Report

Impoundments 1 and 2 Treatability Study Results

American Cyanamid Superfund Site

Prepared for

Pfizer Inc. on behalf of Wyeth Holdings Corporation

October 2012

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Executive Summary

This Laboratory Treatability Study has been completed as part of the Focused Feasibility Study (FFS) process for Impoundments 1 and 2 of the American Cyanamid Superfund Site in Bridgewater Township, New Jersey (Site), as defined in the *Revised Focused Feasibility Study Work Plan* (CH2M HILL, 2012e). The *Laboratory Treatability Studies Work Plan for Impoundments 1 and 2, American Cyanamid Superfund Site* (CH2M HILL, 2012d) identifies the following technologies as potentially able to achieve the proposed Remedial Action Objectives (RAOs), described in the *Revised Focused Feasibility Study Work Plan* (CH2M HILL, 2012e)and *Technology Evaluation Work Plan* (CH2M HILL, 2012a):

- Thermal treatment
- Mixing and homogenization with pH adjustment
- Solidification/stabilization

Technologies proposed for treatment of the impoundment materials were evaluated through laboratory treatability studies described in this report. The overall goal of these studies is to evaluate the effectiveness of homogenization, pH adjustment, solidification/stabilization, and thermal treatment independently and then combined to determine if the subject technologies can achieve the anticipated RAOs for Impoundments 1 and 2 at the Site.

Samples for the treatability study were collected from Impoundment 2 in January 2012 and from Impoundment 1 in February 2012. Samples were collected using a pontoon barge equipped with a vibracore outfitted with a four-inch (outer diameter) stainless steel core barrel and lined with a disposable 6-millimeter-thick polyethylene sleeve. Samples were collected by advancing the vibracore core barrel into the impoundment materials. The cores collected were logged and photographed to document their contents then the different impoundment materials (viscous-rubbery [VR], hard-crumbly [HC], sand- and silt-like, clay-like, and coal aggregate) were segregated into separate containers for shipment to the treatability laboratories for thermal, homogenization, pH adjustment, and solidification /stabilization testing.

The thermal treatment study was premised on two basic objectives:

1) determine the efficacy of thermal treatment for impoundment materials
2) identify and characterize both off-gas and liquid-phase condensate that must be managed if thermal treatment was implemented for treating impoundment contents. The study objectives were successfully accomplished as documented in the extensive observations and data results provided by this report and supporting appendixes.

The thermal study indicated that heating was successful in significantly reducing volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs) in the impoundment materials studied. Benzene experienced the most significant decrease in concentration with greater than 90 percent reduction in the VR material treated at 100°C. In addition, the concentration of VOCs in the vapor phase in equilibrium with the thermally treated HC and VR materials were significantly reduced compared to the concentration of VOCs in the vapor phase in equilibrium with the untreated materials. Highly acidic off-gas caused significant corrosion of the carbon steel thermal treatment vessels, aluminum lining, and thermocouples used during the thermal treatment.

Treatment of the material for extended periods of time did not completely dry out the sample. Some physical properties testing were complicated and affected by the high concentrations of VOCs and the matrix of the material before and after heating. Compressive strength testing of the thermally treated HC indicated up to 80 psi was achieved; however, thermal treatment of the VR material was only able to achieve a compressive strength of9 psi. Even after thermal treatment, VR material that is reheated exhibits liquid behavior as temperatures reach approximately 65°C. The HC material does not show signs of liquefaction up to temperatures of 100°C. When heated to temperatures up to 100°C, layered HC and VR materials do not mix. The VR material showed

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significant signs of expansion and density reduction during heating, while the HC material showed moderate expansion.

The mixing, pH adjustment, and solidification/stabilization treatability studies were performed to evaluate different mixing methodologies and mix ratios of several different alkaline pH adjustment materials and pozzolan recipes for solidification/stabilization of both thermally treated and raw impoundment materials. The solidification/stabilization study confirmed that the materials from Impoundment 1 and 2 at the Site could be successfully homogenized, pH adjusted, and solidified using pozzolans.

The basic objectives of this portion of the treatability study were:

1) Evaluate impoundment materials for homogenization
2) Determine the pH of the impoundment materials could be raised to at least 5 to 6 SU and ideally to 11 SU.
3) Evaluate if the impoundment materials could be stabilized/solidified using pozzolan mixtures.

The study confirmed that both raw impoundment 1 and 2 materials could be homogenized; however, while the water layer added to the raw Impoundment 1 material became incorporated with the material during homogenization, the water layer on the raw Impoundment 2 material did not become incorporated with the material during homogenization. Homogenized samples of materials from the Impoundments 1 and 2 were successfully pH adjusted to 10 SU or higher by an addition of Carmeuse Hydrated Lime or hi calcium lime kiln dust (HiCal LKD). The hydrated lime did not provide strength to the raw impoundment 2 materials when mixed but the HiCal LKD provided significant strength gains when mixed into the raw impoundment materials. Addition of various blends of pozzolans to the homogenized and pH adjusted impoundment material resulted in strength gains ranging from 59.0 psi to greater than 62.5 psi after only seven days of curing.

The pozzolan testing of thermally treated Impoundment 1 and 2 materials indicated that the concentration of benzene in the atmosphere above the mixing vessel decreased by approximately two orders of magnitude when compared to benzene concentration above the mixing vessel for the raw impoundment materials.

While significant conclusions about the effectiveness of homogenization, pH adjustment, and solidification/stabilization can be drawn with the studies completed to date, additional data will be collected after the pozzolan mixture have cured for 28- and 56-days. Upon completion of the curing cycle at 28 and 56 days after pozzolan addition, the amended impoundment materials will be samples for TCLP and SPLP testing to evaluate the extent the pozzolan addition was able to sequester (stabilize)the various constituents within the impoundment materials. An addendum to this report will be completed after the TCLP and SPLP data are received and evaluated.

The results of the laboratory treatability study have not excluded either thermal treatment, mixing and homogenization with pH adjustment, or a combination of the two technologies as potentially being able to meet the RAOs for the Site. After evaluation of the final 28- and 56-day strength and leachability data for the solidification/stabilization study is complete, the optimum pozzolan and pH adjustment mixtures will be selected. In addition the optimum thermal treatment parameters (temperature and treatment time) will also be decided. This information will be used in the final design of a field scale demonstration. While the field scale demonstration will be based on the results of the laboratory treatability studies, the complexities and uncertainties of scaling laboratory studies to field scale demonstrations may determine that one or more of the technologies that were feasible at a laboratory scale may be infeasible at a field scale.

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Contents

Section **Page**

1.1 Site Description 1-1
1.1.1 Site History 1-3
1.1.2 Regulatory Framework 1-3

1.2 Impoundments 1 and 2 Features 1-3
1.2.1 Impoundment 1 1-5
1.2.2 Impoundment 2 1-5
1.2.3 Physical and Chemical Nature of Acid Tar 1-5

2.1 Sample Collection 2-1
2.1.1 Core Processing 2-3
2.1.2 Impoundment 1 2-3
2.1.3 Impoundment 2 2-4

2.2 Air Monitoring 2-4

2.3 Waste Handling 2-4

2.4 Quality Control Procedures 2-5

3.1 Thermal Treatment 3-1
3.1.1 Rationale and Objectives 3-1
3.1.2 Treatability Test Description 3-2

3.2 Mixing, pH Adjustment, and Solidification/Stabilization 3-4
3.2.1 Rationale and Objectives 3-5
3.2.2 Treatability Test Description 3-5

4.1 Baseline Material Chemical Characterization 4-1
4.1.1 Viscous-rubbery Material – VOCs 4-1
4.1.2 Viscous-rubbery Material – SVOCs 4-2
4.1.3 Viscous-rubbery Material – Total Metals 4-2
4.1.4 Viscous-rubbery Material – Equilibrium Vapor Head Space 4-3
4.1.5 Hard-crumbly Materials – VOCs 4-5
4.1.6 Hard-crumbly Materials – SVOCs 4-5
4.1.7 Hard-crumbly Materials – Total Metals 4-6
4.1.8 Hard-crumbly Materials – Equilibrium Vapor Head Space 4-6

4.2 Thermal Treatment Material Evaluation 4-8
4.2.1 Trial Box Reactor 4-8
Trial Reactor Conclusions 4-12
4.2.2 Impoundment Material Testing 4-12
Hard-crumbly Material – 90°C 4-13
Viscous-rubbery Material – 90°C 4-17
Hard-crumbly Material – 100°C 4-18
Viscous-rubbery Material – 100°C 4-20
4.2.3 Thermal Treatment Results 4-24
Condensate Characterization 4-24
Treated Material Chemical Characterization 4-25
Vapor Sampling 4-30
4.2.4 Thermal Treatability Test Conclusions 4-33

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Section **Page**

4.3 Physical Properties Testing 4-37
4.3.1 Viscosity and Specific Gravity Evaluation 4-38
4.3.2 Physical Properties – Untreated Materials 4-38
4.3.3 Physical Properties – Thermally Treated Impoundment Materials 4-39

4.4 Thermal Stability Testing 4-41
4.4.1 Layered Heating 4-41
4.4.2 Sample Reheating and Liquefaction Testing 4-41

5.1 Mixing, pH Adjustment, and Solidification and Stabilization Studies 5-1

5.2 Bulk Heating 5-1

5.3 Study Design and Treatability Objectives 5-2
5.3.1 Homogenization 5-2
Raw Impoundment Material 5-2
Thermally Treated Impoundment Material 5-6
5.3.2 pH Adjustment Material Assessment 5-7
Raw Impoundment Material 5-7
Thermally Treated Material 5-7
5.3.3 Pozzolan Screening 5-7
Tier I Screening – Raw and Thermally Treated Material 5-7
Tier II Optimization Assessment – Raw and Thermally Treated Material 5-8
Tier III Optimization Assessment 5-9

5.4 Performance Results 5-9
5.4.1 Homogenization 5-10
Raw Impoundment Material 5-10
Thermally Treated Material 5-11
5.4.2 pH Adjustment Results 5-12
Raw Impoundment Material 5-12
Thermally Treated Material 5-14
5.4.3 Pozzolan Screening 5-14
Raw Impoundment Material – Tier I Testing 5-14
Raw Material Testing – Tier II Testing 5-14
Thermally Treated Material 5-16
Tier III Optimization Evaluation 5-17

5.5 Homogenization, pH Adjustment, and Solidification/Stabilization Conclusions 5-18

6.1 Thermal Treatment 6-1

6.2 Mixing, pH Adjustment, and Solidification/Stabilization 6-1

Appendixes

A Sediment Core Logs
B Photo Log
C TerraTherm Treatability Study Report

Tables

2-1 Field Air Monitoring Summary
4-1 Selected Volatile Organics Detected in Untreated Impoundment 2 VR Material

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4-2 Selected Semi-Volatile Organics Detected in Untreated Impoundment 2 VR Material
4-3 Selected Metals Detected in Untreated Impoundment 2 VR Material
4-4 Selected Volatile Organics, Aldehydes, and Inorganic Acids Detected in Untreated Impoundment 2 VR Material Headspace Samples
4-5 Selected Volatile Organics Detected in Untreated Impoundment 2 HC Material
4-6 Selected Semi-Volatile Organics Detected in Untreated Impoundment 2 HC Material
4-7 Selected Metals Detected in Untreated Impoundment 2 HC Material
4-8 Selected Volatile Organics, Aldehydes, and Inorganic Acids Detected in Untreated Impoundment 2 HC Material Headspace Samples
4-9 Summary of Selected Volatile Organics Detected in Trial Reactor Condensate Layers
4-10 Summary of Selected Compounds Detected in Baseline and Trial Reactor Vapor During Heating
4-11 Vapor Screening Summary for HC Material Treated at 90°C
4-12 Vapor Screening Summary for VR Material Treated at 90°C
4-13 Vapor Screening Summary for HC Material Treated at 100°C
4-14 Vapor Screening Summary for VR Material Treated at 100°C
4-15 Summary of Selected Organic Compounds Detected in Box Reactor Condensate
4-16 Summary of Selected Organic Compounds in Treated VR90 and HC90 Impoundment Materials
4-17 Summary of Selected Metals in Treated VR90 and HC90 Impoundment Materials
4-18 Summary of Selected Organic Compounds in Treated VR100 and HC100 Impoundment Materials
4-19 Summary of Selected Metals in Treated VR100 and HC100 Impoundment Materials
4-20 TCLP Results – VR and HC Impoundment Materials Post-heating
4-21 Summary of Selected Vapor Phase Malodorous Compounds Detected During Thermal Treatment of Impoundment Materials at 90°C
4-22 Summary of Selected Vapor Phase Malodorous Compounds Detected During Thermal Treatment of Impoundment Materials at 100°C
4-23 Summary of Selected Vapor Phase VOCs Detected During Thermal Treatment of Impoundment Materials
4-24 Results of Viscosity Testing of HC and VR Materials
4-25 Physical Properties of Untreated Impoundment Materials
4-26 Physical Properties of Treated Impoundment Materials
4-27 Physical Properties of Treated Impoundment Materials
5-1 Tier II Pozzolan Optimization Mix Designs
5-2 Selected Compounds Detected in the Headspace During Column Mixing of Raw Impoundment 1 and 2 Materials 5-3 Selected Compounds Detected in the Headspace During Homogenization of Thermally Treated Impoundment 1 and 2 Materials
5-4 Selected Headspace Compounds During pH Adjustment of Raw Impoundment 1 and 2 Materials
5-5 Tier I pH Adjustment and Penetrometer Screening Data
5-6 Tier II Pozzolan Raw impoundment Material Optimization Study Penetrometer Results
5-7 Selected Compounds in Headspace During Tier II Pozzolan Optimization Studies of Raw Materials
5-8 Tier II Pozzolan Thermally Treated Impoundment Material Optimization Study Penetrometer Results
5-9 Selected Compounds in Headspace During Tier II Pozzolan Optimization Studies of Thermally Treated Impoundment Materials

Figures

1-1 Site Location Map
1-2 Impoundment Location Map
2-1 Impoundment Sample Location Map
3-1 Treatability Study Overview
4-1 Headspace Screening Results During the HC90 Test
4-2 Headspace Screening Results During the VR90 Test
4-3 Headspace Screening Results During the HC100 Test
4-4 Headspace Screening Results During the VR100 Test
4-5 BTX and Nap Reductions in HC Materials Pre- and Post-Treatment
4-6 BTX and Nap Reductions in VR Materials Pre- and Post-Treatment
5-1 Impoundment 1 Materials Cross Section
5-2 Impoundment 2 Materials Cross Section

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Acronyms and Abbreviations

°C	degree Celsius
µg/kg	microgram per kilogram
µg/L	microgram per liter
µg/m^3	microgram per cubic meter
ACO	Administrative Consent Order
ASTM	American Society for Testing and Materials
BTEX	benzene, toluene, ethyl benzene, and total xylenes
BTX	benzene, toluene, and total xylenes
CA	coal aggregate
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CKD	Cement Kiln Dust
CL	clay-like
cm/s	centimeter per second
COPC	constituent of potential concern
cP	centipoise
FFS	Focused Feasibility Study
FID	flame ionization detector
Focus	Focus Environmental, Inc.
FS	Feasibility Study
H_2S	hydrogen sulfide
HC	hard-crumbly
IDW	investigation-derived waste
IMP	Impoundment
kg	kilogram
LKD	Lime Kiln Dust
LOS	light oily sludge
LSS	Low Solids Stabilization
mg/kg	milligram per kilogram
mg/L	milligram per liter
NAPL	non-aqueous phase liquid
ND	not detected
NR	not reported
NJDEP	New Jersey Department of Environmental Protection
NR	not reported
NS	not sampled
NT	not tested
OBG	O'Brien & Gere
PAH	polyaromatic nuclear hydrocarbon

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pcf	pound per cubic foot
Pfizer	Pfizer Inc.
PID	photoionization detector
PPE	personal protective equipment
ppm	part per million
psi	pound per square inch
QAPP	Quality Assurance Project Plan
QC	quality control
QMG	Quantum Management Group
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RECON	Remedial Construction Services, L.P.
RM	raw material
Site	American Cyanamid Superfund Site in Bridgewater Township, New Jersey
SO_2	sulfur dioxide
SOP	standard operating procedure
SPLP	Synthetic Precipitation Leaching Procedure
SSL	sand and silt-like
SU	standard units
SVOC	semivolatile organic compound
T_0	time zero
TCLP	Toxicity Characteristic Leaching Procedure
TIC	tentatively identified compound
T_f	time final
TSF	ton per square foot
TT	thermal treatment
UCS	unconfined compressive strength
USEPA	United States Environmental Protection Agency
VE	Volatile Expansion
VOC	volatile organic compound
VR	viscous-rubbery
WHC	Wyeth Holdings Corporation
yd^3	cubic yard

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SECTION 1

Introduction

This report has been prepared as part of the Focused Feasibility Study (FFS) process for Impoundments 1 and 2 of the American Cyanamid Superfund Site in Bridgewater Township, New Jersey (Site), as defined in the *Revised Focused Feasibility Study Work Plan* (CH2M HILL, 2012e). Impoundments 1 and 2 are on the southern portion of the Site, near the Raritan River (Figure 1-1). This report provides the results of the treatability studies documented in the *Laboratory Treatability Studies Work Plan* (CH2M HILL, 2012d), which presented the technologies potentially able to achieve the proposed Remedial Action Objectives (RAOs), described in the *Revised Focused Feasibility Study Work Plan* and *Technology Evaluation Work Plan* (CH2M HILL, 2012a) as follows:

> The overall goal of these studies was to evaluate the effectiveness of in-situ thermal treatment, homogenization, pH adjustment, and solidification/stabilization, both independently and combined to determine if the subject technologies can achieve the anticipated RAOs for Impoundments 1 and 2. While additional evaluation and studies, such as material compatibility assessments will be required throughout the design and remedial processes, the information provided within this document provides the basis for the next phases of the project, mainly design and implementation of a pilot test. The results of the additional studies will be provided when completed, throughout the design process.

The report is organized as follows:

Section 1, Introduction: Describes the Site and regulatory history of Impoundments 1 and 2, and provides a physical description of Impoundments 1 and 2 and characteristics of materials they contain.

Section 2, Impoundment Material Collection: Summarizes the scope of the impoundment material collection activities performed at the Site in 2012, including descriptions of the sample collection and analytical methods, air monitoring, data verification procedures, and variations from the work plan.

Section 3, Treatability Testing Overview: Presents an overview of the laboratory testing program components developed to support completion of the FFS for Impoundments 1 and 2 and details the materials to be used in the proposed studies.

Section 4, Thermal Treatment Results: Discusses the results of the thermal treatment studies conducted.

Section 5, Mixing, pH Adjustment, and Solidification and Stabilization Results: Discusses the results of the mixing, pH adjustment, and solidification and stabilization lab studies conducted.

Section 6, Conclusions: Summarizes the major findings and conclusion**s** of the treatability studies.

Section 7, References: Provides the references cited in this report.

1.1 Site Description

The Site is in the southeastern section of Bridgewater Township, Somerset County, in the north-central portion of New Jersey. The Site is bounded by the New Jersey Transit Railroad to the north, the Raritan River to the south and west, and Somerset Tire Service and Interstate Highway 287 to the east. The Site is divided into five main portions: The North, East, West, and South Areas and the Impoundment 8 Facility. The North Area refers to the portion of the Site within the flood control dike; the East Area is east of Middle Brook; the West Area is west of Bufflehead Road; and the South Area is south of the flood control dike and between Middle Brook and Bufflehead Road; (Figure 1-1). Impoundments 1 and 2 are located within the South Area of the Site.

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FIGURE 1-1
SITE LOCATION MAP
IMPOUNDMENTS 1 & 2 TREATABILITY STUDY RESULTS REPORT
SEPTEMBER 2012
AMERICAN CYANAMID - BRIDGEWATER TOWNSHIP, SOMERSET COUNTY, NEW JERSEY

1.1.1 Site History

The Site was used for nearly nine decades to manufacture a range of products including rubber-based chemicals, dyes, pigments, chemical intermediates, petroleum-based products, and pharmaceuticals. A total of 27 impoundments were historically used to store and treat liquid and semi-solid streams generated from the onsite processes, as well as river water for firefighting purposes. Sixteen of the impoundments are regulated pursuant to CERCLA, six impoundments according to RCRA, and five impoundments were used to manage only river water, storm-water or settled silt from this water. Because of past practices, impacts to soil and groundwater have been documented within several areas of the Site. The majority of these impacts occurred within the footprint or in the immediate vicinity of several of the impoundments.

The Calco Chemical Company, which started operations in 1915 manufacturing chemical intermediates and dyes, originally owned the Site. In 1929, American Cyanamid Company purchased the Site and began producing pharmaceuticals and chemicals in the 1930s. During the following decades, the American Cyanamid facility expanded to meet the nation's demands during and immediately after World War II. As production increased from the 1930s through the 1970s, expansion of buildings and support services, as well as raw material and waste management activities were conducted.

In the late 1970s and early 1980s, the facility experienced a significant downsizing. Organics and dye production at the Site was phased out by the early 1980s. The manufacturing of bulk pharmaceuticals continued until all operations at the facility ceased by 1999. In November 1994, the American Cyanamid Company was acquired by the American Home Products Corporation, which changed its name to Wyeth in 2002. In October 2009, Pfizer Inc. (Pfizer) acquired Wyeth. The Site is owned by Wyeth Holdings Corporation (WHC), which is now a subsidiary of Pfizer. Specific details of the history of Impoundments 1 and 2 at the Site are provided in Section 1.2.

1.1.2 Regulatory Framework

Environmental remediation and restoration activities have been ongoing at the Site under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process. During the development and evaluation of the remedial alternatives for the Site-wide Feasibility Study (FS) (OBG, 1997), it became apparent that handling of the Impoundments 1 and 2 materials was unique and complex. The location of these impoundments within the Raritan River floodplain, along with the acidity and the complex nature of the material, pose significant difficulties in evaluating the technical feasibility of remedial technologies, their implementability, and their ability to meet regulatory requirements.

After review and interaction with stakeholders, including the United States Environmental Protection Agency (USEPA) and the New Jersey Department of Environmental Protection (NJDEP), it was decided by mid-2009 that additional data specific to the Impoundments 1 and 2 materials were needed to complete the evaluations. Therefore, Wyeth and the stakeholders mutually agreed to move Impoundments 1 and 2 into a separate FFS, while moving forward with the Site-wide FS for the remainder of the Site (USEPA, 2008; CH2M HILL2012e).

The USEPA is the lead CERCLA regulatory agency for this Site, with NJDEP providing support, as necessary. Remedial activities at the Site are governed by CERCLA, the Resource Conservation and Recovery Act (RCRA) and the amended Administrative Consent Order (ACO), and the intent of New Jersey's *Technical Requirements for Site Remediation* (NJDEP, 2011). The FFS report for the impoundments will be developed to satisfy the requirements of the 1988 ACO and its subsequent amendment in 1994.

1.2 Impoundments 1 and 2 Features

Impoundments 1 and 2 are in the South Area of the Site (Figure 1-2) and were used to store acid tar residuals. Both Impoundments 1 and 2 are located approximately 700 feet north of the Raritan River. Interstate Highway 287 is approximately 850 feet east of Impoundment 1, and Somerset Tire Service is approximately 400 feet north of the impoundments. The nearest residential areas are approximately 2,000 feet north-east and 1,800 feet east of Impoundment 1.

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FIGURE 1-2
IMPOUNDMENT LOCATION MAP
IMPOUNDMENTS 1 & 2 TREATABILITY STUDY RESULTS REPORT
SEPTEMBER 2012
AMERICAN CYANAMID - BRIDGEWATER TOWNSHIP, SOMERSET COUNTY, NEW JERSEY

1.2.1 Impoundment 1

Impoundment 1 was constructed in 1956 and was used until 1965 to store waste from a coal light-oil refining process (OBG, 2010). The acidic solid and semi-solid waste materials (pH generally less than 2 standard units [SU]) separated into three distinct layers: a light oily sludge (LOS) layer on the top, a viscous-rubbery (VR) tar layer in the middle, and a hard-crumbly (HC) tar layer at the bottom. About 3 million gallons of the uppermost LOS layer was removed from Impoundment 1 in 1966 and 1967 for offsite energy recovery. In the 1980s, coal aggregate (CA) was deposited into Impoundment 1 to facilitate the excavation of acid tar material for an offsite fuel-blending program. This program was unsuccessful, and coal deposits remain in Impoundment 1. In 1991, a synthetic cover was placed on Impoundment 1. A water cap is maintained over Impoundment 1 for odor control.

Impoundment 1 has a surface area of approximately 2.1 acres and contains:

- An upper layer of VR tar (approximately 900 cubic yards [yd^3])
- A lower layer of HC tar (approximately 13,700 yd^3)
- Additional materials mixed into the VR and HC layers include:
    - Clay-like (CL) material (approximately 2,700 yd^3)
    - Sand and silt-like (SSL) material (approximately 1,900 yd^3)
    - CA (5,000 yd^3) (Focus, 2011)

The total volume of waste in Impoundment 1 is approximately 24,200 yd^3. The volume of the water cap on top of the waste is approximately 9,300 yd^3. Impoundment 1 is characterized by a low pH (average of 3.3 SU) and high concentrations of volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs), including benzene, toluene, xylenes (BTX), naphthalene, and a high degree of residual acidity (Focus, 2011).

1.2.2 Impoundment 2

Impoundment 2 is approximately 1.7 acres in size, was constructed in 1947, and was used until 1956 to store waste from the same refining process (OBG, 2010). Like Impoundment 1, the waste materials discharged to Impoundment 2 also separated into three distinct layers of HC tar, VR tar, and LOS. In 1986 and 1987, about 3 million gallons of LOS material was removed from Impoundment 2 for offsite energy recovery, leaving behind two acid tar layers. Based on the most recent characterization, Impoundment 2 contains:

- An upper layer of VR tar (approximately 10,900 yd^3)
- A lower layer of HC tar (approximately 12,900 yd^3)
- A mixed VR and HC layer (approximately 6,500 yd^3) which is observed between the two distinct layers (Focus, 2011)

The total waste volume of Impoundment 2 is 30,300 yd^3, and foreign materials such as CA or CL materials appear absent in Impoundment 2. A synthetic cover was place on Impoundment 2 in 2012. A water cap is maintained over the synthetic cover for odor control. The volume of the water cap on top of the waste is approximately 10,200 yd^3. Like Impoundment 1, Impoundment 2 is characterized by a low pH (average of 1.5 SU) and high concentrations of VOCs and SVOCs (including BTX, and naphthalene), as well as residual acidity (Focus, 2011).

1.2.3 Physical and Chemical Nature of Acid Tar

As described, Impoundment 2 has two primary layers (VR and HC) with some mixture between the two, and Impoundment 1 has more variability. In addition to the HC and VR layers in both impoundments, Impoundment 1 also contains CA added in the 1980s, CL materials, and SSL materials. The location and depths of these material types vary throughout the impoundment. Descriptions for each impoundment materials identified during the 2010 investigation are as follows (OBG, 2010):

VR material: This material is black and tar-like and characterized by its tackiness and lack of matrix. This material also exhibits an oily sheen; in some instances, the surface appeared glass-like. Generally, this material has a low pH (near 1 SU) and contains high concentrations of VOCs and SVOCs. This material is difficult to handle because of its tackiness; its consistency varies with temperature.

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HC material: The HC material is black, often with an oily sheen, and resembles bits of broken asphalt. The HC material generally is highly acidic and contains high concentrations of VOCs and SVOCs. However, in general, the VOC concentrations tend to be an order of magnitude lower, and the SVOC concentrations tend to be 25 percent higher than the concentrations detected in the VR material (OBG, 2010). It is not cohesive and can be broken into small pieces by hand.

CA material: The CA material is grey and fine-grained. While this material is reported to have been placed on the surface of Impoundment 1 in the 1980s, it has shifted deeper into the impoundment.

CL material: CL material is generally grey, similar to the CA, cohesive, and fine-grained. It is generally located in the upper portion of the Impoundment 1 material.

SSL material: This material is a brown, fine-grained, non-cohesive material that is in the middle to lower portion of Impoundment 1.

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SECTION 2

Impoundment Material Collection

The following section describes the overall approach used to complete the Impoundments 1 and 2 material collection activities and includes a discussion of the scopes of work, a brief description of the relevant sampling activities, and any significant deviations from the work plan. The standard operating procedures (SOPs) and analytical methods used for the Impoundment material collection are described in more detailed in the *Material Collection Work Plan for Impoundments 1 and 2, American Cyanamid Superfund Site* (CH2M HILL. 2012b).

The following objectives for tar collection were established in support of the treatability testing program:

1) Collect representative material from each impoundment to support testing of individual material types or laboratory derived material mixtures. To support this objective, impoundment materials were field-segregated following collection based on physical characteristics (VR, HC, and so forth). Segregated material of like characteristics collected in each impoundment were then be combined for treatability testing.
2) Collect material from each impoundment that represents the current field conditions. At designated locations in each impoundment, material recovered was immediately containerized following collection.
3) Visually characterize the composition and stratification of tar materials present in each impoundment.

2.1 Sample Collection

A pontoon barge equipped with a vibracore outfitted with a four-inch (outer diameter) stainless steel core barrel and lined with a disposable 6-millimeter-thick polyethylene sleeve was utilized to collect materials from each impoundment. The vessel was assembled onsite and lifted onto the Impoundments by a crane. The vessel was positioned at each of the sampling locations using a Global Positioning System. Due to adverse weather conditions during the first round of sampling in January 2012, the impoundment material collection activities were completed in two separate mobilizations. Subsections 2.1.2 and 2.1.3 describe the sampling collection activities specific to both of these mobilizations and deviations from the work plan. Impoundment 1 and 2 sampling locations are shown on Figure 2-1.

In general, the vibracore barrel was advanced into the impoundment material at each location approximately 1 foot above the clay impoundment liner or where refusal was encountered. The boring logs from the April 2010 impoundment characterization were used to identify the location of the clay liner at each of the collection points. The penetration depth (measured from the top of the material surface [first occurrence beneath the water cap]), water depth, and actual coordinate locations were recorded for each sample location. Additional runs were collected to meet the sample volume requirement for each material type in locations where the material targeted was encountered.

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FIGURE 2-1
IMPOUNDMENT SAMPLE LOCATION MAP
IMPOUNDMENTS 1 & 2 TREATABILITY STUDY RESULTS REPORT
SEPTEMBER 2012
AMERICAN CYANAMID - BRIDGEWATER TOWNSHIP, SOMERSET COUNTY, NEW JERSEY

2.1.1 Core Processing

The ends of each section of core were capped and the cores were transported to shore for processing. The processing area was situated at the top of the berms surrounding the impoundments, between Impoundment 1 and 2. The capped sections of core containing the impoundment material were cut open along the length of the core to expose the contents. The first core of each location was screened using a photoionization detector (PID), photographed, and logged to document the extent of different classes of materials present. Additional runs were also photographed and screened for PID detections. A photo log is provided in Appendix B of this report. The different classes of material encountered during processing activities were as follows:

Impoundment 1

- VR Tar
- HC Tar
- CA
- CL Material
- SSL Material

Impoundment 2

- VR Tar
- HC Tar

Sample handling procedures were designed to minimize loss of VOCs during processing Following core characterization, the different materials contained in each core were segregated into separate Teflon-lined, five-gallon polyethylene buckets. Any residual material from the cores that was not placed into the five-gallon buckets was placed back into Impoundment 2. A total of 5 gallons of mixed Impoundment 2 materials were returned to Impoundment 2 during the January 2012 sampling event and 5-gallons of mixed Impoundment 1 materials were returned to Impoundment 2 during the February 2012 sampling event in accordance with the approved Work Plan. Material from both impoundments was placed into Impoundment 2 since a liner had not yet been installed in this impoundment until one month later (March 2012). A composite sample of each class of material was collected from the various sampling locations. The composite samples were then processed for shipment to the corresponding laboratories for treatability testing. Chain-of-custody forms were completed for the samples collected during the impoundment material collection activities. A copy of each chain-of-custody form accompanied the samples during shipment to each of the laboratories. The chain-of-custody form identified each sample container and the analytical parameters for each and listed the field personnel who collected the samples, the project name and number, the name of the analytical laboratory that received the samples, and the method of sample shipment. Samples were shipped via courier during both field events.

2.1.2 Impoundment 1

Due to adverse weather conditions encountered during sampling of Impoundment 2 in January 2012, the material collection at Impoundment 1 was conducted in February 2012. Figure 2-1 depicts the sampling locations for Impoundment 1. Impoundment 1 material was collected at four of the six proposed sampling locations based on barge accessibility to each location and material recovery. Sufficient material was collected from these four locations. The locations sampled were designated IMP1-A, IMP1-B, IMP1-E, and IMP1-L, with material characterization at each location as follows:

- **VR Tar:** IMP1-E only
- **HC Tar:** All fours sampling locations (location IMP1-L exhibited the highest content of HC)
- **Coal Aggregates:** IMP1-A only
- **Clay Like Material:** IMP1-A only
- **Sand/Silt Like Material:** IMP1-B only

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Multiple runs were required at each sampling station to achieve the required sample volumes needed for the testing. Material characterization, sampling depths, and number of runs are provided in the sediment cores logs located in Appendix A of this report.

2.1.3 Impoundment 2

Material collection at Impoundment 2 was conducted in January 2012. Figure 2-1 depicts the sampling locations for Impoundment 2. Icy conditions encountered during the sampling event at Impoundment 2 restricted barge accessibility to the six proposed locations. Therefore, three of the proposed six sampling locations were completed during material collection of Impoundment 2. The three sampling points were also re-located based on barge accessibility to each location and material recovery. The locations sampled were designated as IMP2-B, IMP2-J, and IMP2-L, with material characterization at each location as follows:

- **VR Tar:** All three sampling locations
- **HC Tar:** All three sampling locations

Multiple runs were required to achieve the required sample volumes needed for the testing. Material characterization, sampling depths, and number of runs are provided in the sediment cores logs located in Appendix A of this report.

2.2 Air Monitoring

Air monitoring was conducted during impoundment material collection activities as outlined in the site *Health and Safety Plan (HASP)* (CH2M HILL, 2011) and the *Laboratory Treatability Studies Work Plan* (CH2M HILL, 2012d). Air monitoring was conducted on the vessel and at the core processing area with both a PID and a hydrogen sulfide meter. In addition, Draeger-tube sampling was conducted at the core processing area, upwind and downwind of the work area during material collection, and on the barge during sample collection. Benzene, toluene, ethyl benzene, and total xylenes (BTEX), phenol, chlorobenzene, sulfur dioxide, and carbon disulfide were measured using Draeger tubes each day of sampling. The Draeger-tube monitoring was conducted at times when fugitive emissions were expected to be highest (during core processing). The Draeger-tube downwind air samples were collected from two locations, the first downwind of the impoundments on the top of the berm and the second further downwind (approximately 100 feet) of the impoundments. Upwind samples were also collected both on the barge and at an established distance from the processing area. The results from the air monitoring activities are summarized in Table 2-1. A contingency plan was also established for the collection of Summa canisters at each location, if the results of the Draeger tubes or other hand-held air monitoring equipment showed elevated levels of compounds. Details of the thresholds for triggering Summa canister sampling was provided in the *Laboratory Treatability Studies Work Plan* (CH2M HILL, 2012d). Based on the results of the Draeger tube and other air monitoring, the Summa canister sampling was not required.

2.3 Waste Handling

During collection of materials from Impoundment 2, seven drums of combined tar-impacted personal protective equipment (PPE) and core liners were generated and stored in sealed 55-gallon drums. During collection of Impoundment 1 materials, two drums of PPE and four drums of core liners were generated and stored in sealed 55-gallon drums. All wastes were stored at the Impoundment 8 drum storage area and were properly treated and disposed off-Site. In addition, the following materials were placed back into Impoundment 2 as agreed upon with the USEPA during their Site visit on January 9, 2012.

- Five gallons of porewater and residuals from Impoundment 2 core processing
- Three gallons HC Impoundment 1 material from core processing
- Eleven gallons of porewater and residuals collected during Impoundment 1 core processing

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2.4 Quality Control Procedures

SOPs, laboratory methods, and quality control (QC) procedures for the laboratory treatability studies were performed in accordance with the Quality Assurance Project Plan (QAPP) (CH2M HILL, 2012c). Overall, the precision and accuracy of the data, as measured by field and laboratory QC indicators, indicates that the data are usable for project objectives, as qualified.

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TABLE 2-1
Laboratory Treatability Studies Report
Field Air Monitoring Summary

Sampling Station	Monitoring Location	Sample Type	Date	Time	Instrument	VOC	Hydrogen Sulfide
IMP1-A	Barge	Breathing Zone	2/13/12	13:15	Multigas Meter	0.1	0.0
	Barge	Breathing Zone	2/13/12	13:45	Multigas Meter	0.0	0.0
	Barge	Breathing Zone	2/13/12	14:00	Multigas Meter	0.0	0.0
	Barge	Breathing Zone	2/13/12	15:30	Multigas Meter	0.0	0.0
	Barge	Breathing Zone	2/14/12	8:50	Multigas Meter	0.0	0.0
	Barge	Breathing Zone	2/14/12	9:20	Multigas Meter	0.0	0.0
	Barge	Source	2/14/12	10:00	Multigas Meter	81.8	0.0
	Barge	Breathing Zone	2/14/12	10:50	Multigas Meter	0.0	0.0
	Barge	Breathing Zone	2/14/12	12:20	Multigas Meter	0.0	0.0
	Barge	Breathing Zone	2/14/12	14:45	Multigas Meter	0.0	0.0
	Barge	Breathing Zone	2/14/12	15;15	Multigas Meter	0.0	0.0
	Barge	Breathing Zone	2/14/12	15:45	Multigas Meter	0.0	0.0
	Barge	Breathing Zone	2/14/12	16:30	Multigas Meter	0.0	0.0
	Barge	Breathing Zone	2/15/12	8:30	Multigas Meter	0.0	0.0
	Barge	Breathing Zone	2/15/12	9:00	Multigas Meter	0.0	0.0
	Barge	Breathing Zone	2/15/12	9:30	Multigas Meter	0.0	0.0
	Barge	Breathing Zone	2/15/12	10:00	Multigas Meter	0.0	0.0
	Barge	Breathing Zone	2/15/12	10:30	Multigas Meter	0.0	0.0
	Barge	Breathing Zone	2/15/12	11:00	Multigas Meter	0.0	0.0
	Downwind	Area	2/13/12	15:42	Multigas Meter	0.0	0.0
	Downwind	Area	2/14/12	9:50	Multigas Meter	0.0	0.0
	Downwind	Area	2/14/12	15:05	Multigas Meter	0.0	0.0
	Downwind	Area	2/15/12	9:15	Multigas Meter	0.0	0.0
IMP1-A (cont'd)	Downwind	Area	2/15/12	10:15	Multigas Meter	0.0	0.0
	Processing Area	Breathing Zone	2/13/12	15:00	Multigas Meter	0.0	0.0
	Processing Area	Breathing Zone	2/13/12	16:20	Multigas Meter	0.0	0.0
	Processing Area	Breathing Zone	2/14/12	9:15	Multigas Meter	0.0	0.0
	Processing Area	Breathing Zone	2/14/12	9:45	Multigas Meter	0.0	0.0
	Processing Area	Breathing Zone	2/14/12	10:25	Multigas Meter	0.0	0.0
	Processing Area	Breathing Zone	2/14/12	10:55	Multigas Meter	0.0	0.0
	Processing Area	Breathing Zone	2/14/12	11:15	Multigas Meter	0.0	0.0
	Processing Area	Breathing Zone	2/14/12	12:30	Multigas Meter	0.0	0.0
	Processing Area	Breathing Zone	2/14/12	15:00	Multigas Meter	0.0	0.0
	Processing Area	Breathing Zone	2/14/12	15:45	Multigas Meter	0.0	0.0
	Processing Area	Breathing Zone	2/15/12	10:35	Multigas Meter	0.0	0.0
	Processing Area	Breathing Zone	2/15/12	11:30	Multigas Meter	0.0	0.0
IMP1-E	Barge	Breathing Zone	2/15/12	12:45	Multigas Meter	2.4	0.0
	Barge	Breathing Zone	2/15/12	13:10	Multigas Meter	4.4	0.0
	Barge	Breathing Zone	2/15/12	14:50	Multigas Meter	0.0	0.0
	Barge	Breathing Zone	2/15/12	15:20	Multigas Meter	0.0	0.0
	Barge	Breathing Zone	2/15/12	16:00	Multigas Meter	0.0	0.0
	Processing Area	Breathing Zone	2/15/12	16:40	Multigas Meter	0.0	0.0

TABLE 2-1
Laboratory Treatability Studies Report
Field Air Monitoring Summary

Sampling Station	Monitoring Location	Sample Type	Date	Time	Instrument	VOC	Hydrogen Sulfide
IMP1-L	Barge	Breathing Zone	2/16/12	11:00	Multigas Meter	0.0	0.0
	Processing Area	Breathing Zone	2/16/12	15:00	Multigas Meter	0.0	0.0
IMP1-B	Barge	Breathing Zone	2/16/12	8:30	Multigas Meter	0.0	0.0
	Barge	Breathing Zone	2/16/12	9:00	Multigas Meter	0.0	0.0
	Barge	Breathing Zone	2/16/12	9:30	Multigas Meter	0.0	0.0
	Barge	Breathing Zone	2/16/12	10:00	Multigas Meter	0.0	0.0
	Barge	Breathing Zone	2/16/12	10:30	Multigas Meter	0.0	0.0
IMP2-J	Barge	Breathing Zone	1/10/12	11:25	PID	0.0	--
	Barge	Breathing Zone	1/10/12	12:00	PID	0.0	--
	Processing Area	Breathing Zone	1/10/12	12:08	Multigas Meter	0.2	0.0
	Processing Area	Breathing Zone	1/10/12	12:45	Multigas Meter	0.5	0.0
IMP2-B	Barge	Breathing Zone	1/10/12	12:50	PID	0.0	--
	Barge	Breathing Zone	1/10/12	13:50	PID	0.1	--
	Processing Area	Breathing Zone	1/10/12	14:00	Multigas Meter	1054.0	1.0
IMP2-O	Barge	Breathing Zone	1/10/12	15:50	PID	0.1	--
	Barge	Breathing Zone	1/11/12	8:55	Multigas Meter	0.1	0.5
	Barge	Breathing Zone	1/11/12	9:45	Multigas Meter	0.1	0.3
	Barge	Breathing Zone	1/11/12	12:30	Multigas Meter	0.3	1.6
	Barge	Breathing Zone	1/11/12	13:00	Multigas Meter	0.0	0..0
	Barge	Breathing Zone	1/11/12	13:25	Multigas Meter	0.5	2.3
	Barge	Breathing Zone	1/11/12	14:00	Multigas Meter	0.0	0.0
	Barge	Breathing Zone	1/11/12	14:30	Multigas Meter	0.0	0.0
	Barge	Breathing Zone	1/11/12	15:00	Multigas Meter	0.0	0.0
	Barge	Breathing Zone	1/11/12	15:35	Multigas Meter	0.5	0.0
	Barge	Breathing Zone	1/12/12	10:40	PID	0.1	--
	Barge	Breathing Zone	1/12/12	11:15	PID	0.6	--
	Barge	Breathing Zone	1/12/12	12:00	PID	0.0	--
	Barge	Breathing Zone	1/12/12	13:20	PID	1.3	--
	Barge	Breathing Zone	1/12/12	13:45	PID	2.8	--
	Barge	Breathing Zone	1/12/12	14:40	PID	0.0	--
	Downwind	Area	1/11/12	9:35	Multigas Meter	0.6	0.0
	Processing Area	Breathing Zone	1/10/12	16:00	Multigas Meter	10.0	0.2
	Processing Area	Breathing Zone	1/11/12	9:30	Multigas Meter	0.1	0.0
	Processing Area	Breathing Zone	1/11/12	12:50	Multigas Meter	0.0	0.0
	Processing Area	Breathing Zone	1/12/12	13:30	Multigas Meter	0.9	0.0
	Processing Area	Source	1/11/12	12:50	Multigas Meter	12.9	0.0

TABLE 2-1

Laboratory Treatability Studies Report

Field Air Monitoring Summary

Sampling Station	Monitoring Location	Sample Type	Date	Time	Instrument	Benzene	Chlorobenzene	EthylBenzene	Phenol	Sulfur Dioxide	Toluene	Xylene
IMP1-A	Barge	Breathing Zone	2/13/12	13:15	Draëger Tube	--	--	--	--	0.0	--	--
	Barge	Breathing Zone	2/13/12	16:00	Draëger Tube	--	--	--	--	0.0	--	--
	Barge	Breathing Zone	2/14/12	10:52	Draëger Tube	--	--	--	--	0.0	--	--
	Barge	Breathing Zone	2/15/12	9:30	Draëger Tube	--	--	0.0	--	--	--	--
	Downwind	Area	2/15/12	9:16	Draëger Tube	--	0.0	0.0	--	--	--	--
	Downwind	Area	2/15/12	9:20	Draëger Tube	0.0	--	--	--	--	--	--
	Downwind	Area	2/15/12	9:25	Draëger Tube	0.0	--	--	--	--	--	
	Downwind	Area	2/15/12	9:45	Draëger Tube	--	--	--	--	--	0.0	--
	Downwind	Area	2/15/12	10:00	Draëger Tube	--	--	--	--	--	--	0.0
	Downwind	Area	2/15/12	10:05	Draëger Tube	--	--	--	0.0	--	--	--
	Downwind	Area	2/13/12	15:42	Draëger Tube	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Downwind	Area	2/14/12	9:55	Draëger Tube	0.0	0.0	0.0	--	--	0.0	0.0
	Downwind	Area	2/14/12	15:07	Draëger Tube	0.0	0.0	0.0	0.0	--	0.0	0.0
IMP1-E	Barge	Breathing Zone	2/15/12	13:18	Draëger Tube	0.0	--	--	--	--	--	--
	Barge	Breathing Zone	2/15/12	16:00	Draëger Tube	--	--	--	--	0.0	--	--
	Downwind	Area	2/15/12	15:30	Draëger Tube	--	--	--	--	0.0	--	--
	Downwind	Area	2/15/12	15:50	Draëger Tube	--	--	--	0.0	--	--	--
	Downwind	Area	2/15/12	15:55	Draëger Tube	--	--	--	--	--	--	0.0
	Downwind	Area	2/15/12	16:00	Draëger Tube	--	--	--	--	--	0.0	--
	Downwind	Area	2/15/12	16:05	Draëger Tube	0.0	--	--	--	--	--	--
	Downwind	Area	2/15/12	16:25	Draëger Tube	--	0.0	--	--	--	--	--
	Downwind	Area	2/15/12	16:30	Draëger Tube	--	--	0.0	--	--	--	--
IMP1-B	Barge	Breathing Zone	2/16/12	9:50	Draëger Tube	--	--	--	--	0.0	--	--
	Barge	Breathing Zone	2/16/12	10:20	Draëger Tube	0.0	--	--	--	--	--	--
	Downwind	Area	2/16/12	10:05	Draëger Tube	--	--	--	--	--	--	0.0
	Downwind	Area	2/16/12	10:10	Draëger Tube	--	--	0.0	--	--	--	--
	Downwind	Area	2/16/12	10:25	Draëger Tube	--	--	--	--	--	0.0	--
	Downwind	Area	2/16/12	10:30	Draëger Tube	--	--	--	0.0	--	--	--
	Processing Area	Breathing Zone	2/16/12	9:40	Draëger Tube	--	0.0	--	--	0.0	--	--
IMP1-L	Barge	Breathing Zone	2/16/12	11:15	Draëger Tube	0.0	--	--	--	--	--	--
	Barge	Breathing Zone	2/16/12	13:45	Draëger Tube	--	--	--	--	0.0	--	--
	Barge	Breathing Zone	2/16/12	15:30	Draëger Tube	0.0	--	--	--	--	--	--
	Downwind	Area	2/16/12	12:20	Draëger Tube	0.0	--	--	--	--	--	--
	Downwind	Area	2/16/12	12:40	Draëger Tube	--	0.0	--	--	--	--	--
	Downwind	Area	2/16/12	13:00	Draëger Tube	--	--	--	--	0.0	--	--
	Processing Area	Breathing Zone	2/16/12	16:00	Draëger Tube	0.0	--	--	--	--	--	--
IMP2-J	Barge	Breathing Zone	1/10/12	12:00	Draëger Tube	--	--	--	--	0.0	--	--
IMP2-B	Barge	Breathing Zone	1/10/12	13:55	Draëger Tube	--	--	--	--	0.0	--	--
	Upwind	Area	1/10/12	13:10	Draëger Tube	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IMP2-O	Barge	Breathing Zone	1/10/12	16:10	Draëger Tube	--	--	--	--	0.0	--	--
	Barge	Breathing Zone	1/11/12	8:55	Draëger Tube	--	--	--	--	0.0	--	--
	Barge	Breathing Zone	1/11/12	9:50	Draëger Tube	--	--	--	--	0.0	--	--
	Barge	Breathing Zone	1/11/12	13:20	Draëger Tube	--	--	--	--	0.0	--	--
	Barge	Breathing Zone	1/11/12	15:30	Draëger Tube	--	--	--	--	0.0	--	--
	Barge	Breathing Zone	1/12/12	11:30	Draëger Tube	--	--	--	--	0.0	--	--
	Barge	Breathing Zone	1/12/12	15:00	Draëger Tube	--	--	--	--	0.0	--	--
	Downwind	Area	1/10/12	16:00	Draëger Tube	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Downwind	Breathing Zone	1/11/12	13:26	Draëger Tube	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 2-1

Laboratory Treatability Studies Report

Field Air Monitoring Summary

Sampling Station	Monitoring Location	Sample Type	Date	Time	Instrument	Benzene	Chlorobenzene	EthylBenzene	Phenol	Sulfur Dioxide	Toluene	Xylene
	Processing Area	Breathing Zone	1/11/12	10:30	Draëger Tube	--	--	--	--	0.0	--	
	Processing Area	Breathing Zone	1/12/12	14:30	Draëger Tube	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Notes:

1. PID = Photoionization Detector.

2. Dashed lines (--) = parameter not measured.

SECTION 3

Treatability Testing Overview

This section presents the overall rationale, objectives, and general description of the treatability studies conducted. Previous studies have shown that thermal treatment processes and solidification/stabilization processes are generally applicable for treating a wide array of materials, including coal tars. However, to implement a thermal treatment or solidification/stabilization remedial technology for materials contained in the impoundments, studies regarding the effects of the technologies on the impoundment materials physical and chemical characteristics were required. Therefore, two interrelated bench-scale testing programs were performed to explore thermal treatment, solidification/stabilization and a combination of these technologies. The relationship among proposed thermal treatment and solidification/stabilization technologies is presented on Figure 3-1.

3.1 Thermal Treatment

While several studies have been performed to evaluate the characteristics of the impoundment materials during thermal treatment, prior efforts have focused on combustion-based processes where acid tar served as a fuel source. The thermal treatment completed as part of this treatability test focused on heating the impoundment contents to alter chemical and physical properties but not to the extent where combustion would be supported or induced. The testing program focused on the effects of heat on both physical and chemical characteristics of impoundment materials. The testing program was developed to provide a preliminary assessment of the technical feasibility of heat treatment of impoundment materials.

3.1.1 Rationale and Objectives

As illustrated in the decision flow chart (see Figure 3-1), preliminary laboratory testing of impoundment materials was intended to resolve basic scientific questions regarding the effect of heat on the chemical and physical characteristics of the HC and VR materials within the impoundments. Specific objectives of chemical and physical testing are described as follows.

1) Determine the effect of heating on the chemical composition of impoundment materials. Specific test objectives for VR and HC included:
    a. Evaluate the change in chemical composition of impoundment materials before and after the heating.
    b. Characterize the chemical composition of vapor produced during thermal treatment.
    c. Assess leaching characteristics of impoundment materials following thermal treatment.
    d. Characterize the chemical composition of liquid effluent and condensate resulting from thermal treatment.
2) Determine the effect of heating on the physical properties of impoundment material. Specific test objectives included:
    a. Measure the corresponding change in VR and HC compressive strength before and after thermal treatment.
    b. Determine relative change in HC porosity resulting from thermal treatment.
    c. Measure the effect of temperature on the specific gravity and viscosity of the VR material.
    d. Qualitatively assess apparent change in material characteristics before and after heating.

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3) In addition to evaluating the chemical and physical changes that occur during thermal treatment of impoundment materials, the studies also included:

a. Assess the physical stability of VR material with respect to HC material during heating, and evaluate the potential for homogenization during and after thermal treatment.

b. Prepare sufficient volumes of thermally treated material for additional treatment during the solidification/stabilization study.

3.1.2 Treatability Test Description

The initial thermal treatment study incorporated several types of physical and chemical evaluations of Impoundment 2 materials, as outlined on Figure 3-1. In general, three basic tests (outlined as follows) were completed during the initial thermal study. Detailed discussion of each test is provided in following sections of this report.

1) VR and HC materials were heated in separate temperature-controlled reaction cells. The physical and chemical composition of the impoundment materials, both pre- and post-treatment, were evaluated to assess physical changes, contaminant removal, and off-gas composition.

2) Physical stability assessment of the VR and HC materials as a function of increasing temperature was measured.

3) Viscosity and density of the VR and HC materials was determined as a function of increasing temperature.

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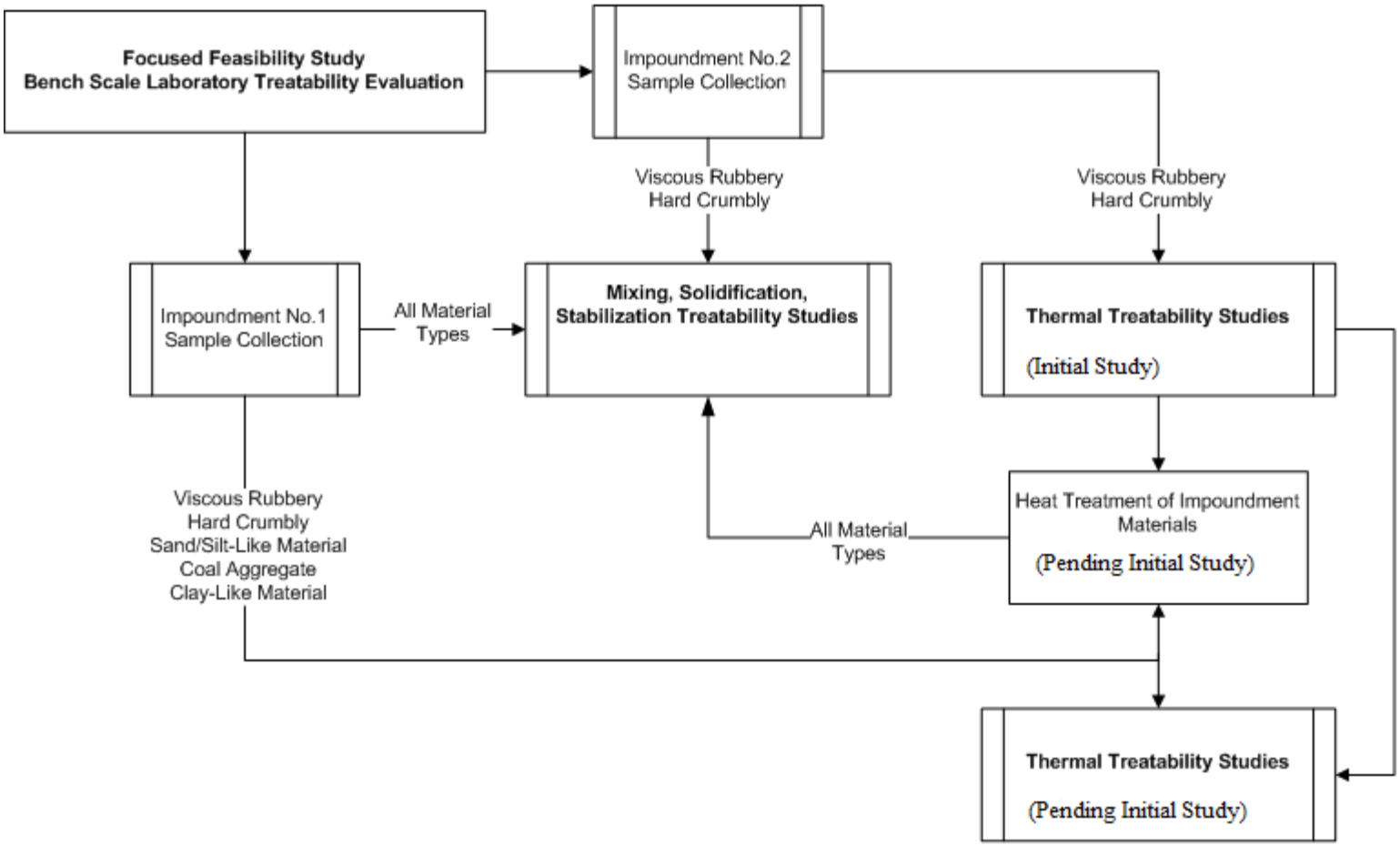
FIGURE 3-1
Treatability Study Overview
Impoundments 1 and 2 Treatability Study Results Report



3.2 Mixing, pH Adjustment, and Solidification/Stabilization

The mixing, pH adjustment, and solidification/stabilization treatability studies were performed to evaluate different mixing methodologies of both thermally treated and raw impoundment materials. Except in special applications, solidification/stabilization does not destroy the contaminants; rather, it immobilizes (e.g. metals) or volatizes (e.g. volatiles due to heat generation) them. The technology has been used extensively to reduce the leachability of metals and the mobility of organic compounds in soils and tarry materials.

The laboratory studies evaluated mixing methods and several different alkaline materials followed by six different pozzolan recipes for solidification/stabilization. Evaluating these sequenced treatment steps on both the raw and thermally treated impoundment material was proposed due to the significant physical and chemical changes that occurred within the impoundment materials following thermal treatment.

Mixing and homogenization of the impoundment material was performed to create a more uniform material for application of subsequent treatment technologies. The low pH of the impoundment materials required adjustment to a higher pH to allow the pozzolans to properly react with the impoundment materials to create optimum physical and chemical properties. After mixing and pH adjustment, solidification/stabilization treatments were applied to reduce the mobility of constituents in the impoundment materials and increase their strength so that the material can be handled and disposed accordingly.

The solidification part of the process involves adding binders to adsorb liquids and increase strength. The stabilization part of the process involves adding chemicals to react with the impoundment material to form less soluble and less mobile compounds.

Solidification/stabilization treatment typically accomplishes:

- Reduced contaminant solubility by formation of sorbed species or insoluble precipitates
- Improved physical characteristics of the waste
- Decreased exposed surface area across which mass transfer loss of contaminants may occur
- Lessened contact between transport fluids and contaminants by reducing the permeability of the material

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3.2.1 Rationale and Objectives

Specific objectives of mixing, pH adjustment, and solidification/stabilization treatability studies are described as follows.

1) Mixing and homogenization and pH adjustment of raw and thermally treated impoundment materials:
    a. Determine the ability of mixing and homogenization to develop a homogeneous blend of VR and HC impoundment materials.
    b. Evaluate blending agents to adjust the pH of VR and HC materials with a target of 5 to 6 SU.
    c. Evaluate temperature rise from exothermic chemical reactions between the impoundment materials and alkaline additives along with emissions produced during the mixing and homogenization and pH adjustment of impoundment materials.
    d. Assess operational conditions for potential field implementation.
2) Solidification/stabilization of raw and thermally treated impoundment materials:
    a. Evaluate mixing various solidification/stabilization reagent materials to achieve the proposed RAOs.
    b. Evaluate temperature rise from exothermic chemical reactions between the waste and pozzolan additives along with emissions produced during solidification/stabilization reagent mixing.
    c. Stabilize and solidify impoundment materials.
    d. Evaluate changes in the chemical properties of the impoundment materials after solidification/stabilization.
    e. Evaluate the changes in physical properties of the impoundment materials after solidification/stabilization, such as unconfined compressive strength (UCS) and permeability.

3.2.2 Treatability Test Description

The mixing, pH adjustment, and solidification/stabilization portion of the study was completed in three stages. These stages include the following:

1) Mixing, homogenization, and pH adjustment of raw and thermally treated Impoundments 1 and 2 materials.
2) Pozzolan screening of homogenized and pH adjusted raw and thermally treated Impoundments 1 and 2 materials.
3) Optimization of promising pozzolans identified during the screening stage of the study to evaluate the final physical and chemical properties of the solidified and stabilized materials.

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SECTION 4

Thermal Treatment Results

Thermal treatment of impoundment materials for the removal of volatile and malodorous compounds offers substantial advantage as part of the remedial strategy. Heat removes the volatile and malodorous compounds, and depletion of these compounds from the impoundment materials results in significant beneficial physical changes in the characteristics of the impoundment materials.

4.1 Baseline Material Chemical Characterization

Prior to conducting any studies on the impoundment materials, batches of HC and VR materials were collected from Impoundment 2 in January 2012, as described in Section 2 of this report. Thermal testing involved evaluation of the physical and chemical response of Impoundment 2 HC and VR materials. As described in Section 3, this study was completed using Impoundment 2 materials only. Since there is no appreciable difference in chemical or physical attributes of the HC and VR materials between the impoundments, observations gained during this study will be representative of heating effects on materials common to both Impoundment 1 and 2. The HC and VR materials were homogenized in separate large tubs by kneading the individual materials until each material was well mixed. Photographs of homogenized VR and HC impoundment materials are included in Appendix B. Samples of the homogenized VR and HC impoundment materials were collected and analyzed in triplicate for VOCs, SVOCs, and metals. In addition to chemical characterization of the untreated impoundment materials, the air above the impoundment materials was evaluated for VOCs, malodorous compounds, aldehydes, and inorganic acid gases. Sample collection and analytical methods used are located in the *QAPP for the Laboratory Treatability Studies of Impoundment 1 and 2 Materials* (CH2M HILL 2012c).

4.1.1 Viscous-rubbery Material – VOCs

Selected VOCs detected in Impoundment 2 VR material are summarized in Table 4-1; results are presented in order of decreasing mass fraction. In general, results are consistent with previous analytical testing of VR material and confirm that VR is primarily composed of aromatic and substituted aromatic hydrocarbons, including BTEX. Among these compounds, ethyl benzene was present in the lowest concentration. Results also indicated that naphthalene (a polyaromatic hydrocarbon [PAH]) and 1,2-dichlorobenzene are each present at appreciable concentrations in the VR material. Detailed tables of results are located in the *Results for Treatability Evaluation of Site Materials the American Cyanamid Superfund Site in Bridgewater Township, New Jersey prepared* (TerraTherm 2012), located in Appendix C.

TABLE 4-1
Laboratory Treatability Studies Report
Selected Volatile Organics Detected in Untreated Impoundment 2 VR Material

Compound	Minimum Concentration (micrograms per kilogram [µg/kg])	Maximum Concentration (µg/kg)	Average Concentration (µg/kg)
Benzene	18,100,000	26,300,000	21,100,000
Toluene	5,570,000	7,510,000	6,306,667
Naphthalene	3,060,000	3,810,000	3,410,000
Total Xylene[1]	1,590,000	2,270,000	1,886,667
1,2-Dichlorobenzene	1,650,000	2,120,000	1,860,000
1,2,4-Trimethylbenzene	301,000	610,000	533,667
sec-Butylbenzene	504,000	575,000	479,000

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TABLE 4-1
Laboratory Treatability Studies Report
Selected Volatile Organics Detected in Untreated Impoundment 2 VR Material

Compound	Minimum Concentration (micrograms per kilogram [µg/kg])	Maximum Concentration (µg/kg)	Average Concentration (µg/kg)
Cumene	353,000	550,000	458,667
1,3,5-Trimethylbenzene	434,000	466,000	390,000
Ethylbenzene	107,000	110,000	108,500

Notes:
[1.] Total xylene calculated by the sum of *ortho, meta, and para* –xylene concentration detected.

4.1.2 Viscous-rubbery Material – SVOCs

Presented in order of decreasing mass fraction, SVOCs detected in homogenized Impoundment 2 VR material are summarized in Table 4-2. Analytical results are consistent with previous characterization efforts and confirm that the composition of VR material within Impoundment 2 is predominantly made up of VOCs, as previously summarized. All SVOCs observed are components commonly found in coal-derived tar. Detailed tables of results are located in the Treatability Study Report prepared by TerraTherm, located in Appendix C.

TABLE 4-2
Laboratory Treatability Studies Report
Selected Semi-Volatile Organics Detected in Pretreated Impoundment 2 VR Material

Compound	Minimum Concentration (µg/kg)	Maximum Concentration (µg/kg)	Average Concentration (µg/kg)
Flourene	941,000	2,390,000	1,547,000
2-Methylnaphthalene	243,000	589,000	384,000
Acenaphthene	39,100	94,800	61,500
Aniline	22,300	58,700	40,500

4.1.3 Viscous-rubbery Material – Total Metals

The metals results of the initial chemical characterization of the Impoundment 2 VR material are summarized in Table 4-3. Results of total metals analysis for VR material were consistent with historical observations reported during previous investigations (Focus, 2011). Detailed tables of results are located in the Treatability Study Report prepared by TerraTherm, located in Appendix C.

TABLE 4-3
Laboratory Treatability Studies Report
Selected Metals Detected in Untreated Impoundment 2 VR Material

Compound	Untreated VR Concentration (mg/kg)		
	Minimum	Maximum	Average
	Metals		
Aluminum	319	360	334
Arsenic	ND	ND	ND
Barium	7.51	8.16	7.87

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TABLE 4-3
Laboratory Treatability Studies Report
Selected Metals Detected in Untreated Impoundment 2 VR Material

Compound	Untreated VR Concentration (mg/kg)		
	Minimum	Maximum	Average
	Metals		
Chromium	2.76	5.23	4.25
Copper	23.5	28.6	25.3
Iron	881	1,120	998
Lead	62.4	67.7	65
Nickel	5.12	5.42	5.27
Mercury	1.71	1.96	1.81

4.1.4 Viscous-rubbery Material – Equilibrium Vapor Head Space

Vapor in equilibrium with VR material under ambient conditions was also evaluated for VOCs, acid gases, aldehydes, and malodorous compounds. Analytical results of headspace sampling are summarized in Table 4-4.Similar to the solid phase, VOC analysis results include BTX as the dominant organic compounds that evolve from the VR material when exposed to ambient air. Detailed tables of results are located in the Treatability Study Report prepared by TerraTherm, located in Appendix C.

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TABLE 4-4
Laboratory Treatability Studies Report
Selected Compounds Detected in Untreated Impoundment 2 VR Material Headspace Samples

VOCs	Ambient Time Zero (T_0) (micrograms per cubic meter [µg/m^3])	Aldehydes	Ambient Time Zero (T_0) (parts per million [ppm])
Carbon Disulfide	333,000	Hydrobromic Acid	< 0.5
Benzene	110,000,000	Hydrochloric Acid	< 1
Toluene	14,000,000	Hydrofluoric Acid	< 2
m,p-Xylene	1,000,000	Nitric Acid	< 0.6
Total Xylene[1]	1,000,000	Phosphoric Acid	< 2
		Sulfuric Acid[3]	< 2
Reduced Sulfur Compounds	**Ambient Time Zero (T_0) (µg/m^3)**	**Inorganic Acids**	**Ambient Time Zero (T_0) (ppm)**
Hydrogen Sulfide	640	Acetaldehyde	0.6
Carbonyl Sulfide	200	Benzaldehyde	< 0.02
Methyl Mercaptan	ND[2]	Butyraldehyde	0.07
Ethyl Mercaptan	ND	Crotonaldehyde	< 0.03
Dimethyl Sulfide	680	Formaldehyde	< 0.07
Carbon Disulfide[4]	48,000	Isovaleraldehyde	2.7
Isopropyl Mercaptan	ND	Propionaldehyde	0.1
tert-Butyl Mercaptan	ND	Valeraldehyde	< 0.02
n-Propyl Mercaptan	ND		
Ethyl Methyl Sulfide	170		
Thiophene	66		
Isobutyl Mercaptan	ND		
Diethyl Sulfide	ND		
n-Butyl Mercaptan	ND		
Dimethyl Disulfide	39		
3-Methylthiophene	ND		

Notes:
[1.] Total xylene calculated by the sum of ortho, meta, and para –xylene concentration detected.
[2.] ND: Not detected.
[3.] Sorbent tube may have had breakthrough or possible migration. Results may be biased low.
[4] Carbon disulfide detected by more than one analytical method; highest concentration detected is presented.

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4.1.5 Hard-crumbly Materials – VOCs

Results of VOC analysis for Impoundment 2 HC material are summarized in Table 4-5. Like the previous data summary, HC results are presented in order of decreasing mass fraction. Overall VOC results are consistent with previous analytical testing and clearly illustrate that the HC material is predominantly composed of BTX and naphthalene. The HC material does differ slightly from the VR in VOC composition, most notably in the lower concentration of 1,2-dichlorobenzene. The mass distribution and detection of substituted aromatic hydrocarbons, including cumene, 1,2,4-trimethyl benzene and 1,3,5-trimethyl benzene, in the HC also differs from the VR concentrations reported. Unlike the VR, ethyl benzene and sec-butylbenzene were not detected in the HC samples analyzed. Benzene is the predominant compound detected in the HC; however, the observed concentration was significantly higher than measured in VR samples. On average, benzene in HC measured 33,100,000 µg/kg, versus 21,100,000 µg/kg in the VR. Detailed tables of results are located in the Treatability Study Report prepared by TerraTherm, located in Appendix C.

TABLE 4-5
Laboratory Treatability Studies Report
Selected Volatile Organics Detected in Untreated Impoundment 2 HC Material

Compound	Minimum Concentration (µg/kg)	Maximum Concentration (µg/kg)	Average Concentration (µg/kg)
Benzene	21,400,000	42,400,000	33,100,000
Toluene	4,260,000	9,120,000	6,866,667
Total Xylene[1]	1,670,000	2,530,000	2,203,333
Naphthalene	1,490,000	2,070,000	1,816,667
Cumene	769,000	778,000	773,500
1,2,4-Trimethylbenzene	557,000	610,000	741,000
1,2-Dichlorobenzene	551,000	662,000	606,500
1,3,5-Trimethylbenzene	607,000	625,000	616,000

Notes:
[1.] Total xylene calculated by the sum of *ortho, meta, and para* –xylene concentration detected.

4.1.6 Hard-crumbly Materials – SVOCs

Presented in order of decreasing mass fraction, SVOCs detected in Impoundment 2 HC material are summarized in Table 4-6. Analytical results are consistent with previous characterization efforts and confirm that the composition of HC material within Impoundment 2 is composed predominantly of VOCs as previously summarized. Detailed tables of results are located in the Treatability Study Report prepared by TerraTherm located in Appendix C.

TABLE 4-6
Laboratory Treatability Studies Report
Selected Semi-Volatile Organics Detected in Untreated Impoundment 2 HC Material

Compound	Minimum Concentration (µg/kg)	Maximum Concentration (µg/kg)	Average Concentration (µg/kg)
Flourene	133,000	223,000	187,667
2-Methylnaphthalene	39,100	60,600	51,700
Acenaphthene	5,930	11,600	8,617

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4.1.7 Hard-crumbly Materials – Total Metals

The metals results of the initial chemical characterization of the Impoundment 2 HC material are summarized in Table 4-7. Results of total metals analysis for HC material are similar to VR sample results with the two exceptions: arsenic was not detected in the VR material, and the concentration of mercury in the HC material is two times the concentration detected in the VR material. Detailed tables of results are located in the Treatability Study Report prepared by TerraTherm, located in Appendix C.

TABLE 4-7
Laboratory Treatability Studies Report

Selected Metals Detected in Untreated Impoundment 2 HC Material

Compound	Untreated HC Concentration (mg/kg)		
	Minimum	Maximum	Average
Metals			
Aluminum	164	286	226
Arsenic	1.41	5.95	3.10
Barium	5.31	6.23	5.74
Chromium	4.16	8.36	6.26
Copper	12.5	15.4	13.6
Iron	529	776	648
Lead	59	76.1	68.8
Nickel	3.57	6.13	4.75
Mercury	2.74	8.68	4.93

4.1.8 Hard-crumbly Materials – Equilibrium Vapor Head Space

Vapor in equilibrium with HC material from Impoundment 2 was also evaluated for VOCs, acid gases, aldehydes, and malodorous compounds under ambient temperature conditions during the treatability study. Analytical results of headspace sampling are summarized in Table 4-8. Like the solid-phase VOC analysis results, BTX are the dominant organic compounds that evolve from the HC when exposed to ambient air. Detailed tables of results are located in the Treatability Study Report prepared by TerraTherm, located in Appendix C.

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TABLE 4-8
Laboratory Treatability Studies Report
Selected Compounds Detected in Untreated Impoundment 2 HC Material Headspace Samples

VOCs	Ambient Time Zero (T_0) (µg/m^3)	Aldehydes	Ambient Time Zero (T_0) (ppm)
Carbon Disulfide	550,000	Hydrobromic Acid	< 0.5
Benzene	180,000,000	Hydrochloric Acid	< 1
Hexane	390,000	Hydrofluoric Acid	< 2
Toluene	22,000,000	Nitric Acid	< 0.6
m,p-Xylene	1,400,000	Phosphoric Acid	< 2
Total Xylene[1]	1,400,000	Sulfuric Acid[3]	6.4
Reduced Sulfur Compounds	**Ambient Time Zero (T_0) (µg/m^3)**	**Inorganic Acids**	**Ambient Time Zero (T_0) (ppm]**
Hydrogen Sulfide	64,000	Acetaldehyde	0.2
Carbonyl Sulfide	1,500	Benzaldehyde	< 0.02
Methyl Mercaptan	540	Butyraldehyde	< 0.03
Ethyl Mercaptan	ND[2]	Crotonaldehyde	< 0.03
Dimethyl Sulfide	13,000	Formaldehyde	< 0.07
Carbon Disulfide[4]	770,000	Isovaleraldehyde	2
Isopropyl Mercaptan	ND	Propionaldehyde	< 0.04
tert-Butyl Mercaptan	ND	Valeraldehyde	< 0.02
n-Propyl Mercaptan	ND		
Ethyl Methyl Sulfide	2,600		
Thiophene	2,800		
Isobutyl Mercaptan	ND		
Diethyl Sulfide	ND		
n-Butyl Mercaptan	ND		
Dimethyl Disulfide	ND		
3-Methylthiophene	ND		

Notes:
[1.] Total xylene calculated by the sum of *ortho, meta, and para* –xylene concentration detected.
[2.] ND: Not detected.
[3.] Sorbent tube may have had breakthrough or possible migration. Results may be biased low.
[4] Carbon disulfide detected by more than one analytical method; highest concentration detected is presented.

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4.2 Thermal Treatment Material Evaluation

The thermal treatment study focused on VR and HC material collected from Impoundment 2 only, as this material was judged to have the most challenging physical and chemical properties of the two impoundments. As defined in the treatability testing work plan, thermal treatment of Impoundment 2 VR and HC material was performed in the laboratory at both 90 degrees Celsius (^{o}C) and 100°C. Study temperatures were selected to evaluate the relative differences in material treatment above and below the boiling point of water. In total, four thermal treatment evaluations were performed in support of the treatability study:

- VR material heated at 100°C
- VR material heated at 90°C
- HC material heated at 100°C
- HC material heated at 90°C

A photograph of the experimental setup employed is in Appendix B and detailed in KEMRON work plan. Briefly, each material and temperature condition was tested as follows:

- A known sample mass (VR or HC material) was placed in a sealed carbon steel treatment cell (box reactor). This box reactor was then placed in a temperature controlled oven.
- Sweep gas was supplied to the box reactor headspace and the displaced vapors were conveyed to a condenser equipped with a receiver for condensate collection. Vapor exiting the condenser was routed to the laboratory fume hood.
- The box reactor and the sample were then heated to the target temperature and monitored using both qualitative and quantitative analytical methods.
- When VOC concentration of vapor exiting the box reactor decreased to below 1,000 ppm (measured by laboratory FID), heating operations were terminated; the box reactor was removed from the oven, allowed to cool, and materials were subsequently sampled.

Routine vapor screening (daily) consisted of qualitative measurements of VOCs, hydrogen sulfide, and sulfur dioxide obtained through direct-reading hand-held instruments equipped with FID, PID, and parameter-specific detectors. Periodic vapor samples for VOCs, acid gases, aldehydes, and malodorous compounds were also collected for analysis by a third-party laboratory. Results of thermal treatment are presented in the following sections. A detailed discussion of the methods and materials used to test Impoundment materials, and the analytical monitoring applied is summarized below and is also found within Appendix C of this report.

4.2.1 Trial Box Reactor

A trial box reactor was set up to evaluate the proposed testing methods. In addition, the trial box reactor provided data regarding how the impoundment material would behave when heated to 100°C. Shortly after heating commenced, the trial reactor experiment was terminated because at approximately 92°C, the VR material inside the box reactor expanded beyond the volume of the box reactor and VR was pushed through the vapor effluent line into the condenser. After ending the test, the box reactor was removed from the oven while it was still near 90°C. The heated VR material was fluid with a consistency similar to molten chocolate. A photograph of the heated VR material from the first trial run is contained in Appendix B. The entire system was broken down and cleaned to remove tar residues from the equipment.

Expansion of the VR upon heating was unforeseen. As a result, a simple evaluation was conducted in the laboratory to quantify the change in VR volume upon heating. A known volume of VR material was added to a graduated cylinder and heated in a laboratory drying oven maintained at 105 ^{o}C. During this test, the VR material expanded to three times the initial volume placed in the cylinder. Based on knowledge gained during the first trial box reactor study, a second trial box reactor study was conducted using a smaller initial mass (700 grams) of VR and a larger reactor that could accommodate the expansion of the VR material. The change in both treatment cell and initial sample mass allowed for successful heating of the VR to 100°C in the trial test.

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The effects of heating of VR materials in the trial test cell were evident immediately. As the treatment cell temperature increased and approached 70°C, condensate formation within the condenser was observed. With increasing temperature, the volume and rate of condensate accumulation also increased. Condensate produced initially exhibited two distinct phases with clearly separated interfaces, but with increasing treatment time, a third phase became evident (see photograph in Appendix B). Specific gravity of the upper two layers was less than 1 gram per cubic centimeter and both were insoluble in distilled water. Specific gravity of bottom layer was not measured; however, this condensate phase was fully miscible with distilled water. The three-phase condensate was consistent with observations from the bulk heating operations which are described in Section 5.2. Condensate produced in the trial was opaque and ranged in color from light tan to dark brown. Comparatively, condensate produced in the bulk heating was consistently clear and colorless to lightly colored (yellow hue) upon initial generation. With increasing time, the base layer in the bulk treatment condensate became white and opaque, which did not occur in trial treatment cell observations.

Condensate generated in the trial test cell was collected and segregated based on relative specific gravity. Three fractions corresponding to the top, middle, and bottom layers were subsequently submitted for chemical analysis. In general, the types and relative distribution of VOCs and SVOCs observed corroborates measurements performed on the VR material prior to thermal treatment. Selected analytical results, presented in Table 4-9, confirm that the top layer of condensate was composed primarily of BTX, naphthalene, dichlorobenzene, and similar substituted monoaromatic hydrocarbons. A comprehensive listing of condensate sample results including tentatively identified compounds (TICs) is provided in Appendix C.

TABLE 4-9
Laboratory Treatability Studies Report
Summary of Selected Volatile Organics Detected in Trial Reactor Condensate Layers

Compound	Bottom Layer (micrograms per liter [µg/L])	Middle Layer (µg/L)	Top Layer (µg/L)
Benzene	454,000	4,090,000	270,000,000
Toluene	64,100	724,000	58,600,000
Total Xylene[1]	8,300	100,000	8,120,000
Naphthalene	6,170	82,500	6,460,000
1,2-Dichlorobenzene	6,040	62,300	4,410,000
1,2,4-Trimethylbenzene	1,300	13,100	1,170,000
1,3,5-Trimethylbenzene	793	8,940	374,000
Acetone	120,000	102,000	ND
pH[2]	2.6	3.2	2

Notes:
1. Total xylene calculated by the sum of *ortho, meta, and para* –xylene concentration detected.
2. pH was measured using pH paper and is approximate.

Vapor screening was conducted after the condenser using a handheld FID while test cell temperatures increased and for the entire period of isothermal treatment. Once the cell temperature approached 50°C, several measurements were performed; however, all attempts saturated the FID detector, indicating the vapor from the trial test cell was highly enriched in VOCs. Detector saturation occurred at 50,000 ppm, and as such, VOC monitoring results for the trial were reported as greater than the 50,000 ppm saturation threshold for the instrument. The trial box reactor was ended after 10 days of heating after the VOC concentration measure by the FID was reduced to 758 ppm. After 10 days of heating, measurements confirmed that one third of the initial VR sample mass was removed by heating operations in the trial reactor.

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In addition to demonstrating the experimental setup, the trial test was also commissioned to demonstrate the integration of quantitative analytical methods to monitor the composition of vapor produced during the thermal treatment tests. As previously described, the concentration of VOCs, inorganic acids, aldehydes, and malodorous compounds were measured in the untreated VR material (Section 4.1.4 and 4.1.8). Vapor data of the raw impoundment materials at ambient temperature was collected to represent baseline conditions (T_0) of the atmosphere over the VR material. Headspace samples for malodorous compounds were collected at T_0, at the time the impoundment material reached temperature (day 1), and after 2 days of heating. Because the vapor sample collection method employed for T_0 conditions was not feasible for the treatment cell configuration, vapor was collected directly after the condenser to analyze the requisite suite of VOCs, inorganic acids, aldehydes, and malodorous compounds. Vapor samples were collected before and during the trial test according to the following timetable:

- T_0 – to represent the baseline conditions of untreated impoundment material
- Day 1 – to represent initial heating ramp
- Day 2 – to provide an interim assessment of aldehyde, inorganic acid, and malodorous compound removal
- Day 5 – to represent VOCs present following sustained- and steady-state treatment conditions

Selected analytical results are summarized in Table 4-10. A comprehensive listing of vapor sample results, including TICs, is provided in Appendix C. Overall, vapor samples collected to characterize the VR material emission during trial thermal treatment were consistent with results generated during analytical evaluation of the solid-phase material. Vapor under ambient and elevated temperature was predominantly composed of benzene, toluene, and carbon disulfide which were detected as major components of the untreated VR material at ambient temperatures.

Several reduced sulfur compounds that were not observed at ambient conditions were detected in vapor from the trial reactor. Most notable was the presence of hydrogen sulfide, which was detected at 41,000,000 µg/m^3 in the day 2 vapor sample. Aldehyde analysis confirmed the presence of acetaldehyde, benzaldehyde, and butyraldehyde in the ambient T_0 samples; however, with the exception of acetaldehyde (observed in the day 2 sample), aldehyde species were not detected during any of the sampling events associated with VR material heating. Interestingly, formaldehyde, a reagent reportedly used in the historical manufacturing process that produced the impoundment materials, was not detected in the baseline or test cell samples associated with VR heating. Sulfuric acid was the only inorganic acid detected in the head space sample during the trial reactor study. Sulfuric acid was not detected at the detection limit of 1,000 µg/m^3 at T_0 and increased to 3,400 µg/m^3 at day 1 and increased to 4,700 µg/m^3 at day 2. The day 1 and 2 sulfuric acid data may be biased low because the inorganic acid samples are collected using a detector tubes and during collection, and sulfuric acid saturated the sorbent in the detector tube.

TABLE 4-10
Laboratory Treatability Studies Report
Summary of Selected Compounds Detected in Baseline and Trial Reactor Vapor During Heating

Compound	Ambient T_0 Concentration[1] (µg/m^3)	Day 1 Concentration (µg/m^3)	Day 2 Concentration (µg/m^3)	Day 5 Concentration (µg/m^3)
		VOCs		
Benzene	2,500,000	16,000,000	NS[2]	1,200,000
Toluene	34,000	200,000	NS	80,000
Chloromethane	54,000	ND[3]	NS	15,000
Acetone	ND	150,000	NS	140,000
Carbon Disulfide	85,000	200,000	NS	6,000

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TABLE 4-10
Laboratory Treatability Studies Report
Summary of Selected Compounds Detected in Baseline and Trial Reactor Vapor During Heating

Compound	Ambient T_0 Concentration[1] (µg/m^3)	Day 1 Concentration (µg/m^3)	Day 2 Concentration (µg/m^3)	Day 5 Concentration (µg/m^3)
Hexane	14,000	96,000	NS	ND
Cyclohexane	9,000	31,000	NS	ND
Malodorous Compounds				
Hydrogen Sulfide	ND	2,000,000	41,000,000	NS
Carbonyl Sulfide	630	1,700,000	33,000	NS
Methyl Mercaptan	ND	18,000	470,000	NS
Ethyl Mercaptan	ND	ND	48,000	NS
Dimethyl Sulfide	2,400	18,000	21,000	NS
Carbon Disulfide	130,000	1,000,000	51,000	NS
Isopropyl Mercaptan	ND	ND	16,000	NS
Ethyl Methyl Sulfide	330	ND	ND	NS
Thiophene	1,500	ND	ND	NS
Isobutyl Mercaptan	370	ND	ND	NS
3-Methylthiophene	160	ND	ND	NS
2-Ethylthiophene	67	ND	ND	NS
Aldehydes				
Acetaldehyde	1.2	< 0.08	0.6	NS[2]
Benzaldehyde	0.2	< 0.08	< 0.08	NS
Butyraldehyde	0.4	< 0.09	< 0.09	NS
Crotonaldehyde	< 0.09	< 0.09	< 0.09	NS
Formaldehyde	< 0.08	< 0.08	< 0.08	NS
Isovaleraldehyde	< 0.08	< 0.08	< 0.08	NS
Propionaldehyde	0.3	< 0.08	< 0.08	NS
Valeraldehyde	0.2	< 0.09	< 0.09	NS
Inorganic Acids				
Hydrobromic Acid	< 1	< 1	< 1	NS
Hydrochloric Acid	< 1	< 1	< 1	NS
Hydrofluoric Acid	< 1	< 1	< 1	NS
Nitric Acid	< 1	< 1	< 1	NS
Phosphoric Acid	< 1	< 1	< 1	NS
Sulfuric Acid[4]	< 1	3.4	4.7	NS

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TABLE 4-10
Laboratory Treatability Studies Report
Summary of Selected Compounds Detected in Baseline and Trial Reactor Vapor During Heating

Compound	Ambient T_0 Concentration[1] (µg/m^3)	Day 1 Concentration (µg/m^3)	Day 2 Concentration (µg/m^3)	Day 5 Concentration (µg/m^3)

Notes:
[1.] Sample size is 40 ml vial with approximately 5.0 grams of sample.
[2.] NS = Not sampled
[3.] ND = Not detected
[4.] Sorbent tube may have had breakthrough or possible migration. Results may be biased low.

Trial Reactor Conclusions

As outlined in the *Laboratory Treatability Studies Work Plan* (CH2M HILL, 2012d), the purpose of the trial test using VR material was to confirm that experimental and analytical methods proposed for testing were feasible given the physical and chemical characteristics of the impoundment materials. In light of the results summarized in previous sections and detailed in the attached laboratory report (Appendix C), the conclusions from the trail reactor study are as follows:

- With the exception of qualitative vapor measurements using the FID, change in vapor-phase chemical composition resulting from heating could be reliably measured over the study duration.
- When heated, VR material undergoes volume expansion. Heating to 105°C resulted in a volume swell of roughly 3:1 compared to ambient laboratory temperature.
- Vapor generated during heating produced a three-phase liquid condensate; the speciation of VOCs detected in the condensate correlated directly with VOCs detected during solid-phase analysis of untreated VR material.
- Under the test conditions established, vapor-phase samples were successfully collected and analyzed for parameters of interest including VOCs, malodorous compounds, aldehydes, and inorganic acid gas.
- Vapor generated during heating was highly enriched in VOCs; the speciation of vapor phase VOCs correlated well with VOCs detected during solid phase analysis of untreated VR material.
- After 10 days of heating, nearly one third of the initial VR mass sample mass was removed by heating operations in the test cell.

4.2.2 Impoundment Material Testing

Detailed thermal treatability testing of the impoundment materials commenced in early July and progressed in general accordance with the testing protocol outlined in the work plan. Because the VR material expanded to three times its initial volume in the trial box reactor study, the expansive properties of the HC material were evaluated prior to setup of the box reactors for the main study by placing a known volume of HC in a graduated cylinder and heating it above 100°C. Although the HC material did expand slightly, the observed volume change was substantially smaller than change observed during VR material heating. Heating of impoundment materials followed the prescribed ramp with intermediate isothermal holds at 30°C, 50°C, 70°C, and 90°C or 100°C for the qualitative screening of vapor (for hydrogen sulfide, sulfur dioxide, and VOCs) exiting the condenser assembly. Once the test reactor reached the desired treatment temperature, vapor exiting the condenser was screened daily.

Screening results for VOCs were used to assess the relative extent of treatment with time in each box reactor. To prevent saturation of screening instrument detectors, early term samples were diluted with ambient air to estimate the approximate concentration for each parameter. Dilution factors varied during the course of heating operations to account for the wide range of total VOCs present in the vapor exiting the condenser system. Supplemental discussion of measurement techniques for vapor screening is contained in Appendix C.

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The vapor exiting the condenser in each box reactor was also sampled for VOCs, malodorous compounds, aldehydes, and acid gas for laboratory analysis. Based on observations from heating during the trial reactor test and the need to extend the heating duration, the vapor sampling schedule was altered to ensure that samples over the entire duration of testing would be collected. The revised vapor sampling schedule was:

- Sample 1 (T_0) – representing ambient or baseline conditions for untreated impoundment material
- Sample 2 – completion of day 1 of heating to document change during initial temperature ramp
- Sample 3 – when total VOC concentration measured by FID decreased below 50,000 ppm
- Sample 4 – when total VOC concentration measured by FID decreased below 1,000 ppm
- Sample 5 (Time Final [T_f]) – representing the return of treated impoundment material to ambient temperature

A synopsis of treatment observations for each material condition tested follows in subsequent sections.

Hard-crumbly Material – 90°C

Hard crumbly material was successfully heated to the target temperature in the box reactor. Following approximately 4 hours of heating, the HC material within the reactor reached the target temperature of 90°C. Initial production of condensate in the collection vessel was observed when the box reactor achieved approximately 80°C; sample heating produced a two-phase condensate. The top layer was pale yellow, thick, and had an oil-like appearance. The bottom layer resembled the top but was colorless. Generally, the pH of the top layer remained higher (3 to 4 SU) than the bottom layer (2 to 3 SU).

The vapor produced during heating was screened using an FID and hydrogen sulfide and sulfate hand-held meters during temperature ramp-up, and then daily after the impoundment material reached temperature. The results of the vapor screening conducted during the testing of HC material treated at 90°C are provided in Table 4-11. A graph representing the headspace screening data during the treatment of the HC material at 90°C is depicted as Figure 4-1.

TABLE 4-11
Laboratory Treatability Studies Report
Vapor Screening Summary for HC Material Treated at 90°C

Day		Hydrogen Sulfide (H_2S) (ppm)	Sulfur Dioxide (SO_2) (ppm)	VOCs (ppm)
Ambient (Untreated)		32.0	19.8	206,895
Day 0	30°C	30.0	21.3	254,226
	50°C	16.0	> 150	> 500,000
	70°C	483	> 150	413,600
	90°C	308	> 150	197,305
Day 1		321	25.9	240,350
Day 2		485	13.7	268,000
Day 3		422	23.0	10,062
Day 4		86.0	32.5	8,849
Day 5		114	18.6	15,630
Day 6		202	1.20	79,662
Day 7		254	29.0	30,688
Day 8		184	98.0	20,876

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TABLE 4-11
Laboratory Treatability Studies Report
Vapor Screening Summary for HC Material Treated at 90°C

Day	Hydrogen Sulfide (H_2S) (ppm)	Sulfur Dioxide (SO_2) (ppm)	VOCs (ppm)
Day 9	202	149	20,403
Day 10	360	142	4,766
Day 11	2.00	11.2	4,246
Day 12	148	138	4,304
Day 13	115	98.7	2,785
Day 14	106	118	3,876
Day 15	98.0	104	6,781
Day 16	88.0	58.6	2,578
Day 17	101	72.0	3,447
Day 18	21.0	64.8	1,127
Day 19	310	124	1,214
Day 20	120	87.0	1,370
Day 21	272	23.1	2,099
Day 22	NR[1]	NR	NR
Day 23	57.8	47.2	1,287
Day 24	35.0	2.2	833

[1] NR = Not Reported.

The work plan assumed seven days would be required to treat the HC impoundment materials to reduce the VOCs; however, 10 days of heating was required during the trial reactor study to treat the VR material at 100°C. The HC material treated at 90°C required 24-days before the VOC concentration in the off-gas was reduced to below 1,000 ppm.. The initial mass of HC material used in this test was 1,997.5 grams and heating resulted in the loss of 468 grams of the initial HC sample mass. Overall, heating of the HC material caused a 23.5 percent mass reduction compared to pre-treatment conditions. Once cooled, visual inspection of the treated HC material revealed that the surface was hard (brittle), uneven, and friable; there was also evidence of air pockets between the surface layer and the underlying material. Photographs of the pre- and post-treatment HC material are located in Appendix B. With increasing depth, moist material was encountered in the bottom layers of the sample. Heat-treated HC material possessed a characteristic tar-like odor, and the interior of the box reactor showed significant surface corrosion and pitting.

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Figure 4-1 - Headspace Screening Results During the HC90 Test

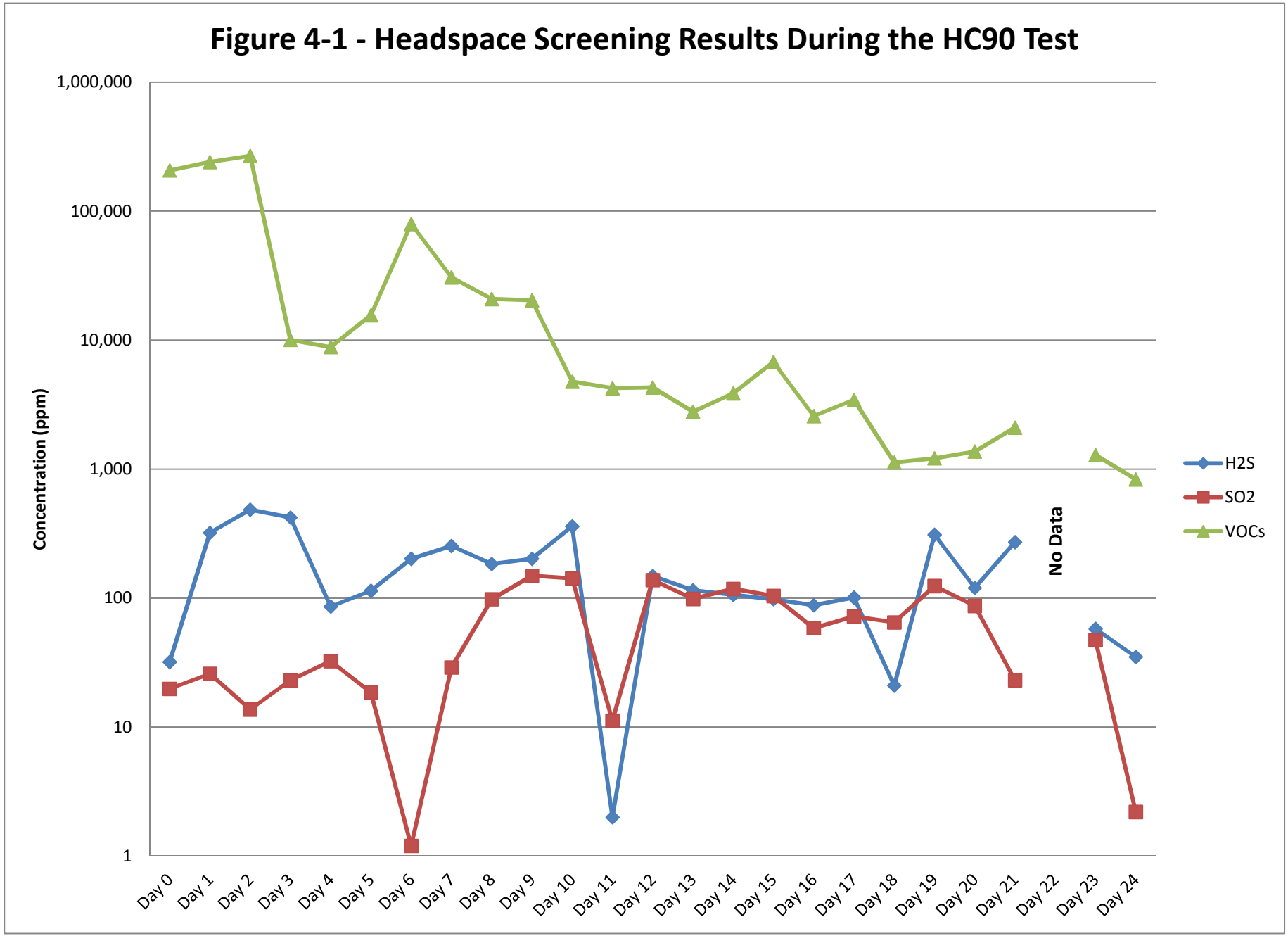
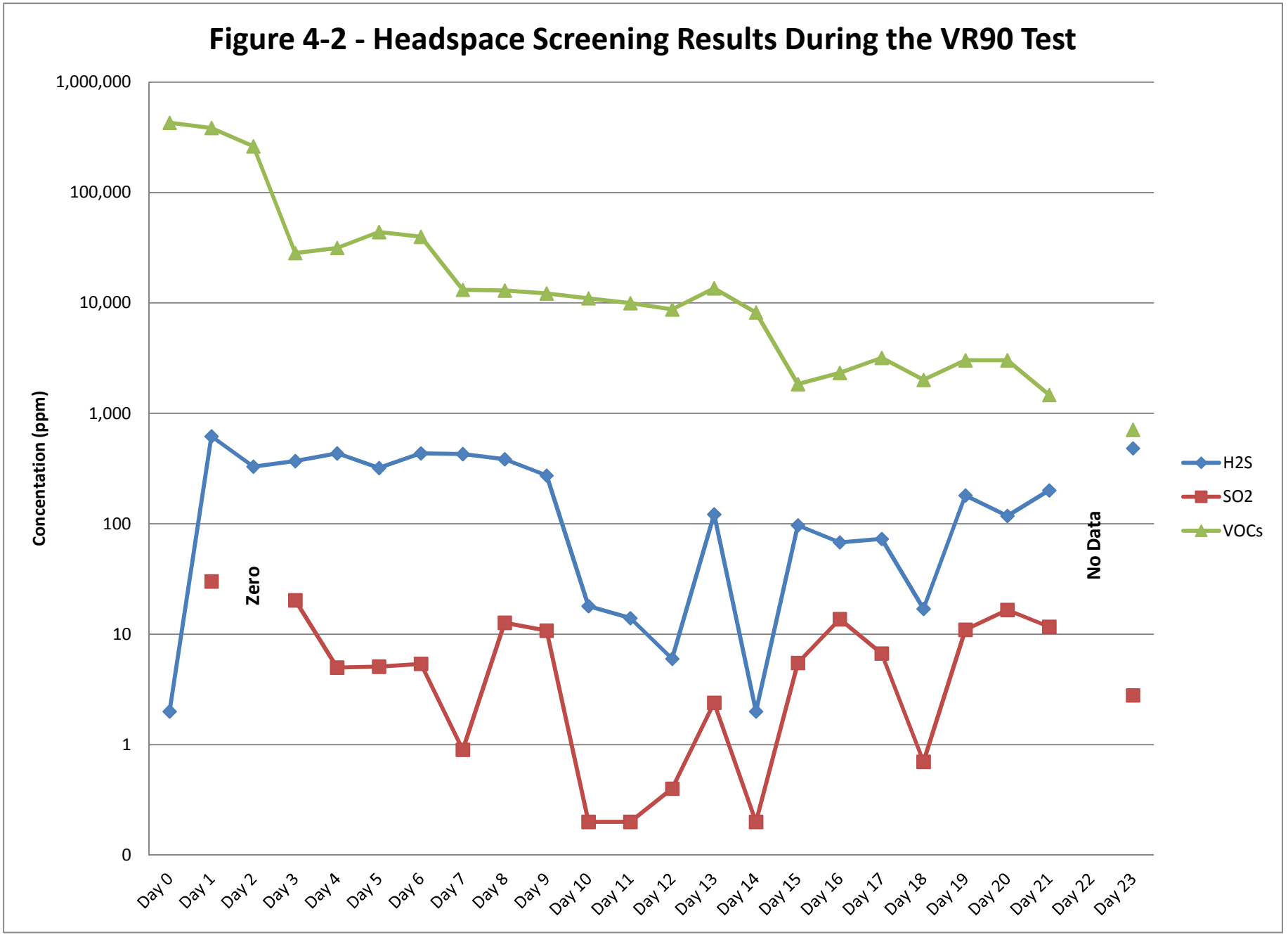


Figure 4-2 - Headspace Screening Results During the VR90 Test



Viscous-rubbery Material – 90°C

To accommodate expansion of VR material during heating, large box reactors were employed for testing at 90°C and 100°C. To further prevent the chance for expulsion of the heated VR material from the reactor through the off-gas line during heating, approximately 8 inches of vertical headspace in the reactor was retained following placement of material in the test cell. As previously described, the box reactor temperature was ramped to the 90°C target temperature with monitoring activities performed at temperatures of 30°C, 50°C, 70°C, and 90°C. At a temperature of 57.5°C, condensate was first noticed in the condensate collection vessel. As with the HC material, a two-phase condensate was observed. Liquid in the top layer was a clear, thick, and oily; properties of the bottom layer appeared similar except the layer was opaque and milky white. Generally, the pH of the top layer remained higher (3-4 SU) than the bottom layer (2-3 SU). Following approximately 1.5 days of heating, the VR material within the reactors reached a temperature of 90°C.

The vapor produced during heating was screened using an FID and hydrogen sulfide and sulfate hand-held meters during temperature ramp-up, and then daily after the impoundment material reached temperature. The results of the vapor screening conducted during the testing of VR material treated at 90°C are provided in Table 4-12. A graph representing the headspace screening data during the treatment of the VR material at 90°C is depicted as Figure 4-2.

TABLE 4-12
Laboratory Treatability Studies Report
Vapor Screening Summary for VR Material Treated at 90°C

Day		H_2S (ppm)	SO_2 (ppm)	VOCs (ppm)
Ambient (Untreated)		2.00	0.00	428,970
Day 0	30°C	0.00	1.30	51,460
	50°C	6.7	5.00	123,410
	70°C	2.5	3.00	431,290
	90°C	284	150	500,000
Day 1		620	30.1	384,360
Day 2		330	0.00	261,900
Day 3		370	20.3	28,310
Day 4		434	5.00	31,526
Day 5		320	5.10	43,958
Day 6		435	5.40	39,842
Day 7		428	0.900	13,181
Day 8		385	12.7	12,988
Day 9		274	10.8	12,200
Day 10		18.0	0.200	11,026
Day 11		14.0	0.200	9,978
Day 12		6.00	0.400	8,752
Day 13		122	2.400	13,580
Day 14		2.00	0.200	8,210
Day 15		97.0	5.50	1,843
Day 16		68.0	13.7	2,333

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TABLE 4-12
Laboratory Treatability Studies Report
Vapor Screening Summary for VR Material Treated at 90°C

Day	H_2S (ppm)	SO_2 (ppm)	VOCs (ppm)
Day 17	73.0	6.7	3,188
Day 18	17.0	0.700	2,017
Day 19	181	11.0	3,025
Day 20	118	16.6	3,033
Day 21	201	11.7	1,472
Day 22	NR	NR	NR
Day 23	483	2.80	711

[1] NR = Not Reported

The work plan assumed seven days would be required to treat the HC materials to reduce the VOCs; however, the trial reactor test indicated that at least 10 days were required to treat the VR material at 100°C. After 23 days of heating at 90°C, vapor screening results indicated that vapor exiting the condenser assembly had fallen below the 1,000-ppm threshold established for termination of the heating test. Heating resulted in the loss of 969 grams of the initial VR sample mass present. Overall, heating of the VR material represented a 37.9 percent mass reduction compared to pre-treatment conditions. Treated VR material possessed a rubbery texture and was removed from the box reactor as rubbery matt. Photographs of the pre- and post-treatment VR material are located in Appendix B. The interior of the box reactor showed significant corrosion with both rusting and some pitting.

Hard-crumbly Material – 100°C

Testing of the HC material at a target treatment temperature of 100°C was performed in accordance with the testing protocol previously outlined and defined in the work plan. The vapor produced during heating was screened using an FID and hydrogen sulfide and sulfate hand-held meters during temperature ramp-up, and daily after the impoundment material reached temperature. The results of the vapor screening conducted during the testing of HC material treated at 100°C are provided in Table 4-13.

TABLE 4-13
Laboratory Treatability Studies Report

Vapor Screening Summary for HC Material Treated at 100°C

Day		H_2S (ppm)	SO_2 (ppm)	VOCs (ppm)
Ambient (Untreated)		29.0	43.4	154,864
	30°C	10.0	97.4	394,696
	50°C	216	18.0	54,030
Day 0	70°C	191	43.2	284,304
	90°C	191	98.1	283,500
	100°C	460	30.0	162,335
Day 1		169	37.3	230,820
Day 2		109	19.7	18,960
Day 3		95.2	152	27,881
Day 4		105	128	40,490

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TABLE 4-13
Laboratory Treatability Studies Report

Vapor Screening Summary for HC Material Treated at 100°C

Day	H_2S (ppm)	SO_2 (ppm)	VOCs (ppm)
Day 5	113	165	15,162
Day 6	358	129	12,458
Day 7	21.0	48.0	2,553
Day 8	102	87.0	7,166
Day 9	100	98.0	5,987
Day 10	109	134.0	6,879
Day 11	44.0	132	7,919
Day 12	34.0	39.0	5,742
Day 13	12.0	4.50	4,680
Day 14	1.0	163	943[1]

Notes:
[1.] Comprehensive analysis of box reactor study data (including post thermal treatment residuals) suggests that Day 14 vapor screening measurement may be biased low.

After 14 days of heating at 100°C, vapor screening results indicated that vapor exiting the condenser assembly had fallen below the 1,000-ppm threshold established for termination of the heating test. However, subsequent evaluation of analytical test results (presented in Section 4.3.3 [Table 4-20]) suggest that the 100°C test was prematurely terminated. Although several FID measurements were made to support test shutdown (vapor less than 1000 ppm) the decrease in total VOC measured in previous days was much smaller compared to the decrease observed between day 13 and 14. Early termination of heating at 100°C had no negative effect on test results or in fulfillment of study objectives. However, since the heating duration was not sufficient to fully exhaust VOCs from the solid matrix, the overall mass reduction demonstrated in the 100°C study is lower than what might be expected if the heating period was extended.

In general, treatment time at 100°C was faster than at 90°C; the mechanism for increased mass removal observed at the higher temperature may be related to steam stripping effects since water present in the sample could theoretically boil. Heating resulted in the loss of 378 grams of the initial HC sample mass present. Overall, heating of the VR material represented a 25 percent mass reduction compared to pre-treatment conditions. Despite a treatment temperature that was 10°C higher, visual inspection of the treated material revealed that the treated HC material was very similar to the treated HC material from the 90°C test. The noted exception was that significantly more water remained in the reactor bottom. Photographs of the post-treatment HC material are located in Appendix B. The interior of the box reactor showed significant surface corrosion and pitting.

Thermal monitoring results confirmed the box reactor temperature was maintained at or slightly above 100°C for the duration of testing. Observation of water in the box reactor was unexpected since treatment temperatures were hot enough and held for a sufficient period to allow complete water removal from the system. Although not confirmed in this phase of testing, HC material appears to form a skin or membrane when heated. The hard and undulating surface of the cooled HC treatment cells suggests that steam or vapor bubbles may have been trapped beneath the skin formed on the HC surface. The membrane was not impermeable since significant condensate volume was produced in both HC reactors tested. Further study of phenomena limiting the removal of water during heating may be required to definitively resolve this testing observation.

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Viscous-rubbery Material – 100°C

Isothermal treatment of VR material at 100°C was conducted for approximately 13 days using a large box reactor with sufficient headspace for material expansion during heating. The vapor produced during heating was screened using an FID and hydrogen sulfide and sulfate hand-held meters during temperature ramp-up, and daily after the impoundment material reached temperature. The results of the vapor screening conducted during the VR treated at 100°C test are provided in Table 4-14.

TABLE 4-14
Laboratory Treatability Studies Report
Vapor Screening Summary for VR Material Treated at 100°C

Day		H_2S (ppm)	SO_2 (ppm)	VOCs (ppm)
Ambient (Untreated)		0.00	5.90	60,048
Day 0	30°C	0.00	2.90	48,460
	50°C	2.00	11.3	150,000
	70°C	0.00	11.1	210,400
	90°C	5.00	115	450,000
	100°C	482	28.7	201,585
Day 1		0.400	16.0	164,000
Day 2		316	9.80	22,740
Day 3		244	6.10	15,112
Day 4		356	12.8	49,173
Day 5		306	96.4	2,895
Day 6		290	66.4	26,680
Day 7		32.0	103	9,023
Day 8		198	148	11,985
Day 9		247	120	11,026
Day 10		148	137	11,412
Day 11		108	78.2	5,223
Day 12		14.0	13.8	4,926
Day 13		16.0	11.2	833

Notes:
1. Comprehensive analysis of box reactor study data (including post thermal treatment residuals) suggests that Day 14 vapor screening measurement may be biased low.

As noted previously, in light of analytical data received several weeks after completion of testing, the 100°C box reactor studies were terminated prematurely. The observed decrease in FID concentration from day 12 to day 13 was considerably larger than many previous and while not outside the realm of previous measurements, laboratory analytical results of post treatment residuals support heating was incomplete for the VR material tested. Regardless of test duration, a substantial mass of VOCs was removed through heating as evidence in both condensate production and the analytical results performed on residual solids after heating (summarized in Section 4.3.3.2). Overall, thermal treatment resulted in the loss of 732 grams of the initial VR sample mass present, which was a 29 percent mass reduction compared to pre treatment conditions. At the conclusion of testing (that is, FID less than 1,000 ppm), the heating furnace was turned off and the reactor was allowed to cool.

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Once cooled, the treated VR material was stiff and could not be easily removed from the test reactor. To aid material removal, the reactor was reheated for approximately one hour at 100°C to make the material more viscous. Treated VR material was then immediately removed from test reactor using a stainless steel spoon. The interior of the box reactor showed significant surface corrosion pitting.

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Figure 4-3 - Headspace Screening Results During the HC100 Test

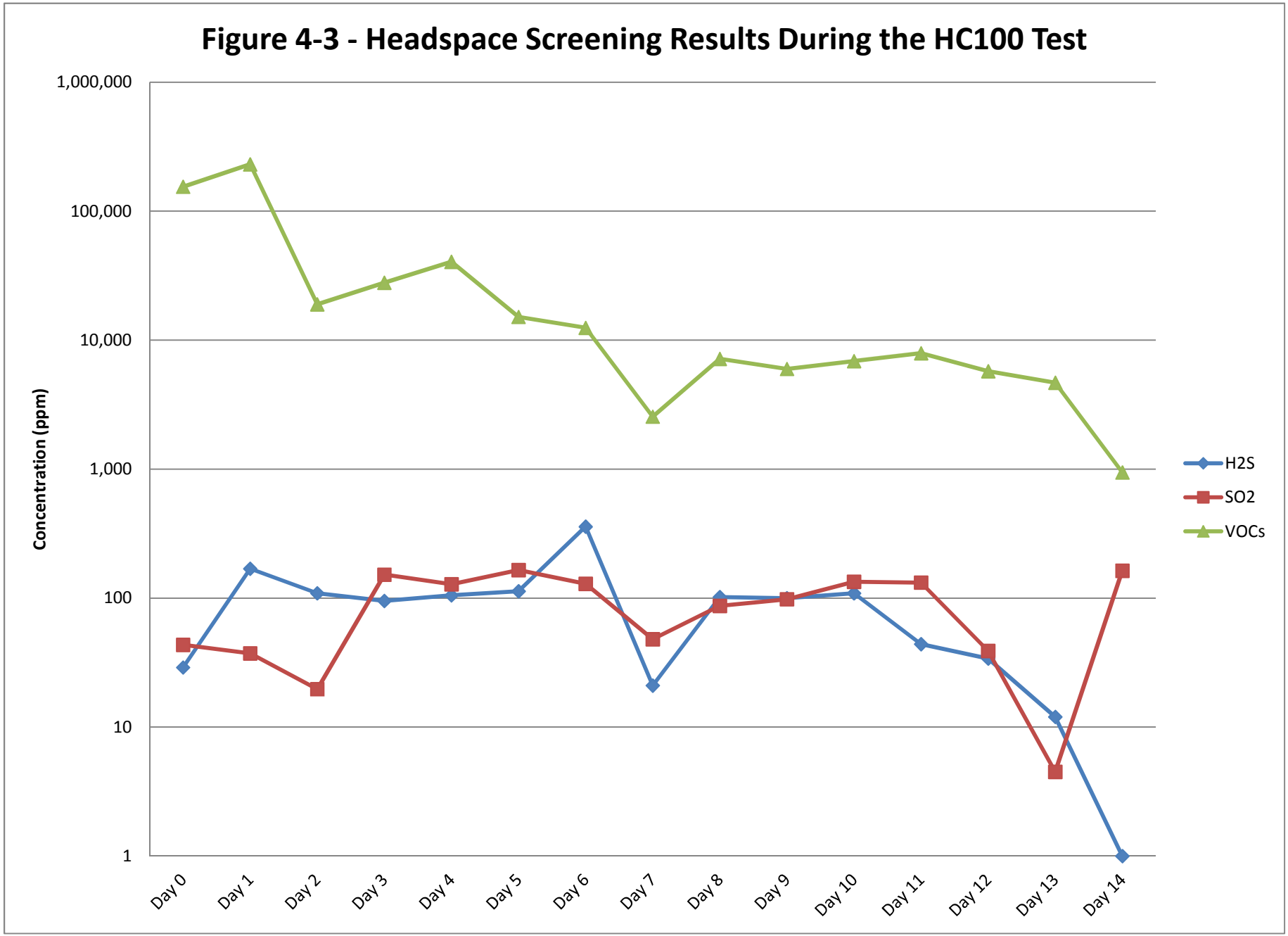
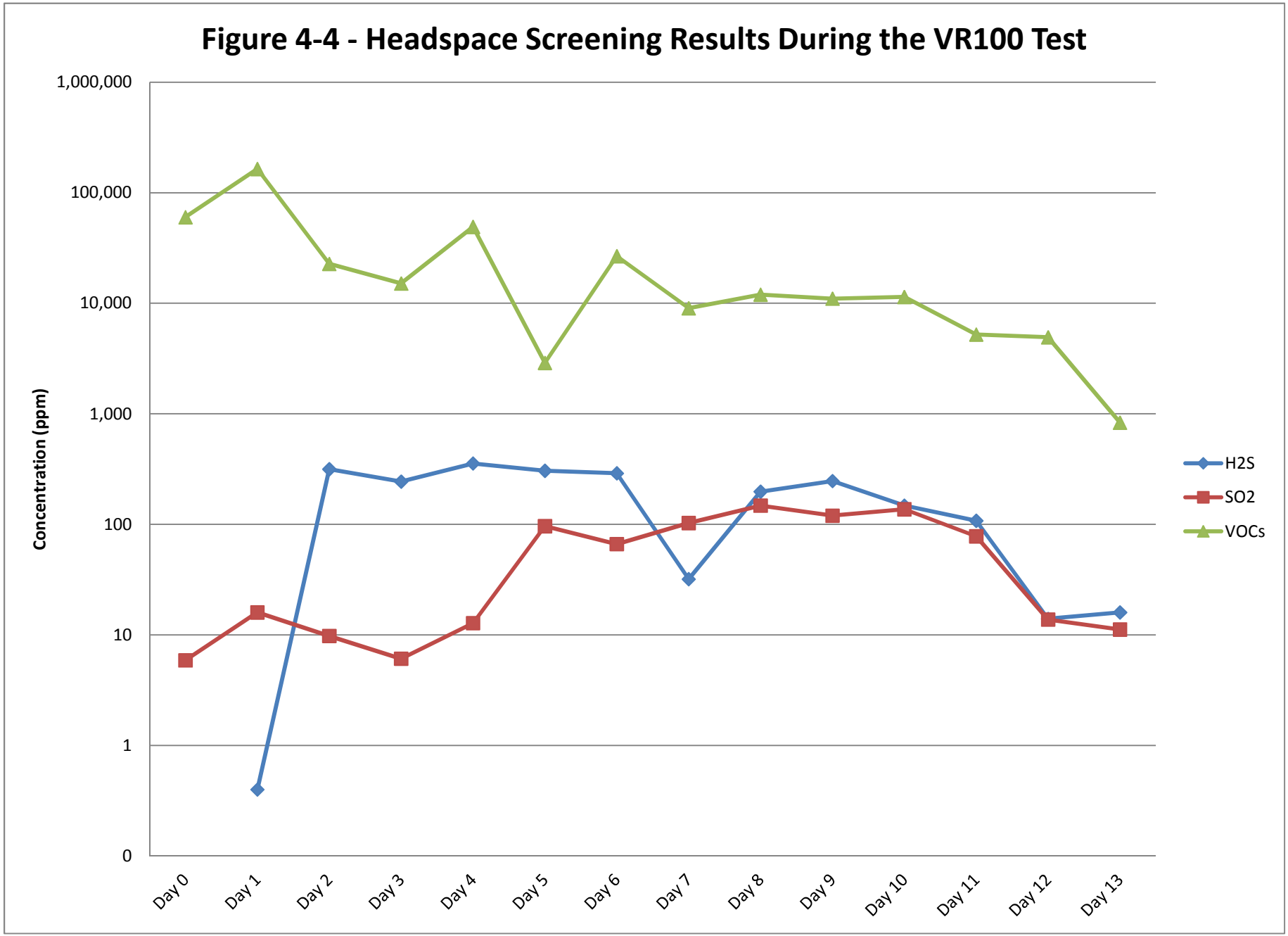


Figure 4-4 - Headspace Screening Results During the VR100 Test



4.2.3 Thermal Treatment Results

The treatability tests previously described in this section were conducted to explore specific objectives as related to the potential application of thermal processes for the treatment of materials contained within Impoundments 1 and 2. Comprehensive data tables with supporting text narratives appear within supporting reports compiled by TerraTherm and their subcontract laboratory (Appendix C). To streamline presentation of study findings, selected results from the box reactor studies performed on VR and HC materials are grouped and reported by test parameter and analytical method. Where applicable, data summaries were also developed to allow direct comparison of material changes imparted by heating and overall efficacy of the thermal treatment process simulated in the laboratory.

Condensate Characterization

Each layer of condensate collected during treatment was individually analyzed for VOCs and SVOCs. For consistency in data presentation among supporting documents, sample nomenclature assigned by the analytical laboratory is retained in Table 4-15. Specifically, the top layer is identified in the laboratory report as "solid" (it consisted of a NAPL) and the bottom layer as the "water" layer. As noted in condensate samples from the trial reactor, BTX are the predominate compounds identified in the condensate. In addition to BTX, the following compounds were also detected in the water fraction only:

- Acetone
- Aniline
- 1,4-Dichlorobenzene
- *ortho*-Cresol
- *meta*-Cresol
- *para*-Cresol
- Phenol
- Pyridine

These results confirm that the speciation of VOCs detected in the condensate is directly correlated with VOCs detected during solid phase analysis of untreated impoundment materials. A comprehensive listing of condensate sample results including TICs is provided in Appendix C.

TABLE 4-15
Laboratory Treatability Studies Report
Summary of Selected Organic Compounds Detected in Box Reactor Condensate

Compound	VR 90°C		VR 90°C		HC 100°C		VR 100°C	
	NAPL[1] (µg/kg)	Water (µg/L)	NAPL (µg/kg)	Water (µg/L)	NAPL (µg/kg)	Water (µg/L)	NAPL (µg/kg)	Water (µg/L)
Benzene	20,200,000	1,470,000	38,400,000	1,310,000	12,700,000	1,230,000	9,840,000	1,090,000
Toluene	2,990,000	136,000	10,500,000	124,000	3,650,000	180,000	2,530,000	135,000
Total Xylene[2]	ND[3]	ND	3,640,000	9,390	747,000	11,500	703,000	10,400
Naphthalene	ND	ND	6,950,000	10,200	ND	ND	ND	ND
2-Methylnaphthalene	80,300	55.50	234,000	43.40	220,000	50.40	720,000	45.70
Fluorene	40,400	25.90	70,600	9.62	139,000	20.90	453,000	23.70

Notes:
1. NAPL = Non-aqueous phase liquid
2. Total xylene calculated by the sum of *ortho, meta, and para* –xylene concentration detected.
3. ND = Not detected

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Treated Material Chemical Characterization

Analyses for total VOCs, SVOCs, and TAL metals for treated impoundment materials were performed in triplicate upon completion of laboratory heating. A comprehensive data set of detected analytes for each analytical method is presented in Appendix C. Minimum, maximum, and average values for selected analytes in VR and HC samples tested at 90°C and 100°C are presented in Table 4-16, Table 4-17, Table 4-18, and Table 4-19.

Additionally, results of TCLP testing for each material and condition tested are presented in Table 4-20. Results of Synthetic Precipitation Leaching Procedure (SPLP) testing, which was also performed during the treatability, are summarized in Appendix C. The TCLP results indicate that the VR material treated at 100°C and the HC impoundment material treated 90°C exceeded TCLP criteria for chromium. In addition, the VR material treated at 100°C also exceeded TCLP criteria for pyridine and benzene. The exceedence for chromium is attributed to corrosion of the metal components in contact with the impoundment material during treatment. In the HC material chromium concentration increased from an untreated average of 6.3 mg/kg to a treated average of 9,517 mg/kg in samples heated to 90°C and an average of 7,640 mg/kg in samples heated to 100°C. Although the magnitude of total change was significantly lower, chromium concentration also increased in the VR impoundment material. The average chromium concentration for VR preheating was 4.2 mg/kg in the untreated material which increased to an average of 20 mg/kg in the 90°C test and 5.8 mg/kg in the 100°C test.

The VR material treated at 100°C also exceeded TCLP criteria for pyridine and benzene. This may be attributed to the treatment being ended before complete VOC removal. Although the VOC concentration in the vapor decreased to below 1,000 ppm on day 13 of treatment (Table 4-14), the concentration of VOCs in the vapor on day 12 was 4,926 ppm. This is a steeper decline in VOC concentration than was observed in either of the other three treatment tests. Thermal treatment testing on VR and HC materials at 90°C and 100°C reduced the concentration of major VOCs (BTX compounds) an average 91 percent Treatment of VR at 90°C and HC at both 90°C and 100°C also resulted in material that successfully passed TCLP criteria for all organic compounds. Additional treatment time for VR material at 100°C is expected to produce material that achieves TCLP criteria.

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TABLE 4-16
Laboratory Treatability Studies Report
Summary of Selected Organic Compounds in Treated VR90 and HC90 Impoundment Materials

Compound	VR 90°C Concentration (µg/kg)			HC 90°C Concentration (µg /kg)		
	Minimum	Maximum	Average	Minimum	Maximum	Average
Volatile Organic Compounds						
Benzene	184,000	201,000	190,333	282,000	656,000	471,333
Toluene	369,000	381,000	377,000	454,000	938,000	701,000
Naphthalene	4,320,000	4,670,000	4,456,667	1,570,000	1,820,000	1,703,333
Total Xylene[1]	535,000	554,000	544,667	464,000	769,000	633,333
1,2-Dichlorobenzene	1,210,000	1,290,000	1,250,000	413,000	538,000	484,667
1,2,4-Trimethylbenzene	213,000	230,000	222,333	66,000	89,100	79,100
sec-Butylbenzene	102,000	113,000	109,000	51,700	77,500	68,567
Cumene	187,000	192,000	188,667	93,700	135,000	117,233
1,3,5-Trimethylbenzene	77,000	85,000	81,733	50,700	53,100	51,900
Ethylbenzene	9,710	10,100	9,880	38,500	38,500	38,500
Semi-Volatile Organic Compounds						
Flourene	242,000	505,000	391,333	205,000	402,000	281,667
2-Methylnaphthalene	52,700	106,000	83,367	53,200	101,000	77,100
Acenaphthene	3,540	3,610	3,577	3,240	3,620	3,387
Aniline	9,810	10,000	9,913	8,990	10,000	9,380

Notes:
[1.] Total xylene calculated by the sum of *ortho, meta, and para* –xylene concentration detected.

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TABLE 4-17
Laboratory Treatability Studies Report
Summary of Selected Metals in Treated VR90 and HC90 Impoundment Materials

Compound	VR 90°C Concentration (mg /kg)			HC 90°C Concentration (mg /kg)		
	Minimum	Maximum	Average	Minimum	Maximum	Average
			Metals			
Aluminum	3,290	4,040	3,710	392	505	467
Arsenic	0.16	0.17	0.167	18.8	43.3	27.7
Barium	7.26	8.5	7.94	6.99	11.2	8.81
Chromium	4.30	50.3	20.2	6,910	14,000	9,517
Copper	24.7	27.0	25.9	92.1	201	129.
Iron	6,660	21,100	11,556	24,300	49,700	34,233
Lead	73.1	74.1	73.5	66.7	90.1	78.1
Nickel	4.94	5.65	5.34	3,420	6,700	4,623
Mercury	0.91	1.13	1.01	1.67	3.14	2.44

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TABLE 4-18
Laboratory Treatability Studies Report
Summary of Selected Organic Compounds in Treated VR100 and HC100 Impoundment Materials

Compound	VR 100°C Concentration (µg/kg)			HC 100°C Concentration (µg/kg)		
	Minimum	Maximum	Average	Minimum	Maximum	Average
Semi-Volatile Compounds						
Benzene	30,000	31,500	30,600	304,000	479,000	390,000
Toluene	148,000	163,000	154,333	351,000	528,000	443,333
Naphthalene	2,240,000	2,510,000	2,413,333	522,000	730,000	620,000
Total Xylene[1]	248,000	259,000	253,667	235,000	338,000	288,333
1,2-Dichlorobenzene	2,710	3,010	2,853	858	882	871
1,2,4-Trimethylbenzene	133,000	143,000	137,333	31,600	43,300	37,600
sec-Butylbenzene	104,000	114,000	109,000	29,600	36,800	33,400
Cumene	73,800	78,000	75,867	41,600	56,100	49,267
1,3,5-Trimethylbenzene	79,000	84,300	82,000	22,900	29,700	26,567
Ethylbenzene	3,450	3,820	3,627	12,900	18,800	15,967
Semi-Volatile Compounds						
Flourene	221,000	436,000	317,667	76,800	102,000	90,667
2-Methylnaphthalene	52,600	108,000	73,900	19,100	25,000	22,633
Acenaphthene	1,630	1,640	1,637	724	1,620	1,028
Aniline	4,800	11,100	8,163	2,010	2,090	2,050

Notes:
[1.] Total xylene calculated by the sum of *ortho, meta, and para* –xylene concentration detected.

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TABLE 4-19
Laboratory Treatability Studies Report
Summary of Selected Metals in Treated VR100 and HC100 Impoundment Materials

Compound	VR 100°C Concentration (mg/kg)			HC 100°C Concentration (mg/kg)		
	Minimum	Maximum	Average	Minimum	Maximum	Average
			Metals			
Aluminum	4,330	5,550	4,757	514	578	544
Arsenic	0.150	0.150	0.150	14.0	26.3	22.1
Barium	7.17	9.94	8.16	10.3	11.4	10.7
Chromium	3.06	9.22	5.82	7,310	7,890	7,640
Copper	42.1	314	164	126	150	135
Iron	2,700	4,110	3,287	23,600	28,000	26,133
Lead	59.2	76.9	65.4	73.1	98.4	86.5
Nickel	4.8	12	7.25	4420	4740	4633
Mercury	0.21	0.33	0.273	2.39	2.77	2.52

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TABLE 4-20
Laboratory Treatability Studies Report
TCLP Results – VR and HC Impoundment Materials Post-heating

Compound	TCLP Criteria (milligrams per liter [mg/L])	VR 90°C - TCLP (mg/L)	HC 90°C - TCLP (mg/L)	VR 100°C - TCLP (mg/L)	HC 100°C - TCLP (mg/L)
Metals					
Barium	100	0.13	0.051	0.02	0.055
Cadmium	1.0	ND[1]	0.0028	ND	0.028
Chromium	5.0	0.068	186[2]	ND	233
Lead	5.0	0.028	0.42	ND	0.46
Selenium	1.0	ND	0.034	ND	ND
Silver	5.0	0.0033	ND	0.0032	0.0085
Mercury	0.2	ND	0.00009	ND	0.0004
SVOCs					
1,4-Dichlorobenzene	7.5	ND	ND	0.083	0.062
Cresols	200	ND	ND	0.241	0.391
Pyridine	5.0	ND	2.37	ND	6.47
m,p-Cresol	200	ND	ND	0.214	0.359
o-Cresol	200	ND	ND	0.026	0.033
VOCs					
2-Butanone	200	ND	ND	0.0094	0.301
Benzene	0.5	0.08	2.52	0.564	13

Notes:
1. ND = Not Detected
2. Shaded cells exceeded respective TCLP threshold concentration.

Vapor Sampling

As previously described, vapor samples for VOCs, malodorous compounds, aldehydes, and acid gases were collected following the condenser five times during sample heating. Regardless of material type tested, vapor generated during heating was highly enriched in VOCs; the speciation of vapor phase VOCs correlated well with VOCs detected during solid-phase analysis of untreated VR material. With increasing time at each treatment temperature, VOCs present in the vapor exiting the condenser decreased significantly as anticipated.

In general, results of the malodorous compound testing revealed that the analytes were observed at the greatest concentration within days 1 through 3 of treatment. A significant concentration decrease with increasing time was observed for all parameters. The highest concentrations were seen as hydrogen sulfide, carbon disulfide, and thiophenes. Hydrogen sulfide remained in the sample after treatment at elevated concentrations. A comprehensive data set of detected analytes for each analytical method is additionally presented in Appendix C.

Selected results for malodorous compounds and VOCs detected are presented for VR and HC material at 90°C and 100°C in Table 4-21, Table 4-22, and Table 4-23. Results of aldehyde and acid gas testing for box reactor vapor effluent were consistent with analytes observed during completion of the trial reactor previously described. These

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compounds were not major constituents in the vapors from the impoundment materials during and after treatment and results for aldehyde, and acid gas samples are presented in Appendix C.

TABLE 4-21

Laboratory Treatability Studies Report

Summary of Selected Vapor Phase Malodorous Compounds Detected During Thermal Treatment of Impoundment Materials at 90°C

Material	Compound	Ambient T_0 ($\mu g/m^3$)	DAY 1 ($\mu g/m^3$)	< 50,000 ppm ($\mu g/m^3$)	< 1,000 ppm ($\mu g/m^3$)	Ambient T_f ($\mu g/m^3$)
VR 90°C	Hydrogen Sulfide	640	1,400,000	2,700,000	1,500,000	2,900
	Carbonyl Sulfide	200	2,900	7,200	13,000	3,100
	Methyl Mercaptan	ND	28,000	41,000	16,000	100
	Ethyl Mercaptan	ND	2,700	7,800	2,700	47
	Dimethyl Sulfide	680	26,000	10,000	2,500	510
	Carbon Disulfide	48,000	1,100,000	100,000	22,000	3,300
	Ethyl Methyl Sulfide	170	1,800	ND	520	120
	Thiophene	66	3,900	6,000	2,200	360
HC 90°C	Hydrogen Sulfide	64,000	32,000,000	420,000	110,000	28,000
	Carbonyl Sulfide	1,500	26,000	12,000	7,300	310
	Methyl Mercaptan	540	700,000	7,300	980	150
	Ethyl Mercaptan	ND	55,000	980	140	ND
	Dimethyl Sulfide	13,000	84,000	20,000	9,000	2,400
	Carbon Disulfide	770,000	620,000	25,000	12,000	1,300
	Ethyl Methyl Sulfide	2,600	5,500	3,000	980	350
	Thiophene	2,800	19,000	43,000	8,300	3,900

TABLE 4-22

Laboratory Treatability Studies Report

Summary of Selected Vapor Phase Malodorous Compounds Detected During Thermal Treatment of Impoundment Materials at 100°C

Material	Compound	Ambient T_0 ($\mu g/m^3$)	DAY 1 ($\mu g/m^3$)	< 50,000 ppm ($\mu g/m^3$)	< 1,000 ppm ($\mu g/m^3$)	Ambient T_f ($\mu g/m^3$)
VR 100°C	Hydrogen Sulfide	640	120,000	6,100,000	3,600,000	470,000
	Carbonyl Sulfide	200	1,100	31,000	95,000	11,000
	Methyl Mercaptan	ND	17,000	47,000	11,000	320
	Ethyl Mercaptan	ND	4,200	10,000	2,700	ND
	Dimethyl Sulfide	680	3,900	19,000	4,000	23,000
	Carbon Disulfide	48,000	48,000	54,000	18,000	6,200
	Ethyl Methyl Sulfide	170	1,300	ND	ND	2,300
	Thiophene	66	9,500	14,000	6,800	23,000

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	Hydrogen Sulfide	64,000	1,200,000	4,500,000	350,000	22,000
	Carbonyl Sulfide	1,500	12,000	6,000	10,000	16,000
	Methyl Mercaptan	540	91,000	20,000	2,900	230
	Ethyl Mercaptan	ND	22,000	3,300	ND	74
	Dimethyl Sulfide	13,000	63,000	31,000	24,000	1,400
HC 100°C	Carbon Disulfide	770,000	110,000	15,000	16,000	7,800
	Isopropyl Mercaptan	ND	5,900	ND	ND	99
	tert-Butyl Mercaptan	ND	11,000	ND	ND	240
	n-Propyl Mercaptan	ND	3,100	ND	ND	ND
	Ethyl Methyl Sulfide	2,600	9,400	ND	2,500	340
	Thiophene	2,800	56,000	32,000	30,000	5,900

TABLE 4-23

Laboratory Treatability Studies Report

Summary of Selected Vapor Phase VOCs Detected During Thermal Treatment of Impoundment Materials

Material	Compound	Ambient T_0 ($\mu g/m^3$)[1]	DAY 1 ($\mu g/m^3$)	< 50,000 ppm ($\mu g/m^3$)	< 1,000 ppm ($\mu g/m^3$)	Ambient T_f ($\mu g/m^3$)[1]
	Acetone	ND[2]	ND	ND	28,000	ND
	Carbon Disulfide	333,000	610,000	98,000	3000	ND
VR 90°C	Benzene	110,000,000	34,000,000	64,000,000	420,000	920,000
	Toluene	14,000,000	340,000	4,600,000	71,000	650,000
	m,p-Xylene	1,000,000	ND	ND	900	140,000
	Acetone	ND	1,200,000	110,000	27,000	ND
	Carbon Disulfide	550,000	ND	ND	5,300	ND
HC 90°C	Benzene	180,000,000	110,000,000	7,300,000	310,000	2,000,000
	Toluene	22,000,000	17,000,000	4,600,000	150,000	1,600,000
	m,p-Xylene	1,400,000	430,000	620,000	19,000	710,000
	Acetone	ND	ND	140,000	81,000	68,000
	Carbon Disulfide	330,000	160,000	ND	7,300	4,500
VR 100°C	Benzene	110,000,000	12,000,000	9,800,000	400,000	150,000
	Toluene	14,000,000	990,000	3,900,000	510,000	280,000
	m,p-Xylene	1,000,000	44,000	240,000	130,000	97,000
	Acetone	ND	64,000	72,000	150,000	ND
	Carbon Disulfide	550,000	5,300	ND	16,000	ND
HC 100°C	Benzene	180,000,000	1,200,000	6,000,000	3,900,000	ND
	Toluene	22,000,000	810,000	2,500,000	3,000,000	1,400,000
	m,p-Xylene	1,400,000	200,000	330,000	870,000	190,000

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Notes:
1. Ambient temperature samples (T_0)were evaluated using a different analytical approach than samples measured during active reactor heating operations. Final samples of treated material therefore may not compare unfavorably to vapor samples collected on the final day of box reactor heating.
2. ND = Not Detected

4.2.4 Thermal Treatability Test Conclusions

The thermal treatability study confirmed that controlled heating of VR and HC materials at the Site was successful in significantly reducing the VOCs and SVOCs concentrations. A summary of treatment efficacy by material type and temperature is illustrated on Figure 4-1 for the HC material and Figure 4-2 for the VR material. Data plotted for each test condition represent the average pre- and post-treatment concentration for BTX and naphthalene, which were determined to be the predominant compounds detected in the impoundment materials. Overall, thermal treatment resulted in the following removal efficiencies:

- HC material treated at 90°C
    - Benzene was reduced from an average of 33,100,000 to 471,133 µg/kg, or 99.58 percent removal
    - Toluene was reduced from an average of 6,866,667 to 701,000 µg/kg, or 89.79 percent removal
    - Total xylenes were reduced from an average of 2,203,333 to 633,333 µg/kg, or 71.26 percent removal
    - Naphthalene was reduced from an average of 1,816,667 to 1,703,333 µg/kg, or 6.24 percent removal. Unlike BTX which possess significant vapor pressures, naphthalene exhibits low vapor. Naphthalene also has a boiling point of 218°C (compared to 80 °C for benzene) therefore its removal efficiency by thermal treatment at 90°C and 100°C was expected to be comparatively lower than the BTX suite which exhibit appreciable volatility and lower boiling points.
- HC material treated at 100°C
    - Benzene was reduced from an average of 33,100,000 to 390,000 µg/kg, or 99.82 percent removal
    - Toluene was reduced from an average of 6,866,667 to 443,333 µg/kg, or 93.54 percent removal
    - Total xylenes were reduced from an average of 2,203,333 to 288,333 µg/kg, or 86.91 percent removal
    - Naphthalene was reduced from an average of 1,816,667 to 620,000 µg/kg, or 65.87 percent removal
- VR material treated at 90°C
    - Benzene was reduced from an average of 21,100,000 to 190,333 µg/kg, or 99.10 percent removal
    - Toluene was reduced from an average of 6,306,667 to 377,000 µg/kg, or 94.02 percent removal
    - Total xylenes were reduced from an average of 1,886,667 to 544,667 µg/kg, or 71.13 percent removal
    - Naphthalene increased from an average of 3,410,000 to 4,456,667 µg/kg. Based on the initial concentration and starting mass of VR, approximately 8.7 grams of naphthalene was present in the box reactor. Given the post treatment VR mass and final concentration, approximately 7.1 grams of naphthalene remained after heating. The difference in naphthalene mass in the reactor before and after treatment suggests that a small fraction was removed through heating As previously stated, naphthalene is far less volatile than BTX and since this test condition occurred well below its boiling point, significant removal was not expected. Overall naphthalene mass reduction measured 18.85%.

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- VR material treated at 100°C
    - Benzene was reduced from an average of 21,100,000 to 30,600 µg/kg, or 99.85 percent removal
    - Toluene was reduced from an average of 6,306,667 to 154,333 µg/kg, or 97.55 percent removal
    - Total xylenes were reduced from an average of 1,886,667 to 253,667 µg/kg, or 86.55 percent removal
    - Naphthalene was reduced from an average of 3,410,000 to 2,413,333 µg/kg, or 29.23 percent removal

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Figure 4-5 - BTX and Nap Reductions in HC Materials Pre- and Post-Treatment

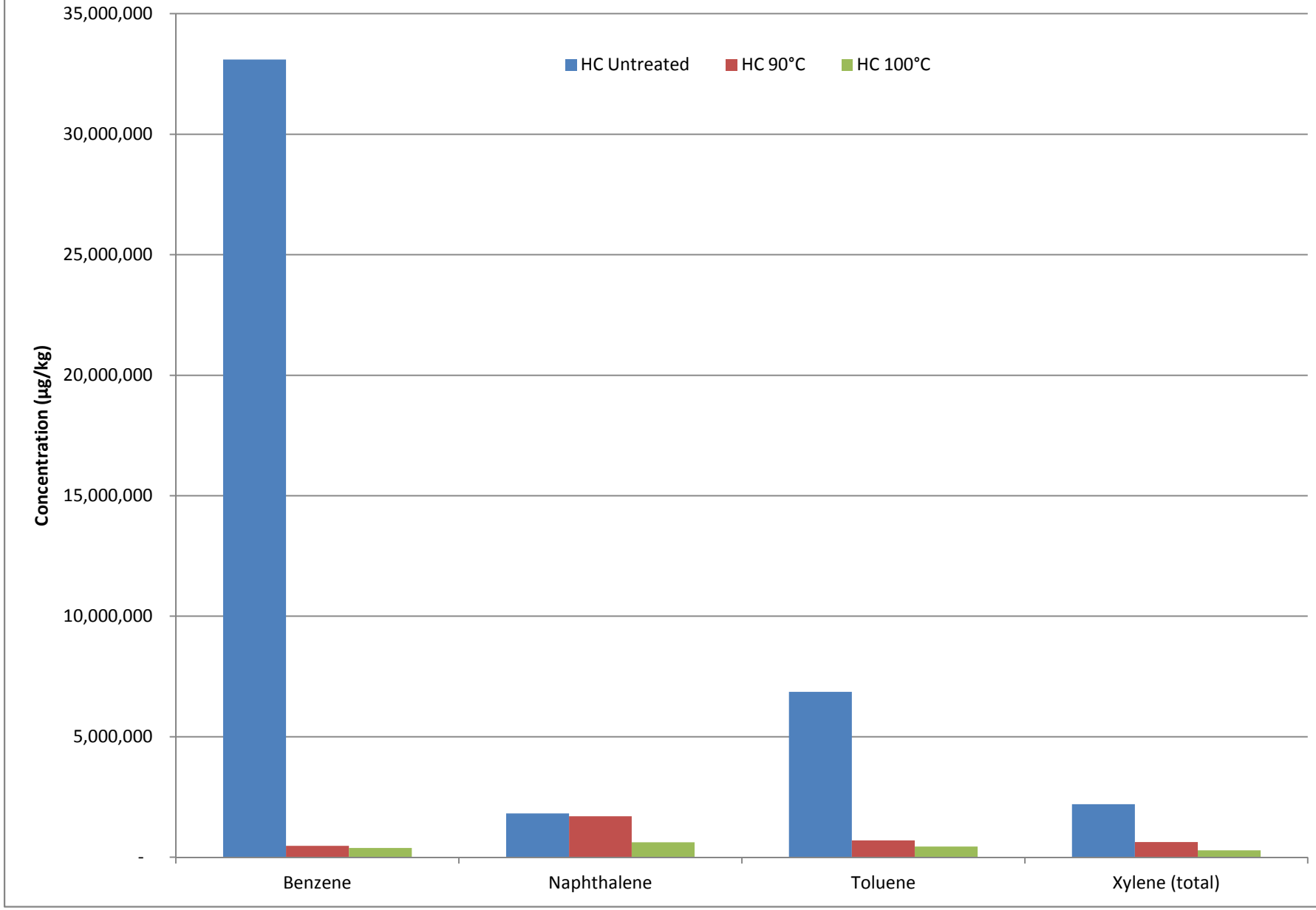
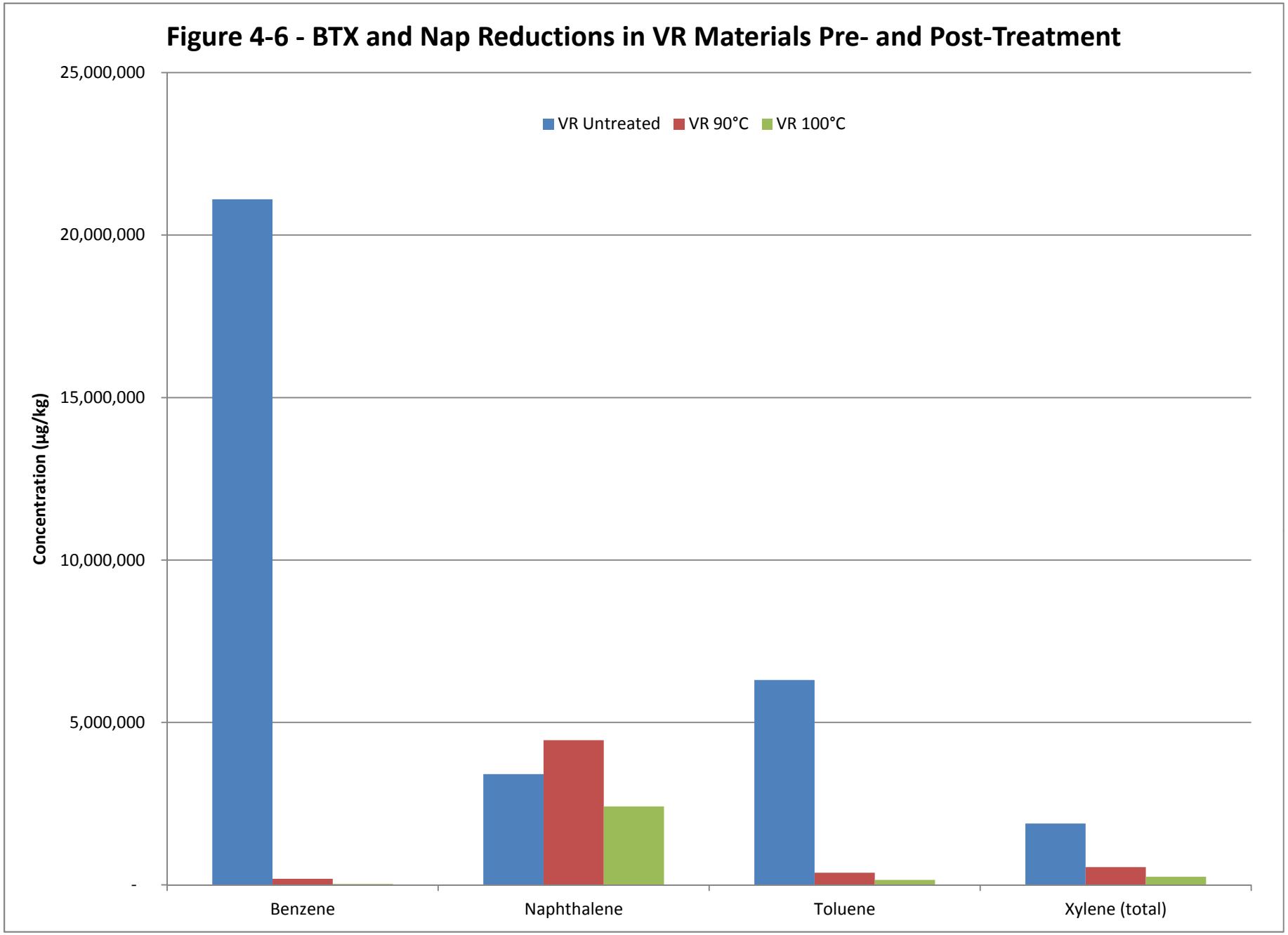


Figure 4-6 - BTX and Nap Reductions in VR Materials Pre- and Post-Treatment



Specific conclusions developed through this study include:

- The condensate produced during the thermal treatment generally produced similar observations and pH results for both the 90°C and 100°C treatments for each impoundment material. During the ramp up to 90°C and 100°C temperatures, the condensate for both VR and HC were generally clear with an oily NAPL on the surface.
- Condensate production seemed more prevalent and longer lasting for the VR material than the HC material.
- The TCLP results for the 90°C treatment are below the RCRA hazardous waste criteria, with the exception of chromium in the HC 90°C material.
- The HC 100°C TCLP results for benzene, pyridine, and chromium exceed RCRA hazardous waste criteria.
    - Chromium can be attributed to corrosion of the box reactor and thermocouple during treatment
    - Additional treatment time is expected to reduce pyridine and benzene to concentrations that would pass a TCLP test.
- Staining on the side walls of the reactor were observed in the VR material for both the 90° and 100°C treatments. The staining indicates that the material swells during heating and then subsides as it cools or subsides as the temperature stabilizes. Once the VR cools, it forms a flat, smooth, glassy surface below the stained sidewalls. It is not known if the swelling occurs along the side walls, or the entire volume of material swells uniformly. Swelling for the VR material appears to be approximately 30 to 40 percent during heating, and an expansion of approximately 3 to 5 percent after cooling.
- Extensive corrosion occurred in the reactors during the thermal treatment. Rust was observed in both the VR and HC materials, reactors, and thermocouples.
- An increase in the trace metals iron, manganese, aluminum, nickel and chromium occurred as compared to the untreated materials. Potential sources of trace metals include, (1) metal alloy and copper thermocouples that showed significant signs of rusting and pitting after treatment, (2) carbon steel reactors that showed significant rusting after treatment, and (3) aluminum foil used in the VR material reactors. Note the aluminum foil was used during testing to help facilitate removal of the treated materials from the reactor following testing; however, the foil partially disintegrated during testing.
- Moisture was retained by the material even after 24 days of heating at 90°C and after 14 days of heating at 100°C. Free water was observed in the bottom of the reactor in the HC material at both 90°C and 100°C. More free water was observed in the HC 100°C reactor.
- The HC responds to heat treatment in both target temperatures by forming a thin bubbly surface. Upon cooling, this surface hardens in place forming a thin fragile “shell.” The VR 90°C material produced a “matted” taffy behavior after treatment and cooling, whereas the VR 100°C material hardens into a stiff material when cooled.

4.3 Physical Properties Testing

Since physical characteristics will figure strongly in the identification and implementation of remedial strategies for the impoundment materials, a portion of the bench-scale studies focused specifically on assessing change in material properties as a function of temperature and sustained heating conditions.

In general, physical property testing methods are designed for solid matrices representative of soil. Despite the solid and semi-solid nature of HC and VR impoundment materials, respectively, these materials do not behave like soil. As such, the application of physical testing methods to the impoundment materials was challenging. More importantly, however, is the understanding that testing methods likely introduced bias to several of the physical tests proposed and completed in this study. Based on limitations posed by the materials studied, results for several tests defined within the work plan were rejected by the testing laboratory. Where feasible, the rationale

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for data rejection will be discussed. The following sections summarize testing observations and laboratory results compiled to characterize the physical properties of VR and HC materials from Impoundment 2.

4.3.1 Viscosity and Specific Gravity Evaluation

Viscosity and density of the Impoundment 2 material was evaluated in the laboratory over the range of temperatures typically encountered during in-situ thermal treatment operations. Testing was proposed for both VR and HC material at the following temperature conditions: 30°C, 50°C, 70°C, and 90°C. Upon heating, VR material readily liquefied to allow measurement for specific gravity and viscosity. Measurement of specific gravity and viscosity for HC material; however, was not feasible given its physical properties. Analysis results are presented in Table 4-24. Photographs of the VR materials at the different temperatures are located in Appendix B.

TABLE 4-24

Laboratory Treatability Studies Report

Results of Viscosity Testing of HC and VR Materials

Test Parameter	HC Material[1]	VR Material
Density: at 30˚C (PCF)[3]	NT[5]	65.9[2]
Density: at 50˚C (PCF)	NT	66.2[2]
Density: at 70˚C (PCF)	NT	65.3[2]
Density: at 90˚C(PCF)	NT	66[2]
Viscosity: at ambient 17˚C (cP)[4]	NT	10,850 to 35,150
Viscosity: at 90˚C (cP)	NT	1,732 to 1,832

Notes:
[1] The viscosity of HC materials could not be tested because the material did not melt during the test temperatures.
[2.] Rejected Value
[3.] (PCF) Pounds per Cubic Foot
[4.] (cP) = Centipoise
[5.] NT = Not Tested

The testing results indicated that heating did not appreciably change the density of VR material; however, during layered heating studies described in Section 4.4.1, the VR material was observed to rise and float on the water as the temperature reached 70°C.In addition, the volume of the VR material increased by approximately thre during the trial reactor studies. Therefore, the density of the material must have decreased during thermal treatment. Consequently the density data for the VR material has been rejected.

During viscosity testing of the VR material at temperatures between ambient and 90°C “channeling” of the spindle agitating the sample was observed. The channeling was caused due to the viscosity of the material being too great to allow the material to flow back into the area swept by the spindle during agitation of the sample. Measurements between 30 and 90 therefore, were rejected by the laboratory based on direct observation of material behavior in the test cell.

4.3.2 Physical Properties – Untreated Materials

Selected physical properties of untreated Impoundment material are summarized in Table 4-25. As previously noted, the chemical characteristics of both the VR and HC material hindered completion of selected physical tests proposed in the work plan. The test apparatus for hydraulic conductivity (HC only) and triaxial shear testing require sample placement in a cylindrical membrane. Although material (HC only) was successfully packed into the sleeve, vapor emissions from the sample inflated the membrane in several locations and prevented completion of both tests. In lieu of performing hydraulic conductivity analysis, Laboratory Vane Shear testing was

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performed. This test provides shear strength of the material at a phi angle of zero (0). The VR sample did not hold form long enough to complete the UCS test. Photographs of the UCS testing are depicted in Appendix B.

TABLE 4-25

Laboratory Treatability Studies Report

Physical Properties of Untreated Impoundment Materials

Test Parameter	HC Material	VR Material
Hydraulic Conductivity	VE[1]	NR[2]
Bulk Density (PCF)[3]	59.2	65.9
Solid Specific Gravity	1.2	*
C.U. Triaxial Test (Cu) Ksf	VE	VE
Vane Shear (TSF)[4]	0.03	0.05
UCS	0.0 psi	Test Failed
Particle Size Distribution	% Gravel = 0.0 % Sand = 62.5 % Silt = 15.0 % Clay = 22.5	NR

Notes:
1. VE = Volatile Expansion
2. NR = Not Reported
3. PCF = Pounds per cubic foot
4. TSF = Tons per square foot

4.3.3 Physical Properties – Thermally Treated Impoundment Materials

Compressive strength of thermally treated impoundment materials was measured to help evaluate change in physical properties following sustained exposure to elevated temperatures. The physical properties of treated impoundment material are summarized in Table 4-26. Physical properties testing for treated impoundment materials were evaluated in accordance with the work plan with two notable exceptions:

- Based on sample matrix characteristics and observed behavior of the impoundment material after heating, representative samples could not be remolded for UCS, hydraulic conductivity, and triaxial shear testing. Rather, samples were prepared explicitly for compressive strength testing by placing untreated impoundment material into a plastic cylinder mold; the cylinders were subsequently heated to the target treatment temperatures and held under isothermal conditions for the same duration as the box reactor studies previously discussed. Due to the expansion of the VR material, additional material was placed in the mold top daily to ensure it remained full. After several days at treatment temperature, the expansion of material outside the cylinder molds ceased. After the designated treatment times, the samples were removed from the molds and tested.
- Laboratory vane shear testing was substituted in lieu of the triaxial shear testing, which could not be tested due to volatile expansion of the material following sample placement within the membrane sleeves used to isolate the sample from the lateral confining pressure conditions.

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TABLE 4-26

Laboratory Treatability Studies Report

Physical Properties of Treated Impoundment Materials

Test Parameter	VR 90°C	HC 90°C	VR 100°C	HC 100°C
Bulk Density (PCF) [1]	69.4	77.9	69	85.7
Porosity (1)	NR[2]	32.6	NR	16.44
Water Content (%)	26.73	19.54	11.44	25.46
Solid Specific Gravity	NR	1.55	NR	1.31
U.U. Triaxial Test	No Results	No Results	No Results	No Results
Vane Shear (TSF)[3]	> 0.6	0.28	> 0.6	0.25
UCS (psi)[3]	4.4	38.4	9.3	80.1
Hydraulic Conductivity	Failed under own weight	No Results	Failed under own weight	No Results
Particle Size Distribution	NR	%Gravel=21.6 %Sand=50.3 %Silt=3.8 %Clay=24.4	NR	%Gravel= 33.8 %Sand=37.9 %Silt=4.3 %Clay=24.0

Notes:
1. PCF = Pounds per cubic foot
2. NR = Not Reported
3. psi = pounds per square inch

Detailed study of physical properties of impoundment materials before and after thermal treatment provided the following observations:

- The density of the material did not significantly change with increasing temperature according to laboratory measurements completed. However, observations from the layering study discussed in the next section suggest that temperature does induce density reduction in both the VR and HC materials. This was documented when VR and HC both floated in a water column which was heated above approximatly 80°C.
- The VR material did not have enough strength to maintain shape during triaxial testing. The HC material maintained a marginal shape during testing, but volatilization continued to produce vapor into the system (water lines) and prohibited performing the test.
- The laboratory vane shear testing indicated a significant increase in shear strength compared to untreated conditions in both materials. The VR material hardens into a stiff taffy and possesses greater shear strength than the HC material.
- Treated VR material possesses very little compressive strength (4 to 9 psi). With increasing load, treated VR material compressed and laterally expanded; the specimen did not shear of mechanically fracture during testing.
- Treated HC material appears to gain significant compressive strength achieving fracture points of 38 psi to 80 psi in the two conditions tested.
- The HC and VR treated at 100°C gained higher compressive strength values. Untreated unconfined strength for both materials was 0 psi.

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- Particle size distribution testing revealed that the treated HC material has significantly more gravel size fractions than the untreated material. The treated material appears to produce conglomerates from smaller fractions. However, these larger fractions could be mechanically pulverized into smaller fractions.

4.4 Thermal Stability Testing

Several qualitative experiments were commissioned during the treatability study to gain basic knowledge of the effects of heating on Impoundment 2 materials.

4.4.1 Layered Heating

To investigate the vertical stability of water, VR, and HC during heating, a layered column was constructed using untreated materials and introduced to a temperature-controlled water bath. To emulate field conditions HC was placed beneath VR in the column; water was then added to cover the materials in the column The column was slowly heated to (30°C, 50°C, 70°C, and 90°C) and was allowed to remain at each temperature for 24 hours. During heating, column headspace was monitored for VOCs using a hand-held FID. The evaluation was performed to assess if natural mixing of the VR and HC materials would occur during heating. The following table (Table 4-27) provides a summary of the observations during heating of the layered materials.

TABLE 4-27

Laboratory Treatability Studies Report

Layered Heating Evaluation Laboratory Observations

Target Temperature	Description
30°C	The untreated material was heated at the target temperature for 24 hours. A gray layer formed on top of the VR sample. The VR, HC, and water did not move or mix throughout the test. Small peaks formed on the surface of the VR, but did not float upward. VOC range: 301.8 to 3859 ppm
50°C	The material was heated at the target temperature for 24 hours. A layer of the VR floated to the top of the water and remained there. The VR, HC, and water did not move or mix throughout the test. VOC range: 311.5 to 1544 ppm
70°C	The material was heated at the target temperature for 24 hours. A thin layer of the VR moved to the top of the water. The VR and HC material moved slightly up, and a thin layer of water formed beneath the HC (See photograph in Appendix B). Overnight, the water on top of the sample evaporated and the VR encapsulated around the HC. VOC range: 114.9 to 1331 ppm
90°C	The material was heated at the target temperature for 24 hours. The HC and VR material moved up and down the vial, exchanging places with the water. Overnight, the water on the sample evaporated and the VR expanded out of the vial. The materials did not mix. VOC range: 31 to above 50,000 ppm

4.4.2 Sample Reheating and Liquefaction Testing

To evaluate reversibility of heating operations and evaluate if heated VR material exhibited potential vertical mobility, the treated VR and HC from 100°C trials were reheated in a water bath at prescribed heating intervals and observed for 24 hours. Observations are summarized as follows:

- **HC 100**°C **-** The sample was prepared using a clear 40-milliliter vial. 1.4 inches of HC 100°C treated material and 1.4 inches of glass beads were inside. For 90 minutes the vial was suspended in a boiling water bath. The reheated material did not move down into glass beads, and liquefaction of the treated HC material did not occur.
- **VR 100**°C **-** The sample was prepared using a clear 40-milliliter vial 1.4 inches of VR 100°C treated material and 1.4 inches of glass beads were inside. For 90 minutes the vial was suspended in a boiling water bath.

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At a sample temperature of 65.5°C, migration of reheated VR material into the dry glass beads was observed. With increasing time, reheated VR material continued slow migration into the glass beads.

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SECTION 5

Mixing, pH Adjustment, and Solidification and Stabilization Study and Results

5.1 Mixing, pH Adjustment, and Solidification and Stabilization Studies

The mixing, pH adjustment, and solidification/stabilization treatability studies evaluate different mixing methodologies of both thermally treated and raw impoundment material. The laboratory studies evaluated mixing methods of six different alkaline compounds and seven different pozzolan recipes (although not every compound screened is a pozzolan by definition, for this report all compounds screened are being referred to as pozzolans) for solidification/stabilization.

5.2 Bulk Heating

Bulk heating operations were conducted for the sole purpose of preparing materials for subsequent study in pH adjustment and solidification/stabilization evaluations. As such, detailed analytical evaluation of materials heated in each round was not performed. Samples of Impoundment 1 and 2 materials were heated in a temperature-controlled laboratory oven to simulate the effects of thermal treatment. Following a fixed heating period of 100°C for 7 days, impoundment materials were cooled, visually inspected, and shipped to Remedial Construction Services, L.P. (RECON), for inclusion in their homogenization, pH adjustment and stabilization/solidification evaluations. The types and quantities of impoundment materials prepared were based on requirement for RECON to implement homogenization, pH adjustment, and solidification/stabilization treatability studies. Further discussion of these studies is found in Section 5. The impoundment materials were heated for further study by RECON in three discrete heating rounds:

- Round 1 – Impoundment 2 HC and VR Material
- Round 2 – Impoundment 1 HC Material
- Round 3 – Impoundment 1 CA, CL, SSL, and VR materials.

During the bulk thermal heating, the impoundment materials were heated in Teflon-lined, 5-gallon steel buckets. A photograph of the bulk heating set up is depicted in Appendix B. Headspace above the impoundment materials was purged with air during the heating process and monitored using a flame ionization detector (FID) and a hydrogen sulfide and sulfur dioxide meter. Vapor generated during heating operations was passed through a surface condenser, a caustic impinger, and granulated activated carbon prior to discharge; vapor treatment operations were all conducted within a laboratory fume hood. Basic observations of bulk heating operations including vapor screening results, sample weight, and visual characteristics of impoundment materials pre- and post-heating were recorded. Results and observations compiled during bulk treatment are documented in Appendix C.

Because different types of impoundment materials were heated, experimental observations differed slightly between each round of heating. All heating rounds produced a significant volume of liquid condensate, which was generally composed of three distinct layers. The pH of the condensate was measured using pH paper and ranged from 2 to 10. Generally the condensate consisted of the following:

- An upper clear yellow layer of non-aqueous phase liquid (NAPL) with a strong gasoline-like odor; layer pH varied between material heated but typically ranged from 2-4 standard units (SU)
- A middle layer of white milky NAPL with a strong tar odor. The pH of this layer ranged from 2-3 SU.

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- A bottom layer of light-green to grayish brown residue with a gritty texture. In general pH for this layer ranged from 8-10 SU.

Photographs, contained in Appendix B clearly illustrate the layers of condensate produced during bulk heating operations. Detailed physical descriptions of the bulk thermally heated materials are contained in Section 5 of this report.

5.3 Study Design and Treatability Objectives

The first step entailed different mixing methodologies of thermally treated and raw impoundment materials followed by in-situ stabilization and solidification. The acidity of the impoundment materials has a detrimental effect upon the chemistry of the stabilization/solidification admixture. Therefore, the treatability testing includes the addition of a pH buffering agent at the time of mixing and homogenization to raise the material pH to enable the stabilization/solidification admixture to optimally react and provide maximum final material strength and permeability reduction. Following the homogenization and pH adjustment, the solidification aspect of the process involves adding binders to absorb free porewater and liquids and increase the bearing capacity of the material. The stabilization part of the process involves adding chemicals to react with the impoundment material constituents to form a crystalline structure that reduces mobility of impoundment material compounds. Solidification/stabilization treatment typically accomplishes:

- Reduced contaminant solubility by formation of sorbed species or insoluble precipitates
- Improved physical strength and handling characteristics
- Decreased exposed surface area across which mass transfer of contaminants may occur
- Reduced contact between transport fluids and contaminants by reducing the permeability of the material

This work evaluated the benefits and feasibility of sequentially treating impoundment contents and determined whether the treated materials meet Land Disposal Restriction guidelines for subsequent disposal.

5.3.1 Homogenization

Impoundments 1 and 2 contain layers of various materials with physical properties that differ significantly between each impoundment. During a full-scale in-situ solidification/stabilization treatment scenario, the various material layers would be mixed together within the impoundment. To mimic this layered-impoundment structure at laboratory scale, 18-kg layered waste material models of each impoundment were created. Thermally treated impoundment materials were provided for testing as described in Section 5.2 of this Report. The target mass of 18 kg was used to create a model that fits into a standard 5-gallon polyethylene bucket. The mass of each layer in the model was based on data collected as part of the 2010 impoundment materials characterization (OBG 2010). Four 18-kg models were created, as follows:

- Impoundment 1 Raw Material (IMP 1 RM),
- Impoundment 2 Raw Material (IMP 2 RM)
- Impoundment 1 Thermally Treated Material (IMP 1 TT)
- Impoundment 2 Thermally Treated Material (IMP 2 TT)

Raw Impoundment Material

The impoundment materials (VR, HC, CA, SSL, and CL) collected in January and February 2012 were segregated in to individual containers by material type and shipped to RECON. Prior to constructing the models of each impoundment, the individual impoundment materials were mixed to create a more uniform blend for that material. The mixed individual impoundment materials were used to create models of IMP 1 RM and IMP 2 RM. The target percentages used for the models were:

- Impoundment 1 (Layered Bottom to Top – see Figure 5-1)

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  - HC Material – 28 percent
  - CA – 21 percent
  - SSL - 8 percent
  - HC Material - 28 percent
  - VR Material - 4.0 percent
  - CL Material -11 percent
  - One inch of Impoundment 1 water (water cap)
- Impoundment 2 (Layered Bottom to Top – see Figure 5-2)
  - HC – 43%
  - VR/HC 50/50 Blend – 14%
  - VR – 36%
  - VR/HC 50/50 Blend 7%
  - 1 inch of Impoundment 2 water (water cap)

In-situ solidification/stabilization treatment is often accomplished by advancing an auger through contaminated media (column mixing) to mix solidification/stabilization additives into the media. Upon completion of the raw impoundment material models, auger-column mixing of the layers was simulated while sampling the headspace air to evaluate the emissions during this step. An apparatus was created to simulate column mixing within a sealed system. The apparatus consisted of a flat-disk drywall compound mixing blade with a shaft through a gasket-sealed aperture that could be advanced through the 18-kg model.

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FIGURE 5-1
Impoundment 1 Material Cross Section
Impoundments 1 and 2 Treatability Study Results Report

Proposed Impoundment 1 Material Proportions for RECON Bench-scale Treatability

LEGEND

- WATER
- CLAY-LIKE MATERIAL
- VISCOUS-RUBBERY
- HARD-CRUMBLY
- SAND/SILT-LIKE MATERIAL
- COAL AGGREGATE

IMPOUNDMENT 1 CROSS-SECTION NORTH WEST CORNER TO SOUTH EAST CORNER

Proposed material layering sequencing for Impoundment 1 RECON Bench-scale Treatability Sample for initial blending/homogenization

The total volume of waste in Impoundment 1 is approximately 24,200 CY. The volume of the water cap on top of the waste is approximately 9,300 CY. Impoundment 1 is characterized by a low pH (average of 3.3 SU) and high concentrations of volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs), including benzene, toluene, xylenes, naphthalene, and a high degree of residual acidity (Focus 2011).

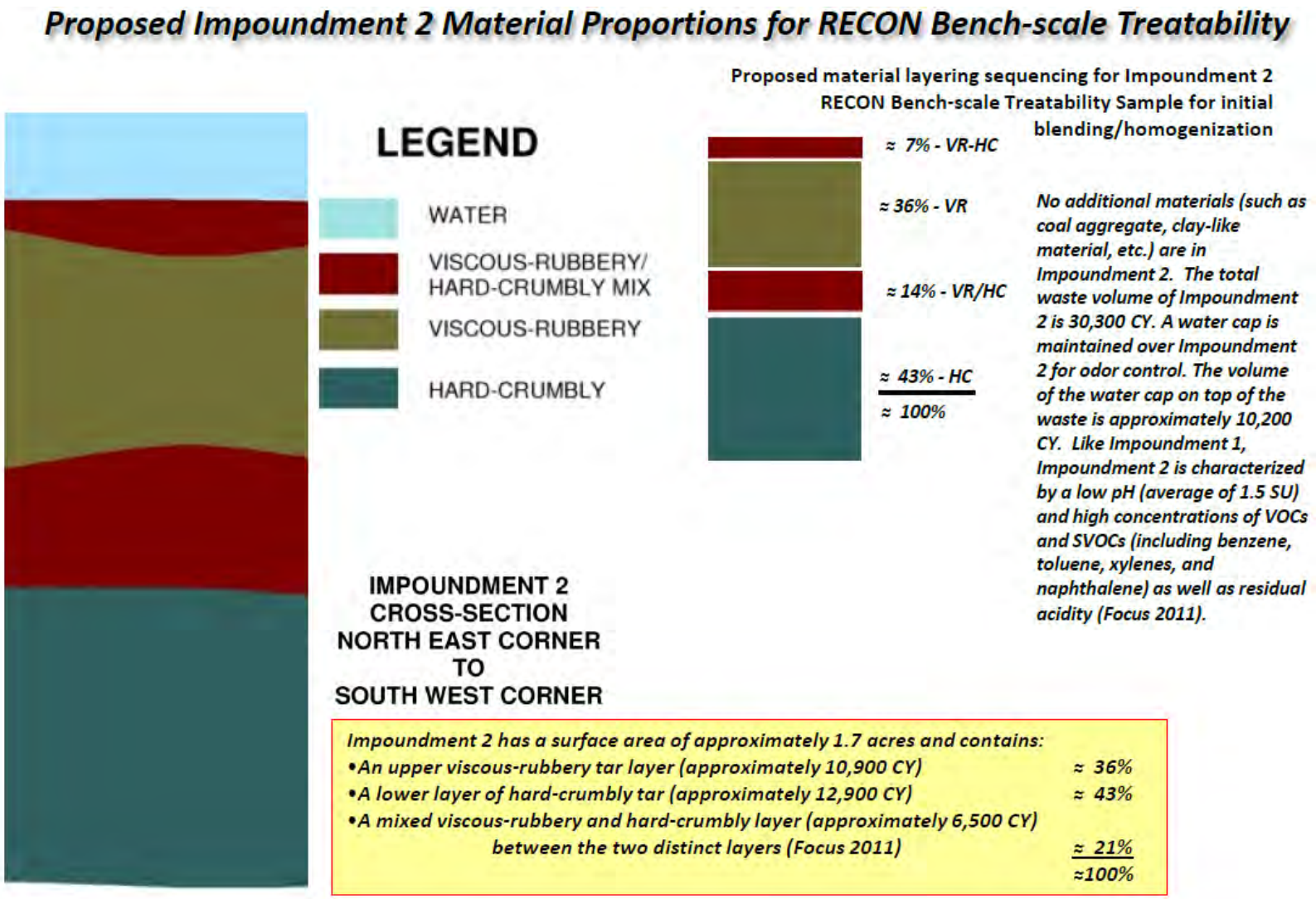
Impoundment 1 has a surface area of approximately 2.1 acres and contains:

• *An upper viscous-rubbery tar layer (approximately 900 cubic yards [CY])*	*≈ 4%*
• *A lower layer of hard-crumbly tar (approximately 13,700 CY)*	*≈ 57%*

Additional materials mixed into the viscous-rubbery and hard-crumbly layers include:

• *Clay-like material (approximately 2,700 CY)*	*≈ 11%*
• *Sand/silt-like material (approximately 1,900 CY)*	*≈ 8%*
• *Coal aggregate (5,000 CY) (Focus Environmental, Inc. [Focus] 2011)*	*≈ 21%*
	≈100%

FIGURE 5-2
Impoundment 2 Material Cross Section
Impoundments 1 and 2 Treatability Study Results Report



To support the characterization of the headspace above the impoundment materials, sampling ports were plumbed onto the lids of each sealed raw impoundment material model container (5-gallon bucket), which permitted sampling of the head space atmosphere above the model during column mixing (See Appendix B). During homogenization, the headspace was sampled for laboratory analysis for the following compounds:

- VOC and Naphthalene
- Aldehydes
- Malodorous Compounds
- Acid Gases

In addition to the samples collected for laboratory analysis, the headspace was screened for total VOCs, hydrogen sulfide and sulfur dioxide during homogenization using a FID, a hydrogen sulfide, and sulfur dioxide meter. Headspace sampling results during the column mixing of the raw impoundment material models are described in Section 5.3.1 of this Report.

Thermally Treated Impoundment Material

Column mixing and headspace sampling of the thermally treated Impoundment 1 and 2 models was completed using the same methods that were employed for the raw material models with an exception that a 1-inch wood spade drill bit with an 18-inch shaft replaced the flat-disk drywall compound mixing blade used to homogenize the raw impoundment materials, as shown in Appendix B. This change was required to break up the hardened thermally treated impoundment materials. A water layer was not added to the top of the thermally treated impoundment material models because it is assumed that the water cover on the impoundments will be boiled off during a field-scale application of in-situ thermal heating.

Appendix B illustrates the Impoundment 1 thermally treated materials pre- and post-homogenization, and presents the Impoundment 2 thermally treated materials pre- and post- homogenization.

Headspace sampling was completed during the column mixing step and after column mixing; homogenization of the entire contents of the thermally treated models was attempted. This was unsuccessful for the Impoundment 1 model due to the “vitrified” or “sintered” physical properties of the thermally treated materials. Before homogenization, the top layer (CL) was chunky and the mixing blade was difficult to plunge into the materials. After homogenization, the various chunk-like layers remained intact.

Homogenization of the materials in the Impoundment 2 thermally treated model was also attempted; however, upon completion, the impoundment materials were not well mixed. Homogenization resulted in the chunks of Impoundment 2 material being disturbed by the mixing blade; however, the chunks of the individual impoundment materials appeared to remain intact. Headspace sampling was completed during column mixing of the Impoundment 2 model as well and sampling results during the column mixing of the thermally treated models are described in Section 5.3.1 of this Report.

During column mixing of the thermally treated impoundment 1 and 2 models, the headspace was sampled for laboratory analysis for the following compounds:

- VOC and Naphthalene
- Aldehydes
- Malodorous Compounds
- Headspace Acid Gases

As a result of the incomplete homogenization of the thermally treated impoundment models, it was concluded that a de-emulsification step was needed to successfully homogenize the thermally treated materials.

The de-emulsification procedure involved using the heat of hydration and chemistry of quicklime (HiCal Lime Kiln Dust [LKD]) to soften and breakdown the thermally treated impoundment materials. This de-emulsification

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procedure also combined the pH adjustment step with the homogenization step and resulted in the thermally treated models becoming pH adjusted. Headspace data from the de-emulsification step is located in Section 5.4.3.

5.3.2 pH Adjustment Material Assessment

Assessment of the effectiveness of pH adjustment compounds on the raw impoundment materials was conducted in two tiers. The first tier involved trial mixes of homogenized Impoundment 1 and 2 raw materials with six different pH adjustment compounds and measuring the pH of the completed mixtures. The second tier involved selecting the best performing pH adjusting compounds from the first tier to be utilized during the optimization studies within an enclosed glove box to allow for sampling the atmosphere created during the pH adjustment process. Only raw materials from Impoundments 1 and 2 were subjected to the pH adjustments because the conditions of the material after thermal treatment did not promote a direct pH adjustment without the need for a de-emulsification step, described as follows.

Raw Impoundment Material

The pH changes resulting from increasing additions of six pH adjustment compounds were evaluated to determine the amount needed to raise the impoundment materials to a pH of 5 and the amount needed to reach a pH of greater than 8 SU but less than 11 SU. The six compounds evaluated as part of the pH adjustment testing were:

- Montague Hydrated Lime ($CaOH_2$) source from Montague, Michigan
- Carmeuse Hydrated Lime ($CaOH_2$) source sold by Carmeuse.
- Terrabond SC
- Lafarge Ravena Plant Reclaimed (Landfilled) Cement Kiln Dust (CKD)
- Sodium Hydroxide laboratory grade
- Mintek (Spent Lime)

Strength gain and headspace sampling results from the pH adjust screening are discussed in Section 5.4.2.

Thermally Treated Material

The pH adjustment step for the thermally treated impoundment materials was replaced by the application of an alkaline agent for the de-emulsification step. The addition of the HiCal LKD described in Section 5.3.1 for de-emulsification concurrently raised the pH of the thermally treated impoundment material to a pH of greater than 10 SU.

5.3.3 Pozzolan Screening

The objective of the pozzolan screening was to identify pozzolan amendment mixes for performance immediately after pozzolan addition. Screening was conducted using a pocket penetrometer to assess strength gain. Pozzolans that achieved the greatest strength gain were carried through to optimization studies. Note that while the results of the performance screening is included in this report, longer-term performance monitoring of the pozzolans will be conducted to evaluate strength gains as described in the work plan.

Tier I Screening – Raw and Thermally Treated Material

The Tier I pozzolan screening focused on evaluating seven pozzolan mixture designs on their relative efficiencies for compressive strength gain using a pocket penetrometer. This assessment provides a general indication of compressive strength gain.

The following pozzolans were evaluated at a 30 percent addition in Tier I:

- PC: Portland Cement, Type I/II

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- RECON Low Solids Stabilization (LSS) Blend A: Lafarge Portland Cement Type I/II 50 Percent and Circulating Fluidized Bed Ash 50 Percent. CFB from Kimberly Clark from HCF Construction/ Curt Forest
- RECON LSS Blend B: Lafarge Newcem 50 Percent and Circulating Fluidized Bed Ash 50 Percent 004
- Terrabond/PC Blend: Terrabond-SC 50 Percent and Buzzi Unicem Type I/II Portland Cement 50 Percent
- Newcem 008
- Newcem/PC Blend: Lafarge Newcem 75 Percent and Lafarge Portland Cement Type I/II 25 Percent 003
- Maxcem: Lafarge Maxcem (Lafarge's blend that includes 30 percent ground granulated blast furnace slag)

Homogenized samples of materials from the Impoundments 1 and 2 models were pH adjusted by an addition of Carmeuse Hydrated Lime immediately before the addition of pozzolans. Materials from the Impoundment 1 raw material models were pH adjusted by addition of 4 percent by weight Carmeuse Hydrated Lime, and homogenized Impoundment 2 raw materials were pH adjusted by addition of 6 percent Carmeuse Hydrated Lime. Samples of homogenized materials from both of the thermally treated models did not require pH adjustment because pH adjustment was completed during the de-emulsification step as described in Section 5.3.1. Strength data from the Tier I evaluations is presented in Section 5.4.3 of this report.

Tier II Optimization Assessment – Raw and Thermally Treated Material

Based on a review of the hand penetrometer screening strength results of Tier 1 pozzolan screening and professional judgment, the Tier II mix designs were selected for each of the four impoundment materials models (Impoundment 1 and 2 raw and thermally treated models).

TABLE 5-1
Laboratory Treatability Studies Report
Tier II Pozzolan Optimization Mix Designs

Optimization	Mix Composition
Impoundment 1 Raw Material Mix A	Carmeuse Hydrated Lime 4 percent by weight
	Lafarge Type I/II Portland Cement 7.5 percent by weight
	Omni Fluidized Bed Ash 7.5 percent by weight
Impoundment 1 Raw Material Mix B	Carmeuse Hydrated Lime 4 percent by weight
	Lafarge Newcem 10 percent by weight
Impoundment 2 Raw Material Mix A	Carmeuse Hydrated Lime 6 percent by weight (added as a slurry with 15 percent water by weight)
	Spent Fullers Earth 33 percent by weight
	Lafarge Newcem 15 percent by weight
	Omni Fluidized Bed Ash 15percent by weight
Impoundment 2 Raw Material Mix B	Carmeuse Hydrated Lime 6 percent by weight (added as a slurry with 15 percent water by weight)
	Spent Fullers Earth 33 percent by weight
	Lafarge Newcem 30 percent by weight
Impoundment 1 Thermally Treated Mix A	Water 15 percent by weight
	Lafarge Type I/II Portland Cement 5 percent by weight
	Omni Fluidized Bed Ash 5 percent by weight

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TABLE 5-1
Laboratory Treatability Studies Report
Tier II Pozzolan Optimization Mix Designs

Optimization	Mix Composition
Impoundment 1 Thermally Treated Mix B	Water 15 percent by weight
	Lafarge Newcem 10 percent by weight
Impoundment 2 Thermally Treated Mix A	Water 15 percent by weight
	Lafarge Type I/II Portland Cement 5 percent by weight
	Omni Fluidized Bed Ash 5 percent by weight
Impoundment 2 Thermally Treated Mix B	Water 15 percent by weight
	Lafarge Newcem 10 percent by weight

...

These samples were homogenized and subject to headspace sampling during homogenization. Following initial curing, penetrometer-indicated strength testing was performed at 1 and 7 days along with headspace sampling conducted at the time of pozzolan addition and blending. Data from this portion of the study is located in Section 5.4.3 of this Report.

Tier III Optimization Assessment

As presented in the Treatability Testing Work Plan, a solidification/ stabilization goal of greater than 15 psi UCS was initially evaluated for the solidification/ stabilization testing. However, higher bearing capacities may need to be evaluated as part of the treatability. Therefore, the laboratory procedures for the Tier III Pozzolan Optimization testing were revised as follows:

- Following homogenization and pH buffering, Tier III consists of addition of approximately ½ of the pozzolan material to obtain a 48 to 72 hour early bearing capacity of greater than 10 psi (this would be sufficient for full-scale tracked equipment to bench out on top of this material to reach the next lift of impoundment material for pozzolan addition and blending operations).
- Following a 5- to 7-day cure time, the incompletely solidified/stabilized test material will be removed from their sample mold and broken up to approximately ½-inch to ¾-inch fractions, and the remaining portion of the Tier III pozzolan and pulping water will be added. This mixture will then be remixed, and placement back into the sample mold for 28- and 56-day cure-out and testing.
    - This approach mimics the excavation of the initially and partially stabilized material and, secondary solidification/stabilization through a pugmill unit, for ultimate disposal.
- Following the 28-day cure-out period, Pocket penetrometer, UCS strength, percent moisture, and TCLP and SPLP extraction testing will be performed.
- Following the 56-day cure-out period, Pocket penetrometer, UCS strength, percent moisture, and falling head permeability testing will be performed.

5.4 Performance Results

The following sections provide the overall results of the homogenization, pH adjustment, and stabilization/solidification portions of the treatability testing. Note that additional strength performance and TCLP sampling results that will be collected later in the testing (at 28 and 56 days) have not been performed to date. The results of these additional tests will be provided after completion. The results of the tests included in this report have allowed for the start of design of the pilot study.

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5.4.1 Homogenization

Raw Impoundment Material

After the column mixing and headspace sampling the entire contents of the layered 18-kg models were completely homogenized using the same mixing tool used for the column mixing. The Impoundment 1 raw material model was the easiest to homogenize. Homogenization of raw Impoundment 1 materials resulted in a "milkshake-like" consistency. The water layer within became blended with the impoundment materials. No other additives were added during homogenization.

The material in the Impoundment 2 raw material model was somewhat blend-able. Before column mixing, the top-most layer (a VR/HC 50/50 blend) was rubbery to the extent that a depression of the mixing blade could be made and the impression held within the material. During homogenization, this top layer was observed to congeal and remain separate from the other material layers. It was difficult to mix this top layer into the other layers of impoundment material during homogenization. Layers beneath were not readily observable. The water layer on top of the model did not blend into the impoundment materials as occurred with Impoundment 1 raw material. No other additives were added during homogenization.

The analytical result from the headspace sampling of the raw impoundment materials during column mixing are in Table 5-2.

TABLE 5-2
Laboratory Treatability Studies Report
Selected Compounds Detected in the Headspace During Column Mixing of Raw Impoundment 1 and 2 Materials

Compound	IMP 1 RM Concentration (µg/m^3)	IMP 2 RM Concentration (µg/m^3)
VOCs		
Benzene	5,200,000	20,000,000
Toluene	410,000	2,100,000
Naphthalene	ND[1]	ND
Total Xylenes[2]	ND	ND
Aldehydes		
Acetaldehyde	290[2]	20
Benzaldehyde	20	ND
Butyraldehyde	30	ND
Propionaldehyde	90[2]	ND
Acid Gases		
Sulfuric Acid[3]	ND	6,900
Malodorous Compounds		
Hydrogen Sulfide	4,900	230,000
Carbonyl Sulfide	88	260
Methyl Mercaptan	290	1,900
Dimethyl Sulfide	2,400	6,900
Carbon disulfide	24,000	220,000
Ethyl Methyl Sulfide	300	1,100

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TABLE 5-2
Laboratory Treatability Studies Report
Selected Compounds Detected in the Headspace During Column Mixing of Raw Impoundment 1 and 2 Materials

Compound	IMP 1 RM Concentration (µg/m^3)	IMP 2 RM Concentration (µg/m^3)
Thiophene	740	3,400
3-Methylthiophene	90	500

Notes:
1. ND = Not Detected.
2. Total xylene calculated by the sum of *ortho, meta, and para* –xylene concentration detected.
3. Sorbent was saturated and result may be biased low.

Benzene and toluene were the VOCs detected in headspace samples during column mixing of the raw Impoundment 1 and 2 material models. Acid gases were not detected in the headspace above the Impoundment 1 model but were detected at 6,900 µg/m^3 in the headspace above the Impoundment 2 model. Concentrations of aldehydes were slightly higher in the headspace above the impoundment 1 model and concentrations of malodorous compounds were greater in the headspace above the Impoundment 2 model.

Thermally Treated Material

As indicated in Section 5.3.1, the thermally treated Impoundment 1 and 2 materials required a de-emulsification step to modify the physical properties of the materials so that homogenization could be completed. De-emulsification was first attempted on the model for Impoundment 1 and was suspended after temperatures of up to 140°F occurred and melted tar was observed. As a result of the high temperatures caused by the reaction of the HiCal LKD with the impoundment materials, the materials were transferred from the 5-gallon polyethylene bucket to a 20-gallon galvanized steel container. Photographs in Appendix B present the de-emulsification of Impoundment 1 thermally treated material with 30 percent addition of HiCal LKD and water. The Impoundment 2 thermal treatment model was also amended with a 30 percent addition of HiCal LKD and water. These amendments modified the physical properties of the thermally treated materials and allowed for thorough homogenization of the materials in the thermally treated models of Impoundment 1 and Impoundment 2.

The analytical results from the headspace sampling of the thermally treated impoundment materials during homogenization are in Table 5-3.

TABLE 5-3
Laboratory Treatability Studies Report
Selected Compounds Detected in the Headspace During Homogenization of Thermally Treated Impoundment 1 and 2 Materials

Compound	IMP 1 TT Concentration (µg/m^3)	IMP 2 TT Concentration (µg/m^3)
VOCs		
Benzene	530,000	530,000
Toluene	180,000	220,00
Naphthalene	ND	ND
Xylene (total)[1]	72,000	57,000
Aldehydes		
Acetaldehyde	1,100	260[2]
Benzaldehyde	20	20
Butyraldehyde	80	30

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TABLE 5-3
Laboratory Treatability Studies Report
Selected Compounds Detected in the Headspace During Homogenization of Thermally Treated Impoundment 1 and 2 Materials

Compound	IMP 1 TT Concentration (µg/m^3)	IMP 2 TT Concentration (µg/m^3)
Isovaleraldehyde	ND	ND
Propionaldehyde	80	70[2]
Acid Gases		
Sulfuric Acid	ND	ND
Malodorous Compounds		
Hydrogen Sulfide	5,400	180,000
Carbonyl Sulfide	850	42
Methyl Mercaptan	50	360
Dimethyl Sulfide	200	2,100
Carbon disulfide	7,400	4,500
Ethyl Methyl Sulfide	47	360
Thiophene	1,100	6,500
3-Methylthiophene	230	830
2-Ethylthiophene	210	1,500

Notes:
[1.] Total xylene calculated by the sum of *ortho, meta, and para* –xylene concentration detected.
[2.] Sorbent tube may have had breakthrough or possible migration. Results may be biased low.
ND = Not Detected.

The headspace analytical results for the homogenization of the thermally treated impoundment materials were similar to the data collected during the column mixing of the raw impoundment models, but the concentrations of constituents were lower. Benzene, toluene, and xylenes were the main VOCs detected in headspace samples during homogenization of the thermally treated Impoundment 1 and 2 material models. Acid gases were not detected in the headspace above either model. Concentrations of aldehydes were generally higher in the headspace above the impoundment 1 model and concentrations of malodorous compounds were generally greater (the exception being carbon sulfide) in the headspace above the Impoundment 2 model.

5.4.2 pH Adjustment Results

Raw Impoundment Material

Carmeuse Hydrated Lime was selected as the pH adjustment compound to be carried through to the Tier 2 pozzolan screening because the dosage rates were approximately one-half of other products tested. In addition, the lime can be applied as slurry, which was beneficial to modifying the physical properties of the thermally treated material to allow for homogenization.

The results of pH adjustment studies indicated that homogenized Impoundment 1 raw material would be treated with a 4 percent by weight of Carmeuse Hydrated Lime and homogenized Impoundment 2 raw material with a 6 percent by weight addition of Carmeuse Hydrated Lime to adjust the pH of the impoundment materials to a pH range of 11 SU for subsequent pozzolan screening. Headspace atmosphere at the final addition rate was sampled for laboratory analysis and the results are in Table 5-4.

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TABLE 5-4
Laboratory Treatability Studies Report
Selected Headspace Compounds During pH Adjustment of Raw Impoundment 1 and 2 Materials

Compound	IMP 1 RM $(CaOH)_2$ Concentration ($\mu g/m^3$)	IMP 1 RM HiCal LKD Concentration ($\mu g/m^3$)	IMP 2 RM $Ca(OH)_2$ Concentration ($\mu g/m^3$)	IMP 2 RM HiCal LKD Concentration ($\mu g/m^3$)
VOCs				
Benzene	910,000	1,500,000	4,300,000	1,800,000
Toluene	130,000	140,000	550,000	19,000
Naphthalene	ND	ND	ND	ND
Xylene (total)[1]	8,500	8,800	3,400	ND
Aldehydes				
Acetaldehyde	10	30	110	30
Crotonaldehyde	ND	200	ND	ND
Isovaleraldehyde	620	530	2,800	1,700
Acid Gases				
Sulfuric Acid	ND	ND	ND	ND
Malodorous Compounds[2]				
Hydrogen Sulfide	NR	NR	NR	NR
Carbonyl Sulfide	NR	NR	NR	NR
Methyl Mercaptan	NR	NR	NR	NR
Dimethyl Sulfide	NR	NR	NR	NR
Carbon disulfide	NR	NR	NR	NR
Ethyl Methyl Sulfide	NR	NR	NR	NR
Thiophene	NR	NR	NR	NR
3-Methylthiophene	NR	NR	NR	NR
2-Ethylthiophene	NR	NR	NR	NR

Notes:
1. Total xylene calculated by the sum of *ortho, meta, and para* –xylene concentration detected.
2. Malodorous compounds Not Reported (NR) because samples were collected on the wrong sorbent tubes.
ND = Not Detected

Headspace sampling during the pH adjustment studies of raw Impoundment 1 and 2 materials indicates that benzene and toluene are the most prevalent VOCs detected with lower concentrations of xylenes also being detected. Concentrations of VOCs and aldehydes detected in the atmosphere during pH adjustment were higher for Impoundment 2 materials than detected during pH adjustment of Impoundment 1 materials. Acid gases were not detected in the headspace for any of the samples collected during the pH adjustment. The concentrations of aldehydes were generally low, with isovaleraldehyde being detected at the highest concentration.

Penetrometer data collected after the pH adjustment of the raw impoundment materials is presented in Table 5-5.

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TABLE 5-5
Laboratory Treatability Studies Report
Tier I pH Adjustment and Penetrometer Screening Data

IMP and Mix Designation	pH alkaline buffering additive	1-day Cure Penetrometer Reading (psi)	7-day Cure Penetrometer Reading (psi)	28-day Cure Penetrometer Reading (psi)
IMP 1 RM $(CaOH)_2$	4% Carmeuse Hydrated Lime	0	0	0
IMP 1 RM HiCal LKD	30% addition of HiCal LKD and water	10.4	15.0	55.6
IMP 2 RM $(CaOH)_2$	6% Carmeuse Hydrated Lime	0	0	0
IMP 2 RM HiCal LKD	30% addition of HiCal LKD and water	34.7	33.7	31.2

The bearing capacity of the homogenized raw Impoundment 1 and 2 materials was zero and the addition of the alkaline buffering agent to the raw Impoundment 1 and 2 materials did not increase the material bearing capacity. However, the addition of the alkaline buffering/de-emulsification agents did significantly increasing the bearing capacity of the materials with up to 34.7 psi developing after one day of curing.

Thermally Treated Material

The pH adjustment step for the thermally treated impoundment materials was circumvented by the application of an alkaline agent for the de-emulsification step. The addition of the HiCal LKD described in Section 5.3.1 for de-emulsification concurrently raised the pH of the thermally treated impoundment material to a pH of greater than 10 SU.

5.4.3 Pozzolan Screening

Raw Impoundment Material – Tier I Testing

For the Tier I small sample pozzolan recipe screening, the hand penetrometer results indicated strengths at the 30 percent pozzolan addition rate for materials from the Impoundment 1 raw material model were higher than the initial target of 15 psi bearing capacity. Based on these results, the solidification agent addition rates for Impoundment 1 raw materials were reduced to 15 percent pozzolan addition in the subsequent optimization studies.

Penetrometer testing-indicated strengths for the materials from the Impoundment 2 raw materials model mix designs at 30 percent addition rates develops strengths slowly with strength of 0 psi after 28 days. Based on these results, spent Fuller's Earth was introduced as a binding agent in the some mix designs for the Impoundment 2 raw material model in the optimization studies.

Penetrometer test readings indicated strengths for the pH adjusted thermally treated impoundment materials from both impoundments with a 30 percent pozzolan addition of HiCal LKD were higher than the initial target of 15 psi bearing capacity. Based on these results, the addition rates of HiCal LKD were reduced to between 10 and 15 percent pozzolan addition in the subsequent optimization studies.

Raw Material Testing – Tier II Testing

Based on a review of the hand penetrometer screening strength results of Tier I Pozzolan Screening and professional judgment, the Tier II two-mix designs were selected for each of the impoundment materials as described in Table 5-1. The Tier II pozzolan optimization penetraometer results for the raw impoundment materials are shown in Table 5-6.

TABLE 5-6

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Laboratory Treatability Studies Report

Tier II Pozzolan Raw impoundment Material Optimization Study Penetrometer Results

Impoundment and Mix Designation	Batch Sheet Identification	1-day Cure Penetrometer Reading (psi)	3-day Cure Penetrometer Reading (psi)	7-day Cure Penetrometer Reading (psi)
IMP 1 RM Mix A	IMP 1 RM 003-C	48.6	>62.5	>62.5
IMP 1 RM Mix B	IMP 1 RM 008-C	52.1	>62.5	>62.5
IMP 2 RM Mix A	IMP 2 RM 004-C	10.4	27.8	59.0
IMP 2 RM Mix B	IMP 2 RM 008-C	3.47	24.3	59.0

Note:
62.5 psi is the maximum strength measurable on the penetrometer

Significant strength gains for raw Impoundment 1 and 2 materials achieved during the Tier II optimization study. The Impoundment 2 material developed strength more slowly than Impoundment 1 material. However, after seven days, both the Impoundment 1 and 2 materials had developed similar strengths.

As part of the Tier II pozzolan optimization studies, headspace samples were collected from the atmosphere inside the glove box where pozzolan mixing occurred and are reported in Table 5-7 for the raw materials.

TABLE 5-7

Laboratory Treatability Studies Report

Selected Compounds in Headspace During Tier II Pozzolan Optimization Studies of Raw Materials

Compound	IMP 1 RM Mix A Concentration (µg/m^3)	IMP 1 RM Mix B Concentration (µg/m^3)	IMP 2 RM Mix A Concentration (µg/m^3)	IMP 2 RM Mix B Concentration (µg/m^3)
VOCs				
Benzene	120	330,000	800,000	85,000
Toluene	32	ND	85,000	13,000
Naphthalene	ND	ND	ND	ND
Xylene (total)[1]	5	ND	ND	1,700
Aldehydes				
Acetaldehyde	260	200	20	40
Crotonaldehyde	ND	ND	ND	ND
Isovaleraldehyde	1,300	1,200	460	470
Acid Gases				
Sulfuric Acid	ND	ND	ND	ND
Malodorous Compounds				
Hydrogen Sulfide	ND	250	67	130
Carbonyl Sulfide	13	ND	ND	ND
Methyl Mercaptan	ND	ND	ND	ND
Dimethyl Sulfide	ND	41	96	110
Carbon disulfide	86	60	2,500	2,400
Ethyl Methyl Sulfide	ND	ND	ND	ND

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TABLE 5-7
Laboratory Treatability Studies Report
Selected Compounds in Headspace During Tier II Pozzolan Optimization Studies of Raw Materials

Compound	IMP 1 RM Mix A Concentration (µg/m^3)	IMP 1 RM Mix B Concentration (µg/m^3)	IMP 2 RM Mix A Concentration (µg/m^3)	IMP 2 RM Mix B Concentration (µg/m^3)
Thiophene	39	23	55	69
3-Methylthiophene	ND	ND	ND	ND
2-Ethylthiophene	ND	ND	ND	ND

Notes:
[1.] Total xylene calculated by the sum of *ortho, meta, and para* –xylene concentration detected.
ND = Not Detected

Concentrations of benzene, toluene and total xylenes were consistently detected in the glove box atmosphere during the pozzolan optimization mixing. The VOC results from IMP 1RM Mix A are believe to be biased low and the VOC data is not being considered valid. The data will be further evaluated by comparing the air results to the concentrations of VOCs in the stabilized material when then material analysis is completed. Acid gases were not detected during the pozzolan mixing of the raw impoundment materials headspace sampling results indicated that three VOCs were consistently detected

Thermally Treated Material

As previously stated, the pH adjustment step for the thermally treated impoundment materials was replaced by the application of an alkaline agent for de-emulsification. The addition of the HiCal LKD described in Section 5.3.1 for de-emulsification concurrently raised the pH of the thermally treated impoundment 1 and 2 materials to a pH of greater than 10 SU. Results from the strength evaluation for the pozzolan optimization of the thermally treated materials are shown in Table 5-8.

TABLE 5-8
Laboratory Treatability Studies Report
Tier II Pozzolan Thermally Treated Impoundment Material Optimization Study Penetrometer Results

Impoundment and Mix Designation	Batch Sheet Identification	1-day Cure Penetrometer Reading (psi)	3-day Cure Penetrometer Reading (psi)	7-day Cure Penetrometer Reading (psi)
IMP 1 TT Mix A	IMP 1 TT 003-C	>62.5	>62.5	>62.5
IMP 1 TT Mix B	IMP 1 TT 008-C	>62.5	>62.5	>62.5
IMP 2 TT Mix A	IMP 2 TT 003-C	41.7	>62.5	>62.5
IMP 2 TT Mix B	IMP 2 TT 008-C	62.5	>62.5	>62.5

Note:
62.5 psi is the maximum strength measurable on the penetrometer

The data indicate that the de-emulsification and pozzolan mix A and B cause rapid strength gains in the thermally treated materials from both impoundments. After seven days of curing, both the raw and thermally treated impoundment materials achieved strengths greater than the measurement range of the penetrometer.

TABLE 5-9
Laboratory Treatability Studies Report
Selected Compounds in Headspace During Tier II Pozzolan Optimization Studies of thermally Treated Impoundment Materials

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Compound	IMP 1 TT Mix A Concentration (µg/m^3)	IMP 1 TT Mix B Concentration (µg/m^3)	IMP 2 TT Mix A Concentration (µg/m^3)	IMP 2 TT Mix B Concentration (µg/m^3)
VOCs				
Benzene	5,300	5,500	6,000	4,300
Toluene	1,300	1,300	3,500	2,500
Naphthalene	99	130	ND	500
Xylene (total)[1]	323	449	1,520	1,230
Aldehydes				
Acetaldehyde	130	60	40	10
Crotonaldehyde	ND	ND	ND	ND
Isovaleraldehyde	370	380	90	20
Acid Gases				
Sulfuric Acid	ND	ND	ND	ND
Malodorous Compounds				
Hydrogen Sulfide	ND	ND	ND	ND
Carbonyl Sulfide	ND	ND	ND	ND
Methyl Mercaptan	ND	ND	ND	ND
Dimethyl Sulfide	ND	ND	ND	ND
Carbon disulfide	25	16	60	46
Ethyl Methyl Sulfide	ND	ND	ND	ND
Thiophene	ND	ND	55	59
3-Methylthiophene	ND	ND	ND	ND
2-Ethylthiophene	ND	ND	ND	ND

Notes:
[1.] Total xylene calculated by the sum of *ortho, meta, and para* –xylene concentration detected.
ND = Not Detected

Concentrations of benzene in the atmosphere of the glove box from the pozzolan mixing of the thermally treated impoundment materials were approximately two orders of magnitude lower than concentration detected during the pozzolan mixing of the raw impoundment materials. In addition, the concentrations of aldehydes decreased in the glove box atmosphere and the number and concentration of malodorous compounds also decreased.

Tier III Optimization Evaluation

The following presents the analytical parameters currently being evaluated for the optimized 28- and 56-day cured samples.

- Bulk unit weight (American Society for Testing and Materials [ASTM] D2726-11)
- UCS (ASTM D2166)
- Falling Head Permeability (ASTM D5084)
- Soil pH (USEPA 9045D)
- Exothermic Temperature Rise ASTM F542-07

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- Percent Moisture ASTM 2216
- Hydrometer Analysis ASTM D422
- Atterberg Limits – Plasticity Index ASTM D4318
- Pocket Penetrometer ASTM WK27337
- TCLP VOCs (SW-846 1311, 8260B)
- TCLP SVOCs (SW-846 1311, 8270C)
- TCLP Metals (SW-846 1311, 6010B, 7470A)
- SPLP VOCs (SW-846 1312, 8260B)
- SPLP SVOCs (SW-846 1312, 8270C)
- SPLP Metals (SW-846 1312, 6010B, 7470A*)*

5.5 Homogenization, pH Adjustment, and Solidification/Stabilization Conclusions

The homogenization, pH adjustment and solidification/stabilization study conducted on the raw and thermally treated impoundment 1 and 2 materials indicated that the physical and chemical properties of these materials can be modified to improve the handling characteristics. The following conclusions can be drawn from this study:

- Blending can be performed for both thermally treated and raw impoundment materials
    - A de-emulsification of thermally treated materials is necessary due to physical characteristics of material after heating
- pH adjustment of both raw and thermally treated materials can be completed, but under different processes
    - Carmeuse Hydrated Lime is effective for raw materials
    - De-emulsification with high calcium lime kiln dust for thermally treated materials achieved pH adjustment without additional additives
- The solidification/stabilization process can treat both VR and HC materials for compressive strength
- Emissions of benzene during mixing of thermally treated impoundment materials is approximately two orders of magnitude less than during mixing of raw materials

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SECTION 6

Conclusions

6.1 Thermal Treatment

The treatability study confirmed that controlled heating of impoundment materials collected from Impoundment 2 at the Site was successful in significantly reducing VOCs and SVOCs content of VR and HC materials.

This portion of the treatability study performed was a comprehensive evaluation intended to investigate the effectiveness of thermal processes for the treatment of materials contained within Impoundment 1 and Impoundment 2. The study was premised on two basic objectives: to determine the efficacy of thermal treatment for impoundment materials and to identify and characterize both off-gas and liquid-phase condensate that must be managed if thermal treatment was implemented for treating impoundment contents. The study objectives were successfully accomplished as documented in the extensive observations and data results provided by this report and supporting appendixes.

In general, this study reveals that heating was successful in significantly reducing VOCs and SVOCs in the impoundment materials studied. Highly acidic off-gas caused significant corrosion of the box reactor, aluminum lining, and thermocouples used during the thermal treatment. Treatment of the material for extended periods of time did not completely dry out the sample. Some physical properties testing were complicated and affected by the high concentrations of VOCs and the matrix of the material before and after heating. Even after thermal treatment, VR material that is reheated does show liquid behavior as temperatures reach approximately 65°C. The HC material does not show signs of liquefaction up to temperatures of 100°C. The VR material shows significant signs of expansion during heating, while the HC material shows moderate expansion.

6.2 Mixing, pH Adjustment, and Solidification/Stabilization

The treatability study confirmed that the materials from Impoundment 1 and 2 at the Site could be successfully homogenized, pH adjusted, and solidified using pozzolans.

The basic objectives of this portion of the treatability study were:

1) Evaluate impoundment materials for homogenization
2) Determine the pH of the impoundment materials could be raised to at least 5 to 6 SU and ideally to 11 SU.
3) Evaluate if the impoundment materials could be stabilized/solidified using pozzolan mixtures.

In general, the results of the study indicate that the impoundment materials can be successfully homogenized, pH adjusted and solidified. Results from this study confirmed that both raw Impoundment 1 and 2 materials could be homogenized; however, the water layer on the raw Impoundment 2 material did not become incorporated with the material. Homogenized samples of materials from the Impoundments 1 and 2 were successfully pH adjusted to 10 SU or higher by an addition of Carmeuse Hydrated Lime or HiCal LKD. Addition of various blends of pozzolans to the homogenized and pH adjusted impoundment material resulted in strength gains ranging from 59.0 psi to greater than 62.5 psi after only seven days of curing.

Tier II pozzolan testing of thermally treated Impoundment 1 and 2 materials indicated that the concentration of benzene in the atmosphere above the mixing vessel decreased by approximately two orders of magnitude when compared to benzene concentration above the raw impoundment materials during mixing.

Upon completion of the curing cycle at 28 and 56 days after pozzolan addition, the amended impoundment materials will be samples for TCLP and SPLP testing to evaluate the extent the pozzolan addition was able to sequester (stabilize)the various constituents within the impoundment materials. An addendum to this report will be completed after the TCLP and SPLP data are received and evaluated.

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SECTION 7

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Appendix A – Sediment Core Logs

CH2MHILL

Site Name: American Cyanamid Superfund Site
Project Number: 429348
Project Location: Bridgewater, NJ
Survey Duration: 2/13/2012

Station ID:	IMP1-A	**Easting:**	2032452.99	**Attempt 1**	**Refusal? Y/N**
Sampling	Lisa Carter/Alex Crane/Susan Kear	**Northing:**	626878.49	**Penetration (ft):** 5'	N
Crew/Company	Aqua Survey	**Elevation:**	--	**Recovery (ft)** 3.5'	
	M. Shappell/Captain	**Datum:**	NJSP Zone East NAD 83	**Date/Time:** 2/13/2012 1330	
	K. Sunday	**Depth (ft):**	2.0 (@Attempt 1)		
		St. Arrival:	13:10 (02/13/12)	**Attempt 2**	**Refusal? Y/N**
Vessel:	*Pontoon Barge*	**St.Depart:**	11:10 (02/15/12)	**Penetration (ft):** 4.5'	N
Collection:	vibracore	**Logged by:**	Lisa Carter	**Recovery (ft)** 4.0'	
Collector Information:				**Date/Time:** 2/13/2012 1350	

Log reflects sample as collected- no correction factor applied for less than 100% core recovery

Depth below mudline (ft)	Lithology	Type	Color (Munsell)	Consistency/ Density	Cementation/ Plasticity	Structure	Moisture Content	Maximum particle size*	Odor	% gravel	% sand	% fines	PID Reading (ppm)	Sample IDs (Single Letter)	Comments
0.8'		CL	2.5 YR 3/1	S	High Plasticity	H	Wet		T	0%	0%	100%	1.0	B	
1		CA		VS	Low Plasticity								24.6	A	16th push has ~6" of SSL material
2.6'		HC	10 YR 2/1	F	No Plasticity								451	C	
3															
3.5'															

Additional Notes/Comments: BOC = 3.5'

Core	Date	Push(ft)	Time	Recovery (ft)
3rd	2/13	4.5	1405	4.3
4th	2/13	5	1530	3.6
5th	2/13	5	1600	2.2
6th	2/14	3.8	850	1.9
7th	2/14	5.8	930	5.2
8th	2/14	5.2	1000	3.1
9th	2/14	6	1025	4.0
10th	2/14	4.5	1045	3.7
11th	2/14	4.8	1220	3.2
12th	2/14	4.8	1230	3.9
13th	2/14	4.4	1250	3.0
14th	2/14	4	1450	2.0

Core	Date	Push(ft)	Time	Recovery (ft)
15th	2/14	4.5	1510	1.4
16th	2/14	multiple	1545	--
17th	2/14	3.0	1610	--
18th	2/14	3.0	1630	--
19th	2/15	5.5	900	5.4
20th	2/15	5.9	915	5.2
21st	2/15	5.3	940	5.4
22nd	2/15	5.5	1000	3.9
23rd	2/15	6	1017	4.9
24th	2/15	6	1040	3.9
25th	2/15	5.4	1045	3.6
26th	2/15	5.9	1105	4.2

*Maximum particle size not provided in log.
CA Coal Aggregate material
HC Hard-crumbly material
VR Viscous-rubbery material

Sample Summary (check boxes for analysis):

Sample ID		Sample Type (N/FD/MSD)	Sample Date/Time	Depth Interval (ft)	Thermal	Stabilization & Solidification
A	IMP1-CA	N	2/15/2012 11:00	Composite	X	X
B	IMP1-CL	N	2/15/2012 11:10	Composite	X	X
C	IMP1-HC	N	2/16/2012 15:50	Composite	X	X

Reviewed by: *M.Velasquez* Date: 9/13/2012

CH2MHILL

Site Name: Pfizer American Cyanamid Acid Tar
Project Number: 429384.FB.BS
Project Location: Bridgewater, NJ
Survey Duration: 2/16/2012

Station ID:	IMP1-B	**Easting:**	2032606.29	**Attempt 1**	**Refusal? Y/N**
Sampling	Lisa Carter/Alex Crane/Susan Kear	**Northing:**	626883.95	**Penetration (ft):** 6'	N
Crew/Company	Aqua Survey	**Elevation:**	--	**Recovery (ft)** 4.5'	
	M. Shappell/Captain	**Datum:**	NJSP Zone East NAD 83	**Date/Time:** 2/16/12 9:15	
	K. Sunday	**Depth (ft):**	3.1 (@Attempt 1)		
		St. Arrival:	9:15	**Attempt 2**	**Refusal? Y/N**
Vessel:	*Pontoon Barge*	**St.Depart:**	10:30	**Penetration (ft):** 6'	N
Collection:	vibracore	**Logged by:**	Lisa Carter	**Recovery (ft)** 4.3'	
Collector Information:				**Date/Time:** 2/16/12 9:40	

Log reflects sample as collected- no correction factor applied for less than 100% core recovery

Depth below mudline (ft)	Lithology	Type	Color (Munsell)	Consistency/ Density	Cementation/ Plasticity	Structure	Moisture Content	Maximum particle size*	Odor	% gravel*	% sand*	% fines*	PID Reading (ppm)*	Sample IDs (Single Letter)	Comments
1		SP-SM	BL10 YR 2/1	VS	NON-PLASTIC	H	Wet		T					A	Sand in 2nd core is white
2															Note: Sand and silt layer has coal mixed in with it
3															
4		HC		F										B	
4.5															
5															

Additional Notes/Comments: BOC = 4.5'

Core	Date	Push(ft)	Time	Recovery (ft)
3rd	2/16	6	9:50	5.0
4th	2/16	6	10:15	3.7
5th	2/16	6	10:30	4.4

*Maximum particle size, particle percentage, and PID reading not provided in log.
CA Coal Aggregate material
HC Hard-crumbly material
VR Viscous-rubbery material

Sample Summary (check boxes for analysis):

Sample ID		Sample Type (N/FD/MSD)	Sample Date/Time	Depth Interval (ft)	Thermal	Stabilization & Solidification
A	IMP1-SSL	N	2/16/2012 11:30	Composite	X	X
B	IMP1-HC	N	2/16/2012 15:50	Composite	X	X

Reviewed by: *M.Velasquez* Date: 9/13/2012

CH2MHILL

Site Name: Pfizer American Cyanamid Acid Tar
Project Number: 429384.FB.BS
Project Location: Bridgewater, NJ
Survey Duration: 2/15/2012

Station ID:	IMP1-E	**Easting:**	2032660.40	**Attempt 1**	**Refusal? Y/N**
Sampling	Lisa Carter/Alex Crane/Susan Kear	**Northing:**	626921.03	**Penetration (ft):** 5.9'	N
Crew/Company	Aqua Survey	**Elevation:**	--	**Recovery (ft)** 4.2'	
	M. Shappell/Captain	**Datum:**	NJSP Zone East NAD 83	**Date/Time:** 2/15/12 12:30	
	K. Sunday	**Depth (ft):**	4.1 (@Attempt 1)		
		St. Arrival:	12:30	**Attempt 2**	**Refusal? Y/N**
Vessel:	*Pontoon Barge*	**St.Depart:**	16:20	**Penetration (ft):** 6.0'	N
Collection:	Vibracore	**Logged by:**	Lisa Carter	**Recovery (ft)** 4.4'	
Collector Information:				**Date/Time:** 2/15/12 13:05	

Log reflects sample as collected- no correction factor applied for less than 100% core recovery

Depth below mudline (ft)	Lithology	Type	Color (Munsell)	Consistency/ Density	Cementation/ Plasticity	Structure	Moisture Content	Maximum particle size*	Odor	% gravel*	% sand*	% fines*	PID Reading (ppm)*	Sample IDs (Single Letter)	Comments
0.5'		VR	BL 10 YR 2/1	S	High Plasticity	H	Wet		T					A	
1		HC		F-H	Non-Plasticity									B	Multi Rae malfunction during core collection at IMP1-E
2															
3															
4															
4.2															

Additional Notes/Comments: BOC = 4.2'

Core	Date	Push(ft)	Time	Recovery
3rd	2/15	5.8	12:45	4.3
4th	2/15	4.5	1500	3.8
5th	2/15	4	1520	4.0
6th	2/15	4.5	1540	3.7
7th	2/15	Multiple	--	--
8th	2/15	Multiple	--	--

*Maximum particle size, particle percentage, and PID reading not provided in log.
CA Coal Aggregate material
HC Hard-crumbly material
VR Viscous-rubbery material

Sample Summary (check boxes for analysis):

Sample ID		Sample Type (N/FD/MSD)	Sample Date/Time	Depth Interval (ft)	Thermal	Stabilization & Solidification									
A	IMP1-VR	N	2/16/2012 16:30	Composite	X	X									
B	IMP1-HC	N	2/16/2012 15:50	Composite	X	X									

Reviewed by: *M.Velasquez* Date: 9/13/2012

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Site Name: Pfizer American Cyanamid Acid Tar
Project Number: 429384.FB.BS
Project Location: Bridgewater, NJ
Survey Duration: 2/16/2012

Station ID:	IMP1-L	**Easting:**	2032638.99	**Attempt 1**	**Refusal? Y/N**
Sampling	Lisa Carter/Alex Crane/Susan Kear	**Northing:**	626719.60	**Penetration (ft):** 4.3'	N
Crew/Company	Aqua Survey	**Elevation:**	--	**Recovery (ft)** 3.0'	
	M. Shappell/Captain	**Datum:**	NJSP Zone East NAD 83	**Date/Time:** 2/16/2012 1300	
	K. Sunday	**Depth (ft):**	4.1 (@Attempt 1)		
		St. Arrival:	11:00	**Attempt 2**	**Refusal? Y/N**
Vessel:	*Pontoon Barge*	**St.Depart:**	16:00	**Penetration (ft):** 6.0'	N
Collection:	Vibracore	**Logged by:**	Lisa Carter	**Recovery (ft)** 4.4'	
Collector Information:				**Date/Time:** 2/15/12 13:05	

Log reflects sample as collected- no correction factor applied for less than 100% core recovery

Depth below mudline (ft)	Lithology	Type	Color (Munsell)	Consistency/ Density	Cementation/ Plasticity	Structure	Moisture Content	Maximum particle size*	Odor	% gravel*	% sand*	% fines*	PID Reading (ppm)*	Sample IDs (Single Letter)	Comments
0		HC	BL 10 YR 2/1	F	Non-Plasticity	H	Wet		T					A	VR in core 2 from 0' -1'
1															
2															
3															

Additional Notes/Comments: BOC = 3.0'

Core	Date	Push(ft)	Time	Recovery
3rd	2/16	Multiple	13:30	--
4th	2/16	4.4	1340	3.4
5th	2/16	5	1400	3.7
6th	2/16	5	1410	4.8
7th	2/16	5.5	1425	4.5
8th	2/16	5	1445	4.0

Core	Date	Push(ft)	Time	Recovery
9th	2/16	Multiple	1500	--
10th	2/16	Multiple	1530	--
11th	2/16	Multiple	1600	--

*Maximum particle size, particle percentage, and PID reading not provided in log.
CA Coal Aggregate material
HC Hard-crumbly material
VR Viscous-rubbery material

Sample Summary (check boxes for analysis):

Sample ID		Sample Type (N/FD/MSD)	Sample Date/Time	Depth Interval (ft)	Thermal	Stabilization & Solidification									
A	IMP1-HC	N	2/16/2012 1550	Composite	X	X									

Reviewed by: *M.Velasquez* Date: 9/13/2012

CH2MHILL

Site Name: Pfizer American Cyanamid Acid Tar
Project Number: 429384.FB.BS
Project Location: Bridgewater, NJ
Survey Duration: 1/10/2012

Station ID:	IMP2-B	**Easting:**	478193.42	**Attempt 1**	**Refusal? Y/N**
Sampling	M. Velasquez/ S. Babu	**Northing:**	626817.22	**Penetration (ft):** 6.6'	Y
Crew/Company	Aqua Survey	**Elevation:**	--	**Recovery (ft)** 6.1'	
	M. Shappell/Captain	**Datum:**	NJSP Zone East NAD 83	**Date/Time:** 1/10/12 1245	
	T. Crosby	**Depth (ft):**	4.7		
		St. Arrival:	12:30	**Attempt 2**	**Refusal? Y/N**
Vessel:	*Pontoon Barge*	**St.Depart:**	13:05	**Penetration (ft):** 6.0'	Y
Collection:	Vibracore	**Logged by:**	M. Velasquez	**Recovery (ft)** 2.1'	
Collector Information:	Log reflects sample as collected- no correction factor applied for less than 100% core recovery. Core opened on 01/10/12 @ 13:20			**Date/Time:** 1/10/12 1305	

Depth below mudline (ft)	Lithology	Type	Color (Munsell)	Consistency/ Density	Cementation/ Plasticity	Structure	Moisture Content	Maximum particle size	Odor	% gravel	% sand	% fines	PID Reading (ppm)	Sample IDs (Single Letter)	Comments	H2S Reading
0		VR	10 YR 2/1	S	M	H	Wet	None	T	0%	0%	0%	104	A		0.0
1															Core #1	
		HC		H	W								1053	B	VR:0'-1.0'	1.0
2															HC:1.0'-6.0'	
3															Core #2	
4															VR: 0.0'- 0.8'	
5															HC: 0.8'-2.1'	
6																

Additional Notes/Comments: BOC = 6.0'

CA Coal Aggregate material
HC Hard-crumbly material
VR Viscous-rubbery material

Sample Summary (check boxes for analysis):

	Sample ID	Sample Type (N/FD/MSD)	Sample Date/Time	Depth Interval (ft)	Thermal	Stabilization/Solidification									
A	IMP2-VR	N	1/12/2012 15:30	Composite	X	X									
B	IMP2-HC	N	1/12/2012 15:40	Composite	X	X									

Reviewed by: *M.Velasquez* Date: 9/13/2012

CH2MHILL

Site Name: Pfizer American Cyanamid Acid Tar
Project Number: 429384.FB.BS
Project Location: 1/10/2012
Survey Duration:

Station ID:	IMP2-J	**Easting:**	478326.7	**Attempt 1**	**Refusal? Y/N**
Sampling	S. Babu/ M. Velasquez	**Northing:**	626738.46	**Penetration (ft):** 7.0'	N
Crew/Company	Aqua Survey	**Elevation:**	--	**Recovery (ft)** 4.4'	
	M. Shappell/Captain	**Datum:**	NJSP Zone East NAD 83	**Date/Time:** 1/10/12 11:25	
	T. Crosby	**Depth (ft):**	4.7		
		St. Arrival:	11:10	**Attempt 2**	**Refusal? Y/N**
Vessel:	*Pontoon Barge*	**St.Depart:**	12:15	**Penetration (ft):** 7.0'	Y
Collection:	Vibracore	**Logged by:**	M. Velasquez	**Recovery (ft)** 5.8'	
Collector Information:	Log reflects sample as collected- no correction factor applied for less than 100% core recovery. Core opened on 01/10/12 @12:00			**Date/Time:** 1/10/12 11:45	

Depth below mudline (ft)	Lithology	Type	Color (Munsell)	Consistency/ Density	Cementation/ Plasticity	Structure	Moisture Content	Maximum particle size	Odor	% gravel	% sand	% fines	PID Reading (ppm)	Sample IDs (Single Letter)	Comments	H2S reading
0		VR	10 YR 2/1	VS	M	H	Wet	None	T	0%	0%	0%	1086	A		0.0
0.4																
1		HC		H	W								527	B		0.0
2																
3																
4																
4.2																

Additional Notes/Comments: BOC = 4.2'

CA Coal Aggregate material
HC Hard-crumbly material (hardened, slightly cemented material, crumbles)
VR Viscous-rubbery material (with no particle content)

Core #2
VR: 0.0'- 0.5'
HC: 0.5'-5.4'

Sample Summary (check boxes for analysis):

Sample ID		Sample Type (N/FD/MSD)	Sample Date/Time	Depth Interval (ft)	Thermal	Stabilization/Solidification									
A	IMP2-VR	N	1/12/2012 15:30	Composite	X	X									
B	IMP2-HC	N	1/12/2012 15:40	Composite	X	X									

Reviewed by: *M.Velasquez* Date: 9/13/2012

CH2MHILL

Site Name: American Cyanamid Superfund Site
Project Number: 429348
Project Location: Bridgewater, NJ
Survey Duration: 1/10/2012

Station ID:	IMP2-O	**Easting:**	478327.68	**Attempt 1**	**Refusal? Y/N**
Sampling	M. Velasquez/ S. Babu	**Northing:**	626589.7	**Penetration (ft):** 6'	Y
Crew/Company	Aqua Survey	**Elevation:**	--	**Recovery (ft)** 2.8'	
	M. Chappell/Captain	**Datum:**	NYSP Zone East NAD 83	**Date/Time:** 1/10/2012 @ 15:45	
	T. Crosby	**Depth (ft):**	4.7		
		St. Arrival:	15:00 (01/10/12)	**Attempt 2**	**Refusal? Y/N**
Vessel:	*Pontoon Barge*	**St.Depart:**	15:15 (01/12/12)	**Penetration (ft):** 6'	Y
Collection:	Vibracore	**Logged by:**	M. Velasquez	**Recovery (ft)** 4.1'	
Collector Information:	Log reflects sample as collected- no correction factor applied for less than 100% core recovery.Core opened on 01/10/12 @16:15			**Date/Time:** 1/10/2012 @ 16:05	

Depth below mudline (ft)	Lithology	Type	Color (Munsell)	Consistency/ Density	Cementation/ Plasticity	Structure	Moisture Content	Maximum particle size	Odor	% gravel	% sand	% fines	PID Reading (ppm)	Sample IDs (Single Letter)	Comments	H2S Reading
0		VR	10 YR 2/1	S	M	H	Wet	None	T	0%	0%	100%	2523	A		0.0
1																
1.3																
		HC		F	W								1644	B		0.0
2																
2.8																

Additional Notes/Comments: BOC = 2.8'

Core	Date	Push(ft)	Time	Recovery (ft)
3rd	1/11	7	830	--
4th	1/11	6.5	905	--
5th	1/11	5	945	--
6th	1/11	Multiple	1000	--
7th	1/11	Multiple	1030	--
8th	1/11	Multiple	1215	--
9th	1/11	1	1305	--
10th	1/11	1	1345	--
11th	1/11	1	1415	--
12th	1/11	1	1500	--
13th	1/11	1	1535	--
14th	1/12	6.6	1040	--

Core	Date	Push(ft)	Time	Recovery (ft)
15th	1/12	6	1100	--
16th	1/12	6	1120	--
17th	1/12	6	1140	--
18th	1/12	5	1210	--
19th	1/12	5	1220	--
20th	1/12	Multiple	1315	--
21st	1/12	Multiple	1340	--
22nd	1/12	Multiple	1355	--
23rd	1/12	6	1445	--

Core #2
VR: 0.0'- 1.1'
HC: 1.1'-4.0'

Core #3
VR: 0.0'- 1.5'
HC: 1.5'-6.3'

Core #4
VR: 0.0'- 1.5'
HC: 1.5'-5.9'

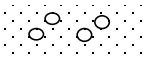
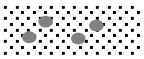
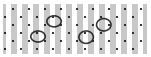
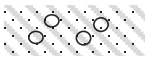
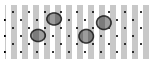
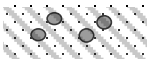
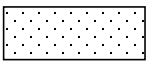
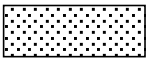
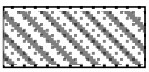
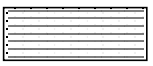
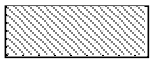
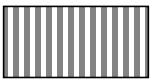
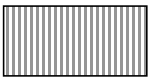
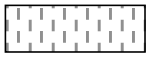
CA Coal Aggregate material
HC Hard-crumbly material
VR Viscous-rubbery material

Sample Summary (check boxes for analysis):

Sample ID		Sample Type (N/FD/MSD)	Sample Date/Time	Depth Interval (ft)	Thermal	Stabilization & Solidification									
A	IMP2-VR	N	1/12/2012 15:30	Composite	X	X									
B	IMP2-HC	N	1/12/2012 15:40	Composite	X	X									

Reviewed by: *M.Velasquez* Date: 9/13/2012

Sediment Core Log Key

MAJOR DIVISIONS		GRAPHIC SYMBOL	GROUP SYMBOL	DESCRIPTION
COARSE-GRAINED MATERIAL	GRAVELS — CLEAN GRAVELS		GW	Well-graded gravel Well-graded gravel with sand
			GP	Poorly graded gravel Poorly graded gravel with sand
	GRAVELS WITH FINES		GW-GM	Well-graded gravel with silt Well-graded gravel with silt and sand
			GW-GC	Well-graded gravel with clay Well graded gravel with clay and sand
			GP-GM	Poorly graded gravel with silt Poorly graded gravel with silt and sand
			GP-GC	Poorly graded gravel with clay Poorly graded gravel with clay and sand
			GM	Silty gravel Silty gravel with sand
			GC	Clayey gravel Clayey gravel with sand
	SANDS — CLEAN SANDS		SW	Well-graded sands Well-graded sand and gravel
			SP	Poorly-graded sands Poorly graded sand with gravel
	SANDS WITH FINES		SW-SM	Well-graded sand with silt Well-graded sand with silt and gravel
			SW-SC	Well-graded sand with clay Well-graded sand with clay and gravel
			SP-SM	Poorly-graded sand with silt Poorly-graded sand with silt and gravel
			SP-SC	Poorly-graded sand with clay Poorly-graded sand with clay and gravel
			SM	Silty sand Silty sand and with gravel
			SC	Clayey sand Clayey sand and with gravel
FINE-GRAINED MATERIALS	SILTS AND CLAYS		CL	Lean clay * Lean clay with sand or gravel * Sandy lean clay * Sandy lean clay with gravel * Gravelly lean clay * Gravelly lean clay with sand
			ML	Silt * Silty with sand or gravel * Sandy silt * Sandy silt with gravel * Gravelly silt * Gravelly silt with sand
			CH	Fat clay * Fat clay with sand or gravel * Sandy fat clay * Gravelly fat clay * Gravelly fat clay with sand
			MH	Elastic silt * Elastic silt with sand or gravel * Sandy elastic silt * Sandy elastic silt with gravel * Gravelly elastic silt * Gravelly elastic silt with sand
			OL/OH	Organic silt * Organic silt with sand or gravel * Sandy organic silt * Sandy organic soil with gravel * Gravelly organic soil * Gravelly organic soil with sand

Well Graded (Engineering) = Poorly Sorted (Geological) = grains of all different sizes mixed together

Poorly Graded (Engineering) = Well Sorted (Geological) = grains are all same size

∩ Shell hash

ʌʌʌʌ Peat/organic matter

CONSISTENCY

Penetration of thumb:

<0.25 cm = hard (H)

0.25 - 2.0 cm = firm (F)

2.0 - 4.0 cm = soft (S)

>4.0 cm = very soft (VS)

CEMENTATION

N = not cemented

W = weakly cemented

M = Moderately cemented

S = Strongly cemented

STRUCTURE

H = Homogeneous

S = Stratified

L = Laminated

M = Mottled

COLOR

from Munsell chart

MAXIMUM PARTICLE SIZE

SC = Small Cobble

CP = Coarse Pebble

MP = Medium Pebble

SP = Small Pebble

CS = Coarse Sand

MS = Medium Sand

FS = Fine Sand

VFS = Very Fine Sand

Z = Silt

SA = Sub-angular

VA = Very angular

ODOR

N = None

UNC = Unclassified

S = Sulfur-like

T = Tar-like

PHC = Petroleum hydrocarbon-like

Quantifying Descriptors

Strong

Moderate

Faint

Moisture Content

Wet

Moist

Dry

well graded = poorly sorted = grains of all different sizes mixed together

poorly graded = well sorted = grains are all same size

VISIBLE CONTAMINATION DESCRIPTORS

Sheen - iridescent petroleum-like sheen. Free product is not present but a distinct film is evident. Not to be used to describe a “bacterial sheen” which can be distinguished by its tendency to break up on the water surface at angles whereas petroleum sheen will be continuous and will not break up.

Stained - used w/ color (i.e. black or brown stained) to indicate that the soil matrix is stained a color other than the natural (unimpacted) color of the soil.

Coated - soil grains are coated with free product – there is not sufficient free-phase material present to saturate the pore spaces.

Blebs - observed discrete sphericals of tar/free product - but for the most part the soil matrix was not visibly contaminated or saturated. Typically this is residual product.

Saturated - the entirety of the pore space for a sample is saturated with NAPL. Care should be taken to ensure that you’re not observing water saturating the pore spaces if you use this term. Depending on viscosity, free-phase saturated materials may freely drain from a soil sample.

Appendix B – Photo Log

CH2MHILL

IMPOUNDMENT MATERIAL COLLECTION
PHOTOGRAPHIC LOG

Site Location: Bridgewater Township, Somerset County, NJ	Impoundments 1 and 2 Treatability Study Results American Cyanamid Superfund Site

Photo No.	Date
1	2/13/2012

Description:
IMP1-A full core recovery.

Photo No.	Date:
1	2/13/12

Description:
IMP1-A close up - top of core.

CH2MHILL

IMPOUNDMENT MATERIAL COLLECTION
PHOTOGRAPHIC LOG

Site Location: Bridgewater Township, Somerset County, NJ	Impoundments 1 and 2 Treatability Study Results American Cyanamid Superfund Site

Photo No.	Date
3	2/13/2012

Description:
IMP1-A close up - bottom of core.

Photo No.	Date
4	2/15/2012

Description:
IMP1-E full core recovery.

CH2MHILL

IMPOUNDMENT MATERIAL COLLECTION
PHOTOGRAPHIC LOG

Site Location: Bridgewater Township, Somerset County, NJ	Impoundments 1 and 2 Treatability Study Results American Cyanamid Superfund Site

Photo No.	Date
5	2/13/2012

Description:
IMP1-E close up - top of core.

Photo No.	Date:
6	2/15/2012

Description:
IMP1-E close up - bottom of core.

CH2MHILL

IMPOUNDMENT MATERIAL COLLECTION
PHOTOGRAPHIC LOG

Site Location: Bridgewater Township, Somerset County, NJ	Impoundments 1 and 2 Treatability Study Results American Cyanamid Superfund Site

Photo No.	Date
7	2/13/2012

Description:
IMP1-B full core recovery.

Photo No.	Date
8	2/16/2012

Description:
IMP1-B close up - top of core.

CH2MHILL

IMPOUNDMENT MATERIAL COLLECTION PHOTOGRAPHIC LOG

Site Location: Bridgewater Township, Somerset County, NJ	Impoundments 1 and 2 Treatability Study Results American Cyanamid Superfund Site
Photo No. 9 / 2/13/2012 Description: IMP1-B close up - top of core.	

Photo No. 10 / Date: 2/16/2012 Description: IMP1-L full core recovery.	

CH2MHILL

IMPOUNDMENT MATERIAL COLLECTION PHOTOGRAPHIC LOG

Site Location: Bridgewater Township, Somerset County, NJ	Impoundments 1 and 2 Treatability Study Results American Cyanamid Superfund Site

Photo No.	Date
11	2/13/2012

Description:
IMP2-B full core recovery.

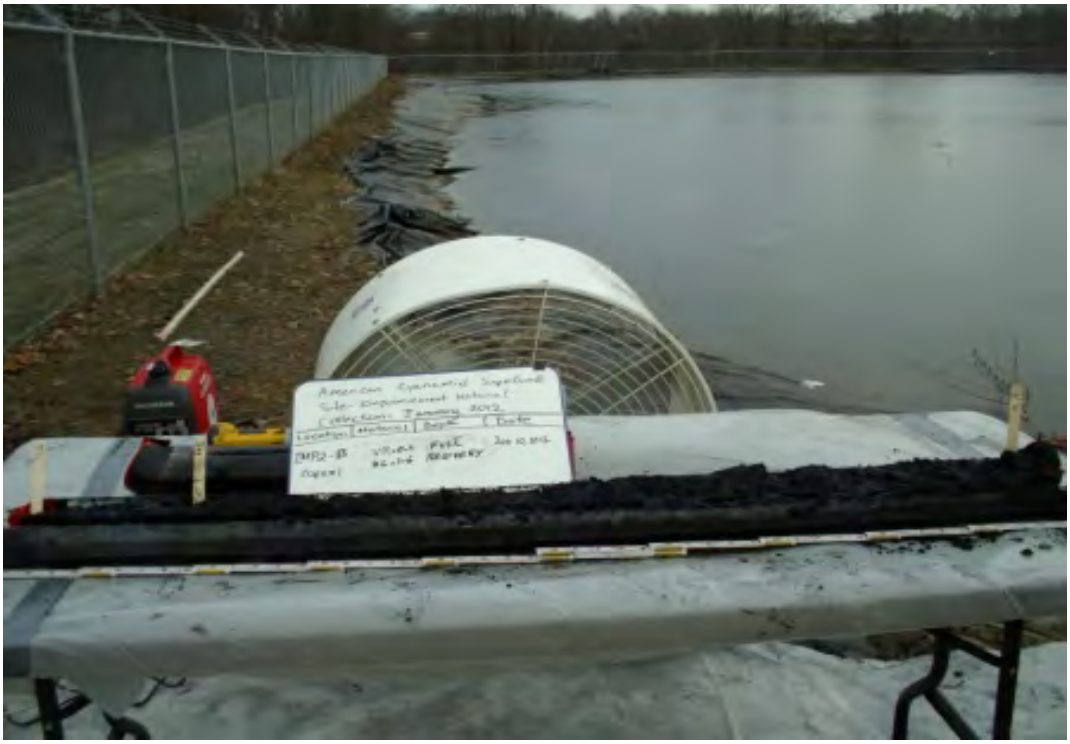
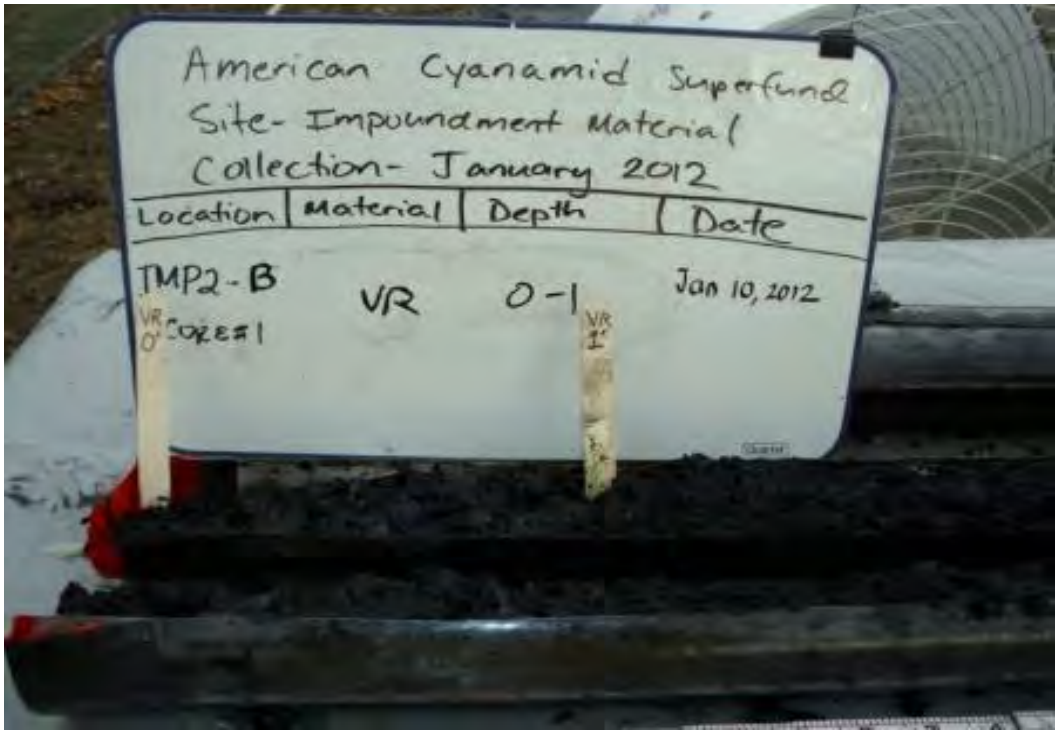


Photo No.	Date:
12	1/10/2012

Description:
IMP2-B close up - top of core.



CH2MHILL

IMPOUNDMENT MATERIAL COLLECTION PHOTOGRAPHIC LOG

Site Location: Bridgewater Township, Somerset County, NJ	Impoundments 1 and 2 Treatability Study Results American Cyanamid Superfund Site

Photo No.	Date
13	2/13/2012

Description:
IMP2-B close up - bottom of core.

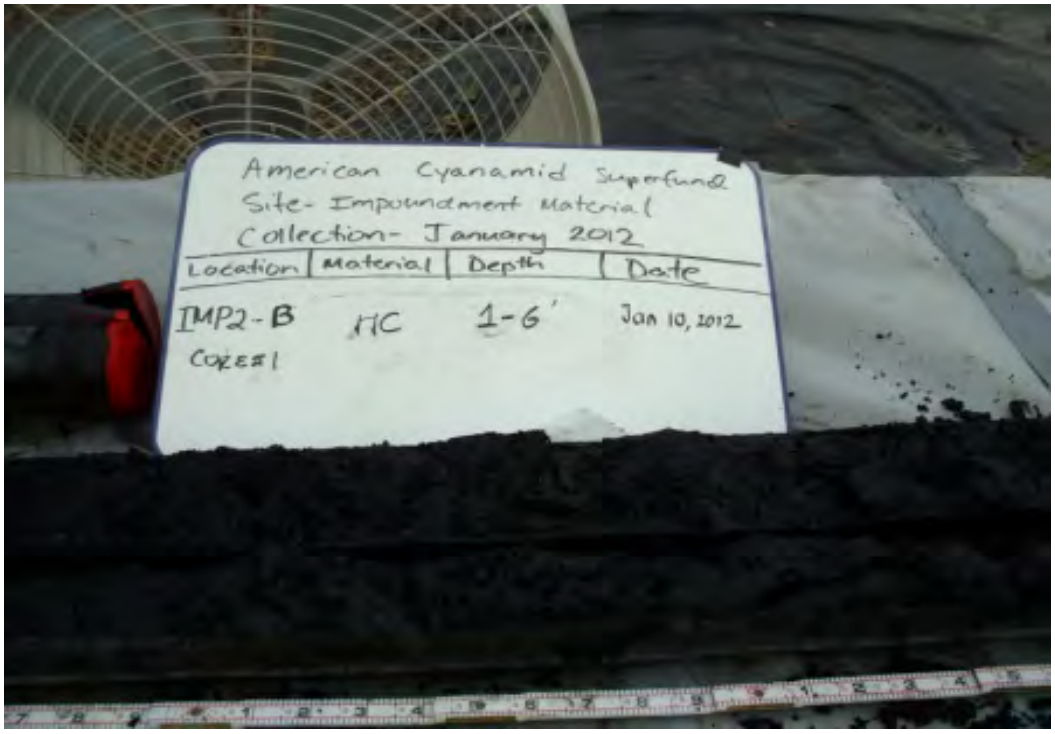


Photo No.	Date
14	1/10/2012

Description:
IMP2-J full core recovery.

CH2MHILL

IMPOUNDMENT MATERIAL COLLECTION PHOTOGRAPHIC LOG

Site Location: Bridgewater Township, Somerset County, NJ	Impoundments 1 and 2 Treatability Study Results American Cyanamid Superfund Site

Photo No.	Date
15	2/13/2012

Description:
IMP2-J close up - top of core.

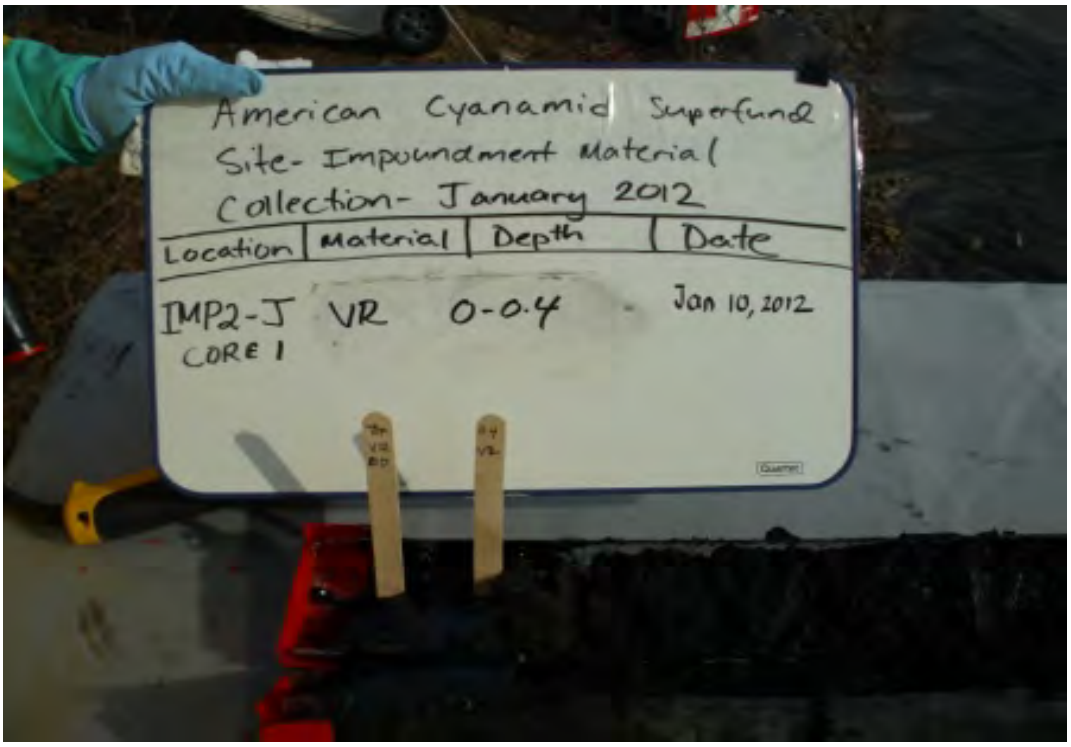
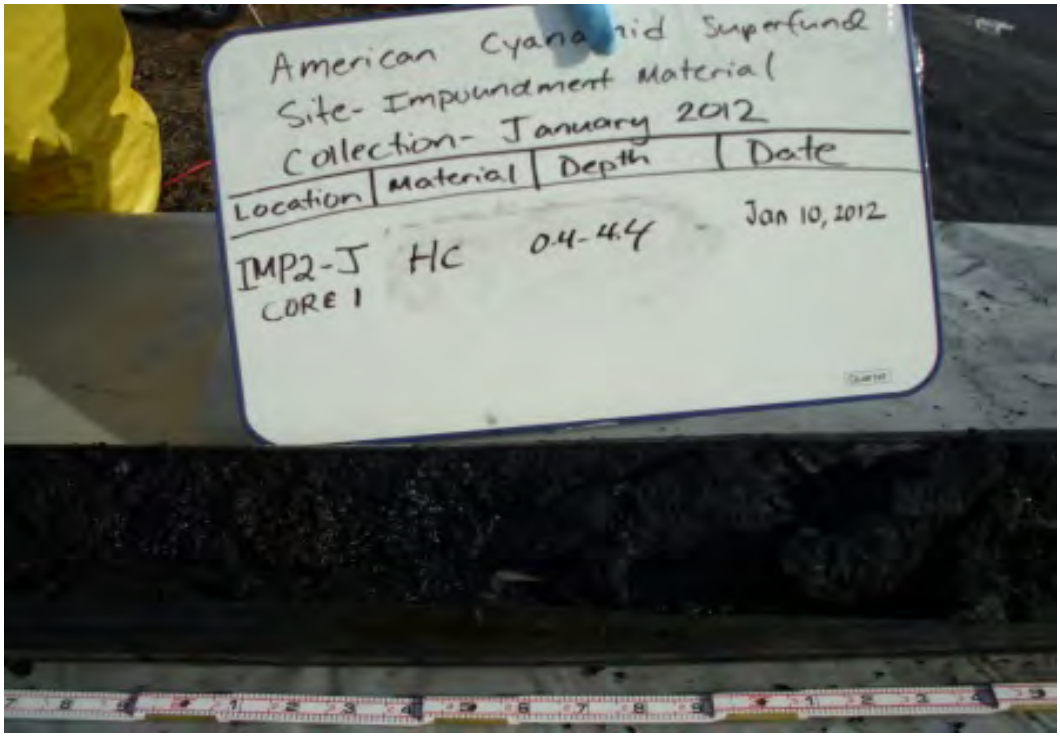


Photo No.	Date:
16	1/10/2012

Description:
IMP2-B close up - bottom of core.



CH2MHILL

IMPOUNDMENT MATERIAL COLLECTION PHOTOGRAPHIC LOG

Site Location: Bridgewater Township, Somerset County, NJ	Impoundments 1 and 2 Treatability Study Results American Cyanamid Superfund Site

Photo No.	Date
17	2/13/2012

Description:
IMP2-O full core recovery.

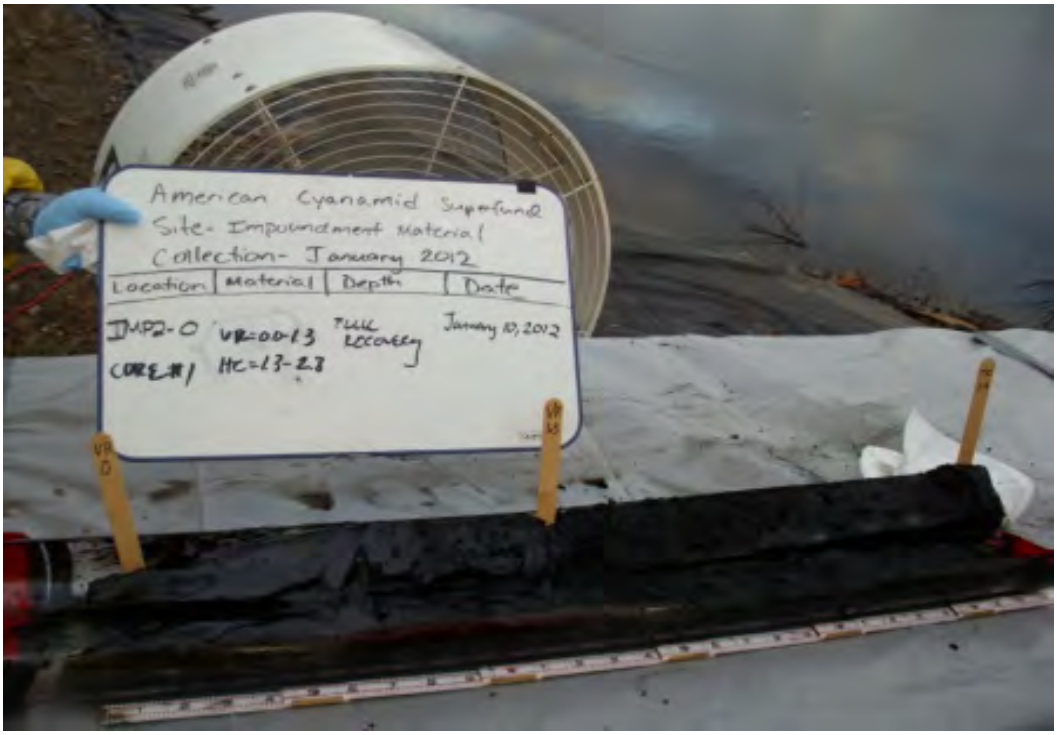
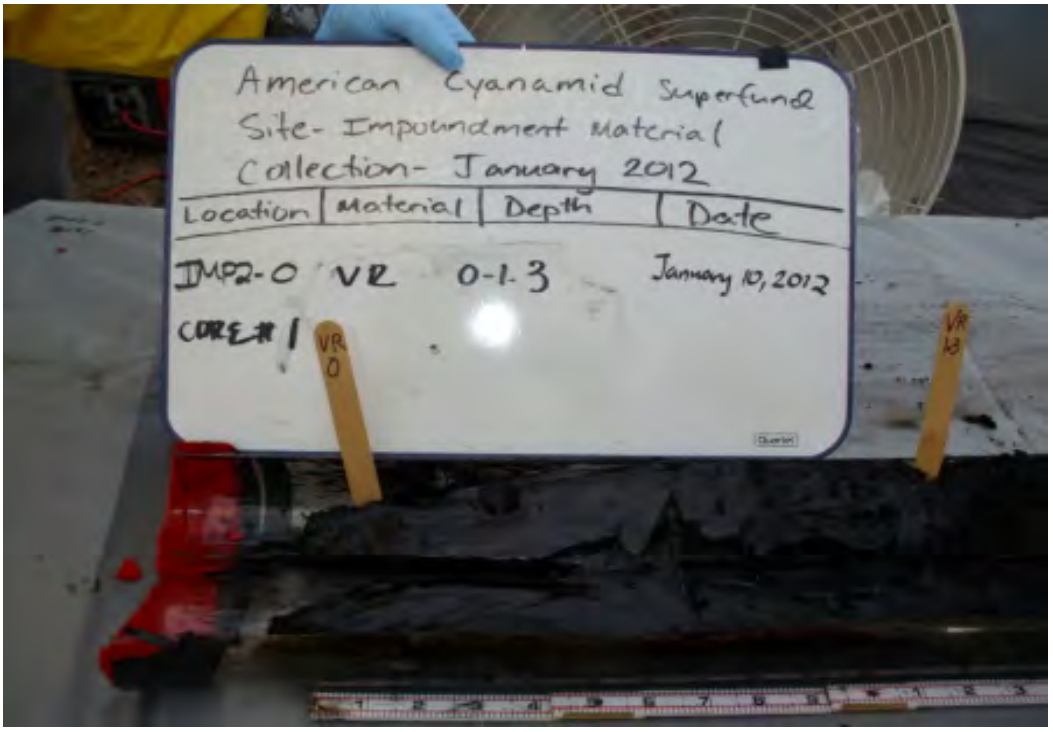


Photo No.	Date
18	1/10/2012

Description:
IMP2-O close up - top of core.



CH2MHILL

IMPOUNDMENT MATERIAL COLLECTION PHOTOGRAPHIC LOG

Site Location: Bridgewater Township, Somerset County, NJ	Impoundments 1 and 2 Treatability Study Results American Cyanamid Superfund Site
Photo No. 19 / 2/13/2012 Description: IMP2-O close up - bottom of core.	

CH2MHILL

THERMAL TREATMENT PHOTOGRAPHIC LOG

Site Location: Bridgewater Township, Somerset County, NJ	Impoundments 1 and 2 Treatability Study Results American Cyanamid Superfund Site

Photo No. 1	2/13/2012

Description:
Thermal Study
Homogenized VR Tar.

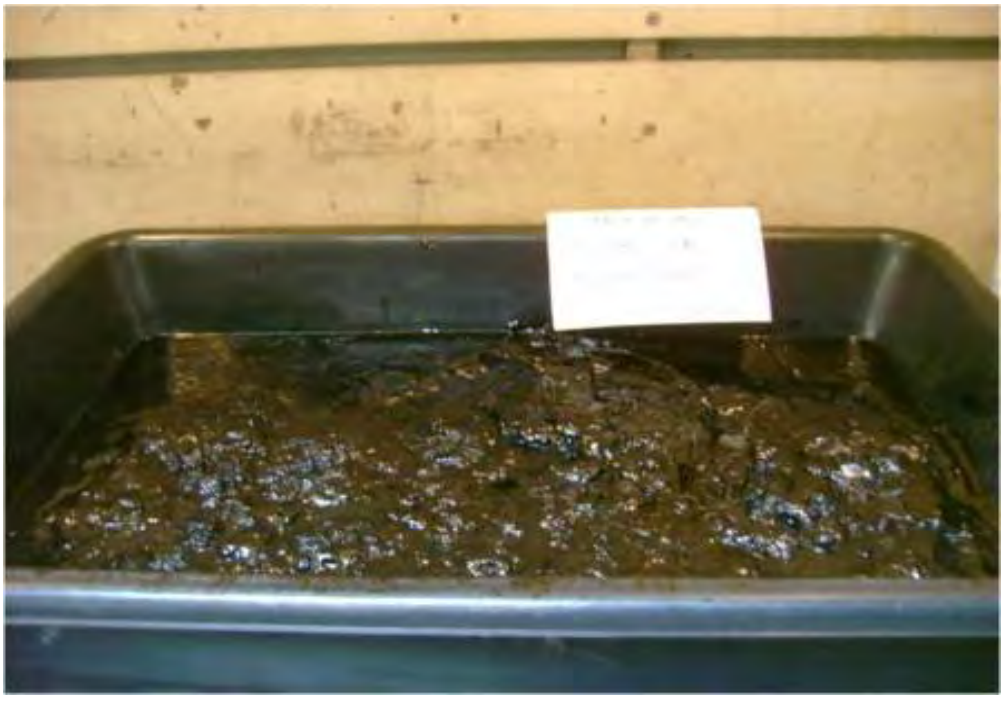


Photo No. 2	

Description:
Thermal Study
Homogenized HC Tar.

CH2MHILL

THERMAL TREATMENT PHOTOGRAPHIC LOG

Site Location: Bridgewater Township, Somerset County, NJ	Impoundments 1 and 2 Treatability Study Results American Cyanamid Superfund Site

Photo No. 3	2/13/2012

Description:
Thermal Bulk Bucket set up.

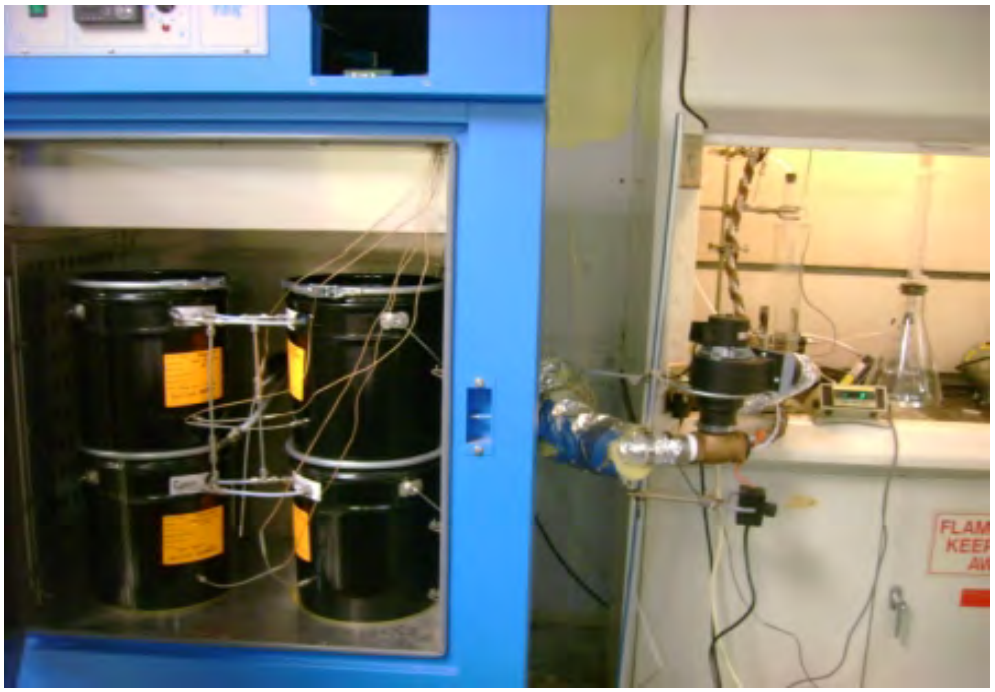


Photo No. 4	

Description:
Thermal Bulk Treatment Condensate.

CH2MHILL

THERMAL TREATMENT
PHOTOGRAPHIC LOG

Site Location: Bridgewater Township, Somerset County, NJ	Impoundments 1 and 2 Treatability Study Results American Cyanamid Superfund Site

Photo No. 5 | 2/13/2012

Description:
Reactor with air set up.

Photo No. 6

Description:
Trial Run Warm VR Tar.

CH2MHILL

THERMAL TREATMENT PHOTOGRAPHIC LOG

Site Location: Bridgewater Township, Somerset County, NJ	Impoundments 1 and 2 Treatability Study Results American Cyanamid Superfund Site

Photo No. 7	2/13/2012
Description: Trial Run Condensate.	

Photo No. 8	
Description: HC 90°C Pre Treatment Material.	

CH2MHILL

THERMAL TREATMENT PHOTOGRAPHIC LOG

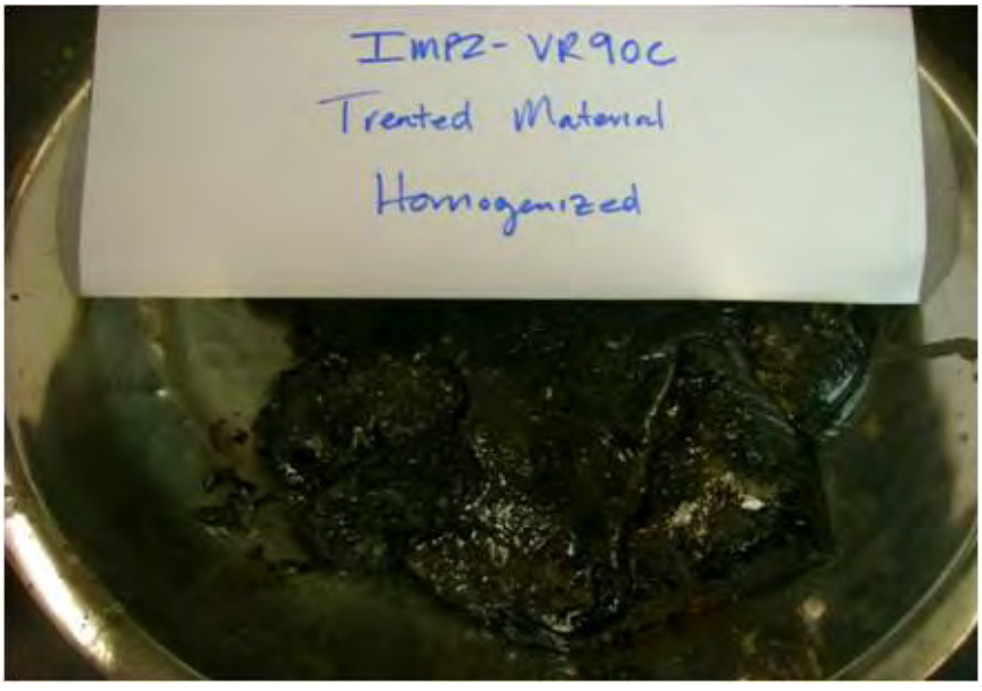
Site Location: Bridgewater Township, Somerset County, NJ	Impoundments 1 and 2 Treatability Study Results American Cyanamid Superfund Site

Photo No. 9 — 2/13/2012

Description:
HC 90°C PostTreatment Material.

Photo No. 10

Description:
VR 90°CPre Treatment Material.



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THERMAL TREATMENT PHOTOGRAPHIC LOG

Site Location: Bridgewater Township, Somerset County, NJ	Impoundments 1 and 2 Treatability Study Results American Cyanamid Superfund Site

Photo No. 11	2/13/2012

Description:
VR 90°C PostTreatment Material.

Photo No. 12	

Description:
HC 100°C PostTreatment Material-1.

CH2MHILL

THERMAL TREATMENT PHOTOGRAPHIC LOG

Site Location: Bridgewater Township, Somerset County, NJ

Impoundments 1 and 2 Treatability Study Results
American Cyanamid Superfund Site

Photo No. 13	2/13/2012

Description:
HC 100°C Post Treatment Material-2.

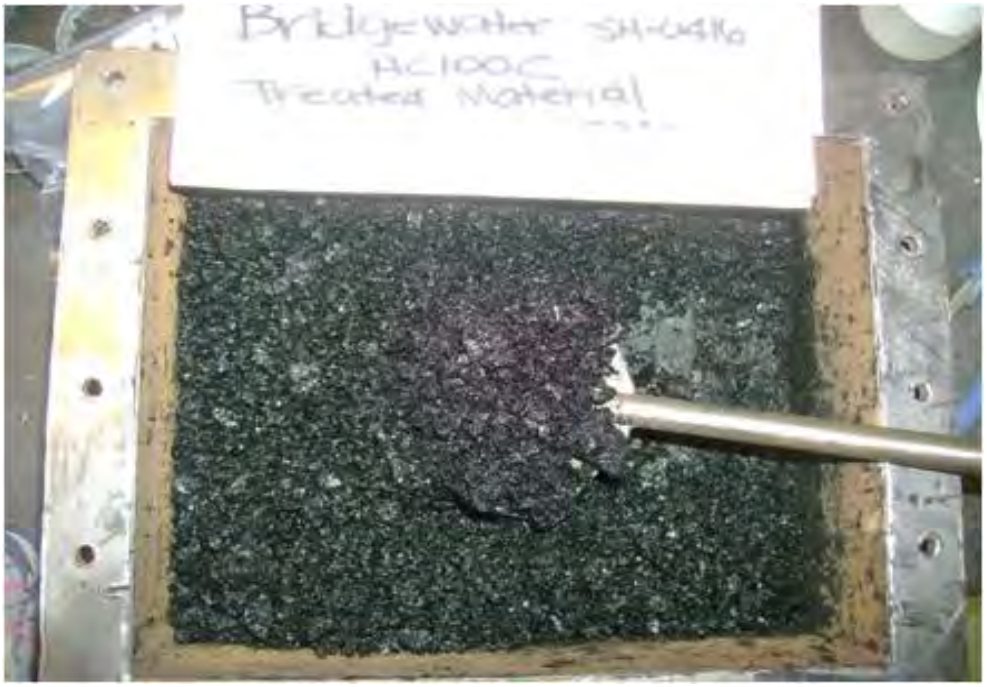


Photo No. 14	

Description:
VR 100°C Post Treatment Material.

CH2MHILL

THERMAL TREATMENT PHOTOGRAPHIC LOG

Site Location: Bridgewater Township, Somerset County, NJ	Impoundments 1 and 2 Treatability Study Results American Cyanamid Superfund Site

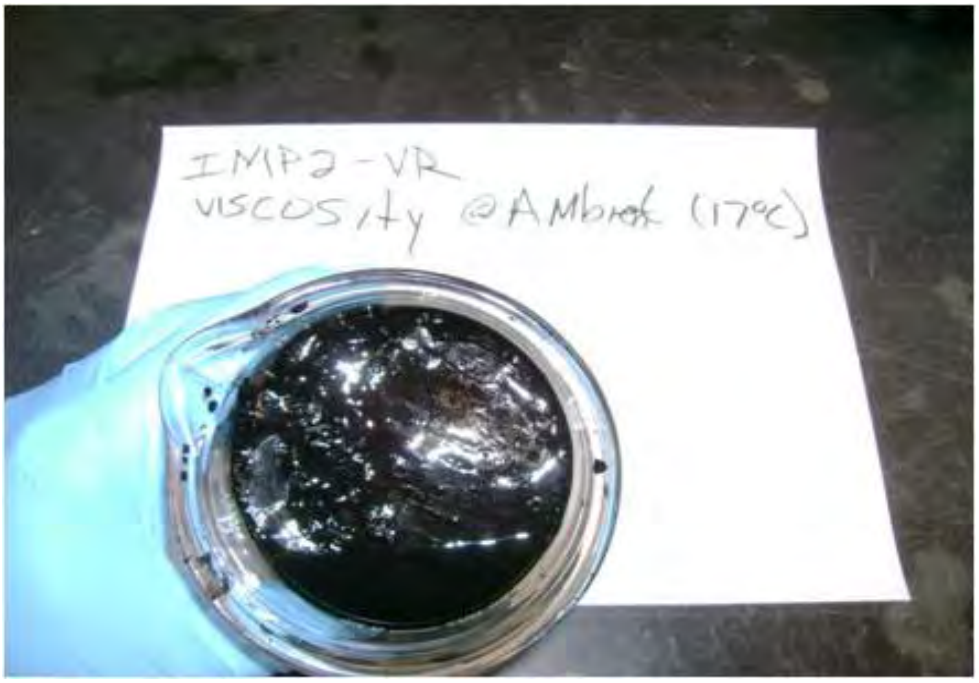
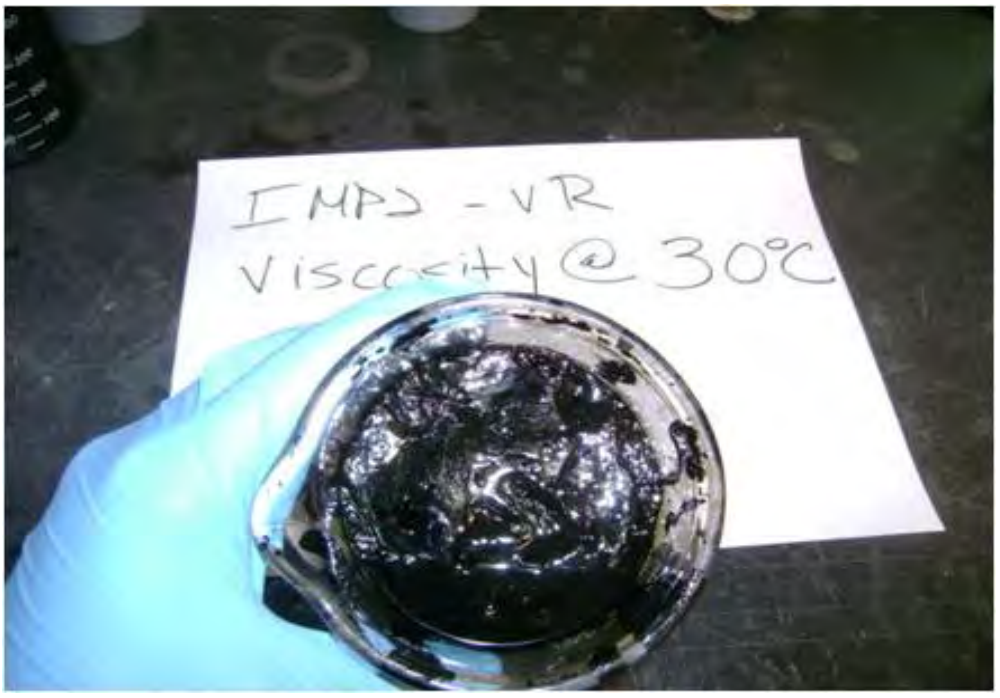
Photo No. 15	2/13/2012
Description: VR Viscosity Testing Ambient Temp.	

Photo No. 16	
Description: VR Viscosity Testing at 30°C.	

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THERMAL TREATMENT
PHOTOGRAPHIC LOG

Site Location: Bridgewater Township, Somerset County, NJ	Impoundments 1 and 2 Treatability Study Results American Cyanamid Superfund Site

Photo No. 17	2/13/2012
Description: VR Viscosity Testing at 50°C.	

Photo No. 18	
Description: VR Viscosity Testing at 70°C.	

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THERMAL TREATMENT
PHOTOGRAPHIC LOG

Site Location: Bridgewater Township, Somerset County, NJ	Impoundments 1 and 2 Treatability Study Results American Cyanamid Superfund Site

Photo No. 19	2/13/2012

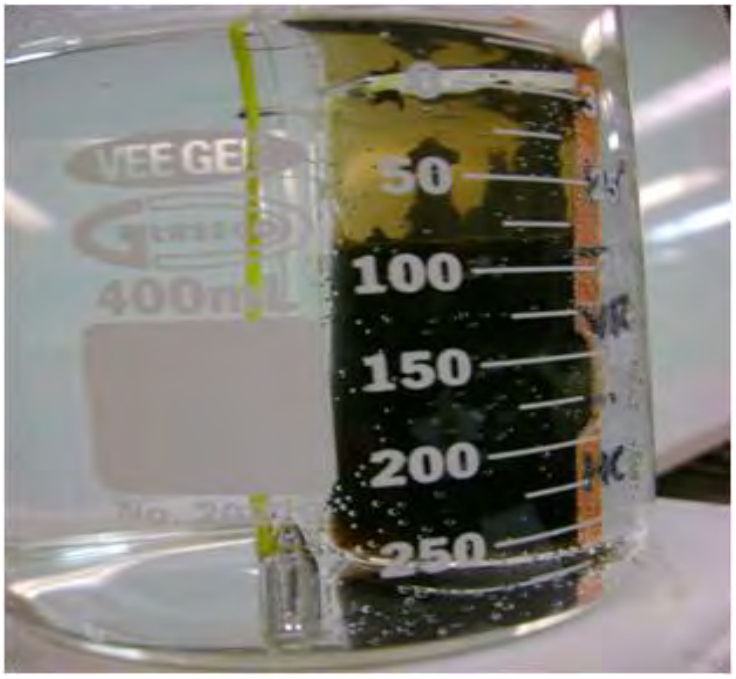
Description:
Untreated VR UCS Testing.

Photo No. 20	

Description:
Untreated HC UCS Testing.

CH2MHILL

THERMAL TREATMENT
PHOTOGRAPHIC LOG

Site Location: Bridgewater Township, Somerset County, NJ	Impoundments 1 and 2 Treatability Study Results American Cyanamid Superfund Site
Photo No. 21 — 2/13/2012	
Description: VR Swapping with Water.	

CH2MHILL

MIXING, pH ADJUSTMENT, & SOLIDIFICATION/STABILIZATION PHOTOGRAPHIC LOG

Site Location: Bridgewater Township, Somerset County, NJ

Impoundments 1 and 2 Treatability Study Results
American Cyanamid Superfund Site

Photo No. 1	2/13/2012

Description:
Layered 18 kg containers of homogenized Impoundment 1 and 2 raw material.

Photo No. 2	

Description:
Sample Homogenization Apparatus & Head Sampling Ports.

CH2MHILL

MIXING, pH ADJUSTMENT, & SOLIDIFICATION/STABILIZATION PHOTOGRAPHIC LOG

Site Location: Bridgewater Township, Somerset County, NJ

Impoundments 1 and 2 Treatability Study Results
American Cyanamid Superfund Site

Photo No. 3	2/13/2012

Description: Homogenization/Head Space Sampling Apparatus.

Photo No. 4	

Description: Impoundment 1 Raw Material Post Blending/Homogenization.

CH2MHILL

MIXING, pH ADJUSTMENT, & SOLIDIFICATION/STABILIZATION PHOTOGRAPHIC LOG

Site Location: Bridgewater Township, Somerset County, NJ

Impoundments 1 and 2 Treatability Study Results
American Cyanamid Superfund Site

Photo No. 5	2/13/2012

Description: Impoundment 2 Raw Material Post Blending/Homogenization.

Photo No. 6	

Description: Drilling chips of sample layer with 1-inch spade wood bit to create a Thermally Treated layering.

CH2MHILL

MIXING, pH ADJUSTMENT, & SOLIDIFICATION/STABILIZATION PHOTOGRAPHIC LOG

Site Location: Bridgewater Township, Somerset County, NJ

Impoundments 1 and 2 Treatability Study Results
American Cyanamid Superfund Site

Photo No. 7	2/13/2012

Description: Un-amended Impoundment 1 Thermally Treated Materials - Pre & Post Blending/Homogenization.

Photo No. 8	

Description: Un-amended Impoundment 2 Thermally Treated Materials Pre & Post Blending/Homogenization.

CH2MHILL

MIXING, pH ADJUSTMENT, & SOLIDIFICATION/STABILIZATION PHOTOGRAPHIC LOG

Site Location: Bridgewater Township, Somerset County, NJ	Impoundments 1 and 2 Treatability Study Results American Cyanamid Superfund Site

Photo No. 9 — 2/13/2012

Description: De-emulsification of Impoundment 1 Thermally Treated Material with 30% addition of HiCal LKD + H_20.

Photo No. 10

Description: Impoundment 1 Thermally Treated / pH-adjusted material.

Homogenization & pH Buffering

Impoundment 1 Thermally Treated / pH-adjusted material. Penetrometer registered between 0.5 and 0.75 tons/ft² (6.9 – 10.4 psi)

CH2MHILL

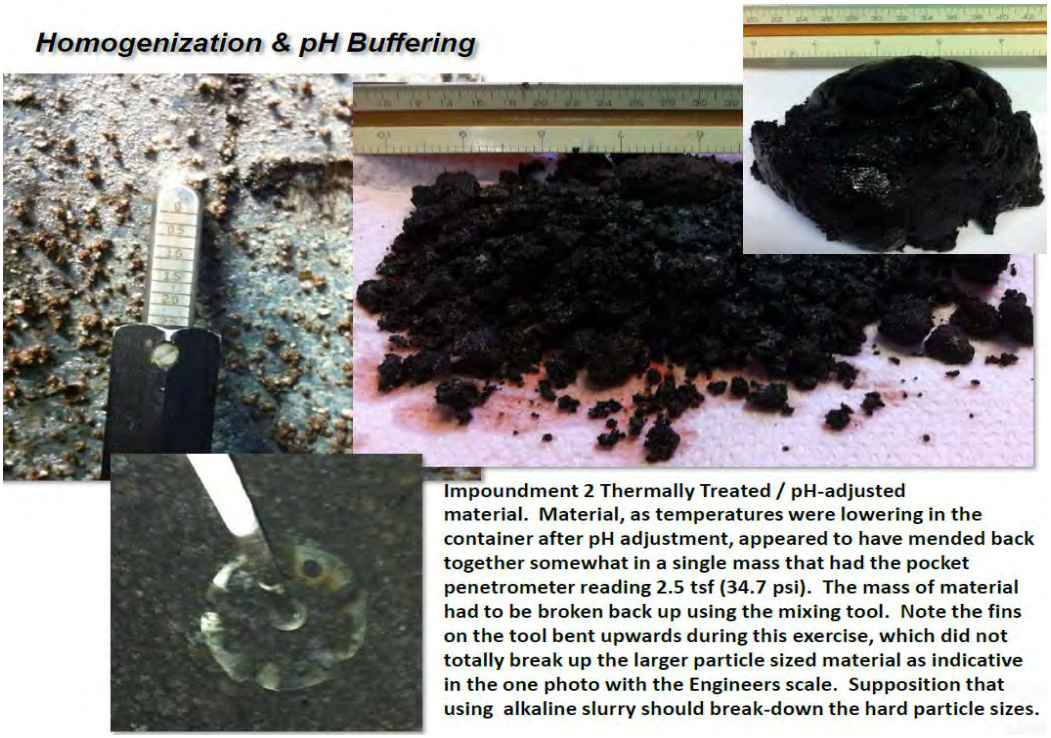
MIXING, pH ADJUSTMENT, & SOLIDIFICATION/STABILIZATION PHOTOGRAPHIC LOG

Site Location: Bridgewater Township, Somerset County, NJ

Impoundments 1 and 2 Treatability Study Results
American Cyanamid Superfund Site

Photo No. 11	2/13/2012

Description: Impoundment 2 Thermally Treated / pH-adjusted material.



Impoundment 2 Thermally Treated / pH-adjusted material. Material, as temperatures were lowering in the container after pH adjustment, appeared to have mended back together somewhat in a single mass that had the pocket penetrometer reading 2.5 tsf (34.7 psi). The mass of material had to be broken back up using the mixing tool. Note the fins on the tool bent upwards during this exercise, which did not totally break up the larger particle sized material as indicative in the one photo with the Engineers scale. Supposition that using alkaline slurry should break-down the hard particle sizes.

Photo No. 12	Date: 4/7/10

Description: Impoundment I – Raw Sludge Pozzolan Solidification

CH2MHILL

MIXING, pH ADJUSTMENT, & SOLIDIFICATION/STABILIZATION PHOTOGRAPHIC LOG

Site Location: Bridgewater Township, Somerset County, NJ	Impoundments 1 and 2 Treatability Study Results American Cyanamid Superfund Site

Photo No. 13 — 2/13/2012

Description: Impoundment 2 – Raw Sludge Pozzolan Solidification

Photo No. 14

Description: Impoundment I – Thermally Treated Sludge Pozzolan Solidification

Appendix C – TerraTherm Report

TERRATHERM, Inc.
151 Suffolk Lane
Gardner, MA 01440
P: 978-730-1200
F: 978-632-3422

September 20, 2012

Jason Cole, Ph.D., P.E.
CH2M HILL
109 William Lane
Oak Ridge, TN 37830

Stephen Maxwell, P.G.
CH2M HILL
1717 Arch St., Suite 4400
Philadelphia, PA 19103

Via Email: Jason.Cole@CH2M.com and Stephen.Maxwell@CH2M.com

Re: Results for Treatability Evaluation of Site Materials the American Cyanamid Superfund Site in Bridgewater Township, New Jersey

Dear Gentlemen,

TerraTherm, Inc. (TerraTherm) is pleased to present CH2MHILL testing results and conclusions for the laboratory treatability study completed from samples collected at the American Cyanamid Superfund Site in Bridgewater Township, New Jersey.

Description of Completed Laboratory Testing

CH2MHILL provided the following site materials for testing:

IMP2-VC-011212	Received on January 12, 2012
IMP2-HC-011212	Received on January 12, 2012
IMP1-CA-021512	Received on February 24, 2012
IMP1-CL-021512	Received on February 24, 2012
IMP1-SSL-021612	Received on February 24, 2012
IMP1-HC-021612	Received on February 24, 2012
IMP1-VR-021612	Received on February 24, 2012

The IMP1 refers to the impoundment one materials which were utilized for the bulk heating phase of work. The IMP2 (i.e., impoundment 2) materials were used for the bench-scale treatability evaluations. Kemron, a subcontractor to TerraTherm, completed the bulk heating and bench-scale treatability evaluations. The following Kemron analytical subcontractor laboratories completed the analytical testing associated with the bench-scale testing: GCAL, Air Toxics, Galson Labs, and CAS Labs.

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The work was performed to meet the following objectives:

1. Determine the effect of heating on the chemical composition of Impoundment 2 materials. Specific test objectives for viscous-rubbery (VR) and hard-crumbly (HC) include:

    a. Evaluate the change in chemical composition of impoundment materials before and after the heating.
    b. Characterize the chemical composition of vapor produced during thermal treatment.
    c. Assess leaching characteristics of impoundment materials following thermal treatment.
    d. Characterize the chemical composition of liquid effluent and condensate resulting from thermal treatment.

2. Determine the effect of heating on the physical properties of impoundment material. Specific test objectives include:

    a. Measure the corresponding change in VR and HC compressive strength before and after thermal treatment.
    b. Determine relative change in HC porosity resulting from thermal treatment.
    c. Measure the effect of increasing temperature on the specific gravity and viscosity of the VR material and the HC layer should liquefaction of this material occur during sample heating.
    d. Qualitatively assess apparent change in material characteristics before and after heating.
    e. Assess the physical stability of VR material with respect to HC material during heating, and evaluate the potential for homogenization during and after thermal treatment.

3. Heat treat bulk quantities of impoundment materials as directed by CH2M HILL for subsequent evaluation under a solidification/stabilization study conducted by others.

The project objectives were developed into a work plan (see Attachment 2) that consisted of three phases of work outlined below:

- Phase I:
    - Untreated Material Characterization (physical properties and chemical testing) (See Sections 3.1 and 3.3 of Kemron's report in Attachment 2).
    - Density and Viscosity of the VR material during heating at temperatures of 30, 50, 70, and 90°C (See Section 3.1 of Kemron's report in Attachment 2).
    - Material Stability Evaluation of VR layered on top of HC during heating at temperatures of 30, 50, 70, and 90°C (See Section 3.2 of Kemron's report in Attachment 2).

    - Thermal Treatment Trial Run Evaluation of VR at 100°C assessing off-gas and condensate analyses (See Section 4.0 of Kemron's report in Attachment 2).
- Phase II
    - Thermal Treatment Evaluations (i.e., HC and VR treatment at 90°C and 100°C) assessing chemical composition of off-gas and condensate collected (See Section 5.0 of Kemron's report in Attachment 2).
    - Reheating evaluation of the HC and VR treated materials from the 100°C thermal evaluations (See Section 6.2 of Kemron's report in Attachment 2).
    - Treated Material Physical Property and Chemical Testing (See Section 6.1 of Kemron's report in Attachment 2).
- Phase III
    - Heat treat bulk quantities of impoundment material for 7 days at 100°C (See Section 2.0 of Kemron's report in Attachment 2).

A trial test was included in Phase 1 of testing to determine if the proposed off-gas and condensate collection methods and analytical methods were sufficient to meet objective 1 of the study. From observations collected during the trial test, the following key revisions were made to the work plan:

- Heating during the trial test was extended from 2 days at 100°C until the PID detections reduced to <1000ppm.

- The addition of a top water layer to the material stability evaluation in Phase I.

- The Phase II off gas collection for the 90°C thermal evaluations for HC and VR changed from collection on days 1, 3, 6 and T_f (final ambient temperatures) to the following:

    - day 1,
    - the point when the FID VOC detection decreased to <50,000 ppm,
    - the point when the FID VOC detection decreased to <1,000 ppm, and
    - T_f.

- The Phase II off gas collection for the 100°C thermal evaluations for HC and VR changed from collection on days 0 (or T_0 initial ambient temperature), 1, 3, 6 and T_f (final ambient temperatures) to the following:

    - T_0,
    - day 1,
    - the point when the FID VOC detection decreased to <50,000 ppm,
    - the point when the FID VOC detection decreased to <1,000 ppm, and
    - T_f.

Results

The thermal testing was conducted at TerraTherm's subcontractor, Kemron Environmental Services, Inc. in Atlanta, GA under TerraTherm's supervision. Phase II of the work included heating VR and HC materials at 90°C or 100°C until the organic vapors (OV) emitted from the system were less than 1000 ppm as detected by flame ionization detector (FID). The following two points concern the study performance:

1. Data indicates that the heating of the 100°C heating of HC may have been cut short since the final FID data consisted of 4 data points some which were greater and less than 1000 ppm. Figure 1 presents the FID monitoring for all testing. Data is presented in Section 5.2.1 of Kemron's Treatability Study Report located in Attachment B.

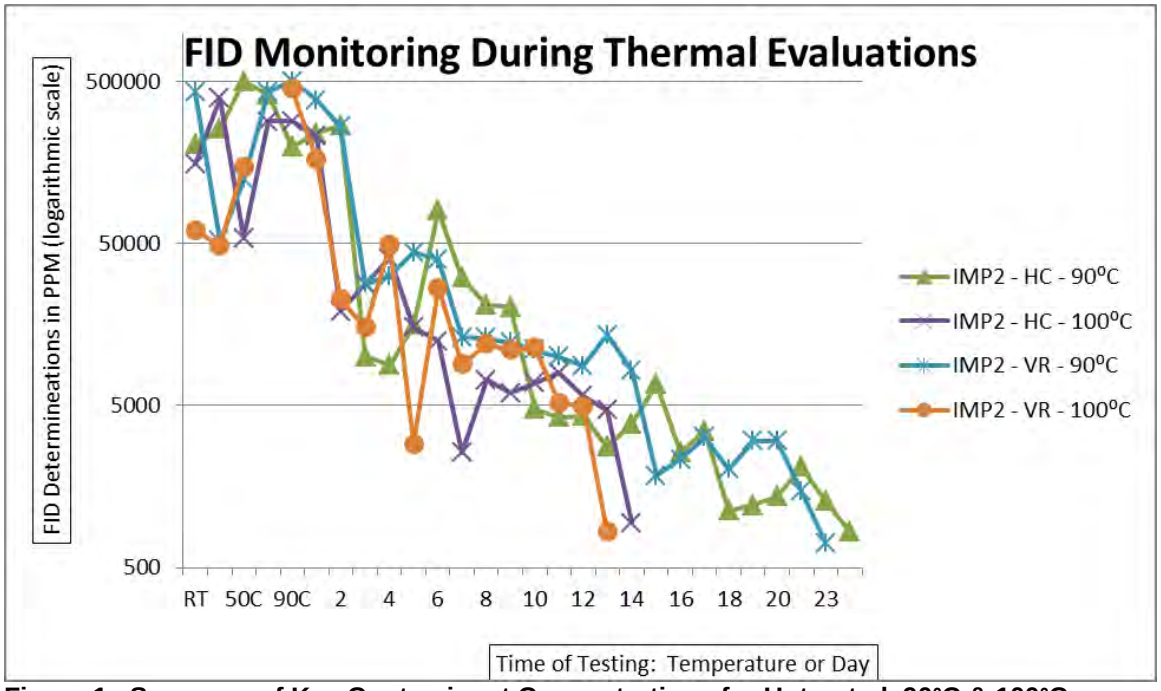

Figure 1. Summary of Key Contaminant Concentrations for Untreated, 90°C & 100°C

2. The temperature data during heating of the HC at 90°C showed that the oven temperature was lower than the material temperature. No apparent reason was determined following an investigation completed after heating; and this occurrence is likely due to the placement of the thermocouple in a cool zone near the top of the oven cavity. We are confident that the temperatures inside the reactor are accurately reported. Data is presented in Section 5.1.1 and Figure 2 of Kemron's Treatability Study Report located in Attachment B.

TerraTherm believes that in spite of the concerns above, the study objectives have been addressed thoroughly. We note that the results of the 100°C test for the HC material do not reflect the same degree of treatment as the other tests; rather it illustrates an

intermediate treatment result, since the test was not allowed to run long enough and to achieved less than 1,000 ppm in the effluent stream.

The remaining portions of this document provide discussion directly related to the study objectives where tables, figures and references to Kemron's study report, as necessary, are included for support. Tables are used extensively when discussing the study objectives. Extended tables are included in Attachment 1 of this report and shorter tabulations of the same data may be included in the text to draw attention to particular points for discussion. The following describes the tables included in this document (i.e., within the text and in Attachment 1):

- Tables 1 and 2 summarize the VOC and SVOC untreated and treated total, TCLP and SPLP analytical results showing averages for material triplicate analyses (objective 1a and 1c).
- Table 3 summarizes the sum of all tentatively identified compounds (TICs).
- Tables 4 and 5 summarize the total, TCLP and SPLP metals, pH and total organic carbon (TOC) untreated and treated analytical results showing averages for metals material triplicate analyses (objective 1a and 1c).
- Table 6 summarizes the off-gas data collected for the four reactors.
- Table 7 presents data from the reconstituted condensate collected for each of the four tests.
- Table 8 includes the untreated and treated physical property data.

Data Discussion: Analytical Results and Tentatively Identified Compounds (TICs) (Objective 1a – 1d)

In general, according to Tables 1 and 2, the volatiles were detected at the highest concentrations with benzene being the highest untreated concentration for both the VR and the HC. Naphthalene, toluene, and xylenes were the also detected at very high concentrations in the untreated VR and HC materials. 1,2-Dichlorobenzene was found at elevated concentrations in the VR untreated material and at four times the concentration of that in the HC untreated material. Of these compounds, all but naphthalene showed a significant reduction in concentrations from the untreated to the 90°C and 100°C, where naphthalene reductions were moderate. Figure 2 presents the VR and HC data for the key contaminants in the untreated and treated materials.

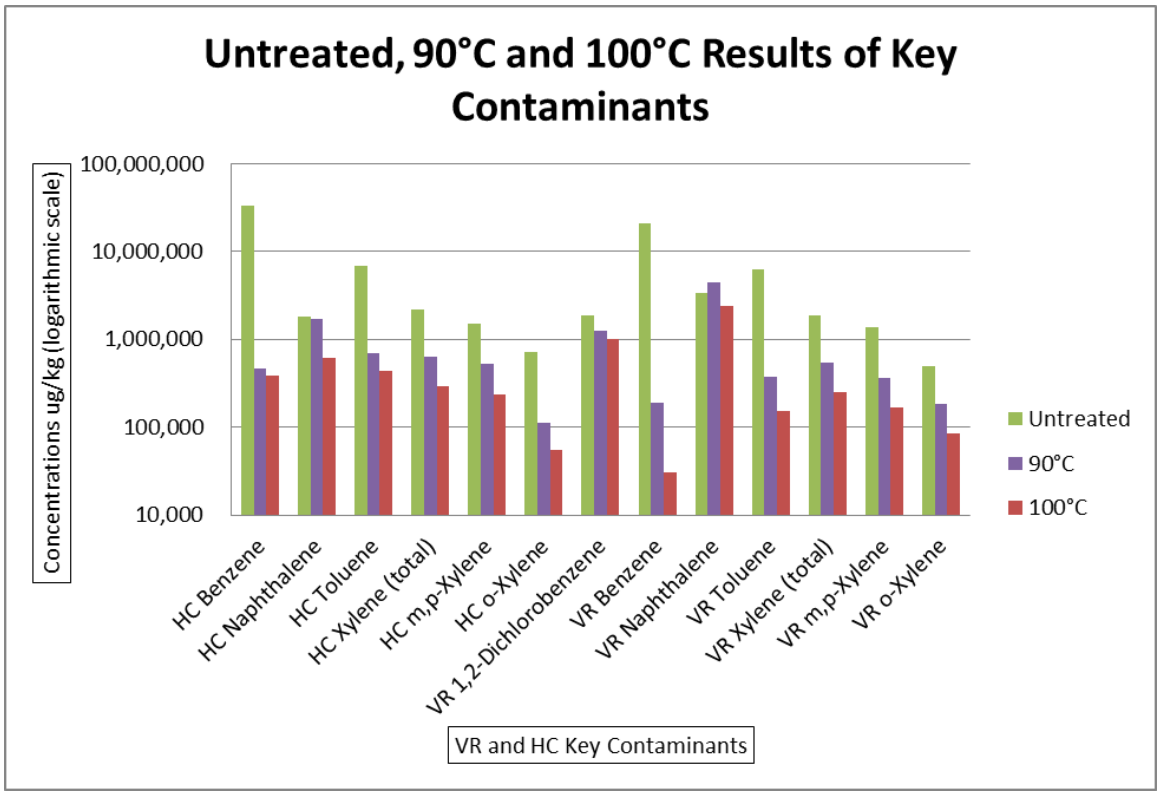

Figure 2. Summary of Key Contaminant Concentrations for Untreated, 90°C & 100°C

The semivolatile compound flourene was detected at the highest concentration for both the VR and the HC materials with the VR an order of magnitude higher in concentration than detected in the HC material. Following heating, flourene reductions were more significant in the VR material than the HC material.

Similar to the total analyses, volatiles were detected at the highest concentrations for the TCLP and SPLP leaching tests completed for the treated. Most of the SVOC leaching results were not detected or were "J" flagged indicating detection near the method detection limit (a portion of the HC SVOC TCLP leaching data is shown in the reduced versions of Table2 below and the remaining data is included in Attachment 1). The SPLP VOC highest concentrations for the treated VR and HC materials were for benzene, naphthalene, toluene, xylenes and 1,2-dichlorobenzene, as was the case for the materials (i.e., HC and VR). Benzene exceeded the TCLP criteria for subtitle D landfill acceptance for both materials; however, the 100°C test for the VR material just exceeded the 0.5 mg/L limit. The treated HC materials leached approximately an order of magnitude higher in concentrations than the VR treated materials where the SPLP benzene leached two orders of magnitude higher than VR for the 100°C evaluation. Pyridine exceeded the TCLP criteria for subtitle D landfill acceptance for the HC material and there were no SVO exceedances for the VR.

Tentatively identified compounds (TIC) were presented as the sum of non-calibrated compounds detected in the treated and untreated material analyses as presented in Table 3. The VR material TICs averaged higher than the HC material for both the VOC and SVOC analyses. The data shows that TICs reduced in the treated materials when compared to the untreated materials, except for the HC material treated at 90°C.

Metals concentrations increased in the treated materials for both the VR and HC materials when compared to the untreated as presented in Tables 4 and 5. Aluminum and iron were detected at elevated concentrations in the treated VR materials; and in addition to these, chromium and nickel were detected at elevated concentrations in the treated HC materials. The TCLP and SPLP data shows that the treated HC materials were more prone to leaching than the treated VR materials with chromium, iron and nickel detected at the largest concentrations in the SPLP analyses, approximately an order of magnitude higher than the VR results. Chromium exceeded the TCLP leaching criteria for acceptance to subtitle D landfill for the HC material. As indicated in the laboratory treatability study report (see Attachment 2), the thermal reactor, thermocouple casing and aluminum foil were in contact with the test materials during treatment. Following treatment, there was evidence of corrosion of these materials and equipment which is the likely cause of the increases in trace metals in the treated materials.

Table 6 includes the sum of detected compounds per analytical test for 5 days of sampling (i.e., T_0, Day 1, FID detections <50,000 and <1,000 ppm, and after the treatment reactor cooled, T_f). FID monitoring data is also included. Overall, the largest concentrations detected were observed in the T0-15 analyses followed by the reduced sulfur analyses. More specifically, the 90°C data shows higher detections than the 100°C data. For instance, the 90°C T0-15 analyses by summa canister collection peaked at 69,000,000 and 129,000,000 ug/m3 for VR and HC; and the 100°C T0-15 analyses peaked at only 14,000,000 and 9,000,000 for VR and HC, respectively

Condensate was collected and removed from the system each day of heating. At the conclusion of heating, the condensate fractions were combined and a double layer formed. Each layer was submitted for analytical testing. Table 7 presents data for the reconstituted condensates. The pH of the top layer was consistently higher than that for the bottom layer for each of the tests. The benzene and toluene were the highest detected VOC compounds in both the top and bottom layers. The sum of all concentrations detected per fraction for VOCs shows that the aqueous portion of the condensate remains relatively consistent; however, the organic fraction shows lower collective concentrations for both 100°C tests. This is most pronounced with the HC 90°C test where detected concentrations were greater than 4 times that in the 100°C test. This trend is also observed in the organic layer for the VR SVO results, where the detected concentrations are about twice that for the 100°C data. Although the SVO detections were overall lower in the organic layer of the HC than the VR, the TIC data shows much higher collective concentrations than those for the VR. Relatively low collective SVO concentrations for calibrated compounds and TICs were observed for the aqueous fraction of condensate.

Data Discussion: Physical Property Results (Objective 2a-2c)

Physical property test methods were developed for use with typical soils. Since the VR and HC are a waste material, some physical property testing was unable to be completed as planned, see the “NT” identifier in Table 8a.

The unconfined compressive strength (UCS) results improved with heating; however due to the nature of the sample matrix the treated VR materials expanded laterally under

pressure. The HC material hardened during heating and produced increased strength reaching 80.1 psi for the 100°C treated material.

The porosity method is based on a calculation using moisture content, soil specific gravity, and bulk density. These three data points used to calculate porosity required heating to obtain results. The heating of the material is required to remove moisture per the respective test methods; however, mass loss due to volatilization of the high levels of contaminants rendered some of these tests not applicable and are reported as NT in Table 8a. The porosity results for the HC treated materials showed a decrease as treatment temperature increase.

As presented in Table 8b, the density of the VR material remained relatively consistent over the heating range of 30 - 90°C. An order of magnitude decrease in viscosity was observed at 90°C when compared to viscosities at ambient temperatures.

Data Discussion: Material Observations (Objective 2d-2e)

The VR and HC material behavior before and after heating is a critical component to the study and the utility of the results. Various observations were made about the materials and include the following:

- The 90 and 100°C VR treated materials had similar odor, increases in stiffness, a final treated shiny/glassy finish, and were free of standing water. When heating to 100°C; however, the VR material showed signs of expanding not observed in the 90°C test.

- The 90 and 100°C HC treated materials both were observed to have a hardened top shell layer with moist HC material beneath and the treated moist material was jet black with a green tint. The 90°C tests were observed to have strong odors of super glue and tar. Standing water was present in the bottom of the 100°C treated material.

- All metal equipment that came in contact with the materials showed signs of corrosion.

Two tests were completed to target evaluation of material characteristics during heating (i.e., the stability and reheating tests).

The stability testing included layering untreated materials in the following order: HC below VR with a water layer on top. Four test cells were prepared this way to test at 30, 50, 70 and 90°C. Heating methods may have created a heat gradient from the lower portion of the test cell to the higher portions; and therefore, observations during heating may differ if no heat gradient was generated. Key observations include:

- the HC and VR untreated materials never mixed with heating,
- at lower temperatures portions of the VR materials floated to the top of the test cell,
- at higher temperatures the VR and HC moved as a unit within the test cell, and
- at 90°C the VR and water exchanged locations so that the water was between the VR and HC.

Videos are available to view portions of the stability testing.

The sample reheating test included placing each 100°C treated material in a container with glass beads to facilitate assessment during heating at the boiling point of water. The HC material did not liquefy after 90 minutes and a few drops of green liquid were released. The VR became mobile at around 60-70°C with a very slow movement downward into the glass beads.

The following tables may be shorter versions to facilitate discussions presented in this document. Complete tables are presented in Attachment 1 and additional supporting data for these tables is included in Kemron's report in Attachment 2.

Table 1. Summary of Total (averaged), TCLP and SPLP Analyses for the VR Material: VOC and SVOC (Selected Results)

PARAMETER	UNITS	Viscous Rubbery (VR)								
		Untreated			90°C			100°C		
		RESULTS	QUAL	MDL	RESULTS	QUAL	MDL	RESULTS	QUAL	MDL
SVOCs - AVERAGED RESULTS										
Fluorene	ug/Kg	1,547,000		8,647	391,333		3,783	317,667		1,727
VOCs - AVERAGED RESULTS										
1,2-Dichlorobenzene	ug/Kg	1,860,000		36,500	1,250,000		14,867	994,333		5,467
Benzene	ug/Kg	21,100,000		24,133	190,333	J	8,203	30,600	J	3,010
Naphthalene	ug/Kg	3,410,000		42,433	4,456,667		17,300	2,413,333		6,360
Toluene	ug/Kg	6,306,667		20,500	377,000		8,367	154,333		3,067
Xylene (total)	ug/Kg	1,886,667		53,033	544,667		23,150	253,667		7,940
m,p-Xylene	ug/Kg	1,390,000		38,900	361,333		15,867	169,000		5,823
TCLP VOC										
Benzene	mg/L	NT		NT	0.08	J	0.00196	0.564		0.00196
SPLP VOC										
1,2-Dichlorobenzene	ug/L	NT		NT	1400		2.15	1450		4.29
Benzene	ug/L	NT		NT	2620		1.23	513		0.245
Naphthalene	ug/L	NT		NT	4120		4.38	3580		8.75
Toluene	ug/L	NT		NT	2120		1.94	996		0.388
Xylene (total)	ug/L	NT		NT	743		3.08	574		0.615
m,p-Xylene	ug/L	NT		NT	517		2.46	371		0.493
o-Xylene	ug/L	NT		NT	226		1.93	202		0.387

MDL = Method Detection Limit
J = detection between the MDL and the low standard/reporting limit
NT = Not Tested

Table 2. Summary of Total (averaged), TCLP and SPLP Analyses for the HC Material: VOC and SVOC (Selected Results)

		HC								
		Untreated			90°C			100°C		
PARAMETER	UNITS	RESULTS	QUAL	MDL	RESULTS	QUAL	MDL	RESULTS	QUAL	MDL
SVOCs - AVERAGED RESULTS										
Fluorene	ug/Kg	187,667		5,510	281,667		3,583	90,667		782
VOCs - AVERAGED RESULTS										
Benzene	ug/Kg	33,100,000		45,133	471,333		1,553	390,000		919
Naphthalene	ug/Kg	1,816,667		95,233	1,703,333		3,277	620,000		1,940
Toluene	ug/Kg	6,866,667		46,067	701,000		1,580	443,333		938
Xylene (total)	ug/Kg	2,203,333	J	119,000	633,333		4,093	288,333		2,427
m,p-Xylene	ug/Kg	1,490,000	J+	87,300	521,333		3,000	234,000		1,777
o-Xylene	ug/Kg	712,667	J	40,100	112,533		1,377	54,800		817
TCLP SVOC										
Pyridine	mg/L	NT		NT	2.37		0.179	6.47		0.179
TCLP VOC										
Benzene	mg/L	NT		NT	2.52		0.002	13		0.0098
SPLP VOC										
1,2-Dichlorobenzene	ug/L	NT		NT	1000		4.29	980		1.72
Benzene	ug/L	NT		NT	4520		2.45	13600		9.8
Naphthalene	ug/L	NT		NT	3240		8.75	2550		3.5
Toluene	ug/L	NT		NT	3870		3.88	7450		15.5
Xylene (total)	ug/L	NT		NT	2000		6.15	2720		2.46
m,p-Xylene	ug/L	NT		NT	1610		4.93	2170		1.97
o-Xylene	ug/L	NT		NT	387		3.87	554		1.55

MDL = Method Detection Limit
J = detection between the MDL and the low standard/reporting limit
+ = J values were included for up to two results in the average of three
NT = Not Tested

Table 3. Summary of Triplicate Analyses: Sum of TICs for each VOC and SVOC analysis

Material Tested	VOC: Total TIC Estimated Concentrations (ug/kg)			
	VR-A	**VR-B**	**VR-C**	**Average**
Untreated	NTD	NTD	NTD	N/A
90°C Treatment	NTD	NTD	NTD	N/A
100°C Treatment	172,400	315,100	401,400	296,300
	HC-A	**HC-B**	**HC-C**	**Average**
Untreated	NTD	NTD	NTD	N/A
90°C Treatment	NTD	NTD	NTD	N/A
100°C Treatment	16,110	21,200	17,520	18,277
	SVOC: Total TIC Estimated Concentrations (ug/kg)			
	VR-A	**VR-B**	**VR-C**	**Average**
Untreated	7,337,000	7,259,000	17,506,000	10,700,667
90°C Treatment	3,022,900	5,190,400	5,916,000	4,709,767
100°C Treatment	2,925,400	2,141,900	2,365,900	2,477,733
	HC-A	**HC-B**	**HC-C**	**Average**
Untreated	2,794,400	2,842,400	1,473,500	2,370,100
90°C Treatment	2,908,000	2,921,800	4,610,200	3,480,000
100°C Treatment	757,530	696,930	977,901	810,787

Notes:

NTD =	no TICs detected
TIC =	tentatively identified compound
N/A =	not applicable
"A", "B". "C" =	triplicate fractions of the sample
VR =	viscous rubbery test material
HC =	hard and crumbly test material

Table 4. Summary of Total (averaged), TCLP and SPLP Analyses for Metals, pH (averaged), TOC for the VR Material (Selected Results)

		VR					
		Untreated		90°C		100°C	
PARAMETER	UNITS	RESULTS	MDL	RESULTS	MDL	RESULTS	MDL
Total Organic Carbon	mg/Kg	815,000	50	69,300	97	712,000	97
pH	pH Unit	2.03	1.0	4.0	1.0	4.0	1.0
METALS - AVERAGED RESULTS							
Aluminum	mg/Kg	334	1.3	3,710	0.9	4,757	0.9
Iron	mg/Kg	998	1.2	11,557	0.83	3,287	0.76
SPLP Metals							
Aluminum	mg/L	NT	NT	1.87	0.024	1.32	0.024
Iron	mg/L	NT	NT	43	0.027	1.33	0.027

MDL = Method Detection Limit
NT = Not Tested

Table 5. Summary of Total (averaged), TCLP and SPLP Analyses for Metals, pH (averaged), TOC for the HC Material (Selected Results)

		HC					
		Untreated		90°C		100°C	
PARAMETER	UNITS	RESULTS	MDL	RESULTS	MDL	RESULTS	MDL
Total Organic Carbon	mg/Kg	606,000	50	64,900	50	475,000	50
pH	pH Unit	1.1	1.0	1.2	1.0	<2/>DL	1
METALS - AVERAGED RESULTS							
Aluminum	mg/Kg	226	1.4	467	4.4	544	1.9
Chromium	mg/Kg	6.3	0.031	9,517	0.1	7,640	0.04
Iron	mg/Kg	648	1.2	34,233	3.9	26,133	1.7
Nickel	mg/Kg	4.8	0.036	4,623	0.1	4,633	0.1
TCLP Metals							
Chromium	mg/L	NT	NT	186	0.0017	233	0.0017
SPLP Metals							
Aluminum	mg/L	NT	NT	9.28	0.12	12.3	0.24
Chromium	mg/L	NT	NT	204	0.0017	217	0.0034
Iron	mg/L	NT	NT	523	0.13	749	0.27
Nickel	mg/L	NT	NT	93	0.0042	122	0.0084

MDL = Method Detection Limit
NT = Not Tested

Table 6. Summary of Off-Gas Data

		RESULTS				
PARAMETER / TEST	UNITS	T_0	DAY 1	< 50,000 ppm	< 1,000 ppm	T_f
VR 90C						
ALDEHYDES	ppm	7.1	0.96	13	2.5	14
INORGANIC ACIDS	ppm	8.1	4.7	11	6.4	8.1
REDUCED SULFUR	µg/m³	50,243	2,568,560	2,917,300	1,565,270	11,098
TO-15 (summa canister)	µg/m³		35,250,000	68,698,000	522,900	
TO-15 (summa canister) - Benzene	µg/m³		34,000,000	64,000,000	420,000	

PARAMETER / TEST	UNITS	RESULTS				
		T_0	DAY 1	< 50,000 ppm	< 1,000 ppm	T_f
TO-15 (headspace)	µg/m³	125,330,000				1,865,000
TO-15 (headspace) - Benzene	µg/m³	110,000,000				920,000
PID Determinations	ppm		384,360	28,310	711	
VR 100C						
ALDEHYDES	ppm	7.1	4.3	4.6	7.9	12
INORGANIC ACIDS	ppm	8.1	5.1	24	180	2.2
REDUCED SULFUR	µg/m³	50,243	216,020	6,338,600	3,760,060	553,040
TO-15 (summa canister)	µg/m³		13,333,000	14,154,000	1,280,400	
TO-15 (summa canister) - Benzene	µg/m³		12,000,000	9,800,000	400,000	
TO-15 (headspace)	µg/m³	125,330,000				839,400
TO-15 (headspace) - Benzene	µg/m³	110,000,000				150,000
PID Determinations	ppm		164,000	15,112	833	
HC 90C						
ALDEHYDES	ppm	4.6	15	6.2	0.45	2.8
INORGANIC ACIDS	ppm	19	4.5	10	3.1	10
REDUCED SULFUR	µg/m³	863,400	33,531,060	559,250	152,980	41,340
TO-15 (summa canister)	µg/m³		129,240,000	12,890,000	525,100	
TO-15 (summa canister) - Benzene	µg/m³		110,000,000	7,300,000	310,000	
TO-15 (headspace)	µg/m³	204,340,000				4,790,000
TO-15 (headspace) - Benzene	µg/m³	180,000,000				2,000,000
PID Determinations	ppm		240,350	10,062	833	
HC 100C						
ALDEHYDES	ppm	4.6	2.3	2.0	7.8	3.2
INORGANIC ACIDS	ppm	19	13	27	40	3.8
REDUCED SULFUR	µg/m³	863,400	1,601,200	4,667,100	466,300	57,859
TO-15 (summa canister)	µg/m³		2,426,300	9,155,000	1,410,000	
TO-15 (summa canister) - Benzene	µg/m³		1,200,000	6,000,000	3,900,000	
TO-15 (headspace)	µg/m³	204,340,000				1,668,000
TO-15 (headspace) - Benzene	µg/m³	180,000,000				<16,000
PID Determinations	ppm		230,280	27,881	943	

Table 7. Summary of Reconstituted Condensate (Selected Results)

		VR - 90C		VR - 100C		HC - 90C		HC - 100C	
PARAMETER	**UNITS**	**Result**	**MDL**	**Result**	**MDL**	**Result**	**MDL**	**Result**	**MDL**
Quantity of Condensate									
Total Condensate	g	568.21		654.31		341.43		331.8	
Top Layer	%	35.07		20.88		37.51		20.46	
Bottom Layer	%	64.93		79.11		62.48		79.53	
Top Layer	s.u.	3.67		3.63		3.05		2.86	
Bottom Layer	s.u.	2.95		2.64		2.42		2.41	
Benzene	ug/Kg	38,400,000	75,400	9,840,000	28,600	20,200,000	29,700	12,700,000	30,000
Toluene	ug/Kg	10,500,000	76,900	2,530,000	29,100	2,990,000	30,300	3,650,000	30,600
Sum of all detected compounds	ug/Kg	65,760,000		13,999,000		23,190,000		17,844,000	
Benzene	ug/L	1,310,000	1,980	1,090,000	1,980	1,470,000	1,980	1,230,000	1,980
Toluene	ug/L	124,000	2,540	135,000	2,540	136,000	2,540	180,000	2,540
Sum of all detected compounds	ug/L	1,645,980		1,369,800		1,830,000		1,574,000	
Sum of all detected compounds	ug/Kg	3,204,600		1,326,000		150,700		397,100	
Sum of TICs	ug/Kg	19,435,000		29,278,000		35,318,000		27,208,000	
Sum of all detected compounds	ug/L	11,595		12,462		11,317		6,352	
Sum of TICs	ug/L	21,839		9,587		12,027		22,974	

Notes:
MDL= Method Detection Limit

Table 8a. Physical Property Test Results, excluding Density and Viscosity

Sample	Treatment	Bulk Density (pcf)	Porosity	Water Content (%)	Solid Specific Gravity	Triaxial Test (Cu)Ksf	Vane Shear (TSF)	Unconfined Compressive Strength (psi)	Hydraulic Conductivity
	Untreated	65.9	NR	**NT**	**NT**	**NT**	0.0525	**NT**	NR
	90°C	69.4	**NT**	26.73	**NT**	**NT**	> 0.6	4.4	**NT**
VR	100°C	69.0	**NT**	11.44	**NT**	**NT**	> 0.6	9.3	**NT**
	Untreated	59.2	**NT**	NT	1.2	**NT**	0.03	0.0	**NT**
	90°C	77.9	32.60	19.54	1.55	**NT**	0.28	38.4	**NT**
HC	100°C	85.7	16.44	25.46	1.31	**NT**	0.25	80.1	**NT**

Notes:
NR = Testing Not Requested
NT = sample not able to be tested properly due to matrix
pcf = Pounds per cubic foot
(Cu)Ksf = (Undrained cohesion) thousand pounds per square foot

Table 8b. Physical Property Test Results: Density and Viscosity Data

ample	Treatment	Density: @30˚C	Density: @50˚C	Density: @70˚C	Density: @90˚C	Viscosity: @Ambient 17˚C (cP)	Viscosity: 30˚C (cP)	Viscosity: 50˚C (cP)	Viscosity: 70˚C (cP)	Viscosity: 90˚C (cP)
	Untreated	65.9	66.2	65.3	66.0	10,850 -35,150	**NT**	**NT**	**NT**	1,732-1,832

Notes:
NT = sample not able to be tested properly due to matrix
Cp = centipoise

Conclusion

The following conclusions to the treatability testing presented in this report can be made:

- Site materials improve in both chemical and physical properties following heating.
- SPLP leaching includes similar contaminant profiles as what was seen in the treated HC and VR materials.
- TCLP leaching shows promising results for the organic compounds.
- Corrosion will occur upon contact with the untreated material which may pose a TCLP metals concern.

Should you have questions about the treatability evaluation presented in this report, please let us know.

Sincerely,

TerraTherm, Inc.

Kelly M. Clemons
Technical Sales Representative

Gorm Heron, PhD.
Vice President and Senior Engineer

/attachments (3)

ATTACHMENT 1

EXTENDED DATA TABLES

Table 1. Summary of Total (averaged), TCLP and SPLP Analyses for the VR Material: VOC and SVOC

PARAMETER	UNITS	Viscous Rubbery (VR)								
		Untreated			90°C			100°C		
		RESULTS	QUAL	MDL	RESULTS	QUAL	MDL	RESULTS	QUAL	MDL
SVOCs - AVERAGED RESULTS										
2,4-Dinitrotoluene	ug/Kg	<13,396	ND	13,397	<13,466	ND	13,467	37,247	J*	6,150
2-Methylnaphthalene	**ug/Kg**	**384,000**		**6,000**	**83,367**	**J**	**3,713**	**73,900**	**J+**	**1,697**
4,6-Dinitro-2-methylphenol	ug/Kg	<100,533	ND	100,533	59,567	J*	52,633	<24,033	ND	24,033
Acenaphthene	ug/Kg	61,500	J	7,910	17,600	J	3,083	13,097	J	1,407
Aniline	ug/Kg	32,133	J*	20,600	9,913	ND	9,913	8,163	J	4,530
Fluorene	**ug/Kg**	**1,547,000**		**8,647**	**391,333**		**3,783**	**317,667**		**1,727**
VOCs - AVERAGED RESULTS										
1,2,4-Trimethylbenzene	ug/Kg	533,667	J+	47,600	222,333	J	19,400	137,333		7,127
1,2-Dichlorobenzene	**ug/Kg**	**1,860,000**		**36,500**	**1,250,000**		**14,867**	**994,333**		**5,467**
1,3,5-Trimethylbenzene	ug/Kg	390,000	J	49,733	81,733	J	20,267	82,000	J	7,447
1,4-Dichlorobenzene	ug/Kg	78,933	J*	30,567	107,667	J	12,467	80,300	J	4,573
4-Isopropyltoluene	ug/Kg	103,300	J*	27,767	135,333	J	11,333	54,700	J	4,160
Benzene	**ug/Kg**	**21,100,000**		**24,133**	**190,333**	**J**	**8,203**	**30,600**	**J**	**3,010**
Ethylbenzene	ug/Kg	82,333	J*	24,200	<9,880	ND	9,880	<3,627	ND	3,627
Isopropylbenzene (Cumene)	ug/Kg	458,667	J	24,467	188,667	J	9,983	75,867	J	3,667
Naphthalene	**ug/Kg**	**3,410,000**		**42,433**	**4,456,667**		**17,300**	**2,413,333**		**6,360**
Toluene	**ug/Kg**	**6,306,667**		**20,500**	**377,000**		**8,367**	**154,333**		**3,067**
Xylene (total)	**ug/Kg**	**1,886,667**		**53,033**	**544,667**		**23,150**	**253,667**		**7,940**
m,p-Xylene	**ug/Kg**	**1,390,000**		**38,900**	**361,333**		**15,867**	**169,000**		**5,823**
o-Xylene	ug/Kg	496,000	J	17,833	183,333	J	7,283	84,333	J	2,673
sec-Butylbenzene	ug/Kg	479,000	J	26,067	109,000	J	10,633	109,000		3,900
TCLP SVOC										
1,4-Dichlorobenzene	mg/L	NT		NT	0.0128	ND	0.0128	0.083	J	0.0128
Cresols	mg/L	NT		NT	0.0341	ND	0.0341	0.241	J	0.0341
m,p-Cresol	mg/L	NT		NT	0.0176	ND	0.0176	0.214	J	0.0176
o-Cresol	mg/L	NT		NT	0.0165	ND	0.0165	0.026	J	0.0165
SPLP SVOC										

PARAMETER	UNITS	Viscous Rubbery (VR)								
		Untreated			90°C			100°C		
		RESULTS	QUAL	MDL	RESULTS	QUAL	MDL	RESULTS	QUAL	MDL
2-Methylnaphthalene	ug/L	NT		NT	60.8		1.02	53.8	J	2.55
Acenaphthene	ug/L	NT		NT	6.37	J	1.07	6.33	J	2.68
Aniline	ug/L	NT		NT	66.1	J	2.87	33.2	J	7.18
Carbazole	ug/L	NT		NT	18.5	J	0.928	10.5	J	2.32
Dibenzofuran	ug/L	NT		NT	3.69	J	0.908	2.27	ND	2.27
Fluorene	ug/L	NT		NT	18.8	J	1.15	16.8	J	2.88
Isophorone	ug/L	NT		NT	11.6	J	1.52	7.7	J	3.8
Phenol	ug/L	NT		NT	109	J	0.6	90.2	J	1.5
m,p-Cresol	ug/L	NT		NT	1.41		1.41	211		3.52
o-Cresol	ug/L	NT		NT	1.32	ND	1.32	24.6	J	3.29
TCLP VOC										
Benzene	mg/L	NT		NT	0.08	J	0.00196	**0.564**		**0.00196**
SPLP VOC										
1,2,4-Trimethylbenzene	ug/L	NT		NT	155		2.01	152		0.402
1,2-Dichlorobenzene	**ug/L**	NT		NT	**1400**		**2.15**	**1450**		**4.29**
1,3,5-Trimethylbenzene	ug/L	NT		NT	65.7	J	1.32	71.5		0.263
1,3-Dichlorobenzene	ug/L	NT		NT	16	J	2	15.4	J	0.4
1,4-Dichlorobenzene	ug/L	NT		NT	103	J	1.46	91.8		0.292
2-Butanone	ug/L	NT		NT	5.88	ND	5.88	48.3	J	1.18
2-Hexanone	ug/L	NT		NT	7.55	ND	7.55	34.2		1.51
4-Isopropyltoluene	ug/L	NT		NT	4.38	ND	4.38	7.21	J	0.875
4-Methyl-2-pentanone	ug/L	NT		NT	3.55	ND	3.55	7.16	J	0.71
Acetone	ug/L	NT		NT	117	J	8.05	139		1.61
Benzene	**ug/L**	NT		NT	**2620**		**1.23**	**513**		**0.245**
Chlorobenzene	ug/L	NT		NT	1.37	ND	1.37	6.4	J	0.274
Chloroethane	ug/L	NT		NT	6.98	ND	6.98	10.3	J	1.4
Chloromethane	ug/L	NT		NT	1.89	ND	1.89	35.5		0.379
Ethylbenzene	ug/L	NT		NT	46.1	J	4.5	35.7		0.9
Isopropylbenzene (Cumene)	ug/L	NT		NT	113	J	1.46	62.9		0.292
Methylene chloride	ug/L	NT		NT	18.3	J	2.55	3.74	J	0.51

PARAMETER	UNITS	Viscous Rubbery (VR)								
		Untreated			90°C			100°C		
		RESULTS	QUAL	MDL	RESULTS	QUAL	MDL	RESULTS	QUAL	MDL
Naphthalene	**ug/L**	NT		NT	**4120**		**4.38**	**3580**		**8.75**
Styrene	ug/L	NT		NT	1.44	ND	1.44	34.2		0.288
Toluene	**ug/L**	NT		NT	**2120**		**1.94**	**996**		**0.388**
Xylene (total)	**ug/L**	NT		NT	**743**		**3.08**	**574**		**0.615**
m,p-Xylene	ug/L	NT		NT	517		2.46	371		0.493
o-Xylene	ug/L	NT		NT	226		1.93	202		0.387
sec-Butylbenzene	ug/L	NT		NT	30.1	J	2.2	31		0.441
tert-Butylbenzene	ug/L	NT		NT	1.45	ND	1.45	7.77	J	0.29

MDL = Method Detection Limit
ND = sample result was not detected or was detected below the MDL
* = MDL was included for up to two ND results in the average of three
+ = J values were included for up to two results in the average of three
NT = Not Tested

Table 2. Summary of Total (averaged), TCLP and SPLP Analyses for the HC Material: VOC and SVOC

		HC								
		Untreated			90°C			100°C		
PARAMETER	UNITS	RESULTS	QUAL	MDL	RESULTS	QUAL	MDL	RESULTS	QUAL	MDL
SVOCs - AVERAGED RESULTS										
2-Methylnaphthalene	ug/Kg	51,700	J	3,827	77,100	J	3,520	22,633	J+	767
Acenaphthene	ug/Kg	8,617	J	5,037	14,650	J	2,917	4,237	J	637
Acenaphthylene	ug/Kg	<5,590	ND	5,590	<3,387	ND	3,387	1,028	J*	740
Fluorene	**ug/Kg**	**187,667**		**5,510**	**281,667**		**3,583**	**90,667**		**782**
Phenanthrene	ug/Kg	6,583	J*	4,523	<2,947	ND	2,947	3,617	J	644
VOCs - AVERAGED RESULTS										
1,2,4-Trimethylbenzene	ug/Kg	525,100	J*	106,767	79,100		3,670	37,600		2,180
1,2-Dichlorobenzene	ug/Kg	428,167	J*	81,967	484,667		2,817	227,333		1,670
1,3,5-Trimethylbenzene	ug/Kg	443,133	J*	111,467	47,233	J+	3,837	26,567	J	2,273
1,4-Dichlorobenzene	ug/Kg	<68,600	ND	68,600	37,067	J	2,357	17,267	J	1,400
4-Isopropyltoluene	ug/Kg	<62,333	ND	62,333	34,700	J	2,143	17,100	J	1,270
Benzene	**ug/Kg**	**33,100,000**		**45,133**	**471,333**		**1,553**	**390,000**		**919**
Ethylbenzene	ug/Kg	<54,333	ND	54,333	31,300	J	1,867	15,967	J	1,107
Isopropylbenzene (Cumene)	ug/Kg	531,633	J+	54,933	117,233		1,890	49,267		1,117
Naphthalene	**ug/Kg**	**1,816,667**		**95,233**	**1,703,333**		**3,277**	**620,000**		**1,940**
Toluene	**ug/Kg**	**6,866,667**		**46,067**	**701,000**		**1,580**	**443,333**		**938**
Xylene (total)	**ug/Kg**	**2,203,333**	**J**	**119,000**	**633,333**		**4,093**	**288,333**		**2,427**
m,p-Xylene	**ug/Kg**	**1,490,000**	**J+**	**87,300**	**521,333**		**3,000**	**234,000**		**1,777**
o-Xylene	ug/Kg	712,667	J	40,100	112,533		1,377	54,800		817
sec-Butylbenzene	ug/Kg	<58,467	ND	58,467	68,567	J+	2,013	33,400		1,190
tert-Butylbenzene	ug/Kg	<76,000	ND	76,000	17,233	J	2,610	<1,550	ND	1,550
TCLP SVOC										
1,4-Dichlorobenzene	mg/L	NT		NT	0.0128	ND	0.0128	0.062	J	0.0128
Cresols	mg/L	NT		NT	0.0341	ND	0.0341	0.391	J	0.0341
Pyridine	**mg/L**	NT		NT	**2.37**		**0.179**	**6.47**		**0.179**

PARAMETER	UNITS	HC								
		Untreated			90°C			100°C		
		RESULTS	QUAL	MDL	RESULTS	QUAL	MDL	RESULTS	QUAL	MDL
m,p-Cresol	mg/L	NT		NT	0.0176	ND	0.0176	0.359	J	0.0176
o-Cresol	mg/L	NT		NT	0.0165	ND	0.0165	0.033	J	0.0165
SPLP SVOC										
2-Methylnaphthalene	ug/L	NT		NT	20.3	J	1.02	27.1	J	2.55
Acenaphthene	ug/L	NT		NT	2.52	J	1.07	3.35	J	2.68
Aniline	**ug/L**	NT		NT	**1980**		**35.9**	**617**		**7.18**
Fluorene	ug/L	NT		NT	6.87	J	1.15	12.5	J	2.88
Isophorone	ug/L	NT		NT	5.24	J	1.52	11.2	J	3.8
Phenol	ug/L	NT		NT	0.6	ND	0.6	117		1.5
Pyridine	**ug/L**	NT		NT	**1760**		**179**	**84.5**	**J**	**35.8**
m,p-Cresol	**ug/L**	NT		NT	**185**		**1.41**	**361**		**3.52**
o-Cresol	ug/L	NT		NT	1.32	ND	1.32	27.2	J	3.29
TCLP VOC										
2-Butanone	mg/L	NT		NT	0.0094	ND	0.0094	0.301	J	0.047
Benzene	**mg/L**	NT		NT	**2.52**		**0.002**	**13**		**0.0098**
SPLP VOC										
1,2,4-Trimethylbenzene	ug/L	NT		NT	191	J	4.02	176		1.61
1,2-Dichlorobenzene	**ug/L**	NT		NT	**1000**		**4.29**	**980**		**1.72**
1,3,5-Trimethylbenzene	ug/L	NT		NT	80	J	2.63	105		1.05
1,3-Dichlorobenzene	ug/L	NT		NT	4	ND	4	12.6	J	1.6
1,4-Dichlorobenzene	ug/L	NT		NT	78.4	J	2.92	69.7	J	1.17
2-Butanone	ug/L	NT		NT	11.8	ND	11.8	71.5	J	4.7
4-Isopropyltoluene	ug/L	NT		NT	8.75	ND	8.75	13.4	J	3.5
Acetone	ug/L	NT		NT	216	J	16.1	196	J	6.44
Benzene	**ug/L**	NT		NT	**4520**		**2.45**	**13600**		**9.8**
Chlorobenzene	ug/L	NT		NT	2.74	ND	2.74	8	J	1.1
Chloroethane	ug/L	NT		NT	14	ND	14	25.2	J	5.58
Chloromethane	ug/L	NT		NT	20.8	J	3.79	42.8	J	1.51
Ethylbenzene	ug/L	NT		NT	92.7	J	9	136		3.6

PARAMETER	UNITS	HC								
		Untreated			90°C			100°C		
		RESULTS	QUAL	MDL	RESULTS	QUAL	MDL	RESULTS	QUAL	MDL
Isopropylbenzene (Cumene)	ug/L	NT		NT	251		2.92	233		1.17
Methylene chloride	ug/L	NT		NT	25.9	J	5.1	2.04	ND	2.04
Naphthalene	**ug/L**	NT		NT	**3240**		**8.75**	**2550**		**3.5**
Toluene	**ug/L**	NT		NT	**3870**		**3.88**	**7450**		**15.5**
Xylene (total)	**ug/L**	NT		NT	**2000**		**6.15**	**2720**		**2.46**
m,p-Xylene	**ug/L**	NT		NT	**1610**		**4.93**	**2170**		**1.97**
o-Xylene	ug/L	NT		NT	387		3.87	554		1.55
sec-Butylbenzene	ug/L	NT		NT	4.41	ND	4.41	52.6	J	1.76
tert-Butylbenzene	ug/L	NT		NT	2.9	ND	2.9	23.1	J	1.16

MDL = Method Detection Limit
ND = sample result was not detected or was detected below the MDL
* = MDL was included for up to two ND results in the average of three
+ = J values were included for up to two results in the average of three
NT = Not Tested

Table 3. Summary of Triplicate Analyses: Sum of TICs for each VOC and SVOC analysis

Material Tested	VOC: Total TIC Estimated Concentrations (ug/kg)			
	VR-A	**VR-B**	**VR-C**	**Average**
Untreated	NTD	NTD	NTD	N/A
90°C Treatment	NTD	NTD	NTD	N/A
100°C Treatment	172,400	315,100	401,400	296,300
	HC-A	**HC-B**	**HC-C**	**Average**
Untreated	NTD	NTD	NTD	N/A
90°C Treatment	NTD	NTD	NTD	N/A
100°C Treatment	16,110	21,200	17,520	18,277
	SVOC: Total TIC Estimated Concentrations (ug/kg)			
	VR-A	**VR-B**	**VR-C**	**Average**
Untreated	7,337,000	7,259,000	17,506,000	10,700,667
90°C Treatment	3,022,900	5,190,400	5,916,000	4,709,767
100°C Treatment	2,925,400	2,141,900	2,365,900	2,477,733
	HC-A	**HC-B**	**HC-C**	**Average**
Untreated	2,794,400	2,842,400	1,473,500	2,370,100
90°C Treatment	2,908,000	2,921,800	4,610,200	3,480,000
100°C Treatment	757,530	696,930	977,901	810,787

Notes:

NTD =	no TICs detected
TIC =	tentatively identified compound
N/A =	not applicable
"A", "B". "C" =	triplicate fractions of the sample
VR =	viscous rubbery test material
HC =	hard and crumbly test material

Table 4. Summary of Total (averaged), TCLP and SPLP Analyses for Metals, pH Average, TOC for the VR Material

		VR								
		Untreated			90°C			100°C		
PARAMETER	UNITS	RESULTS	QUAL	MDL	RESULTS	QUAL	MDL	RESULTS	QUAL	MDL
Total Organic Carbon	mg/Kg	815,000		50	69,300		97	712,000		97
pH	pH Unit	2.03		1.0	4		1.0	4.0		1.0
METALS - AVERAGED RESULTS										
Aluminum	**mg/Kg**	**334**		**1.3**	**3,710**		**0.9**	**4,757**		**0.9**
Antimony	mg/Kg	1.3	J	0.2	<0.12	ND	0.12	0.25	J	0.10
Barium	mg/Kg	7.9		0.04	7.9		0.03	8.2		0.03
Beryllium	mg/Kg	0.02	J	0.003	<0.002	ND	0.002	0.01	J	0.002
Cadmium	mg/Kg	0.05	J	0.02	<0.011	ND	0.01	<0.01	ND	0.01
Calcium	mg/Kg	213		7.3	153		5.2	180		4.73
Chromium	mg/Kg	4.2		0.03	20		0.02	5.8		0.02
Cobalt	mg/Kg	0.29	J	0.02	0.12	J	0.01	0.34	J+	0.011
Copper	mg/Kg	25		0.05	26		0.04	164.0		0.03
Iron	**mg/Kg**	**998**		**1.2**	**11,557**		**0.83**	**3,287**		**0.76**
Lead	mg/Kg	65		0.2	74		0.14	65.4		0.12
Magnesium	mg/Kg	59		0.7	53		0.52	57.5		0.47
Manganese	mg/Kg	14		0.02	145		0.02	48.2		0.02
Nickel	mg/Kg	5.3		0.04	5		0.03	7.3		0.02
Potassium	mg/Kg	66		3.5	62		2.5	85.8		2.3
Selenium	mg/Kg	14		0.22	10		0.16	11.0		0.14
Silver	mg/Kg	<0.04	ND	0.04	<0.03	ND	0.03	0.06	J	0.024
Sodium	mg/Kg	4,090		5.07	3,280		3.6	3,713		3.3
Thallium	mg/Kg	2.1		0.15	0.44	J	0.10	0.53	J	0.095
Vanadium	mg/Kg	1.1	J	0.03	0.03	J*	0.02	1.2		0.02
Zinc	mg/Kg	7.3		0.71	5.6		0.5	7.1		0.46
Mercury	mg/Kg	1.8		0.04	1.0		0.01	0.3		0.01
TCLP Metals										
Barium	mg/L	NT		NT	0.13	J	0.0079	0.02	J	0.0079
Chromium	mg/L	NT		NT	0.068	J	0.0017	0.0017	ND	0.0017

PARAMETER	UNITS	VR								
		Untreated			90°C			100°C		
		RESULTS	QUAL	MDL	RESULTS	QUAL	MDL	RESULTS	QUAL	MDL
Lead	mg/L	NT		NT	0.028	J	0.014	0.014	ND	0.014
Silver	mg/L	NT		NT	0.0033	J	0.0032	0.0032	J	0.0032
SPLP Metals										
Aluminum	mg/L	NT		NT	1.87		0.024	1.32		0.024
Barium	mg/L	NT		NT	0.0047	J	0.0016	0.0047	J	0.0016
Cadmium	mg/L	NT		NT	0.0001	ND	0.0001	0.0001	J	0.0001
Calcium	mg/L	NT		NT	0.84		0.024	0.5		0.024
Chromium	mg/L	NT		NT	0.031		0.00034	0.0037	J	0.00034
Cobalt	mg/L	NT		NT	0.0022	J	0.00052	0.0011	J	0.00052
Copper	mg/L	NT		NT	0.0028	J	0.0017	0.0017	ND	0.0017
Iron	**mg/L**	NT		NT	**43**		**0.027**	**1.33**		**0.027**
Lead	mg/L	NT		NT	0.0059	J	0.0028	0.0028	ND	0.0028
Magnesium	mg/L	NT		NT	0.28		0.012	0.055		0.012
Manganese	mg/L	NT		NT	1.23		0.00083	0.017		0.00083
Nickel	mg/L	NT		NT	0.019	J	0.00084	0.0079	J	0.00084
Potassium	mg/L	NT		NT	0.11	J	0.041	0.22	J	0.041
Sodium	mg/L	NT		NT	16.3	J	0.056	1.82		0.056
Thallium	mg/L	NT		NT	0.0026	ND	0.0026	0.0067	J	0.0026
Zinc	mg/L	NT		NT	0.033		0.0059	0.016	J	0.0059

Table 5. Summary of Total (averaged), TCLP and SPLP Analyses for Metals, pH Average, TOC for the HC Material

		HC								
		Untreated			90°C			100°C		
PARAMETER	UNITS	RESULTS	QUAL	MDL	RESULTS	QUAL	MDL	RESULTS	QUAL	MDL
Total Organic Carbon	mg/Kg	606,000		50	64,900		50	475,000		50
pH	pH Unit	1.1		1.0	1.2		1.0	<2/>DL		1
METALS - AVERAGED RESULTS										
Aluminum	**mg/Kg**	**226**		**1.4**	**467**		**4.4**	**544**		**1.9**
Antimony	mg/Kg	0.32	J	0.17	3.3	J*	0.5	<0.24	ND	0.24
Arsenic	mg/Kg	3.1	J+	0.24	27.7		0.8	22		0.3
Barium	mg/Kg	5.7		0.041	8.8		0.1	11		0.1
Beryllium	mg/Kg	0.014	J	0.003	<0.01	ND	0.01	<0.005	ND	0.005
Calcium	mg/Kg	128		7.5	160.0	J+	24.6	143		10.7
Chromium	**mg/Kg**	**6.3**		**0.031**	**9,517**		**0.1**	**7,640**		**0.04**
Cobalt	mg/Kg	0.2	J	0.017	59.8		0.1	43		0.02
Copper	mg/Kg	13.6		0.053	129.2		0.2	135		0.1
Iron	**mg/Kg**	**648**		**1.2**	**34,233**		**3.9**	**26,133**		**1.7**
Lead	mg/Kg	69		0.20	78.1		0.6	87		0.3
Magnesium	mg/Kg	37		0.74	42.9		2.4	47		1.1
Manganese	mg/Kg	5.6		0.024	890		0.1	606		0.03
Nickel	**mg/Kg**	**4.8**		**0.036**	**4,623**		**0.1**	**4,633**		**0.1**
Potassium	mg/Kg	87		3.6	167		11.8	188		5.1
Selenium	mg/Kg	10		0.23	10		0.7	13		0.3
Silver	mg/Kg	0.040	J	0.04	<0.1	ND	0.1	<0.05	ND	0.05
Sodium	mg/Kg	5,577		5.2	4,837		17.0	5,923		7.4
Thallium	mg/Kg	0.77	J	0.15	<0.5	ND	0.5	2	J+	0.2
Vanadium	mg/Kg	0.65	J	0.026	37		0.1	24		0.04
Zinc	mg/Kg	4.4		0.73	13		2.4	9		1.0
Mercury	mg/Kg	4.9		0.10	2.4		0.03	3		0.03
TCLP Metals										
Arsenic	mg/L	NT		NT	0.37	ND	0.017	0.017	ND	0.017

PARAMETER	UNITS	HC								
		Untreated			90°C			100°C		
		RESULTS	QUAL	MDL	RESULTS	QUAL	MDL	RESULTS	QUAL	MDL
Barium	mg/L	NT		NT	0.051	J	0.0079	0.055	J	0.0079
Cadmium	mg/L	NT		NT	0.0028	J	0.00052	0.028	J	0.00052
Chromium	**mg/L**	NT		NT	**186**		**0.0017**	**233**		**0.0017**
Lead	mg/L	NT		NT	0.42	J	0.014	0.46	J	0.014
Mercury	mg/L	NT		NT	0.00009	J	0.000075	0.0004	J	0.000075
Selenium	mg/L	NT		NT	0.034	J	0.019	0.019	ND	0.019
Silver	mg/L	NT		NT	0.0032	ND	0.0032	0.0085	J	0.0032
SPLP Metals										
Aluminum	mg/L	NT		NT	9.28		0.12	12.3		0.24
Arsenic	mg/L	NT		NT	0.43		0.017	0.65		0.035
Barium	mg/L	NT		NT	0.018		0.0079	0.025	J	0.016
Cadmium	mg/L	NT		NT	0.00052	J	0.00052	0.001	ND	0.001
Calcium	mg/L	NT		NT	3.21		0.12	3.88		0.24
Chromium	**mg/L**	NT		NT	**204**		**0.0017**	**217**		**0.0034**
Cobalt	mg/L	NT		NT	0.93		0.0026	1.23		0.0052
Copper	mg/L	NT		NT	0.57		0.0085	1.35		0.017
Iron	**mg/L**	NT		NT	**523**		**0.13**	**749**		**0.27**
Lead	mg/L	NT		NT	0.34		0.014	0.54		0.028
Magnesium	mg/L	NT		NT	1.01		0.061	1.1		0.12
Manganese	mg/L	NT		NT	16.3		0.0042	17.4		0.0083
Mercury	mg/L	NT		NT	0.000075	ND	0.000075	0.00018	J	0.000075
Nickel	**mg/L**	NT		NT	**93**		**0.0042**	**122**		**0.0084**
Potassium	mg/L	NT		NT	3.18		0.2	5.2		0.41
Selenium	mg/L	NT		NT	0.019	ND	0.019	0.06	J	0.038
Sodium	mg/L	NT		NT	111		0.28	162		0.56
Vanadium	mg/L	NT		NT	0.64		0.0061	0.67		0.012
Zinc	mg/L	NT		NT	0.26		0.029	0.27		0.059

Table 6. Summary of Off-Gas Data

PARAMETER / TEST	UNITS	RESULTS				
		T_0	DAY 1	< 50,000 ppm	< 1,000 ppm	T_f
VR 90C						
ALDEHYDES	ppm	7.1	0.96	13	2.5	14
INORGANIC ACIDS	ppm	8.1	4.7	11	6.4	8.1
REDUCED SULFUR	µg/m³	50,243	2,568,560	2,917,300	1,565,270	11,098
TO-15 (summa canister)	µg/m³		35,250,000	68,698,000	522,900	
TO-15 (summa canister) - Benzene	µg/m³		34,000,000	64,000,000	420,000	
TO-15 (headspace)	µg/m³	125,330,000				1,865,000
TO-15 (headspace) - Benzene	µg/m³	110,000,000				920,000
PID Determinations	ppm		384,360	28,310	711	
VR 100C						
ALDEHYDES	ppm	7.1	4.3	4.6	7.9	12
INORGANIC ACIDS	ppm	8.1	5.1	24	180	2.2
REDUCED SULFUR	µg/m³	50,243	216,020	6,338,600	3,760,060	553,040
TO-15 (summa canister)	µg/m³		13,333,000	14,154,000	1,280,400	
TO-15 (summa canister) - Benzene	µg/m³		12,000,000	9,800,000	400,000	
TO-15 (headspace)	µg/m³	125,330,000				839,400
TO-15 (headspace) - Benzene	µg/m³	110,000,000				150,000
PID Determinations	ppm		164,000	15,112	833	
HC 90C						
ALDEHYDES	ppm	4.6	15	6.2	0.45	2.8
INORGANIC ACIDS	ppm	19	4.5	10	3.1	10
REDUCED SULFUR	µg/m³	863,400	33,531,060	559,250	152,980	41,340
TO-15 (summa canister)	µg/m³		129,240,000	12,890,000	525,100	
TO-15 (summa canister) - Benzene	µg/m³		110,000,000	7,300,000	310,000	
TO-15 (headspace)	µg/m³	204,340,000				4,790,000
TO-15 (headspace) - Benzene	µg/m³	180,000,000				2,000,000
PID Determinations	ppm		240,350	10,062	833	

PARAMETER / TEST	UNITS	RESULTS				
		T_0	DAY 1	< 50,000 ppm	< 1,000 ppm	T_f
HC 100C						
ALDEHYDES	ppm	4.6	2.3	2.0	7.8	3.2
INORGANIC ACIDS	ppm	19	13	27	40	3.8
REDUCED SULFUR	µg/m³	863,400	1,601,200	4,667,100	466,300	57,859
TO-15 (summa canister)	µg/m³		2,426,300	9,155,000	1,410,000	
TO-15 (summa canister) - Benzene	µg/m³		1,200,000	6,000,000	3,900,000	
TO-15 (headspace)	µg/m³	204,340,000				1,668,000
TO-15 (headspace) - Benzene	µg/m³	180,000,000				<16,000
PID Determinations	ppm		230,280	27,881	943	

Table 7. Summary of Reconstituted Condensate

PARAMETER	UNITS	VR - 90C			VR - 100C			HC - 90C			HC - 100C		
		Result	Q	MDL	Result	Q	MDL	Result	Q	MDL	Result	Q	MDL
Quantity of Condensate													
Total Condensate	g	568.21			654.31			341.43			331.8		
Top Layer	%	35.07			20.88			37.51			20.46		
Bottom Layer	%	64.93			79.11			62.48			79.53		
pH													
Top Layer	s.u.	3.67			3.63			3.05			2.86		
Bottom Layer	s.u.	2.95			2.64			2.42			2.41		
VOCs - Top Layer													
1,2-Dichlorobenzene	ug/Kg	1,500,000	J	137,000	223,000	J	51,900	<54,000	ND	54,000	<54500	ND	54,500
Benzene	**ug/Kg**	**38,400,000**		**75,400**	**9,840,000**		**28,600**	**20,200,000**		**29,700**	**12,700,000**		**30,000**
Isopropylbenzene (Cumene)	ug/Kg	1,130,000	J	91,800	<34,800	ND	34,800	<36,200	ND	36,200	<36,600	ND	36,600
Naphthalene	ug/Kg	6,950,000		159,000	<60,300	ND	60,300	<62,800	ND	62,800	<63,400	ND	63,400
Toluene	**ug/Kg**	**10,500,000**		**76,900**	**2,530,000**		**29,100**	**2,990,000**		**30,300**	**3,650,000**		**30,600**
Xylene (total)	ug/Kg	3,640,000	J	199,000	703,000	J	75,400	<78,500	ND	78,500	747,000	J	79,200
m,p-Xylene	ug/Kg	2,410,000	J	146,000	703,000	J	55,300	<57,500	ND	57,500	747,000	J	58,100
o-Xylene	ug/Kg	1,230,000	J	67,000	<25,400	ND	25,400	<26,400	ND	26,400	<26,700	ND	26,700
Sum of Detected Compounds	ug/Kg	65,760,000			13,999,000			23,190,000			17,844,000		
VOCs - Bottom Layer													
2-Butanone	ug/L	19,000	J	7,240	<7,240	ND	7,240	<7,240	ND	7,240	<7,240	ND	7,240
Acetone	ug/L	164,000		7,980	124,000		7,980	224,000		7,980	141,000		7,980
Benzene	**ug/L**	**1,310,000**		**1,980**	**1,090,000**		**1,980**	**1,470,000**		**1,980**	**1,230,000**		**1,980**
Naphthalene	ug/L	10,200	J	1,300	<1,300	ND	1,300	<1,300	ND	1,300	<1,300	ND	1,300
Toluene	**ug/L**	**124,000**		**2,540**	**135,000**		**2,540**	**136,000**		**2,540**	**180,000**		**2,540**
Xylene (total)	ug/L	9,390	J	7,680	10,400	J	7,680	<7,680	ND	7,680	11,500	J	7,680
m,p-Xylene	ug/L	9,390	J	4,740	10,400	J	4,740	<4,740	ND	4,740	11,500	J	4,740
Sum of Detected Compounds	ug/L	1,645,980			1,369,800			1,830,000			1,574,000		

PARAMETER	UNITS	VR - 90C			VR - 100C			HC - 90C			HC - 100C		
		Result	Q	MDL	Result	Q	MDL	Result	Q	MDL	Result	Q	MDL
Quantity of Condensate													
Total Condensate	g	568.21			654.31			341.43			331.8		
Top Layer	%	35.07			20.88			37.51			20.46		
Bottom Layer	%	64.93			79.11			62.48			79.53		
pH													
Top Layer	s.u.	3.67			3.63			3.05			2.86		
Bottom Layer	s.u.	2.95			2.64			2.42			2.41		
SVOCs - Top Layer													
2-Methylnaphthalene	ug/Kg	234,000	J	15,700	720,000		15,700	80,300	J	15,700	220,000	J	15,700
Bis(2-Ethylhexyl)phthalate	ug/Kg	2,900,000		24,700	153,000	J	24,700	30,000	J	24,700	38,100	J	24,700
Fluorene	ug/Kg	70,600	J	15,900	453,000	J	15,900	40,400	J	15,900	139,000	J	15,900
Sum of Detected Compounds	ug/Kg	3,204,600			1,326,000			150,700			397,100		
Sum of TICs	ug/Kg	19,435,000			29,278,000			35,318,000			27,208,000		
SVOCs - Bottom Layer													
1,4-Dichlorobenzene	ug/L	414		2.6	219		2.6	229		2.6	259		2.6
2-Methylnaphthalene	ug/L	43	J	2.6	46	J	2.6	56	J	2.6	50	J	2.6
Acenaphthene	ug/L	3.5	J	2.7	<2.7	ND	2.7	<2.7	ND	2.7	4	J	2.7
Aniline	ug/L	2,880		29	2,660		29	<7.2	ND	7.2	143		7.2
Bis(2-Ethylhexyl)phthalate	ug/L	749		1.9	8.0	J	1.9	10	J	1.9	35	J	1.9
Di-n-butyl phthalate	ug/L	5.1	J	1.9	<1.9	ND	1.9	<1.9	ND	1.9	<1.9	ND	1.9
Fluorene	ug/L	10	J	2.9	24	J	2.9	26	J	2.9	21	J	2.9
Isophorone	ug/L	<3.8	ND	3.8	<3.8	ND	3.8	73	J	3.8	27	J	3.8
Phenol	ug/L	3,950		6.0	3,960		6.0	5,490		7.5	3,180		3.0
Pyridine	ug/L	620		36	447		36	<36	ND	36	<36	ND	36
m,p-Cresol	ug/L	2,920		14	4,530		14	4,840		18	2,290		7.0
o-Cresol	ug/L	<3.3	ND	3.3	569		3.3	593		3.3	370		3.3

PARAMETER	UNITS	VR - 90C			VR - 100C			HC - 90C			HC - 100C		
		Result	Q	MDL	Result	Q	MDL	Result	Q	MDL	Result	Q	MDL
Quantity of Condensate													
Total Condensate	g	568.21			654.31			341.43			331.8		
Top Layer	%	35.07			20.88			37.51			20.46		
Bottom Layer	%	64.93			79.11			62.48			79.53		
pH													
Top Layer	s.u.	3.67			3.63			3.05			2.86		
Bottom Layer	s.u.	2.95			2.64			2.42			2.41		
Sum of Detected Compounds	ug/L	11,595			12,462			11,317			6,352		
Sum of TICs	ug/L	21,839			9,587			12,027			22,974		

Notes:
MDL= Method Detection Limit
Q= Laboratory Qualifiers
J= Result between the MDL and RDL
ND=Compound was analyzed for but not detected

Table 8. Physical Property Test Results

Sample	Treatment	Bulk Density (pcf)	Porosity (1)	Water Content (%)	Solid Specific Gravity	Triaxial Test (Cu)Ksf	Vane Shear (TSF)	Unconfined Comnpressive Strength (psi)	Hydraulic Condustivity	Density: @30˚C	Density: @50˚C	Density: @70˚C	Density: @90˚C	Viscosity: @Ambient 17˚C (cP)	Viscosity: 30˚C (cP)	Viscosity: 50˚C (cP)	Viscosity: 70˚C (cP)	Viscosity: 90˚C (cP)	Particle Size Distribution			
																			% Gravel	% Sand	% Silt	% Clay
	Untreated	65.9	NR	**NT**	**NT**	**NT**	0.0525	NT	NR	65.9	66.2	65.3	66.0	10,850 - 35,150	**NT**	**NT**	**NT**	1,732-1,832	NR	NR	NR	NR
	90°C	69.4	**NT**	26.73	**NT**	**NT**	> 0.6	4.4	**NT**	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
VR	100°C	69.0	**NT**	11.44	**NT**	**NT**	> 0.6	9.3	**NT**	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
	Untreated	59.2	**NT**	**NT**	1.2	**NT**	0.03	0.0	**NT**	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.0	62.5	15.0	22.5
	90°C	77.9	32.60	19.54	1.55	**NT**	0.28	38.4	**NT**	NR	NR	NR	NR	NR	NR	NR	NR	NR	21.6	50.3	3.80	24.4
HC	100°C	85.7	16.44	25.46	1.31	**NT**	0.25	80.1	**NT**	NR	NR	NR	NR	NR	NR	NR	NR	NR	33.8	37.9	4.30	24.0

Notes:

NR = Testing Not Requested
NT = sample not able to be tested properly due to matrix
pcf = Pounds per cubic foot
Cp = centipoise
(Cu)Ksf = (Undrained cohesion) thousand pounds per square foot
(1) = calculated per method ASTM D7263 Appendix X1 using data from bulk density, water content, and solid specific gravity testing

ATTACHMENT 2

KEMRON TREATABILITY STUDY REPORT

BRIDGEWATER THERMAL TREATABILITY STUDY

KEMRON PROJECT #: SE041601

September 19, 2012

Prepared for:

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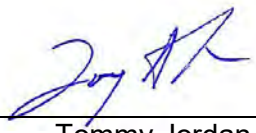


Tommy Jordan, P.G.
Program Manager

TABLE OF CONTENTS

1.0 INTRODUCTION 3
1.1 Treatability Study Methodology 3
1.2 Treatability Study Report Organization 4
2.0 TEST SAMPLES 4
2.1 Sample Receipt and Handling 6
3.0 UNTREATED CHARACTERIZATION 6
3.1 Physical Characterization 6
3.2 Thermal Stability Testing 11
3.3 Untreated Chemical Characterization 14
4.0 TRIAL ISTD EVALUATION 21
4.1 Daily Off Gas and Condensate Monitoring 21
4.2 Trial Off Gas Analytical Characterization 22
4.3 Trial Condensate Analytical Results 25
5.0 ISTD THERMAL TREATMENT SIMULATIONS WITH AIR FLOW 29
5.1 Individual ISTD Full Simulation Details 29
5.1.1 HC-90°C Treatment 29
5.1.2 VR-90°C Treatment 32
5.1.3 HC-100°C Treatment 34
5.1.4 VR-100°C Treatment 36
5.2 Daily Off Gas and Condensate Monitoring 38
5.2.1 Daily Off Gas Monitoring. 38
5.2.2 Daily Condensate Monitoring 40
5.2.3 Reconstituted Condensate 41
5.3 Thermal Treatment Analytical Results 43
5.3.1 Condensate Analytical Results 43
5.3.2 Treated Material Analytical Results 49
5.3.3 Off-Gas Analytical Testing 61
5.4 Summary of ISTD Full Simulation Testing 69
6.0 TESTING OF TREATED MATERIAL 73
6.1 Physical Properties Testing 73
6.2 Treated Sample Reheating/Liquefaction Testing 77
7.0 CONCLUSION 81

TABLES

Table 1A Summary of Untreated Physical Characteristics
Table 1B Summary Table for Thermal Stability Testing
Table 2A Untreated Chemical Properties
Table 2B Untreated Chemical Properties-TICs
Table 3A Trial Off-Gas Daily Monitoring Results
Table 3B Trial Condensate Daily Monitoring Results
Table 3C Trial Off-Gas Analytical Characterization- VOCs
Table 3D Trial Off-Gas Analytical Characterization- Aldehydes and Inorganic Acids
Table 3E Trial Off-Gas Analytical Characterization- Reduced Sulfur
Table 3F Trial Run Condensate Analytical Characterization
Table 4 Treated Off Gas Daily Monitoring Results
Table 5A Treated Condensate Daily Monitoring Results
Table 6A Treated Condensate Analytical Characterization (Top Layer-Solids)
Table 6B Treated Condensate Analytical Characterization (Bottom Layer-Water)
Table 6C Treated Condensate Analytical Characterization-TICs (Top Layer-Solids)
Table 6D Treated Condensate Analytical Characterization-TICs (Bottom Layer-Water)
Table 7A Treated Material Chemical Characterization-VR100 HC100
Table 7B Treated Material Chemical Characterization-TCLP VR100 HC100
Table 7C Treated Material Chemical Characterization-SPLP VR100 HC100
Table 7D Treated Material Chemical Characterization- VR90 HC90
Table 7E Treated Material Chemical Characterization- TCLP VR90 HC90
Table 7F Treated Material Chemical Characterization- SPLP VR90 HC90
Table 7G Treated Material Chemical Characterization TICs 90
Table 7 H Treated Material Chemical Characterization TICs 100
Table 8 Treated Off Gas Reduced Sulfur Results
Table 9 Treated Off Gas Analytical Characterization- Aldehydes and Inorganic Acids
Table 10A Treated Off Gas Analytical Characterization- VR 90 VOCs
Table 10B Treated Off Gas Analytical Characterization- HC 90 VOCs
Table 10C Treated Off Gas Analytical Characterization- VR 100 VOCs
Table 10D Treated Off Gas Analytical Characterization- HC 100 VOCs
Table 11 Headspace Off Gas Analytical Characterization
Table 12 Summary of Thermal Testing
Table 13 Treated Materials Property Testing
Table 14 Summary Table for Reheated Treated Samples

VIDEOS

Submitted under a separate cover

ATTACHMENTS

APPENDIX A Treatability Study Work Plan
APPENDIX B Untreated Material Physical Characterization
APPENDIX C Untreated Material Chemical Analytical Reports
APPENDIX D Trial Analytical Reports
APPENDIX E Thermal Temperature Monitoring Sheets
APPENDIX F Condensate Analytical Reports
APPENDIX G Off Gas Analytical Reports
APPENDIX H Treated Material Analytical Reports
APPENDIX I Treated Material Properties Data Sheets
APPENDIX J Bulk Treatment Summary Tables and Photos

1.0 INTRODUCTION

The Bridgewater, NJ Treatability Study (hereafter referred to as The Study) has been developed based on information provided by TerraTherm, and was performed to meet the following technical objectives:

1. Determine the effect of heating on the chemical composition of Impoundment 2 materials. Specific test objectives for viscous rubbery (VR) and hard crumbly (HC) include:

    a. Evaluate the change in chemical composition of impoundment materials before and after the heating.
    b. Characterize the chemical composition of vapor produced during thermal treatment.
    c. Assess leaching characteristics of impoundment materials following thermal treatment.
    d. Characterize the chemical composition of liquid effluent and condensate resulting from thermal treatment.

2. Determine the effect of heating on the physical properties of impoundment material. Specific test objectives include:

    a. Measure the corresponding change in VR and HC compressive strength before and after thermal treatment.
    b. Determine relative change in HC porosity resulting from thermal treatment.
    c. Measure the effect of increasing temperature on the specific gravity and viscosity of the VR material and the HC layer should liquefaction of this material occur during sample heating.
    d. Qualitatively assess apparent change in material characteristics before and after heating.
    e. Assess the physical stability of VR material with respect to HC material during heating, and evaluate the potential for homogenization during and after thermal treatment.

3. Heat treated bulk quantities of impoundment materials as directed by TerraTherm for subsequent evaluation under a solidification/stabilization study conducted by others.

1.1 Treatability Study Methodology

Testing was completed in three phases of work based on the *Treatability Study Work Plan* (hereafter referred to as the Work Plan), dated May 14, 2012, and prepared by a collaborative effort between TerraTherm and KEMRON. The Work Plan is provided in Appendix A. The first phase of the treatability study allowed for a trial thermal test to determine if the prescribed off-gas and condensate collection protocols were suitable, or if modifications were necessary for the subsequent testing. The second phase of the treatability study was to perform full simulation bench scale thermal evaluations to assess chemical and or physical characterization of off-gas, condensate, and treated material. The third phase of the study was to perform heat treatment for bulk quantities of impoundment material.

1.2 Treatability Study Report Organization

The following sections of this Treatability Study Report present summary tables of the results and photographic documentation from The Study. Details regarding the tasks and protocols that were followed in completing The Study are provided in The Work Plan located in **Appendix A**. Full tabulated results are provided in the Tables section of the Appendix. Support Figures, data sheets, monitoring sheets, power point presentations and analytical reports are provided in the Appendix and outlined in the Table of Contents.

2.0 TEST SAMPLES

KEMRON received materials for the Study on January 18, 2012 and February 24, 2012. The materials provided included various samples from Impoundment 1 (IMP-1) and Impoundment 2 (IMP-2). Impoundment 1 material included (1) Claylike material (CL); (2) Coal Aggregate (CA), (3) Viscous Rubbery (VR), (4) Sand-Silt (SS), and (5) Hard Crumbly (HC). Impoundment 2 materials included the viscous rubbery (VR) material, and the hard crumbly (HC) material.

The Bulk heat treatment was performed on Impoundment 1 materials, and the physical and chemical characterization, thermal trial, and thermal full simulations were performed on the VR and HC Impoundment 2 materials. Bulk Treatment was performed in accordance with the Work Plan. Summary Tables and powerpoint presentations concerning the bulk treatment are provided in **Appendix J**. The following photographs depict the untreated material from Impoundment 1.

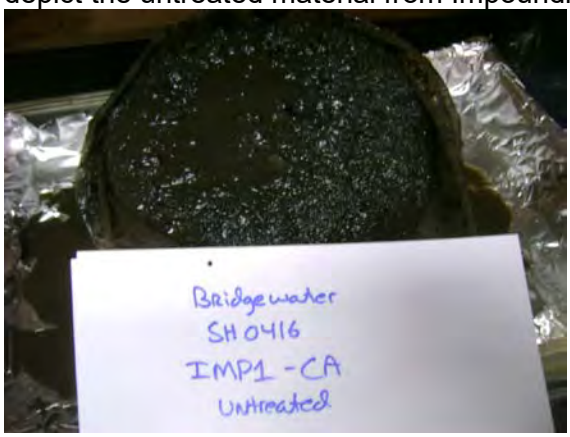


Photo 1- IMP1-CA Untreated

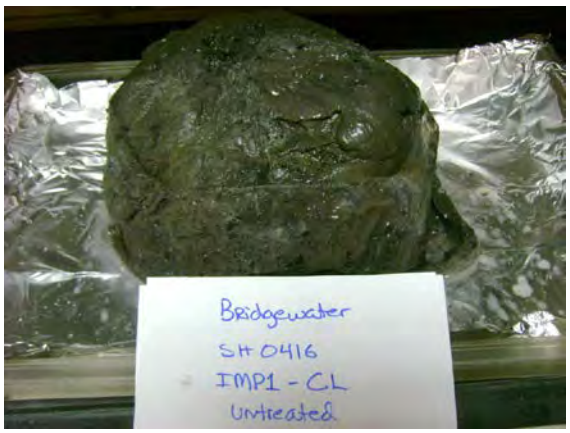


Photo 2- IMP1-CL Untreated

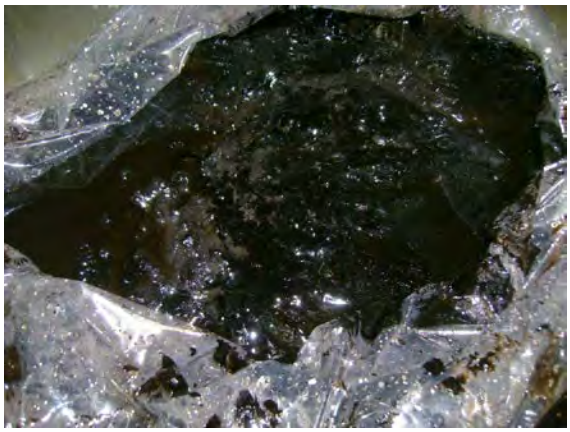


Photo 3- Impoundment 1 VR Material

Photo 4-Impoundment 1 SSL Material

Photo 5- Impoundment 1 HC Material

The following photographs depict the homogenized untreated material from IMP-2.

Photo 6- IMP 2 HC Untreated Homogenized

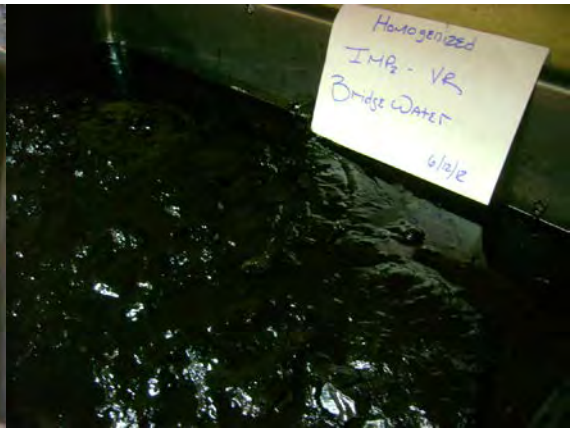


Photo 7- IMP 2 VR Untreated Homogenized

2.1 Sample Receipt and Handling

Upon receipt by KEMRON, the untreated site materials were logged in, and placed into refrigerated secure storage (maintained at a temperature of 4ºC + 2ºC).

No homogenization of the bulk heat materials (Impoundment 1) were required. For the materials from IMP-2, KEMRON attempted to homogenize the VR material in a chilled state, but was unable to manually homogenize the material due to the stiffness and rubbery consistency. The sample was allowed to warm to ambient temperatures (20 degrees Celsius) and then homogenized by hand using stainless steel utensils. The HC material was fairly sandy and KEMRON could homogenize the material while chilled. Once homogenized, an appropriate aliquot of each test material was removed for chemical and physical characterization testing. Any remaining test material not utilized for untreated material characterization testing was returned to the appropriate shipping containers and placed into refrigerated storage.

The establishment of the baseline level of constituents of concern was important for comparing and determining the effectiveness of the various treatment processes evaluated. The untreated analyses also allowed verification that the samples were representative of expected site material concentrations.

3.0 UNTREATED CHARACTERIZATION

KEMRON performed characterization testing of IMP-2 VR and IMP-2 HC untreated materials as outlined in the Work Plan included in Appendix A. The testing included physical and chemical characterization.

3.1 Physical Characterization

Physical Characterization consisted of evaluating common geotechnical parameters as listed in the Work Plan in Appendix A. In addition, two additional tasks to characterize the physical behavior of the untreated materials were included. First, the viscosity and density of the VR material at various temperatures was evaluated. Second, the behavior of layered site materials during heating, where the layering consisted of HC, covered by a layer of VR, and then covered by a layer of water. The following is a summary of results of the physical properties testing performed on the untreated site materials:

Table 1A

Summary of Untreated Physical Characteristics

Sample ID	Bulk Density (pcf)	Solid Specific Gravity	C.U. Triaxial Test (Cu)Ksf	Vane Shear (TSF)	Unconfined Comnpressive Strength	Hydraulic Condustivity	Density: @30˚C	Density: @50˚C	Density: @70˚C	Density: @90˚C	Viscosity: @Ambient 17˚C (cP)	Viscosity: @90˚C (cP)	Particle Size Distribution
IMP2 - HC - Homogenized	59.2	1.2	VE	0.03	0.0 psi	VE							% Gravel = 0.0 % Sand = 62.5 % Silt = 15.0 % Clay = 22.5
IMP2 - VR - Homogenized	65.9	*	VE	0.05	F		65.9	66.2	65.3	66.0	10,850-35,150	1,732-1,832	NR

Notes:

NR = Testing Not Requested

TIP = Testing still in progress

S.U. = Standard Units

pcf = Pounds per cubic foot

cP = centiPoise

F = failed under own weight

* = Test could not be performed, material stuck to glass beaker, Jason with CH2M HILL said it was ok to NR

VE = volatiles expanded causing material to expanded becoming untestable. Sample failing under its own weight.

(1) calculated per method ASTM D7263 Appendix X1 using data from bulk density, water content, and solid specific gravity testing

Shaded areas = testing not required

Table 1 includes a portion of the data initially requested since due to sample difficulty, some results were not considered reliable. Furthermore the typically physical property testing methods are designed soils type matrices and site materials (i.e., HC and VR materials) were more of a chemical waste material than a soil. Testing that was unable to be reported for VR included (1) the specific gravity, (2) some of the temperature specific viscosity tests, (3) moisture content, (4) CU Triaxial Test, and (5) UCS. Testing that was unable to be reported for the HC included (1) porosity, (2) moisture content, (3) CU Triaxial Test, and (4) hydraulic conductive. For example, the VR material hardened in the test container while performing the specific gravity test and could not be removed to finish the testing procedure. Also, during viscosity testing of the VR material at temperatures between ambient and 90°C "channeling" was observed where the spindle of the apparatus created a well in the sample material thereby spinning with lower resistance than if sample were present; and therefore, produced erroneous results. Volatile expansion (VE) occurred during Hydraulic Conductivity (HC only) and Triaxial Shear testing and prevented KEMRON from performing the tests per the method. In lieu of performing hydraulic conductivity, Laboratory Vane Shear testing was performed. This provides a shear strength of the material at a phi angle of zero (0). The VR sample did not hold form long enough to complete the UCS test. The physical property tests that included a heating step were also likely producing erroneous results. See Section 6.1 for additional details.

In general, the physical property testing results show that heating was not observed to change the density of the IMP-2 VR material.

Shaded areas in the table indicate that testing was not required. A more detailed summary of the untreated physical properties testing is provided in Table 1A. Physical Properties Data Sheets are provided in **Appendix B**. Selective photographs of the physical properties testing are provided below:

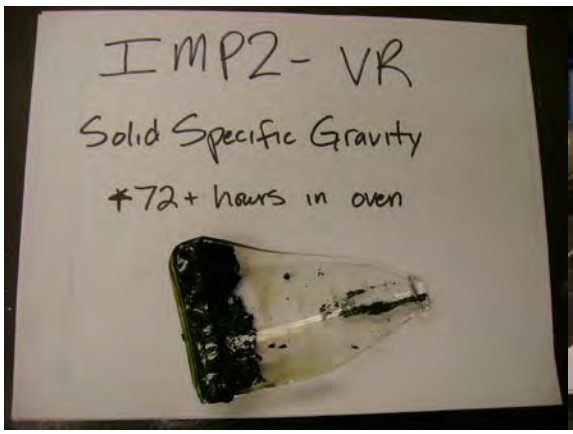


Photo 8 -VR Material hardens onto the glass

Photo 9 -IMP-2 HC Untreated has no unconfined strength

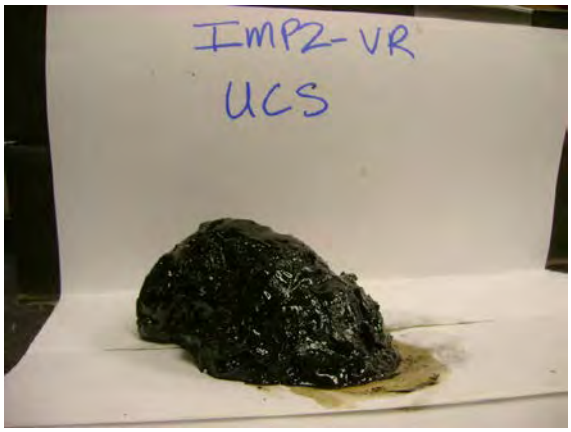


Photo 10 IMP 2 VR Untreated fails under its own weight

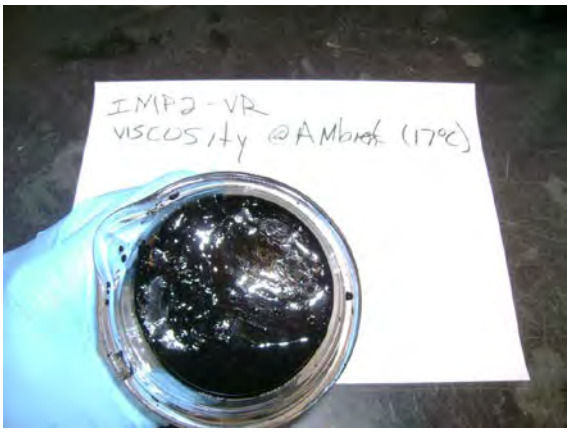


Photo 11- Viscosity Testing at Ambient Temperatures notice the water separated on the rough surface.

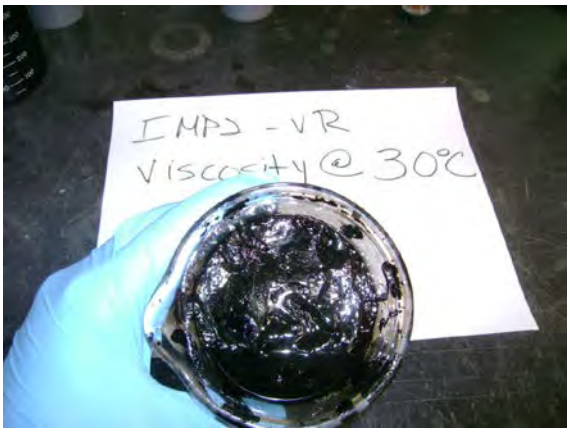


Photo 12- Viscosity at 30 ° Celsius. Water and irregular surface still present

Photo 13- Viscosity Testing Surface becoming smooth and water decreasing

Photo 14- Surface becoming smoother. No to little water on the surface.

Photo 15- Surface very smooth. No water on the surface

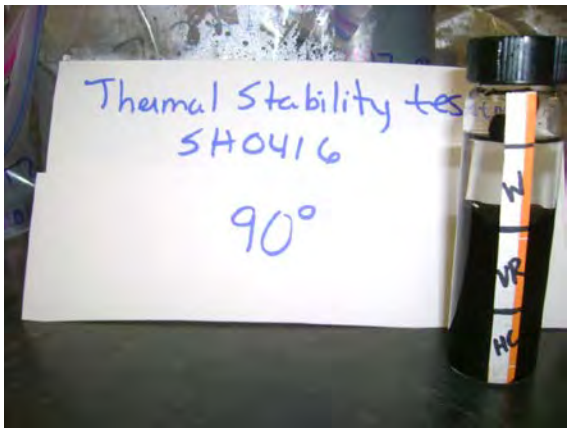
3.2 Thermal Stability Testing

KEMRON evaluated the behavior of the untreated material in a layered column. The HC material was overlaid by the same volume of VR material, and then a layer of the same volume of water was placed on top. The material was slowly heated to prescribed temperatures as outlined in the Work Plan (30, 50, 70, and 90 ° Celsius) and allowed to remain at those temperatures for 24 hours. KEMRON recorded movement and monitored off gas concentrations of volatile organic compounds using a Flame Ionization Detector (FID). The following table provides a summary of the observations and off gas readings.

Summary Table for Thermal Stability Testing
Table 1B

Target Temperature	Description
30°C	The untreated material was heated at the target temperature for 24 hours. A gray layer formed on top of the VR sample. The VR, HC and water did not move or mixed through the test. Small peaks formed on the surface of the VR, but did not float upward. VOC range: 301.8 - 3859 ppm
50°C	The material was heated at the target temperature for 24 hours. A layer of the VR floated to the top of the water and remained there. The VR, HC and water did not move or mixed through the test. VOC range: 311.5 - 1544 ppm
70°C	The material was heated at the target temperature for 24 hours. A thin layer of the VR moved to the top of the water. The VR and HC material moved slightly up and a thin layer of water formed beneath the HC. Overnight the water on top of the sample evaporated and the VR encapsulated around the HC. VOC range: 114.9 - 1331 ppm
90°C	The material was heated at the target temperature for 24 hours. The HC and VR material moved up and down the vial, exchanging places with the water. Overnight the water on the sample evaporated and the VR expanded out of the vial. The materials did not mix. VOC range: 31 - above 50,000 ppm

Below are photographs depicting the material at the different prescribed temperatures.



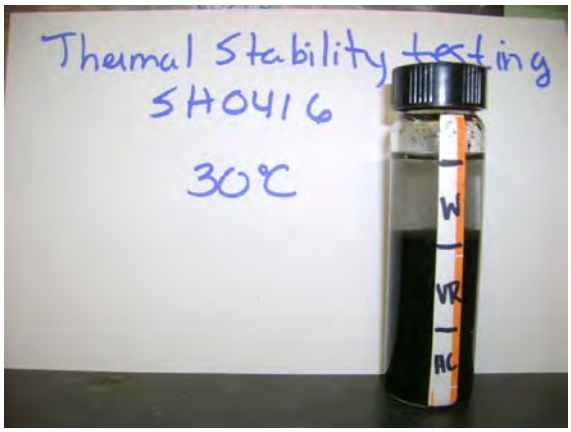


Photo 16- Representative sample photographs of testing tubes prior to heating

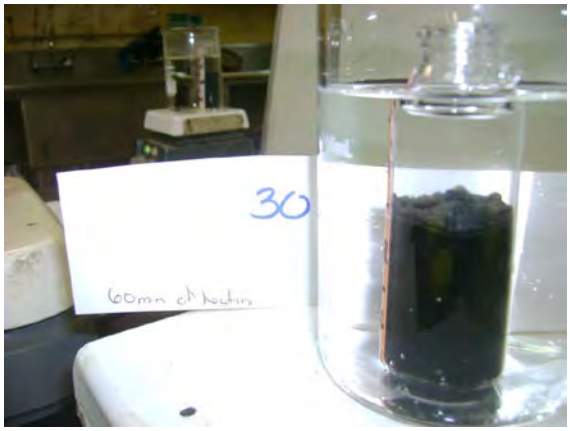


Photo 17-Testing at 30 °C shows some small peaks forming on the VR surface but not released in the 24 hour testing time.

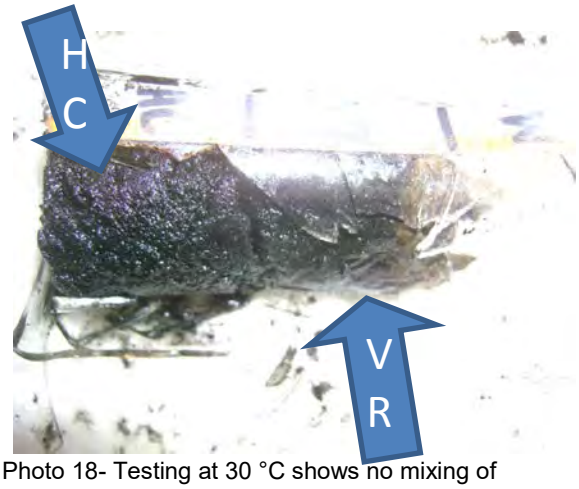


Photo 18- Testing at 30 °C shows no mixing of HC and VR

Photo 19- At 50 ° C a layer of VR has floated to the top. After 22 hours, the surface of the VR is smooth.

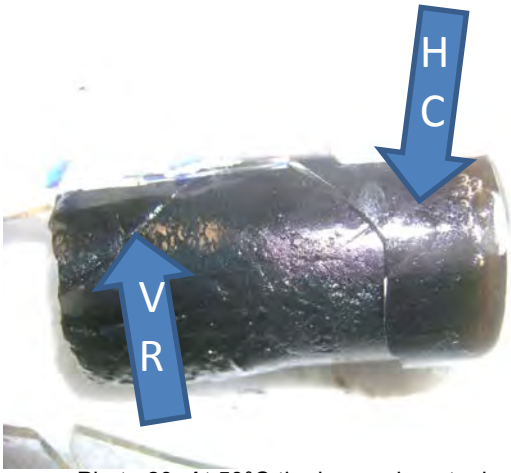


Photo 20- At 50°C the layers do not mix.

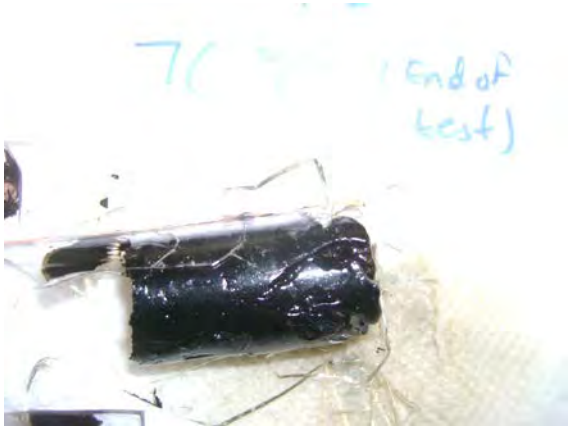
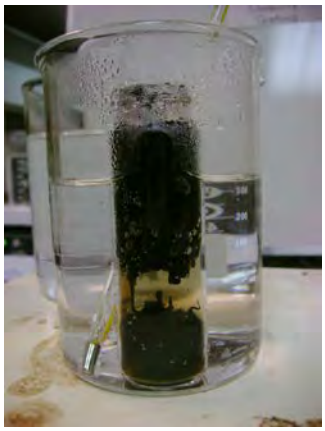


Photo 21 and 22- At 70 ° C, VR continues to lift to the top of the sample. The HC and VR layers had shifted up and a small layer of brown water has formed in the bottom of the vial, after 40 minutes of heating. After 24 hours, the VR moved downward and encapsulated the HC.



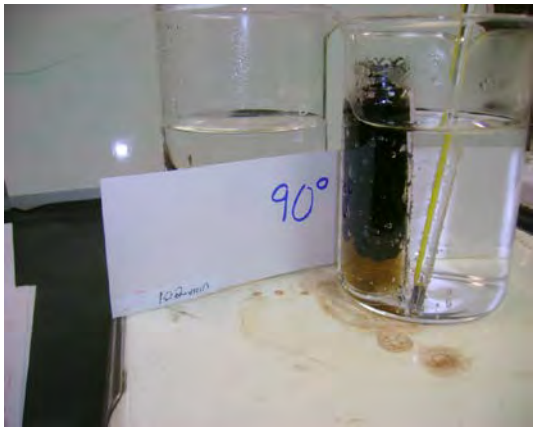
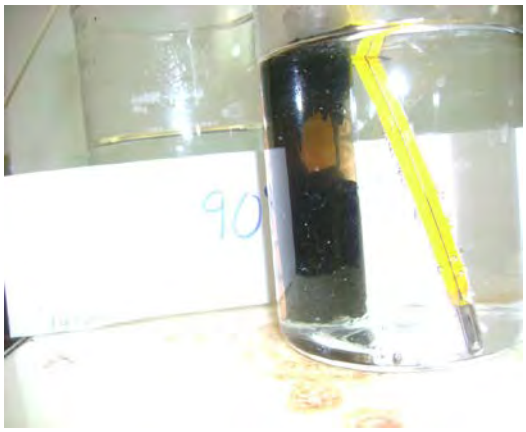


Photo 23 and 24 - At 78 ° C, the VR separates from the HC and floats upward. Afterwards the HC rises as well and a layer of water forms at the bottom of the test tube.



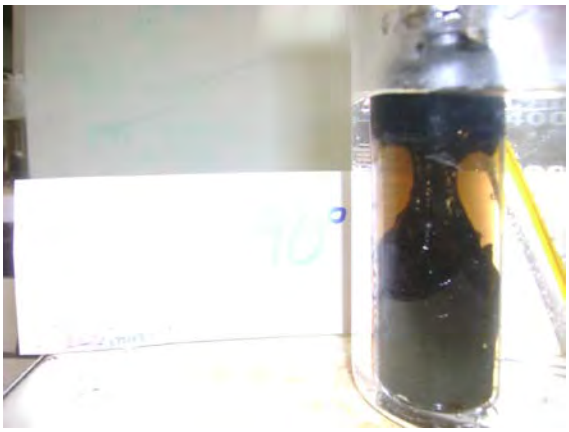


Photo 25 and 26- As the temperature maintains 90 °C, the VR and HC separate again and the HC sinks.

Photo 27- After 24 hours, the water evaporated and the VR expanded outside the tube. No apparent mixing of HC and VR was observed. No liquefaction of the HC material was observed.

Detailed observations of the Thermal Stability testing are provided in **Appendix B**.

3.3 Untreated Chemical Characterization

In addition to the physical properties testing, aliquots of each untreated material were forwarded to selected sub-contracted laboratories for analytical testing. Analysis was performed in triplicate for selected parameters. The following table includes the chemical and advanced testing parameters performed on the untreated materials.

TABLE 2A

UNTREATED MATERIAL CHEMICAL PROPERTIES

		IMP 2 VR-A	IMP 2 VR-B	IMP 2 VR-C	IMP 2 HC-A	IMP 2 HC-B	IMP 2 HC-C
		Untreated	Untreated	Untreated	Untreated	Untreated	Untreated
PARAMETER	**UNITS**	**RESULTS**	**RESULTS**	**RESULTS**	**RESULTS**	**RESULTS**	**RESULTS**
Total Organic Carbon	mg/Kg			815,000			606,000
pH	pH Unit	1.1	1.1	2.0	1.0	1.0	1.0
Metals							
Aluminum	mg/Kg	319.0	323.0	360.0	227.0	286.0	164.0
Antimony	mg/Kg	1.5	1.1	1.3	0.3	0.4	0.3
Arsenic	mg/Kg	ND	ND	ND	6.0	1.4	1.9
Barium	mg/Kg	8.0	7.5	8.2	5.3	6.2	5.7
Beryllium	mg/Kg	0.0	0.0	0.0	0.0	0.0	0.0
Cadmium	mg/Kg	0.1	0.0	0.1	ND	ND	ND
Calcium	mg/Kg	195.0	209.0	234.0	97.6	163.0	122.0
Chromium	mg/Kg	5.2	4.8	2.8	6.3	8.4	4.2
Cobalt	mg/Kg	0.2	0.3	0.3	0.2	0.2	0.2
Copper	mg/Kg	23.5	23.8	28.6	12.5	15.4	12.8
Iron	mg/Kg	881.0	992.0	1,120	639.0	776.0	529.0
Lead	mg/Kg	62.4	64.9	67.7	59.0	76.1	71.2
Magnesium	mg/Kg	54.0	58.8	63.2	36.3	44.2	31.6
Manganese	mg/Kg	11.3	13.6	15.6	5.6	6.6	4.7
Nickel	mg/Kg	5.4	5.1	5.3	4.6	6.1	3.6
Potassium	mg/Kg	68.1	65.0	65.0	91.2	104.0	65.0
Selenium	mg/Kg	13.8	13.4	13.9	9.7	10.7	10.0
Silver	mg/Kg	ND	ND	ND	ND	0.0	0.0
Sodium	mg/Kg	3,570	4,260	4,440	5,740	6,440	4,550
Thallium	mg/Kg	2.0	1.9	2.3	0.7	0.9	0.7
Vanadium	mg/Kg	1.1	1.1	1.1	0.5	0.8	0.6
Zinc	mg/Kg	7.0	7.9	7.1	4.6	5.0	3.7
Mercury	mg/Kg	1.7	2.0	1.8	8.7	3.4	2.7

TABLE 2A (cont)

UNTREATED MATERIAL CHEMICAL PROPERTIES

Semivolatile Organic Compounds		**IMP 2 VR-A**	**IMP 2 VR-B**	**IMP 2 VR-C**	**IMP 2 HC-A**	**IMP 2 HC-B**	**IMP 2 HC-C**
		Untreated	**Untreated**	**Untreated**	**Untreated**	**Untreated**	**Untreated**
2-Methylnaphthalene	ug/Kg	320,000	243,000	589,000	60,600	55,400	39,100
Acenaphthene	ug/Kg	50,600	39,100	94,800	11,600	8,320	5,930
Acenaphthylene	ug/Kg	ND	ND	ND	ND	ND	ND
Aniline	ug/Kg	22,300	ND	58,700	ND	ND	ND
Fluorene	ug/Kg	1,310,000	941,000	2,390,000	223,000	207,000	133,000
1,2,4-Trimethylbenzene	ug/Kg	557,000	610,000	434,000	ND	749,000	733,000
1,2-Dichlorobenzene	ug/Kg	1,650,000	2,120,000	1,810,000	ND	551,000	662,000
1,3,5-Trimethylbenzene	ug/Kg	403,000	466,000	301,000	ND	625,000	607,000
1,4-Dichlorobenzene	ug/Kg	ND	183,000	ND	ND	ND	ND
4-Isopropyltoluene	ug/Kg	41,500	ND	234,000	ND	ND	ND
Volatile Organic Compounds							
Benzene	ug/Kg	18,900,000	26,300,000	18,100,000	21,400,000	35,500,000	42,400,000
Ethylbenzene	ug/Kg	110,000	ND	107,000	ND	ND	ND
Isopropylbenzene (Cumene)	ug/Kg	473,000	550,000	353,000	ND	769,000	778,000
Naphthalene	ug/Kg	3,060,000	3,810,000	3,360,000	1,490,000	1,890,000	2,070,000
Toluene	ug/Kg	5,570,000	7,510,000	5,840,000	4,260,000	7,220,000	9,120,000
Xylene (total)	ug/Kg	1,800,000	2,270,000	1,590,000	1,670,000	2,410,000	2,530,000
m,p-Xylene	ug/Kg	1,300,000	1,680,000	1,190,000	1,090,000	1,640,000	1,740,000
o-Xylene	ug/Kg	500,000	591,000	397,000	583,000	767,000	788,000
sec-Butylbenzene	ug/Kg	504,000	575,000	358,000	ND	ND	ND

Due to the high concentrations of benzene, elevated detection limits were required for volatiles analyses. The above table represents parameters detected above the detection limits. Detection limits, qualifiers, and additional notes are provided in Table 2A at the end of the report. Results of the analytical testing revealed that higher concentrations of Benzene are found in the HC material than the VR and higher concentrations of Naphthalene were found in the VR material than the HC. In general, concentrations of semivolatile organic compounds appear to be significantly higher in the VR material than the HC material; and the volatile organic compounds show more consistent results between the VR and HC. The pH of both materials is approximately 1 standard units (s.u.). Total organic carbon for the HC and VR material are 606,000 mg/kg and 815,000 mg/kg, respectively.

A Library Search for Tentatively Identified Compounds was performed on the untreated material. The results of the library search are provided in Table 2B below. The analytical report for the untreated material is provided in **Appendix C**.

TABLE 2 B

UNTREATED MATERIAL CHEMICAL PROPERTIES (TICS) (ug/Kg)

PARAMETER	RETENTION TIME	IMP 2 VR-A RESULT	IMP 2 VR-B RESULT	IMP 2 VR-C RESULT	IMP 2 HC-A RESULT	IMP 2 HC-B RESULT	IMP 2 HC-C RESULT
VOCs							
No TICs Detected							
Semi Volatiles Organic Compounds							
Ethyl Chloride	1.07						83,400
Toluene	1.29	1,440,000	1,590,000	3,210,000	1,850,000	1,850,000	1,030,000
Ethylbenzene	1.74	60,900			71,300	65,000	36,100
p-Xylene	1.78	577,000	554,000		547,000		295,000
Benzene, 1,3-dimethyl-	1.78			1,110,000		481,000	
Benzene, 1,3-dimethyl-	1.89				148,000		
p-Xylene	1.89					130,000	
Benzene, 1,2-dimethyl-	1.89						78,400
Benzene, (1-methylethyl)-	2.03					137,000	
Benzene, (1-methylethyl)-	2.04				159,000		83,900
1,2,4-Trimethylbenzene	2.37				124,000		
4-tert-Butyltoluene	2.79					105,000	72,500
Benzene, cyclopentyl-	3.33	47,100	44,400				
Benzene, [2-methyl-1-(1-methylethyl	3.46	62,900		119,000			
Benzene, (1-ethylpropyl)-	3.46		58,800				

TABLE 2 B (cont)

UNTREATED MATERIAL CHEMICAL PROPERTIES (TICS) (ug/Kg)

PARAMETER	RETENTION TIME	IMP 2 VR-A RESULT	IMP 2 VR-B RESULT	IMP 2 VR-C RESULT	IMP 2 HC-A RESULT	IMP 2 HC-B RESULT	IMP 2 HC-C RESULT
1-Methyl-4-N-hexylbenzene	3.57		66,900		41,500		
Benzene, (1-methylhexyl)-	3.57			141,000		42,100	
Unknown	3.57						21,400
Unknown	3.58	71,600					
Benzene, cyclohexyl-	3.70	70,400	67,200	146,000	53,500	50,900	27,400
Unknown	3.74		94,700				
Benzene, 1-ethyl-3-(1-methylethyl)-	3.81	117,000		227,000			
Benzene, 1-ethyl-4-(1-methylethyl)-	3.81		122,000				
Benzene, 4-ethyl-1,2-dimethyl-	3.91	134,000			77,500		
2-Hexanone, 5-methyl-5-phenyl-	3.91		125,000				
Benzenepropanoic acid, .alpha.,.alp	3.91					63,900	
Benzene, 4-(chloromethyl)-1,2-dimet	3.91						37,400
Benzene, 1-cyclohexyl-3-methyl-	4.06					85,200	49,200
Diphenylmethane	4.07	201,000	185,000	374,000	92,700		
Benzene, 1-methyl-4-(phenylmethyl)-	4.42	203,000				67,000	
2,2'-Dimethylbiphenyl	4.42			411,000			
1,1'-Biphenyl, 2,3'-dimethyl-	4.42				88,100		
Benzene, 1-methyl-3-[(4-methylpheny	4.53	190,000		401,000			
Benzene, 1,1'-methylenebis[4-methyl	4.53		170,000		93,100		53,400

TABLE 2 B (cont)
UNTREATED MATERIAL CHEMICAL PROPERTIES (TICS) (ug/Kg)

PARAMETER	RETENTION TIME	IMP 2 VR-A RESULT	IMP 2 VR-B RESULT	IMP 2 VR-C RESULT	IMP 2 HC-A RESULT	IMP 2 HC-B RESULT	IMP 2 HC-C RESULT
Benzene, 1,2-dimethyl-4-(phenylmeth	4.53					95,800	
Benzene, 1,1'-(1-methylethylidene)b	4.58	727,000	683,000	1,410,000	364,000	334,000	195,000
Unknown	4.75				112,000		
Unknown	4.78						55,000
Stilbene, 4-amino-(E)-	4.82	3,110,000					
Naphthalene, 1,2,3-trimethyl-4-prop	4.82		2,620,000		743,000	671,000	398,000
Benzenamine, 3-(2-phenylethenyl)-,	4.82			5,800,000			
1H-Indene, 2,3-dihydro-1-methyl-3-p	4.85	282,000					
Naphthalene, 1,2,3-trimethyl-4-prop	4.90	613,000		1,110,000			
Unknown	4.90		516,000		145,000		78,700
Stilbene, 4-amino-(E)-	4.90					122,000	
9H-Carbazol-3-amine, 9-ethyl-	5.00	570,000			141,000		
9,9-Dimethyl-9-silafluorene	5.00		472,000				
N,N-Diethyl-.alpha.-(aminomethylene	5.00			1,150,000			
Unknown	5.00					99,500	65,900
Unknown	5.07	628,000		1,790,000			
Unknown	5.07		791,000		221,000	181,000	106,000
Unknown	5.24	310,000					
Silane, trimethyl[5-methyl-2-(1-met	5.30		345,000			105,000	

TABLE 2 B (cont)
UNTREATED MATERIAL CHEMICAL PROPERTIES (TICS) (ug/Kg)

PARAMETER	RETENTION TIME	IMP 2 VR-A RESULT	IMP 2 VR-B RESULT	IMP 2 VR-C RESULT	IMP 2 HC-A RESULT	IMP 2 HC-B RESULT	IMP 2 HC-C RESULT
2H-3,9a-Methano-1-benzoxepin, octah	5.30			836,000			
1,4-Benzenediol, 2,5-bis(1,1-dimeth	5.30				117,000		53,700
Unknown	5.37			508,000			
Sulfur, mol. (S8)	5.94		241,000		198,000	202,000	97,600
Sulfur, mol. (S8)	5.95			515,000			
Unknown	7.00		334,000	833,000			
Unknown	7.42		323,000	625,000			

4.0 TRIAL ISTD EVALUATION

KEMRON performed a trial ISTD evaluation of the IMP-2 VR material prior to performing the full simulations in accordance with the protocols described in the Work Plan in Appendix A. The testing included includes heating approximately 700 grams of the VR material in a box reactor to 100°C and holding at 100°C for 10 days. Originally, the trial test was planned for a 2 day treatment time; however, due to continuing high off gas concentrations of VOCs, the trial evaluation was extended to 10 days. The initial data collection design reflected the 2 day treatment time; and therefore, some data collected does not span the entire 10day heating duration that ultimately occurred. During the trial thermal testing, KEMRON collected off gas readings, collected condensate, and performed analytical characterization of the condensate for VOCs, Aldehydes, Inorganic Acids, and Reduced Sulfur.

The ISTD Thermal evaluation set up is depicted in the following photographs.

Photo 28- Typical ISTD Set up with small box reactor

Photo 29- Typical full set up with condenser and air flow

4.1 Daily Off Gas and Condensate Monitoring

Daily off gas readings are provided in Table 3A at the end of the report. The results of the daily off gas monitoring revealed that concentrations exceeding the maximum calibration values of the instrument were being emitted. The VOC concentrations at ambient temperatures exceeded 2,500 parts per million (ppm) the maximum calibrated value of the instrument at that time. The instrument was calibrated for “high concentrations” and the VOC concentrations exceeded 50,000 ppm (the high concentration calibration maximum value) as early as a soil temperature of 50° C. The VOC off gas concentration remained above 50,000 ppm until day 3 of treatment. After 3 days of treatment, the VOC concentrations continued to decline and eventually dropped to below 1,000 ppm after 10 days of treatment. Hydrogen Sulfide (H2S) concentrations exceeded 337 ppm as early as a 50 °C soil temperature and maintained concentrations above 337 ppm till at least day 3 which concluded the H2S off gas data collection.

Daily condensate monitoring data is provided in Table 3B at the end of the report. Condensate production was observed around 70 °C. After one day of heating, the condensate production equaled approximately half of the total weight loss generated during the 10 day heating. Initial condensate collected was observed to have three layers. The top layer was a black liquid color (likely VR material); the middle was a slight opaque white with brown solids; and the bottom layer was yellow/opaque white with brown solids. The VR material expanded within the reactor and rose up the off gas line and then into the condenser (see photo 30 below). . The trial thermal testing was discontinued. A volume of VR material was placed in a cylinder and heated to determine an approximate value of expansion. The approximate value was between 30 and 40 % expansion. Using this value, a new reactor with a smaller amount of VR was made. The amount of headspace in the reactor would allow for the expansion of the material without the material rising up through the off gas lines.

The pH of the initial condensate produced (up to Day 1 of treatment) is 2 (top layer), 3.2 (middle layer), and 2.6 (bottom layer). Over the treatment period the condensate became a three phase substance. The top layer became a darker brown color, the middle was a lighter brown color, and the bottom was a lighter opaque color. (see photo 31 below). This condensate was preserved in 40 ml vials and subsequently each layer was sent off for analytical testing. The results of the analytical testing are discussed in Section 4.3. The remaining condensate was collected during the 10 day treatment period. The remaining condensate produced 2 layers. The top layer appeared to be a brown NAPL and it had a pH of 2.0 s.u. The bottom layer appeared to be a white opaque color with a pH of 2.5 s.u.

Photo 30 VR rising up the off gas line into condenser

Photo 31 - Initial Condensate

Photo 32- Post Day 1 Condensate at the end of the trial

4.2 Trial Off Gas Analytical Characterization

Off Gas samples were collected at Time Zero (T_0) which represented an ambient condition, at Day 1 of treatment, and at Day 2 or Day 5 of treatment. Complete data for the off gas analytical results are provided in Tables 3C through 3E. The samples were subjected to analysis of VOCs, Aldehydes, Inorganic Acids, and Reduced Sulfur. The following is a summary of the positive results for the VOC analysis:

Table 3C
Trial Off Gas Volatile Organic Compounds (TO-15)

PARAMETER	UNITS	IMP-2 VR T_0 (ppbv)* RESULT	IMP-2 VR DAY 1 RESULT	IMP-2 VR DAY 5 RESULT
Volatile Organic Compounds				
Chloromethane	ug/m^3	54,000	ND	15,000
Acetone	ug/m^3	ND	150,000	140,000
Carbon Disulfide	ug/m^3	85,000	200,000	6,000
Hexane	ug/m^3	14,000	96,000	ND
Cyclohexane	ug/m^3	9,000	31,000	ND
Benzene	ug/m^3	2,500,000	16,000,000	1,200,000
Toluene	ug/m^3	34,000	200,000	80,000

* Sample size is 40 ml vial with approximately 5.0 grams of sample

The results indicated elevated VOC concentrations at the first day (i.e., Day 1) of heating and significant reduction by Day 5.

The following is a summary of the Aldehydes and Inorganic Acids produced during the trial thermal evaluation.

TABLE 3D

TRIAL OFF-GAS ANALYTICAL CHARACTERIZATION
ALDEHYDES AND INORGANIC ACIDS (NIOSH 2016M/NIOSH 7903M)

PARAMETER	UNITS	IMP-2 VR DAY To RESULT	IMP-2 VR Day 1 RESULT	IMP-2 VR Day 2 RESULT
ALDEHYDES				
ACETALDEHYDE	MG/M3	1.2	< 0.08	0.6
BENZALDEHYDE	MG/M3	0.2	< 0.08	< 0.08
BUTYRALDEHYDE	MG/M3	0.4	< 0.09	< 0.09
Crotonaldehyde	MG/M3	< 0.09	< 0.09	< 0.09
FORMALDEHYDE	MG/M3	< 0.08	< 0.08	< 0.08
ISOVALERALDEHYDE	MG/M3	< 0.08	< 0.08	< 0.08
PROPIONALDEHYDE	MG/M3	0.3	< 0.08	< 0.08
VALERALDEHYDE	MG/M3	0.2	< 0.09	< 0.09
INORGANIC ACIDS				
HYDROBROMIC ACID	MG/M3	< 1	< 1	< 1
HYDROCHLORIC ACID	MG/M3	< 1	< 1	< 1
HYDROFLUORIC ACID	MG/M3	< 1	< 1	< 1
NITRIC ACID	MG/M3	< 1	< 1	< 1
PHOSPHORIC ACID	MG/M3	< 1	< 1	< 1
SULFURIC ACID	MG/M3	< 1	*3.4	*4.7

* Results may have had breakthrough or possible migration. Results may have exceeded method capabilities.

The results indicated Sulfuric Acid was primarily the only constituent detected. Breakthrough or migration indicated for the sulfuric acid results means that the concentrations at the front of the sampling tube were equal to the rear sampling tube. This could mean that the concentrations and duration of the testing exceeded the absorption capacity of the sampling media. These results for the sulfuric acid may be biased low.

The following table presents the detected Reduced Sulfur results. Table 3E at the end of the report presents the full list of constituents and detection limits.

TABLE 3E

TRIAL OFF-GAS ANALYTICAL CHARACTERIZATION

Reduced Sulfur (ASTM D5504)

PARAMETER	UNITS	IMP-2 VR DAY T_0 RESULT	IMP-2 VR Day 1 RESULT	IMP-2 VR Day 2 RESULT
Reduced Sulfur Compounds				
Hydrogen Sulfide	µg/m³	ND	2,000,000	41,000,000
Carbonyl Sulfide	µg/m³	630	1,700,000	33,000
Methyl Mercaptan	µg/m³	ND	18,000	470,000
Ethyl Mercaptan	µg/m³	ND	ND	48,000
Dimethyl Sulfide	µg/m³	2,400	18,000	21,000
Carbon Disulfide	µg/m³	130,000	1,000,000	51,000
Isopropyl Mercaptan	µg/m³	ND	ND	16,000
Ethyl Methyl Sulfide	µg/m³	330	ND	ND
Thiophene	µg/m³	1,500	ND	ND
Isobutyl Mercaptan	µg/m³	370	ND	ND
3-Methylthiophene	µg/m³	160	ND	ND
2-Ethylthiophene	µg/m³	67	ND	ND

The hydrogen sulfide continues to increase in concentration peaking at 41,000,000 ppb on the final day of data collection (i.e, day 2 of treatment at 100°C). Carbon Disulfide appears to peak in the first day of treatment at 1,000,000 ppb. Mercaptan's appeared to peak at day 1 and then began to decrease in concentration.

4.3 Trial Condensate Analytical Results

After the first day of treatment, the condensate that was produced was segregated into the three different phases present and submitted for analysis of VOCs, SVOCs, and TICs. The following summary table presents the detected compounds. The full table is provided in Table 3 F at the end of the report. The analytic reports are provided in **Appendix D**.

TABLE 3F

TRIAL RUN CONDENSATE ANALYTICAL CHARACTERIZATION

		Trial Run Condensate	Trial Run Condensate	Trial Run Condensate
		Bottom	Middle	Top
PARAMETER	UNITS	RESULT	RESULT	RESULT
Semivolatile Organic Compounds				
1,4-Dichlorobenzene	ug/L	1,190	107,000	ND
2-Methylnaphthalene	ug/L	264	26,600	ND
Bis(2-Chloroisopropyl)ether	ug/L	ND	ND	904,000
Bis(2-Ethylhexyl)phthalate	ug/L	ND	16,400	ND
Fluoranthene	ug/L	ND	ND	334,000
Fluorene	ug/L	313	28,800	ND
Phenol	ug/L	1,600	ND	ND
m,p-Cresol	ug/L	1,220	ND	ND
Volatile Organic Compounds	ug/L			ND
1,2,4-Trimethylbenzene	ug/L	1,300	13,100	1,170,000
1,2-Dichlorobenzene	ug/L	6,040	62,300	4,410,000
1,3,5-Trimethylbenzene	ug/L	793	8,940	374,000
1,4-Dichlorobenzene	ug/L	549	6,110	ND
2-Butanone	ug/L	9,120	ND	ND
Acetone	ug/L	120,000	102,000	ND
Benzene	ug/L	454,000	4,090,000	270,000,000
Dichlorodifluoromethane	ug/L	ND	ND	223,000
Ethylbenzene	ug/L	624	7,650	ND
Hexachlorobutadiene	ug/L	ND	ND	ND
Isopropylbenzene (Cumene)	ug/L	992	9,950	ND
Naphthalene	ug/L	6,170	82,500	6,460,000
Toluene	ug/L	64,100	724,000	58,600,000
Xylene (total)	ug/L	8,300	100,000	8,120,000
m,p-Xylene	ug/L	6,200	76,100	6,410,000
o-Xylene	ug/L	2,100	24,300	1,700,000
sec-Butylbenzene	ug/L	524	5,090	ND

In general, the results indicated that higher concentrations of VOCs and SVOCs were detected in the top and middle layers of the condensate.

TABLE 3F (con't)
TRIAL RUN CONDENSATE ANALYTICAL CHARACTERIZATION (TICs)

		Bottom Layer		Middle Layer		Top Layer	
Volatile Organic Compounds -TICs		Value	Retention Time	Value	Retention Time	Value	Retention Time
Propanoic acid, methyl ester	ug/L	2,680	4.48	ND		ND	
Semivolatile Organic Compounds - TICs							
Toluene	ug/L	92,800	1.11	485,000	1.13	85,000,000	1.59
Ethylbenzene	ug/L	2,050	1.53	22,900	1.53	2,250,000	2
p-Xylene	ug/L	20,400	1.58	184,000	1.58	19,400,000	2.04
Benzene, 1,3-dimethyl-	ug/L	5,790	1.68			5,420,000	2.15
Benzene, (1-methylethyl)-	ug/L	3,840	1.83	47,100	1.83	4,220,000	2.28
Benzene, 1-ethyl-2-methyl-	ug/L	4,430	2				
Benzene, 1,2,4-trimethyl-	ug/L	4,990	2.15			2,990,000	2.45
Sulfur, mol. (S8)	ug/L	18,400	5.75	410,000	5.75		
Benzene, (1-ethylpropyl)-	ug/L			11,800	2.54	1,020,000	2.99
4-tert-Butyltoluene	ug/L			42,700	2.58		
Benzene, (1,1-dimethylpropyl)-	ug/L			19,100	2.65		
Benzene, (1-ethylbutyl)-	ug/L			17,400	2.9		
Benzene, cyclopentyl-	ug/L			17,200	3.12		
Benzene, (1-nitropropyl)-	ug/L			19,600	3.25		

Benzene, (1-methylhexyl)-	ug/L			21,400	3.36		
Benzene, 1,1'-(1-methylethylidene)b	ug/L			76,900	4.36		
Naphthalene, 1,2,3-trimethyl-4-prop	ug/L			157,000	4.60		
Benzene, 1,2-dimethyl-	ug/L			55,500	1.68		
Benzene, 1,3,5-trimethyl-	ug/L			53,100	2.04	5,280,000	2.6
Benzene, 1,2,3-trimethyl-	ug/L			63,900	2.15		
Benzene, (1-methylpropyl)	ug/L			91,000	2.22		
Benzene, (2-methyl-1-propenyl)-	ug/L			12,400	2.47		
Unknown	ug/L					1,370,000	3.68
Benzene, 1-(1,1-dimethylethyl)-3-me	ug/L					2,070,000	3.01
Benzene, 1,2-dimethyl-4-(phenylmeth	ug/L					1,330,000	4.8
Naphthalene, 1,2,3-trimethyl-4-prop	ug/L					1,900,000	5.04
Benzene, 1-ethyl-2-methyl- 2.45 ug/Kg	ug/L					1,630,000	2.45
Benzene, 2-ethyl-1,3-dimethyl-	ug/L					1,240,000	2.73

5.0 ISTD THERMAL TREATMENT SIMULATIONS WITH AIR FLOW

KEMRON performed two specific thermal treatment simulations for each site material, HC, and VR. The treatment parameters included treatments at target temperatures of 90, and 100°C. For each test KEMRON injected breathing quality air at an air-flow rate of approximately 10 milliliters per minute (ml/min). This air-flow assisted in the removal of off-gases from the system and to provide a constant off-gas flow for analytical off-gas sampling. Each test was performed to provide information regarding potential contaminants present in condensed off-gas vapors (i.e., condensate); non-condensed vapors; and physical and chemical characteristics of each treated test material.

Throughout each test, KEMRON collected air and condensate samples for selective analyses. All tests were performed in general accordance with the Work Plan established for this study. Based on the trial ISTD, TerraTherm modified the scope of work for the full simulations. The following modifications were performed:

1) The length of treatment was extended from 7 days until the off gas readings were below 1,000 ppm for VOCs
2) Dilutions were to be attempted for the daily off gas readings in order to gain specific values for H2S and the VOCs
3) The off-gas collection design (i.e., VOCs, Inorganic Acids, Aldehydes, and Reduced Sulfur) was changed to collection at Day 1 of treatment, when the off gas for VOCs were below 50,000 ppm, and when the off gas for VOCs was below 1,000 ppm.
4) The VR material could not be chilled after testing and be removable from the reactor. Therefore, the sample was kept at ambient to elevated temperatures after treatment and small pieces were collected and placed in sample jars for analysis.

Section 5.1 will discuss some specific details of each of the four full simulations that were unique to each test. Section 5.2 will discuss the daily condensate and off gas monitoring. Section 5.3 will present the analytical results of the off gas, condensate, and treated material. Section 5.4 will discuss the summary results of the four thermal simulations. A copy of the original Work Plan is included in this report as Appendix A for specific details of system setup and operation.

5.1 Individual ISTD Full Simulation Details

The following sections in 5.1 discuss some specific details of each of the four full thermal simulations that were unique to each test. Thermal Monitoring Sheets are located in **Appendix E**.

5.1.1 HC-90°C Treatment

Testing of the HC material at a target treatment temperature of 90°C was initiated on July 11, 2012 in general accordance with the testing protocol outlined in the Work Plan. Because of potential expansion of the soil material within the reactor during heating, and the quantity of material needed to perform the physical and chemical testing on the

treated material, KEMRON deviated from the Work Plan and used two smaller box reactors for testing of the HC material at a target temperature of 90°C. Reactor A contained 997.0 grams of HC material and Reactor B contained 1,000.5 grams of soil. The height of the material in reactor "A" was so that a reactor head space of 1.885 inches existed, and the headspace of reactor "B" was 1.895 inches.

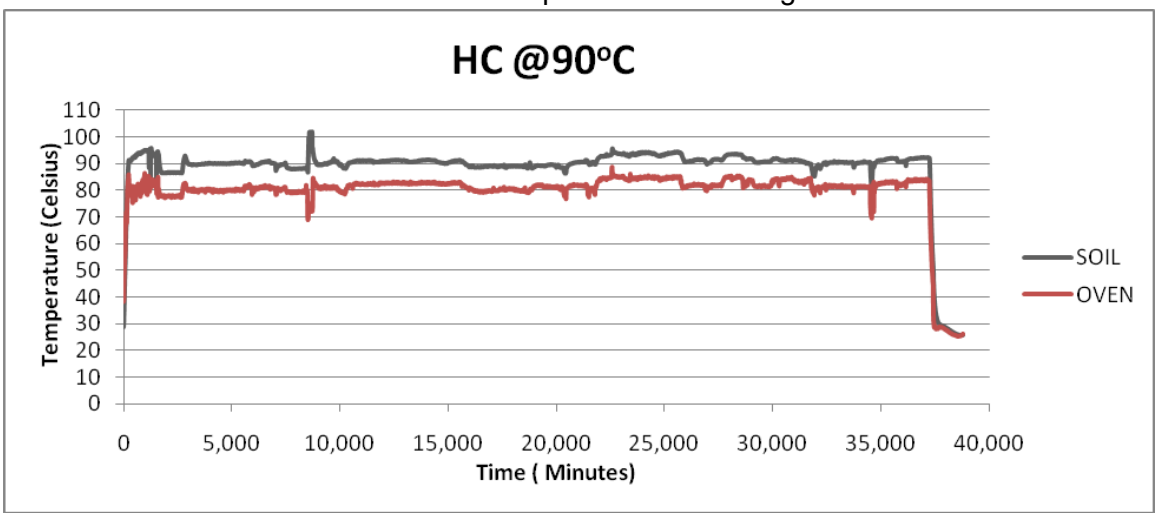
The assembled reactors were placed into the heating oven and a separate air inlet line was connected to the lid of each reactor. The off-gas lines were connected to each reactor lid and then were merged together using a stainless steel TEE, forming a master off-gas line. A temperature thermocouple was inserted into the reactor "A" material through a Swagelok fitting on the lid of the reactor. This thermocouple was utilized to record temperature data throughout testing. A second thermocouple was situated in the oven to record the oven temperature during testing.

KEMRON attached a ball-valve to the master off-gas line at the connection to the cold-water condenser. The system was then pressurized to 5.0 pounds per square inch (psi) using the pressurized air inlet system, then a second ball valve, connected to the air inlet lines was closed and KEMRON monitored the pressure of the system using a pressure transducer. After 10 minutes, the pressure in the system remained at 5.0 psi and KEMRON determined that the system was leak-free. The master off-gas line was connected to the condenser and testing was ready to begin.

On July 12, 2012 KEMRON began testing of the treatment simulation by sequentially programming the oven to temperatures of 30, 50, 70, and 90°C. When each target temperature was met, KEMRON performed off-gas monitoring for H_2S, SO_2, and FID Volatiles. At a temperature of 80.0°C, KEMRON observed the initial collection of condensate in the condensate collection vessel. Following approximately 4 hours of heating, the HC material within the reactors reached a temperature of 90.0°C.

Throughout this treatment of the HC material KEMRON periodically performed off-gas monitoring using direct read instrumentation, as well as analytical off-gas sampling as outlined in the Work Plan. The results of off-gas monitoring activities are summarized in Table 4 and presented later sections. The temperature monitoring activities performed on the HC material indicated that there was some variability in the material temperature during testing but that the HC material remained between 87 and 93°C throughout the testing. Temperature monitoring indicated a 2.75 hour period where the temperature of the HC material exceeded 95°C. This elevated temperature occurred on July 17, 2012 at approximately 12:15 p.m. The following is a graphical presentation of temperature monitoring activities performed during the treatment of the HC material.

Figure 1
HC 90°C Temperature Monitoring



Review of the data presented in the temperature monitoring graph, shows that the oven temperature was consistently lower than the soil temperature. KEMRON believes that this may be due to the location of the thermocouple within the air-space of the oven. Verification of the thermocouple was completed using boiling water following the thermal evaluation and accuracy was confirmed.

At the conclusion of testing, the heating furnace was turned off and the reactor was allowed to cool. The reactor was then removed from the furnace and placed into refrigeration until chilled. The chilled reactor was then weighed, height measurements of the material recorded, and the treated soil material was homogenized and sampled for appropriate testing parameters outlined in the Work Plan. Visual inspection of the treated material revealed that the surface of the treated material appeared to have a hard very uneven and friable layer, showing evidence of pockets of air between the surface layer and the underlying material. The material had a very tarry odor and the interior of the reactor showed significant rusting and some pitting. The 1,997.5g of original HC material had lost a total of 468.5g of mass, representing a 23.5% mass reduction. The material was moist on the bottom layers of the sample in the reactor.

Throughout testing of the HC material KEMRON made visual observations regarding the quantity and quality of condensate. This data is presented in Table 5A and discussed in later sections of this report.

Photo 33 and 34- The above are photographs of the treated HC 90 material after it had been removed from the reactor and homogenized.

5.1.2 VR-90°C Treatment

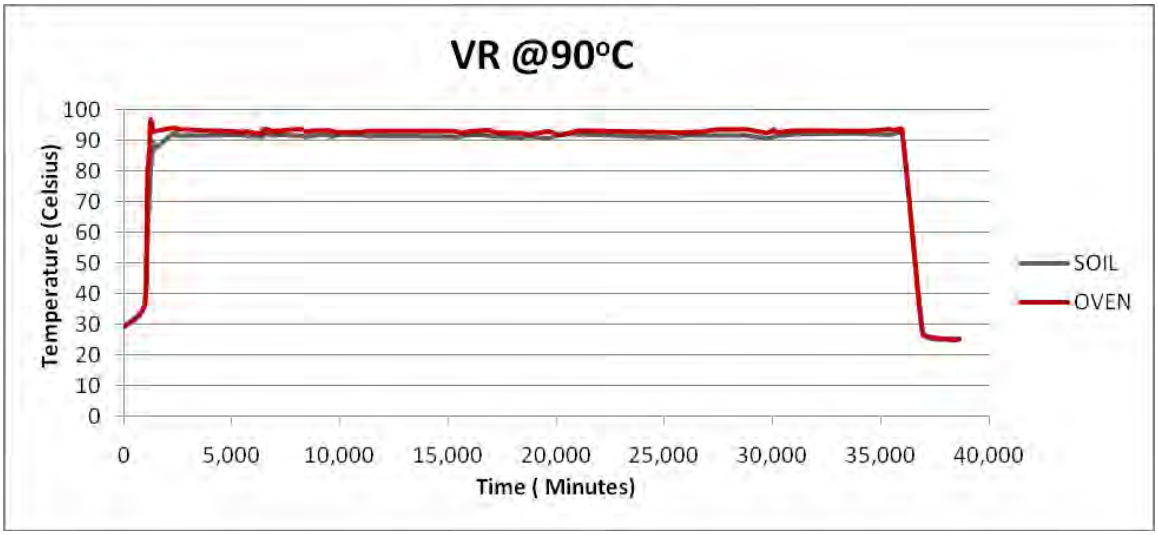
Testing of the VR material at 90°C was also initiated on July 11, 2012 in accordance with the testing protocol outlined in the Work Plan. Because of potential expansion of 30 to 40 % as indicated during the trial thermal simulation, KEMRON utilized a single "mega" reactor. Based on the trial simulations, KEMRON lined the inside of the reactor with tin foil in the hopes the material could be removed an accurate measurements of the final treated weight could be made. In addition, the mega reactor exceeds our digital scales so only an approximate pound weight for the reactor could be assumed at the end of the test. To prevent the expulsion of the heated VR material from the reactor through the off-gas line, KEMRON placed 2,556.5g of untreated material into the reactor which left a vertical headspace in the reactor of approximately 7.78 inches.

KEMRON performed "TIME-0" off-gas analytical sampling prior to heating the sample as outlined in the Work Plan, and on July 12, 2012 heating was initiated. The soil temperature was ramped to the 90°C target temperature with monitoring activities performed at temperatures of 30, 50, 70, and 90°C. At a temperature of 57.5°C, KEMRON observed the initial production of condensate in the condensate collection vessel. Following approximately 1.5 days of heating, the VR material within the reactors reached a temperature of 90.0°C. At this time KEMRON observed no collection of condensate and determined that the off-gas line was obstructed. The off-gas line was replaced and testing resumed. Condensate was produced in small amounts throughout the remainder of the testing.

Throughout this treatment of the VR material periodic off-gas monitoring was performed as well as condensate observations and collection. The results of off-gas monitoring activities are summarized in Table 4. The appropriate off-gas analytical samples were collected as required in the Work Plan. Temperature monitoring activities performed on the VR material show extremely consistent temperatures throughout testing. Additionally, the oven and soil temperatures were very similar. The following is a

graphical presentation of temperature monitoring activities performed during the treatment of the VR material.

Figure 2
VR 90°C Temperature Monitoring



Temperature monitoring shows that the soil remained at the target operating temperature for approximately 23 days. At the conclusion of testing, the heating furnace was turned off and the reactor was allowed to cool. The reactor was then weighed and height measurements were made of the material as well as the staining (evidence of expansion) on the sides of the reactor. The reactor was then reheated for approximately 20 minutes at 90 °C in order to make the VR material more viscous so it could be removed from the reactor. This material was able to be removed in a “matted” rubbery condition. The treated soil material was then pulled apart into small pieces for chemical and physical testing as outlined in the Work Plan. Refer to pictures below.

Throughout testing of the VR material KEMRON made visual observations regarding the quantity and quality of condensate. This data is summarized in Table 5A and discussed in later sections of this report.

At the conclusion of testing, of the 2556.5g of untreated VR material KEMRON estimated a mass loss of 969g, representing a 37.9% mass reduction. The amount of mass loss is estimated because the weight of the mega reactor exceeded the maximum values of our digital scales at the time. The weight of the reactor was weight on a scale that provided values in approximate pounds.

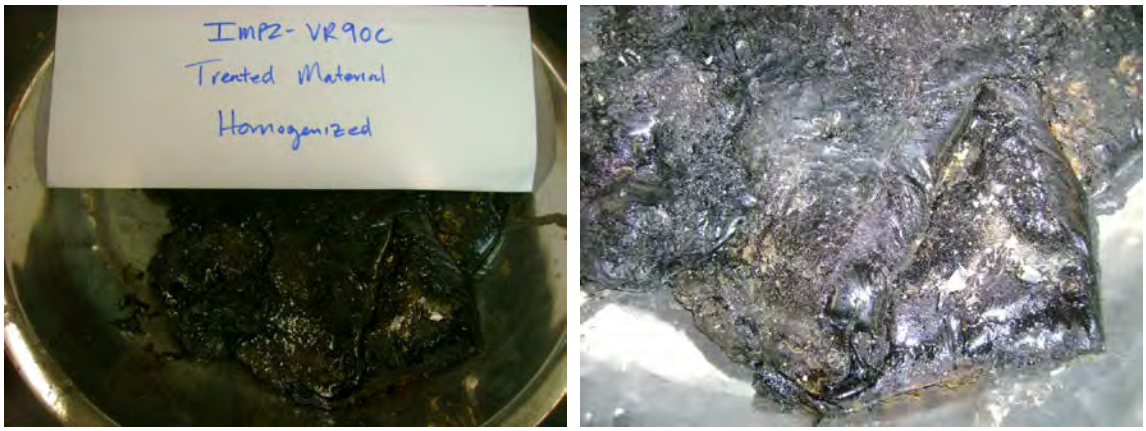


Photo -35 and 36- The photographs above represent the VR90 material after treatment and removal from the reactor.

5.1.3 HC-100°C Treatment

Testing of the HC material at a target treatment temperature of 100°C was started on July 10, 2012 in accordance with the testing protocol outlined in the Work Plan. Testing was performed using a single moderately sized box reactor. KEMRON placed 1514.0g of the untreated HC material into the reactor resulting in an average initial reactor head space of 1.795 inches.

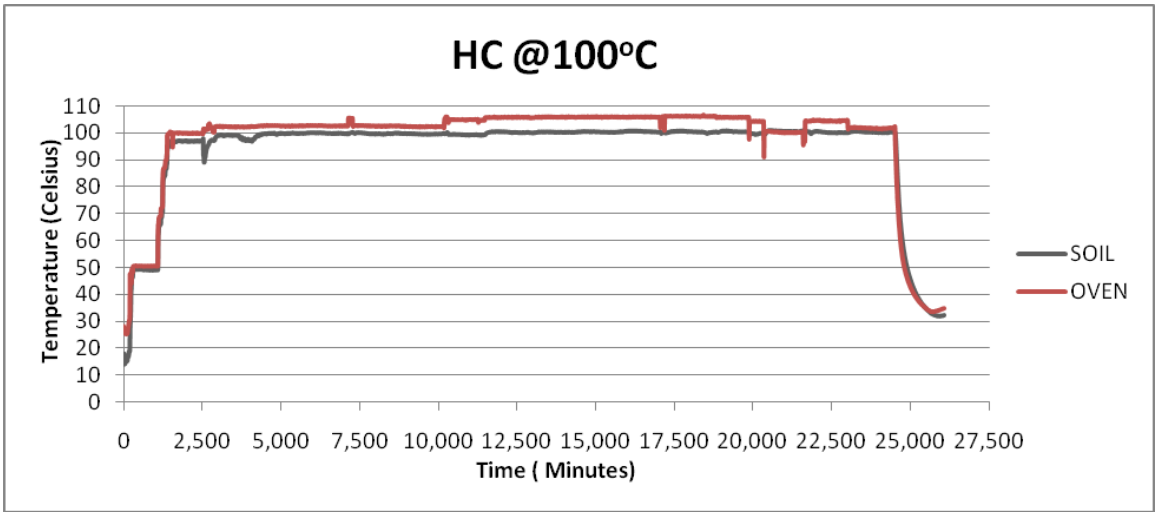
Note that the "Time-0" off-gas analytical sampling was conducted on the HC material prior to the 90°C thermal simulation, therefore, the "Time-0" value for HC 100 and HC 90 are the same.

Heating of the HC 100°C was performed by ramping up the temperature to the targeted soil temperature of 100C. At 30, 50, 70, 90, and 100°C, KEMRON performed off-gas monitoring for H_2S, SO_2, and FID Volatiles. The HC material reached the target temperature at approximately 1.9 days into the heating process.

KEMRON periodically performed off-gas monitoring using direct read instrumentation, as well as analytical off-gas sampling as outlined in the Work Plan with modifications stated ealier. The results of off-gas monitoring activities are summarized in Table 4. The temperature monitoring activities performed on the HC material indicated that the soil temperature was very constant throughout testing, but some variability in the oven temperature was recorded. KEMRON did experience a thermocouple failure which indicated that the soil material had dropped to below 90°C. The thermocouple was replaced, and KEMRON observed significant degradation of the thermocouple upon replacement. This recorded "temperature drop" took place before the test material had reached the appropriate target temperature.

The following is a graphical presentation of the temperature monitoring activities performed during testing.

Figure 3
HC 100°C Temperature Monitoring



Temperature monitoring shows that the soil remained at the target operating temperature for approximately 14 days.

At the conclusion of testing (i.e, PID <1000 ppm), the heating furnace was turned off and the reactor was allowed to cool. The reactor was then removed from the furnace and placed into refrigeration until chilled. The chilled reactor was then weighed, dismantled, and the treated soil material was homogenized and sampled for appropriate testing parameters outlined in the Work Plan. Visual inspection of the treated material revealed that the treated HC material was very similar to the treated HC material from the 90°C test with the exception of significantly more water remaining at the bottom of the reactor. Refer to pictures below. A total mass loss of 378.5g was recorded from the treatment simulation, representing a 25% mass reduction.

Throughout testing of the HC material KEMRON made visual observations regarding the quantity and quality of condensate. This data is presented in Table 5A and discussed later in this report.

Photo 37- This photo represents the uneven layer covering the HC 100 sample and apparent rust from the reactor

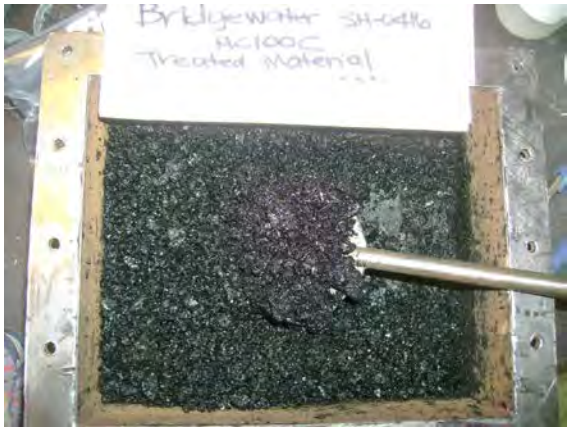


Photo 38-This photograph represents the material homogenized

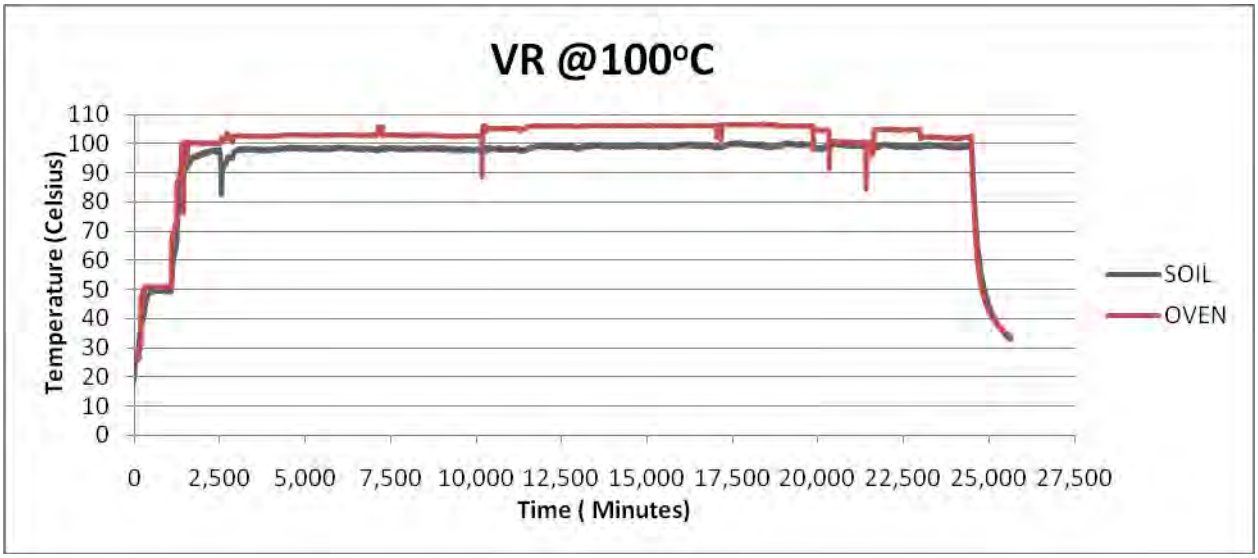
5.1.4 VR-100°C Treatment

Testing of the VR material at 100°C was started on July 11, 2012 in accordance with the testing protocol outlined in the Work Plan. KEMRON utilized a single "mega" reactor for this treatment simulation. Based on the trial simulations, KEMRON lined the inside of the reactor with tin foil in the hopes the material could be removed an accurate measurements of the final treated weight could be made. In addition, the mega reactor exceeds our digital scales so only an approximate pound weight for the reactor could be assumed at the end of the test. A total of 2,517.5g of untreated VR material was placed into the reactor resulting in a reactor empty headspace of 8.233 inches.

Time 0 off gas collection was conducted on the VR material prior to initiating the 90°C testing, therefore, the off gas values for Time 0 is the used for both the VR 90 and VR 100. As outlined in the other testing discussions, the soil temperature was increased incrementally. At temperatures including 30, 50, 70, 90, and 100°C KEMRON performed off-gas monitoring using direct read instrumentation. At 16:28 on July 11, 2012 heating the test sample reactor was initiated. Approximately 7.5 hours into heating the test material reached a temperature of approximately 50°C. Because of the late hour in the work day KEMRON allowed the test to remain static at 50°C overnight. On July 12, 2012 testing was commenced by increasing the oven temperature to 70°C, followed by 90 and 100°C, which took an additional 27.8 hours, for a total of 35.3 hours for the soil to reach the operating temperature.

KERMON performed periodic off-gas monitoring as well as condensate observations and collection. The results of off-gas monitoring activities are summarized in Table 4 and discussed later in this report. The appropriate off-gas analytical samples were collected as required in the Work Plan. Temperature monitoring activities performed on the VR material show extremely consistent temperatures throughout testing. Additionally, the oven and soil temperatures were very similar. The following is a graphical presentation of temperature monitoring activities performed during the treatment of the VR material.

Figure 4
VR 100°C Temperature Monitoring



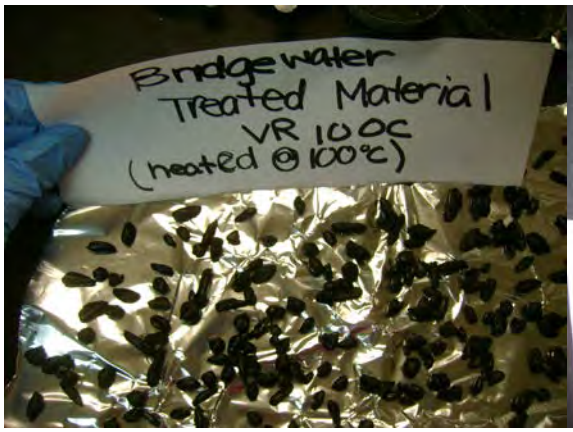
Temperature monitoring shows that the soil remained at the target operating temperature for approximately 13 days. At the conclusion of testing (i.e., PID <1000 ppm), the heating furnace was turned off and the reactor was allowed to cool. The reactor was then removed from the furnace and allowed to cool. KEMRON realized that the material could not be extracted from the reactor in a cooled state due to the stiffness of the material and the lack of strength of the heated tin foil. The material was reheated for approximately 1 hour at 100°C in order to make the material more viscous. KEMRON recorded a video of the re-heated material as it was being removed using a stainless steel spoon. Videos are provided under a separate cover. The material was placed on new tin foil and was sampled by rolling small pieces into balls for analytical testing as outlined in the Work Plan. Refer to pictures below.

Throughout testing of the VR material KEMRON made visual observations regarding the quantity and quality of condensate. This data is presented in Table 5A.

At the conclusion of testing, KEMRON estimated that the VR material had lost a total of 732.5 of mass, representing a 29% mass reduction.

Photograph 39- VR100 material partially removed from the reactor

Photograph 40- VR 100 treated material after opening the reactor lid



Photographs 41 and 42- VR 100 treated rolled into small pellets for analytical testing

5.2 Daily Off Gas and Condensate Monitoring

Section 5.2 presents a summary of the daily off gas and condensate monitoring. Off gas and condensate collection and testing was performed in general accordance with the Work Plan provided in Appendix A. Deviations from the Work Plan included the use of pH paper to test the daily condensate, and attempts at diluting the Tedlar Bag samples with clean air for off gas testing during treatment. Deviations were necessary because (1) the pH meter produced “error messages” when attempting to collect pH determinations and (2) undiluted off gas samples exceeded the “high concentration” calibration of the FID meter. See discussion in Sections 5.2.2 and 5.2.3 regarding pH determinations by pH paper.

5.2.1 Daily Off Gas Monitoring.

The daily off gas monitoring data is provided in Table 4 at the end of the report. Air samples were collected using Tedlar Bags at volume rates of 10 to 30 ml/min, depending on the time available to collect the needed volumes and dilutions. The

results of the off gas monitoring revealed that peak concentrations of VOCs were realized during the first and second day of heating. Generally, the VOCs peaked when soil temperatures reach 90° C to 100 °C for both VR and HC materials and then gradually declined until daily readings measured below 1,000 ppm. In general, the concentration of VOCs declined in a steady gradual slope to below 1,000 ppm in the VR and HC 90 °C samples at days 23 and 24.

VOC concentrations dropped to below 1,000 ppm at day 13 and 14 for VR and HC 100°C treatments. Kemron collected several readings in the Teddlar bags when the VOC readings were below 1,000 ppm. The following presents those readings:

Collection of VR 100 at Day 13 (End of Test)

Collection Number	Collection Time (min)	VOC Results (ppm)
1	3 Minutes	833
2	5 Minutes	556
3	5 Minutes	622

Collection of HC 100 at Day 14 (End of Test)

Collection Number	Collection Time (min)	VOC Results (ppm)
1	3 Minutes	943
2	3 Minutes	686
3	5 Minutes	4784
4	5 Minutes	3776

The drop in concentrations for the 100°C occurred on Thursday July 26, 2012; and although the HC100 PID readings varied including results greater than 1000ppm, the testing ended so that the analytical sample holding times could be met while keeping the same off-gas sampling routine as occurred with the other three tests. Based on reviewing the multiple PID results, it appears that the heating duration should have been a few days longer. Note, this observation is consistent with data presentation in later sections of this report. .

Concentrations of H2S and Sulfur Dioxide (S02) were inconsistent during the treatments for all of the materials. We believe this is primarily contributed to varying flow rates affecting the dilutions and subsequent concentration calculations.

The summary table below depicts selective days of the daily off gas monitoring. The full summary table is provided in Table 4 at the end of the report. The yellow highlights in Table 4 help in the discussion following Table 8.

TABLE 4

TREATED OFF-GAS DAILY MONITORING RESULTS

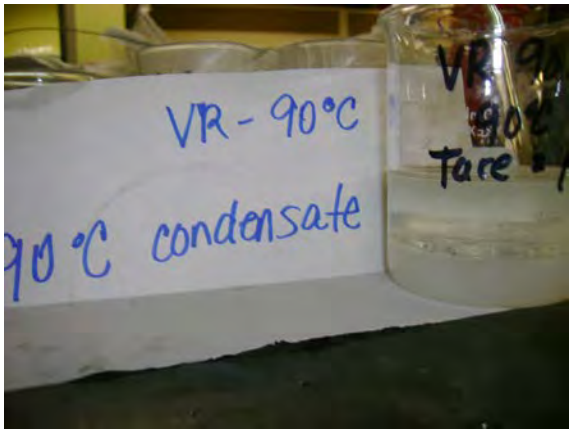
PARAMETER	Time Zero (ambient)	Ramp Up 90°C	Ramp Up 100°C	Day 1	Day 3	Day 10	Day 11	Day 12	Day 13	Day 14	Day 20	Day 21	Day 23	Day 24
IMP2 - HC - 90°C														
H2S	32.0	308.0		321.0	422.0	360.0	2.0	148.0	115.8	106.0	120.0	272.0	57.8	35.0
SO2	19.8	>150.0		25.9	23.0	142.0	11.2	138.4	98.7	118.3	87.0	23.1	47.2	2.2
VOCs	206,895	197,305		240,350	10,062	4,766	4,246	4,304	2,785	3,876	1,370	2,099	1,287	833
IMP2 - HC - 100°C														
H2S	29.0	191.0	460.0	169.0	95.2	109.0	44.0	34.0	12.0	10.0				
SO2	43.4	98.1	30.0	37.3	152.0	134.0	132.0	39.0	4.5	163.0				
VOCs	154,864	283,500	162,335	230,280	27,881	6,879	7,919	5,742	4,680	943				
IMP2 - VR - 90°C														
H2S	2.0	284.0		620.0	370.0	18.0	14.0	6.0	122.0	2.0	118.0	201.0	483.0	
SO2	0.0	150.0		30.1	20.3	0.2	0.2	0.4	2.4	0.2	16.6	11.7	2.8	
VOCs	428,970	500,000		384,360	28,310	11,026	9,978	8,752	13,580	8,210	3,033	1,472	711	
IMP2 - VR - 100°C														
H2S	0.0	5.0	482.0	0.4	244.0	147.9	108.0	14.0	16.0					
SO2	5.9	115.2	28.7	16.0	6.1	137.4	78.2	13.8	11.2					
VOCs	60,048	450,000	201,585	164,000	15,112	11,412	5,223	4,926	833					

Testing Series

Notes: Testing Series included Aldehydes, Inorganic Acids, VOCs, and Reduced Sulfur

5.2.2 Daily Condensate Monitoring

Condensate was collected daily, tested for pH, and recorded observation during the treatment. After the materials reached 90°C, two layers of condensate were produced consistently throughout the treatment for both the VR and HC materials at 90°C and 100° C temperatures. The condensate generally produced similar observations and pH results for both the 90°C and 100°C treatments. During the ramp up to 90 °C and 100 °C temperatures, the condensate for both VR and HC were generally clear with an oily NAPL on the surface.



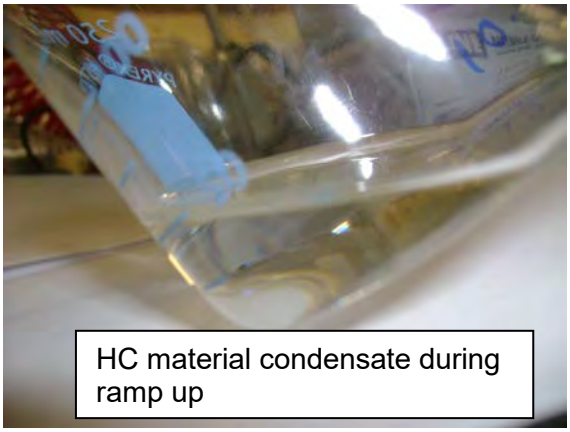


Photo 43 and 44- Condensate of the VR 90 has a top layer that is a clear, thick oily substance with a bottom layer that is a white cloudy substance. The HC material produced a similar oily top layer but a clear bottom layer.

In general, beginning at Day 1, the condensate layers begin to display a clear or yellow tint layer on top and a white or opaque layer on the bottom.

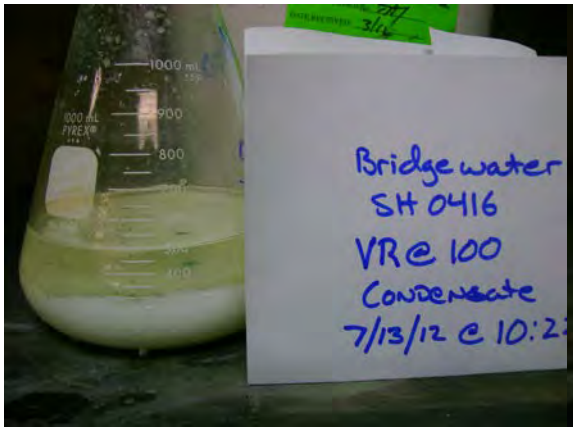


Photo 45- Day 1 VR 100 Condensate

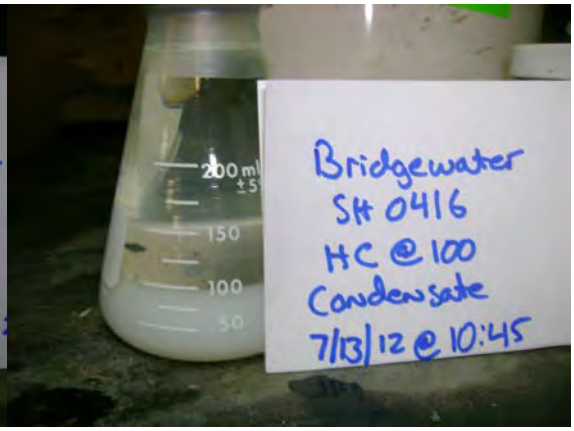


Photo 46- Day 1 HC 100 Condensate

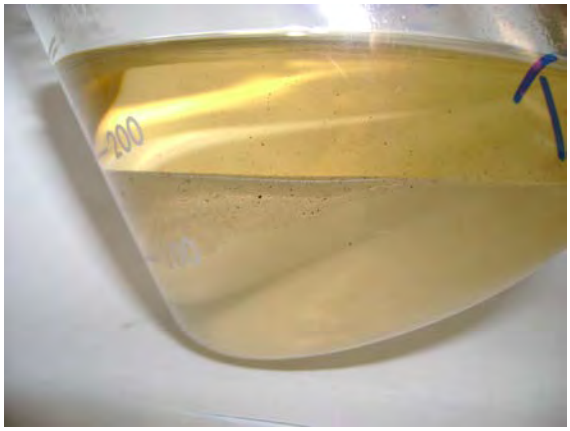


Photo 47- Day 2 HC 100 Condensate

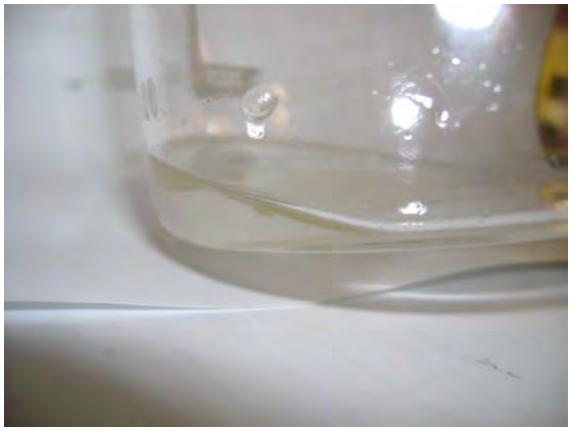


Photo 48- Day 2 VR 100 Condensate

At times both the HC and VR displayed a yellow tint in the condensate. During later periods of treatment, the amount of daily condensate generated did not easily allow distinction of layers and colors. But in general, a clear layer, with a yellow tint, and a milky layer were commonly observed daily. Detailed notes of the daily condensate testing and observations are provided in Table 5A at the end of the report.

pH paper was the method used for daily pH determinations for each condensate layer per treatment. In general, the top layer of condensate for all treatments displayed a higher pH (2-5 s.u) while the bottom layer displayed a pH, generally, of 1-2 s.u. The general trend is that the pH in the top layer of condensate shows a pH of around 4 s.u. during the first few days of treatment and then drops to around 2 for the remainder of the testing. The bottom layer generally shows a pH of around 1 -2 s.u throughout the treatment. See TerraTherm's report concerning a discussion of pH determination by pH paper.

5.2.3 Reconstituted Condensate

At the end of the thermal treatment, the individual condensates collected during the treatment were combined (reconstituted) for measurements and for analytical testing. The table below summarizes the results of the reconstituted samples.

TABLE 5B

RECONSTITUTED CONDENSATE WEIGHT PORPORTIONS

	VR 100	VR90	HC100	HC 90
Weight of Condensate (g)	654.31	568.21	331.8	341.43
Quantify by % by weight of any layering	Top layer 20.88% Bottom 79.11%	Top layer 35.07 % Bottom 64.93%	Top Layer 20.46% Bottom 79.53%	Top Layer 37.51% Bottom 62.48%
pH of non-aqueous layer (top)	3.63	3.67	2.86	3.05
PH of aquouis layer (bottom)	2.64	2.95	2.41	2.42

The top layer (non-aqueous) proportion of the samples treated at 100°C were 20% for both the HC and VR. The proportion of the top layer for the 90°C material was 35% for both the HC and VR. The pH of the top layer remained higher (3-4 s.u.) than the bottom layer (2-3 s.u.).

The following are photographs of the reconstituted condensates that were forwarded to the analytical laboratory for analysis (see section 5.3.1 for additional details):

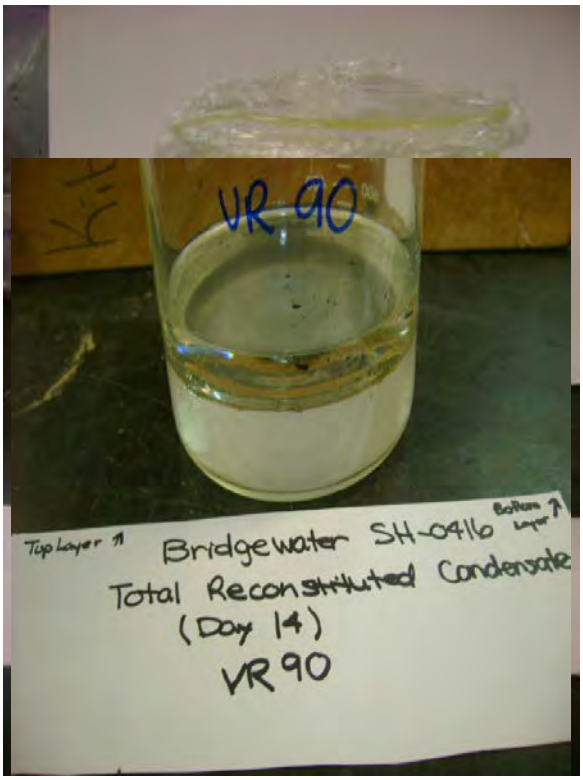


Photo 49- VR 100 Reconstituted Condensate

Photo 50-VR 90 Reconstituted Condensate

In general, the VR reconstituted condensate produced a milky white bottom layer with a pH of 2.6 to 2.9. The top layer appears to be oily with a yellow tint and a pH of 3.6. We observed black particles of the VR90 material that were resting on top of the bottom condensate layer of the condensate fractions.

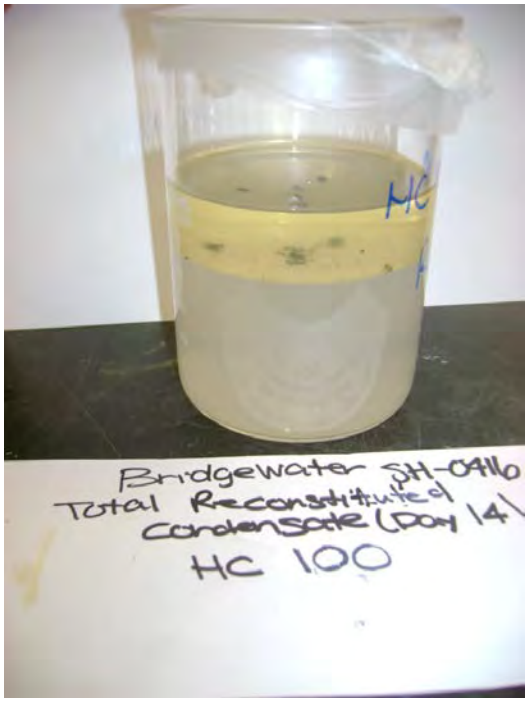


Photo 51- HC 100 Reconstituted Condensate

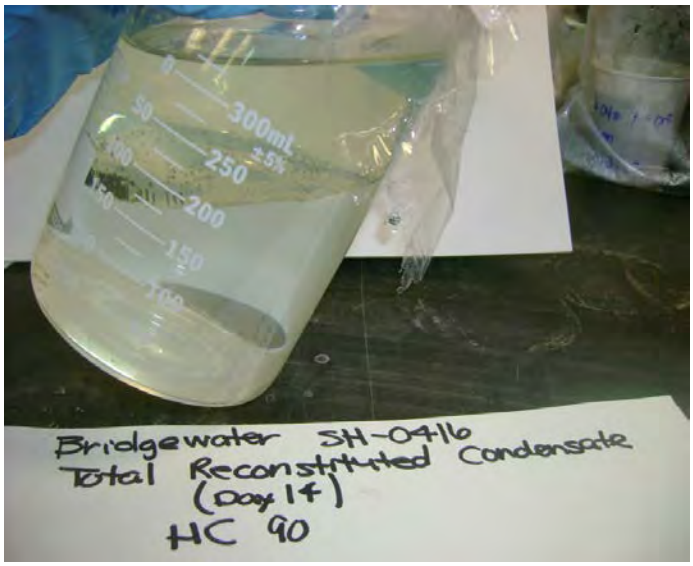


Photo 52- HC 90 Reconstituted Condensate

In general, the HC reconstituted condensate produced an opaque bottom layer in the 100 °C treatment and a fairly clear bottom layer in the 90 °C treatment. The top layer appears to be oily with a slight yellow tint in the 100°C treatment and clear in the 90 ° C treatment. We observed black particles of the HC material that were resting on top of the bottom condensate layer of both the VR90 and VR100 condensate fractions. The pH of the top layer was 2.8 to 3.0 and the pH of the bottom layer was 2.4 s.u.

5.3 Thermal Treatment Analytical Results

Section 5.3 presents the analytical results of the condensate, treated material, and the off gas.

5.3.1 Condensate Analytical Results

The analytical testing of the condensate was performed in general accordance with the Work Plan. The analytical laboratory analyzed both layers present in each of the reconstituted condensates. The purpose of analyzing each layer was to attempt to analyze the samples at the lowest detection limits and protect the analytical instruments. The top layer is referenced in the laboratory report as “solid” and the bottom layer is identified as the “water” layer. The analyses included VOC, SVOCs, and tentatively identified compounds (TICs). The analytical results are presented in Tables 6A through

6D. The analytical reports are included in **Appendix F**. Tables 6A and 6B presented below include a shorter version of the data than that in the appendices.

TABLE 6 A (Solids)
TOP LAYER

CONDENSATE ANALYTICAL CHARACTERIZATION

PARAMETER	UNITS	VR90 RESULT	HC100 RESULT	VR100 RESULT	HC90 RESULT
VOC					
1,2-Dichlorobenzene	ug/Kg	1,500,000	ND	223,000	ND
Benzene	ug/Kg	38,400,000	12,700,000	9,840,000	20,200,000
Isopropylbenzene (Cumene)	ug/Kg	1,130,000	ND	ND	ND
Naphthalene	ug/Kg	6,950,000	ND	ND	ND
Toluene	ug/Kg	10,500,000	3,650,000	2,530,000	2,990,000
Xylene (total)	ug/Kg	3,640,000	747,000	703,000	ND
m,p-Xylene	ug/Kg	2,410,000	747,000	703,000	ND
o-Xylene	ug/Kg	1,230,000	ND	ND	ND
SVOC					
2-Methylnaphthalene	ug/Kg	234,000	220,000	720,000	80,300
Bis(2-Ethylhexyl)phthalate	ug/Kg	2,900,000	38,100	153,000	30,000
Fluorene	ug/Kg	70,600	139,000	453,000	40,400

Due to the high concentrations of Benzene, the detection limits for the top layer analyses are very high. In the top layer, detections primarily included Benzene, Toluene, and Xylenes at very high concentrations. Naphthalene was only detected in the VR 90 condensate. 2-Methylnaphthalene, bis(2-ethylhexyl)phthalate and Fluorene were detected above the elevated detection limits for SVOCs.

TABLE 6 B (Water)
Bottom Layer

CONDENSATE ANALYTICAL CHARACTERIZATION

PARAMETER	UNITS	VR 90 RESULT	HC100 RESULT	VR100 RESULT	HC 90 RESULT
Volatiles Organic Compounds					
2-Butanone	ug/L	19,000	ND	ND	ND
Acetone	ug/L	164,000	141,000	124,000	224,000
Benzene	ug/L	1,310,000	1,230,000	1,090,000	1,470,000
Naphthalene	ug/L	10,200	ND	ND	ND
Toluene	ug/L	124,000	180,000	135,000	136,000
Xylene (total)	ug/L	9,390	11,500	10,400	ND
m,p-Xylene	ug/L	9,390	11,500	10,400	ND
Semi Volatiles Organic Compounds					
1,4-Dichlorobenzene	ug/L	414.00	259.00	219.00	229.00
2-Methylnaphthalene	ug/L	43.40	50.40	45.70	55.50
Acenaphthene	ug/L	3.53	3.59	ND	ND
Aniline	ug/L	2,880.00	143.00	2,660.00	ND
Bis(2-Ethylhexyl)phthalate	ug/L	749.00	35.30	7.95	10.20
Di-n-butyl phthalate	ug/L	5.08	ND	ND	ND
Fluorene	ug/L	9.62	20.90	23.70	25.90
Isophorone	ug/L	ND	27.40	ND	73.10
Phenol	ug/L	3,950.00	3,180.00	3,960.00	5,490.00
Pyridine	ug/L	620.00	ND	447.00	ND
m,p-Cresol	ug/L	2,920.00	2,290.00	4,530.00	4,840.00
o-Cresol	ug/L	ND	370.00	569.00	593.00

The analysis of the bottom layer of condensate revealed primarily the same constituents as the top layer for both the VOCs and SVOCs. Additional constituents detected in the SVOC analysis included Aniline, Pyridine, Phenols, and Cresols.

The following tables include the TICs for both condensate fractions. These TICs indicate that there are many “non-calibrated” compounds native to the site materials or formed during heating.

TABLE 6 C (TICS Solids)

Top Layer

CONDENSATE ANALYTICAL CHARACTERIZATION (ug/kg)

PARAMETER	UNITS	RETENTION TIME	VR 90 RECONSTITUTED CONDENSATE RESULT	HC100 RECONSTITUTED CONDENSATE RESULT	VR100 RECONSTITUTED CONDENSATE RESULT	HC 90 RECONSTITUTED CONDENSATE RESULT
VOC						
No TICs Detected						
Semi Volatiles Organic Compounds						
Cyclopentane, ethyl-	ug/Kg	0.96				204,000
Unknown	ug/Kg	1.13				315,000
Octane	ug/Kg	1.20	324,000	421,000		679,000
Cyclohexane, 1,1,3-trimethyl-	ug/Kg	1.39	252,000	412,000		614,000
Benzene, 1,3-dimethyl	ug/Kg	1.53		14,300,000	8,440,000	19,100,000
Benzene, 1,2-dimethyl-	ug/Kg	1.64	2,760,000		2,670,000	
Benzene, (1-methylethyl)-	ug/Kg	1.78	2,210,000	3,980,000	2,150,000	4,630,000
Benzene, 1-ethyl-2methyl)-	ug/Kg	1.96		716,000		794,000
Benzene, 1-ethyl-3-methyl-	ug/Kg	1.96			775,000	
Benzene, 1,3,5-trimethyl-	ug/Kg	1.99	1,540,000	1,440,000	1,570,000	1,520,000
Benzene, 1,2,3-trimethyl-	ug/Kg	2.10			2,920,000	
Benzene, 1,2,3-trimethyl-	ug/Kg	2.11	2,850,000			
Benzene, 1,2,4-trimethyl-	ug/Kg	2.11		2,230,000		
1,2,4-Trimethylbenzene	ug/Kg	2.11				2,440,000
Benzene (1-methylpropyl)-	ug/Kg	2.17	1,790,000		1,820,000	
Benzene, (1-methylprophyl)-	ug/Kg	2.17			1,820,000	
Benzene, 1-methyl-4-(1-methylethyl)	ug/Kg	2.17				2,000,000
Benzene, 4-ethyl-1,2-dimethyl-	ug/Kg	2.38	214,000		231,000	
Benzene, (2-methyl-1-propenyl)-	ug/Kg	2.43	457,000			

TABLE 6 C (TICS Solids)

Top Layer

CONDENSATE ANALYTICAL CHARACTERIZATION (ug/kg)

PARAMETER	UNITS	RETENTION TIME	VR 90 RECONSTITUTED CONDENSATE RESULT	HC100 RECONSTITUTED CONDENSATE RESULT	VR100 RECONSTITUTED CONDENSATE RESULT	HC 90 RECONSTITUTED CONDENSATE RESULT
Benzene, (1-ethylpropyl)-	ug/Kg	2.50	571,000	418,000		
Benzene, (1-ethylprophyl)-	ug/Kg	2.50				399,000
4-tert-Butyltoluene	ug/Kg	2.53	1,900,000	1,690,000		1,560,000
Benzene, (1,1-dimethylpropyl)-	ug/Kg	2.60	816,000		222,000	216,000
Benzene, 1-methyl-4-(1-methylethyl)	ug/Kg	2.6		241,000		
Benzene, (1-ethylbutyl)-	ug/Kg	2.85	645,000			192,000
Benzene, cyclopentyl-	ug/Kg	3.07			214,000	
Benzene, (1-methylhexyl)-	ug/Kg	3.31	1,280,000	252,000		171,000
Benzene, cyclohexyl-	ug/Kg	3.43			238,000	
Unknown	ug/Kg	3.47	483,000	400,000		
Benzene, (1,3-dimethlyl-2-butenyl)-	ug/Kg	3.47			846,000	
4-tert-Butyltoluene	ug/Kg	3.54	805,000			
Unknown	ug/Kg	3.54		708,000		
Benzene, 1,4-dipropyl-	ug/Kg	3.54			1,400,000	
Benzene, 1-(1,1-dimethylethyl)-3-me	ug/Kg	3.54				281,000
Benzene, 1-methyl-4-(1-methylethyl)	ug/Kg	3.65	538,000			
Benzene, 4-ethyl-1,2-dimethyl-	ug/Kg	3.65			1,020,000	
Ethanol, 2-xylyl-	ug/Kg	3.65				203,000
Benzene, 1-cyclohexyl-3-methyl-	ug/Kg	3.76			242,000	
Benzene, 1,2-dimethyl- 4-(phenylmeth	ug/Kg	4.26			231,000	
Stilbenzene, 4-amino-(E)	ug/Kg	4.55			1,660,000	
Sulfur, mol. (S8)	ug/Kg	5.70			809,000	

TABLE 6 D (TICS Water)

Bottom Layer

CONDENSATE ANALYTICAL CHARACTERIZATION (ug/Kg)

PARAMETER	UNITS	RETENTION TIME	VR 90 RECONSTITUTED CONDENSATE (H2O) RESULT	HC100 RECONSTITUTED CONDENSATE (H2O) RESULT	VR100 RECONSTITUTED CONDENSATE (H2O) RESULT	HC 90 RECONSTITUTED CONDENSATE (H2O) RESULT
VOCs						
No TICs Detected						
Semi Volatiles Organic Compounds						
Furan, tetrahydro-2,5-dimethyl-	ug/L	0.97	692			
2-Pentanone, 3-methyl-	ug/L	1.02		1,070		974
Unknown	ug/L	1.12			1,020	1,270
3-Hexanone	ug/L	1.14		1,480		
Cyclopentanone	ug/L	1.17	3,600			2,610
Cyclopentanone	ug/L	1.18		3,130		
2-Hexanol,(R)-	ug/L	1.21			1,850	
Unknown	ug/L	1.23		1,020		847
Unknown	ug/L	1.28			114	
Unknown	ug/L	1.32	433	830	280	
Unknown	ug/L	1.36		289		
2-Furancarboxaldehyde	ug/L	1.36				270
Unknown	ug/L	1.37			102	
Cyclopentanone, 2-methyl-	ug/L	1.40	956	393	536	
Cyclopentanone, 3-methyl-	ug/L	1.44				334
Benzene, 1,3-dimethyl-	ug/L	1.53	4,510		2,190	
Benzene, 1,3-dimethyl-	ug/L	1.54		7,070		
2-Hexanone, 5-methyl-	ug/L	1.61				731
Benzene, 1,2-dimethyl-	ug/L	1.64	3,670	2,460		
2-Cyclopenten-1-one, 2-methyl-	ug/L	1.69		392	497	367
Benzene, (1-methylethyl)-	ug/L	1.78	819	1,610	322	1,200
Cyclohexanone, 2-methyl-	ug/L	1.90			452	
Unknown	ug/L	1.92	587			
2(3H)-Furanone, dihydro-5-methyl-	ug/L	1.92		676		833
PARAMETER	**UNITS**	**RETENTION**	**VR 90 RECONSTITUTED CONDENSATE**	**HC100 RECONSTITUTED CONDENSATE**	**VR100 RECONSTITUTED CONDENSATE**	**HC 90 RECONSTITUTED CONDENSATE**

		TIME	(H2O) RESULT	(H2O) RESULT	(H2O) RESULT	(H2O) RESULT
Benzene, 1-ethyl-2-methyl-	ug/L	1.96	225			
Benzene, 1,3,5-trimethyl-	ug/L	1.99	842		552	
Benzene, 1,2,3-trimetil-	ug/L	1.99		1,190		
1,2,4-Trimethylbenzene	ug/L	1.99				1,090
Benzene, 1,3,5-trimethyl-	ug/L	2.10				859
1,2,4-Trimethylbenzene	ug/L	2.11	1,220			
Benzene, (1-methylpropyl)-	ug/L	2.17		497		
Unknown	ug/L	2.24	299			
Unknown	ug/L	2.24			131	
2-Pyrrolidinone, 1-methyl-	ug/L	2.32	582			
Phenol, 2-methyl-	ug/L	2.37			281	
Unknown	ug/L	2.38	349			
Unknown 487 2.59 ug/L	ug/L	2.59	487			
Phenylethyl Alcohol	ug/L	2.62		319		
Phenol, 2,5-dimethyl-	ug/L	2.75	296			
1,3-Butanedione, 2-butyl-1-phenyl-	ug/L	2.90	2,230			
Parachlorophenol	ug/L	2.97		269		
Benzene, cyclopentyl-	ug/L	3.07		279		
Benzene, 1,2-dimethyl-4-(phenylmeth	ug/L	4.31	42			
Sulfur, mil. (S8)	ug/L	5.71			1,260	
Maneb	ug/L	5.71				642

5.3.2 Treated Material Analytical Results

The analyses of the treated materials were performed in accordance with the Work Plan provided in Appendix A. Analyses for total VOCs, SVOCs, and TAL Metals were performed in triplicate. Complete summary tables for the treated material analysis are provided in Tables 7A through 7F. This section provides summaries of the detected compounds. The analytical reports for the treated material analyses are included in **Appendix H**.

TABLE 7 A

TREATED MATERIAL CHEMICAL CHARACTERIZATION - VR100 and HC100

		VR100 - A	VR100 - B	VR100 - C	HC100 - A	HC100 - B	HC100 - C
		Treated	Treated	Treated	Treated	Treated	Treated
PARAMETER	UNITS	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
Total Organic Carbon	mg/Kg			712,000			475,000
pH	pH unit	3.97	4.06	3.97	< 2	< 2	>1
Metals							
Aluminum	mg/Kg	4330	5550	4390	514	539	578
Antimony	mg/Kg	0.45	ND	0.2	ND	ND	ND
Arsenic	mg/Kg	ND	ND	ND	14	26	26.3
Barium	mg/Kg	7.17	9.94	7.38	10.3	10.4	11.4
Beryllium	mg/Kg	0.0069	0.0094	0.0083	ND	ND	ND
Calcium	mg/Kg	152	220	168	143	144	143
Chromium	mg/Kg	5.17	9.22	3.06	7310	7720	7890
Cobalt	mg/Kg	0.47	0.27	0.28	32.4	48.3	48.5
Copper	mg/Kg	314	42.1	136	130	126	150
Iron	mg/Kg	4,110	3,050	2,700	23,600	26,800	28,000
Lead	mg/Kg	59.2	76.9	60.1	73.1	88.1	98.4
Magnesium	mg/Kg	59.2	56.9	56.5	46.1	46.1	47.7
Manganese	mg/Kg	54.9	46	43.7	566	606	647
Nickel	mg/Kg	12	4.96	4.8	4420	4740	4740
Potassium	mg/Kg	82.3	95.1	79.9	176	187	200
Selenium	mg/Kg	12.1	10.1	10.9	12.1	12.9	13.9
Silver	mg/Kg	0.043	0.048	0.08	ND	ND	ND
Sodium	mg/Kg	3,470	4,070	3,600	5,850	5,920	6,000
Thallium	mg/Kg	0.69	0.42	0.48	1.22	1.76	2.59
Vanadium	mg/Kg	1.06	1.48	1.18	22.1	23.8	24.7
Zinc	mg/Kg	8.91	6.75	5.69	9.09	9.18	9.04
Mercury	mg/Kg	0.33	0.21	0.28	2.41	2.77	2.39

TABLE 7 A (cont)

TREATED MATERIAL CHEMICAL CHARACTERIZATION - VR100 and HC100

		VR100 - A	VR100 - B	VR100 - C	HC100 - A	HC100 - B	HC100 - C
		Treated	Treated	Treated	Treated	Treated	Treated
PARAMETER	UNITS	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
Semivolatile Organic Compounds							
2,4-Dinitrotoluene	ug/Kg	ND	99,400	ND	ND	ND	ND
2-Methylnaphthalene	ug/Kg	108,000	52,600	61,100	25,000	19,100	23,800
Acenaphthene	ug/Kg	16,700	9,390	13,200	4,620	3,690	4,400
Fluorene	ug/Kg	436,000	221,000	296,000	102,000	76,800	93,200
VOCs							
1,2,4-Trimethylbenzene	ug/Kg	136,000	143,000	133,000	37,900	43,300	31,600
1,2-Dichlorobenzene	ug/Kg	972,000	1,040,000	971,000	232,000	265,000	185,000
1,3,5-Trimethylbenzene	ug/Kg	82,700	84,300	79,000	27,100	29,700	22,900
1,4-Dichlorobenzene	ug/Kg	77,200	83,000	80,700	17,700	19,600	14,500
4-Isopropyltoluene	ug/Kg	55,700	54,400	54,000	17,300	17,600	16,400
Benzene	ug/Kg	30,300	31,500	30,000	387,000	479,000	304,000
Ethylbenzene	ug/Kg	ND	ND	ND	16,200	18,800	12,900
Isopropylbenzene (Cumene)	ug/Kg	75,800	78,000	73,800	50,100	56,100	41,600
Naphthalene	ug/Kg	2,240,000	2,510,000	2,490,000	608,000	730,000	522,000
Thiophene	ug/Kg	ND	ND		2,450	3,310	1,970
Toluene	ug/Kg	148,000	163,000	152,000	451,000	528,000	351,000
Xylene (total)	ug/Kg	254,000	259,000	248,000	292,000	338,000	235,000
m,p-Xylene	ug/Kg	169,000	172,000	166,000	237,000	275,000	190,000
o-Xylene	ug/Kg	86,100	85,500	81,400	55,200	63,600	45,600
sec-Butylbenzene	ug/Kg	109,000	114,000	104,000	33,800	36,800	29,600

TABLE 7 B

TREATED MATERIAL CHEMICAL CHARACTERIZATION - TCLP VR100 and HC100

		VR100 - TCLP	HC100 - TCLP
		Treated	Treated
PARAMETER	**UNITS**	**RESULT**	**RESULT**
Metals			
Barium	mg/L	0.02	0.055
Cadmium	mg/L	ND	0.028
Chromium	mg/L	ND	233
Lead	mg/L	ND	0.46
Silver	mg/L	0.0032	0.0085
Mercury	mg/L	ND	0.0004
Semivolatile Organic Compounds			
1,4-Dichlorobenzene	mg/L	0.083	0.062
Cresols	mg/L	0.241	0.391
Pyridine	mg/L	ND	6.47
m,p-Cresol	mg/L	0.214	0.359
o-Cresol	mg/L	0.026	0.033
Volatile Organic Compounds			
2-Butanone	mg/L	0.0094	0.301
Benzene	mg/L	0.564	13

TABLE 7 C

TREATED MATERIAL CHEMICAL CHARACTERIZATION -
SPLP VR100 and HC100

		VR100 - SPLP	HC100 - SPLP

		Treated	Treated
PARAMETER	**UNITS**	**RESULT**	**RESULT**
Metals			
Aluminum	mg/Kg	1.32	12.3
Arsenic	mg/Kg	ND	0.65
Barium	mg/Kg	0.0047	0.025
Cadmium	mg/Kg	0.0001	ND
Calcium	mg/Kg	0.5	3.88
Chromium	mg/Kg	0.0037	217
Cobalt	mg/Kg	0.0011	1.23
Copper	mg/Kg	ND	1.35
Iron	mg/Kg	1.33	749
Lead	mg/Kg	ND	0.54
Magnesium	mg/Kg	0.055	1.1
Manganese	mg/Kg	0.017	17.4
Nickel	mg/Kg	0.0079	122
Potassium	mg/Kg	0.22	5.2
Selenium	mg/Kg	ND	0.06
Sodium	mg/Kg	1.82	162
Thallium	mg/Kg	0.0067	ND
Vanadium	mg/Kg	ND	0.67
Zinc	mg/Kg	0.016	0.27
Mercury	mg/Kg	ND	0.00018

TABLE 7 C (cont)
TREATED MATERIAL CHEMICAL CHARACTERIZATION -
SPLP VR100 and HC100

		VR100 - SPLP	HC100 - SPLP
		Treated	**Treated**

PARAMETER	UNITS	RESULT	RESULT
Semivolatile Organic Compounds			
2-Methylnaphthalene	ug/Kg	53.8	27.1
Acenaphthene	ug/Kg	6.33	3.35
Aniline	ug/Kg	33.2	617
Carbazole	ug/Kg	10.5	ND
Fluorene	ug/Kg	16.8	12.5
Isophorone	ug/Kg	7.7	11.2
Phenol	ug/Kg	90.2	117
Pyridine	ug/Kg	ND	84.5
m,p-Cresol	ug/Kg	211	361
o-Cresol	ug/Kg	24.6	27.2
VOCs			
1,2,4-Trimethylbenzene	ug/Kg	152	176
1,2-Dichlorobenzene	ug/Kg	1450	980
1,3,5-Trimethylbenzene	ug/Kg	71.5	105
1,3-Dichlorobenzene	ug/Kg	15.4	12.6
1,4-Dichlorobenzene	ug/Kg	91.8	69.7
2-Butanone	ug/Kg	48.3	71.5
2-Hexanone	ug/Kg	34.2	ND
4-Isopropyltoluene	ug/Kg	7.21	13.4
4-Methyl-2-pentanone	ug/Kg	7.16	ND
Acetone	ug/Kg	139	196
Benzene	ug/Kg	513	13600
Chlorobenzene	ug/Kg	6.4	8
Chloroethane	ug/Kg	10.3	25.2
Chloromethane	ug/Kg	35.5	42.8
Ethylbenzene	ug/Kg	35.7	136
Isopropylbenzene (Cumene)	ug/Kg	62.9	233
Methylene chloride	ug/Kg	3.74	ND
Naphthalene	ug/Kg	3580	2550
Styrene	ug/Kg	34.2	ND
Thiophene	ug/Kg	15.1	129

TABLE 7 C (cont)

TREATED MATERIAL CHEMICAL CHARACTERIZATION -

SPLP VR100 and HC100

		VR100 - SPLP	HC100 - SPLP
		Treated	**Treated**

PARAMETER	UNITS	RESULT	RESULT
Toluene	ug/Kg	996	7450
Xylene (total)	ug/Kg	574	2720
m,p-Xylene	ug/Kg	371	2170
o-Xylene	ug/Kg	202	554
sec-Butylbenzene	ug/Kg	31	52.6
tert-Butylbenzene	ug/Kg	7.77	23.1

A review of the 100 °C treated materials revealed the following observations:

- An increase in trace metals (i.e., iron, manganese, aluminum, and chromium) from that in the untreated results. Potential sources of trace metals introduced into the material during treatment include, (1) metal alloy and copper thermocouples which showed significant signs of rusting and pitting after treatment, (2) carbon steel reactors that showed significant rusting after treatment, and (3) aluminum foil used in the VR reactors. Note the aluminum foil was used during testing to help facilitate removal of the treated materials from the reactor following testing, however, the foil partially disintegrated during testing.
- Benzene decreased from approximately 30,000,000 ppb in the untreated sample to approximately 400,000 ppb in the treated HC100 sample. Benzene was found at higher concentrations in the HC100 material than the VR100 sample.
- Naphthalene concentrations are much lower in the HC100 treated material than the VR100 material.
- The HC100 TCLP results for Benzene, Pyridine and Chromium exceed RCRA minimum disposal criteria for non-hazardous materials.

TABLE 7 D

TREATED MATERIAL CHEMICAL CHARACTERIZATION - VR90 and HC90

		VR90 - A	VR90 - B	VR90 -	HC90 - A	HC90 -	HC90 -

				C		B	C
		Treated	Treated	Treated	Treated	Treated	Treated
PARAMETER	UNITS	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
Total Organic Carbon	mg/Kg			69,300			64,900
pH	pH unit	4.23	4.42	4.47	1.58	1.0	1.0
Metals							
Aluminum	mg/Kg	3,290	3,800	4,040	392	505	503
Antimony	mg/Kg	0.18	0.47	ND	ND	0.89	8.61
Arsenic	mg/Kg	ND	ND	ND	18.8	21.1	43.3
Barium	mg/Kg	7.26	8.06	8.5	6.99	11.2	8.24
Beryllium	mg/Kg	0.0054	0.0052	ND	ND	ND	ND
Cadmium	mg/Kg	ND	ND	ND	ND	ND	ND
Calcium	mg/Kg	169	150	141	147	179J	173
Chromium	mg/Kg	4.3	5.85	50.3	6910	7,640	14,000
Cobalt	mg/Kg	0.17	0.18	0.015	41.8	49.2	88.5
Copper	mg/Kg	24.7	26.1	27	92.1	94.4	201
Iron	mg/Kg	6,660	6,910	21,100	24,300	28,700	49,700
Lead	mg/Kg	73.1	73.4	74.1	66.7	90.1	77.4
Magnesium	mg/Kg	50.7	55.5	53.9	37.5	45.1	46
Manganese	mg/Kg	101	113	220	635	724	1310
Mercury	mg/Kg	0.91	1.13	1	2.5	3.14	1.67
Nickel	mg/Kg	4.94	5.65	5.43	3420	3750	6,700
Potassium	mg/Kg	58.7	59.1	67.6	132	178	192
Selenium	mg/Kg	9.4	10.2	11.7	8.71	10.6	10.9
Silver	mg/Kg	ND	ND	ND	ND	ND	ND
Sodium	mg/Kg	3,150	3,260	3,430	3,950	4,640	5,920
Thallium	mg/Kg	0.33	0.61	0.39	ND	ND	ND
Vanadium	mg/Kg	0.045	0.037	ND	25.4	30.3	53.8
Zinc	mg/Kg	6.13	5.54	5.17	10.4	12.3	17.2

TABLE 7 D
TREATED MATERIAL CHEMICAL CHARACTERIZATION - VR90 and HC90

		VR90 - A	VR90 - B	VR90 - C	HC90 - A	HC90 - B	HC90 - C
		Treated	Treated	Treated	Treated	Treated	Treated

Semivolatile Organic Compounds							
2-Methylnaphthalene	ug/Kg	52,700	106,000	91,400	53,200	51900J	101,000
4,6-Dinitro-2-methylphenol	ug/Kg	72,900	ND	ND	ND	ND	ND
Acenaphthene	ug/Kg	11,900	22,100	18,800	10,800	9350J	18,500
Fluorene	ug/Kg	242,000	505,000	427,000	238,000	205,000	402,000
VOCs							
1,2,4-Trimethylbenzene	ug/Kg	224,000	213,000	230,000	89,100	82,200	66,000
1,2-Dichlorobenzene	ug/Kg	1,290,000	1,210,000	1,250,000	538,000	503,000	413,000
1,3,5-Trimethylbenzene	ug/Kg	83,200	77,000	85,000	53,100	50,700	37900J
1,4-Dichlorobenzene	ug/Kg	112,000	105,000	106,000	42,800	38200J	30200J
4-Isopropyltoluene	ug/Kg	135,000	132,000	139,000	37,300	33800J	33000J
Benzene	ug/Kg	201,000	184,000	186,000	656,000	476,000	282,000
Ethylbenzene	ug/Kg	ND	ND	ND	38,500	33900J	21500J
Isopropylbenzene (Cumene)	ug/Kg	187,000	187,000	192,000	135,000	123,000	93,700
Naphthalene	ug/Kg	4,670,000	4,380,000	4,320,000	1,820,000	1,720,000	1,570,000
Thiophene	ug/Kg	ND	ND	ND	5,230	3,750	2,630
Toluene	ug/Kg	381,000	369,000	381,000	938,000	711,000	454,000
Xylene (total)	ug/Kg	544,000	535,000	554,000	769,000	667,000	464,000
m,p-Xylene	ug/Kg	361,000	352,000	371,000	638,000	550,000	376,000
o-Xylene	ug/Kg	183,000	183,000	184,000	131,000	117,000	89,600
sec-Butylbenzene	ug/Kg	112,000	102,000	113,000	76,500	77,500	51,700
tert-Butylbenzene	ug/Kg	ND	ND	ND	19,400	19,500	12,800

TABLE 7 E

TREATED MATERIAL CHEMICAL CHARACTERIZATION-
TCLP VR90 and HC90

		VR90 - TCLP	HC90 - TCLP
		Treated	Treated
PARAMETER	UNITS	RESULT	RESULT
Metals			
Barium	mg/L	0.13	0.051
Cadmium	mg/L	ND	0.0028
Chromium	mg/L	0.068	186
Lead	mg/L	0.028	0.42
Mercury	mg/L	ND	0.00009
Selenium	mg/L	ND	0.034
Silver	mg/L	0.0033	ND
SVOCs			
Pyridine	mg/L	ND	2.37
VOCs			
Benzene	mg/L	0.08	2.52

TABLE 7 F
TREATED MATERIAL CHEMICAL PROPERTIES -
VR90(SPLP) and HC90(SPLP)

		VR90 -	HC90 -

		SPLP	SPLP
		Treated	Treated
PARAMETER	UNITS	RESULT	RESULT
Metals			
Aluminum	mg/L	1.87	9.28
Arsenic	mg/L	ND	0.43
Barium	mg/L	0.0047	0.018
Cadmium	mg/L	ND	0.00052
Calcium	mg/L	0.84	3.21
Chromium	mg/L	0.031	204
Cobalt	mg/L	0.0022	0.93
Copper	mg/L	0.0028	0.57
Iron	mg/L	43	523
Lead	mg/L	0.0059	0.34
Magnesium	mg/L	0.28	1.01
Manganese	mg/L	1.23	16.3
Nickel	mg/L	0.019	93
Potassium	mg/L	0.11	3.18
Sodium	mg/L	16.3	111
Vanadium	mg/L	ND	0.64
Zinc	mg/L	0.033	0.26

TABLE 7 F
TREATED MATERIAL CHEMICAL PROPERTIES -
VR90(SPLP) and HC90(SPLP)

		VR90 - SPLP	HC90 - SPLP

		Treated	Treated
PARAMETER	**UNITS**	**RESULT**	**RESULT**
SVOC			
2-Methylnaphthalene	ug/L	60.8	20.3
Acenaphthene	ug/L	6.37	2.52
Aniline	ug/L	66.1	1980
Carbazole	ug/L	18.5	ND
Dibenzofuran	ug/L	3.69	ND
Fluorene	ug/L	18.8	6.87
Isophorone	ug/L	11.6	5.24
Phenol	ug/L	109	ND
Pyridine	ug/L	ND	1760
m,p-Cresol	ug/L	1.41	185
VOC			
1,2,4-Trimethylbenzene	ug/L	155	191
1,2-Dichlorobenzene	ug/L	1400	1000
1,3,5-Trimethylbenzene	ug/L	65.7	80
1,3-Dichlorobenzene	ug/L	16	ND
1,4-Dichlorobenzene	ug/L	103	78.4
Acetone	ug/L	117	216
Benzene	ug/L	2620	4520
Chloromethane	ug/L	ND	20.8
Ethylbenzene	ug/L	46.1	92.7
Isopropylbenzene (Cumene)	ug/L	113	251
Methylene chloride	ug/L		25.9
Naphthalene	ug/L	4120	3240
Thiophene	ug/L	0	54.8
Toluene	ug/L	2120	3870
Xylene (total)	ug/L	743	2000
m,p-Xylene	ug/L	517	1610
o-Xylene	ug/L	226	387
sec-Butylbenzene	ug/L	30.1	ND

A review of the 90 °C treated materials revealed the following observations:

- An increase in the trace metals (i.e., iron, manganese, aluminum, and chromium) from that in the untreated results. Potential sources of trace metals include, (1) metal alloy and copper thermocouples which showed significant signs of rusting

and pitting after treatment, (2) carbon steel reactors that showed significant rusting after treatment, and (3) aluminum foil used in the VR reactors. Note the aluminum foil was used during testing to help facilitate removal of the treated materials from the reactor following testing, however, the foil partially disintegrated during testing.

- Benzene concentrations in the VR90 are an order of magnitude higher than the Benzene concentration of VR100. Benzene concentrations are significantly lower in VR90 than HC90.
- Naphthalene concentrations are much lower in the HC90 treated material than the VR90 treated material.
- The HC90 TCLP results for Benzene and Chromium exceed the RCRA minimum disposal criteria for non-hazardous materials.

5.3.3 Off-Gas Analytical Testing

Off gas collection for analytical testing was performed at 5 intervals during each of the four ISTD thermal simulations. The sampling occurred at the following points during the process: Time 0 (T_0), Day 1 of treatment, the point when the PID fell below 50,000 ppm, the point when the PID fell below 1,000 ppm, and after the treatment simulation was completed and the treated material cooled to ambient temperatures (T_f). The off gas sampling design resulted from changes implemented after the trial test; and therefore, deviates from the initial Work Plan in Appendix A. Furthermore, the updated off gas sampling design changed the testing endpoint from a fixed 7-days of heating to the time when the PID detections fell below 1,000 ppm.

Off gas was sampled and analyzed at a subcontractor analytical laboratory for VOCs, Aldehydes, Inorganic Acids, and Reduced Sulfur. The following tables present the detected compounds for the off gas analyses. Complete summary tables are provided in Tables 8 through 11. The analytical reports are provided in **Appendix G**.

TABLE 8

REDUCED SULFUR RESULTS (ug/m^3)

		AMBIENT T_0	DAY 1	< 50,000 ppm	< 1,000 ppm	AMBIENT T_f

SAMPLE ID	COMPOUND	RESULT	RESULT	RESULT	RESULT	RESULT
VR 90	Hydrogen Sulfide	640	1,400,000	2,700,000	1,500,000	2,900
	Carbonyl Sulfide	200	2,900	7,200	13,000	3,100
	Methyl Mercaptan	ND	28,000	41,000	16,000	100
	Ethyl Mercaptan	ND	2,700	7,800	2,700	47
	Dimethyl Sulfide	680	26,000	10,000	2,500	510
	Carbon Disulfide	48,000	1,100,000	100,000	22,000	3,300
	Isopropyl Mercaptan	ND	1,200	ND	1,200	60
	tert-Butyl Mercaptan	ND	ND	ND	1,100	150
	n-Propyl Mercaptan	ND	ND	ND	ND	ND
	Ethyl Methyl Sulfide	170	1,800	ND	520	120
	Thiophene	66	3,900	6,000	2,200	360
	Isobutyl Mercaptan	ND	ND	ND	ND	50
	Dimethyl Disulfide	39	220	ND	700	160
	3-Methylthiophene	ND	ND	ND	ND	100
	Tetrahydrothiophene	ND	ND	ND	ND	31
HC 90	Hydrogen Sulfide	64,000	32,000,000	420,000	110,000	28,000
	Carbonyl Sulfide	1,500	26,000	12,000	7,300	310
	Methyl Mercaptan	540	700,000	7,300	980	150
	Ethyl Mercaptan	ND	55,000	980	140	ND
	Dimethyl Sulfide	13,000	84,000	20,000	9,000	2,400
	Carbon Disulfide	770,000	620,000	25,000	12,000	1,300
	Isopropyl Mercaptan	ND	8,800	620	ND	ND
	tert-Butyl Mercaptan	ND	3,700	2,400	220	ND
	n-Propyl Mercaptan	ND	1,100	ND	ND	ND
	Ethyl Methyl Sulfide	2,600	5,500	3,000	980	350
	Thiophene	2,800	19,000	43,000	8,300	3,900
	Isobutyl Mercaptan	ND	3,000	ND	ND	ND
	Dimethyl Disulfide	ND	2,500	6,900	1,400	600
	3-Methylthiophene	ND	790	6,000	680	830
	Tetrahydrothiophene	ND	ND	1,000	ND	ND
	2-Ethylthiophene	ND	780	10,000	590	1,800

TABLE 8 (cont)

REDUCED SULFUR RESULTS (ug/m^3)

SAMPLE		AMBIENT T_0	DAY 1	< 50,000	< 1,000	AMBIENT T_f

ID				ppm*	ppm	
	COMPOUND	RESULT	RESULT	RESULT	RESULT	RESULT
VR 100	Hydrogen Sulfide	640	120,000	6,100,000	3,600,000	470,000
	Carbonyl Sulfide	200	1,100	31,000	95,000	11,000
	Methyl Mercaptan	ND	17,000	47,000	11,000	320
	Ethyl Mercaptan	ND	4,200	10,000	2,700	ND
	Dimethyl Sulfide	680	3,900	19,000	4,000	23,000
	Carbon Disulfide	48,000	48,000	54,000	18,000	6,200
	Isopropyl Mercaptan	ND	3,100	11,000	ND	ND
	tert-Butyl Mercaptan	ND	840	ND	ND	ND
	n-Propyl Mercaptan	ND	330	ND	ND	ND
	Ethyl Methyl Sulfide	170	1,300	ND	ND	2,300
	Thiophene	66	9,500	14,000	6,800	23,000
	Isobutyl Mercaptan	ND	1,500	ND	ND	ND
	Diethyl Sulfide	ND	260	ND	ND	ND
	Dimethyl Disulfide	39	1,000	ND	ND	2,700
	3-Methylthiophene	ND	2,400	ND	ND	3,500
	Tetrahydrothiophene	ND	400	ND	ND	ND
	2-Ethylthiophene	ND	660	ND	ND	7,600
HC 100	Hydrogen Sulfide	64,000	1,200,000	4,500,000	350,000	22,000
	Carbonyl Sulfide	1,500	12,000	6,000	10,000	16,000
	Methyl Mercaptan	540	91,000	20,000	2,900	230
	Ethyl Mercaptan	ND	22,000	3,300	ND	74
	Dimethyl Sulfide	13,000	63,000	31,000	24,000	1,400
	Carbon Disulfide	770,000	110,000	15,000	16,000	7,800
	Isopropyl Mercaptan	ND	5,900	ND	ND	99
	tert-Butyl Mercaptan	ND	11,000	ND	ND	240
	n-Propyl Mercaptan	ND	3,100	ND	ND	ND
	Ethyl Methyl Sulfide	2,600	9,400	ND	2,500	340
	Thiophene	2,800	56,000	32,000	30,000	5,900
	Diethyl Sulfide	ND	ND	ND	ND	39
	n-Butyl Mercaptan	ND	ND	ND	ND	48
	Dimethyl Disulfide	ND	2,800	5,500	4,500	460
	3-Methylthiophene	ND	ND	ND	3,200	1,800
	Tetrahydrothiophene	ND	ND	ND	ND	360
	2-Ethylthiophene	ND	ND	5,900	6,200	1,000

*per Table 4, <50,000 ppm VOC detection occurs on Day 3 of treatment.

The results of the Reduced Sulfur testing revealed that the highest concentrations were generally produced in the first days of treatment and then decreased similar to the monitor testing performed (see Table 4). The highest detections observed were H2S,

Carbonyl Sulfide, Methyl Mercaptan, Dimethyl Sulfide, Carbon Disulfide, and Thiophenes. H_2S was detected at the highest concentration for each treated material during the final sampling (i.e., T_f) except the VR90.

TABLE 9

TREATED OFF-GAS ANALYTICAL CHARACTERIZATION

ALDEHYDES AND INORGANIC ACIDS (ppm)

PARAMETER	T_0 RESULT	DAY 1 RESULT	< 50,000 RESULT	< 1,000 RESULT	T_f RESULT
VR 90C					
ALDEHYDES					
ACETALDEHYDE	0.6	0.3	6.1	0.63	5.5
BENZALDEHYDE	< 0.02	< 0.03	< 0.02	< 0.02	< 0.01
BUTYRALDEHYDE	0.07	< 0.04	0.84	0.2	0.24
Crotonaldehyde	< 0.03	< 0.04	< 0.04	< 0.04	< 0.02
FORMALDEHYDE	< 0.07	< 0.1	< 0.09	< 0.08	< 0.05
ISOVALERALDEHYDE	2.7	0.37	4.7	1.2	0.27
PROPIONALDEHYDE	0.1	0.05	1.3	0.3	0.96
VALERALDEHYDE	< 0.02	< 0.03	0.04	< 0.03	< 0.02
INORGANIC ACIDS					
HYDROBROMIC ACID	< 0.5	< 0.4	< 0.5	< 0.5	< 0.5
HYDROCHLORIC ACID	< 1	< 0.9	< 1	< 1	< 1
HYDROFLUORIC ACID	< 2	< 2	< 2	< 2	< 2
NITRIC ACID	< 0.6	< 0.5	< 0.6	< 0.6	< 0.6
PHOSPHORIC ACID	< 2	< 0.3	< 2	< 2	< 2
SULFURIC ACID	< 2	0.6	< 2	*43	< 2
HC 90C					
ALDEHYDES					
ACETALDEHYDE	0.2	*9.1	0.51	0.1	0.6
BENZALDEHYDE	< 0.02	0.2	*0.1	< 0.02	0.05
BUTYRALDEHYDE	< 0.03	*1.3	0.2	< 0.04	0.07
Crotonaldehyde	< 0.03	< 0.04	< 0.03	< 0.04	< 0.03
FORMALDEHYDE	< 0.07	*0.1	< 0.06	< 0.08	< 0.07
ISOVALERALDEHYDE	2	*2.6	*4.9	0.1	0.41
PROPIONALDEHYDE	< 0.04	*1.8	0.1	< 0.04	0.2
VALERALDEHYDE	< 0.02	0.04	< 0.02	< 0.03	< 0.02
INORGANIC ACIDS					
HYDROBROMIC ACID	< 0.5	< 0.4	< 0.5	< 0.3	< 0.5
HYDROCHLORIC ACID	< 1	1	< 1	< 0.6	< 1
HYDROFLUORIC ACID	< 2	< 2	< 2	< 1	< 2
NITRIC ACID	< 0.6	< 0.5	< 0.6	< 0.3	< 0.6
PHOSPHORIC ACID	< 2	< 0.3	< 2	< 0.9	< 2
SULFURIC ACID	6.4	< 0.3	< 2	*52	2

TABLE 9

TREATED OFF-GAS ANALYTICAL CHARACTERIZATION

ALDEHYDES AND INORGANIC ACIDS (ppm)

PARAMETER	T_0 RESULT	DAY 1	< 50,000 RESUL	< 1,000 RESUL	T_f RESUL

		RESULT	T	T	T
VR 100C					
ALDEHYDES					
ACETALDEHYDE	0.6	1.3	0.78	2.3	3.4
BENZALDEHYDE	< 0.02	0.02	< 0.02	0.03	0.03
BUTYRALDEHYDE	0.07	0.39	0.48	1	0.28
Crotonaldehyde	< 0.03	< 0.03	< 0.04	< 0.04	< 0.02
FORMALDEHYDE	< 0.07	*0.3	< 0.08	< 0.08	< 0.05
ISOVALERALDEHYDE	2.7	1.9	3	3.6	1.7
PROPIONALDEHYDE	0.1	0.3	0.2	0.8	0.77
VALERALDEHYDE	< 0.02	< 0.02	< 0.03	< 0.03	< 0.02
INORGANIC ACIDS					
HYDROBROMIC ACID	< 0.5	< 0.5	< 0.8	< 0.5	< 0.1
HYDROCHLORIC ACID	< 1	< 1	< 2	2	< 0.3
HYDROFLUORIC ACID	< 2	< 2	< 3	< 2	< 0.6
NITRIC ACID	< 0.6	< 0.6	< 1	< 0.6	< 0.2
PHOSPHORIC ACID	< 2	< 0.4	< 5	< 2	< 0.5
SULFURIC ACID	< 2	0.6	*9.9	*170	< 0.5
HC 100C					
ALDEHYDES					
ACETALDEHYDE	0.2	1.3	0.06	1.1	0.4
BENZALDEHYDE	< 0.02	0.01	< 0.02	0.2	0.09
BUTYRALDEHYDE	< 0.03	0.28	< 0.04	0.3	0.05
Crotonaldehyde	< 0.03	< 0.01	< 0.04	< 0.04	< 0.02
FORMALDEHYDE	< 0.07	< 0.02	< 0.08	< 0.08	< 0.05
ISOVALERALDEHYDE	2	0.37	1.2	5.2	0.94
PROPIONALDEHYDE	< 0.04	0.32	< 0.04	0.3	0.09
VALERALDEHYDE	< 0.02	0.03	< 0.03	< 0.03	< 0.02
INORGANIC ACIDS					
HYDROBROMIC ACID	< 0.5	< 1	< 0.8	< 0.5	< 0.3
HYDROCHLORIC ACID	< 1	< 3	< 2	< 1	< 0.6
HYDROFLUORIC ACID	< 2	< 5	< 3	< 2	< 1
NITRIC ACID	< 0.6	< 2	< 1	< 0.6	< 0.3
PHOSPHORIC ACID	< 2	< 1	< 3	< 2	< 0.8
SULFURIC ACID	6.4	1	*15	*31	< 0.8

*Results may have had breakthrough or possible migration; and therefore, results may exceeding the method detection capabilities. . The results are the total mass collected in both the front and rear media within the tube

In general, Sulfuric Acid, Isovaleraldehyde and Acetaldehyde were elevated in both the HC and VR materials, per Table 9.

TABLE 10A

OFF-GAS ANALYTICAL CHARACTERIZATION VR 90

Summa Canister Volatile Organic Compounds (TO-15)

PARAMETER	UNITS	DAY 1 RESULT	< 50,000 RESULT	< 1,000 RESULT
Volatile Organic Compounds				
Acetone	ug/m^3	ND	ND	28,000
Carbon Disulfide	ug/m^3	610,000	98,000	3000
Hexane	ug/m^3	300,000	ND	ND
Benzene	ug/m^3	34,000,000	64,000,000	420,000
Toluene	ug/m^3	340,000	4,600,000	71,000
m,p-Xylene	ug/m^3	ND	ND	900

In general, the results of the VOC off gas analyses during the VR90 treatment show a decrease in concentrations from the first day of treatment until the last day of treatment (<1,000 ppm off gas monitoring). Please note that ND indicates the concentration was below the detection limits.

TABLE 10B

OFF-GAS ANALYTICAL CHARACTERIZATION HC 90

Summa Canister Volatile Organic Compounds (TO-15)

PARAMETER	UNITS	DAY 1 RESULT	< 50,000 RESULT	< 1,000 RESULT
Volatile Organic Compounds				
Chloromethane	ug/m^3	610,000	64,000	9,400
Acetone	ug/m^3	1,200,000	110,000	27,000
Carbon Disulfide	ug/m^3	ND	ND	5,300
2-Butanone (Methyl Ethyl Ketone)	ug/m^3	ND	ND	2,700
Benzene	ug/m^3	110,000,000	7,300,000	310,000
Toluene	ug/m^3	17,000,000	4,600,000	150,000
Ethyl Benzene	ug/m^3	ND	78,000	1,700
m,p-Xylene	ug/m^3	430,000	620,000	19,000
o-Xylene	ug/m^3	ND	78,000	3,100
Cumene	ug/m^3	ND	40,000	2,200

In general, the results of the VOC off gas analyses during the HC90 treatment show a decrease in concentrations from the first day of treatment until the last day of treatment (<1,000 ppm off gas monitoring). Please note that ND indicates the concentration was below the detection limits.

TABLE 10C

OFF-GAS ANALYTICAL CHARACTERIZATION VR100

Summa Canister Volatile Organic Compounds (TO-15)

PARAMETER	UNITS	DAY 1 RESULT	< 50,000 RESULT	< 1,000 RESULT
Volatile Organic Compounds				
Chloromethane	ug/m^3	89,000	ND	29,000
Acetone	ug/m^3	ND	140,000	81,000
Carbon Disulfide	ug/m^3	160,000	ND	7,300
Hexane	ug/m^3	50,000	ND	ND
2-Butanone (Methyl Ethyl Ketone)	ug/m^3	ND	ND	6,800
Benzene	ug/m^3	12,000,000	9,800,000	400,000
Toluene	ug/m^3	990,000	3,900,000	510,000
Chlorobenzene	ug/m^3	ND	ND	1,200
Ethyl Benzene	ug/m^3	ND	31,000	14,000
m,p-Xylene	ug/m^3	44,000	240,000	130,000
o-Xylene	ug/m^3	ND	43,000	39,000
Cumene	ug/m^3	ND	ND	27,000
4-Ethyltoluene	ug/m^3	ND	ND	3,900
1,3,5-Trimethylbenzene	ug/m^3	ND	ND	9,200
1,2,4-Trimethylbenzene	ug/m^3	ND	ND	8,900
1,4-Dichlorobenzene	ug/m^3	ND	ND	1,100
1,2-Dichlorobenzene	ug/m^3	ND	ND	12,000

In general, the results of the VOC off gas analysis during the VR100 treatment show a decrease in concentrations from the first day of treatment until the last day of treatment (<1,000 ppm off gas monitoring). Please note that ND indicates the concentration was below the detection limits.

TABLE 10D

OFF-GAS ANALYTICAL CHARACTERIZATION HC 100

Summa Canister Volatile Organic Compounds (TO-15)

PARAMETER	UNITS	DAY 1 RESULT	< 50,000 RESULT	< 1,000 RESULT
Volatile Organic Compounds				
Chloromethane	ug/m^3	30,000	100,000	63,000
Acetone	ug/m^3	64,000	72,000	150,000
Carbon Disulfide	ug/m^3	5,300	ND	16,000
Methylene Chloride	ug/m^3	3,800	ND	13,000
Benzene	ug/m^3	1,200,000	6,000,000	3,900,000
Toluene	ug/m^3	810,000	2,500,000	3,000,000
Ethyl Benzene	ug/m^3	16,000	34,000	68,000
m,p-Xylene	ug/m^3	200,000	330,000	870,000
o-Xylene	ug/m^3	38,000	69,000	160,000
Cumene	ug/m^3	28,000	50,000	140,000
4-Ethyltoluene	ug/m^3	3,300	ND	16,000
1,3,5-Trimethylbenzene	ug/m^3	6,800	ND	34,000
1,2,4-Trimethylbenzene	ug/m^3	7,100	ND	35,000
1,2-Dichlorobenzene	ug/m^3	14,000	ND	87,000

In general, an increase in VOC off gas concentrations was observed as the treatment progressed and the last VOC summa canister was collected (i.e., <1000ppm VOCs). Benzene, acetone and chloromethane were the only exceptions to the increasing trend. After heating and disassembling the cooled test reactor, KEMRON observed that the HC material had formed a bubble just below the surface of the material. In addition, a significant amount of liquid was observed at the bottom of the reactor following treatment.

TABLE 11

HEADSPACE OFF-GAS ANALYTICAL CHARACTERIZATION

Volatile Organic Compounds (TO-15)

PARAMETER	VR T_0 (ug/m^3)* RESULT	VR 90 T_f (ug/m^3)* RESULT	VR 100 T_f (ug/m^3)* RESULT	HC T_0 (ug/m^3)* RESULT	HC 90 T_f (ug/m^3)* RESULT	HC 100 T_f (ug/m^3)* RESULT
Volatile Organic Compounds						
Chloromethane	ND	ND	41,000	ND	ND	48,000
Acetone	ND	ND	68,000	ND	ND	ND
Carbon Disulfide	330,000	ND	4,500	550,000	ND	ND
Hexane	ND	ND	ND	390,000	ND	ND
Benzene	110,000,000	920,000	150,000	180,000,000	2,000,000	ND
Toluene	14,000,000	650,000	280,000	22,000,000	1,600,000	1,400,000
Ethyl Benzene	ND	ND	9,200	ND	44,000	ND
m,p-Xylene	1,000,000	140,000	97,000	1,400,000	710,000	190,000
o-Xylene	ND	40,000	30,000	ND	110,000	30,000
Cumene	ND	31,000	24,000	ND	130,000	ND
4-Ethyltoluene	ND	ND	7,000	ND	ND	ND
1,3,5-Trimethylbenzene	ND	ND	17,000	ND	44,000	ND
1,2,4-Trimethylbenzene	ND	26,000	26,000	ND	52,000	ND
1,4-Dichlorobenzene	ND	ND	7,700	ND	ND	ND
1,2-Dichlorobenzene	ND	58,000	78,000	ND	100,000	ND

Note: * Sample size is 40 ml vial with approximately 5.0 grams of sample

The headspace analyses was performed on 5.0 grams of material placed in a 40 ml vial. Upon arrival at the analytical laboratory, test material clinged to the vial cap septum; and therefore, the sample was uncapped to replace the septum. This procedure was necessary so that sample material did not contaminant the headspace analyses and produce biased high results. Following septum replacement, the samples were allowed to equilibrate for approximately 1 hour prior to extracting the headspace for analysis. Table 11 shows that T_f concentrations for the 90°C and 100°C headspace analyses had significant reductions in VOCs as compared to the initial T_0 concentrations.

5.4 Summary of ISTD Full Simulation Testing

Section 5.4 presents a summary of physical parameters and observations reported from the four thermal simulations. The untreated physical properties testing (**Appendix B**), thermal data monitoring sheets (**Appendix E**), and treated physical properties testing (**Appendix I**) were the sources of data for Table 12.

Table 12
Summary of Thermal Testing

Sample ID	Treatment Temperature (Celsius)	Length of Treatment (Days)	Intial Weight of Soil (g)	Initial Moisture (%)	Final Moisture (%)	Final Weight of Soil (g)	Weight Loss (g)	Total Condensate Collected (g)	Swell (%)	Significant Final Observations
VR 90	90	23	2556.5	72.32	26.73	1587.5	969.0	568.21	2.6/ 31.9	Sample has a tar odor. Shiny finish. Air bubbles were observed on the surface of the material. Rubbery surface. The material is not as hard as the 100 C material after cooling but still a very stiff taffy like resistance. No free water was visible in reactor. Treated material could be removed after cooling, but with much difficulty. Condensate was produced daily during the entire 23 days of treatment.
HC 90	90	24	1997.5	57.36	19.54	1529.0	468.5	341.43	18.46	Material bubbles during the heating causing a semi impermeable layer and hardens into an uneven surface after cooling. The exposed uneven surface is thin and brittle like ash. Beneath that, the surface is hard and crumbly (dry to moist) . After removing the sample from the reactor, the material is jet black with a green tint. Strong odor of super glue and tar. The sample is wet beneath the hard and crumbly layer. Seemed to get a styrene/plastic odor from condensate. Significant rust pieces of rust and "dusting" were observed on the top surface of the material in the reactor. This was not present in the VR materials.
VR 100	100	13	2517.5	72.36	11.44	1785.0	732.5	654.31	5.6/ 38.09	Odor not as tarry. Expansion up to 30-40% along the sidewalls. Blue "fuzz" on thermocouple copper tube after heating. Significantly harder after cooling than the VR90, but somewhat pliable (taffy) with much effort. Expands around the edges of the reactor but may not expand in the center. Texture after heating is smooth like glass. White flakes were observed around the edges of the material as well. Condensate produced seemed to be more milky than HC. Condensate was produced over the entire treatment period. Sample did not completely dry out. Rusted the entire reactor. Handling of the material in the lab improved around 50 -90 C producing a material that was like silly putty which was able to be pulled apart and rolled into balls. Free water was not found in the reactor after heating. Material had to be reheated to remove from the reactor. Significant rust pieces and dust were observed on the material from the reactor.

Sample ID	Treatment Temperature (Celsius)	Length of Treatment (Days)	Intial Weight of Soil (g)	Initial Moisture (%)	Final Moisture (%)	Final Weight of Soil (g)	Weight Loss (g)	Total Condensate Collected (g)	Swell (%)	Significant Final Observations
HC 100	100	14	1514.0	57.32	25.46	1135.5	378.5	331.8	46.24	Material bubbles during the heating causing a semi impermeable layer and hardens into an uneven surface after cooling. The exposed uneven surface is thin and brittle like ash. Beneath that, the surface is hard and crumbly (dry to moist) . After removing the sample from the reactor, the material is jet black with a green tint. Significant water present under the hard and crumbly layer. Movie made.

Notes:
*VR100 and VR90 = Due to MegaReactor weight and difficulty in completely removing material from thermal reactors, final weights and weight losses are approximate.
Swell Equation = [(initial height-final height)/initial height]x100. Second value for VR tests are side wall expansion stain

Significant observations provided from Table 12 include the following:

- Extensive corrosion occurred in the reactors during the thermal treatment. Rust was observed in both the VR and HC materials, the reactors, and on the thermocouples.
- Staining on the side walls of the reactor were observed in the VR material for both the 90° and 100 ° C treatments. The staining indicated that the material swelled during heating and then at some point subsided. Upon opening the VR test reactors after cooling, a flat smooth glassy surface was observed at a level below the rust staining on the sidewalls. There are no observations to indicated whether the swelling occurred uniformly at the test material surface or just at the interface between the test sample and the walls of the reactor. Swelling for the VR material appeared to have been approximately 30-40% during heating, and an expansion of approximately 3%-5% after cooling.
- A fair amount of moisture was retained by both materials even after 23/24 days of heating at 90°C and after 13/14 days of heating at 100°C. Free water was observed in the bottom of the reactor after removing the HC materials following both 90°C and 100°C treatments. Larger quantities of free water were observed in the HC 100°C reactor than the HC 90°C reactor.
- The HC responds to heat treatment at both target temperatures by forming a thin bubbly surface. Upon cooling, this surface hardens in place forming a thin fragile “shell”.
- Off gassing of the VR material produced a “blue fuzz” on the copper thermocouple.
- The HC material had a greenish tint after treatment.
- The VR 90°C treatment produced a “matted” taffy material after treatment and cooling as compared to the VR 100°C treatment which produced a harder more stiff material when cooled.
- The VR material produced higher condensate volumes and was collected over a longer period of time than the HC material.

6.0 TESTING OF TREATED MATERIAL

Section 6.0 discusses the physical properties testing and Reheating/Liquefaction testing performed on the treated material. The physical properties testing data sheets are provided in **Appendix I**. The complete table of physical properties testing is provided in Table 13 at the end of the report.

6.1 Physical Properties Testing

KEMRON performed the physical properties testing in accordance with the Work Plan provided in Appendix A. Two deviations to the work plan included (1) preparing certain samples by placing them in plastic cylinder molds and heat treating them at the target temperatures for the treatment time, and (2) adding laboratory vane shear testing in lieu of the triaxial shear testing.

The Work Plan anticipated that the treated material could be remolded to form proper test samples for testing after treatment. However, based on the matrix and behavior of the material after treatment, test samples could not be remolded for these certain tests. The tests included the Unconfined Compressive Strength, Hydraulic Conductivity, and Triaxial Shear test. KEMRON remolded samples for these tests by placing untreated material into appropriately sized plastic cylinder molds and heat treated the samples at the target temperatures for the treatment durations as stated in Table 12. After treatment, the samples were removed from the molds and tested. The following table provides a summary of the results.

Table 13
Treated Materials Properties Testing

Sample ID	Bulk Density (pcf)	Porosity (1)	Water Content (%)	Solid Specific Gravity	U.U. Triaxial Test (Cu)Ksf	Vane Shear (TSF)	Unconfined Comnpressive Strength (psi)	Hydraulic Condustivity	Particle Size Distribution
VR90C	69.4		26.73		No Results	> 0.6	4.4	Failed under own weight	
HC90C	77.9	32.60	19.54	1.55	No Results	0.28	38.4	Not Results	%Gravel=21.6 %Sand=50.3 %Silt=3.8 %Clay=24.4
VR100C	69.0		11.44		No Results	> 0.6	9.3	Failed under own weight	
HC100C	85.7	16.44	25.46	1.31	No Results	0.25	80.1	No Results	%Gravel= 33.8 %Sand=37.9 %Silt=4.3 %Clay=24.0

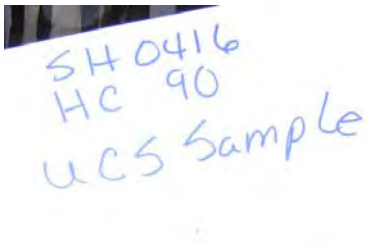
The results of the treated physical properties show the following observations:

- The density of the treated VR material remained consistent between the 90 and 100°C tests; however, the HC treated at 100°C shows a higher density than the HC materials treated to 90°C.
- When attempting the Triaxial and Hydraulic Conductivity Testing, VR material strength was not sufficient to perform the test. See photo 62 and 63.
- The HC material maintained a marginal shape during Triaxial and Hydraulic Conductivity Testing but the sample continued to volatilize and force air into the system (water lines) preventing the ability to perform the test. See photos 62 and 63.
- When removing the HC heat treated samples from the cylinder molds for testing, a layer of free water had accumulated in the bottom of the molds. See photo 55.
- The laboratory vane shear testing indicated a significant increase in shear strength from the untreated bulk samples for both materials (see Table 1). The VR material hardened into a stiff taffy with a greater shear strength than the HC material.
- UCS testing (photos 55 thru 61) showed that the treated VR material had very little compressive strength (4-9 psi). The treated VR material continued to compress as long as a load was applied, but it simply expanded outward and did not shear or break. This was not observed for the treated HC material which showed a significant gain in compressive strength (38 psi to 80 psi) and reached a fracturing point. The 100°C treatments showed higher compressive strength values than the 90°C tests. Untreated unconfined strength for both materials was 0 psi.
- Particle Size distribution (photo 53 and 54) testing of the treated HC material had significantly more gravel size fractions than the untreated and the silts were reduced also (see Table 1). The larger “gravel” fractions could be mechanically pulverized into smaller fractions. During the hydrometer testing, the deionized water turned a bright green after mixing with the treated material. This green discoloration was not observed during the hydrometer testing of the untreated material. In addition, after several days of the hydrometer sitting static at ambient temperatures, a white substance began to precipitate. A video of the precipitation was prepared from this observation.

The following are photographs of the treated material physical properties testing.

Photo 53 HC100 Hydrometer Testing

Photo 54- Treated grain size fractions



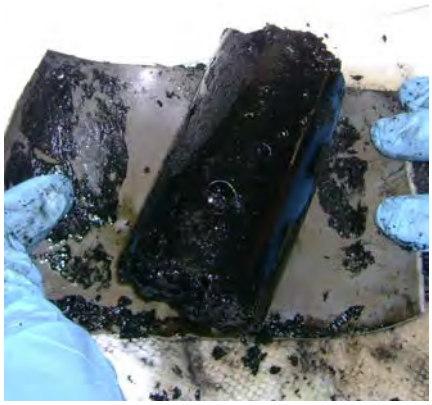


Photo 55- Removal of treated HC sample notice the water soaked paper towel from and that the material at the bottom did not form due to the water

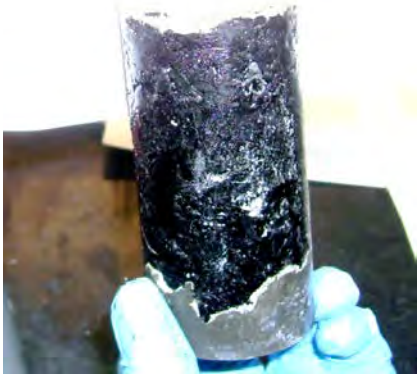


Photo 56-the capped HC 90 sample prepared for testing. the free water Notice the Portland cement forms a good seal to the HC material

Photograph 57-59 HC100 treated UCS testing. Notice the vertical fracture pattern

Photo 60- VR100 UCS sample extracted from mold.

Photo 61-VR100 UCS sample under loading

Photo 62- HC100 Triaxial and Permeability Sample after removal from the mold

Photo 63- VR 100 Triaxial and Pem sample after removing from the mold

Photo 64- VR sample in Permeameter The sample folds over and shows signs of expansion of the membrane

Photo 65- HC sample in Permeameter less folding over but expansion of gas in the membrane prevents testing

6.2 Treated Sample Reheating/Liquefaction Testing

KEMRON performed the Reheating/Liquefaction testing in accordance with the Work Plan provided in Appendix A. The treated VR and HC 100 °C materials were heated in a water bath at prescribed heating intervals and observed for 24 hours. The observation data sheets are provided in **Appendix I**. A summary of the observations are provided in Table 14 below.

Summary Table for Reheated Treated Samples
Table 14

Sample ID	Description
HC 100	The sample was prepared using a clear 40mL vial. 1.4inches of HC100 treated material and 1.4 inches of glass beads inside. For 90 minutes it was subjected to a water bath to boiling point. The material did not move down the glass beads, no liquefaction occurred. Three beads were tinted green in the process and at the end of testing the material had a slight green tint.
VR 100	The sample was prepared using a clear 40mL vial. 1.4 inches of HC100 treated material and 1.4 inches of glass beads inside. For 90 minutes, it was subjected to a water bath to boiling point. The VR material started migrating down the glass beads at 65.5°C. As time passed the material continued to migrate down the glass beads slowly.

The following photographs show the preparation and testing when the HC and VR treated samples were reheated.

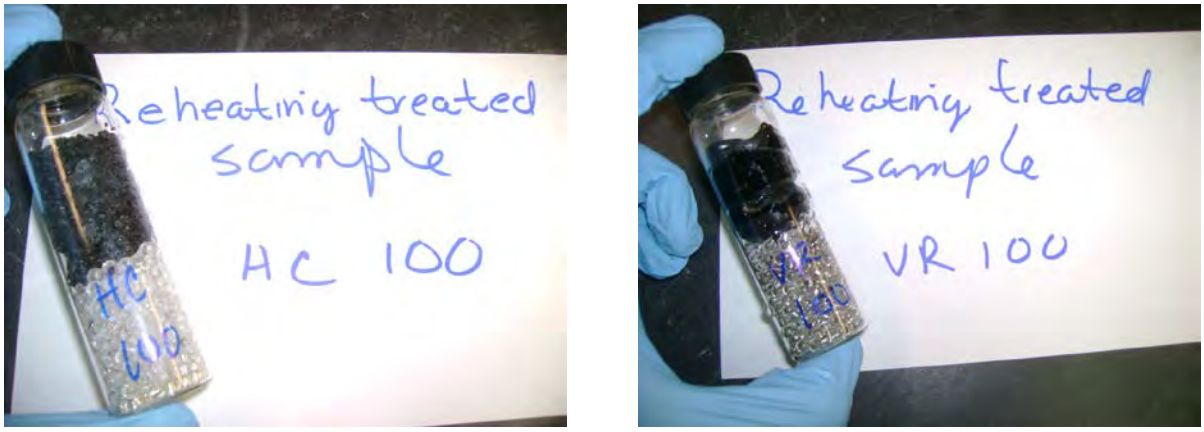


Photo 66 -67- HC 100°C and VR 100 °C (1.4 inch of glass beads and 1.4 inch of material)

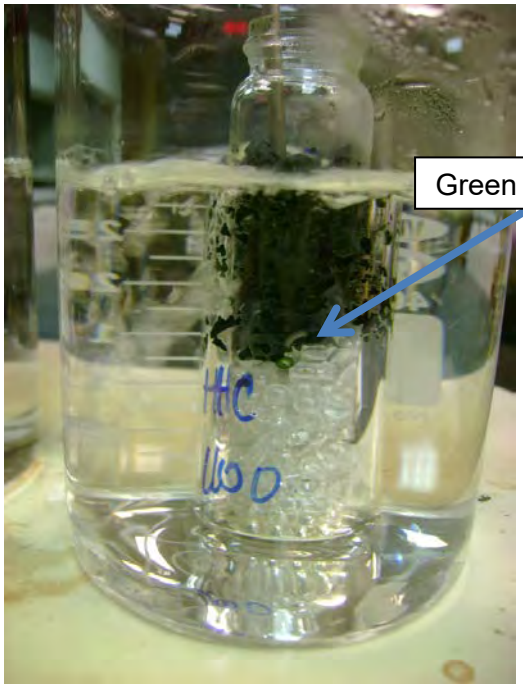


Photo 68 At 82.7 °C, the HC material begins to dye the beads green.
No movement.

Photo 69- at 76 °C, the VR material begins to move downward.

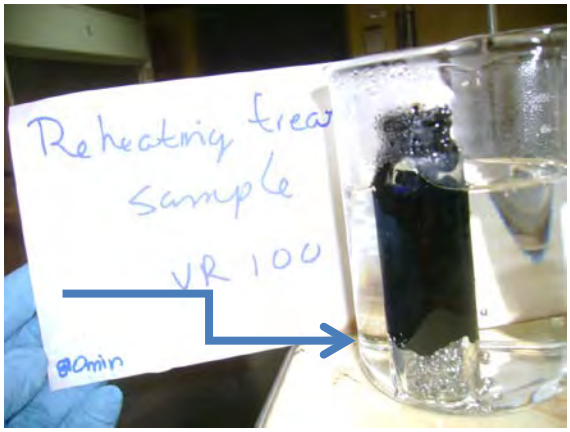


Photo 70-The VR material is going down the glass beads ¾ of an inch .
Temperature is 96.1°C

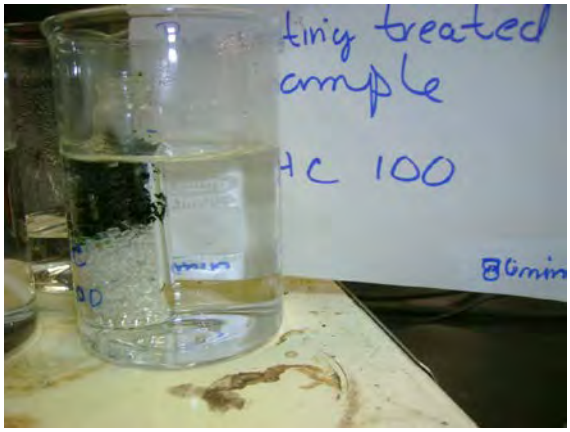


Photo 71- At 96.1 °C, the HC begins to turn to a green tint. No movement.

Photo 72- After 90 minutes the VR material continues to move down but also appears to start expanding along the walls of the vial at the top.

Photo 73- After 90 minutes, the HC material has not moved.

The results of the Reheating/Liquefaction testing included the following:

- Movement (liquefaction) of the VR material begins at approximately 65°C.
- The VR material also begins to expand up the walls of the vial around 90°C.
- The HC material begins producing a green tint around 80°C.
- The HC material does not liquefy at temperatures up to 100°C.

7.0 CONCLUSION

The Bridgewater Treatability Study was designed to evaluate the effects of heating on the chemical composition and physical properties of the VR and HC site materials; and to prepare large batches of thermally treated site materials. Other than the deviation included in the sections above, the project was completed per the work plan (see Appendix A).

TABLES

Terratherm
Bridgewate Thermal Study
KEMRON Project # SH0416
Table 1
Summary of Untreated Physical Characteristics

Sample ID	Bulk Density (pcf)	Porosity (%)	Water Content (%)	Solid Specific Gravity	C.U. Triaxial Test (Cu)Ksf	Vane Shear (TSF)	Unconfined Comnpressive Strength	Hydraulic Condustivity	Density: @30˚C	Density: @50˚C	Density: @70˚C	Density: @90˚C	Viscosity: @Ambient 17˚C (cP)	Viscosity: @30˚C (cP)	Viscosity: @50˚C (cP)	Viscosity: @70˚C (cP)	Viscosity: @90˚C (cP)	Particle Size Distribution
IMP2 - HC - Homogenized	59.2			1.2	VE	0.03	0.0 psi	VE										% Gravel = 0.0 % Sand = 62.5 % Silt = 15.0 % Clay = 22.5
IMP2 - VR - Homogenized	65.9			*	VE	0.0525	F		65.9	66.2	65.3	66.0	10,850-35,150				1,732-1,832	NR

Notes:
NR = Testing Not Requested
TIP = Testing still in progress
S.U. = Standard Units
pcf = Pounds per cubic foot
cP = centiPoise
(Cu)Ksf = (Undrained cohesion) thousand pounds per square foot
F = failed under own weight
* = Test could not be performed, material stuck to glass beaker, Jason with CH2M HILL said it was ok to NR
VE = volatiles expanded causing material to expanded becoming untestable. Sample failing under its own weight.
(1) calculated per method ASTM D7263 Appendix X1 using data from bulk density, water content, and solid specific gravity testing

Material tested per method. However, results were not consistent with visual observation or expected results. Anolymous results

Test Methods:
Density = ASTM D7263
Moisture Content = ASTM D2216
Particle Size Distribution = ASTM D422 and ASTM D1140
C.U Triaxial Test = ASTM D4767

BRIDGEWATER
KEMRON PROJECT # SH-0416
Summary Table for Thermal Stabilty Testing
Table 1B

Target Temperature	Description
30°C	The untreated material was heated at the target temperature for 24 hours. A gray layer formed on top of the VR sample. The VR, HC and water did not move or mixed through the test. Small peaks formed on the surface of the VR, but did not float upwared. VOC range: 301.8 - 3859 ppm
50°C	The material was heated at the target temperature for 24 hours. A layer of the VR floated to the top of the water and remained there. The VR, HC and water did not move or mixed through the test. VOC range: 311.5 - 1544 ppm
70°C	The material was heated at the target temperature for 24 hours. A thin layer of the VR moved to the top of the water. The VR and HC material moved slightly up and a thin layer of water formed beneath the HC. Overnight the water on top of the sample evaporated and the VR encapsulated around the HC. VOC range: 114.9 - 1331 ppm
90°C	The material was heated at the target temperature for 24 hours. The HC and VR material move up and down the vial, exchanging places with the water. Overnight the water on the sample evaporated and the VR expanded out of the vial. The materials did not mix. VOC range: 31 - above 50,000 ppm

Note

All samples were prepared in a 40 ml clear vial with 0.9 inch of HC untreated material on the bottom, 0.9 inch of VR untreated material above the HC, and 0.9 inch of water above the VR.

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 2A

UNTREATED MATERIAL CHEMICAL PROPERTIES

		IMP 2 VR- A			IMP 2 VR- B			IMP 2 VR- C			IMP 2 HC- A			IMP 2 HC- B			IMP 2 HC- C		
		Untreated			Untreated			Untreated			Untreated			Untreated			Untreated		
PARAMETER	**UNITS**	**RESULTS**	**QUAL**	**MDL**	**RESULTS**	**QUAL**	**MDL**	**RESULTS**	**QUAL**	**MDL**	**RESULTS**	**QUAL**	**MDL**	**RESULTS**	**QUAL**	**MDL**	**RESULTS**	**QUAL**	**MDL**
Total Organic Carbon	mg/Kg							815,000		50							606,000		50.0
pH	pH Unit	1.1		1.0	1.1		1.0	2.03		1.0	1.04		1.0	1.06		1.0	1.06		1.0
Metals																			
Aluminum	mg/Kg	319.0		1.4	323.0		1.3	360.0		1.3	227.0		1.3	286.0		1.4	164.0		1.4
Antimony	mg/Kg	1.5	J	0.2	1.1	J	0.2	1.3	J	0.2	0.3	J	0.2	0.4	J	0.2	0.3	J	0.2
Arsenic	mg/Kg	ND	U	0.2	ND	U	0.2	ND	U	0.2	6.0		0.2	1.4	J	0.3	1.9	J	0.2
Barium	mg/Kg	8.0		0.0	7.5		0.0	8.2		0.0	5.3		0.0	6.2		0.0	5.7		0.0
Beryllium	mg/Kg	0.0	J	0.0	0.0	J	0.0	0.0	J	0.0	0.0	J	0.0	0.0	J	0.0	0.0	J	0.0
Cadmium	mg/Kg	0.1	J	0.0	0.0	J	0.0	0.1	J	0.0	ND	U	0.0	ND	U	0.0	ND	U	0.0
Calcium	mg/Kg	195.0		7.4	209.0		7.3	234.0		7.2	97.6		7.0	163.0		7.9	122.0		7.5
Chromium	mg/Kg	5.2		0.0	4.8		0.0	2.8		0.0	6.3		0.0	8.4		0.0	4.2		0.0
Cobalt	mg/Kg	0.2	J	0.0	0.3	J	0.0	0.3	J	0.0	0.2	J	0.0	0.2	J	0.0	0.2	J	0.0
Copper	mg/Kg	23.5		0.1	23.8		0.1	28.6		0.1	12.5		0.1	15.4		0.1	12.8		0.1
Iron	mg/Kg	881.0		1.2	992.0		1.2	1,120		1.2	639.0		1.1	776.0		1.3	529.0		1.2
Lead	mg/Kg	62.4		0.2	64.9		0.2	67.7		0.2	59.0		0.2	76.1		0.2	71.2		0.2
Magnesium	mg/Kg	54.0		0.7	58.8		0.7	63.2		0.7	36.3		0.7	44.2		0.8	31.6		0.8
Manganese	mg/Kg	11.3		0.0	13.6		0.0	15.6		0.0	5.6		0.0	6.6		0.0	4.7		0.0
Nickel	mg/Kg	5.4		0.0	5.1		0.0	5.3		0.0	4.6		0.0	6.1		0.0	3.6		0.0
Potassium	mg/Kg	68.1		3.6	65.0		3.5	65.0		3.5	91.2		3.4	104.0		3.8	65.0		3.6
Selenium	mg/Kg	13.8		0.2	13.4		0.2	13.9		0.2	9.7		0.2	10.7		0.2	10.0		0.2
Silver	mg/Kg	ND	U	0.0	ND	U	0.0	ND	U	0.0	ND	U	0.0	0.0	J	0.0	0.0	J	0.0
Sodium	mg/Kg	3,570		5.2	4,260		5.1	4,440		5.0	5,740		4.9	6,440		5.5	4,550		5.2
Thallium	mg/Kg	2.0		0.2	1.9		0.2	2.3		0.2	0.7	J	0.1	0.9	J	0.2	0.7	J	0.2
Vanadium	mg/Kg	1.1	J	0.0	1.1	J	0.0	1.1	J	0.0	0.5	J	0.0	0.8	J	0.0	0.6	J	0.0
Zinc	mg/Kg	7.0		0.7	7.9		0.7	7.1		0.7	4.6		0.7	5.0		0.8	3.7		0.7
Mercury	mg/Kg	1.7		0.0	2.0		0.0	1.8		0.0	8.7		0.2	3.4		0.1	2.7		0.0
Semivolatile Organic Compounds																			
1,2,4-Trichlorobenzene	ug/Kg	ND	U	5,770	ND	U	5,650	ND	U	11,300	ND	U	5,450	ND	U	6,100	ND	U	2,920
1,2Diphenylhydrazine/Azobenzen	ug/Kg	ND	U	5,970	ND	U	5,850	ND	U	11,700	ND	U	5,640	ND	U	6,320	ND	U	3,030
2,4,5-Trichlorophenol	ug/Kg	ND	U	11,400	ND	U	11,100	ND	U	22,300	ND	U	10,700	ND	U	12,000	ND	U	5,770
2,4,6-Trichlorophenol	ug/Kg	ND	U	40,200	ND	U	39,300	ND	U	78,500	ND	U	37,900	ND	U	42,500	ND	U	20,400
2,4-Dichlorophenol	ug/Kg	ND	U	18,100	ND	U	17,700	ND	U	35,300	ND	U	17,100	ND	U	19,100	ND	U	9,160
2,4-Dimethylphenol	ug/Kg	ND	U	119,000	ND	U	116,000	ND	U	232,000	ND	U	112,000	ND	U	126,000	ND	U	60,300
2,4-Dinitrophenol	ug/Kg	ND	U	77,600	ND	U	76,000	ND	U	152,000	ND	U	73,200	ND	U	82,100	ND	U	39,300
2,4-Dinitrotoluene	ug/Kg	ND	U	10,200	ND	U	9,990	ND	U	20,000	ND	U	9,640	ND	U	10,800	ND	U	5,170
2,6-Dinitrotoluene	ug/Kg	ND	U	13,600	ND	U	13,300	ND	U	26,500	ND	U	12,800	ND	U	14,400	ND	U	6,880
2-Chloronaphthalene	ug/Kg	ND	U	5,410	ND	U	5,300	ND	U	10,600	ND	U	5,110	ND	U	5,720	ND	U	2,740
2-Chlorophenol	ug/Kg	ND	U	5,920	ND	U	5,800	ND	U	11,600	ND	U	5,590	ND	U	6,260	ND	U	3,000
2-Methylnaphthalene	ug/Kg	320,000		4,580	243,000		4,480	589,000		8,940	60,600	J	4,320	55,400	J	4,840	39,100	J	2,320
2-Nitroaniline	ug/Kg	ND	U	12,300	ND	U	12,000	ND	U	23,900	ND	U	11,600	ND	U	13,000	ND	U	6,210
2-Nitrophenol	ug/Kg	ND	U	12,500	ND	U	12,200	ND	U	24,400	ND	U	11,800	ND	U	13,200	ND	U	6,340
3,3'-Dichlorobenzidine	ug/Kg	ND	U	156,000	ND	U	153,000	ND	U	305,000	ND	U	147,000	ND	U	165,000	ND	U	79,100
3-Nitroaniline	ug/Kg	ND	U	11,200	ND	U	11,000	ND	U	22,000	ND	U	10,600	ND	U	11,900	ND	U	5,690
4,6-Dinitro-2-methylphenol	ug/Kg	ND	U	76,600	ND	U	75,000	ND	U	150,000	ND	U	72,300	ND	U	81,000	ND	U	38,800
4-Bromophenyl phenyl ether	ug/Kg	ND	U	9,450	ND	U	9,250	ND	U	18,500	ND	U	8,910	ND	U	9,990	ND	U	4,780
4-Chloro-3-methylphenol	ug/Kg	ND	U	16,100	ND	U	15,700	ND	U	31,400	ND	U	15,200	ND	U	17,000	ND	U	8,150
4-Chloroaniline	ug/Kg	ND	U	11,300	ND	U	11,100	ND	U	22,200	ND	U	10,700	ND	U	12,000	ND	U	5,740
4-Chlorophenyl phenyl ether	ug/Kg	ND	U	9,550	ND	U	9,350	ND	U	18,700	ND	U	9,010	ND	U	10,100	ND	U	4,840
4-Nitroaniline	ug/Kg	ND	U	83,200	ND	U	81,500	ND	U	163,000	ND	U	78,500	ND	U	88,000	ND	U	42,200
4-Nitrophenol	ug/Kg	ND	U	47,500	ND	U	46,500	ND	U	92,900	ND	U	44,900	ND	U	50,300	ND	U	24,100
Acenaphthene	ug/Kg	50,600	J	6,030	39,100	J	5,900	94,800	J	11,800	11,600	J	5,690	8,320	J	6,370	5,930	J	3,050
Acenaphthylene	ug/Kg	ND	U	6,690	ND	U	6,550	ND	U	13,100	ND	U	6,310	ND	U	7,070	ND	U	3,390
Aniline	ug/Kg	22,300	J	15,700	ND	U	15,400	58,700	J	30,700	ND	U	14,800	ND	U	16,600	ND	U	7,970
Anthracene	ug/Kg	ND	U	5,820	ND	U	5,700	ND	U	11,400	ND	U	5,490	ND	U	6,160	ND	U	2,950
Benzo(a)anthracene	ug/Kg	ND	U	13,200	ND	U	12,900	ND	U	25,700	ND	U	12,400	ND	U	13,900	ND	U	6,670
Benzo(a)pyrene	ug/Kg	ND	U	6,280	ND	U	6,150	ND	U	12,300	ND	U	5,930	ND	U	6,640	ND	U	3,180
Benzo(b)fluoranthene	ug/Kg	ND	U	15,500	ND	U	15,200	ND	U	30,300	ND	U	14,600	ND	U	16,400	ND	U	7,860
Benzo(g,h,i)perylene	ug/Kg	ND	U	5,360	ND	U	5,250	ND	U	10,500	ND	U	5,060	ND	U	5,670	ND	U	2,720
Benzo(k)fluoranthene	ug/Kg	ND	U	6,840	ND	U	6,700	ND	U	13,400	ND	U	6,460	ND	U	7,240	ND	U	3,470
Benzyl alcohol	ug/Kg	ND	U	23,000	ND	U	22,500	ND	U	45,000	ND	U	21,700	ND	U	24,400	ND	U	11,700
Bis(2-Chloroethoxy)methane	ug/Kg	ND	U	13,200	ND	U	12,900	ND	U	25,700	ND	U	12,400	ND	U	13,900	ND	U	6,670
Bis(2-Chloroethyl)ether	ug/Kg	ND	U	12,400	ND	U	12,100	ND	U	24,200	ND	U	11,700	ND	U	13,100	ND	U	6,280
Bis(2-Chloroisopropyl)ether	ug/Kg	ND	U	10,500	ND	U	10,300	ND	U	20,600	ND	U	9,930	ND	U	11,100	ND	U	5,330
Bis(2-Ethylhexyl)phthalate	ug/Kg	ND	U	10,000	ND	U	9,800	ND	U	19,600	ND	U	9,440	ND	U	10,600	ND	U	5,070
Butyl benzyl phthalate	ug/Kg	ND	U	3,030	ND	U	2,960	ND	U	5,920	ND	U	2,860	ND	U	3,200	ND	U	1,530
Carbazole	ug/Kg	ND	U	10,200	ND	U	9,990	ND	U	20,000	ND	U	9,640	ND	U	10,800	ND	U	5,170
Chrysene	ug/Kg	ND	U	7,400	ND	U	7,250	ND	U	14,500	ND	U	6,990	ND	U	7,830	ND	U	3,750
Di-n-butyl phthalate	ug/Kg	ND	U	6,690	ND	U	6,550	ND	U	13,100	ND	U	6,310	ND	U	7,070	ND	U	3,390
Di-n-octyl phthalate	ug/Kg	ND	U	2,270	ND	U	2,220	ND	U	4,430	ND	U	2,140	ND	U	2,400	ND	U	1,150
Dibenz(a,h)anthracene	ug/Kg	ND	U	5,870	ND	U	5,750	ND	U	11,500	ND	U	5,540	ND	U	6,210	ND	U	2,970
Dibenzofuran	ug/Kg	ND	U	5,460	ND	U	5,350	ND	U	10,700	ND	U	5,160	ND	U	5,780	ND	U	2,770
Diethyl phthalate	ug/Kg	ND	U	10,400	ND	U	10,100	ND	U	20,300	ND	U	9,780	ND	U	11,000	ND	U	5,250
Dimethyl phthalate	ug/Kg	ND	U	7,200	ND	U	7,050	ND	U	14,100	ND	U	6,790	ND	U	7,610	ND	U	3,650
Fluoranthene	ug/Kg	ND	U	3,330	ND	U	3,260	ND	U	6,510	ND	U	3,140	ND	U	3,520	ND	U	1,690
Fluorene	ug/Kg	1,310,000		6,590	941,000		6,450	2,390,000		12,900	223,000		6,220	207,000		6,970	133,000		3,340
Hexachlorobenzene	ug/Kg	ND	U	9,750	ND	U	9,550	ND	U	19,100	ND	U	9,200	ND	U	10,300	ND	U	4,940
Hexachlorobutadiene	ug/Kg	ND	U	10,200	ND	U	9,990	ND	U	20,000	ND	U	9,640	ND	U	10,800	ND	U	5,170
Hexachlorocyclopentadiene	ug/Kg	ND	U	61,300	ND	U	60,000	ND	U	120,000	ND	U	57,800	ND	U	64,800	ND	U	31,000
Hexachloroethane	ug/Kg	ND	U	8,120	ND	U	7,950	ND	U	15,900	ND	U	7,660	ND	U	8,590	ND	U	4,110
Indeno(1,2,3-cd)pyrene	ug/Kg	ND	U	15,800	ND	U	15,400	ND	U	30,800	ND	U	14,900	ND	U	16,700	ND	U	7,990
Isophorone	ug/Kg	ND	U	5,920	ND	U	5,800	ND	U	11,600	ND	U	5,590	ND	U	6,260	ND	U	3,000
Nitrobenzene	ug/Kg	ND	U	9,400	ND	U	9,200	ND	U	18,400	ND	U	8,870	ND	U	9,940	ND	U	4,760
Pentachlorophenol	ug/Kg	ND	U	64,300	ND	U	63,000	ND	U	126,000	ND	U	60,700	ND	U	68,000	ND	U	32,600
Phenanthrene	ug/Kg	ND	U	5,410	ND	U	5,300	ND	U	10,600	ND	U	5,110	9,400	J	5,720	5,240	J	2,740
Phenol	ug/Kg	ND	U	10,100	ND	U	9,890	ND	U	19,800	ND	U	9,540	ND	U	10,700	ND	U	5,120
Pyrene	ug/Kg	ND	U	7,810	ND	U	7,650	ND	U	15,300	ND	U	7,370	ND	U	8,260	ND	U	3,960
Pyridine	ug/Kg	ND	U	61,300	ND	U	60,000	ND	U	120,000	ND	U	57,800	ND	U	64,800	ND	U	31,000
m,p-Cresol	ug/Kg	ND	U	23,800	ND	U	23,300	ND	U	46,500	ND	U	22,500	ND	U	25,200	ND	U	12,100
n-Nitrosodi-n-propylamine	ug/Kg	ND	U	7,710	ND	U	7,550	ND	U	15,100	ND	U	7,280	ND	U	8,150	ND	U	3,910
n-Nitrosodimethylamine	ug/Kg	ND	U	23,100	ND	U	22,600	ND	U	45,200	ND	U	21,800	ND	U	24,500	ND	U	11,700
n-Nitrosodiphenylamine	ug/Kg	ND	U	5,360	ND	U	5,250	ND	U	10,500	ND	U	5,060	ND	U	5,670	ND	U	2,720
o-Cresol	ug/Kg	ND	U	5,970	ND	U	5,850	ND	U	11,700	ND	U	5,640	ND	U	6,320	ND	U	3,030

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 2A

UNTREATED MATERIAL CHEMICAL PROPERTIES

		IMP 2 VR- A			IMP 2 VR- B			IMP 2 VR- C			IMP 2 HC- A			IMP 2 HC- B			IMP 2 HC- C		
		Untreated			Untreated			Untreated			Untreated			Untreated			Untreated		
PARAMETER	UNITS	RESULTS	QUAL	MDL	RESULTS	QUAL	MDL	RESULTS	QUAL	MDL	RESULTS	QUAL	MDL	RESULTS	QUAL	MDL	RESULTS	QUAL	MDL
Volatile Organic Compounds																			
1,1,1,2-Tetrachloroethane	ug/Kg	ND	U	20,700	ND	U	22,100	ND	U	10,700	ND	U	35,000	ND	U	43,900	ND	U	41,400
1,1,1-Trichloroethane	ug/Kg	ND	U	36,300	ND	U	38,900	ND	U	18,800	ND	U	61,400	ND	U	77,000	ND	U	72,700
1,1,2,2-Tetrachloroethane	ug/Kg	ND	U	17,500	ND	U	18,700	ND	U	9,060	ND	U	29,500	ND	U	37,000	ND	U	35,000
1,1,2-Trichloroethane	ug/Kg	ND	U	20,500	ND	U	22,000	ND	U	10,700	ND	U	34,700	ND	U	43,500	ND	U	41,100
1,1-Dichloroethane	ug/Kg	ND	U	22,800	ND	U	24,400	ND	U	11,800	ND	U	38,600	ND	U	48,400	ND	U	45,700
1,1-Dichloroethene	ug/Kg	ND	U	35,600	ND	U	38,000	ND	U	18,400	ND	U	60,100	ND	U	75,400	ND	U	71,200
1,1-Dichloropropene	ug/Kg	ND	U	37,400	ND	U	40,000	ND	U	19,400	ND	U	63,200	ND	U	79,300	ND	U	74,900
1,2,3-Trichloropropane	ug/Kg	ND	U	17,600	ND	U	18,900	ND	U	9,140	ND	U	29,800	ND	U	37,400	ND	U	35,300
1,2,4-Trichlorobenzene	ug/Kg	ND	U	54,400	ND	U	58,200	ND	U	28,200	ND	U	92,000	ND	U	115,000	ND	U	109,000
1,2,4-Trimethylbenzene	ug/Kg	557,000	J	55,200	610,000	J	59,000	434,000		28,600	ND	U	93,300	749,000	J	117,000	733,000	J	110,000
1,2-Dibromo-3-chloropropane	ug/Kg	ND	U	61,500	ND	U	65,700	ND	U	31,900	ND	U	104,000	ND	U	130,000	ND	U	123,000
1,2-Dibromoethane	ug/Kg	ND	U	22,100	ND	U	23,600	ND	U	11,400	ND	U	37,300	ND	U	46,800	ND	U	44,200
1,2-Dichlorobenzene	ug/Kg	1,650,000		42,300	2,120,000		45,300	1,810,000		21,900	ND	U	71,500	551,000	J	89,700	662,000	J	84,700
1,2-Dichloroethane	ug/Kg	ND	U	30,400	ND	U	32,500	ND	U	15,700	ND	U	51,300	ND	U	64,300	ND	U	60,700
1,2-Dichloroethene(Total)	ug/Kg	ND	U	35,900	ND	U	38,400	ND	U	18,600	ND	U	60,600	ND	U	76,000	ND	U	71,800
1,2-Dichloropropane	ug/Kg	ND	U	23,600	ND	U	25,200	ND	U	12,200	ND	U	39,900	ND	U	50,000	ND	U	47,200
1,3,5-Trimethylbenzene	ug/Kg	403,000	J	57,700	466,000	J	61,600	301,000	J	29,900	ND	U	97,400	625,000	J	122,000	607,000	J	115,000
1,3-Dichlorobenzene	ug/Kg	ND	U	39,900	ND	U	42,600	ND	U	20,700	ND	U	67,400	ND	U	84,500	ND	U	79,800
1,3-Dichloropropane	ug/Kg	ND	U	24,200	ND	U	25,900	ND	U	12,600	ND	U	40,900	ND	U	51,300	ND	U	48,500
1,4-Dichlorobenzene	ug/Kg	ND	U	35,400	183,000	J	37,900	ND	U	18,400	ND	U	59,800	ND	U	75,100	ND	U	70,900
2,2-Dichloropropane	ug/Kg	ND	U	38,200	ND	U	40,800	ND	U	19,800	ND	U	64,500	ND	U	80,900	ND	U	76,400
2-Butanone	ug/Kg	ND	U	79,400	ND	U	84,900	ND	U	41,200	ND	U	134,000	ND	U	168,000	ND	U	159,000
2-Chlorotoluene	ug/Kg	ND	U	33,600	ND	U	35,900	ND	U	17,400	ND	U	56,700	ND	U	71,200	ND	U	67,200
2-Hexanone	ug/Kg	ND	U	66,400	ND	U	71,000	ND	U	34,400	ND	U	112,000	ND	U	141,000	ND	U	133,000
4-Chlorotoluene	ug/Kg	ND	U	36,000	ND	U	38,500	ND	U	18,700	ND	U	60,900	ND	U	76,400	ND	U	72,100
4-Isopropyltoluene	ug/Kg	41,500	J	32,200	ND	U	34,400	234,000	J	16,700	ND	U	54,400	ND	U	68,200	ND	U	64,400
4-Methyl-2-pentanone	ug/Kg	ND	U	20,200	ND	U	21,600	ND	U	10,500	ND	U	34,200	ND	U	42,900	ND	U	40,500
Acetone	ug/Kg	ND	U	158,000	ND	U	169,000	ND	U	81,900	ND	U	267,000	ND	U	335,000	ND	U	316,000
Benzene	ug/Kg	18,900,000		23,300	26,300,000		24,900	18,100,000		24,200	21,400,000		39,400	35,500,000		49,400	42,400,000		46,600
Bromobenzene	ug/Kg	ND	U	23,900	ND	U	25,600	ND	U	12,400	ND	U	40,400	ND	U	50,700	ND	U	47,900
Bromochloromethane	ug/Kg	ND	U	20,700	ND	U	22,100	ND	U	10,700	ND	U	35,000	ND	U	43,900	ND	U	41,400
Bromodichloromethane	ug/Kg	ND	U	24,800	ND	U	26,600	ND	U	12,900	ND	U	42,000	ND	U	52,600	ND	U	49,700
Bromoform	ug/Kg	ND	U	24,400	ND	U	26,100	ND	U	12,600	ND	U	41,200	ND	U	51,700	ND	U	48,800
Bromomethane	ug/Kg	ND	U	46,500	ND	U	49,700	ND	U	24,100	ND	U	78,500	ND	U	98,500	ND	U	93,000
Carbon disulfide	ug/Kg	ND	U	49,800	ND	U	53,300	ND	U	25,800	ND	U	84,200	ND	U	106,000	ND	U	99,700
Carbon tetrachloride	ug/Kg	ND	U	31,000	ND	U	33,100	ND	U	16,100	ND	U	52,300	ND	U	65,600	ND	U	62,000
Chlorobenzene	ug/Kg	ND	U	22,800	ND	U	24,400	ND	U	11,800	ND	U	38,600	ND	U	48,400	ND	U	45,700
Chloroethane	ug/Kg	ND	U	50,800	ND	U	54,300	ND	U	26,300	ND	U	85,800	ND	U	108,000	ND	U	102,000
Chloroform	ug/Kg	ND	U	33,000	ND	U	35,300	ND	U	17,100	ND	U	55,700	ND	U	69,900	ND	U	66,000
Chloromethane	ug/Kg	ND	U	36,300	ND	U	38,900	ND	U	18,800	ND	U	61,400	ND	U	77,000	ND	U	72,700
Dibromochloromethane	ug/Kg	ND	U	33,400	ND	U	35,700	ND	U	17,300	ND	U	56,500	ND	U	70,800	ND	U	66,900
Dibromomethane	ug/Kg	ND	U	35,400	ND	U	37,900	ND	U	18,400	ND	U	59,800	ND	U	75,100	ND	U	70,900
Dichlorodifluoromethane	ug/Kg	ND	U	34,300	ND	U	36,700	ND	U	17,800	ND	U	58,000	ND	U	72,800	ND	U	68,700
Ethylbenzene	ug/Kg	110,000	J	28,100	ND	U	30,000	107,000	J	14,500	ND	U	47,400	ND	U	59,500	ND	U	56,100
Hexachlorobutadiene	ug/Kg	ND	U	32,800	ND	U	35,100	ND	U	17,000	ND	U	55,400	ND	U	69,500	ND	U	65,700
Isopropylbenzene (Cumene)	ug/Kg	473,000	J	28,400	550,000	J	30,300	353,000	J	14,700	ND	U	47,900	769,000	J	60,100	778,000	J	56,800
Methyl iodide	ug/Kg	ND	U	189,000	ND	U	202,000	ND	U	97,800	ND	U	319,000	ND	U	400,000	ND	U	377,000
Methylene chloride	ug/Kg	ND	U	67,800	ND	U	72,500	ND	U	35,100	ND	U	115,000	ND	U	144,000	ND	U	136,000
Naphthalene	ug/Kg	3,060,000		49,200	3,810,000		52,600	3,360,000		25,500	1,490,000		83,200	1,890,000		104,000	2,070,000		98,500
Styrene	ug/Kg	ND	U	23,600	ND	U	25,200	ND	U	12,200	ND	U	39,900	ND	U	50,000	ND	U	47,200
Tetrachloroethene	ug/Kg	ND	U	45,400	ND	U	48,500	ND	U	23,500	ND	U	76,700	ND	U	96,200	ND	U	90,800
Thiophene	ug/Kg	ND	B		ND	B		ND	B		ND	B		ND	B		ND	B	
Toluene	ug/Kg	5,570,000		23,800	7,510,000		25,400	5,840,000		12,300	4,260,000		40,200	7,220,000		50,400	9,120,000		47,600
Trichloroethene	ug/Kg	ND	U	32,700	ND	U	34,900	ND	U	16,900	ND	U	55,200	ND	U	69,200	ND	U	65,400
Trichlorofluoromethane	ug/Kg	ND	U	40,000	ND	U	42,800	ND	U	20,700	ND	U	67,600	ND	U	84,800	ND	U	80,100
Trichlorotrifluoroethane	ug/Kg	ND	U	30,700	ND	U	32,800	ND	U	15,900	ND	U	51,800	ND	U	65,000	ND	U	61,400
Vinyl acetate	ug/Kg	ND	U	21,600	ND	U	23,100	ND	U	11,200	ND	U	36,500	ND	U	45,800	ND	U	43,300
Vinyl chloride	ug/Kg	ND	U	41,700	ND	U	44,600	ND	U	21,600	ND	U	70,500	ND	U	88,400	ND	U	83,500
Xylene (total)	ug/Kg	1,800,000		61,500	2,270,000		65,700	1,590,000		31,900	1,670,000	J	104,000	2,410,000	J	130,000	2,530,000	J	123,000
cis-1,2-Dichloroethene	ug/Kg	ND	U	22,700	ND	U	24,300	ND	U	11,800	ND	U	38,300	ND	U	48,100	ND	U	45,400
cis-1,3-Dichloropropene	ug/Kg	ND	U	28,400	ND	U	30,300	ND	U	14,700	ND	U	47,900	ND	U	60,100	ND	U	56,800
m,p-Xylene	ug/Kg	1,300,000		45,100	1,680,000		48,200	1,190,000		23,400	1,090,000	J	76,200	1,640,000		95,500	1,740,000		90,200
n-Butylbenzene	ug/Kg	ND	U	35,700	ND	U	38,200	ND	U	18,500	ND	U	60,400	ND	U	75,700	ND	U	71,500
n-Propylbenzene	ug/Kg	ND	U	113,000	ND	U	121,000	ND	U	58,700	ND	U	191,000	ND	U	240,000	ND	U	227,000
o-Xylene	ug/Kg	500,000	J	20,700	591,000	J	22,100	397,000	J	10,700	583,000	J	35,000	767,000	J	43,900	788,000	J	41,400
sec-Butylbenzene	ug/Kg	504,000	J	30,200	575,000	J	32,300	358,000	J	15,700	ND	U	51,000	ND	U	64,000	ND	U	60,400
tert-Butyl methyl ether (MTBE)	ug/Kg	ND	U	18,700	ND	U	20,000	ND	U	9,700	ND	U	31,600	ND	U	39,600	ND	U	37,400
tert-Butylbenzene	ug/Kg	ND	U	39,300	ND	U	42,000	ND	U	20,400	ND	U	66,300	ND	U	83,200	ND	U	78,500
trans-1,2-Dichloroethene	ug/Kg	ND	U	20,100	ND	U	21,500	ND	U	10,400	ND	U	33,900	ND	U	42,600	ND	U	40,200
trans-1,3-Dichloropropene	ug/Kg	ND	U	26,100	ND	U	27,900	ND	U	13,500	ND	U	44,000	ND	U	55,200	ND	U	52,200
trans-1,4-Dichloro-2-butene	ug/Kg	ND	U	79,400	ND	U	84,900	ND	U	41,200	ND	U	134,000	ND	U	168,000	ND	U	159,000

KEMRON ENVIRONMENTAL SERVICES

THERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 2 B

UNTREATED MATERIAL CHEMICAL PROPERTIES (TICS)

PARAMETER	UNITS	RETENTION TIME	IMP 2 VR-A RESULT	IMP 2 VR-B RESULT	IMP 2 VR-C RESULT	IMP 2 HC-A RESULT	IMP 2 HC-B RESULT	IMP 2 HC-C RESULT
VOCs								
No TICs Detected								
Semi Volatiles Organic Compounds								
Ethyl Chloride	ug/Kg	1.07						83,400
Toluene	ug/Kg	1.29	1,440,000	1,590,000	3,210,000	1,850,000	1,850,000	1,030,000
Ethylbenzene	ug/Kg	1.74	60,900			71,300	65,000	36,100
p-Xylene	ug/Kg	1.78	577,000	554,000		547,000		295,000
Benzene, 1,3-dimethyl-	ug/Kg	1.78			1,110,000		481,000	
Benzene, 1,3-dimethyl-	ug/Kg	1.89				148,000		
p-Xylene	ug/Kg	1.89					130,000	
Benzene, 1,2-dimethyl-	ug/Kg	1.89						78,400
Benzene, (1-methylethyl)-	ug/Kg	2.03					137,000	
Benzene, (1-methylethyl)-	ug/Kg	2.04				159,000		83,900
1,2,4-Trimethylbenzene	ug/Kg	2.37				124,000		
4-tert-Butyltoluene	ug/Kg	2.79					105,000	72,500
Benzene, cyclopentyl-	ug/Kg	3.33	47,100	44,400				
Benzene, [2-methyl-1-(1-methylethyl	ug/Kg	3.46	62,900		119,000			
Benzene, (1-ethylpropyl)-	ug/Kg	3.46		58,800				
1-Methyl-4-N-hexylbenzene	ug/Kg	3.57		66,900		41,500		
Benzene, (1-methylhexyl)-	ug/Kg	3.57			141,000		42,100	
Unknown	ug/Kg	3.57						21,400
Unknown	ug/Kg	3.58	71,600					
Benzene, cyclohexyl-	ug/Kg	3.70	70,400	67,200	146,000	53,500	50,900	27,400
Unknown	ug/Kg	3.74		94,700				
Benzene, 1-ethyl-3-(1-methylethyl)-	ug/Kg	3.81	117,000		227,000			
Benzene, 1-ethyl-4-(1-methylethyl)-	ug/Kg	3.81		122,000				
Benzene, 4-ethyl-1,2-dimethyl-	ug/Kg	3.91	134,000			77,500		
2-Hexanone, 5-methyl-5-phenyl-	ug/Kg	3.91		125,000				
Benzenepropanoic acid, .alpha.,.alp	ug/Kg	3.91					63,900	
Benzene, 4-(chloromethyl)-1,2-dimet	ug/Kg	3.91						37,400
Benzene, 1-cyclohexyl-3-methyl-	ug/Kg	4.06					85,200	49,200
Diphenylmethane	ug/Kg	4.07	201,000	185,000	374,000	92,700		
Benzene, 1-methyl-4-(phenylmethyl)-	ug/Kg	4.42	203,000				67,000	
2,2'-Dimethylbiphenyl	ug/Kg	4.42			411,000			
1,1'-Biphenyl, 2,3'-dimethyl-	ug/Kg	4.42				88,100		
Benzene, 1-methyl-3-[(4-methylpheny	ug/Kg	4.53	190,000		401,000			
Benzene, 1,1'-methylenebis[4-methyl	ug/Kg	4.53		170,000		93,100		53,400
Benzene, 1,2-dimethyl-4-(phenylmeth	ug/Kg	4.53					95,800	
Benzene, 1,1'-(1-methylethylidene)b	ug/Kg	4.58	727,000	683,000	1,410,000	364,000	334,000	195,000
Unknown	ug/Kg	4.75				112,000		
Unknown	ug/Kg	4.78						55,000

KEMRON ENVIRONMENTAL SERVICES

THERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 2 B

UNTREATED MATERIAL CHEMICAL PROPERTIES (TICS)

PARAMETER	UNITS	RETENTION TIME	IMP 2 VR-A RESULT	IMP 2 VR-B RESULT	IMP 2 VR-C RESULT	IMP 2 HC-A RESULT	IMP 2 HC-B RESULT	IMP 2 HC-C RESULT
Stilbene, 4-amino-(E)-	ug/Kg	4.82	3,110,000					
Naphthalene, 1,2,3-trimethyl-4-prop	ug/Kg	4.82		2,620,000		743,000	671,000	398,000
Benzenamine, 3-(2-phenylethenyl)-,	ug/Kg	4.82			5,800,000			
1H-Indene, 2,3-dihydro-1-methyl-3-p	ug/Kg	4.85	282,000					
Naphthalene, 1,2,3-trimethyl-4-prop	ug/Kg	4.90	613,000		1,110,000			
Unknown	ug/Kg	4.90		516,000		145,000		78,700
Stilbene, 4-amino-(E)-	ug/Kg	4.90					122,000	
9H-Carbazol-3-amine, 9-ethyl-	ug/Kg	5.00	570,000			141,000		
9,9-Dimethyl-9-silafluorene	ug/Kg	5.00		472,000				
N,N-Diethyl-.alpha.-(aminomethylene	ug/Kg	5.00			1,150,000			
Unknown	ug/Kg	5.00					99,500	65,900
Unknown	ug/Kg	5.07	628,000		1,790,000			
Unknown	ug/Kg	5.07		791,000		221,000	181,000	106,000
Unknown	ug/Kg	5.24	310,000					
Silane, trimethyl[5-methyl-2-(1-met	ug/Kg	5.30		345,000			105,000	
2H-3,9a-Methano-1-benzoxepin, octah	ug/Kg	5.30			836,000			
1,4-Benzenediol, 2,5-bis(1,1-dimeth	ug/Kg	5.30				117,000		53,700
Unknown	ug/Kg	5.37			508,000			
Sulfur, mol. (S8)	ug/Kg	5.94		241,000		198,000	202,000	97,600
Sulfur, mol. (S8)	ug/Kg	5.95			515,000			
Unknown	ug/Kg	7.00		334,000	833,000			
Unknown	ug/Kg	7.42		323,000	625,000			

Note
TICS=Tentatively Identified Compounds
ug/kg=micrograms per kilogram
Shaded areas indicate non detection

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 3A

TRIAL OFF-GAS DAILY MONITORING RESULTS

PARAMETER	Time Zero (ambient)	Day Zero					Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
		30°C	50°C	70°C	90°C	100°C										
IMP2 - VR - 100°C																
H2S	3.0	0.0	27.0	135.0	> 337	NA	> 337	> 337	XX	XX	XX	XX	XX	XX	XX	XX
CO*	XX	XX	8.0	39.0	132.0	NA	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
VOCs	> 2,500	>2,821	>50,000	>50,000	>50,000	NA	>50,000	>50,000	37,000	29,579	6,414	8,205	2,360	XX	1,190	758
LEL	XX	XX	99.0	>100	>100	NA	>100	xx	XX	XX	XX	XX	XX	XX	XX	XX

S02 was not programed in the FID.

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TRIAL CONDENSATE DAILY MONITORING RESULTS

PARAMETER	Day Zero 30°C	Day Zero 50°C	Day Zero 70°C	Day Zero 90°C	Day Zero 100°C	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
IMP2 - VR - TRIAL RUN															
Weight of Condensate Daily (g)	NC	NC	XX	XX	XX	143.92	XX	XX	XX	XX	XX	XX	XX	XX	62.99
Analysis and Observations	NC	NC	Begin seeing condensate production	XX	XX	**3 Layers** Top = Black liquid, color Middle- lsight opaque white with brown solids Bottom- yellow brown solids	XX	XX	XX	XX	XX	XX	XX	XX	Post Day One Condensate: 2 Layers: Top- Brown Napl Bottom white opaque liquid
pH - Aquesous Layer	NC	NC	XX	2	XX	2	XX	XX	XX	XX	XX	XX	XX	XX	2.0
pH - Non-Aquesous Layer	NC	NC	XX	XX	XX	3.2 / 2.6	XX	XX	XX	XX	XX	XX	XX	XX	2.5

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 3C

TRIAL OFF-GAS ANALYTICAL CHARACTERIZATION
Volatile Organic Compounds (TO-15)

PARAMETER	UNITS	IMP-2 VR T 0 (ppbv)*		IMP-2 VR DAY 1		IMP-2 VR DAY 5	
		RESULT	RPT. LIMIT	RESULT	RPT. LIMIT	RESULT	RPT. LIMIT
Volatile Organic Compounds							
Freon 12	ug/m^3	ND	5,000	ND	36,000	ND	4,300
Freon 114	ug/m^3	ND	5,000	ND	51,000	ND	6,100
Chloromethane	ug/m^3	54,000	20,000	ND	61,000	15,000	7,200
Vinyl Chloride	ug/m^3	ND	5,000	ND	19,000	ND	2,200
1,3-Butadiene	ug/m^3	ND	5,000	ND	16,000	ND	1,900
Bromomethane	ug/m^3	ND	5,000	ND	28,000	ND	3,400
Chloroethane	ug/m^3	ND	5,000	ND	78,000	ND	9,200
Freon 11	ug/m^3	ND	5,000	ND	41,000	ND	4,900
Ethanol	ug/m^3	ND	20,000	ND	55,000	ND	6,600
Freon 113	ug/m^3	ND	5,000	ND	56,000	ND	6,700
1,1-Dichloroethene	ug/m^3	ND	5,000	ND	29,000	ND	3,500
Acetone	ug/m^3	ND	20,000	150,000	70,000	140,000	8,300
2-Propanol	ug/m^3	ND	20,000	ND	72,000	ND	8,600
Carbon Disulfide	ug/m^3	85,000	5,000	200,000	23,000	6,000	2,700
3-Chloropropene	ug/m^3	ND	20,000	ND	92,000	ND	11,000
Methylene Chloride	ug/m^3	ND	5,000	ND	26,000	ND	3,000
Methyl tert-butyl ether	ug/m^3	ND	5,000	ND	26,000	ND	3,200
trans-1,2-Dichloroethene	ug/m^3	ND	5,000	ND	29,000	ND	3,500
Hexane	ug/m^3	14,000	5,000	96,000	26,000	ND	3,100
1,1-Dichloroethane	ug/m^3	ND	5,000	ND	30,000	ND	3,500
2-Butanone (Methyl Ethyl Ketone)	ug/m^3	ND	5,000	ND	87,000	ND	10,000
cis-1,2-Dichloroethene	ug/m^3	ND	5,000	ND	29,000	ND	3,500
Tetrahydrofuran	ug/m^3	ND	5,000	ND	22,000	ND	2,600
Chloroform	ug/m^3	ND	5,000	ND	36,000	ND	4,300
1,1,1-Trichloroethane	ug/m^3	ND	5,000	ND	40,000	ND	4,800
Cyclohexane	ug/m^3	9,000	5,000	31,000	25,000	ND	3,000
Carbon Tetrachloride	ug/m^3	ND	5,000	ND	46,000	ND	5,500
2,2,4-Trimethylpentane	ug/m^3	ND	5,000	ND	34,000	ND	4,100
Benzene	ug/m^3	2,500,000	5,000	16,000,000	23,000	1,200,000	2,800
1,2-Dichloroethane	ug/m^3	ND	5,000	ND	30,000	ND	3,500
Heptane	ug/m^3	ND	5,000	ND	30,000	ND	3,600
Trichloroethene	ug/m^3	ND	5,000	ND	40,000	ND	4,700
1,2-Dichloropropane	ug/m^3	ND	5,000	ND	34,000	ND	4,000
1,4-Dioxane	ug/m^3	ND	20,000	ND	100,000	ND	13,000
Bromodichloromethane	ug/m^3	ND	5,000	ND	49,000	ND	5,900
cis-1,3-Dichloropropene	ug/m^3	ND	5,000	ND	33,000	ND	4,000
4-Methyl-2-pentanone	ug/m^3	ND	5,000	ND	30,000	ND	3,600
Toluene	ug/m^3	34,000	5,000	200,000	28,000	80,000	3,300
trans-1,3-Dichloropropene	ug/m^3	ND	5,000	ND	33,000	ND	4,000
1,1,2-Trichloroethane	ug/m^3	ND	5,000	ND	40,000	ND	4,800
Tetrachloroethene	ug/m^3	ND	5,000	ND	50,000	ND	5,900
2-Hexanone	ug/m^3	ND	20,000	ND	120,000	ND	14,000
Dibromochloromethane	ug/m^3	ND	5,000	ND	63,000	ND	7,400
1,2-Dibromoethane (EDB)	ug/m^3	ND	5,000	ND	56,000	ND	6,700

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 3C

TRIAL OFF-GAS ANALYTICAL CHARACTERIZATION
Volatile Organic Compounds (TO-15)

PARAMETER	UNITS	IMP-2 VR T 0 (ppbv)*		IMP-2 VR DAY 1		IMP-2 VR DAY 5	
		RESULT	RPT. LIMIT	RESULT	RPT. LIMIT	RESULT	RPT. LIMIT
Chlorobenzene	ug/m^3	ND	5,000	ND	34,000	ND	4,000
Ethyl Benzene	ug/m^3	ND	5,000	ND	32,000	ND	3,800
m,p-Xylene	ug/m^3	ND	5,000	ND	32,000	ND	3,800
o-Xylene	ug/m^3	ND	5,000	ND	32,000	ND	3,800
Styrene	ug/m^3	ND	5,000	ND	31,000	ND	3,700
Bromoform	ug/m^3	ND	5,000	ND	76,000	ND	9,000
Cumene	ug/m^3	ND	5,000	ND	36,000	ND	4,300
1,1,2,2-Tetrachloroethane	ug/m^3	ND	5,000	ND	50,000	ND	6,000
Propylbenzene	ug/m^3	ND	5,000	ND	36,000	ND	4,300
4-Ethyltoluene	ug/m^3	ND	5,000	ND	36,000	ND	4,300
1,3,5-Trimethylbenzene	ug/m^3	ND	5,000	ND	36,000	ND	4,300
1,2,4-Trimethylbenzene	ug/m^3	ND	5,000	ND	36,000	ND	4,300
1,3-Dichlorobenzene	ug/m^3	ND	5,000	ND	44,000	ND	5,300
1,4-Dichlorobenzene	ug/m^3	ND	5,000	ND	44,000	ND	5,300
alpha-Chlorotoluene	ug/m^3	ND	5,000	ND	38,000	ND	4,500
1,2-Dichlorobenzene	ug/m^3	ND	5,000	ND	44,000	ND	5,300
1,2,4-Trichlorobenzene	ug/m^3	ND	20,000	ND	220,000	ND	26,000
Hexachlorobutadiene	ug/m^3	ND	20,000	ND	310,000	ND	37,000
Naphthalene	ug/m^3	ND	20,000	ND	150,000	ND	18,000

* Sample size is 40 ml vial with approximately 5.0 grams of sample
E = Exceeds instrument calibration range
RPT. LIMIT = Reporting limit

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SE-0416

TABLE 3D

TRIAL OFF-GAS ANALYTICAL CHARACTERIZATION
ALDEHYDES AND INORGANIC ACIDS (NIOSH 2016M/NIOSH 7903M)

PARAMETER	UNITS	IMP-2 VR DAY To RESULT	IMP-2 VR Day 1 RESULT	IMP-2 VR Day 2 RESULT
ALDEHYDES				
ACETALDEHYDE	MG/M3	1.2	< 0.08	0.6
BENZALDEHYDE	MG/M3	0.2	< 0.08	< 0.08
BUTYRALDEHYDE	MG/M3	0.4	< 0.09	< 0.09
Crotonaldehyde	MG/M3	< 0.09	< 0.09	< 0.09
FORMALDEHYDE	MG/M3	< 0.08	< 0.08	< 0.08
ISOVALERALDEHYDE	MG/M3	< 0.08	< 0.08	< 0.08
PROPIONALDEHYDE	MG/M3	0.3	< 0.08	< 0.08
VALERALDEHYDE	MG/M3	0.2	< 0.09	< 0.09
INORGANIC ACIDS				
HYDROBROMIC ACID	MG/M3	< 1	< 1	< 1
HYDROCHLORIC ACID	MG/M3	< 1	< 1	< 1
HYDROFLUORIC ACID	MG/M3	< 1	< 1	< 1
NITRIC ACID	MG/M3	< 1	< 1	< 1
PHOSPHORIC ACID	MG/M3	< 1	< 1	< 1
SULFURIC ACID	MG/M3	< 1	*3.4	*4.7

* Results may have had breakthrough or possible migration. Results may be biased low

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SE-0416

TABLE 3E

TRIAL OFF-GAS ANALYTICAL CHARACTERIZATION
Reduced Sulfur (ASTM D5504)

PARAMETER	UNITS	IMP-2 VR DAY To		IMP-2 VR Day 1		IMP-2 VR Day 2	
		RESULT	RPT. LIMIT	RESULT	RPT. LIMIT	RESULT	RPT. LIMIT
Reduced Sulfur Compounds							
Hydrogen Sulfide	µg/m³	ND	14	2,000,000	1,400	41,000,000	14,000
Carbonyl Sulfide	µg/m³	630	25	1,700,000	2,500	33,000	2,500
Methyl Mercaptan	µg/m³	ND	20	18,000	2,000	470,000	2,000
Ethyl Mercaptan	µg/m³	ND	25	ND	2,500	48,000	2,500
Dimethyl Sulfide	µg/m³	2,400	25	18,000	2,500	21,000	2,500
Carbon Disulfide	µg/m³	130,000	16	1,000,000	1,600	51,000	1,600
Isopropyl Mercaptan	µg/m³	ND	31	ND	3,100	16,000	3,100
tert-Butyl Mercaptan	µg/m³	ND	37	ND	3,700	ND	3,700
n-Propyl Mercaptan	µg/m³	ND	31	ND	3,100	ND	3,100
Ethyl Methyl Sulfide	µg/m³	330	31	ND	3,100	ND	3,100
Thiophene	µg/m³	1,500	34	ND	3,400	ND	3,400
Isobutyl Mercaptan	µg/m³	370	37	ND	3,700	ND	3,700
Diethyl Sulfide	µg/m³	ND	37	ND	3,700	ND	3,700
n-Butyl Mercaptan	µg/m³	ND	37	ND	3,700	ND	3,700
Dimethyl Disulfide	µg/m³	ND	19	ND	1,900	ND	1,900
3-Methylthiophene	µg/m³	160	40	ND	4,000	ND	4,000
Tetrahydrothiophene	µg/m³	ND	36	ND	3,600	ND	3,600
2,5-Dimethylthiophene	µg/m³	ND	46	ND	4,600	ND	4,600
2-Ethylthiophene	µg/m³	67	46	ND	4,600	ND	4,600
Diethyl Disulfide	µg/m³	ND	25	ND	2,500	ND	2,500

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SE-0416

TABLE 3F

TRIAL RUN CONDENSATE ANALYTICAL CHARACTERIZATION

		Trial Run Condensate			Trial Run Condensate			Trial Run Condensate		
		Bottom			Middle			Top		
PARAMETER	**UNITS**	**RESULT**	**QUAL**	**MDL**	**RESULT**	**QUAL**	**MDL**	**RESULT**	**QUAL**	**MDL**
Semivolatile Organic Compounds										
1,2,4-Trichlorobenzene	ug/Kg	ND	U	111	ND	U	1,020	565	U	565
1,2Diphenylhydrazine/Azobenzen	ug/Kg	ND	U	132	ND	U	1,210	585	U	585
1,4-Dichlorobenzene	ug/Kg	1190	J	121	107000		1,110	1120	U	1,120
2,4,5-Trichlorophenol	ug/Kg	ND	U	151	ND	U	1,380	3940	U	3,940
2,4,6-Trichlorophenol	ug/Kg	ND	U	131	ND	U	1,200	1770	U	1,770
2,4-Dichlorophenol	ug/Kg	ND	U	103	ND	U	943	11700	U	11,700
2,4-Dimethylphenol	ug/Kg	ND	U	330	ND	U	3,020	7600	U	7,600
2,4-Dinitrophenol	ug/Kg	ND	U	1,240	ND	U	11,300	1000	U	1,000
2,4-Dinitrotoluene	ug/Kg	ND	U	125	ND	U	1,140	1330	U	1,330
2,6-Dinitrotoluene	ug/Kg	ND	U	168	ND	U	1,530	530	U	530
2-Chloronaphthalene	ug/Kg	ND	U	105	ND	U	961	580	U	580
2-Chlorophenol	ug/Kg	ND	U	131	ND	U	1,200	448	U	448
2-Methylnaphthalene	ug/Kg	264	J	121	26,600	J	1,110	1200	U	1,200
2-Nitroaniline	ug/Kg	ND	U	94	ND	U	861	1230	U	1,230
2-Nitrophenol	ug/Kg	ND	U	170	ND	U	1,550	15300	U	15,300
3,3'-Dichlorobenzidine	ug/Kg	ND	U	141	ND	U	1,290	1100	U	1,100
3-Nitroaniline	ug/Kg	ND	U	108	ND	U	983	7500	U	7,500
4,6-Dinitro-2-methylphenol	ug/Kg	ND	U	943	ND	U	8,610	925	U	925
4-Bromophenyl phenyl ether	ug/Kg	ND	U	160	ND	U	1,470	1580	U	1,580
4-Chloro-3-methylphenol	ug/Kg	ND	U	111	ND	U	1,020	1110	U	1,110
4-Chloroaniline	ug/Kg	ND	U	220	ND	U	2,010	935	U	935
4-Chlorophenyl phenyl ether	ug/Kg	ND	U	128	ND	U	1,170	8150	U	8,150
4-Nitroaniline	ug/Kg	ND	U	105	ND	U	961	4660	U	4,660
4-Nitrophenol	ug/Kg	ND	U	871	ND	U	7,960	590	U	590
Acenaphthene	ug/Kg	ND	U	128	ND	U	1,170	655	U	655
Acenaphthylene	ug/Kg	ND	U	144	ND	U	1,320	1,540	U	1,540
Aniline	ug/Kg	ND	U	342	ND	U	3,120	570	U	570
Anthracene	ug/Kg	ND	U	150	ND	U	1,370	1290	U	1,290
Benzo(a)anthracene	ug/Kg	ND	U	150	ND	U	1,370	615	U	615
Benzo(a)pyrene	ug/Kg	ND	U	60	ND	U	543	1520	U	1,520
Benzo(b)fluoranthene	ug/Kg	ND	U	103	ND	U	943	525	U	525
Benzo(g,h,i)perylene	ug/Kg	ND	U	102	ND	U	935	670	U	670
Benzo(k)fluoranthene	ug/Kg	ND	U	112	ND	U	1,030	2260	U	2,260
Benzyl alcohol	ug/Kg	ND	U	169	ND	U	1,540	1290	U	1,290
Bis(2-Chloroethoxy)methane	ug/Kg	ND	U	138	ND	U	1,260	1220	U	1,220
Bis(2-Chloroethyl)ether	ug/Kg	ND	U	137	ND	U	1,250	1030	U	1,030
Bis(2-Chloroisopropyl)ether	ug/Kg	ND	U	122	ND	U	1,120	904000		980
Bis(2-Ethylhexyl)phthalate	ug/Kg	ND	U	91	16,400	J	830	297	U	297
Butyl benzyl phthalate	ug/Kg	ND	U	79	ND	U	717	1000	U	1,000
Carbazole	ug/Kg	ND	U	110	ND	U	1,010	725	U	725
Chrysene	ug/Kg	ND	U	206	ND	U	1,880	655	U	655
Di-n-butyl phthalate	ug/Kg	ND	U	90	ND	U	822	222	U	222
Di-n-octyl phthalate	ug/Kg	ND	U	80	ND	U	726	575	U	575
Dibenz(a,h)anthracene	ug/Kg	ND	U	103	ND	U	943	535	U	535
Dibenzofuran	ug/Kg	ND	U	108	ND	U	987	1020	U	1,020
Diethyl phthalate	ug/Kg	ND	U	144	ND	U	1,320	705	U	705
Dimethyl phthalate	ug/Kg	ND	U	121	ND	U	1,110	326	U	326
Fluoranthene	ug/Kg	ND	U	127	ND	U	1,160	334,000		645
Fluorene	ug/Kg	313	J	137	28,800	J	1,250	955	U	955
Hexachlorobenzene	ug/Kg	ND	U	119	ND	U	1,080	1000	U	1,000
Hexachlorobutadiene	ug/Kg	ND	U	91	ND	U	835	6000	U	6,000
Hexachlorocyclopentadiene	ug/Kg	ND	U	83	ND	U	757	795	U	795
Hexachloroethane	ug/Kg	ND	U	142	ND	U	1,300	1550	U	1,550
Indeno(1,2,3-cd)pyrene	ug/Kg	ND	U	75	ND	U	683	580	U	580
Isophorone	ug/Kg	ND	U	181	ND	U	1,650	920	U	920
Nitrobenzene	ug/Kg	ND	U	157	ND	U	1,430	6300	U	6,300
Pentachlorophenol	ug/Kg	ND	U	80	ND	U	730	530	U	530
Phenanthrene	ug/Kg	ND	U	145	ND	U	1,320	990	U	990
Phenol	ug/Kg	1,600	J	71	ND	U	652	765	U	765
Pyrene	ug/Kg	ND	U	231	ND	U	2,110	6000	U	6,000
Pyridine	ug/Kg	ND	U	1,700	ND	U	15,600	2330	U	2,330
m,p-Cresol	ug/Kg	1,220	J	168	ND	U	1,530	755	U	755
n-Nitrosodi-n-propylamine	ug/Kg	ND	U	145	ND	U	1,320	2270	U	2,270
n-Nitrosodimethylamine	ug/Kg	ND	U	145	ND	U	1,320	525	U	525
n-Nitrosodiphenylamine	ug/Kg	ND	U	173	ND	U	1,580	585	U	585
o-Cresol	ug/Kg	ND	U	157	ND	U	1,430			
Volatile Organic Compounds										
1,1,1,2-Tetrachloroethane	ug/Kg	ND	U	52	ND	U	1,030	134000	U	134,000
1,1,1-Trichloroethane	ug/Kg	ND	U	43	ND	U	850	236000	U	236,000
1,1,2,2-Tetrachloroethane	ug/Kg	ND	U	54	ND	U	1,080	113000	U	113,000
1,1,2-Trichloroethane	ug/Kg	ND	U	74	ND	U	1,470	133000	U	133,000
1,1-Dichloroethane	ug/Kg	ND	U	69	ND	U	1,380	148000	U	148,000
1,1-Dichloroethene	ug/Kg	ND	U	104	ND	U	2,080	231000	U	231,000
1,1-Dichloropropene	ug/Kg	ND	U	61	ND	U	1,210	243000	U	243,000
1,2,3-Trichloropropane	ug/Kg	ND	U	49	ND	U	980	114000	U	114,000
1,2,4-Trichlorobenzene	ug/Kg	ND	U	78	ND	U	1,560	353000	U	353,000
1,2,4-Trimethylbenzene	ug/Kg	1,300	J	51	13100	J	1,020	1,170,000	J	358,000
1,2-Dibromo-3-chloropropane	ug/Kg	ND	U	89	ND	U	1,780	399000	U	399,000
1,2-Dibromoethane	ug/Kg	ND	U	50	ND	U	1,000	143000	U	143,000
1,2-Dichlorobenzene	ug/Kg	6,040		59	62,300		1,170	4,410,000	J	274,000
1,2-Dichloroethane	ug/Kg	ND	U	60	ND	U	1,190	197000	U	197,000
1,2-Dichloroethene(Total)	ug/Kg	ND	U	105	ND	U	2,090	233000	U	233,000
1,2-Dichloropropane	ug/Kg	ND	U	75	ND	U	1,500	153000	U	153,000
1,3,5-Trimethylbenzene	ug/Kg	793	J	38	8,940	J	750	374,000	U	374,000
1,3-Dichlorobenzene	ug/Kg	ND	U	68	ND	U	1,350	258000	U	258,000
1,3-Dichloropropane	ug/Kg	ND	U	36	ND	U	720	157000	U	157,000
1,4-Dichlorobenzene	ug/Kg	549	J	55	6,110	J	1,100	230000	U	230,000
2,2-Dichloropropane	ug/Kg	ND	U	91	ND	U	1,810	248000	U	248,000

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KEMRON PROJECT # SE-0416

TABLE 3F

TRIAL RUN CONDENSATE ANALYTICAL CHARACTERIZATION

		Trial Run Condensate			Trial Run Condensate			Trial Run Condensate		
		Bottom			Middle			Top		
PARAMETER	**UNITS**	**RESULT**	**QUAL**	**MDL**	**RESULT**	**QUAL**	**MDL**	**RESULT**	**QUAL**	**MDL**
2-Butanone	ug/Kg	9,120		181	ND	U	3,620	515000	U	515,000
2-Chlorotoluene	ug/Kg	ND	U	54	ND	U	1,080	218000	U	218,000
2-Hexanone	ug/Kg	ND	U	47	ND	U	930	430000	U	430,000
4-Chlorotoluene	ug/Kg	ND	U	59	ND	U	1,170	234000	U	234,000
4-Isopropyltoluene	ug/Kg	ND	U	41	ND	U	820	209000	U	209,000
4-Methyl-2-pentanone	ug/Kg	ND	U	40	ND	U	794	131000	U	131,000
Acetone	ug/Kg	120,000		2,000	102,000		3,990	1020000	U	1,020,000
Benzene	ug/Kg	454,000		495	4,090,000		9,900	270,000,000		1,510,000
Bromobenzene	ug/Kg	ND	U	55	ND	U	1,090	155000	U	155,000
Bromochloromethane	ug/Kg	ND	U	64	ND	U	1,270	134000	U	134,000
Bromodichloromethane	ug/Kg	ND	U	38	ND	U	760	161000	U	161,000
Bromoform	ug/Kg	ND	U	75	ND	U	1,500	158000	U	158,000
Bromomethane	ug/Kg	ND	U	214	ND	U	4,270	301000	U	301,000
Carbon disulfide	ug/Kg	ND	U	95	ND	U	1,900	323000	U	323,000
Carbon tetrachloride	ug/Kg	ND	U	73	ND	U	1,460	201000	U	201,000
Chlorobenzene	ug/Kg	ND	U	45	ND	U	890	148000	U	148,000
Chloroethane	ug/Kg	ND	U	118	ND	U	2,350	329000	U	329,000
Chloroform	ug/Kg	ND	U	55	ND	U	1,090	214000	U	214,000
Chloromethane	ug/Kg	ND	U	29	ND	U	580	236000	U	236,000
Dibromochloromethane	ug/Kg	ND	U	38	ND	U	760	217000	U	217,000
Dibromomethane	ug/Kg	ND	U	66	ND	U	1,310	230000	U	230,000
Dichlorodifluoromethane	ug/Kg	ND	U	77	ND	U	1,540	223,000	U	223,000
Ethylbenzene	ug/Kg	624	J	60	7,650	J	1,190	182,000	U	182,000
Hexachlorobutadiene	ug/Kg	ND	U	106	ND	U	2,110	213,000	U	213,000
Isopropylbenzene (Cumene)	ug/Kg	992	J	62	9,950	J	1,230	184,000	U	184,000
Methyl iodide	ug/Kg	ND	U	42	ND	U	840	1,220,000	U	1,220,000
Methylene chloride	ug/Kg	ND	U	75	ND	U	1,490	439,000	U	439,000
Naphthalene	ug/Kg	6,170		33	82,500		650	6,460,000		319,000
Styrene	ug/Kg	ND	U	49	ND	U	980	153,000	U	153,000
Tetrachloroethene	ug/Kg	ND	U	63	ND	U	1,260	294,000	U	294,000
Thiophene	ug/Kg	ND			ND					
Toluene	ug/Kg	64,100		64	724,000		1,270	58,600,000		154,000
Trichloroethene	ug/Kg	ND	U	76	ND	U	1,510	212,000	U	212,000
Trichlorofluoromethane	ug/Kg	ND	U	66	ND	U	1,310	259,000	U	259,000
Trichlorotrifluoroethane	ug/Kg	ND	U	79	ND	U	1,580	199,000	U	199,000
Vinyl acetate	ug/Kg	ND	U	38	ND	U	760	140,000	U	140,000
Vinyl chloride	ug/Kg	ND	U	69	ND	U	1,370	270,000	U	270,000
Xylene (total)	ug/Kg	8,300		192	100,000	J	3,840	8,120,000	J	399,000
cis-1,2-Dichloroethene	ug/Kg	ND	U	67	ND	U	1,340	147,000	U	147,000
cis-1,3-Dichloropropene	ug/Kg	ND	U	46	ND	U	920	184,000	U	184,000
m,p-Xylene	ug/Kg	6,200		119	76,100	J	2,370	6,410,000		292,000
n-Butylbenzene	ug/Kg	ND	U	76	ND	U	1,520	232,000	U	232,000
n-Propylbenzene	ug/Kg	ND	U	51	ND	U	1,020	735,000	U	735,000
o-Xylene	ug/Kg	2,100	J	74	24,300	J	1,470	1,700,000	J	134,000
sec-Butylbenzene	ug/Kg	524	J	56	5,090	J	1,110	196,000	U	196,000
tert-Butyl methyl ether (MTBE)	ug/Kg	ND	U	30	ND	U	604	121,000	U	121,000
tert-Butylbenzene	ug/Kg	ND	U	49	ND	U	970	254,000	U	254,000
trans-1,2-Dichloroethene	ug/Kg	ND	U	38	ND	U	750	130,000	U	130,000
trans-1,3-Dichloropropene	ug/Kg	ND	U	73	ND	U	1,460	169,000	U	169,000
trans-1,4-Dichloro-2-butene	ug/Kg	ND	U	156	ND	U	3,120	515,000	U	515,000
Volatile Organic Compounds -TICs										
Propanoic acid, methyl ester	ug/Kg	2,680		4.48	ND			ND		
Semivolatile Organic Compounds - TICs										
Toluene	ug/Kg	92,800		1.11	485,000		1.13	85,000,000		1.59
Ethylbenzene	ug/Kg	2,050		1.53	22,900		1.53	2,250,000		2
p-Xylene	ug/Kg	20,400		1.58	184,000		1.58	19,400,000		2.04
Benzene, 1,3-dimethyl-	ug/Kg	5,790		1.68				5,420,000		2.15
Benzene, (1-methylethyl)-	ug/Kg	3,840		1.83	47,100		1.83	4,220,000		2.28
Benzene, 1-ethyl-2-methyl-	ug/Kg	4,430		2						
Benzene, 1,2,4-trimethyl-	ug/Kg	4,990		2.15				2,990,000		2.45
Sulfur, mol. (S8)	ug/Kg	18,400		5.75	410,000		5.75			
Benzene, (1-ethylpropyl)-	ug/Kg				11,800		2.54	1,020,000		2.99
4-tert-Butyltoluene	ug/Kg				42,700		2.58			
Benzene, (1,1-dimethylpropyl)-	ug/Kg				19,100		2.65			
Benzene, (1-ethylbutyl)-	ug/Kg				17,400		2.9			
Benzene, cyclopentyl-	ug/Kg				17,200		3.12			
Benzene, (1-nitropropyl)-	ug/Kg				19,600		3.25			
Benzene, (1-methylhexyl)-	ug/Kg				21,400		3.36			
Benzene, 1,1'-(1-methylethylidene)b	ug/Kg				76,900		4.36			
Naphthalene, 1,2,3-trimethyl-4-prop	ug/Kg				157,000		4.60			
Benzene, 1,2-dimethyl-	ug/Kg				55,500		1.68			
Benzene, 1,3,5-trimethyl-	ug/Kg				53,100		2.04	5,280,000		2.6
Benzene, 1,2,3-trimethyl-	ug/Kg				63,900		2.15			
Benzene, (1-methylpropyl)	ug/Kg				91,000		2.22			
Benzene, (2-methyl-1-propenyl)-	ug/Kg				12,400		2.47			
Unknown								1,370,000		3.68
Benzene, 1-(1,1-dimethylethyl)-3-me								2,070,000		3.01
Benzene, 1,2-dimethyl-4-(phenylmeth								1,330,000		4.8
Naphthalene, 1,2,3-trimethyl-4-prop								1,900,000		5.04
Benzene, 1-ethyl-2-methyl- 2.45 ug/Kg								1,630,000		2.45
Benzene, 2-ethyl-1,3-dimethyl-								1,240,000		2.73

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 4

TREATED OFF-GAS DAILY MONITORING RESULTS

PARAMETER	Time Zero (ambient)	Day Zero					Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
		30°C	50°C	70°C	90°C	100°C										
IMP2 - HC - 90°C																
H2S	32.0	30.0	16.0	483.0	308.0		321.0	485.0	422.0	86.0	114.0	202.0	254.0	184.0	202.0	360.0
SO2	19.8	21.3	>150.0	>150.0	>150.0		25.9	13.7	23.0	32.5	18.6	1.2	29.0	98.0	149.0	142.0
VOCs	206,895	254,226	>500,000	413,600	197,305		240,350	268,000	10,062	8,849	15,630	79,662	30,688	20,876	20,403	4,766
IMP2 - HC - 100°C																
H2S	29.0	10.0	216.0	191.0	191.0	460.0	169.0	108.7	95.2	104.6	113.0	358.0	21.0	102.4	100.4	109.0
SO2	43.4	97.4	18.0	43.2	98.1	30.0	37.3	19.7	152.0	128.0	165.0	129.0	48.0	87.0	98.0	134.0
VOCs	154,864	394,696	54,030	284,304	283,500	162,335	230,280	18,960	27,881	40,490	15,162	12,458	2,553	7,166	5,987	6,879
IMP2 - VR - 90°C																
H2S	2.0	0.0	6.7	2.5	284.0		620.0	330.0	370.0	434.0	320.0	435.0	428.0	385.0	274.0	18.0
SO2	0.0	1.3	5.0	3.0	150.0		30.1	0.0	20.3	5.0	5.1	5.4	0.9	12.7	10.8	0.2
VOCs	428,970	51,460	123,410	431,290	500,000		384,360	261,900	28,310	31,526	43,958	39,842	13,181	12,988	12,200	11,026
IMP2 - VR - 100°C																
H2S	0.0	0.0	2.0	0.0	5.0	482.0	0.4	316.1	244.0	356.0	306.0	290.0	32.0	198.0	247.0	147.9
SO2	5.9	2.9	11.3	11.1	115.2	28.7	16.0	9.8	6.1	12.8	96.4	66.4	102.6	148.4	119.5	137.4
VOCs	60,048	48,460	150,000	210,40	450,000	201,585	164,000	22,740	15,112	49,173	2,895	26,680	9,023	11,985	11,026	11,412

Testing Series included Aldehydes, Inorganic Acids Testing, VOCs, and Reduced Sulfur

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 4

TREATED OFF-GAS DAILY MONITORING RESULTS

PARAMETER	Day 11	Day 12	Day 13	Day 14	Day 15	Day 16	Day 17	Day 18	Day 19	Day 20	Day 21	Day 22	Day 23	Day 24
IMP2 - HC - 90°C														
H2S	2.0	148.0	115.8	106.0	98.0	88.0	101.0	21.0	310.0	120.0	272.0		57.8	35.0
SO2	11.2	138.4	98.7	118.3	104.0	58.6	72.0	64.8	123.6	87.0	23.1		47.2	2.2
VOCs	4,246	4,304	2,785	3,876	6,781	2,578	3,447	1,127	1,214	1,370	2,099		1,287	833
IMP2 - HC - 100°C														
H2S	44.0	34.0	12.0	10.0										
SO2	132.0	39.0	4.5	163.0										
VOCs	7,919	5,742	4,680	943										
IMP2 - VR - 90°C														
H2S	14.0	6.0	122.0	2.0	97.0	68.0	73.0	17.0	181.0	118.0	201.0		483.0	
SO2	0.2	0.4	2.4	0.2	5.5	13.7	6.7	0.7	11.0	16.6	11.7		2.8	
VOCs	9,978	8,752	13,580	8,210	1,843	2,333	3,188	2,017	3,025	3,033	1,472		711	
IMP2 - VR - 100°C														
H2S	108.0	14.0	16.0											
SO2	78.2	13.8	11.2											
VOCs	5,223	4,926	833											

KEMRON ENVIRONMENTAL SERVICES

BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416
TABLE 5
TREATED CONDENSATE DAILY MONITORING RESULTS

PARAMETER	Time Zero (ambient)	Day Zero 30°C	Day Zero 50°C	Day Zero 70°C	Day Zero 90°C	Day Zero 100°C	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9 (90C - 8/19/201
IMP2 - HC - 90°C															
Weight of Condensate Daily (g)		NC	NC	1.64	37.56		46.40	4.65	5.00	4.87	0.72	NC	10.29	4.38	
Analysis and Observations		NC	NC	One layer of yellow condensate. Stong gasoline odor	**2 Layers** Top = Opaque color Bottom = Light yellow tint		**2 Layers** Top = Light yellow tint Bottom = Opaque color	One layer of clear condensate.	One layer of clear condensate with black droplets	Not enough condensate was collected for adequate testing	One layer of clear condensate.	NC	One layer of oily clear condensate.	One layer of oily cloudy condensate.	
pH - Aquesous Layer		NC	NC	4	5		5	3	3	NC	2	NC	1/2	1	
pH - Non-Aquesous Layer		NC	NC	NC	2		3	NC	NC	NC	NC	NC	NC	NC	
IMP2 - HC - 100°C															
Weight of Condensate Daily (g)		1.80	0.72	0.96	18.00	108.22	97.34	78.10	87.21	57.32	33.82	27.20	18.14		20.86
Analysis and Observations		One layer of clear condensate. No odor	One layer of clear condensate. No odor	One layer of clear condensate. No odor	**2 Layers** Top = yellow tint Bottom = Opaque color	**2 Layers** Top = yellow tint Bottom = Opaque color	**2 Layers** Top = yellow tint Bottom = Opaque color	**2 Layers** Top = yellow tint Bottom = Opaque color	**2 Layers** Top = yellow tint Bottom = Opaque color	**2 Layers** Top = yellow tint Bottom = Opaque color	**2 Layers** Top = yellow tint Bottom = Opaque color	**2 Layers** Top = yellow tint Bottom = Opaque color	One layer of clear condensate with black droplets		Small amount of thin, clear condensate
pH - Aquesous Layer		5	5	5	4	4	4	4	4	4	4	4	1		1/2
pH - Non-Aquesous Layer		NC	NC	NC	1	2	3	2	1	2	2	2	NC		NC
IMP2 - VR - 90°C															
Weight of Condensate Daily (g)		NC	0.80	1.43	102.72		46.87	26.30	3.66	1.55	24.71	32.38	NC	28.24	
Analysis and Observations		NC	One small droplet of condensate. Clear like water	One layer of oily liquid. Light yellow tint. Gasoline and sweet aroma.	**2 Layers** Top = clear like water Bottom = Opaque color with black droplets		One layer of semi-cloudy condensate	**2 Layers** Top = Opaque color Bottom = Clear like water	One layer of opaque color with black droplets	**2 Layers** Top = Opaque color Bottom = Light yellow tint. Sweet gas/chemical odor.	One layer of semi-cloudy condensate	**2 Layers** Top = Opaque color Bottom = Cloudy white	NC	One layer of cloudy condensate	
pH - Aquesous Layer		NC	4	4	4		2	5	4/5	4	4	3	NC	3	
pH - Non-Aquesous Layer		NC	NC	NC	2		NT	2	NC	2	NC	4	NC	NC	
IMP2 - VR - 100°C															
Weight of Condensate Daily (g)		NC	23.99	0.04	3.40	399.1	123.12	133.82	95.61	75.60	65.85	40.12	31.86		27.63
Analysis and Observations		NC	**2 Layers** Top = clear like water Bottom = Opaque color	One small droplet of condensate. Clear like water	One layer of oily liquid. Yellow tint. Gasoline and tar odor	**2 Layers** Top = yellow tint Bottom = Opaque color	**2 Layers** Top = yellow tint Bottom = Opaque color	**2 Layers** Top = yellow tint Bottom = Opaque color	**2 Layers** Top = thick oil Bottom = Opaque color	One layer of oily liquid. Yellow tint.	One layer of opaque color	**2 Layers** Top = yellow tint Bottom = Opaque color	One layer of cloudy condensate		Small amount of opaque conensate with tiny black particles.
pH - Aquesous Layer		NC	4	4	2	4	4	4	5	4	4	4	1		1/2
pH - Non-Aquesous Layer		NC	4	NC	NC	1	2/3	2	2	NC	NC	1/2	NC		NC

NC = Not enough Condensate Produced to test
NT = Not Tested
Missing data or Weekend
test not needed

KEMRON ENVIRONMENTAL SERVICES

BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416
TABLE 5
TREATED CONDENSATE DAILY MONITORING RESULTS

PARAMETER	Day 10	Day 11	Day 12	Day 13	Day 14	Day 15	Day 16	Day 17	Day 18	Day 19	Day 20	Day 21	Day 22	Day 23	Day 24
IMP2 - HC - 90°C															
Weight of Condensate Daily (g)	15.66	4.96	3.56	1.72	2.85	1.43	2.16	1.47	0.15	4.03	0.91	1.50			
Analysis and Observations	One layer of oily clear condensate.	One layer of very clear condensate.	One layer of clear and thin condensate.	One layer of clear and thin condensate.	One layer of clear and thin condensate.	Clear condensate with tiny white bubbles throughout	One layer of clear and thin condensate.	One layer of clear and thin condensate.	One layer of light yellow condensate	NC	One layer of clear and thin condensate.	One layer of clear and thin condensate.			
pH - Aquesous Layer	1	1	1	1	NC	2	1/2	1	1	NC	1	1.5			
pH - Non-Aquesous Layer	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC			
IMP2 - HC - 100°C															
Weight of Condensate Daily (g)	20.46	25.00	14.24	19.76	11.43										
Analysis and Observations	One layer of oqapue oily liquid. Yellow tint with black droplets.	One layer of oqapue oily liquid. Yellow tint.	One layer of clear oily liquid. Yellow tint.	One layer of clear oily liquid. Yellow tint with black droplets.	One layer of clear oily liquid. Yellow tint.										
pH - Aquesous Layer	1	1	2	2	1										
pH - Non-Aquesous Layer	NC	NC	NC	NC	NC										
IMP2 - VR - 90°C															
Weight of Condensate Daily (g)	47.45	30.30	11.61	10.73	13.42	25.28	20.31	8.52	13.42	17.48	5.27	40.00			
Analysis and Observations	One layer of cloudy condensate	One layer of semi-cloudy condensate	One layer of semi-cloudy condensate	One layer of semi-cloudy condensate	One layer of semi-cloudy condensate	**2 Layers** Top = yellow tint Bottom = milky white condensate	**2 Layers** Top = yellow tint Bottom = milky white condensate	NT	One layer of milky white condensate	**2 Layers** Top = clear like water Bottom = Opaque color	One layer of milky white condensate	1 layer of milky white condensate			
pH - Aquesous Layer	3	3	2	2	2	4	4	NT	2	2	2	2			
pH - Non-Aquesous Layer	NC	NC	NC	NC	NC	2	1/2	NC	NC	NT	NC				
IMP2 - VR - 100°C															
Weight of Condensate Daily (g)	26.96	14.79	10.01	8.94											
Analysis and Observations	**2 Layers** Top = yellow tint Bottom = Opaque color	**2 Layers** Top = yellow tint Bottom = Opaque color	One layer of oily liquid. Yellow tint.	**2 Layers** Top = yellow tint Bottom = Opaque color											
pH - Aquesous Layer	2	2/3	2	2											
pH - Non-Aquesous Layer	2	2	NC	2											

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 5B

RECONSTITUTED CONDENSATE WEIGHT PORPORTIONS

	VR 100	VR90	HC100	HC 90
Weight of Condensate (g)	654.31	568.21	331.8	341.43
Quantify by % by weight of any layering	Top layer 20.88% Bottom 79.11%	Top layer 35.07 % Bottom 64.93%	Top Layer 20.46% Bottom 79.53%	Top Layer 37.51% Bottom 62.48%
pH of non-aqueous layer (top)	3.63	3.67	2.86	3.05
PH of aquouis layer (bottom)	2.64	2.95	2.41	2.42

KEMRON ENVIRONMENTAL SERVICES

THERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 6 A (Solids)
TOP LAYER

CONDENSATE ANALYTICAL CHARACTERIZATION

		VR90 RECONSTITUTED CONDENSATE			HC100 RECONSTITUTED CONDENSATE			VR100 RECONSTITUTED CONDENSATE			HC90 RECONSTITUTED CONDENSATE		
PARAMETER	**UNITS**	**RESULT**	**QUAL**	**MDL**	**RESULT**	**QUAL**	**MDL**	**RESULT**	**QUAL**	**MDL**	**RESULT**	**QUAL**	**MDL**
Volatiles Organic Compounds													
1,1,1,2-Tetrachloroethane	ug/Kg	67,000	ND	67,000	26,700	ND	26,700	25,400	ND	25,400	26,400	ND	26,400
1,1,1-Trichloroethane	ug/Kg	118,000	ND	118,000	46,800	ND	46,800	44,500	ND	44,500	46,400	ND	46,400
1,1,2,2-Tetrachloroethane	ug/Kg	56,500	ND	56,500	22,500	ND	22,500	21,400	ND	21,400	22,300	ND	22,300
1,1,2-Trichloroethane	ug/Kg	66,500	ND	66,500	26,500	ND	26,500	25,200	ND	25,200	26,200	ND	26,200
1,1-Dichloroethane	ug/Kg	73,900	ND	73,900	29,400	ND	29,400	28,000	ND	28,000	29,200	ND	29,200
1,1-Dichloroethene	ug/Kg	115,000	ND	115,000	45,800	ND	45,800	43,600	ND	43,600	45,400	ND	45,400
1,1-Dichloropropene	ug/Kg	121,000	ND	121,000	48,200	ND	48,200	45,900	ND	45,900	47,700	ND	47,700
1,2,3-Trichloropropane	ug/Kg	57,000	ND	57,000	22,700	ND	22,700	21,600	ND	21,600	22,500	ND	22,500
1,2,4-Trichlorobenzene	ug/Kg	176,000	ND	176,000	70,200	ND	70,200	66,700	ND	66,700	69,500	ND	69,500
1,2,4-Trimethylbenzene	ug/Kg	179,000	ND	179,000	71,100	ND	71,100	67,700	ND	67,700	70,500	ND	70,500
1,2-Dibromo-3-chloropropane	ug/Kg	199,000	ND	199,000	79,200	ND	79,200	75,400	ND	75,400	78,500	ND	78,500
1,2-Dibromoethane	ug/Kg	71,400	ND	71,400	28,500	ND	28,500	27,100	ND	27,100	28,200	ND	28,200
1,2-Dichlorobenzene	ug/Kg	1,500,000	J	137,000	54,500	ND	54,500	223,000	J	51,900	54,000	ND	54,000
1,2-Dichloroethane	ug/Kg	98,200	ND	98,200	39,100	ND	39,100	37,200	ND	37,200	38,700	ND	38,700
1,2-Dichloroethene(Total)	ug/Kg	116,000	ND	116,000	46,200	ND	46,200	44,000	ND	44,000	45,800	ND	45,800
1,2-Dichloropropane	ug/Kg	76,400	ND	76,400	30,400	ND	30,400	28,900	ND	28,900	30,100	ND	30,100
1,3,5-Trimethylbenzene	ug/Kg	187,000	ND	187,000	74,300	ND	74,300	70,700	ND	70,700	73,600	ND	73,600
1,3-Dichlorobenzene	ug/Kg	129,000	ND	129,000	51,400	ND	51,400	48,900	ND	48,900	50,900	ND	50,900
1,3-Dichloropropane	ug/Kg	78,400	ND	78,400	31,200	ND	31,200	29,700	ND	29,700	30,900	ND	30,900
1,4-Dichlorobenzene	ug/Kg	115,000	ND	115,000	45,700	ND	45,700	43,400	ND	43,400	45,200	ND	45,200
2,2-Dichloropropane	ug/Kg	124,000	ND	124,000	49,200	ND	49,200	46,800	ND	46,800	48,700	ND	48,700
2-Butanone	ug/Kg	257,000	ND	257,000	102,000	ND	102,000	97,400	ND	97,400	101,000	ND	101,000
2-Chlorotoluene	ug/Kg	109,000	ND	109,000	43,300	ND	43,300	41,200	ND	41,200	42,900	ND	42,900
2-Hexanone	ug/Kg	215,000	ND	215,000	85,600	ND	85,600	81,400	ND	81,400	84,700	ND	84,700
4-Chlorotoluene	ug/Kg	117,000	ND	117,000	46,400	ND	46,400	44,200	ND	44,200	46,000	ND	46,000
4-Isopropyltoluene	ug/Kg	104,000	ND	104,000	41,500	ND	41,500	39,500	ND	39,500	41,100	ND	41,100
4-Methyl-2-pentanone	ug/Kg	65,500	ND	65,500	26,100	ND	26,100	24,800	ND	24,800	25,800	ND	25,800
Acetone	ug/Kg	511,000	ND	511,000	204,000	ND	204,000	194,000	ND	194,000	202,000	ND	202,000
Benzene	ug/Kg	38,400,000		75,400	12,700,000		30,000	9,840,000		28,600	20,200,000		29,700
Bromobenzene	ug/Kg	77,400	ND	77,400	30,800	ND	30,800	29,300	ND	29,300	30,500	ND	30,500
Bromochloromethane	ug/Kg	67,000	ND	67,000	26,700	ND	26,700	25,400	ND	25,400	26,400	ND	26,400
Bromodichloromethane	ug/Kg	80,400	ND	80,400	32,000	ND	32,000	30,500	ND	30,500	31,700	ND	31,700
Bromoform	ug/Kg	78,900	ND	78,900	31,400	ND	31,400	29,900	ND	29,900	31,100	ND	31,100

KEMRON ENVIRONMENTAL SERVICES

THERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 6 A (Solids)
TOP LAYER

CONDENSATE ANALYTICAL CHARACTERIZATION

PARAMETER	UNITS	VR90 RECONSTITUTED CONDENSATE			HC100 RECONSTITUTED CONDENSATE			VR100 RECONSTITUTED CONDENSATE			HC90 RECONSTITUTED CONDENSATE		
		RESULT	QUAL	MDL	RESULT	QUAL	MDL	RESULT	QUAL	MDL	RESULT	QUAL	MDL
Bromomethane	ug/Kg	150,000	ND	150,000	59,900	ND	59,900	57,000	ND	57,000	59,300	ND	59,300
Carbon disulfide	ug/Kg	161,000	ND	161,000	64,200	ND	64,200	61,100	ND	61,100	63,600	ND	63,600
Carbon tetrachloride	ug/Kg	100,000	ND	100,000	39,900	ND	39,900	38,000	ND	38,000	39,500	ND	39,500
Chlorobenzene	ug/Kg	73,900	ND	73,900	29,400	ND	29,400	28,000	ND	28,000	29,200	ND	29,200
Chloroethane	ug/Kg	164,000	ND	164,000	65,400	ND	65,400	62,200	ND	62,200	64,800	ND	64,800
Chloroform	ug/Kg	107,000	ND	107,000	42,500	ND	42,500	40,400	ND	40,400	42,100	ND	42,100
Chloromethane	ug/Kg	118,000	ND	118,000	46,800	ND	46,800	44,500	ND	44,500	46,400	ND	46,400
Dibromochloromethane	ug/Kg	108,000	ND	108,000	43,100	ND	43,100	41,000	ND	41,000	42,700	ND	42,700
Dibromomethane	ug/Kg	115,000	ND	115,000	45,700	ND	45,700	43,400	ND	43,400	45,200	ND	45,200
Dichlorodifluoromethane	ug/Kg	111,000	ND	111,000	44,300	ND	44,300	42,100	ND	42,100	43,800	ND	43,800
Ethylbenzene	ug/Kg	90,800	ND	90,800	36,200	ND	36,200	34,400	ND	34,400	35,800	ND	35,800
Hexachlorobutadiene	ug/Kg	106,000	ND	106,000	42,300	ND	42,300	40,200	ND	40,200	41,900	ND	41,900
Isopropylbenzene (Cumene)	ug/Kg	1,130,000	J	91,800	36,600	ND	36,600	34,800	ND	34,800	36,200	ND	36,200
Methyl iodide	ug/Kg	610,000	ND	610,000	243,000	ND	243,000	231,000	ND	231,000	241,000	ND	241,000
Methylene chloride	ug/Kg	219,000	ND	219,000	87,400	ND	87,400	83,100	ND	83,100	86,500	ND	86,500
Naphthalene	ug/Kg	6,950,000		159,000	63,400	ND	63,400	60,300	ND	60,300	62,800	ND	62,800
Styrene	ug/Kg	76,400	ND	76,400	30,400	ND	30,400	28,900	ND	28,900	30,100	ND	30,100
Tetrachloroethene	ug/Kg	147,000	ND	147,000	58,500	ND	58,500	55,600	ND	55,600	57,900	ND	57,900
Thiophene	ug/Kg		B			B			B			B	
Toluene	ug/Kg	10,500,000		76,900	3,650,000		30,600	2,530,000		29,100	2,990,000		30,300
Trichloroethene	ug/Kg	106,000	ND	106,000	42,100	ND	42,100	40,000	ND	40,000	41,700	ND	41,700
Trichlorofluoromethane	ug/Kg	129,000	ND	129,000	51,600	ND	51,600	49,100	ND	49,100	51,100	ND	51,100
Trichlorotrifluoroethane	ug/Kg	99,200	ND	99,200	39,500	ND	39,500	37,600	ND	37,600	39,100	ND	39,100
Vinyl acetate	ug/Kg	69,900	ND	69,900	27,900	ND	27,900	26,500	ND	26,500	27,600	ND	27,600
Vinyl chloride	ug/Kg	135,000	ND	135,000	53,800	ND	53,800	51,100	ND	51,100	53,200	ND	53,200
Xylene (total)	ug/Kg	3,640,000	J	199,000	747,000	J	79,200	703,000	J	75,400	78,500	ND	78,500
cis-1,2-Dichloroethene	ug/Kg	73,400	ND	73,400	29,200	ND	29,200	27,800	ND	27,800	29,000	ND	29,000
cis-1,3-Dichloropropene	ug/Kg	91,800	ND	91,800	36,600	ND	36,600	34,800	ND	34,800	36,200	ND	36,200
m,p-Xylene	ug/Kg	2,410,000	J	146,000	747,000	J	58,100	703,000	J	55,300	57,500	ND	57,500
n-Butylbenzene	ug/Kg	116,000	ND	116,000	46,000	ND	46,000	43,800	ND	43,800	45,600	ND	45,600
n-Propylbenzene	ug/Kg	367,000	ND	367,000	146,000	ND	146,000	139,000	ND	139,000	145,000	ND	145,000
o-Xylene	ug/Kg	1,230,000	J	67,000	26,700	ND	26,700	25,400	ND	25,400	26,400	ND	26,400
sec-Butylbenzene	ug/Kg	97,700	ND	97,700	38,900	ND	38,900	37,000	ND	37,000	38,600	ND	38,600
tert-Butyl methyl ether (MTBE)	ug/Kg	60,500	ND	60,500	24,100	ND	24,100	22,900	ND	22,900	23,900	ND	23,900
tert-Butylbenzene	ug/Kg	127,000	ND	127,000	50,600	ND	50,600	48,100	ND	48,100	50,100	ND	50,100
trans-1,2-Dichloroethene	ug/Kg	65,000	ND	65,000	25,900	ND	25,900	24,600	ND	24,600	25,600	ND	25,600
trans-1,3-Dichloropropene	ug/Kg	84,300	ND	84,300	33,600	ND	33,600	32,000	ND	32,000	33,300	ND	33,300
trans-1,4-Dichloro-2-butene	ug/Kg	257,000	ND	257,000	102,000	ND	102,000	97,400	ND	97,400	101,000	ND	101,000

KEMRON ENVIRONMENTAL SERVICES

THERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 6 A (Solids)
TOP LAYER

CONDENSATE ANALYTICAL CHARACTERIZATION

		VR90 RECONSTITUTED CONDENSATE			HC100 RECONSTITUTED CONDENSATE			VR100 RECONSTITUTED CONDENSATE			HC90 RECONSTITUTED CONDENSATE		
PARAMETER	**UNITS**	**RESULT**	**QUAL**	**MDL**	**RESULT**	**QUAL**	**MDL**	**RESULT**	**QUAL**	**MDL**	**RESULT**	**QUAL**	**MDL**
Semi Volatiles Organic Compounds													
1,2,4-Trichlorobenzene	ug/Kg	18,600	ND	18,600	18,600	ND	18,600	18,600	ND	18,600	18,600	ND	18,600
1,2Diphenylhydrazine/Azobenzen	ug/Kg	11,200	ND	11,200	11,200	ND	11,200	11,200	ND	11,200	11,200	ND	11,200
2,4,5-Trichlorophenol	ug/Kg	25,000	ND	25,000	25,000	ND	25,000	25,000	ND	25,000	25,000	ND	25,000
2,4,6-Trichlorophenol	ug/Kg	201,000	ND	201,000	201,000	ND	201,000	201,000	ND	201,000	201,000	ND	201,000
2,4-Dichlorophenol	ug/Kg	40,900	ND	40,900	40,900	ND	40,900	40,900	ND	40,900	40,900	ND	40,900
2,4-Dimethylphenol	ug/Kg	227,000	ND	227,000	227,000	ND	227,000	227,000	ND	227,000	227,000	ND	227,000
2,4-Dinitrophenol	ug/Kg	211,000	ND	211,000	211,000	ND	211,000	211,000	ND	211,000	211,000	ND	211,000
2,4-Dinitrotoluene	ug/Kg	56,700	ND	56,700	56,700	ND	56,700	56,700	ND	56,700	56,700	ND	56,700
2,6-Dinitrotoluene	ug/Kg	48,900	ND	48,900	48,900	ND	48,900	48,900	ND	48,900	48,900	ND	48,900
2-Chloronaphthalene	ug/Kg	6,340	ND	6,340	6,340	ND	6,340	6,340	ND	6,340	6,340	ND	6,340
2-Chlorophenol	ug/Kg	20,300	ND	20,300	20,300	ND	20,300	20,300	ND	20,300	20,300	ND	20,300
2-Methylnaphthalene	ug/Kg	234,000	J	15,700	220,000	J	15,700	720,000		15,700	80,300	J	15,700
2-Nitroaniline	ug/Kg	27,200	ND	27,200	27,200	ND	27,200	27,200	ND	27,200	27,200	ND	27,200
2-Nitrophenol	ug/Kg	33,700	ND	33,700	33,700	ND	33,700	33,700	ND	33,700	33,700	ND	33,700
3,3'-Dichlorobenzidine	ug/Kg	168,000	ND	168,000	168,000	ND	168,000	168,000	ND	168,000	168,000	ND	168,000
3-Nitroaniline	ug/Kg	35,600	ND	35,600	35,600	ND	35,600	35,600	ND	35,600	35,600	ND	35,600
4,6-Dinitro-2-methylphenol	ug/Kg	222,000	ND	222,000	222,000	ND	222,000	222,000	ND	222,000	222,000	ND	222,000
4-Bromophenyl phenyl ether	ug/Kg	37,200	ND	37,200	37,200	ND	37,200	37,200	ND	37,200	37,200	ND	37,200
4-Chloro-3-methylphenol	ug/Kg	52,800	ND	52,800	52,800	ND	52,800	52,800	ND	52,800	52,800	ND	52,800
4-Chloroaniline	ug/Kg	41,700	ND	41,700	41,700	ND	41,700	41,700	ND	41,700	41,700	ND	41,700
4-Chlorophenyl phenyl ether	ug/Kg	40,100	ND	40,100	40,100	ND	40,100	40,100	ND	40,100	40,100	ND	40,100
4-Nitroaniline	ug/Kg	329,000	ND	329,000	329,000	ND	329,000	329,000	ND	329,000	329,000	ND	329,000
4-Nitrophenol	ug/Kg	320,000	ND	320,000	320,000	ND	320,000	320,000	ND	320,000	320,000	ND	320,000
Acenaphthene	ug/Kg	13,000	ND	13,000	13,000	ND	13,000	13,000	ND	13,000	13,000	ND	13,000
Acenaphthylene	ug/Kg	15,100	ND	15,100	15,100	ND	15,100	15,100	ND	15,100	15,100	ND	15,100
Aniline	ug/Kg	41,800	ND	41,800	41,800	ND	41,800	41,800	ND	41,800	41,800	ND	41,800
Anthracene	ug/Kg	12,400	ND	12,400	12,400	ND	12,400	12,400	ND	12,400	12,400	ND	12,400
Benzo(a)anthracene	ug/Kg	43,800	ND	43,800	43,800	ND	43,800	43,800	ND	43,800	43,800	ND	43,800
Benzo(a)pyrene	ug/Kg	13,300	ND	13,300	13,300	ND	13,300	13,300	ND	13,300	13,300	ND	13,300
Benzo(b)fluoranthene	ug/Kg	76,000	ND	76,000	76,000	ND	76,000	76,000	ND	76,000	76,000	ND	76,000
Benzo(g,h,i)perylene	ug/Kg	16,800	ND	16,800	16,800	ND	16,800	16,800	ND	16,800	16,800	ND	16,800

KEMRON ENVIRONMENTAL SERVICES

THERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 6 A (Solids)
TOP LAYER

CONDENSATE ANALYTICAL CHARACTERIZATION

		VR90 RECONSTITUTED CONDENSATE			HC100 RECONSTITUTED CONDENSATE			VR100 RECONSTITUTED CONDENSATE			HC90 RECONSTITUTED CONDENSATE		
PARAMETER	UNITS	RESULT	QUAL	MDL	RESULT	QUAL	MDL	RESULT	QUAL	MDL	RESULT	QUAL	MDL
Benzo(k)fluoranthene	ug/Kg	11,400	ND	11,400	11,400	ND	11,400	11,400	ND	11,400	11,400	ND	11,400
Benzyl alcohol	ug/Kg	54,900	ND	54,900	54,900	ND	54,900	54,900	ND	54,900	54,900	ND	54,900
Bis(2-Chloroethoxy)methane	ug/Kg	28,000	ND	28,000	28,000	ND	28,000	28,000	ND	28,000	28,000	ND	28,000
Bis(2-Chloroethyl)ether	ug/Kg	41,900	ND	41,900	41,900	ND	41,900	41,900	ND	41,900	41,900	ND	41,900
Bis(2-Chloroisopropyl)ether	ug/Kg	39,000	ND	39,000	39,000	ND	39,000	39,000	ND	39,000	39,000	ND	39,000
Bis(2-Ethylhexyl)phthalate	ug/Kg	2,900,000		24,700	38,100	J	24,700	153,000	J	24,700	30,000	J	24,700
Butyl benzyl phthalate	ug/Kg	13,300	ND	13,300	13,300	ND	13,300	13,300	ND	13,300	13,300	ND	13,300
Carbazole	ug/Kg	34,200	ND	34,200	34,200	ND	34,200	34,200	ND	34,200	34,200	ND	34,200
Chrysene	ug/Kg	13,800	ND	13,800	13,800	ND	13,800	13,800	ND	13,800	13,800	ND	13,800
Di-n-butyl phthalate	ug/Kg	15,700	ND	15,700	15,700	ND	15,700	15,700	ND	15,700	15,700	ND	15,700
Di-n-octyl phthalate	ug/Kg	16,300	ND	16,300	16,300	ND	16,300	16,300	ND	16,300	16,300	ND	16,300
Dibenzofuran	ug/Kg	7,700	ND	7,700	7,700	ND	7,700	7,700	ND	7,700	7,700	ND	7,700
Diethyl phthalate	ug/Kg	20,100	ND	20,100	20,100	ND	20,100	20,100	ND	20,100	20,100	ND	20,100
Dimethyl phthalate	ug/Kg	8,350	ND	8,350	8,350	ND	8,350	8,350	ND	8,350	8,350	ND	8,350
Fluoranthene	ug/Kg	9,670	ND	9,670	9,670	ND	9,670	9,670	ND	9,670	9,670	ND	9,670
Fluorene	ug/Kg	70,600	J	15,900	139,000	J	15,900	453,000	J	15,900	40,400	J	15,900
Hexachlorobenzene	ug/Kg	61,700	ND	61,700	61,700	ND	61,700	61,700	ND	61,700	61,700	ND	61,700
Hexachlorobutadiene	ug/Kg	29,600	ND	29,600	29,600	ND	29,600	29,600	ND	29,600	29,600	ND	29,600
Hexachlorocyclopentadiene	ug/Kg	246,000	ND	246,000	246,000	ND	246,000	246,000	ND	246,000	246,000	ND	246,000
Hexachloroethane	ug/Kg	18,100	ND	18,100	18,100	ND	18,100	18,100	ND	18,100	18,100	ND	18,100
lueno(1,2,3-cd)pyrene	ug/Kg	30,500	ND	30,500	30,500	ND	30,500	30,500	ND	30,500	30,500	ND	30,500
Isophorone	ug/Kg	21,200	ND	21,200	21,200	ND	21,200	21,200	ND	21,200	21,200	ND	21,200
Nitrobenzene	ug/Kg	17,800	ND	17,800	17,800	ND	17,800	17,800	ND	17,800	17,800	ND	17,800
Pentachlorophenol	ug/Kg	279,000	ND	279,000	279,000	ND	279,000	279,000	ND	279,000	279,000	ND	279,000
Phenanthrene	ug/Kg	13,100	ND	13,100	13,100	ND	13,100	13,100	ND	13,100	13,100	ND	13,100
Phenol	ug/Kg	49,900	ND	49,900	49,900	ND	49,900	49,900	ND	49,900	49,900	ND	49,900
Pyrene	ug/Kg	11,400	ND	11,400	11,400	ND	11,400	11,400	ND	11,400	11,400	ND	11,400
Pyridine	ug/Kg	243,000	ND	243,000	243,000	ND	243,000	243,000	ND	243,000	243,000	ND	243,000
m,p-Cresol	ug/Kg	58,300	ND	58,300	58,300	ND	58,300	58,300	ND	58,300	58,300	ND	58,300
n-Nitrosodi-n-propylamine	ug/Kg	18,300	ND	18,300	18,300	ND	18,300	18,300	ND	18,300	18,300	ND	18,300
n-Nitrosodimethylamine	ug/Kg	91,400	ND	91,400	91,400	ND	91,400	91,400	ND	91,400	91,400	ND	91,400
n-Nitrosodiphenylamine	ug/Kg	11,400	ND	11,400	11,400	ND	11,400	11,400	ND	11,400	11,400	ND	11,400
o-Cresol	ug/Kg	17,900	ND	17,900	17,900	ND	17,900	17,900	ND	17,900	17,900	ND	17,900

Note
MDL= Method Detection Limit
RDL=Report Detection Limit
QuAL= Laboratory Qualifiers
J= Result between the MDL and RDL
ND=Compound was analyzed for but not detected
B=Analyte was detected in the associated Method Blank
ug/kg= micrograms per kilogram

KEMRON ENVIRONMENTAL SERVICES

THERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 6 B (Water)
Bottom Layer

CONDENSATE ANALYTICAL CHARACTERIZATION

		VR 90 RECONSTITUTED CONDENSATE (H2O)			HC100 RECONSTITUTED CONDENSATE (H2O)			VR100 RECONSTITUTED CONDENSATE (H2O)			HC 90 RECONSTITUTED CONDENSATE (H2O)		
PARAMETER	**UNITS**	**RESULT**	**QUAL**	**MDL**	**RESULT**	**QUAL**	**MDL**	**RESULT**	**QUAL**	**MDL**	**RESULT**	**QUAL**	**MDL**
Volatiles Organic Compounds													
1,1,1,2-Tetrachloroethane	ug/L	2,060	ND	2,060	2,060	ND	2,060	2,060	ND	2,060	2,060	ND	2,060
1,1,1-Trichloroethane	ug/L	1,700	ND	1,700	1,700	ND	1,700	1,700	ND	1,700	1,700	ND	1,700
1,1,2,2-Tetrachloroethane	ug/L	2,160	ND	2,160	2,160	ND	2,160	2,160	ND	2,160	2,160	ND	2,160
1,1,2-Trichloroethane	ug/L	2,940	ND	2,940	2,940	ND	2,940	2,940	ND	2,940	2,940	ND	2,940
1,1-Dichloroethane	ug/L	2,760	ND	2,760	2,760	ND	2,760	2,760	ND	2,760	2,760	ND	2,760
1,1-Dichloroethene	ug/L	4,160	ND	4,160	4,160	ND	4,160	4,160	ND	4,160	4,160	ND	4,160
1,1-Dichloropropene	ug/L	2,420	ND	2,420	2,420	ND	2,420	2,420	ND	2,420	2,420	ND	2,420
1,2,3-Trichloropropane	ug/L	1,960	ND	1,960	1,960	ND	1,960	1,960	ND	1,960	1,960	ND	1,960
1,2,4-Trichlorobenzene	ug/L	3,120	ND	3,120	3,120	ND	3,120	3,120	ND	3,120	3,120	ND	3,120
1,2,4-Trimethylbenzene	ug/L	2,040	ND	2,040	2,040	ND	2,040	2,040	ND	2,040	2,040	ND	2,040
1,2-Dibromo-3-chloropropane	ug/L	3,560	ND	3,560	3,560	ND	3,560	3,560	ND	3,560	3,560	ND	3,560
1,2-Dibromoethane	ug/L	2,010	ND	2,010	2,010	ND	2,010	2,010	ND	2,010	2,010	ND	2,010
1,2-Dichlorobenzene	ug/L	2,340	ND	2,340	2,340	ND	2,340	2,340	ND	2,340	2,340	ND	2,340
1,2-Dichloroethane	ug/L	2,380	ND	2,380	2,380	ND	2,380	2,380	ND	2,380	2,380	ND	2,380
1,2-Dichloroethene(Total)	ug/L	4,180	ND	4,180	4,180	ND	4,180	4,180	ND	4,180	4,180	ND	4,180
1,2-Dichloropropane	ug/L	3,010	ND	3,010	3,010	ND	3,010	3,010	ND	3,010	3,010	ND	3,010
1,3,5-Trimethylbenzene	ug/L	1,500	ND	1,500	1,500	ND	1,500	1,500	ND	1,500	1,500	ND	1,500
1,3-Dichlorobenzene	ug/L	2,700	ND	2,700	2,700	ND	2,700	2,700	ND	2,700	2,700	ND	2,700
1,3-Dichloropropane	ug/L	1,440	ND	1,440	1,440	ND	1,440	1,440	ND	1,440	1,440	ND	1,440
1,4-Dichlorobenzene	ug/L	2,200	ND	2,200	2,200	ND	2,200	2,200	ND	2,200	2,200	ND	2,200
2,2-Dichloropropane	ug/L	3,620	ND	3,620	3,620	ND	3,620	3,620	ND	3,620	3,620	ND	3,620
2-Butanone	ug/L	19,000	J	7,240	7,240	ND	7,240	7,240	ND	7,240	7,240	ND	7,240
2-Chlorotoluene	ug/L	2,160	ND	2,160	2,160	ND	2,160	2,160	ND	2,160	2,160	ND	2,160
2-Hexanone	ug/L	1,860	ND	1,860	1,860	ND	1,860	1,860	ND	1,860	1,860	ND	1,860
4-Chlorotoluene	ug/L	2,340	ND	2,340	2,340	ND	2,340	2,340	ND	2,340	2,340	ND	2,340
4-Isopropyltoluene	ug/L	1,640	ND	1,640	1,640	ND	1,640	1,640	ND	1,640	1,640	ND	1,640
4-Methyl-2-pentanone	ug/L	1,590	ND	1,590	1,590	ND	1,590	1,590	ND	1,590	1,590	ND	1,590
Acetone	ug/L	164,000		7,980	141,000		7,980	124,000		7,980	224,000		7,980
Benzene	ug/L	1,310,000		1,980	1,230,000		1,980	1,090,000		1,980	1,470,000		1,980
Bromobenzene	ug/L	2,180	ND	2,180	2,180	ND	2,180	2,180	ND	2,180	2,180	ND	2,180
Bromochloromethane	ug/L	2,540	ND	2,540	2,540	ND	2,540	2,540	ND	2,540	2,540	ND	2,540
Bromodichloromethane	ug/L	1,520	ND	1,520	1,520	ND	1,520	1,520	ND	1,520	1,520	ND	1,520
Bromoform	ug/L	3,000	ND	3,000	3,000	ND	3,000	3,000	ND	3,000	3,000	ND	3,000

KEMRON ENVIRONMENTAL SERVICES

THERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 6 B (Water)
Bottom Layer

CONDENSATE ANALYTICAL CHARACTERIZATION

PARAMETER	UNITS	VR 90 RECONSTITUTED CONDENSATE (H2O)			HC100 RECONSTITUTED CONDENSATE (H2O)			VR100 RECONSTITUTED CONDENSATE (H2O)			HC 90 RECONSTITUTED CONDENSATE (H2O)		
		RESULT	QUAL	MDL	RESULT	QUAL	MDL	RESULT	QUAL	MDL	RESULT	QUAL	MDL
Bromomethane	ug/L	8,540	ND	8,540	8,540	ND	8,540	8,540	ND	8,540	8,540	ND	8,540
Carbon disulfide	ug/L	3,800	ND	3,800	3,800	ND	3,800	3,800	ND	3,800	3,800	ND	3,800
Carbon tetrachloride	ug/L	2,920	ND	2,920	2,920	ND	2,920	2,920	ND	2,920	2,920	ND	2,920
Chlorobenzene	ug/L	1,780	ND	1,780	1,780	ND	1,780	1,780	ND	1,780	1,780	ND	1,780
Chloroethane	ug/L	4,700	ND	4,700	4,700	ND	4,700	4,700	ND	4,700	4,700	ND	4,700
Chloroform	ug/L	2,180	ND	2,180	2,180	ND	2,180	2,180	ND	2,180	2,180	ND	2,180
Chloromethane	ug/L	1,160	ND	1,160	1,160	ND	1,160	1,160	ND	1,160	1,160	ND	1,160
Dibromochloromethane	ug/L	1,520	ND	1,520	1,520	ND	1,520	1,520	ND	1,520	1,520	ND	1,520
Dibromomethane	ug/L	2,620	ND	2,620	2,620	ND	2,620	2,620	ND	2,620	2,620	ND	2,620
Dichlorodifluoromethane	ug/L	3,080	ND	3,080	3,080	ND	3,080	3,080	ND	3,080	3,080	ND	3,080
Ethylbenzene	ug/L	2,380	ND	2,380	2,380	ND	2,380	2,380	ND	2,380	2,380	ND	2,380
Hexachlorobutadiene	ug/L	4,220	ND	4,220	4,220	ND	4,220	4,220	ND	4,220	4,220	ND	4,220
Isopropylbenzene (Cumene)	ug/L	2,460	ND	2,460	2,460	ND	2,460	2,460	ND	2,460	2,460	ND	2,460
Methyl iodide	ug/L	1,680	ND	1,680	1,680	ND	1,680	1,680	ND	1,680	1,680	ND	1,680
Methylene chloride	ug/L	2,980	ND	2,980	2,980	ND	2,980	2,980	ND	2,980	2,980	ND	2,980
Naphthalene	ug/L	10,200	J	1,300	1,300	ND	1,300	1,300	ND	1,300	1,300	ND	1,300
Styrene	ug/L	1,960	ND	1,960	1,960	ND	1,960	1,960	ND	1,960	1,960	ND	1,960
Tetrachloroethene	ug/L	2,520	ND	2,520	2,520	ND	2,520	2,520	ND	2,520	2,520	ND	2,520
Thiophene	ug/L		B			B			B			B	
Toluene	ug/L	124,000		2,540	180,000		2,540	135,000		2,540	136,000		2,540
Trichloroethene	ug/L	3,020	ND	3,020	3,020	ND	3,020	3,020	ND	3,020	3,020	ND	3,020
Trichlorofluoromethane	ug/L	2,620	ND	2,620	2,620	ND	2,620	2,620	ND	2,620	2,620	ND	2,620
Trichlorotrifluoroethane	ug/L	3,160	ND	3,160	3,160	ND	3,160	3,160	ND	3,160	3,160	ND	3,160
Vinyl acetate	ug/L	1,520	ND	1,520	1,520	ND	1,520	1,520	ND	1,520	1,520	ND	1,520
Vinyl chloride	ug/L	2,740	ND	2,740	2,740	ND	2,740	2,740	ND	2,740	2,740	ND	2,740
Xylene (total)	ug/L	9,390	J	7,680	11,500	J	7,680	10,400	J	7,680	7,680	ND	7,680
cis-1,2-Dichloroethene	ug/L	2,680	ND	2,680	2,680	ND	2,680	2,680	ND	2,680	2,680	ND	2,680
cis-1,3-Dichloropropene	ug/L	1,840	ND	1,840	1,840	ND	1,840	1,840	ND	1,840	1,840	ND	1,840
m,p-Xylene	ug/L	9,390	J	4,740	11,500	J	4,740	10,400	J	4,740	4,740	ND	4,740
n-Butylbenzene	ug/L	3,040	ND	3,040	3,040	ND	3,040	3,040	ND	3,040	3,040	ND	3,040
n-Propylbenzene	ug/L	2,040	ND	2,040	2,040	ND	2,040	2,040	ND	2,040	2,040	ND	2,040
o-Xylene	ug/L	2,940	ND	2,940	2,940	ND	2,940	2,940	ND	2,940	2,940	ND	2,940
sec-Butylbenzene	ug/L	2,220	ND	2,220	2,220	ND	2,220	2,220	ND	2,220	2,220	ND	2,220
tert-Butyl methyl ether (MTBE)	ug/L	1,210	ND	1,210	1,210	ND	1,210	1,210	ND	1,210	1,210	ND	1,210
tert-Butylbenzene	ug/L	1,940	ND	1,940	1,940	ND	1,940	1,940	ND	1,940	1,940	ND	1,940
trans-1,2-Dichloroethene	ug/L	1,500	ND	1,500	1,500	ND	1,500	1,500	ND	1,500	1,500	ND	1,500
trans-1,3-Dichloropropene	ug/L	2,920	ND	2,920	2,920	ND	2,920	2,920	ND	2,920	2,920	ND	2,920
trans-1,4-Dichloro-2-butene	ug/L	6,240	ND	6,240	6,240	ND	6,240	6,240	ND	6,240	6,240	ND	6,240
Semi Volatiles Organic Compounds													
1,2,4-Trichlorobenzene	ug/L	2.34	ND	2.34	2.34	ND	2.34	2.34	ND	2.34	2.34	ND	2.34
1,2Diphenylhydrazine/Azobenzen	ug/L	2.78	ND	2.78	2.78	ND	2.78	2.78	ND	2.78	2.78	ND	2.78
1,4-Dichlorobenzene	ug/L	414.00		2.55	259.00		2.55	219.00		2.55	229.00		2.55
2,4,5-Trichlorophenol	ug/L	3.17	ND	3.17	3.17	ND	3.17	3.17	ND	3.17	3.17	ND	3.17
2,4,6-Trichlorophenol	ug/L	2.75	ND	2.75	2.75	ND	2.75	2.75	ND	2.75	2.75	ND	2.75
2,4-Dichlorophenol	ug/L	2.17	ND	2.17	2.17	ND	2.17	2.17	ND	2.17	2.17	ND	2.17
2,4-Dimethylphenol	ug/L	6.94	ND	6.94	6.94	ND	6.94	6.94	ND	6.94	6.94	ND	6.94
2,4-Dinitrophenol	ug/L	26.00	ND	26.00	26.00	ND	26.00	26.00	ND	26.00	26.00	ND	26.00
2,4-Dinitrotoluene	ug/L	2.63	ND	2.63	2.63	ND	2.63	2.63	ND	2.63	2.63	ND	2.63

KEMRON ENVIRONMENTAL SERVICES

THERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 6 B (Water)
Bottom Layer

CONDENSATE ANALYTICAL CHARACTERIZATION

PARAMETER	UNITS	VR 90 RECONSTITUTED CONDENSATE (H2O)			HC100 RECONSTITUTED CONDENSATE (H2O)			VR100 RECONSTITUTED CONDENSATE (H2O)			HC 90 RECONSTITUTED CONDENSATE (H2O)		
		RESULT	QUAL	MDL	RESULT	QUAL	MDL	RESULT	QUAL	MDL	RESULT	QUAL	MDL
2,6-Dinitrotoluene	ug/L	3.52	ND	3.52	3.52	ND	3.52	3.52	ND	3.52	3.52	ND	3.52
2-Chloronaphthalene	ug/L	2.21	ND	2.21	2.21	ND	2.21	2.21	ND	2.21	2.21	ND	2.21
2-Chlorophenol	ug/L	2.76	ND	2.76	2.76	ND	2.76	2.76	ND	2.76	2.76	ND	2.76
2-Methylnaphthalene	ug/L	43.40	J	2.55	50.40	J	2.55	45.70	J	2.55	55.50	J	2.55
2-Nitroaniline	ug/L	1.98	ND	1.98	1.98	ND	1.98	1.98	ND	1.98	1.98	ND	1.98
2-Nitrophenol	ug/L	3.57	ND	3.57	3.57	ND	3.57	3.57	ND	3.57	3.57	ND	3.57
3,3'-Dichlorobenzidine	ug/L	2.97	ND	2.97	2.97	ND	2.97	2.97	ND	2.97	2.97	ND	2.97
3-Nitroaniline	ug/L	2.26	ND	2.26	2.26	ND	2.26	2.26	ND	2.26	2.26	ND	2.26
4,6-Dinitro-2-methylphenol	ug/L	19.80	ND	19.80	19.80	ND	19.80	19.80	ND	19.80	19.80	ND	19.80
4-Bromophenyl phenyl ether	ug/L	3.37	ND	3.37	3.37	ND	3.37	3.37	ND	3.37	3.37	ND	3.37
4-Chloro-3-methylphenol	ug/L	2.34	ND	2.34	2.34	ND	2.34	2.34	ND	2.34	2.34	ND	2.34
4-Chloroaniline	ug/L	4.63	ND	4.63	4.63	ND	4.63	4.63	ND	4.63	4.63	ND	4.63
4-Chlorophenyl phenyl ether	ug/L	2.68	ND	2.68	2.68	ND	2.68	2.68	ND	2.68	2.68	ND	2.68
4-Nitroaniline	ug/L	2.21	ND	2.21	2.21	ND	2.21	2.21	ND	2.21	2.21	ND	2.21
4-Nitrophenol	ug/L	18.30	ND	18.30	18.30	ND	18.30	18.30	ND	18.30	18.30	ND	18.30
Acenaphthene	ug/L	3.53	J	2.68	3.59	J	2.68	2.68	ND	2.68	2.68	ND	2.68
Acenaphthylene	ug/L	3.03	ND	3.03	3.03	ND	3.03	3.03	ND	3.03	3.03	ND	3.03
Aniline	ug/L	2,880.00		28.70	143.00		7.18	2,660.00		28.70	7.18	ND	7.18
Anthracene	ug/L	3.16	ND	3.16	3.16	ND	3.16	3.16	ND	3.16	3.16	ND	3.16
Benzo(a)anthracene	ug/L	3.16	ND	3.16	3.16	ND	3.16	3.16	ND	3.16	3.16	ND	3.16
Benzo(a)pyrene	ug/L	1.25	ND	1.25	1.25	ND	1.25	1.25	ND	1.25	1.25	ND	1.25
Benzo(b)fluoranthene	ug/L	2.17	ND	2.17	2.17	ND	2.17	2.17	ND	2.17	2.17	ND	2.17

KEMRON ENVIRONMENTAL SERVICES

THERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 6 B (Water)
Bottom Layer

CONDENSATE ANALYTICAL CHARACTERIZATION

		VR 90 RECONSTITUTED CONDENSATE (H2O)			HC100 RECONSTITUTED CONDENSATE (H2O)			VR100 RECONSTITUTED CONDENSATE (H2O)			HC 90 RECONSTITUTED CONDENSATE (H2O)		
PARAMETER	**UNITS**	**RESULT**	**QUAL**	**MDL**	**RESULT**	**QUAL**	**MDL**	**RESULT**	**QUAL**	**MDL**	**RESULT**	**QUAL**	**MDL**
Benzo(g,h,i)perylene	ug/L	2.15	ND	2.15	2.15	ND	2.15	2.15	ND	2.15	2.15	ND	2.15
Benzo(k)fluoranthene	ug/L	2.36	ND	2.36	2.36	ND	2.36	2.36	ND	2.36	2.36	ND	2.36
Benzyl alcohol	ug/L	3.55	ND	3.55	3.55	ND	3.55	3.55	ND	3.55	3.55	ND	3.55
Bis(2-Chloroethoxy)methane	ug/L	2.90	ND	2.90	2.90	ND	2.90	2.90	ND	2.90	2.90	ND	2.90
Bis(2-Chloroethyl)ether	ug/L	2.88	ND	2.88	2.88	ND	2.88	2.88	ND	2.88	2.88	ND	2.88
Bis(2-Chloroisopropyl)ether	ug/L	2.57	ND	2.57	2.57	ND	2.57	2.57	ND	2.57	2.57	ND	2.57
Bis(2-Ethylhexyl)phthalate	ug/L	749.00		1.91	35.30	J	1.91	7.95	J	1.91	10.20	J	1.91
Butyl benzyl phthalate	ug/L	1.65	ND	1.65	1.65	ND	1.65	1.65	ND	1.65	1.65	ND	1.65
Carbazole	ug/L	2.32	ND	2.32	2.32	ND	2.32	2.32	ND	2.32	2.32	ND	2.32
Chrysene	ug/L	4.33	ND	4.33	4.33	ND	4.33	4.33	ND	4.33	4.33	ND	4.33
Di-n-butyl phthalate	ug/L	5.08	J	1.89	1.89	ND	1.89	1.89	ND	1.89	1.89	ND	1.89
Dibenz(a,h)anthracene	ug/L	2.17	ND	2.17	2.17	ND	2.17	2.17	ND	2.17	2.17	ND	2.17
Dibenzofuran	ug/L	2.27	ND	2.27	2.27	ND	2.27	2.27	ND	2.27	2.27	ND	2.27
Diethyl phthalate	ug/L	3.03	ND	3.03	3.03	ND	3.03	3.03	ND	3.03	3.03	ND	3.03
Dimethyl phthalate	ug/L	2.55	ND	2.55	2.55	ND	2.55	2.55	ND	2.55	2.55	ND	2.55
Fluoranthene	ug/L	2.67	ND	2.67	2.67	ND	2.67	2.67	ND	2.67	2.67	ND	2.67
Fluorene	ug/L	9.62	J	2.88	20.90	J	2.88	23.70	J	2.88	25.90	J	2.88
Hexachlorobenzene	ug/L	2.49	ND	2.49	2.49	ND	2.49	2.49	ND	2.49	2.49	ND	2.49
Hexachlorobutadiene	ug/L	1.92	ND	1.92	1.92	ND	1.92	1.92	ND	1.92	1.92	ND	1.92
Hexachlorocyclopentadiene	ug/L	1.74	ND	1.74	1.74	ND	1.74	1.74	ND	1.74	1.74	ND	1.74
Hexachloroethane	ug/L	2.99	ND	2.99	2.99	ND	2.99	2.99	ND	2.99	2.99	ND	2.99
Indeno(1,2,3-cd)pyrene	ug/L	1.57	ND	1.57	1.57	ND	1.57	1.57	ND	1.57	1.57	ND	1.57
Isophorone	ug/L	3.80	ND	3.80	27.40	J	3.80	3.80	ND	3.80	73.10	J	3.80
Nitrobenzene	ug/L	3.29	ND	3.29	3.29	ND	3.29	3.29	ND	3.29	3.29	ND	3.29
Pentachlorophenol	ug/L	1.68	ND	1.68	1.68	ND	1.68	1.68	ND	1.68	1.68	ND	1.68
Phenanthrene	ug/L	3.04	ND	3.04	3.04	ND	3.04	3.04	ND	3.04	3.04	ND	3.04
Phenol	ug/L	3,950.00		6.00	3,180.00		3.00	3,960.00		6.00	5,490.00		7.50
Pyrene	ug/L	4.86	ND	4.86	4.86	ND	4.86	4.86	ND	4.86	4.86	ND	4.86
Pyridine	ug/L	620.00		35.80	35.80	ND	35.80	447.00		35.80	35.80	ND	35.80
m,p-Cresol	ug/L	2,920.00		14.10	2,290.00		7.04	4,530.00		14.10	4,840.00		17.60
n-Nitrosodi-n-propylamine	ug/L	3.04	ND	3.04	3.04	ND	3.04	3.04	ND	3.04	3.04	ND	3.04
n-Nitrosodimethylamine	ug/L	3.04	ND	3.04	3.04	ND	3.04	3.04	ND	3.04	3.04	ND	3.04
n-Nitrosodiphenylamine	ug/L	3.64	ND	3.64	3.64	ND	3.64	3.64	ND	3.64	3.64	ND	3.64
o-Cresol	ug/L	3.29	ND	3.29	370.00		3.29	569.00		3.29	593.00		3.29

Note
MDL= Method Detection Limit
RDL=Report Detection Limit
QUAL= Laboratory Qualifiers
J= Result between the MDL and RDL
U=Compound was analyzed for but not detected
B=Analyte was detected in the associated Method Blank
ug/L= micrograms per liter

KEMRON ENVIRONMENTAL SERVICES

THERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 6 C (TICS Solids)
Top Layer

CONDENSATE ANALYTICAL CHARACTERIZATION

PARAMETER	UNITS	RETENTION TIME	VR 90 RECONSTITUTED CONDENSATE RESULT	HC100 RECONSTITUTED RESULT	VR100 RECONSTITUTED RESULT	HC 90 RECONSTITUTED RESULT
VOC						
No TICs Detected						
Semi Volatiles Organic Compounds						
Cyclopentane, ethyl-	ug/Kg	0.96				204,000
Unknown	ug/Kg	1.13				315,000
Octane	ug/Kg	1.20	324,000	421,000		679,000
Cyclohexane, 1,1,3-trimethyl-	ug/Kg	1.39	252,000	412,000		614,000
Benzene, 1,3-dimethyl	ug/Kg	1.53		14,300,000	8,440,000	19,100,000
Benzene, 1,2-dimethyl-	ug/Kg	1.64	2,760,000		2,670,000	
Benzene, (1-methylethyl)-	ug/Kg	1.78	2,210,000	3,980,000	2,150,000	4,630,000
Benzene, 1-ethyl-2methyl)-	ug/Kg	1.96		716,000		794,000
Benzene, 1-ethyl-3-methyl-	ug/Kg	1.96			775,000	
Benzene, 1,3,5-trimethyl-	ug/Kg	1.99	1,540,000	1,440,000	1,570,000	1,520,000
Benzene, 1,2,3-trimethyl-	ug/Kg	2.10			2,920,000	
Benzene, 1,2,3-trimethyl-	ug/Kg	2.11	2,850,000			
Benzene, 1,2,4-trimethyl-	ug/Kg	2.11		2,230,000		
1,2,4-Trimethylbenzene	ug/Kg	2.11				2,440,000
Benzene (1-methylpropyl)-	ug/Kg	2.17	1,790,000		1,820,000	
Benzene, (1-methylprophyl)-	ug/Kg	2.17			1,820,000	
Benzene, 1-methyl-4-(1-methylethyl)	ug/Kg	2.17				2,000,000
Benzene, 4-ethyl-1,2-dimethyl-	ug/Kg	2.38	214,000		231,000	
Benzene, (2-methyl-1-propenyl)-	ug/Kg	2.43	457,000			
Benzene, (1-ethylpropyl)-	ug/Kg	2.50	571,000	418,000		
Benzene, (1-ethylprophyl)-	ug/Kg	2.50				399,000
4-tert-Butyltoluene	ug/Kg	2.53	1,900,000	1,690,000		1,560,000
Benzene, (1,1-dimethylpropyl)-	ug/Kg	2.60	816,000		222,000	216,000
Benzene, 1-methyl-4-(1-methylethyl)	ug/Kg	2.6		241,000		
Benzene, (1-ethylbutyl)-	ug/Kg	2.85	645,000			192,000
Benzene, cyclopentyl-	ug/Kg	3.07			214,000	
Benzene, (1-methylhexyl)-	ug/Kg	3.31	1,280,000	252,000		171,000
Benzene, cyclohexyl-	ug/Kg	3.43			238,000	
Unknown	ug/Kg	3.47	483,000	400,000		

KEMRON ENVIRONMENTAL SERVICES

THERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 6 C (TICS Solids)
Top Layer

CONDENSATE ANALYTICAL CHARACTERIZATION

PARAMETER	UNITS	RETENTION TIME	VR 90 RECONSTITUTED CONDENSATE RESULT	HC100 RECONSTITUTED RESULT	VR100 RECONSTITUTED RESULT	HC 90 RECONSTITUTED RESULT
Benzene, (1,3-dimethlyl-2-butenyl)-	ug/Kg	3.47			846,000	
4-tert-Butyltoluene	ug/Kg	3.54	805,000			
Unknown	ug/Kg	3.54		708,000		
Benzene, 1,4-dipropyl-	ug/Kg	3.54			1,400,000	
Benzene, 1-(1,1-dimethylethyl)-3-me	ug/Kg	3.54				281,000
Benzene, 1-methyl-4-(1-methylethyl)	ug/Kg	3.65	538,000			
Benzene, 4-ethyl-1,2-dimethyl-	ug/Kg	3.65			1,020,000	
Ethanol, 2-xylyl-	ug/Kg	3.65				203,000
Benzene, 1-cyclohexyl-3-methyl-	ug/Kg	3.76			242,000	
Benzene, 1,2-dimethyl- 4-(phenylmeth	ug/Kg	4.26			231,000	
Stilbenzene, 4-amino-(E)	ug/Kg	4.55			1,660,000	
Sulfur, mol. (S8)	ug/Kg	5.70			809,000	

Note
TICS=Tentatively Identified Compounds
ug/kg=micrograms per kilogram

KEMRON ENVIRONMENTAL SERVICES

THERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 6 D (TICS Water)
Bottom Layer

CONDENSATE ANALYTICAL CHARACTERIZATION

PARAMETER	UNITS	RETENTION TIME	VR 90 RECONSTITUTED RESULT	HC100 RECONSTITUTED RESULT	VR100 RECONSTITUTED RESULT	HC 90 RECONSTITUTED RESULT
VOCs						
No TICs Detected						
Semi Volatiles Organic Compounds						
Furan, tetrahydro-2,5-dimethyl-	ug/L	0.97	692			
2-Pentanone, 3-methyl-	ug/L	1.02		1,070		974
Unknown	ug/L	1.12			1,020	1,270
3-Hexanone	ug/L	1.14		1,480		
Cyclopentanone	ug/L	1.17	3,600			2,610
Cyclopentanone	ug/L	1.18		3,130		
2-Hexanol,(R)-	ug/L	1.21			1,850	
Unknown	ug/L	1.23		1,020		847
Unknown	ug/L	1.28			114	
Unknown	ug/L	1.32	433	830	280	
Unknown	ug/L	1.36		289		
2-Furancarboxaldehyde	ug/L	1.36				270
Unknown	ug/L	1.37			102	
Cyclopentanone, 2-methyl-	ug/L	1.40	956	393	536	
Cyclopentanone, 3-methyl-	ug/L	1.44				334
Benzene, 1,3-dimethyl-	ug/L	1.53	4,510		2,190	
Benzene, 1,3-dimethyl-	ug/L	1.54		7,070		
2-Hexanone, 5-methyl-	ug/L	1.61				731
Benzene, 1,2-dimethyl-	ug/L	1.64	3,670	2,460		
2-Cyclopenten-1-one, 2-methyl-	ug/L	1.69		392	497	367
Benzene, (1-methylethyl)-	ug/L	1.78	819	1,610	322	1,200
Cyclohexanone, 2-methyl-	ug/L	1.90			452	
Unknown	ug/L	1.92	587			
2(3H)-Furanone, dihydro-5-methyl-	ug/L	1.92		676		833
Benzene, 1-ethyl-2-methyl-	ug/L	1.96	225			
Benzene, 1,3,5-trimethyl-	ug/L	1.99	842		552	
Benzene, 1,2,3-trimetil-	ug/L	1.99		1,190		
1,2,4-Trimethylbenzene	ug/L	1.99				1,090
Benzene, 1,3,5-trimethyl-	ug/L	2.10				859

KEMRON ENVIRONMENTAL SERVICES

THERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 6 D (TICS Water)
Bottom Layer

CONDENSATE ANALYTICAL CHARACTERIZATION

PARAMETER	UNITS	RETENTION TIME	VR 90 RECONSTITUTED RESULT	HC100 RECONSTITUTED RESULT	VR100 RECONSTITUTED RESULT	HC 90 RECONSTITUTED RESULT
1,2,4-Trimethylbenzene	ug/L	2.11	1,220			
Benzene, (1-methylpropyl)-	ug/L	2.17		497		
Unknown	ug/L	2.24	299			
Unknown	ug/L	2.24			131	
2-Pyrrolidinone, 1-methyl-	ug/L	2.32	582			
Phenol, 2-methyl-	ug/L	2.37			281	
Unknown	ug/L	2.38	349			
Unknown 487 2.59 ug/L	ug/L	2.59	487			
Phenylethyl Alcohol	ug/L	2.62		319		
Phenol, 2,5-dimethyl-	ug/L	2.75	296			
1,3-Butanedione, 2-butyl-1-phenyl-	ug/L	2.90	2,230			
Parachlorophenol	ug/L	2.97		269		
Benzene, cyclopentyl-	ug/L	3.07		279		
Benzene, 1,2-dimethyl-4-(phenylmeth	ug/L	4.31	42			
Sulfur, mil. (S8)	ug/L	5.71			1,260	
Maneb	ug/L	5.71				642

Note
TICS=Tentatively Identified Compounds
ug/L=micrograms per liter

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 7 A

TREATED MATERIAL CHEMICAL CHARACTERIZATION - VR100 and HC100

		VR100 - A Treated			VR100 - B Treated			VR100 - C Treated			HC100 - A Treated			HC100 - B Treated			HC100 - C Treated		
PARAMETER	**UNITS**	**RESULT**	**QUAL**	**MDL**	**RESULT**	**QUAL**	**MDL**	**RESULT**	**QUAL**	**MDL**	**RESULT**	**QUAL**	**MDL**	**RESULT**	**QUAL**	**MDL**	**RESULT**	**QUAL**	**MDL**
Total Organic Carbon	mg/Kg							712,000.0	200.0	97.0							475,000.0	200.0	97.0
pH	pH unit	3.97	1.00	1.00	4.06	1.00	1.00	3.97	1.00	1.00	< 2	1.00	1.00	< 2	1.00	1.00	> DL	1.00	1.00
Metals																			
Aluminum	mg/Kg	4330		0.86	5550		0.85	4390		0.85	514		1.94	539		1.9	578		1.97
Antimony	mg/Kg	0.45	J	0.11	0.1	U	0.1	0.2	J	0.1	0.24	U	0.24	0.23	U	0.23	0.24	U	0.24
Arsenic	mg/Kg	0.15	U	0.15	0.15	U	0.15	0.15	U	0.15	14		0.34	26		0.33	26.3		0.35
Barium	mg/Kg	7.17		0.026	9.94		0.026	7.38		0.026	10.3		0.059	10.4		0.058	11.4		0.06
Beryllium	mg/Kg	0.0069	J	0.0022	0.0094	J	0.0022	0.0083	J	0.0022	0.0049	U	0.0049	0.0048	U	0.0048	0.005	U	0.005
Cadmium	mg/Kg	0.0098	U	0.0098	0.0097	U	0.0097	0.0097	U	0.0097	0.022	U	0.022	0.022	U	0.022	0.022	U	0.022
Calcium	mg/Kg	152		4.75	220		4.71	168		4.72	143		10.7	144		10.5	143		10.9
Chromium	mg/Kg	5.17		0.02	9.22		0.019	3.06		0.019	7310		0.044	7720		0.043	7890		0.045
Cobalt	mg/Kg	0.47		0.011	0.27	J	0.011	0.28	J	0.011	32.4		0.025	48.3		0.024	48.5		0.025
Copper	mg/Kg	314		0.034	42.1		0.033	136		0.033	130		0.076	126		0.074	150		0.077
Iron	mg/Kg	4110		0.76	3050		0.76	2700		0.76	23600		1.72	26800		1.68	28000		1.74
Lead	mg/Kg	59.2		0.12	76.9		0.12	60.1		0.12	73.1		0.28	88.1		0.27	98.4		0.28
Magnesium	mg/Kg	59.2		0.47	56.9		0.47	56.5		0.47	46.1		1.06	46.1		1.04	47.7		1.08
Manganese	mg/Kg	54.9		0.015	46		0.015	43.7		0.015	566		0.034	606		0.034	647		0.035
Nickel	mg/Kg	12		0.023	4.96		0.023	4.8		0.023	4420		0.051	4740		0.05	4740		0.052
Potassium	mg/Kg	82.3		2.29	95.1		2.27	79.9		2.27	176		5.16	187		5.05	200		5.23
Selenium	mg/Kg	12.1		0.14	10.1		0.14	10.9		0.14	12.1		0.32	12.9		0.31	13.9		0.33
Silver	mg/Kg	0.043	J	0.024	0.048	J	0.024	0.08	J	0.024	0.054	U	0.054	0.053	U	0.053	0.055	U	0.055
Sodium	mg/Kg	3470		3.3	4070		3.27	3600		3.27	5850		7.43	5920		7.27	6000		7.54
Thallium	mg/Kg	0.69	J	0.096	0.42	J	0.095	0.48	J	0.095	1.22	J	0.22	1.76	J	0.21	2.59		0.22
Vanadium	mg/Kg	1.06		0.016	1.48		0.016	1.18		0.016	22.1		0.037	23.8		0.036	24.7		0.037
Zinc	mg/Kg	8.91		0.46	6.75		0.46	5.69		0.46	9.09		1.04	9.18		1.02	9.04		1.06
Mercury	mg/Kg	0.33		0.006	0.21		0.0054	0.28		0.006	2.41		0.028	2.77		0.032	2.39		0.034
Semivolatile Organic Compounds																			
1,2,4-Trichlorobenzene	ug/Kg	2,020	U	2,020	2,000	U	2,000	2,020	U	2,020	911	U	911	891	U	891	931	U	931
1,2Diphenylhydrazine/Azobenzen	ug/Kg	1,220	U	1,220	1,210	U	1,210	1,220	U	1,220	549	U	549	537	U	537	561	U	561
2,4,5-Trichlorophenol	ug/Kg	2,720	U	2,720	2,700	U	2,700	2,720	U	2,720	1,230	U	1,230	1,200	U	1,200	1,250	U	1,250
2,4,6-Trichlorophenol	ug/Kg	21,900	U	21,900	21,700	U	21,700	21,900	U	21,900	9,860	U	9,860	9,650	U	9,650	10,100	U	10,100
2,4-Dichlorophenol	ug/Kg	4,450	U	4,450	4,410	U	4,410	4,450	U	4,450	2,010	U	2,010	1,960	U	1,960	2,050	U	2,050
2,4-Dimethylphenol	ug/Kg	24,700	U	24,700	24,500	U	24,500	24,700	U	24,700	11,200	U	11,200	10,900	U	10,900	11,400	U	11,400
2,4-Dinitrophenol	ug/Kg	22,900	U	22,900	22,700	U	22,700	22,900	U	22,900	10,300	U	10,300	10,100	U	10,100	10,600	U	10,600
2,4-Dinitrotoluene	ug/Kg	6,170	U	6,170	99,400		6,110	6,170	U	6,170	2,780	U	2,780	2,720	U	2,720	2,840	U	2,840
2,6-Dinitrotoluene	ug/Kg	5,320	U	5,320	5,270	U	5,270	5,320	U	5,320	2,400	U	2,400	2,350	U	2,350	2,450	U	2,450
2-Chloronaphthalene	ug/Kg	689	U	689	683	U	683	690	U	690	311	U	311	304	U	304	318	U	318
2-Chlorophenol	ug/Kg	2,210	U	2,210	2,190	U	2,190	2,210	U	2,210	996	U	996	975	U	975	1,020	U	1,020
2-Methylnaphthalene	ug/Kg	108,000		1,700	52,600	J	1,690	61,100		1,700	25,000		767	19,100	J	751	23,800	J	784
2-Nitroaniline	ug/Kg	2,960	U	2,960	2,930	U	2,930	2,960	U	2,960	1,330	U	1,330	1,310	U	1,310	1,360	U	1,360
2-Nitrophenol	ug/Kg	3,660	U	3,660	3,630	U	3,630	3,660	U	3,660	1,650	U	1,650	1,620	U	1,620	1,690	U	1,690
3,3'-Dichlorobenzidine	ug/Kg	18,300	U	18,300	18,100	U	18,100	18,300	U	18,300	8,260	U	8,260	8,080	U	8,080	8,440	U	8,440
3-Nitroaniline	ug/Kg	3,870	U	3,870	3,830	U	3,830	3,870	U	3,870	1,740	U	1,740	1,710	U	1,710	1,780	U	1,780
4,6-Dinitro-2-methylphenol	ug/Kg	24,100	U	24,100	23,900	U	23,900	24,100	U	24,100	10,900	U	10,900	10,600	U	10,600	11,100	U	11,100
4-Bromophenyl phenyl ether	ug/Kg	4,040	U	4,040	4,010	U	4,010	4,040	U	4,040	1,820	U	1,820	1,780	U	1,780	1,860	U	1,860
4-Chloro-3-methylphenol	ug/Kg	5,740	U	5,740	5,690	U	5,690	5,740	U	5,740	2,590	U	2,590	2,530	U	2,530	2,640	U	2,640
4-Chloroaniline	ug/Kg	4,530	U	4,530	4,490	U	4,490	4,540	U	4,540	2,040	U	2,040	2,000	U	2,000	2,090	U	2,090
4-Chlorophenyl phenyl ether	ug/Kg	4,360	U	4,360	4,320	U	4,320	4,360	U	4,360	1,970	U	1,970	1,920	U	1,920	2,010	U	2,010
4-Nitroaniline	ug/Kg	35,800	U	35,800	35,500	U	35,500	35,800	U	35,800	16,200	U	16,200	15,800	U	15,800	16,500	U	16,500
4-Nitrophenol	ug/Kg	34,800	U	34,800	34,500	U	34,500	34,800	U	34,800	15,700	U	15,700	15,400	U	15,400	16,000	U	16,000
Acenaphthene	ug/Kg	16,700	J	1,410	9,390	J	1,400	13,200	J	1,410	4,620	J	637	3,690	J	623	4,400	J	650
Acenaphthylene	ug/Kg	1,640	U	1,640	1,630	U	1,630	1,640	U	1,640	740	U	740	724	U	724	1,620	J	756
Aniline	ug/Kg	11,100	J	4,540	4,800	J	4,500	8,590	J	4,550	2,050	U	2,050	2,010	U	2,010	2,090	U	2,090
Anthracene	ug/Kg	1,340	U	1,340	1,330	U	1,330	1,340	U	1,340	606	U	606	593	U	593	619	U	619
Benzo(a)anthracene	ug/Kg	4,760	U	4,760	4,720	U	4,720	4,760	U	4,760	2,150	U	2,150	2,100	U	2,100	2,190	U	2,190
Benzo(a)pyrene	ug/Kg	1,440	U	1,440	1,430	U	1,430	1,440	U	1,440	651	U	651	637	U	637	665	U	665
Benzo(b)fluoranthene	ug/Kg	8,260	U	8,260	8,190	U	8,190	8,270	U	8,270	3,730	U	3,730	3,650	U	3,650	3,810	U	3,810
Benzo(g,h,i)perylene	ug/Kg	1,820	U	1,820	1,810	U	1,810	1,820	U	1,820	822	U	822	805	U	805	840	U	840
Benzo(k)fluoranthene	ug/Kg	1,240	U	1,240	1,230	U	1,230	1,240	U	1,240	561	U	561	549	U	549	573	U	573
Benzyl alcohol	ug/Kg	5,970	U	5,970	5,910	U	5,910	5,970	U	5,970	2,690	U	2,690	2,630	U	2,630	2,750	U	2,750
Bis(2-Chloroethoxy)methane	ug/Kg	3,050	U	3,050	3,020	U	3,020	3,050	U	3,050	1,370	U	1,370	1,340	U	1,340	1,400	U	1,400
Bis(2-Chloroethyl)ether	ug/Kg	4,550	U	4,550	4,510	U	4,510	4,550	U	4,550	2,050	U	2,050	2,010	U	2,010	2,100	U	2,100
Bis(2-Chloroisopropyl)ether	ug/Kg	4,250	U	4,250	4,210	U	4,210	4,250	U	4,250	1,910	U	1,910	1,870	U	1,870	1,960	U	1,960
Bis(2-Ethylhexyl)phthalate	ug/Kg	2,690	U	2,690	2,660	U	2,660	2,690	U	2,690	1,210	U	1,210	1,190	U	1,190	1,240	U	1,240
Butyl benzyl phthalate	ug/Kg	1,450	U	1,450	1,430	U	1,430	1,450	U	1,450	652	U	652	638	U	638	666	U	666
Carbazole	ug/Kg	3,720	U	3,720	3,680	U	3,680	3,720	U	3,720	1,680	U	1,680	1,640	U	1,640	1,710	U	1,710
Chrysene	ug/Kg	1,500	U	1,500	1,490	U	1,490	1,500	U	1,500	677	U	677	663	U	663	692	U	692
Di-n-butyl phthalate	ug/Kg	1,710	U	1,710	1,690	U	1,690	1,710	U	1,710	771	U	771	754	U	754	787	U	787
Di-n-octyl phthalate	ug/Kg	1,770	U	1,770	1,750	U	1,750	1,770	U	1,770	798	U	798	781	U	781	816	U	816
Dibenz(a,h)anthracene	ug/Kg	1,570	U	1,570	1,560	U	1,560	1,570	U	1,570	710	U	710	694	U	694	725	U	725
Dibenzofuran	ug/Kg	837	U	837	830	U	830	838	U	838	378	U	378	370	U	370	386	U	386
Diethyl phthalate	ug/Kg	2,180	U	2,180	2,160	U	2,160	2,180	U	2,180	983	U	983	962	U	962	1,000	U	1,000
Dimethyl phthalate	ug/Kg	908	U	908	900	U	900	908	U	908	409	U	409	401	U	401	418	U	418
Fluoranthene	ug/Kg	1,050	U	1,050	1,040	U	1,040	1,050	U	1,050	474	U	474	464	U	464	484	U	484
Fluorene	ug/Kg	436,000		1,730	221,000		1,720	296,000		1,730	102,000		782	76,800		765	93,200		799
Hexachlorobenzene	ug/Kg	6,710	U	6,710	6,650	U	6,650	6,720	U	6,720	3,030	U	3,030	2,960	U	2,960	3,090	U	3,090
Hexachlorobutadiene	ug/Kg	3,220	U	3,220	3,190	U	3,190	3,220	U	3,220	1,450	U	1,450	1,420	U	1,420	1,480	U	1,480
Hexachlorocyclopentadiene	ug/Kg	26,700	U	26,700	26,500	U	26,500	26,700	U	26,700	12,000	U	12,000	11,800	U	11,800	12,300	U	12,300
Hexachloroethane	ug/Kg	1,960	U	1,960	1,950	U	1,950	1,970	U	1,970	886	U	886	867	U	867	905	U	905
Indeno(1,2,3-cd)pyrene	ug/Kg	3,310	U	3,310	3,280	U	3,280	3,320	U	3,320	1,490	U	1,490	1,460	U	1,460	1,530	U	1,530
Isophorone	ug/Kg	2,300	U	2,300	2,280	U	2,280	2,300	U	2,300	1,040	U	1,040	1,020	U	1,020	1,060	U	1,060
Nitrobenzene	ug/Kg	1,930	U	1,930	1,910	U	1,910	1,930	U	1,930	871	U	871	852	U	852	890	U	890
Pentachlorophenol	ug/Kg	30,400	U	30,400	30,100	U	30,100	30,400	U	30,400	13,700	U	13,700	13,400	U	13,400	14,000	U	14,000
Phenanthrene	ug/Kg	1,430	U	1,430	1,410	U	1,410	1,430	U	1,430	4,050	J	643	3,240	J	630	3,560	J	658
Phenol	ug/Kg	5,430	U	5,430	5,380	U	5,380	5,430	U	5,430	2,450	U	2,450	2,400	U	2,400	2,500	U	2,500
Pyrene	ug/Kg	1,240	U	1,240	1,230	U	1,230	1,240	U	1,240	558	U	558	546	U	546	570	U	570
Pyridine	ug/Kg	26,400	U	26,400	26,200	U	26,200	26,400	U	26,400	11,900	U	11,900	11,700	U	11,700	12,200	U	12,200
m,p-Cresol	ug/Kg	6,340	U	6,340	6,280	U	6,280	6,340	U	6,340	2,860	U	2,860	2,800	U	2,800	2,920	U	2,920
n-Nitrosodi-n-propylamine	ug/Kg	1,990	U	1,990	1,970	U	1,970	1,990	U	1,990	897	U	897	878	U	878	917	U	917
n-Nitrosodimethylamine	ug/Kg	9,940	U	9,940	9,850	U	9,850	9,950	U	9,950	4,480	U	4,480	4,390	U	4,390	4,580	U	4,580
n-Nitrosodiphenylamine	ug/Kg	1,240	U	1,240	1,230	U	1,230	1,240	U	1,240	560	U	560	548	U	548	572	U	572
o-Cresol	ug/Kg	1,940	U	1,940	1,920	U	1,920	1,940	U	1,940	876	U	876	857	U	857	895	U	895
Volatile Organic Compounds																			
1,1,1,2-Tetrachloroethane	ug/Kg	2,820	U	2,820	2,540	U	2,540	2,660	U	2,660	818	U	818	805	U	805	827	U	827
1,1,1-Trichloroethane	ug/Kg	4,950	U	4,950	4,460	U	4,460	4,670	U	4,670	1,440	U	1,440	1,410	U	1,410	1,450	U	1,450
1,1,2,2-Tetrachloroethane	ug/Kg	2,380	U	2,380	2,150	U	2,150	2,250	U	2,250	690	U	690	680	U	680	699	U	699
1,1,2-Trichloroethane	ug/Kg	2,800	U	2,800	2,520	U	2,520	2,640	U	2,640	812	U	812	799	U	799	821	U	821
1,1-Dichloroethane	ug/Kg	3,110	U	3,110	2,810	U	2,810	2,940	U	2,940	902	U	902	888	U	888	913	U	913
1,1-Dichloroethene	ug/Kg	4,840	U	4,840	4,370	U	4,370	4,570	U	4,570	1,410	U	1,410	1,380	U	1,380	1,420	U	1,420
1,1-Dichloropropene	ug/Kg	5,090	U	5,090	4,600	U	4,600	4,810	U	4,810	1,480	U	1,480	1,450	U	1,450	1,500	U	1,500
1,2,3-Trichloropropane	ug/Kg	2,400	U	2,400	2,170	U	2,170	2,270	U	2,270	696	U	696	686	U	686	705	U	705
1,2,4-Trichlorobenzene	ug/Kg	7,410	U	7,410	6,690	U	6,690	7,000	U	7,000	2,150	U	2,150	2,120	U	2,120	2,180	U	2,180
1,2,4-Trimethylbenzene	ug/Kg	136,000		7,510	143,000		6,780	133,000		7,090	37,900		2,180	43,300		2,150	31,600		2,210
1,2-Dibromo-3-chloropropane	ug/Kg	8,370	U	8,370	7,550	U	7,550	7,900	U	7,900	2,430	U	2,430	2,390	U	2,390	2,460	U	2,460
1,2-Dibromoethane	ug/Kg	3,010	U	3,010	2,710	U	2,710	2,840	U	2,840	872	U	872	858	U	858	882	U	882
1,2-Dichlorobenzene	ug/Kg	972,000		5,760	1,040,000		5,200	971,000		5,440	232,000		1,670	265,000		1,650	185,000		1,690
1,2-Dichloroethane	ug/Kg	4,130	U	4,130	3,730	U	3,730	3,900	U	3,900	1,200	U	1,200	1,180	U	1,180	1,210	U	1,210
1,2-Dichloroethene(Total)	ug/Kg	4,880	U	4,880	4,410	U	4,410	4,610	U	4,610	1,420	U	1,420	1,390	U	1,390	1,430	U	1,430
1,2-Dichloropropane	ug/Kg	3,210	U	3,210	2,900	U	2,900	3,030	U	3,030	933	U	933	918	U	918	944	U	944
1,3,5-Trimethylbenzene	ug/Kg	82,700	J	7,850	84,300	J	7,080	79,000	J	7,410	27,100	J	2,280	29,700	J	2,240	22,900	J	2,300
1,3-Dichlorobenzene	ug/Kg	5,430	U	5,430	4,900	U	4,900	5,120	U	5,120	1,570	U	1,570	1,550	U	1,550	1,590	U	1,590
1,3-Dichloropropane	ug/Kg	3,300	U	3,300	2,980	U	2,980	3,110	U	3,110	957	U	957	942	U	942	968	U	968
1,4-Dichlorobenzene	ug/Kg	77,200	J	4,820	83,000	J	4,350	80,700	J	4,550	17,700	J	1,400	19,600	J	1,380	14,500	J	1,420
2,2-Dichloropropane	ug/Kg	5,200	U	5,200	4,690	U	4,690	4,910	U	4,910	1,510	U	1,510	1,480	U	1,480	1,530	U	1,530
2-Butanone	ug/Kg	10,800	U	10,800	9,760	U	9,760	10,200	U	10,200	3,140	U	3,140	3,090	U	3,090	3,170	U	3,170
2-Chlorotoluene	ug/Kg	4,570	U	4,570	4,130	U	4,130	4,320	U	4,320	1,330	U	1,330	1,310	U	1,310	1,340	U	1,340
2-Hexanone	ug/Kg	9,040	U	9,040	8,160	U	8,160	8,530	U	8,530	2,620	U	2,620	2,580	U	2,580	2,650	U	2,650
4-Chlorotoluene	ug/Kg	4,900	U	4,900	4,430	U	4,430	4,630	U	4,630	1,420	U	1,420	1,400	U	1,400	1,440	U	1,440
4-Isopropyltoluene	ug/Kg	55,700	J	4,380	54,400	J	3,960	54,000	J	4,140	17,300	J	1,270	17,600	J	1,250	16,400	J	1,290
4-Methyl-2-pentanone	ug/Kg	2,750	U	2,750	2,490	U	2,490	2,600	U	2,600	799	U	799	787	U	787	809	U	809
Acetone	ug/Kg	21,500	U	21,500	19,400	U	19,400	20,300	U	20,300	6,240	U	6,240	6,140	U	6,140	6,310	U	6,310
Benzene	ug/Kg	30,300	J	3,170	31,500	J	2,860	30,000	J	3,000	387,000		921	479,000		906	304,000		931
Bromobenzene	ug/Kg	3,260	U	3,260	2,940	U	2,940	3,070	U	3,070	945	U	945	930	U	930	956	U	956
Bromochloromethane	ug/Kg	2,820	U	2,820	2,540	U	2,540	2,660	U	2,660	818	U	818	805	U	805	827	U	827
Bromodichloromethane	ug/Kg	3,380	U	3,380	3,050	U	3,050	3,190	U	3,190	981	U	981	966	U	966	993	U	993
Bromoform	ug/Kg	3,320	U	3,320	3,000	U	3,000	3,130	U	3,130	963	U	963	948	U	948	974	U	974

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 7 A

TREATED MATERIAL CHEMICAL CHARACTERIZATION - VR100 and HC100

		VR100 - A			VR100 - B			VR100 - C			HC100 - A			HC100 - B			HC100 - C		
		Treated			Treated			Treated			Treated			Treated			Treated		
PARAMETER	UNITS	RESULT	QUAL	MDL	RESULT	QUAL	MDL	RESULT	QUAL	MDL	RESULT	QUAL	MDL	RESULT	QUAL	MDL	RESULT	QUAL	MDL
Bromomethane	ug/Kg	6,320	U	6,320	5,710	U	5,710	5,970	U	5,970	1,840	U	1,840	1,810	U	1,810	1,860	U	1,860
Carbon disulfide	ug/Kg	6,780	U	6,780	6,120	U	6,120	6,400	U	6,400	1,970	U	1,970	1,940	U	1,940	1,990	U	1,990
Carbon tetrachloride	ug/Kg	4,220	U	4,220	3,810	U	3,810	3,980	U	3,980	1,220	U	1,220	1,200	U	1,200	1,240	U	1,240
Chlorobenzene	ug/Kg	3,110	U	3,110	2,810	U	2,810	2,940	U	2,940	902	U	902	888	U	888	913	U	913
Chloroethane	ug/Kg	6,910	U	6,910	6,240	U	6,240	6,520	U	6,520	2,000	U	2,000	1,970	U	1,970	2,030	U	2,030
Chloroform	ug/Kg	4,490	U	4,490	4,050	U	4,050	4,240	U	4,240	1,300	U	1,300	1,280	U	1,280	1,320	U	1,320
Chloromethane	ug/Kg	4,950	U	4,950	4,460	U	4,460	4,670	U	4,670	1,440	U	1,440	1,410	U	1,410	1,450	U	1,450
Dibromochloromethane	ug/Kg	4,550	U	4,550	4,110	U	4,110	4,300	U	4,300	1,320	U	1,320	1,300	U	1,300	1,340	U	1,340
Dibromomethane	ug/Kg	4,820	U	4,820	4,350	U	4,350	4,550	U	4,550	1,400	U	1,400	1,380	U	1,380	1,420	U	1,420
Dichlorodifluoromethane	ug/Kg	4,670	U	4,670	4,220	U	4,220	4,410	U	4,410	1,360	U	1,360	1,340	U	1,340	1,370	U	1,370
Ethylbenzene	ug/Kg	3,820	U	3,820	3,450	U	3,450	3,610	U	3,610	16,200	J	1,110	18,800	J	1,090	12,900	J	1,120
Hexachlorobutadiene	ug/Kg	4,470	U	4,470	4,030	U	4,030	4,220	U	4,220	1,300	U	1,300	1,280	U	1,280	1,310	U	1,310
Isopropylbenzene (Cumene)	ug/Kg	75,800	J	3,860	78,000	J	3,490	73,800	J	3,650	50,100		1,120	56,100		1,100	41,600		1,130
Methyl iodide	ug/Kg	25,700	U	25,700	23,200	U	23,200	24,200	U	24,200	7,450	U	7,450	7,330	U	7,330	7,540	U	7,540
Methylene chloride	ug/Kg	9,220	U	9,220	8,330	U	8,330	8,710	U	8,710	2,680	U	2,680	2,630	U	2,630	2,710	U	2,710
Naphthalene	ug/Kg	2,240,000		6,700	2,510,000		6,050	2,490,000		6,330	608,000		1,940	730,000		1,910	522,000		1,970
Styrene	ug/Kg	3,210	U	3,210	2,900	U	2,900	3,030	U	3,030	933	U	933	918	U	918	944	U	944
Tetrachloroethene	ug/Kg	6,180	U	6,180	5,580	U	5,580	5,830	U	5,830	1,790	U	1,790	1,760	U	1,760	1,810	U	1,810
Thiophene	ug/Kg		B			B			B		2,450	B		3,310	B		1,970	B	
Toluene	ug/Kg	148,000		3,230	163,000		2,920	152,000		3,050	451,000		939	528,000		924	351,000		950
Trichloroethene	ug/Kg	4,450	U	4,450	4,010	U	4,010	4,200	U	4,200	1,290	U	1,290	1,270	U	1,270	1,310	U	1,310
Trichlorofluoromethane	ug/Kg	5,450	U	5,450	4,920	U	4,920	5,140	U	5,140	1,580	U	1,580	1,560	U	1,560	1,600	U	1,600
Trichlorotrifluoroethane	ug/Kg	4,170	U	4,170	3,770	U	3,770	3,940	U	3,940	1,210	U	1,210	1,190	U	1,190	1,230	U	1,230
Vinyl acetate	ug/Kg	2,940	U	2,940	2,660	U	2,660	2,780	U	2,780	854	U	854	841	U	841	864	U	864
Vinyl chloride	ug/Kg	5,680	U	5,680	5,120	U	5,120	5,360	U	5,360	1,650	U	1,650	1,620	U	1,620	1,670	U	1,670
Xylene (total)	ug/Kg	254,000		8,370	259,000		7,550	248,000		7,900	292,000		2,430	338,000		2,390	235,000		2,460
cis-1,2-Dichloroethene	ug/Kg	3,090	U	3,090	2,790	U	2,790	2,920	U	2,920	896	U	896	882	U	882	907	U	907
cis-1,3-Dichloropropene	ug/Kg	3,860	U	3,860	3,490	U	3,490	3,650	U	3,650	1,120	U	1,120	1,100	U	1,100	1,130	U	1,130
m,p-Xylene	ug/Kg	169,000		6,140	172,000		5,540	166,000		5,790	237,000		1,780	275,000		1,750	190,000		1,800
n-Butylbenzene	ug/Kg	4,860	U	4,860	4,390	U	4,390	4,590	U	4,590	1,410	U	1,410	1,390	U	1,390	1,430	U	1,430
n-Propylbenzene	ug/Kg	15,400	U	15,400	13,900	U	13,900	14,600	U	14,600	4,480	U	4,480	4,410	U	4,410	4,530	U	4,530
o-Xylene	ug/Kg	86,100	J	2,820	85,500	J	2,540	81,400	J	2,660	55,200		818	63,600		805	45,600		827
sec-Butylbenzene	ug/Kg	109,000		4,110	114,000		3,710	104,000		3,880	33,800		1,190	36,800		1,170	29,600	J	1,210
tert-Butyl methyl ether (MTBE)	ug/Kg	2,550	U	2,550	2,300	U	2,300	2,400	U	2,400	739	U	739	727	U	727	748	U	748
tert-Butylbenzene	ug/Kg	5,340	U	5,340	4,820	U	4,820	5,050	U	5,050	1,550	U	1,550	1,530	U	1,530	1,570	U	1,570
trans-1,2-Dichloroethene	ug/Kg	2,730	U	2,730	2,470	U	2,470	2,580	U	2,580	793	U	793	781	U	781	803	U	803
trans-1,3-Dichloropropene	ug/Kg	3,550	U	3,550	3,200	U	3,200	3,350	U	3,350	1,030	U	1,030	1,010	U	1,010	1,040	U	1,040
trans-1,4-Dichloro-2-butene	ug/Kg	10,800	U	10,800	9,760	U	9,760	10,200	U	10,200	3,140	U	3,140	3,090	U	3,090	3,170	U	3,170

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 7 B

TREATED MATERIAL CHEMICAL CHARACTERIZATION - TCLP VR100 and HC100

		VR100 - TCLP			HC100 - TCLP		
		Treated			Treated		
PARAMETER	UNITS	RESULT	QUAL	MDL	RESULT	QUAL	MDL
Metals							
Arsenic	mg/L	0.017	ND	0.017	0.017	ND	0.017
Barium	mg/L	0.02	J	0.0079	0.055	J	0.0079
Cadmium	mg/L	0.00052	ND	0.00052	0.028	J	0.00052
Chromium	mg/L	0.0017	ND	0.0017	233		0.0017
Lead	mg/L	0.014	ND	0.014	0.46	J	0.014
Selenium	mg/L	0.019	ND	0.019	0.019	ND	0.019
Silver	mg/L	0.0032	J	0.0032	0.0085	J	0.0032
Mercury	mg/L	0.000075	ND	0.000075	0.0004	J	0.000075
Semivolatile Organic Compounds							
1,4-Dichlorobenzene	mg/L	0.083	J	0.0128	0.062	J	0.0128
2,4,5-Trichlorophenol	mg/L	0.0159	ND	0.0159	0.0159	ND	0.0159
2,4,6-Trichlorophenol	mg/L	0.0138	ND	0.0138	0.0138	ND	0.0138
2,4-Dinitrotoluene	mg/L	0.0132	ND	0.0132	0.0132	ND	0.0132
Cresols	mg/L	0.241	J	0.0341	0.391	J	0.0341
Hexachlorobenzene	mg/L	0.0125	ND	0.0125	0.0125	ND	0.0125
Hexachlorobutadiene	mg/L	0.0096	ND	0.0096	0.0096	ND	0.0096
Hexachloroethane	mg/L	0.015	ND	0.015	0.015	ND	0.015
Nitrobenzene	mg/L	0.0165	ND	0.0165	0.0165	ND	0.0165
Pentachlorophenol	mg/L	0.0084	ND	0.0084	0.0084	ND	0.0084
Pyridine	mg/L	0.179	ND	0.179	6.47		0.179
m,p-Cresol	mg/L	0.214	J	0.0176	0.359	J	0.0176
o-Cresol	mg/L	0.026	J	0.0165	0.033	J	0.0165
Volatile Organic Compounds							
1,1-Dichloroethene	mg/L	0.00732	ND	0.00732	0.037	ND	0.037
1,2-Dichloroethane	mg/L	0.00484	ND	0.00484	0.024	ND	0.024
2-Butanone	mg/L	0.0094	ND	0.0094	0.301	J	0.047
Benzene	mg/L	0.564		0.00196	13		0.0098
Carbon tetrachloride	mg/L	0.00225	ND	0.00225	0.011	ND	0.011
Chlorobenzene	mg/L	0.00219	ND	0.00219	0.011	ND	0.011
Chloroform	mg/L	0.00246	ND	0.00246	0.012	ND	0.012
Tetrachloroethene	mg/L	0.00564	ND	0.00564	0.028	ND	0.028
Thiophene	mg/L	0			0		
Trichloroethene	mg/L	0.00377	ND	0.00377	0.019	ND	0.019
Vinyl chloride	mg/L	0.00416	ND	0.00416	0.021	ND	0.021

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 7 C

TREATED MATERIAL CHEMICAL CHARACTERIZATION - SPLP VR100 and HC100

		VR100 - SPLP			HC100 - SPLP		
		Treated			Treated		
PARAMETER	UNITS	RESULT	QUAL	MDL	RESULT	QUAL	MDL
Metals							
Aluminum	mg/Kg	1.32		0.024	12.3		0.24
Antimony	mg/Kg	0.004	ND	0.004	0.04	ND	0.04
Arsenic	mg/Kg	0.0035	ND	0.0035	0.65		0.035
Barium	mg/Kg	0.0047	J	0.0016	0.025	J	0.016
Beryllium	mg/Kg	0.000082	ND	0.000082	0.00082	ND	0.00082
Cadmium	mg/Kg	0.0001	J	0.0001	0.001	ND	0.001
Calcium	mg/Kg	0.5		0.024	3.88		0.24
Chromium	mg/Kg	0.0037	J	0.00034	217		0.0034
Cobalt	mg/Kg	0.0011	J	0.00052	1.23		0.0052
Copper	mg/Kg	0.0017	ND	0.0017	1.35		0.017
Iron	mg/Kg	1.33		0.027	749		0.27
Lead	mg/Kg	0.0028	ND	0.0028	0.54		0.028
Magnesium	mg/Kg	0.055		0.012	1.1		0.12
Manganese	mg/Kg	0.017		0.00083	17.4		0.0083
Nickel	mg/Kg	0.0079	J	0.00084	122		0.0084
Potassium	mg/Kg	0.22	J	0.041	5.2		0.41
Selenium	mg/Kg	0.0038	ND	0.0038	0.06	J	0.038
Silver	mg/Kg	0.00064	ND	0.00064	0.0064	ND	0.0064
Sodium	mg/Kg	1.82		0.056	162		0.56
Thallium	mg/Kg	0.0067	J	0.0026	0.026	ND	0.026
Vanadium	mg/Kg	0.0012	ND	0.0012	0.67		0.012
Zinc	mg/Kg	0.016	J	0.0059	0.27		0.059
Mercury	mg/Kg	0.000075	ND	0.000075	0.00018	J	0.000075
Semivolatile Organic Compounds							
1,2,4-Trichlorobenzene	ug/Kg	2.34	ND	2.34	2.34	ND	2.34
1,2Diphenylhydrazine/Azobenzen	ug/Kg	2.78	ND	2.78	2.78	ND	2.78
2,4,5-Trichlorophenol	ug/Kg	3.17	ND	3.17	3.17	ND	3.17
2,4,6-Trichlorophenol	ug/Kg	2.75	ND	2.75	2.75	ND	2.75
2,4-Dichlorophenol	ug/Kg	2.17	ND	2.17	2.17	ND	2.17
2,4-Dimethylphenol	ug/Kg	6.94	ND	6.94	6.94	ND	6.94
2,4-Dinitrophenol	ug/Kg	26	ND	26	26	ND	26
2,4-Dinitrotoluene	ug/Kg	2.63	ND	2.63	2.63	ND	2.63
2,6-Dinitrotoluene	ug/Kg	3.52	ND	3.52	3.52	ND	3.52
2-Chloronaphthalene	ug/Kg	2.21	ND	2.21	2.21	ND	2.21
2-Chlorophenol	ug/Kg	2.76	ND	2.76	2.76	ND	2.76
2-Methylnaphthalene	ug/Kg	53.8	J	2.55	27.1	J	2.55
2-Nitroaniline	ug/Kg	1.98	ND	1.98	1.98	ND	1.98
2-Nitrophenol	ug/Kg	3.57	ND	3.57	3.57	ND	3.57
3,3'-Dichlorobenzidine	ug/Kg	2.97	ND	2.97	2.97	ND	2.97
3-Nitroaniline	ug/Kg	2.26	ND	2.26	2.26	ND	2.26
4,6-Dinitro-2-methylphenol	ug/Kg	19.8	ND	19.8	19.8	ND	19.8
4-Bromophenyl phenyl ether	ug/Kg	3.37	ND	3.37	3.37	ND	3.37
4-Chloro-3-methylphenol	ug/Kg	2.34	ND	2.34	2.34	ND	2.34
4-Chloroaniline	ug/Kg	4.63	ND	4.63	4.63	ND	4.63
4-Chlorophenyl phenyl ether	ug/Kg	2.68	ND	2.68	2.68	ND	2.68
4-Nitroaniline	ug/Kg	2.21	ND	2.21	2.21	ND	2.21
4-Nitrophenol	ug/Kg	18.3	ND	18.3	18.3	ND	18.3
Acenaphthene	ug/Kg	6.33	J	2.68	3.35	J	2.68
Acenaphthylene	ug/Kg	3.03	ND	3.03	3.03	ND	3.03
Aniline	ug/Kg	33.2	J	7.18	617		7.18
Anthracene	ug/Kg	3.16	ND	3.16	3.16	ND	3.16
Benzo(a)anthracene	ug/Kg	3.16	ND	3.16	3.16	ND	3.16
Benzo(a)pyrene	ug/Kg	1.25	ND	1.25	1.25	ND	1.25
Benzo(b)fluoranthene	ug/Kg	2.17	ND	2.17	2.17	ND	2.17
Benzo(g,h,i)perylene	ug/Kg	2.15	ND	2.15	2.15	ND	2.15

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 7 C

TREATED MATERIAL CHEMICAL CHARACTERIZATION - SPLP VR100 and HC100

		VR100 - SPLP			HC100 - SPLP		
		Treated			Treated		
PARAMETER	UNITS	RESULT	QUAL	MDL	RESULT	QUAL	MDL
Benzo(k)fluoranthene	ug/Kg	2.36	ND	2.36	2.36	ND	2.36
Benzyl alcohol	ug/Kg	3.55	ND	3.55	3.55	ND	3.55
Bis(2-Chloroethoxy)methane	ug/Kg	2.9	ND	2.9	2.9	ND	2.9
Bis(2-Chloroethyl)ether	ug/Kg	2.88	ND	2.88	2.88	ND	2.88
Bis(2-Chloroisopropyl)ether	ug/Kg	2.57	ND	2.57	2.57	ND	2.57
Bis(2-Ethylhexyl)phthalate	ug/Kg	1.91	ND	1.91	1.91	ND	1.91
Butyl benzyl phthalate	ug/Kg	1.65	ND	1.65	1.65	ND	1.65
Carbazole	ug/Kg	10.5	J	2.32	2.32	ND	2.32
Chrysene	ug/Kg	4.33	ND	4.33	4.33	ND	4.33
Di-n-butyl phthalate	ug/Kg	1.89	ND	1.89	1.89	ND	1.89
Di-n-octyl phthalate	ug/Kg	1.67	ND	1.67	1.67	ND	1.67
Dibenz(a,h)anthracene	ug/Kg	2.17	ND	2.17	2.17	ND	2.17
Dibenzofuran	ug/Kg	2.27	ND	2.27	2.27	ND	2.27
Diethyl phthalate	ug/Kg	3.03	ND	3.03	3.03	ND	3.03
Dimethyl phthalate	ug/Kg	2.55	ND	2.55	2.55	ND	2.55
Fluoranthene	ug/Kg	2.67	ND	2.67	2.67	ND	2.67
Fluorene	ug/Kg	16.8	J	2.88	12.5	J	2.88
Hexachlorobenzene	ug/Kg	2.49	ND	2.49	2.49	ND	2.49
Hexachlorobutadiene	ug/Kg	1.92	ND	1.92	1.92	ND	1.92
Hexachlorocyclopentadiene	ug/Kg	1.74	ND	1.74	1.74	ND	1.74
Hexachloroethane	ug/Kg	2.99	ND	2.99	2.99	ND	2.99
Indeno(1,2,3-cd)pyrene	ug/Kg	1.57	ND	1.57	1.57	ND	1.57
Isophorone	ug/Kg	7.7	J	3.8	11.2	J	3.8
Nitrobenzene	ug/Kg	3.29	ND	3.29	3.29	ND	3.29
Pentachlorophenol	ug/Kg	1.68	ND	1.68	1.68	ND	1.68
Phenanthrene	ug/Kg	3.04	ND	3.04	3.04	ND	3.04
Phenol	ug/Kg	90.2	J	1.5	117		1.5
Pyrene	ug/Kg	4.86	ND	4.86	4.86	ND	4.86
Pyridine	ug/Kg	35.8	ND	35.8	84.5	J	35.8
m,p-Cresol	ug/Kg	211		3.52	361		3.52
n-Nitrosodi-n-propylamine	ug/Kg	3.04	ND	3.04	3.04	ND	3.04
n-Nitrosodimethylamine	ug/Kg	3.04	ND	3.04	3.04	ND	3.04
n-Nitrosodiphenylamine	ug/Kg	3.64	ND	3.64	3.64	ND	3.64
o-Cresol	ug/Kg	24.6	J	3.29	27.2	J	3.29
Volatile Organic Compounds							
1,1,1,2-Tetrachloroethane	ug/Kg	0.75	ND	0.75	3	ND	3
1,1,1-Trichloroethane	ug/Kg	0.388	ND	0.388	1.55	ND	1.55
1,1,2,2-Tetrachloroethane	ug/Kg	0.56	ND	0.56	2.24	ND	2.24
1,1,2-Trichloroethane	ug/Kg	0.895	ND	0.895	3.58	ND	3.58
1,1-Dichloroethane	ug/Kg	0.319	ND	0.319	1.27	ND	1.27
1,1-Dichloroethene	ug/Kg	0.915	ND	0.915	3.66	ND	3.66
1,1-Dichloropropene	ug/Kg	0.357	ND	0.357	1.43	ND	1.43
1,2,3-Trichloropropane	ug/Kg	0.317	ND	0.317	1.27	ND	1.27
1,2,4-Trichlorobenzene	ug/Kg	0.69	ND	0.69	2.76	ND	2.76
1,2,4-Trimethylbenzene	ug/Kg	152		0.402	176		1.61
1,2-Dibromo-3-chloropropane	ug/Kg	0.412	ND	0.412	1.65	ND	1.65
1,2-Dibromoethane	ug/Kg	0.845	ND	0.845	3.38	ND	3.38
1,2-Dichlorobenzene	ug/Kg	1450		4.29	980		1.72
1,2-Dichloroethane	ug/Kg	0.605	ND	0.605	2.42	ND	2.42
1,2-Dichloroethene(Total)	ug/Kg	0.845	ND	0.845	3.38	ND	3.38
1,2-Dichloropropane	ug/Kg	0.57	ND	0.57	2.28	ND	2.28
1,3,5-Trimethylbenzene	ug/Kg	71.5		0.263	105		1.05
1,3-Dichlorobenzene	ug/Kg	15.4	J	0.4	12.6	J	1.6
1,3-Dichloropropane	ug/Kg	0.565	ND	0.565	2.26	ND	2.26
1,4-Dichlorobenzene	ug/Kg	91.8		0.292	69.7	J	1.17
2,2-Dichloropropane	ug/Kg	0.56	ND	0.56	2.24	ND	2.24
2-Butanone	ug/Kg	48.3	J	1.18	71.5	J	4.7
2-Chlorotoluene	ug/Kg	0.449	ND	0.449	1.8	ND	1.8

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 7 C

TREATED MATERIAL CHEMICAL CHARACTERIZATION - SPLP VR100 and HC100

		VR100 - SPLP			HC100 - SPLP		
		Treated			Treated		
PARAMETER	UNITS	RESULT	QUAL	MDL	RESULT	QUAL	MDL
2-Hexanone	ug/Kg	34.2		1.51	6.04	ND	6.04
4-Chlorotoluene	ug/Kg	0.23	ND	0.23	0.92	ND	0.92
4-Isopropyltoluene	ug/Kg	7.21	J	0.875	13.4	J	3.5
4-Methyl-2-pentanone	ug/Kg	7.16	J	0.71	2.84	ND	2.84
Acetone	ug/Kg	139		1.61	196	J	6.44
Benzene	ug/Kg	513		0.245	13600		9.8
Bromobenzene	ug/Kg	0.473	ND	0.473	1.89	ND	1.89
Bromochloromethane	ug/Kg	1.19	ND	1.19	4.76	ND	4.76
Bromodichloromethane	ug/Kg	0.353	ND	0.353	1.41	ND	1.41
Bromoform	ug/Kg	1.39	ND	1.39	5.56	ND	5.56
Bromomethane	ug/Kg	1.38	ND	1.38	5.52	ND	5.52
Carbon disulfide	ug/Kg	0.95	ND	0.95	3.8	ND	3.8
Carbon tetrachloride	ug/Kg	0.282	ND	0.282	1.13	ND	1.13
Chlorobenzene	ug/Kg	6.4	J	0.274	8	J	1.1
Chloroethane	ug/Kg	10.3	J	1.4	25.2	J	5.58
Chloroform	ug/Kg	0.308	ND	0.308	1.23	ND	1.23
Chloromethane	ug/Kg	35.5		0.379	42.8	J	1.51
Dibromochloromethane	ug/Kg	0.665	ND	0.665	2.66	ND	2.66
Dibromomethane	ug/Kg	0.985	ND	0.985	3.94	ND	3.94
Dichlorodifluoromethane	ug/Kg	0.441	ND	0.441	1.76	ND	1.76
Ethylbenzene	ug/Kg	35.7		0.9	136		3.6
Hexachlorobutadiene	ug/Kg	1.74	ND	1.74	6.94	ND	6.94
Isopropylbenzene (Cumene)	ug/Kg	62.9		0.292	233		1.17
Methyl iodide	ug/Kg	0.485	ND	0.485	1.94	ND	1.94
Methylene chloride	ug/Kg	3.74	J	0.51	2.04	ND	2.04
Naphthalene	ug/Kg	3580		8.75	2550		3.5
Styrene	ug/Kg	34.2		0.288	1.15	ND	1.15
Tetrachloroethene	ug/Kg	0.705	ND	0.705	2.82	ND	2.82
Thiophene	ug/Kg	15.1	B		129	BE	
Toluene	ug/Kg	996		0.388	7450		15.5
Trichloroethene	ug/Kg	0.472	ND	0.472	1.89	ND	1.89
Trichlorofluoromethane	ug/Kg	0.468	ND	0.468	1.87	ND	1.87
Trichlorotrifluoroethane	ug/Kg	0.705	ND	0.705	2.82	ND	2.82
Vinyl acetate	ug/Kg	0.985	ND	0.985	3.94	ND	3.94
Vinyl chloride	ug/Kg	0.52	ND	0.52	2.08	ND	2.08
Xylene (total)	ug/Kg	574		0.615	2720		2.46
cis-1,2-Dichloroethene	ug/Kg	0.52	ND	0.52	2.08	ND	2.08
cis-1,3-Dichloropropene	ug/Kg	0.525	ND	0.525	2.1	ND	2.1
m,p-Xylene	ug/Kg	371		0.493	2170		1.97
n-Butylbenzene	ug/Kg	0.342	ND	0.342	1.37	ND	1.37
n-Propylbenzene	ug/Kg	0.343	ND	0.343	1.37	ND	1.37
o-Xylene	ug/Kg	202		0.387	554		1.55
sec-Butylbenzene	ug/Kg	31		0.441	52.6	J	1.76
tert-Butyl methyl ether (MTBE)	ug/Kg	0.42	ND	0.42	1.68	ND	1.68
tert-Butylbenzene	ug/Kg	7.77	J	0.29	23.1	J	1.16
trans-1,2-Dichloroethene	ug/Kg	0.478	ND	0.478	1.91	ND	1.91
trans-1,3-Dichloropropene	ug/Kg	0.339	ND	0.339	1.36	ND	1.36
trans-1,4-Dichloro-2-butene	ug/Kg	2.15	ND	2.15	8.58	ND	8.58

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 7 D

TREATED MATERIAL CHEMICAL CHARACTERIZATION - VR90 and HC90

		VR90 - A			VR90 - B			VR90 - C			HC90 - A			HC90 - B			HC90 - C		
		Treated			Treated			Treated			Treated			Treated			Treated		
PARAMETER	UNITS	RESULT	QUAL	MDL	RESULT	QUAL	MDL	RESULT	QUAL	MDL	RESULT	QUAL	MDL	RESULT	QUAL	MDL	RESULT	QUAL	MDL
Total Organic Carbon	mg/Kg							69,300	200.0	97.0							64,900	200.0	97.0
pH	pH unit	4.23	1.0	1.0	4.42	1.0	1.0	4.47	1.0	1.0	1.58	1.0	1.0	1.0	2.0	1.0	1.0	2.0	1.0
Metals																			
Aluminum	mg/Kg	3,290		0.93	3,800		0.94	4,040		0.95	392		4.25	505		4.75	503		4.33
Antimony	mg/Kg	0.18	J	0.11	0.47	J	0.12	0.12	U	0.12	0.52	U	0.52	0.89	J	0.58	8.61	J	0.53
Arsenic	mg/Kg	0.16	U	0.16	0.17	U	0.17	0.17	U	0.17	18.8		0.75	21.1		0.84	43.3		0.76
Barium	mg/Kg	7.26		0.028	8.06		0.029	8.5		0.029	6.99		0.13	11.2		0.14	8.24		0.13
Beryllium	mg/Kg	0.0054	J	0.0023	0.0052	J	0.0024	0.0024	U	0.0024	0.011	U	0.011	0.012	U	0.012	0.011	U	0.011
Cadmium	mg/Kg	0.011	U	0.011	0.011	U	0.011	0.011	U	0.011	0.048	U	0.048	0.054	U	0.054	0.049	U	0.049
Calcium	mg/Kg	169		5.13	150		5.2	141		5.24	147	J	23.5	179J	J	26.3	173		23.9
Chromium	mg/Kg	4.3		0.021	5.85		0.021	50.3		0.022	6910		0.097	7,640		0.11	14,000		0.099
Cobalt	mg/Kg	0.17	J	0.012	0.18	J	0.012	0.015	J	0.012	41.8		0.054	49.2		0.06	88.5		0.055
Copper	mg/Kg	24.7		0.036	26.1		0.037	27		0.037	92.1		0.17	94.4		0.19	201		0.17
Iron	mg/Kg	6,660		0.82	6,910		0.83	21,100		0.84	24,300		3.77	28,700		4.21	49,700		3.84
Lead	mg/Kg	73.1		0.13	73.4		0.14	74.1		0.14	66.7		0.61	90.1		0.68	77.4		0.62
Magnesium	mg/Kg	50.7		0.51	55.5		0.52	53.9		0.52	37.5		2.33	45.1		2.61	46		2.38
Manganese	mg/Kg	101		0.016	113		0.017	220		0.017	635		0.075	724		0.084	1310		0.077
Mercury	mg/Kg	0.91		0.012	1.13		0.013	1		0.012	2.5		0.028	3.14		0.033	1.67		0.03
Nickel	mg/Kg	4.94		0.025	5.65		0.025	5.43		0.025	3420		0.11	3750		0.13	6,700		0.11
Potassium	mg/Kg	58.7		2.47	59.1		2.5	67.6		2.52	132		11.3	178		12.6	192		11.5
Selenium	mg/Kg	9.4		0.15	10.2		0.16	11.7		0.16	8.71		0.7	10.6		0.79	10.9		0.72
Silver	mg/Kg	0.026	U	0.026	0.026	U	0.026	0.026	U	0.026	0.12	U	0.12	0.13	U	0.13	0.12	U	0.12
Sodium	mg/Kg	3,150		3.56	3,260		3.6	3,430		3.63	3,950		16.3	4,640		18.2	5,920		16.6
Thallium	mg/Kg	0.33	J	0.1	0.61	J	0.1	0.39	J	0.11	0.47	U	0.47	0.53	U	0.53	0.48	U	0.48
Vanadium	mg/Kg	0.045	J	0.018	0.037	J	0.018	0.018	U	0.018	25.4		0.081	30.3		0.09	53.8		0.082
Zinc	mg/Kg	6.13		0.5	5.54		0.51	5.17		0.51	10.4		2.29	12.3		2.56	17.2		2.33
Semivolatile Organic Compounds																			
1,2,4-Trichlorobenzene	ug/Kg	4,360	U	4,360	4,420	U	4,420	4,450	U	4,450	4,000	U	4,000	4,470	U	4,470	4,070	U	4,070
1,2Diphenylhydrazine/Azobenzen	ug/Kg	2,630	U	2,630	2,660	U	2,660	2,680	U	2,680	2,410	U	2,410	2,690	U	2,690	2,450	U	2,450
2,4,5-Trichlorophenol	ug/Kg	5,870	U	5,870	5,950	U	5,950	5,990	U	5,990	5,380	U	5,380	6,010	U	6,010	5,480	U	5,480
2,4,6-Trichlorophenol	ug/Kg	47,200	U	47,200	47,800	U	47,800	48,200	U	48,200	43,200	U	43,200	48,300	U	48,300	44,000	U	44,000
2,4-Dichlorophenol	ug/Kg	9,600	U	9,600	9,720	U	9,720	9,790	U	9,790	8,800	U	8,800	9,830	U	9,830	8,950	U	8,950
2,4-Dimethylphenol	ug/Kg	53,400	U	53,400	54,000	U	54,000	54,500	U	54,500	48,900	U	48,900	54,700	U	54,700	49,800	U	49,800
2,4-Dinitrophenol	ug/Kg	49,500	U	49,500	50,100	U	50,100	50,500	U	50,500	45,300	U	45,300	50,700	U	50,700	46,200	U	46,200
2,4-Dinitrotoluene	ug/Kg	13,300	U	13,300	13,500	U	13,500	13,600	U	13,600	12,200	U	12,200	13,600	U	13,600	12,400	U	12,400
2,6-Dinitrotoluene	ug/Kg	11,500	U	11,500	11,600	U	11,600	11,700	U	11,700	10,500	U	10,500	11,800	U	11,800	10,700	U	10,700
2-Chloronaphthalene	ug/Kg	1,490	U	1,490	1,510	U	1,510	1,520	U	1,520	1,360	U	1,360	1,520	U	1,520	1,390	U	1,390
2-Chlorophenol	ug/Kg	4,770	U	4,770	4,830	U	4,830	4,870	U	4,870	4,370	U	4,370	4,880	U	4,880	4,450	U	4,450
2-Methylnaphthalene	ug/Kg	52,700	J	3,670	106,000	J	3,720	91,400	J	3,750	53,200	J	3,370	51900J	J	3,760	101,000	J	3,430
2-Nitroaniline	ug/Kg	6,380	U	6,380	6,460	U	6,460	6,510	U	6,510	5,850	U	5,850	6,540	U	6,540	5,960	U	5,960
2-Nitrophenol	ug/Kg	7,900	U	7,900	8,000	U	8,000	8,060	U	8,060	7,240	U	7,240	8,090	U	8,090	7,370	U	7,370
3,3'-Dichlorobenzidine	ug/Kg	39,500	U	39,500	40,000	U	40,000	40,300	U	40,300	36,200	U	36,200	40,500	U	40,500	36,900	U	36,900
3-Nitroaniline	ug/Kg	8,340	U	8,340	8,450	U	8,450	8,520	U	8,520	7,650	U	7,650	8,540	U	8,540	7,790	U	7,790
4,6-Dinitro-2-methylphenol	ug/Kg	72,900	J	52,100	52,700	U	52,700	53,100	U	53,100	47,700	U	47,700	53,300	U	53,300	48,600	U	48,600
4-Bromophenyl phenyl ether	ug/Kg	8,720	U	8,720	8,830	U	8,830	8,900	U	8,900	7,990	U	7,990	8,930	U	8,930	8,140	U	8,140
4-Chloro-3-methylphenol	ug/Kg	12,400	U	12,400	12,500	U	12,500	12,600	U	12,600	11,300	U	11,300	12,700	U	12,700	11,600	U	11,600
4-Chloroaniline	ug/Kg	9,790	U	9,790	9,910	U	9,910	9,990	U	9,990	8,970	U	8,970	10,000	U	10,000	9,130	U	9,130
4-Chlorophenyl phenyl ether	ug/Kg	9,410	U	9,410	9,530	U	9,530	9,610	U	9,610	8,630	U	8,630	9,640	U	9,640	8,780	U	8,780
4-Nitroaniline	ug/Kg	77,300	U	77,300	78,300	U	78,300	78,900	U	78,900	70,900	U	70,900	79,200	U	79,200	72,100	U	72,100
4-Nitrophenol	ug/Kg	75,100	U	75,100	76,000	U	76,000	76,600	U	76,600	68,800	U	68,800	76,900	U	76,900	70,100	U	70,100
Acenaphthene	ug/Kg	11,900	J	3,050	22,100	J	3,090	18,800	J	3,110	10,800	J	2,790	9350J	J	3,120	18,500	J	2,840
Acenaphthylene	ug/Kg	3,540	U	3,540	3,580	U	3,580	3,610	U	3,610	3,240	U	3,240	3,620	U	3,620	3,300	U	3,300
Aniline	ug/Kg	9,810	U	9,810	9,930	U	9,930	10,000	U	10,000	8,990	U	8,990	10,000	U	10,000	9,150	U	9,150
Anthracene	ug/Kg	2,900	U	2,900	2,940	U	2,940	2,960	U	2,960	2,660	U	2,660	2,970	U	2,970	2,710	U	2,710
Benzo(a)anthracene	ug/Kg	10,300	U	10,300	10,400	U	10,400	10,500	U	10,500	9,410	U	9,410	10,500	U	10,500	9,580	U	9,580
Benzo(a)pyrene	ug/Kg	3,110	U	3,110	3,150	U	3,150	3,180	U	3,180	2,850	U	2,850	3,190	U	3,190	2,910	U	2,910

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 7 D

TREATED MATERIAL CHEMICAL CHARACTERIZATION - VR90 and HC90

		VR90 - A			VR90 - B			VR90 - C			HC90 - A			HC90 - B			HC90 - C		
		Treated			Treated			Treated			Treated			Treated			Treated		
PARAMETER	UNITS	RESULT	QUAL	MDL	RESULT	QUAL	MDL	RESULT	QUAL	MDL	RESULT	QUAL	MDL	RESULT	QUAL	MDL	RESULT	QUAL	MDL
Benzo(b)fluoranthene	ug/Kg	17,800	U	17,800	18,100	U	18,100	18,200	U	18,200	16,300	U	16,300	18,300	U	18,300	16,600	U	16,600
Benzo(g,h,i)perylene	ug/Kg	3,940	U	3,940	3,990	U	3,990	4,020	U	4,020	3,610	U	3,610	4,030	U	4,030	3,670	U	3,670
Benzo(k)fluoranthene	ug/Kg	2,690	U	2,690	2,720	U	2,720	2,740	U	2,740	2,460	U	2,460	2,750	U	2,750	2,510	U	2,510
Benzyl alcohol	ug/Kg	12,900	U	12,900	13,000	U	13,000	13,100	U	13,100	11,800	U	11,800	13,200	U	13,200	12,000	U	12,000
Bis(2-Chloroethoxy)methane	ug/Kg	6,570	U	6,570	6,650	U	6,650	6,710	U	6,710	6,020	U	6,020	6,730	U	6,730	6,130	U	6,130
Bis(2-Chloroethyl)ether	ug/Kg	9,830	U	9,830	9,950	U	9,950	10,000	U	10,000	9,000	U	9,000	10,100	U	10,100	9,170	U	9,170
Bis(2-Chloroisopropyl)ether	ug/Kg	9,160	U	9,160	9,280	U	9,280	9,350	U	9,350	8,400	U	8,400	9,380	U	9,380	8,550	U	8,550
Bis(2-Ethylhexyl)phthalate	ug/Kg	5,800	U	5,800	5,870	U	5,870	5,920	U	5,920	5,320	U	5,320	5,940	U	5,940	5,410	U	5,410
Butyl benzyl phthalate	ug/Kg	3,120	U	3,120	3,160	U	3,160	3,180	U	3,180	2,860	U	2,860	3,200	U	3,200	2,910	U	2,910
Carbazole	ug/Kg	8,020	U	8,020	8,120	U	8,120	8,180	U	8,180	7,350	U	7,350	8,210	U	8,210	7,480	U	7,480
Chrysene	ug/Kg	3,240	U	3,240	3,280	U	3,280	3,310	U	3,310	2,970	U	2,970	3,320	U	3,320	3,030	U	3,030
Di-n-butyl phthalate	ug/Kg	3,690	U	3,690	3,730	U	3,730	3,760	U	3,760	3,380	U	3,380	3,780	U	3,780	3,440	U	3,440
Di-n-octyl phthalate	ug/Kg	3,820	U	3,820	3,870	U	3,870	3,900	U	3,900	3,500	U	3,500	3,910	U	3,910	3,560	U	3,560
Dibenz(a,h)anthracene	ug/Kg	3,400	U	3,400	3,440	U	3,440	3,470	U	3,470	3,110	U	3,110	3,480	U	3,480	3,170	U	3,170
Dibenzofuran	ug/Kg	1,810	U	1,810	1,830	U	1,830	1,840	U	1,840	1,660	U	1,660	1,850	U	1,850	1,690	U	1,690
Diethyl phthalate	ug/Kg	4,710	U	4,710	4,770	U	4,770	4,800	U	4,800	4,310	U	4,310	4,820	U	4,820	4,390	U	4,390
Dimethyl phthalate	ug/Kg	1,960	U	1,960	1,980	U	1,980	2,000	U	2,000	1,800	U	1,800	2,010	U	2,010	1,830	U	1,830
Fluoranthene	ug/Kg	2,270	U	2,270	2,300	U	2,300	2,320	U	2,320	2,080	U	2,080	2,320	U	2,320	2,120	U	2,120
Fluorene	ug/Kg	242,000		3,740	505,000		3,790	427,000		3,820	238,000		3,430	205,000		3,830	402,000		3,490
Hexachlorobenzene	ug/Kg	14,500	U	14,500	14,700	U	14,700	14,800	U	14,800	13,300	U	13,300	14,800	U	14,800	13,500	U	13,500
Hexachlorobutadiene	ug/Kg	6,940	U	6,940	7,030	U	7,030	7,090	U	7,090	6,360	U	6,360	7,110	U	7,110	6,480	U	6,480
Hexachlorocyclopentadiene	ug/Kg	57,600	U	57,600	58,300	U	58,300	58,800	U	58,800	52,800	U	52,800	59,000	U	59,000	53,800	U	53,800
Hexachloroethane	ug/Kg	4,240	U	4,240	4,290	U	4,290	4,330	U	4,330	3,890	U	3,890	4,340	U	4,340	3,960	U	3,960
Indeno(1,2,3-cd)pyrene	ug/Kg	7,150	U	7,150	7,240	U	7,240	7,300	U	7,300	6,560	U	6,560	7,330	U	7,330	6,670	U	6,670
Isophorone	ug/Kg	4,970	U	4,970	5,030	U	5,030	5,070	U	5,070	4,560	U	4,560	5,090	U	5,090	4,640	U	4,640
Nitrobenzene	ug/Kg	4,170	U	4,170	4,220	U	4,220	4,250	U	4,250	3,820	U	3,820	4,270	U	4,270	3,890	U	3,890
Pentachlorophenol	ug/Kg	65,500	U	65,500	66,400	U	66,400	66,900	U	66,900	60,100	U	60,100	67,100	U	67,100	61,200	U	61,200
Phenanthrene	ug/Kg	3,080	U	3,080	3,120	U	3,120	3,140	U	3,140	2,820	U	2,820	3,150	U	3,150	2,870	U	2,870
Phenol	ug/Kg	11,700	U	11,700	11,900	U	11,900	12,000	U	12,000	10,700	U	10,700	12,000	U	12,000	10,900	U	10,900
Pyrene	ug/Kg	2,670	U	2,670	2,710	U	2,710	2,730	U	2,730	2,450	U	2,450	2,740	U	2,740	2,490	U	2,490
Pyridine	ug/Kg	57,100	U	57,100	57,800	U	57,800	58,200	U	58,200	52,300	U	52,300	58,400	U	58,400	53,200	U	53,200
m,p-Cresol	ug/Kg	13,700	U	13,700	13,800	U	13,800	14,000	U	14,000	12,500	U	12,500	14,000	U	14,000	12,800	U	12,800
n-Nitrosodi-n-propylamine	ug/Kg	4,300	U	4,300	4,350	U	4,350	4,380	U	4,380	3,940	U	3,940	4,400	U	4,400	4,010	U	4,010
n-Nitrosodimethylamine	ug/Kg	21,500	U	21,500	21,700	U	21,700	21,900	U	21,900	19,700	U	19,700	22,000	U	22,000	20,000	U	20,000
n-Nitrosodiphenylamine	ug/Kg	2,680	U	2,680	2,710	U	2,710	2,730	U	2,730	2,450	U	2,450	2,740	U	2,740	2,500	U	2,500
o-Cresol	ug/Kg	4,190	U	4,190	4,240	U	4,240	4,280	U	4,280	3,840	U	3,840	4,290	U	4,290	3,910	U	3,910
Volatile Organic Compounds																			
1,1,1,2-Tetrachloroethane	ug/Kg	7,250	U	7,250	7,160	U	7,160	7,440	U	7,440	1,440	U	1,440	1,230	U	1,230	1,460	U	1,460
1,1,1-Trichloroethane	ug/Kg	12,700	U	12,700	12,600	U	12,600	13,100	U	13,100	2,520	U	2,520	2,160	U	2,160	2,570	U	2,570
1,1,2,2-Tetrachloroethane	ug/Kg	6,130	U	6,130	6,050	U	6,050	6,290	U	6,290	1,210	U	1,210	1,040	U	1,040	1,240	U	1,240
1,1,2-Trichloroethane	ug/Kg	7,200	U	7,200	7,110	U	7,110	7,390	U	7,390	1,430	U	1,430	1,220	U	1,220	1,450	U	1,450
1,1-Dichloroethane	ug/Kg	8,010	U	8,010	7,900	U	7,900	8,210	U	8,210	1,590	U	1,590	1,360	U	1,360	1,620	U	1,620
1,1-Dichloroethene	ug/Kg	12,500	U	12,500	12,300	U	12,300	12,800	U	12,800	2,470	U	2,470	2,120	U	2,120	2,510	U	2,510
1,1-Dichloropropene	ug/Kg	13,100	U	13,100	12,900	U	12,900	13,500	U	13,500	2,600	U	2,600	2,220	U	2,220	2,640	U	2,640
1,2,3-Trichloropropane	ug/Kg	6,180	U	6,180	6,100	U	6,100	6,340	U	6,340	1,220	U	1,220	1,050	U	1,050	1,250	U	1,250
1,2,4-Trichlorobenzene	ug/Kg	19,100	U	19,100	18,800	U	18,800	19,600	U	19,600	3,780	U	3,780	3,240	U	3,240	3,850	U	3,850
1,2,4-Trimethylbenzene	ug/Kg	224,000	J	19,300	213,000	J	19,100	230,000	J	19,800	89,100		3,830	82,200		3,280	66,000		3,900
1,2-Dibromo-3-chloropropane	ug/Kg	21,500	U	21,500	21,300	U	21,300	22,100	U	22,100	4,270	U	4,270	3,660	U	3,660	4,350	U	4,350
1,2-Dibromoethane	ug/Kg	7,740	U	7,740	7,640	U	7,640	7,940	U	7,940	1,530	U	1,530	1,310	U	1,310	1,560	U	1,560
1,2-Dichlorobenzene	ug/Kg	1,290,000		14,800	1,210,000		14,600	1,250,000		15,200	538,000		2,940	503,000		2,520	413,000		2,990
1,2-Dichloroethane	ug/Kg	10,600	U	10,600	10,500	U	10,500	10,900	U	10,900	2,110	U	2,110	1,810	U	1,810	2,150	U	2,150
1,2-Dichloroethene(Total)	ug/Kg	12,600	U	12,600	12,400	U	12,400	12,900	U	12,900	2,490	U	2,490	2,130	U	2,130	2,540	U	2,540
1,2-Dichloropropane	ug/Kg	8,270	U	8,270	8,170	U	8,170	8,490	U	8,490	1,640	U	1,640	1,400	U	1,400	1,670	U	1,670
1,3,5-Trimethylbenzene	ug/Kg	83,200	J	20,200	77,000	J	19,900	85,000	J	20,700	53,100	J	4,000	50,700		3,430	37900J	J	4,080
1,3-Dichlorobenzene	ug/Kg	14,000	U	14,000	13,800	U	13,800	14,300	U	14,300	2,770	U	2,770	2,370	U	2,370	2,820	U	2,820
1,3-Dichloropropane	ug/Kg	8,490	U	8,490	8,380	U	8,380	8,710	U	8,710	1,680	U	1,680	1,440	U	1,440	1,710	U	1,710
1,4-Dichlorobenzene	ug/Kg	112,000	J	12,400	105,000	J	12,300	106,000	J	12,700	42,800	J	2,460	38200J	J	2,110	30200J	J	2,500
2,2-Dichloropropane	ug/Kg	13,400	U	13,400	13,200	U	13,200	13,700	U	13,700	2,650	U	2,650	2,270	U	2,270	2,700	U	2,700

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 7 D

TREATED MATERIAL CHEMICAL CHARACTERIZATION - VR90 and HC90

		VR90 - A			VR90 - B			VR90 - C			HC90 - A			HC90 - B			HC90 - C		
		Treated			Treated			Treated			Treated			Treated			Treated		
PARAMETER	UNITS	RESULT	QUAL	MDL	RESULT	QUAL	MDL	RESULT	QUAL	MDL	RESULT	QUAL	MDL	RESULT	QUAL	MDL	RESULT	QUAL	MDL
2-Butanone	ug/Kg	27,800	U	27,800	27,500	U	27,500	28,600	U	28,600	5,510	U	5,510	4,720	U	4,720	5,610	U	5,610
2-Chlorotoluene	ug/Kg	11,800	U	11,800	11,600	U	11,600	12,100	U	12,100	2,330	U	2,330	2,000	U	2,000	2,370	U	2,370
2-Hexanone	ug/Kg	23,300	U	23,300	23,000	U	23,000	23,900	U	23,900	4,610	U	4,610	3,950	U	3,950	4,690	U	4,690
4-Chlorotoluene	ug/Kg	12,600	U	12,600	12,500	U	12,500	13,000	U	13,000	2,500	U	2,500	2,140	U	2,140	2,550	U	2,550
4-Isopropyltoluene	ug/Kg	135,000	J	11,300	132,000	J	11,100	139,000	J	11,600	37,300	J	2,240	33800J	J	1,910	33000J	J	2,280
4-Methyl-2-pentanone	ug/Kg	7,090	U	7,090	7,000	U	7,000	7,280	U	7,280	1,410	U	1,410	1,200	U	1,200	1,430	U	1,430
Acetone	ug/Kg	55,300	U	55,300	54,600	U	54,600	56,800	U	56,800	11,000	U	11,000	9,390	U	9,390	11,200	U	11,200
Benzene	ug/Kg	201,000	J	8,170	184,000	J	8,060	186,000	J	8,380	656,000		1,620	476,000		1,390	282,000		1,650
Bromobenzene	ug/Kg	8,380	U	8,380	8,270	U	8,270	8,600	U	8,600	1,660	U	1,660	1,420	U	1,420	1,690	U	1,690
Bromochloromethane	ug/Kg	7,250	U	7,250	7,160	U	7,160	7,440	U	7,440	1,440	U	1,440	1,230	U	1,230	1,460	U	1,460
Bromodichloromethane	ug/Kg	8,700	U	8,700	8,590	U	8,590	8,930	U	8,930	1,720	U	1,720	1,480	U	1,480	1,760	U	1,760
Bromoform	ug/Kg	8,540	U	8,540	8,430	U	8,430	8,770	U	8,770	1,690	U	1,690	1,450	U	1,450	1,720	U	1,720
Bromomethane	ug/Kg	16,300	U	16,300	16,100	U	16,100	16,700	U	16,700	3,230	U	3,230	2,760	U	2,760	3,280	U	3,280
Carbon disulfide	ug/Kg	17,500	U	17,500	17,200	U	17,200	17,900	U	17,900	3,460	U	3,460	2,960	U	2,960	3,520	U	3,520
Carbon tetrachloride	ug/Kg	10,900	U	10,900	10,700	U	10,700	11,100	U	11,100	2,150	U	2,150	1,840	U	1,840	2,190	U	2,190
Chlorobenzene	ug/Kg	8,010	U	8,010	7,900	U	7,900	8,210	U	8,210	1,590	U	1,590	1,360	U	1,360	1,620	U	1,620
Chloroethane	ug/Kg	17,800	U	17,800	17,600	U	17,600	18,200	U	18,200	3,520	U	3,520	3,020	U	3,020	3,590	U	3,590
Chloroform	ug/Kg	11,600	U	11,600	11,400	U	11,400	11,900	U	11,900	2,290	U	2,290	1,960	U	1,960	2,330	U	2,330
Chloromethane	ug/Kg	12,700	U	12,700	12,600	U	12,600	13,100	U	13,100	2,520	U	2,520	2,160	U	2,160	2,570	U	2,570
Dibromochloromethane	ug/Kg	11,700	U	11,700	11,600	U	11,600	12,000	U	12,000	2,320	U	2,320	1,990	U	1,990	2,360	U	2,360
Dibromomethane	ug/Kg	12,400	U	12,400	12,300	U	12,300	12,700	U	12,700	2,460	U	2,460	2,110	U	2,110	2,500	U	2,500
Dichlorodifluoromethane	ug/Kg	12,000	U	12,000	11,900	U	11,900	12,300	U	12,300	2,380	U	2,380	2,040	U	2,040	2,430	U	2,430
Ethylbenzene	ug/Kg	9,830	U	9,830	9,710	U	9,710	10,100	U	10,100	38,500	J	1,950	33900J	J	1,670	21500J	J	1,980
Hexachlorobutadiene	ug/Kg	11,500	U	11,500	11,400	U	11,400	11,800	U	11,800	2,280	U	2,280	1,950	U	1,950	2,320	U	2,320
Isopropylbenzene (Cumene)	ug/Kg	187,000	J	9,940	187,000	J	9,810	192,000	J	10,200	135,000		1,970	123,000		1,690	93,700		2,010
Methyl iodide	ug/Kg	66,100	U	66,100	65,200	U	65,200	67,800	U	67,800	13,100	U	13,100	11,200	U	11,200	13,300	U	13,300
Methylene chloride	ug/Kg	23,700	U	23,700	23,400	U	23,400	24,400	U	24,400	4,710	U	4,710	4,030	U	4,030	4,790	U	4,790
Naphthalene	ug/Kg	4,670,000		17,200	4,380,000		17,000	4,320,000		17,700	1,820,000		3,420	1,720,000		2,930	1,570,000		3,480
Styrene	ug/Kg	8,270	U	8,270	8,170	U	8,170	8,490	U	8,490	1,640	U	1,640	1,400	U	1,400	1,670	U	1,670
Tetrachloroethene	ug/Kg	15,900	U	15,900	15,700	U	15,700	16,300	U	16,300	3,150	U	3,150	2,700	U	2,700	3,210	U	3,210
Thiophene	ug/Kg	ND			ND			ND			5,230			3,750			2,630		
Toluene	ug/Kg	381,000		8,330	369,000		8,220	381,000		8,550	938,000		1,650	711,000		1,410	454,000		1,680
Trichloroethene	ug/Kg	11,400	U	11,400	11,300	U	11,300	11,700	U	11,700	2,270	U	2,270	1,940	U	1,940	2,310	U	2,310
Trichlorofluoromethane	ug/Kg	14,000	U	14,000	13,800	U	13,800	14,400	U	14,400	2,780	U	2,780	2,380	U	2,380	2,830	U	2,830
Trichlorotrifluoroethane	ug/Kg	10,700	U	10,700	10,600	U	10,600	11,000	U	11,000	2,130	U	2,130	1,820	U	1,820	2,170	U	2,170
Vinyl acetate	ug/Kg	7,580	U	7,580	7,480	U	7,480	7,770	U	7,770	1,500	U	1,500	1,290	U	1,290	1,530	U	1,530
Vinyl chloride	ug/Kg	14,600	U	14,600	14,400	U	14,400	15,000	U	15,000	2,900	U	2,900	2,480	U	2,480	2,950	U	2,950
Xylene (total)	ug/Kg	544,000		21,500	535,000		21,300	554,000		22,100	769,000		4,270	667,000		3,660	464,000		4,350
cis-1,2-Dichloroethene	ug/Kg	7,950	U	7,950	7,850	U	7,850	8,160	U	8,160	1,580	U	1,580	1,350	U	1,350	1,600	U	1,600
cis-1,3-Dichloropropene	ug/Kg	9,940	U	9,940	9,810	U	9,810	10,200	U	10,200	1,970	U	1,970	1,690	U	1,690	2,010	U	2,010
m,p-Xylene	ug/Kg	361,000		15,800	352,000		15,600	371,000		16,200	638,000		3,130	550,000		2,680	376,000		3,190
n-Butylbenzene	ug/Kg	12,500	U	12,500	12,400	U	12,400	12,800	U	12,800	2,480	U	2,480	2,120	U	2,120	2,530	U	2,530
n-Propylbenzene	ug/Kg	39,700	U	39,700	39,200	U	39,200	40,700	U	40,700	7,870	U	7,870	6,740	U	6,740	8,010	U	8,010
o-Xylene	ug/Kg	183,000	J	7,250	183,000	J	7,160	184,000	J	7,440	131,000		1,440	117,000		1,230	89,600		1,460
sec-Butylbenzene	ug/Kg	112,000	J	10,600	102,000	J	10,400	113,000	J	10,900	76,500		2,100	77,500		1,800	51,700	J	2,140
tert-Butyl methyl ether (MTBE	ug/Kg	6,550	U	6,550	6,470	U	6,470	6,730	U	6,730	1,300	U	1,300	1,110	U	1,110	1,320	U	1,320
tert-Butylbenzene	ug/Kg	13,800	U	13,800	13,600	U	13,600	14,100	U	14,100	19,400	J	2,730	19,500	J	2,330	12,800	J	2,770
trans-1,2-Dichloroethene	ug/Kg	7,040	U	7,040	6,950	U	6,950	7,220	U	7,220	1,390	U	1,390	1,190	U	1,190	1,420	U	1,420
trans-1,3-Dichloropropene	ug/Kg	9,130	U	9,130	9,020	U	9,020	9,370	U	9,370	1,810	U	1,810	1,550	U	1,550	1,840	U	1,840
trans-1,4-Dichloro-2-butene	ug/Kg	27,800	U	27,800	27,500	U	27,500	28,600	U	28,600	5,510	U	5,510	4,720	U	4,720	5,610	U	5,610

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 7 E

TREATED MATERIAL CHEMICAL CHARACTERIZATION-TCLP VR90 and HC90

		VR90 - TCLP			HC90 - TCLP		
		Treated			Treated		
PARAMETER	UNITS	RESULT	QUAL	MDL	RESULT	QUAL	MDL
Metals							
Arsenic	mg/L	0.017	ND	0.017	0.37	ND	0.017
Barium	mg/L	0.13	J	0.0079	0.051	J	0.0079
Cadmium	mg/L	0.00052	ND	0.00052	0.0028	J	0.00052
Chromium	mg/L	0.068	J	0.0017	186		0.0017
Lead	mg/L	0.028	J	0.014	0.42	J	0.014
Mercury	mg/L	0.000075	ND	0.000075	0.00009	J	0.000075
Selenium	mg/L	0.019	ND	0.019	0.034	J	0.019
Silver	mg/L	0.0033	J	0.0032	0.0032	ND	0.0032
Semivolatile Organic Compounds							
1,4-Dichlorobenzene	mg/L	0.0128	ND	0.0128	0.0128	ND	0.0128
2,4,5-Trichlorophenol	mg/L	0.0159	ND	0.0159	0.0159	ND	0.0159
2,4,6-Trichlorophenol	mg/L	0.0138	ND	0.0138	0.0138	ND	0.0138
2,4-Dinitrotoluene	mg/L	0.0132	ND	0.0132	0.0132	ND	0.0132
Cresols	mg/L	0.0341	ND	0.0341	0.0341	ND	0.0341
Hexachlorobenzene	mg/L	0.0125	ND	0.0125	0.0125	ND	0.0125
Hexachlorobutadiene	mg/L	0.0096	ND	0.0096	0.0096	ND	0.0096
Hexachloroethane	mg/L	0.015	ND	0.015	0.015	ND	0.015
Nitrobenzene	mg/L	0.0165	ND	0.0165	0.0165	ND	0.0165
Pentachlorophenol	mg/L	0.0084	ND	0.0084	0.0084	ND	0.0084
Pyridine	mg/L	0.179	ND	0.179	2.37		0.179
m,p-Cresol	mg/L	0.0176	ND	0.0176	0.0176	ND	0.0176
o-Cresol	mg/L	0.0165	ND	0.0165	0.0165	ND	0.0165
Volatile Organic Compounds							
1,1-Dichloroethene	mg/L	0.00732	ND	0.00732	0.00732	ND	0.00732
1,2-Dichloroethane	mg/L	0.00484	ND	0.00484	0.00484	ND	0.00484
2-Butanone	mg/L	0.0094	ND	0.0094	0.0094	ND	0.0094
Benzene	mg/L	0.08	J	0.00196	2.52		0.00196
Carbon tetrachloride	mg/L	0.00225	ND	0.00225	0.00225	ND	0.00225
Chlorobenzene	mg/L	0.00219	ND	0.00219	0.00219	ND	0.00219
Chloroform	mg/L	0.00246	ND	0.00246	0.00246	ND	0.00246
Tetrachloroethene	mg/L	0.00564	ND	0.00564	0.00564	ND	0.00564
Thiophene	mg/L	0			0		
Trichloroethene	mg/L	0.00377	ND	0.00377	0.00377	ND	0.00377
Vinyl chloride	mg/L	0.00416	ND	0.00416	0.00416	ND	0.00416

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 7 F

TREATED MATERIAL CHEMICAL PROPERTIES - VR90(SPLP) and HC90(SPLP)

		VR90 - SPLP			HC90 - SPLP		
		Treated			Treated		
PARAMETER	UNITS	RESULT	QUAL	MDL	RESULT	QUAL	MDL
Metals							
Aluminum	mg/L	1.87		0.024	9.28		0.12
Antimony	mg/L	0.004	ND	0.004	0.02	ND	0.02
Arsenic	mg/L	0.0035	ND	0.0035	0.43		0.017
Barium	mg/L	0.0047	J	0.0016	0.018		0.0079
Beryllium	mg/L	0.000082	ND	0.000082	0.00041	ND	0.00041
Cadmium	mg/L	0.0001	ND	0.0001	0.00052	J	0.00052
Calcium	mg/L	0.84		0.024	3.21		0.12
Chromium	mg/L	0.031		0.00034	204		0.0017
Cobalt	mg/L	0.0022	J	0.00052	0.93		0.0026
Copper	mg/L	0.0028	J	0.0017	0.57		0.0085
Iron	mg/L	43		0.027	523		0.13
Lead	mg/L	0.0059	J	0.0028	0.34		0.014
Magnesium	mg/L	0.28		0.012	1.01		0.061
Manganese	mg/L	1.23		0.00083	16.3		0.0042
Mercury	mg/L	0.000075	ND	0.000075	0.000075	ND	0.000075
Nickel	mg/L	0.019	J	0.00084	93		0.0042
Potassium	mg/L	0.11	J	0.041	3.18		0.2
Selenium	mg/L	0.0038	ND	0.0038	0.019	ND	0.019
Silver	mg/L	0.00064	ND	0.00064	0.0032	ND	0.0032
Sodium	mg/L	16.3	J	0.056	111		0.28
Thallium	mg/L	0.0026	ND	0.0026	0.013	ND	0.013
Vanadium	mg/L	0.0012	ND	0.0012	0.64		0.0061
Zinc	mg/L	0.033		0.0059	0.26		0.029
Semivolatile Organic Compounds							
1,2,4-Trichlorobenzene	ug/L	0.936	ND	0.936	0.936	ND	0.936
1,2Diphenylhydrazine/Azobenzen	ug/L	1.11	ND	1.11	1.11	ND	1.11
2,4,5-Trichlorophenol	ug/L	1.27	ND	1.27	1.27	ND	1.27
2,4,6-Trichlorophenol	ug/L	1.1	ND	1.1	1.1	ND	1.1
2,4-Dichlorophenol	ug/L	0.868	ND	0.868	0.868	ND	0.868
2,4-Dimethylphenol	ug/L	2.78	ND	2.78	2.78	ND	2.78
2,4-Dinitrophenol	ug/L	10.4	ND	10.4	10.4	ND	10.4
2,4-Dinitrotoluene	ug/L	1.05	ND	1.05	1.05	ND	1.05
2,6-Dinitrotoluene	ug/L	1.41	ND	1.41	1.41	ND	1.41
2-Chloronaphthalene	ug/L	0.884	ND	0.884	0.884	ND	0.884
2-Chlorophenol	ug/L	1.1	ND	1.1	1.1	ND	1.1
2-Methylnaphthalene	ug/L	60.8		1.02	20.3	J	1.02
2-Nitroaniline	ug/L	0.792	ND	0.792	0.792	ND	0.792
2-Nitrophenol	ug/L	1.43	ND	1.43	1.43	ND	1.43
3,3'-Dichlorobenzidine	ug/L	1.19	ND	1.19	1.19	ND	1.19
3-Nitroaniline	ug/L	0.904	ND	0.904	0.904	ND	0.904
4,6-Dinitro-2-methylphenol	ug/L	7.92	ND	7.92	7.92	ND	7.92
4-Bromophenyl phenyl ether	ug/L	1.35	ND	1.35	1.35	ND	1.35
4-Chloro-3-methylphenol	ug/L	0.936	ND	0.936	0.936	ND	0.936
4-Chloroaniline	ug/L	1.85	ND	1.85	1.85	ND	1.85
4-Chlorophenyl phenyl ether	ug/L	1.07	ND	1.07	1.07	ND	1.07
4-Nitroaniline	ug/L	0.884	ND	0.884	0.884	ND	0.884
4-Nitrophenol	ug/L	7.32	ND	7.32	7.32	ND	7.32
Acenaphthene	ug/L	6.37	J	1.07	2.52	J	1.07
Acenaphthylene	ug/L	1.21	ND	1.21	1.21	ND	1.21
Aniline	ug/L	66.1	J	2.87	1980		35.9
Anthracene	ug/L	1.26	ND	1.26	1.26	ND	1.26
Benzo(a)anthracene	ug/L	1.26	ND	1.26	1.26	ND	1.26
Benzo(a)pyrene	ug/L	0.5	ND	0.5	0.5	ND	0.5
Benzo(b)fluoranthene	ug/L	0.868	ND	0.868	0.868	ND	0.868
Benzo(g,h,i)perylene	ug/L	0.86	ND	0.86	0.86	ND	0.86
Benzo(k)fluoranthene	ug/L	0.944	ND	0.944	0.944	ND	0.944

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 7 F

TREATED MATERIAL CHEMICAL PROPERTIES - VR90(SPLP) and HC90(SPLP)

		VR90 - SPLP			HC90 - SPLP		
		Treated			Treated		
PARAMETER	UNITS	RESULT	QUAL	MDL	RESULT	QUAL	MDL
Benzyl alcohol	ug/L	1.42	ND	1.42	1.42	ND	1.42
Bis(2-Chloroethoxy)methane	ug/L	1.16	ND	1.16	1.16	ND	1.16
Bis(2-Chloroethyl)ether	ug/L	1.15	ND	1.15	1.15	ND	1.15
Bis(2-Chloroisopropyl)ether	ug/L	1.03	ND	1.03	1.03	ND	1.03
Bis(2-Ethylhexyl)phthalate	ug/L	0.764	ND	0.764	0.764	ND	0.764
Butyl benzyl phthalate	ug/L	0.66	ND	0.66	0.66	ND	0.66
Carbazole	ug/L	18.5	J	0.928	0.928	ND	0.928
Chrysene	ug/L	1.73	ND	1.73	1.73	ND	1.73
Di-n-butyl phthalate	ug/L	0.756	ND	0.756	0.756	ND	0.756
Di-n-octyl phthalate	ug/L	0.668	ND	0.668	0.668	ND	0.668
Dibenz(a,h)anthracene	ug/L	0.868	ND	0.868	0.868	ND	0.868
Dibenzofuran	ug/L	3.69	J	0.908	0.908	ND	0.908
Diethyl phthalate	ug/L	1.21	ND	1.21	1.21	ND	1.21
Dimethyl phthalate	ug/L	1.02	ND	1.02	1.02	ND	1.02
Fluoranthene	ug/L	1.07	ND	1.07	1.07	ND	1.07
Fluorene	ug/L	18.8	J	1.15	6.87	J	1.15
Hexachlorobenzene	ug/L	0.996	ND	0.996	0.996	ND	0.996
Hexachlorobutadiene	ug/L	0.768	ND	0.768	0.768	ND	0.768
Hexachlorocyclopentadiene	ug/L	0.696	ND	0.696	0.696	ND	0.696
Hexachloroethane	ug/L	1.2	ND	1.2	1.2	ND	1.2
Indeno(1,2,3-cd)pyrene	ug/L	0.628	ND	0.628	0.628	ND	0.628
Isophorone	ug/L	11.6	J	1.52	5.24	J	1.52
Nitrobenzene	ug/L	1.32	ND	1.32	1.32	ND	1.32
Pentachlorophenol	ug/L	0.672	ND	0.672	0.672	ND	0.672
Phenanthrene	ug/L	1.22	ND	1.22	1.22	ND	1.22
Phenol	ug/L	109	J	0.6	0.6	ND	0.6
Pyrene	ug/L	1.94	ND	1.94	1.94	ND	1.94
Pyridine	ug/L	159	ND	14.3	1760		179
m,p-Cresol	ug/L	1.41		1.41	185		1.41
n-Nitrosodi-n-propylamine	ug/L	1.22	ND	1.22	1.22	ND	1.22
n-Nitrosodimethylamine	ug/L	1.22	ND	1.22	1.22	ND	1.22
n-Nitrosodiphenylamine	ug/L	8.91	ND	1.46	1.46	ND	1.46
o-Cresol	ug/L	1.32	ND	1.32	1.32	ND	1.32
Volatile Organic Compounds							
1,1,1,2-Tetrachloroethane	ug/L	3.75	ND	3.75	7.5	ND	7.5
1,1,1-Trichloroethane	ug/L	1.94	ND	1.94	3.88	ND	3.88
1,1,2,2-Tetrachloroethane	ug/L	2.8	ND	2.8	5.6	ND	5.6
1,1,2-Trichloroethane	ug/L	4.48	ND	4.48	8.95	ND	8.95
1,1-Dichloroethane	ug/L	1.59	ND	1.59	3.19	ND	3.19
1,1-Dichloroethene	ug/L	4.58	ND	4.58	9.15	ND	9.15
1,1-Dichloropropene	ug/L	1.79	ND	1.79	3.57	ND	3.57
1,2,3-Trichloropropane	ug/L	1.58	ND	1.58	3.17	ND	3.17
1,2,4-Trichlorobenzene	ug/L	3.45	ND	3.45	6.9	ND	6.9
1,2,4-Trimethylbenzene	ug/L	155		2.01	191	J	4.02
1,2-Dibromo-3-chloropropane	ug/L	2.06	ND	2.06	4.12	ND	4.12
1,2-Dibromoethane	ug/L	4.23	ND	4.23	8.45	ND	8.45
1,2-Dichlorobenzene	ug/L	1400		2.15	1000		4.29
1,2-Dichloroethane	ug/L	3.03	ND	3.03	6.05	ND	6.05
1,2-Dichloroethene(Total)	ug/L	4.23	ND	4.23	8.45	ND	8.45
1,2-Dichloropropane	ug/L	2.85	ND	2.85	5.7	ND	5.7
1,3,5-Trimethylbenzene	ug/L	65.7	J	1.32	80	J	2.63
1,3-Dichlorobenzene	ug/L	16	J	2	4	ND	4
1,3-Dichloropropane	ug/L	2.83	ND	2.83	5.65	ND	5.65
1,4-Dichlorobenzene	ug/L	103	J	1.46	78.4	J	2.92
2,2-Dichloropropane	ug/L	2.8	ND	2.8	5.6	ND	5.6
2-Butanone	ug/L	5.88	ND	5.88	11.8	ND	11.8
2-Chlorotoluene	ug/L	2.25	ND	2.25	4.49	ND	4.49

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 7 F

TREATED MATERIAL CHEMICAL PROPERTIES - VR90(SPLP) and HC90(SPLP)

		VR90 - SPLP			HC90 - SPLP		
		Treated			Treated		
PARAMETER	UNITS	RESULT	QUAL	MDL	RESULT	QUAL	MDL
2-Hexanone	ug/L	7.55	ND	7.55	15.1	ND	15.1
4-Chlorotoluene	ug/L	1.15	ND	1.15	2.3	ND	2.3
4-Isopropyltoluene	ug/L	4.38	ND	4.38	8.75	ND	8.75
4-Methyl-2-pentanone	ug/L	3.55	ND	3.55	7.1	ND	7.1
Acetone	ug/L	117	J	8.05	216	J	16.1
Benzene	ug/L	2620		1.23	4520		2.45
Bromobenzene	ug/L	2.37	ND	2.37	4.73	ND	4.73
Bromochloromethane	ug/L	5.95	ND	5.95	11.9	ND	11.9
Bromodichloromethane	ug/L	1.76	ND	1.76	3.53	ND	3.53
Bromoform	ug/L	6.95	ND	6.95	13.9	ND	13.9
Bromomethane	ug/L	6.9	ND	6.9	13.8	ND	13.8
Carbon disulfide	ug/L	4.75	ND	4.75	9.5	ND	9.5
Carbon tetrachloride	ug/L	1.41	ND	1.41	2.82	ND	2.82
Chlorobenzene	ug/L	1.37	ND	1.37	2.74	ND	2.74
Chloroethane	ug/L	6.98	ND	6.98	14	ND	14
Chloroform	ug/L	1.54	ND	1.54	3.08	ND	3.08
Chloromethane	ug/L	1.89	ND	1.89	20.8	J	3.79
Dibromochloromethane	ug/L	3.33	ND	3.33	6.65	ND	6.65
Dibromomethane	ug/L	4.93	ND	4.93	9.85	ND	9.85
Dichlorodifluoromethane	ug/L	2.21	ND	2.21	4.41	ND	4.41
Ethylbenzene	ug/L	46.1	J	4.5	92.7	J	9
Hexachlorobutadiene	ug/L	8.68	ND	8.68	17.4	ND	17.4
Isopropylbenzene (Cumene)	ug/L	113	J	1.46	251		2.92
Methyl iodide	ug/L	2.42	ND	2.42	4.85	ND	4.85
Methylene chloride	ug/L	18.3	J	2.55	25.9	J	5.1
Naphthalene	ug/L	4120		4.38	3240		8.75
Styrene	ug/L	1.44	ND	1.44	2.88	ND	2.88
Tetrachloroethene	ug/L	3.53	ND	3.53	7.05	ND	7.05
Thiophene	ug/L	0			54.8		
Toluene	ug/L	2120		1.94	3870		3.88
Trichloroethene	ug/L	2.36	ND	2.36	4.72	ND	4.72
Trichlorofluoromethane	ug/L	2.34	ND	2.34	4.68	ND	4.68
Trichlorotrifluoroethane	ug/L	3.53	ND	3.53	7.05	ND	7.05
Vinyl acetate	ug/L	4.93	ND	4.93	9.85	ND	9.85
Vinyl chloride	ug/L	2.6	ND	2.6	5.2	ND	5.2
Xylene (total)	ug/L	743		3.08	2000		6.15
cis-1,2-Dichloroethene	ug/L	2.6	ND	2.6	5.2	ND	5.2
cis-1,3-Dichloropropene	ug/L	2.63	ND	2.63	5.25	ND	5.25
m,p-Xylene	ug/L	517		2.46	1610		4.93
n-Butylbenzene	ug/L	1.71	ND	1.71	3.42	ND	3.42
n-Propylbenzene	ug/L	1.72	ND	1.72	3.43	ND	3.43
o-Xylene	ug/L	226		1.93	387		3.87
sec-Butylbenzene	ug/L	30.1	J	2.2	4.41	ND	4.41
tert-Butyl methyl ether (MTBE)	ug/L	2.1	ND	2.1	4.2	ND	4.2
tert-Butylbenzene	ug/L	1.45	ND	1.45	2.9	ND	2.9
trans-1,2-Dichloroethene	ug/L	2.39	ND	2.39	4.78	ND	4.78
trans-1,3-Dichloropropene	ug/L	1.7	ND	1.7	3.39	ND	3.39
trans-1,4-Dichloro-2-butene	ug/L	10.7	ND	10.7	21.5	ND	21.5

KEMRON ENVIRONMENTAL SERVICES

BRIDGEWATER
KEMRON PROJECT # SE-0416

TABLE 8

REDUCE SULFUR RESULTS

			AMBIENT T0			DAY 1			< 50,000 ppm			< 1,000 ppm			AMBIENT Tf		
SAMPLE ID	COMPOUND	UNITS	RESULT	QUAL	MDL	RESULT	QUAL	MDL	RESULT	QUAL	MDL	RESULT	QUAL	MDL	RESULT	QUAL	MDL
VR 90	Hydrogen Sulfide	µg/m³	640		14	1,400,000		1,400	2,700,000		1,400	1,500,000		1,400	2,900		7.0
	Carbonyl Sulfide	µg/m³	200		25	2,900		2,500	7,200		2,500	13,000		250	3,100		12
	Methyl Mercaptan	µg/m³	ND		20	28,000		98	41,000		2,000	16,000		200	100		9.8
	Ethyl Mercaptan	µg/m³	ND		25	2,700		130	7,800		2,500	2,700		250	47		13
	Dimethyl Sulfide	µg/m³	680		25	26,000		130	10,000		2,500	2,500		250	510		13
	Carbon Disulfide	µg/m³	48,000		16	1,100,000		1,600	100,000		1,600	22,000		160	3,300		7.8
	Isopropyl Mercaptan	µg/m³	ND		31	1,200		160	ND		3,100	1,200		310	60		16
	tert-Butyl Mercaptan	µg/m³	ND		37	ND		180	ND		3,700	1,100		370	150		18
	n-Propyl Mercaptan	µg/m³	ND		31	ND		160	ND		3,100	ND		310	ND		16
	Ethyl Methyl Sulfide	µg/m³	170		31	1,800		160	ND		3,100	520		310	120		16
	Thiophene	µg/m³	66		34	3,900		170	6,000		3,400	2,200		340	360		17
	Isobutyl Mercaptan	µg/m³	ND		37	ND		180	ND		3,700	ND		370	50		18
	Diethyl Sulfide	µg/m³	ND		37	ND		180	ND		3,700	ND		370	ND		18
	n-Butyl Mercaptan	µg/m³	ND		37	ND		180	ND		3,700	ND		370	ND		18
	Dimethyl Disulfide	µg/m³	39		19	220		96	ND		1,900	700		190	160		9.6
	3-Methylthiophene	µg/m³	ND		40	ND		200	ND		4,000	ND		400	100		20
	Tetrahydrothiophene	µg/m³	ND		36	ND		180	ND		3,600	ND		360	31		18
	2,5-Dimethylthiophene	µg/m³	ND		46	ND		230	ND		4,600	ND		460	ND		23
	2-Ethylthiophene	µg/m³	ND		46	ND		230	ND		4,600	ND		460	ND		23
	Diethyl Disulfide	µg/m³	ND		25	ND		120	ND		2,500	ND		250	ND		12
HC 90	Hydrogen Sulfide	µg/m³	64,000		280	32,000,000		7,000	420,000		70	110,000		70	28,000		70
	Carbonyl Sulfide	µg/m³	1,500		490	26,000		120	12,000		120	7,300		120	310		120
	Methyl Mercaptan	µg/m³	540		390	700,000		9,800	7,300		98	980		98	150		98
	Ethyl Mercaptan	µg/m³	ND		510	55,000		130	980		130	140		130	ND		130
	Dimethyl Sulfide	µg/m³	13,000		510	84,000		130	20,000		130	9,000		130	2,400		130
	Carbon Disulfide	µg/m³	770,000		310	620,000		78	25,000		78	12,000		78	1,300		78
	Isopropyl Mercaptan	µg/m³	ND		620	8,800		160	620		160	ND		160	ND		160
	tert-Butyl Mercaptan	µg/m³	ND		740	3,700		180	2,400		180	220		180	ND		180
	n-Propyl Mercaptan	µg/m³	ND		620	1,100		160	ND		160	ND		160	ND		160
	Ethyl Methyl Sulfide	µg/m³	2,600		620	5,500		160	3,000		160	980		160	350		160
	Thiophene	µg/m³	2,800		690	19,000		170	43,000		170	8,300		170	3,900		170
	Isobutyl Mercaptan	µg/m³	ND		740	3,000		180	ND		180	ND		180	ND		180
	Diethyl Sulfide	µg/m³	ND		740	ND		180	ND		180	ND		180	ND		180
	n-Butyl Mercaptan	µg/m³	ND		740	ND		180	ND		180	ND		180	ND		180
	Dimethyl Disulfide	µg/m³	ND		390	2,500		96	6,900		96	1,400		96	600		96
	3-Methylthiophene	µg/m³	ND		800	790		200	6,000		200	680		200	830		200
	Tetrahydrothiophene	µg/m³	ND		720	ND		180	1,000		180	ND		180	ND		180
	2,5-Dimethylthiophene	µg/m³	ND		920	ND		230	ND		230	ND		230	ND		230
	2-Ethylthiophene	µg/m³	ND		920	780		230	10,000		230	590		230	1,800		230
	Diethyl Disulfide	µg/m³	ND		500	ND		120	ND		120	ND		120	ND		120

KEMRON ENVIRONMENTAL SERVICES

BRIDGEWATER
KEMRON PROJECT # SE-0416

TABLE 8

REDUCE SULFUR RESULTS

			AMBIENT T0			DAY 1			< 50,000 ppm			< 1,000 ppm			AMBIENT Tf		
SAMPLE ID	**COMPOUND**	**UNITS**	**RESULT**	**QUAL**	**MDL**	**RESULT**	**QUAL**	**MDL**	**RESULT**	**QUAL**	**MDL**	**RESULT**	**QUAL**	**MDL**	**RESULT**	**QUAL**	**MDL**
VR 100	Hydrogen Sulfide	µg/m³	640		14	120,000		70	6,100,000		1,700	3,600,000		700	470,000		140
	Carbonyl Sulfide	µg/m³	200		25	1,100		120	31,000		3,100	95,000		1,200	11,000		250
	Methyl Mercaptan	µg/m³	ND		20	17,000		98	47,000		2,500	11,000		980	320		200
	Ethyl Mercaptan	µg/m³	ND		25	4,200		130	10,000		3,200	2,700		1,300	ND		250
	Dimethyl Sulfide	µg/m³	680		25	3,900		130	19,000		3,200	4,000		1,300	23,000		250
	Carbon Disulfide	µg/m³	48,000		16	48,000		78	54,000		1,900	18,000		780	6,200		160
	Isopropyl Mercaptan	µg/m³	ND		31	3,100		160	11,000		3,900	ND		1,600	ND		310
	tert-Butyl Mercaptan	µg/m³	ND		37	840		180	ND		4,600	ND		1,800	ND		370
	n-Propyl Mercaptan	µg/m³	ND		31	330		160	ND		3,900	ND		1,600	ND		310
	Ethyl Methyl Sulfide	µg/m³	170		31	1,300		160	ND		3,900	ND		1,600	2,300		310
	Thiophene	µg/m³	66		34	9,500		170	14,000		4,300	6,800		1,700	23,000		340
	Isobutyl Mercaptan	µg/m³	ND		37	1,500		180	ND		4,600	ND		1,800	ND		370
	Diethyl Sulfide	µg/m³	ND		37	260		180	ND		4,600	ND		1,800	ND		370
	n-Butyl Mercaptan	µg/m³	ND		37	ND		180	ND		4,600	ND		1,800	ND		370
	Dimethyl Disulfide	µg/m³	39		19	1,000		96	ND		2,400	ND		960	2,700		190
	3-Methylthiophene	µg/m³	ND		40	2,400		200	ND		5,000	ND		2,000	3,500		400
	Tetrahydrothiophene	µg/m³	ND		36	400		180	ND		4,500	ND		1,800	ND		360
	2,5-Dimethylthiophene	µg/m³	ND		46	ND		230	ND		5,700	ND		2,300	ND		460
	2-Ethylthiophene	µg/m³	ND		46	660		230	ND		5,700	ND		2,300	7,600		460
	Diethyl Disulfide	µg/m³	ND		25	ND		120	ND		3,100	ND		1,200	ND		250
HC 100	Hydrogen Sulfide	µg/m³	64,000		280	1,200,000		700	4,500,000		1,700	350,000		700	22,000		7.0
	Carbonyl Sulfide	µg/m³	1,500		490	12,000		1,200	6,000		3,100	10,000		1,200	16,000		12
	Methyl Mercaptan	µg/m³	540		390	91,000		980	20,000		2,500	2,900		980	230		9.8
	Ethyl Mercaptan	µg/m³	ND		510	22,000		1,300	3,300		3,200	ND		1,300	74		13
	Dimethyl Sulfide	µg/m³	13,000		510	63,000		1,300	31,000		3,200	24,000		1,300	1,400		13
	Carbon Disulfide	µg/m³	770,000		310	110,000		780	15,000		1,900	16,000		780	7,800		7.8
	Isopropyl Mercaptan	µg/m³	ND		620	5,900		1,600	ND		3,900	ND		1,600	99		16
	tert-Butyl Mercaptan	µg/m³	ND		740	11,000		1,800	ND		4,600	ND		1,800	240		18
	n-Propyl Mercaptan	µg/m³	ND		620	3,100		1,600	ND		3,900	ND		1,600	ND		16
	Ethyl Methyl Sulfide	µg/m³	2,600		620	9,400		1,600	ND		3,900	2,500		1,600	340		16
	Thiophene	µg/m³	2,800		690	56,000		1,700	32,000		4,300	30,000		1,700	5,900		17
	Isobutyl Mercaptan	µg/m³	ND		740	ND		1,800	ND		4,600	ND		1,800	ND		18
	Diethyl Sulfide	µg/m³	ND		740	ND		1,800	ND		4,600	ND		1,800	39		18
	n-Butyl Mercaptan	µg/m³	ND		740	ND		1,800	ND		4,600	ND		1,800	48		18
	Dimethyl Disulfide	µg/m³	ND		390	2,800		960	5,500		2,400	4,500		960	460		9.6
	3-Methylthiophene	µg/m³	ND		800	ND		2,000	ND		5,000	3,200		2,000	1,800		20
	Tetrahydrothiophene	µg/m³	ND		720	ND		1,800	ND		4,500	ND		1,800	360		18
	2,5-Dimethylthiophene	µg/m³	ND		920	ND		2,300	ND		5,700	ND		2,300	ND		23
	2-Ethylthiophene	µg/m³	ND		920	ND		2,300	5,900		5,700	6,200		2,300	1,000		23
	Diethyl Disulfide	µg/m³	ND		500	ND		1,200	ND		3,100	ND		1,200	ND		12

Notes:
MDL = Method Detection Limit
µg/m³ = micrograms por cubic meter
QUAL = Qualifier
ND = Not detected at or above the reporting limit.

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SE-0416

TABLE 9

TREATED OFF-GAS ANALYTICAL CHARACTERIZATION
ALDEHYDES AND INORGANIC ACIDS (NIOSH 2016M/NIOSH 7903M)

PARAMETER	UNITS	T 0 RESULT	DAY 1 RESULT	< 50,000 ppm RESULT	< 1,000 ppm RESULT
VR 90C					
ALDEHYDES					
ACETALDEHYDE	PPM	0.6	0.3	6.1	0.63
BENZALDEHYDE	PPM	< 0.02	< 0.03	< 0.02	< 0.02
BUTYRALDEHYDE	PPM	0.07	< 0.04	0.84	0.2
Crotonaldehyde	PPM	< 0.03	< 0.04	< 0.04	< 0.04
FORMALDEHYDE	PPM	< 0.07	< 0.1	< 0.09	< 0.08
ISOVALERALDEHYDE	PPM	2.7	0.37	4.7	1.2
PROPIONALDEHYDE	PPM	0.1	0.05	1.3	0.3
VALERALDEHYDE	PPM	< 0.02	< 0.03	0.04	< 0.03
INORGANIC ACIDS					
HYDROBROMIC ACID	PPM	< 0.5	< 0.4	< 0.5	< 0.5
HYDROCHLORIC ACID	PPM	< 1	< 0.9	< 1	< 1
HYDROFLUORIC ACID	PPM	< 2	< 2	< 2	< 2
NITRIC ACID	PPM	< 0.6	< 0.5	< 0.6	< 0.6
PHOSPHORIC ACID	PPM	< 2	< 0.3	< 2	< 2
SULFURIC ACID	PPM	< 2	0.6	< 2	*43
HC 90C					
ALDEHYDES					
ACETALDEHYDE	PPM	0.2	*9.1	0.51	0.1
BENZALDEHYDE	PPM	< 0.02	0.2	*0.1	< 0.02
BUTYRALDEHYDE	PPM	< 0.03	*1.3	0.2	< 0.04
Crotonaldehyde	PPM	< 0.03	< 0.04	< 0.03	< 0.04
FORMALDEHYDE	PPM	< 0.07	*0.1	< 0.06	< 0.08
ISOVALERALDEHYDE	PPM	2	*2.6	*4.9	0.1
PROPIONALDEHYDE	PPM	< 0.04	*1.8	0.1	< 0.04
VALERALDEHYDE	PPM	< 0.02	0.04	< 0.02	< 0.03
INORGANIC ACIDS					
HYDROBROMIC ACID	PPM	< 0.5	< 0.4	< 0.5	< 0.3
HYDROCHLORIC ACID	PPM	< 1	1	< 1	< 0.6
HYDROFLUORIC ACID	PPM	< 2	< 2	< 2	< 1
NITRIC ACID	PPM	< 0.6	< 0.5	< 0.6	< 0.3
PHOSPHORIC ACID	PPM	< 2	< 0.3	< 2	< 0.9
SULFURIC ACID	PPM	6.4	< 0.3	< 2	*52
VR 100C					
ALDEHYDES					
ACETALDEHYDE	PPM	0.6	1.3	0.78	2.3
BENZALDEHYDE	PPM	< 0.02	0.02	< 0.02	0.03
BUTYRALDEHYDE	PPM	0.07	0.39	0.48	1
Crotonaldehyde	PPM	< 0.03	< 0.03	< 0.04	< 0.04
FORMALDEHYDE	PPM	< 0.07	*0.3	< 0.08	< 0.08
ISOVALERALDEHYDE	PPM	2.7	1.9	3	3.6
PROPIONALDEHYDE	PPM	0.1	0.3	0.2	0.8
VALERALDEHYDE	PPM	< 0.02	< 0.02	< 0.03	< 0.03
INORGANIC ACIDS					
HYDROBROMIC ACID	PPM	< 0.5	< 0.5	< 0.8	< 0.5
HYDROCHLORIC ACID	PPM	< 1	< 1	< 2	2
HYDROFLUORIC ACID	PPM	< 2	< 2	< 3	< 2
NITRIC ACID	PPM	< 0.6	< 0.6	< 1	< 0.6
PHOSPHORIC ACID	PPM	< 2	< 0.4	< 5	< 2
SULFURIC ACID	PPM	< 2	0.6	*9.9	*170
HC 100C					
ALDEHYDES					
ACETALDEHYDE	PPM	0.2	1.3	0.06	1.1
BENZALDEHYDE	PPM	< 0.02	0.01	< 0.02	0.2
BUTYRALDEHYDE	PPM	< 0.03	0.28	< 0.04	0.3
Crotonaldehyde	PPM	< 0.03	< 0.01	< 0.04	< 0.04
FORMALDEHYDE	PPM	< 0.07	< 0.02	< 0.08	< 0.08
ISOVALERALDEHYDE	PPM	2	0.37	1.2	5.2

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SE-0416

TABLE 9

TREATED OFF-GAS ANALYTICAL CHARACTERIZATION
ALDEHYDES AND INORGANIC ACIDS (NIOSH 2016M/NIOSH 7903M)

PARAMETER	UNITS	T 0 RESULT	DAY 1 RESULT	< 50,000 ppm RESULT	< 1,000 ppm RESULT
PROPIONALDEHYDE	PPM	< 0.04	0.32	< 0.04	0.3
VALERALDEHYDE	PPM	< 0.02	0.03	< 0.03	< 0.03
INORGANIC ACIDS					
HYDROBROMIC ACID	PPM	< 0.5	< 1	< 0.8	< 0.5
HYDROCHLORIC ACID	PPM	< 1	< 3	< 2	< 1
HYDROFLUORIC ACID	PPM	< 2	< 5	< 3	< 2
NITRIC ACID	PPM	< 0.6	< 2	< 1	< 0.6
PHOSPHORIC ACID	PPM	< 2	< 1	< 3	< 2
SULFURIC ACID	PPM	6.4	1	*15	*31

* Results may have had breakthrough or possible migration. Results may be biased low

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 10A

OFF-GAS ANALYTICAL CHARACTERIZATION VR 90
Summa Canister Volatile Organic Compounds (TO-15)

PARAMETER	UNITS	DAY 1		< 50,000		< 1,000	
		RESULT	RPT. LIMIT	RESULT	RPT. LIMIT	RESULT	RPT. LIMIT
Volatile Organic Compounds							
Freon 12	ug/m^3	ND	120,000	ND	440,000	ND	3,400
Freon 114	ug/m^3	ND	170,000	ND	630,000	ND	4,800
Chloromethane	ug/m^3	ND	200,000	ND	740,000	ND	5,600
Vinyl Chloride	ug/m^3	ND	64,000	ND	230,000	ND	1,700
1,3-Butadiene	ug/m^3	ND	55,000	ND	200,000	ND	1,500
Bromomethane	ug/m^3	ND	96,000	ND	350,000	ND	2,600
Chloroethane	ug/m^3	ND	260,000	ND	950,000	ND	7,200
Freon 11	ug/m^3	ND	140,000	ND	500,000	ND	3,800
Ethanol	ug/m^3	ND	190,000	ND	680,000	ND	5,100
Freon 113	ug/m^3	ND	190,000	ND	690,000	ND	5,200
1,1-Dichloroethene	ug/m^3	ND	98,000	ND	360,000	ND	2,700
Acetone	ug/m^3	ND	240,000	ND	860,000	28,000	6,500
2-Propanol	ug/m^3	ND	240,000	ND	880,000	ND	6,700
Carbon Disulfide	ug/m^3	610,000	77,000	98,000	280,000	3000	2,100
3-Chloropropene	ug/m^3	ND	310,000	ND	1,100,000	ND	8,500
Methylene Chloride	ug/m^3	ND	86,000	ND	310,000	ND	2,400
Methyl tert-butyl ether	ug/m^3	ND	90,000	ND	320,000	ND	2,400
trans-1,2-Dichloroethene	ug/m^3	ND	98,000	ND	360,000	ND	2,700
Hexane	ug/m^3	300,000	88,000	ND	320,000	ND	2,400
1,1-Dichloroethane	ug/m^3	ND	100,000	ND	360,000	ND	2,800
2-Butanone (Methyl Ethyl Ketone)	ug/m^3	ND	290,000	ND	1,100,000	ND	8,000
cis-1,2-Dichloroethene	ug/m^3	ND	98,000	ND	360,000	ND	2,700
Tetrahydrofuran	ug/m^3	ND	73,000	ND	260,000	ND	2,000
Chloroform	ug/m^3	ND	120,000	ND	440,000	ND	3,300
1,1,1-Trichloroethane	ug/m^3	ND	140,000	ND	490,000	ND	3,700
Cyclohexane	ug/m^3	ND	86,000	ND	310,000	ND	2,300
Carbon Tetrachloride	ug/m^3	ND	160,000	ND	570,000	ND	4,300
2,2,4-Trimethylpentane	ug/m^3	ND	120,000	ND	420,000	ND	3,200
Benzene	ug/m^3	34,000,000	79,000	64,000,000	290,000	420,000	2,200
1,2-Dichloroethane	ug/m^3	ND	100,000	ND	360,000	ND	2,800
Heptane	ug/m^3	ND	100,000	ND	370,000	ND	2,800
Trichloroethene	ug/m^3	ND	130,000	ND	480,000	ND	3,600
1,2-Dichloropropane	ug/m^3	ND	110,000	ND	420,000	ND	3,100
1,4-Dioxane	ug/m^3	ND	360,000	ND	1,300,000	ND	9,800
Bromodichloromethane	ug/m^3	ND	170,000	ND	600,000	ND	4,600
cis-1,3-Dichloropropene	ug/m^3	ND	110,000	ND	410,000	ND	3,100
4-Methyl-2-pentanone	ug/m^3	ND	100,000	ND	370,000	ND	2,800
Toluene	ug/m^3	340,000	94,000	4,600,000	340,000	71,000	2,600
trans-1,3-Dichloropropene	ug/m^3	ND	110,000	ND	410,000	ND	3,100
1,1,2-Trichloroethane	ug/m^3	ND	140,000	ND	490,000	ND	3,700
Tetrachloroethene	ug/m^3	ND	170,000	ND	610,000	ND	4,600
2-Hexanone	ug/m^3	ND	410,000	ND	1,500,000	ND	11,000
Dibromochloromethane	ug/m^3	ND	210,000	ND	770,000	ND	5,800
1,2-Dibromoethane (EDB)	ug/m^3	ND	190,000	ND	690,000	ND	5,200
Chlorobenzene	ug/m^3	ND	110,000	ND	410,000	ND	3,100
Ethyl Benzene	ug/m^3	ND	110,000	ND	390,000	ND	3,000

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 10A

OFF-GAS ANALYTICAL CHARACTERIZATION VR 90
Summa Canister Volatile Organic Compounds (TO-15)

PARAMETER	UNITS	DAY 1		< 50,000		< 1,000	
		RESULT	RPT. LIMIT	RESULT	RPT. LIMIT	RESULT	RPT. LIMIT
m,p-Xylene	ug/m^3	ND	110,000	ND	390,000	900	3,000
o-Xylene	ug/m^3	ND	110,000	ND	390,000	ND	3,000
Styrene	ug/m^3	ND	100,000	ND	380,000	ND	2,900
Bromoform	ug/m^3	ND	260,000	ND	930,000	ND	7,000
Cumene	ug/m^3	ND	120,000	ND	440,000	ND	3,300
1,1,2,2-Tetrachloroethane	ug/m^3	ND	170,000	ND	620,000	ND	4,700
Propylbenzene	ug/m^3	ND	120,000	ND	440,000	ND	3,300
4-Ethyltoluene	ug/m^3	ND	120,000	ND	440,000	ND	3,300
1,3,5-Trimethylbenzene	ug/m^3	ND	120,000	ND	440,000	ND	3,300
1,2,4-Trimethylbenzene	ug/m^3	ND	120,000	ND	440,000	ND	3,300
1,3-Dichlorobenzene	ug/m^3	ND	150,000	ND	540,000	ND	4,100
1,4-Dichlorobenzene	ug/m^3	ND	150,000	ND	540,000	ND	4,100
alpha-Chlorotoluene	ug/m^3	ND	130,000	ND	460,000	ND	3,500
1,2-Dichlorobenzene	ug/m^3	ND	150,000	ND	540,000	ND	4,100
1,2,4-Trichlorobenzene	ug/m^3	ND	740,000	ND	2,700,000	ND	20,000
Hexachlorobutadiene	ug/m^3	ND	1,100,000	ND	3,800,000	ND	29,000
Naphthalene	ug/m^3	ND	520,000	ND	1,900,000	ND	14,000

RPT. LIMIT = Reporting limit

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 10B

OFF-GAS ANALYTICAL CHARACTERIZATION HC 90
Summa Canister Volatile Organic Compounds (TO-15)

PARAMETER	UNITS	DAY 1		< 50,000		< 1,000	
		RESULT	RPT. LIMIT	RESULT	RPT. LIMIT	RESULT	RPT. LIMIT
Volatile Organic Compounds							
Freon 12	ug/m^3	ND	270,000	ND	54,000	ND	2,000
Freon 114	ug/m^3	ND	380,000	ND	76,000	ND	2,800
Chloromethane	ug/m^3	610,000.00	450,000	64,000	90,000	9,400	3,300
Vinyl Chloride	ug/m^3	ND	140,000	ND	28,000	ND	1,000
1,3-Butadiene	ug/m^3	ND	120,000	ND	24,000	ND	870
Bromomethane	ug/m^3	ND	210,000	ND	42,000	ND	1,500
Chloroethane	ug/m^3	ND	580,000	ND	110,000	ND	4,200
Freon 11	ug/m^3	ND	310,000	ND	61,000	ND	2,200
Ethanol	ug/m^3	ND	410,000	ND	82,000	ND	3,000
Freon 113	ug/m^3	ND	420,000	ND	83,000	ND	3,000
1,1-Dichloroethene	ug/m^3	ND	220,000	ND	43,000	ND	1,600
Acetone	ug/m^3	1,200,000.00	520,000	110,000	100,000	27,000	3,800
2-Propanol	ug/m^3	ND	540,000	ND	110,000	ND	3,900
Carbon Disulfide	ug/m^3	ND	170,000	ND	34,000	5,300	1,200
3-Chloropropene	ug/m^3	ND	680,000	ND	140,000	ND	4,900
Methylene Chloride	ug/m^3	ND	190,000	ND	38,000	ND	1,400
Methyl tert-butyl ether	ug/m^3	ND	200,000	ND	39,000	ND	1,400
trans-1,2-Dichloroethene	ug/m^3	ND	220,000	ND	43,000	ND	1,600
Hexane	ug/m^3	ND	190,000	ND	38,000	ND	1,400
1,1-Dichloroethane	ug/m^3	ND	220,000	ND	44,000	ND	1,600
2-Butanone (Methyl Ethyl Ketone)	ug/m^3	ND	640,000	ND	130,000	2,700	4,600
cis-1,2-Dichloroethene	ug/m^3	ND	220,000	ND	43,000	ND	1,600
Tetrahydrofuran	ug/m^3	ND	160,000	ND	32,000	ND	1,200
Chloroform	ug/m^3	ND	270,000	ND	53,000	ND	1,900
1,1,1-Trichloroethane	ug/m^3	ND	300,000	ND	59,000	ND	2,200
Cyclohexane	ug/m^3	ND	190,000	ND	37,000	ND	1,400
Carbon Tetrachloride	ug/m^3	ND	340,000	ND	68,000	ND	2,500
2,2,4-Trimethylpentane	ug/m^3	ND	250,000	ND	51,000	ND	1,800
Benzene	ug/m^3	110,000,000	170,000	7,300,000	35,000	310,000	1,300
1,2-Dichloroethane	ug/m^3	ND	220,000	ND	44,000	ND	1,600
Heptane	ug/m^3	ND	220,000	ND	44,000	ND	1,600
Trichloroethene	ug/m^3	ND	290,000	ND	58,000	ND	2,100
1,2-Dichloropropane	ug/m^3	ND	250,000	ND	50,000	ND	1,800
1,4-Dioxane	ug/m^3	ND	780,000	ND	160,000	ND	5,700
Bromodichloromethane	ug/m^3	ND	360,000	ND	73,000	ND	2,600
cis-1,3-Dichloropropene	ug/m^3	ND	250,000	ND	49,000	ND	1,800
4-Methyl-2-pentanone	ug/m^3	ND	220,000	ND	44,000	ND	1,600
Toluene	ug/m^3	17,000,000	200,000	4,600,000	41,000	150,000	1,500
trans-1,3-Dichloropropene	ug/m^3	ND	250,000	ND	49,000	ND	1,800
1,1,2-Trichloroethane	ug/m^3	ND	300,000	ND	59,000	ND	2,200
Tetrachloroethene	ug/m^3	ND	370,000	ND	74,000	ND	2,700
2-Hexanone	ug/m^3	ND	890,000	ND	180,000	ND	6,500
Dibromochloromethane	ug/m^3	ND	460,000	ND	92,000	ND	3,400
1,2-Dibromoethane (EDB)	ug/m^3	ND	420,000	ND	83,000	ND	3,000
Chlorobenzene	ug/m^3	ND	250,000	ND	50,000	ND	1,800
Ethyl Benzene	ug/m^3	ND	240,000	78,000	47,000	1,700	1,700

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 10B

OFF-GAS ANALYTICAL CHARACTERIZATION HC 90
Summa Canister Volatile Organic Compounds (TO-15)

PARAMETER	UNITS	DAY 1		< 50,000		< 1,000	
		RESULT	RPT. LIMIT	RESULT	RPT. LIMIT	RESULT	RPT. LIMIT
m,p-Xylene	ug/m^3	430,000.00	240,000	620,000	47,000	19,000	1,700
o-Xylene	ug/m^3	ND	240,000	78,000	47,000	3,100	1,700
Styrene	ug/m^3	ND	230,000	ND	46,000	ND	1,700
Bromoform	ug/m^3	ND	560,000	ND	110,000	ND	4,100
Cumene	ug/m^3	ND	270,000	40,000	53,000	2,200	1,900
1,1,2,2-Tetrachloroethane	ug/m^3	ND	370,000	ND	74,000	ND	2,700
Propylbenzene	ug/m^3	ND	270,000	ND	53,000	ND	1,900
4-Ethyltoluene	ug/m^3	ND	270,000	ND	53,000	ND	1,900
1,3,5-Trimethylbenzene	ug/m^3	ND	270,000	ND	53,000	ND	1,900
1,2,4-Trimethylbenzene	ug/m^3	ND	270,000	ND	53,000	ND	1,900
1,3-Dichlorobenzene	ug/m^3	ND	330,000	ND	65,000	ND	2,400
1,4-Dichlorobenzene	ug/m^3	ND	330,000	ND	65,000	ND	2,400
alpha-Chlorotoluene	ug/m^3	ND	280,000	ND	56,000	ND	2,000
1,2-Dichlorobenzene	ug/m^3	ND	330,000	ND	65,000	ND	2,400
1,2,4-Trichlorobenzene	ug/m^3	ND	1,600,000	ND	320,000	ND	12,000
Hexachlorobutadiene	ug/m^3	ND	2,300,000	ND	460,000	ND	17,000
Naphthalene	ug/m^3	ND	1,100,000	ND	230,000	ND	8,300

RPT. LIMIT = Reporting limit

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 10C

OFF-GAS ANALYTICAL CHARACTERIZATION VR100
Summa Canister Volatile Organic Compounds (TO-15)

PARAMETER	UNITS	DAY 1		< 50,000		< 1,000	
		RESULT	RPT. LIMIT	RESULT	RPT. LIMIT	RESULT	RPT. LIMIT
Volatile Organic Compounds							
Freon 12	ug/m3	ND	47,000	ND	120,000	ND	4,000
Freon 114	ug/m3	ND	66,000	ND	170,000	ND	5,600
Chloromethane	ug/m3	89,000.00	78,000	ND	200,000	29,000	6,600
Vinyl Chloride	ug/m3	ND	24,000	ND	63,000	ND	2,000
1,3-Butadiene	ug/m3	ND	21,000	ND	54,000	ND	1,800
Bromomethane	ug/m3	ND	37,000	ND	95,000	ND	3,100
Chloroethane	ug/m3	ND	100,000	ND	260,000	ND	8,500
Freon 11	ug/m3	ND	53,000	ND	140,000	ND	4,500
Ethanol	ug/m3	ND	72,000	ND	180,000	ND	6,100
Freon 113	ug/m3	ND	73,000	ND	190,000	ND	6,200
1,1-Dichloroethene	ug/m3	ND	38,000	ND	97,000	ND	3,200
Acetone	ug/m3	ND	90,000	140,000	230,000	81,000	7,600
2-Propanol	ug/m3	ND	93,000	ND	240,000	ND	7,900
Carbon Disulfide	ug/m3	160,000.00	30,000	ND	76,000	7,300	2,500
3-Chloropropene	ug/m3	ND	120,000	ND	310,000	ND	10,000
Methylene Chloride	ug/m3	ND	33,000	ND	85,000	ND	2,800
Methyl tert-butyl ether	ug/m3	ND	34,000	ND	88,000	ND	2,900
trans-1,2-Dichloroethene	ug/m3	ND	38,000	ND	97,000	ND	3,200
Hexane	ug/m3	50,000.00	33,000	ND	86,000	ND	2,800
1,1-Dichloroethane	ug/m3	ND	38,000	ND	99,000	ND	3,200
2-Butanone (Methyl Ethyl Ketone)	ug/m3	ND	110,000	ND	290,000	6,800	9,500
cis-1,2-Dichloroethene	ug/m3	ND	38,000	ND	97,000	ND	3,200
Tetrahydrofuran	ug/m3	ND	28,000	ND	72,000	ND	2,400
Chloroform	ug/m3	ND	46,000	ND	120,000	ND	3,900
1,1,1-Trichloroethane	ug/m3	ND	52,000	ND	130,000	ND	4,400
Cyclohexane	ug/m3	ND	33,000	ND	84,000	ND	2,800
Carbon Tetrachloride	ug/m3	ND	60,000	ND	150,000	ND	5,100
2,2,4-Trimethylpentane	ug/m3	ND	44,000	ND	110,000	ND	3,800
Benzene	ug/m3	12,000,000	30,000	9,800,000	78,000	400,000	2,600
1,2-Dichloroethane	ug/m3	ND	38,000	ND	99,000	ND	3,200
Heptane	ug/m3	ND	39,000	ND	100,000	ND	3,300
Trichloroethene	ug/m3	ND	51,000	ND	130,000	ND	4,300
1,2-Dichloropropane	ug/m3	ND	44,000	ND	110,000	ND	3,700
1,4-Dioxane	ug/m3	ND	140,000	ND	350,000	ND	12,000
Bromodichloromethane	ug/m3	ND	64,000	ND	160,000	ND	5,400
cis-1,3-Dichloropropene	ug/m3	ND	43,000	ND	110,000	ND	3,600
4-Methyl-2-pentanone	ug/m3	ND	39,000	ND	100,000	ND	3,300
Toluene	ug/m3	990,000	36,000	3,900,000	92,000	510,000	3,000
trans-1,3-Dichloropropene	ug/m3	ND	43,000	ND	110,000	ND	3,600
1,1,2-Trichloroethane	ug/m3	ND	52,000	ND	130,000	ND	4,400
Tetrachloroethene	ug/m3	ND	64,000	ND	170,000	ND	5,500
2-Hexanone	ug/m3	ND	160,000	ND	400,000	ND	13,000
Dibromochloromethane	ug/m3	ND	81,000	ND	210,000	ND	6,800
1,2-Dibromoethane (EDB)	ug/m3	ND	73,000	ND	190,000	ND	6,200
Chlorobenzene	ug/m3	ND	44,000	ND	110,000	1,200	3,700
Ethyl Benzene	ug/m3	ND	41,000	31,000	110,000	14,000	3,500

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 10C

OFF-GAS ANALYTICAL CHARACTERIZATION VR100
Summa Canister Volatile Organic Compounds (TO-15)

PARAMETER	UNITS	DAY 1		< 50,000		< 1,000	
		RESULT	RPT. LIMIT	RESULT	RPT. LIMIT	RESULT	RPT. LIMIT
m,p-Xylene	ug/m^3	44,000.00	41,000	240,000	110,000	130,000	3,500
o-Xylene	ug/m^3	ND	41,000	43,000	110,000	39,000	3,500
Styrene	ug/m^3	ND	40,000	ND	100,000	ND	3,400
Bromoform	ug/m^3	ND	98,000	ND	250,000	ND	8,300
Cumene	ug/m^3	ND	47,000	ND	120,000	27,000	4,000
1,1,2,2-Tetrachloroethane	ug/m^3	ND	65,000	ND	170,000	ND	5,500
Propylbenzene	ug/m^3	ND	47,000	ND	120,000	ND	4,000
4-Ethyltoluene	ug/m^3	ND	47,000	ND	120,000	3,900	4,000
1,3,5-Trimethylbenzene	ug/m^3	ND	47,000	ND	120,000	9,200	4,000
1,2,4-Trimethylbenzene	ug/m^3	ND	47,000	ND	120,000	8,900	4,000
1,3-Dichlorobenzene	ug/m^3	ND	57,000	ND	150,000	ND	4,800
1,4-Dichlorobenzene	ug/m^3	ND	57,000	ND	150,000	1,100	4,800
alpha-Chlorotoluene	ug/m^3	ND	49,000	ND	130,000	ND	4,200
1,2-Dichlorobenzene	ug/m^3	ND	57,000	ND	150,000	12,000	4,800
1,2,4-Trichlorobenzene	ug/m^3	ND	280,000	ND	730,000	ND	24,000
Hexachlorobutadiene	ug/m^3	ND	400,000	ND	1,000,000	ND	34,000
Naphthalene	ug/m^3	ND	200,000	ND	510,000	ND	17,000

RPT. LIMIT = Reporting limit

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 10D

OFF-GAS ANALYTICAL CHARACTERIZATION HC 100
Summa Canister Volatile Organic Compounds (TO-15)

PARAMETER	UNITS	DAY 1		< 50,000		< 1,000	
		RESULT	RPT. LIMIT	RESULT	RPT. LIMIT	RESULT	RPT. LIMIT
Volatile Organic Compounds							
Freon 12	ug/m^3	ND	13,000	ND	61,000	ND	13,000
Freon 114	ug/m^3	ND	18,000	ND	87,000	ND	18,000
Chloromethane	ug/m^3	30,000	21,000	100,000	100,000	63000	21,000
Vinyl Chloride	ug/m^3	ND	6,600	ND	32,000	ND	6,600
1,3-Butadiene	ug/m^3	ND	5,700	ND	27,000	ND	5,700
Bromomethane	ug/m^3	ND	10,000	ND	48,000	ND	10,000
Chloroethane	ug/m^3	ND	27,000	ND	130,000	ND	27,000
Freon 11	ug/m^3	ND	14,000	ND	70,000	ND	14,000
Ethanol	ug/m^3	ND	19,000	ND	93,000	ND	19,000
Freon 113	ug/m^3	ND	20,000	ND	95,000	ND	20,000
1,1-Dichloroethene	ug/m^3	ND	10,000	ND	49,000	ND	10,000
Acetone	ug/m^3	64,000	24,000	72,000	120,000	150000	24,000
2-Propanol	ug/m^3	ND	25,000	ND	120,000	ND	25,000
Carbon Disulfide	ug/m^3	5,300	8,000	ND	39,000	16000	8,000
3-Chloropropene	ug/m^3	ND	32,000	ND	160,000	ND	32,000
Methylene Chloride	ug/m^3	3,800	9,000	ND	43,000	13000	9,000
Methyl tert-butyl ether	ug/m^3	ND	9,300	ND	45,000	ND	9,300
trans-1,2-Dichloroethene	ug/m^3	ND	10,000	ND	49,000	ND	10,000
Hexane	ug/m^3	ND	9,100	ND	44,000	ND	9,100
1,1-Dichloroethane	ug/m^3	ND	10,000	ND	50,000	ND	10,000
2-Butanone (Methyl Ethyl Ketone)	ug/m^3	ND	30,000	ND	150,000	ND	30,000
cis-1,2-Dichloroethene	ug/m^3	ND	10,000	ND	49,000	ND	10,000
Tetrahydrofuran	ug/m^3	ND	7,600	ND	36,000	ND	7,600
Chloroform	ug/m^3	ND	13,000	ND	60,000	ND	13,000
1,1,1-Trichloroethane	ug/m^3	ND	14,000	ND	68,000	ND	14,000
Cyclohexane	ug/m^3	ND	8,900	ND	43,000	ND	8,900
Carbon Tetrachloride	ug/m^3	ND	16,000	ND	78,000	ND	16,000
2,2,4-Trimethylpentane	ug/m^3	ND	12,000	ND	58,000	ND	12,000
Benzene	ug/m^3	1,200,000	8,200	6,000,000	40,000	3,900,000	8,200
1,2-Dichloroethane	ug/m^3	ND	10,000	ND	50,000	ND	10,000
Heptane	ug/m^3	ND	10,000	ND	51,000	ND	10,000
Trichloroethene	ug/m^3	ND	14,000	ND	67,000	ND	14,000
1,2-Dichloropropane	ug/m^3	ND	12,000	ND	57,000	ND	12,000
1,4-Dioxane	ug/m^3	ND	37,000	ND	180,000	ND	37,000
Bromodichloromethane	ug/m^3	ND	17,000	ND	83,000	ND	17,000
cis-1,3-Dichloropropene	ug/m^3	ND	12,000	ND	56,000	ND	12,000
4-Methyl-2-pentanone	ug/m^3	ND	10,000	ND	51,000	ND	10,000
Toluene	ug/m^3	810,000	9,700	2,500,000	47,000	3000000	9,700
trans-1,3-Dichloropropene	ug/m^3	ND	12,000	ND	56,000	ND	12,000
1,1,2-Trichloroethane	ug/m^3	ND	14,000	ND	68,000	ND	14,000
Tetrachloroethene	ug/m^3	ND	18,000	ND	84,000	ND	18,000
2-Hexanone	ug/m^3	ND	42,000	ND	200,000	ND	42,000
Dibromochloromethane	ug/m^3	ND	22,000	ND	100,000	ND	22,000
1,2-Dibromoethane (EDB)	ug/m^3	ND	20,000	ND	95,000	ND	20,000
Chlorobenzene	ug/m^3	ND	12,000	ND	57,000	ND	12,000
Ethyl Benzene	ug/m^3	16,000	11,000	34,000	54,000	68000	11,000

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 10D

OFF-GAS ANALYTICAL CHARACTERIZATION HC 100
Summa Canister Volatile Organic Compounds (TO-15)

PARAMETER	UNITS	DAY 1		< 50,000		< 1,000	
		RESULT	RPT. LIMIT	RESULT	RPT. LIMIT	RESULT	RPT. LIMIT
m,p-Xylene	ug/m^3	200,000	11,000	330,000	54,000	870000	11,000
o-Xylene	ug/m^3	38,000	11,000	69,000	54,000	160000	11,000
Styrene	ug/m^3	ND	11,000	ND	53,000	ND	11,000
Bromoform	ug/m^3	ND	27,000	ND	130,000	ND	27,000
Cumene	ug/m^3	28,000	13,000	50,000	61,000	140000	13,000
1,1,2,2-Tetrachloroethane	ug/m^3	ND	18,000	ND	85,000	ND	18,000
Propylbenzene	ug/m^3	ND	13,000	ND	61,000	ND	13,000
4-Ethyltoluene	ug/m^3	3,300	13,000	ND	61,000	16000	13,000
1,3,5-Trimethylbenzene	ug/m^3	6,800	13,000	ND	61,000	34000	13,000
1,2,4-Trimethylbenzene	ug/m^3	7,100	13,000	ND	61,000	35000	13,000
1,3-Dichlorobenzene	ug/m^3	ND	16,000	ND	74,000	ND	16,000
1,4-Dichlorobenzene	ug/m^3	ND	16,000	ND	74,000	ND	16,000
alpha-Chlorotoluene	ug/m^3	ND	13,000	ND	64,000	ND	13,000
1,2-Dichlorobenzene	ug/m^3	14,000	16,000	ND	74,000	87000	16,000
1,2,4-Trichlorobenzene	ug/m^3	ND	77,000	ND	370,000	ND	77,000
Hexachlorobutadiene	ug/m^3	ND	110,000	ND	530,000	ND	110,000
Naphthalene	ug/m^3	ND	54,000	ND	260,000	ND	54,000

RPT. LIMIT = Reporting limit

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 11

HEADSPACE OFF-GAS ANALYTICAL CHARACTERIZATION
Volatile Organic Compounds (TO-15)

	VR T 0 (ug/m^3)*		VR 90 Tf (ug/m^3)*		VR 100 Tf (ug/m^3)*		HC T0 (ug/m^3)*		HC 90 Tf (ug/m^3)*		HC 100 Tf (ug/m^3)*	
PARAMETER	**RESULT**	**RPT. LIMIT**	**RESULT**	**RPT. LIMIT**	**RESULT**	**RPT. LIMIT**	**RESULT**	**RPT. LIMIT**	**RESULT**	**RPT. LIMIT**	**RESULT**	**RPT. LIMIT**
Volatile Organic Compounds												
Freon 12	ND	490,000	ND	25,000	ND	6,200	ND	490,000	ND	25,000	ND	25,000
Freon 114	ND	700,000	ND	35,000	ND	8,700	ND	700,000	ND	35,000	ND	35,000
Chloromethane	ND	830,000	ND	41,000	41,000	10,000	ND	830,000	ND	41,000	48,000	41,000
Vinyl Chloride	ND	260,000	ND	13,000	ND	3,200	ND	260,000	ND	13,000	ND	13,000
1,3-Butadiene	ND	220,000	ND	11,000	ND	2,800	ND	220,000	ND	11,000	ND	11,000
Bromomethane	ND	390,000	ND	19,000	ND	4,800	ND	390,000	ND	19,000	ND	19,000
Chloroethane	ND	260,000	ND	13,000	ND	3,300	ND	260,000	ND	13,000	ND	13,000
Freon 11	ND	560,000	ND	28,000	ND	7,000	ND	560,000	ND	28,000	ND	28,000
Ethanol	ND	750,000	ND	38,000	ND	9,400	ND	750,000	ND	38,000	ND	38,000
Freon 113	ND	770,000	ND	38,000	ND	9,600	ND	770,000	ND	38,000	ND	38,000
1,1-Dichloroethene	ND	400,000	ND	20,000	ND	5,000	ND	400,000	ND	20,000	ND	20,000
Acetone	ND	950,000	ND	48,000	68,000	12,000	ND	950,000	ND	48,000	ND	48,000
2-Propanol	ND	980,000	ND	49,000	ND	12,000	ND	980,000	ND	49,000	ND	49,000
Carbon Disulfide	330,000	310,000	ND	16,000	4,500	3,900	550,000	310,000	ND	16,000	ND	16,000
3-Chloropropene	ND	1,200,000	ND	63,000	ND	16,000	ND	1,200,000	ND	63,000	ND	63,000
Methylene Chloride	ND	350,000	ND	17,000	ND	4,300	ND	350,000	ND	17,000	ND	17,000
Methyl tert-butyl ether	ND	360,000	ND	18,000	ND	4,500	ND	360,000	ND	18,000	ND	18,000
trans-1,2-Dichloroethene	ND	400,000	ND	20,000	ND	5,000	ND	400,000	ND	20,000	ND	20,000
Hexane	ND	350,000	ND	18,000	ND	4,400	390,000	350,000	ND	18,000	ND	18,000
1,1-Dichloroethane	ND	400,000	ND	20,000	ND	5,000	ND	400,000	ND	20,000	ND	20,000
2-Butanone (Methyl Ethyl Ketone)	ND	290,000	ND	15,000	ND	3,700	ND	290,000	ND	15,000	ND	15,000
cis-1,2-Dichloroethene	ND	400,000	ND	20,000	ND	5,000	ND	400,000	ND	20,000	ND	20,000
Tetrahydrofuran	ND	290,000	ND	15,000	ND	3,700	ND	290,000	ND	15,000	ND	15,000
Chloroform	ND	490,000	ND	24,000	ND	6,100	ND	490,000	ND	24,000	ND	24,000
1,1,1-Trichloroethane	ND	540,000	ND	27,000	ND	6,800	ND	540,000	ND	27,000	ND	27,000
Cyclohexane	ND	340,000	ND	17,000	ND	4,300	ND	340,000	ND	17,000	ND	17,000
Carbon Tetrachloride	ND	630,000	ND	31,000	ND	7,900	ND	630,000	ND	31,000	ND	31,000
2,2,4-Trimethylpentane	ND	470,000	ND	23,000	ND	5,800	ND	470,000	ND	23,000	ND	23,000
Benzene	110,000,000	320,000	920,000	16,000	150,000	4,000	180,000,000	320,000	2,000,000	16,000	ND	16,000
1,2-Dichloroethane	ND	400,000	ND	20,000	ND	5,000	ND	400,000	ND	20,000	ND	20,000
Heptane	ND	410,000	ND	20,000	ND	5,100	ND	410,000	ND	20,000	ND	20,000
Trichloroethene	ND	540,000	ND	27,000	ND	6,700	ND	540,000	ND	27,000	ND	27,000
1,2-Dichloropropane	ND	460,000	ND	23,000	ND	5,800	ND	460,000	ND	23,000	ND	23,000
1,4-Dioxane	ND	1,400,000	ND	72,000	ND	18,000	ND	1,400,000	ND	72,000	ND	72,000
Bromodichloromethane	ND	670,000	ND	34,000	ND	8,400	ND	670,000	ND	34,000	ND	34,000
cis-1,3-Dichloropropene	ND	450,000	ND	23,000	ND	5,700	ND	450,000	ND	23,000	ND	23,000
4-Methyl-2-pentanone	ND	410,000	ND	20,000	ND	5,100	ND	410,000	ND	20,000	ND	20,000
Toluene	14,000,000	380,000	650,000	19,000	280,000	4,700	22,000,000	380,000	1,600,000	19,000	1,400,000	19,000
trans-1,3-Dichloropropene	ND	450,000	ND	23,000	ND	5,700	ND	450,000	ND	23,000	ND	23,000
1,1,2-Trichloroethane	ND	540,000	ND	27,000	ND	6,800	ND	540,000	ND	27,000	ND	27,000
Tetrachloroethene	ND	680,000	ND	34,000	ND	8,500	ND	680,000	ND	34,000	ND	34,000

KEMRON ENVIRONMENTAL SERVICES

TERRATHERM
BRIDGEWATER THERMAL STUDY
KEMRON PROJECT # SH-0416

TABLE 11

HEADSPACE OFF-GAS ANALYTICAL CHARACTERIZATION
Volatile Organic Compounds (TO-15)

PARAMETER	VR T 0 (ug/m^3)*		VR 90 Tf (ug/m^3)*		VR 100 Tf (ug/m^3)*		HC T0 (ug/m^3)*		HC 90 Tf (ug/m^3)*		HC 100 Tf (ug/m^3)*	
	RESULT	RPT. LIMIT	RESULT	RPT. LIMIT	RESULT	RPT. LIMIT	RESULT	RPT. LIMIT	RESULT	RPT. LIMIT	RESULT	RPT. LIMIT
2-Hexanone	ND	1,600,000	ND	82,000	ND	20,000	ND	1,600,000	ND	82,000	ND	82,000
Dibromochloromethane	ND	850,000	ND	42,000	ND	11,000	ND	850,000	ND	42,000	ND	42,000
1,2-Dibromoethane (EDB)	ND	770,000	ND	38,000	ND	9,600	ND	770,000	ND	38,000	ND	38,000
Chlorobenzene	ND	460,000	ND	23,000	ND	5,800	ND	460,000	ND	23,000	ND	23,000
Ethyl Benzene	ND	430,000	ND	22,000	9,200	5,400	ND	430,000	44,000	22,000	ND	22,000
m,p-Xylene	1,000,000	430,000	140,000	22,000	97,000	5,400	1,400,000	430,000	710,000	22,000	190,000	22,000
o-Xylene	ND	430,000	40,000	22,000	30,000	5,400	ND	430,000	110,000	22,000	30,000	22,000
Styrene	ND	420,000	ND	21,000	ND	5,300	ND	420,000	ND	21,000	ND	21,000
Bromoform	ND	1,000,000	ND	52,000	ND	13,000	ND	1,000,000	ND	52,000	ND	52,000
Cumene	ND	490,000	31,000	24,000	24,000	6,100	ND	490,000	130,000	24,000	ND	24,000
1,1,2,2-Tetrachloroethane	ND	690,000	ND	34,000	ND	8,600	ND	690,000	ND	34,000	ND	34,000
Propylbenzene	ND	490,000	ND	24,000	ND	6,100	ND	490,000	ND	24,000	ND	24,000
4-Ethyltoluene	ND	490,000	ND	24,000	7,000	6,100	ND	490,000	ND	24,000	ND	24,000
1,3,5-Trimethylbenzene	ND	490,000	ND	24,000	17,000	6,100	ND	490,000	44,000	24,000	ND	24,000
1,2,4-Trimethylbenzene	ND	490,000	26,000	24,000	26,000	6,100	ND	490,000	52,000	24,000	ND	24,000
1,3-Dichlorobenzene	ND	600,000	ND	30,000	ND	7,500	ND	600,000	ND	30,000	ND	30,000
1,4-Dichlorobenzene	ND	600,000	ND	30,000	7,700	7,500	ND	600,000	ND	30,000	ND	30,000
alpha-Chlorotoluene	ND	520,000	ND	26,000	ND	6,500	ND	520,000	ND	26,000	ND	26,000
1,2-Dichlorobenzene	ND	600,000	58,000	30,000	78,000	7,500	ND	600,000	100,000	30,000	ND	30,000
1,2,4-Trichlorobenzene	ND	3,000,000	ND	150,000	ND	37,000	ND	3,000,000	ND	150,000	ND	150,000
Hexachlorobutadiene	ND	4,300,000	ND	210,000	ND	53,000	ND	4,300,000	ND	210,000	ND	210,000
Naphthalene	ND	2,100,000	ND	100,000	ND	26,000	ND	2,100,000	ND	100,000	ND	100,000

* Sample size is 40 ml vial with approximately 5.0 grams of sample
E = Exceeds instrument calibration range
RPT. LIMIT = Reporting limit

TERRATHERM
Bridgewater Thermal Study
KEMRON Project # SH0416

Table 12

Summary of Thermal Testing

Sample ID	Treatment Temperature (Celsius)	Length of Treatment (Days)	Intial Weight of Soil (g)	Initial Moisture (%)	Final Moisture (%)	Final Weight of Soil (g)	Weight Loss (g)	Total Condensate Collected (g)	Swell/Shrinkage (%)	Significant Final Observations
VR 90	90	23	2556.5	72.32	26.73	1587.5	969.0	568.21	2.672/31.9	Sample has a tar odor. Shiny finish. Air bubbles were observed on the surface of the material. Rubbery surface. The material is not as hard as the 100 C material after cooling but still a very stiff taffy like resistance. No free water was visible in reactor. Treated material cCould be removed after cooling, but with much difficulty. Condensate was produced daily during the entire 23 days of treatment.
HC 90	90	24	1997.5	57.36	19.54	1529.0	468.5	341.43	18.46	Material bubbles during the heating causing a semi impermeable layer and hardens into thant uneven surface after cooling. The exposed uneven surface is thin and brittle like ash. Beneath that, the surface is hard and crumbly (dry to moist) . After removing the sample from the reactor, the material is jet black with a green tint. Strong odor of super glue and tar. The sample is wet beneath the hard and crumbly layer. Seemed to get a styrene/plastic odor from condensate. Significant rust pieces of rust and "dusting" were observed on the top surface of the material in the reactor. This was not present in the VR materials.
VR 100	100	13	2517.5	72.36	11.44	1785.0	732.5	654.31	5.684/38.09	Odor not as tarry. Expansion up to 30-40% along the sidewalls. Blue "fuzz" on thermocouple copper tube after heating. Significantly harder after cooling than the VR90, but somewhat pliable (taffy) with much effort. Expands around the edges of the reactor but may not expand in the center. Texture after heating is smooth like glass. White flakes were observed around the edges of the material as well. Condensate produced seemed to be more milky than HC. Condensate was produced over the entire treatment period. Sample did not completely dry out. Rusted the entire reactor. Handling of the material in the lab improved around 50 -90 C producing a material that was like silly putty which was able to be pulled apart and rolled into balls. Free water was not found in the reactor after heating. Material had to be reheated to remove from the reactor. Significant rust pieces and dust were observed on the material from the reactor.
HC 100	100	14	1514.0	57.32	25.46	1135.5	378.5	331.8	46.24	Material bubbles during the heating causing a semi impermeable layer and hardens into an uneven surface after cooling. The exposed uneven surface is thin and brittle like ash. Beneath that, the surface is hard and crumbly (dry to moist) . After removing the sample from the reactor, the material is jet black with a green tint. Significant water present under the hard and crumbly layer. Movie made.

Notes:
*VR100 and VR90 = Due to MegaReactor weight and difficulty in completely removing material from thermal reactors, final weights and weight loss is approximate.
Swell Equation = [(initial height-final height)/initial height]x100. Second value for VR tests are side wall expansion stain

KEMRON ENVIRONMENTAL SERVICES

Terratherm
Bridgewater Thermal Study
KEMRON Project # SH0416

Table 13

Treated Materials Properties Testing

Sample ID	Bulk Density (pcf)	Porosity (1)	Water Content (%)	Solid Specific Gravity	U.U. Triaxial Test (Cu)Ksf	Vane Shear (TSF)	Unconfined Commpressive Strength (psi)	Hydraulic Condustivity	Particle Size Distribution
VR90C	69.4		26.73		No Results	> 0.6	4.4	Failed under own weight	
HC90C	77.9	32.60	19.54	1.55	No Results	0.28	38.4	Not Results	%Gravel=21.6 %Sand=50.3 %Silt=3.8 %Clay=24.4
VR100C	69.0		11.44		No Results	> 0.6	9.3	Failed under own weight	
HC100C	85.7	16.44	25.46	1.31	No Results	0.25	80.1	No Results	%Gravel= 33.8 %Sand=37.9 %Silt=4.3 %Clay=24.0

Notes:
NR = Testing Not Requested
TIP = Testing still in progress
pcf = Pounds per cubic foot
(Cu)Ksf = (Undrained cohesion) thousand pounds per square foot
* = Test could not be performed, material stuck to glass beaker, Jason with CH2M HILL said it was ok to NR
(1) calculated per method ASTM D7263 Appendix X1 using data from bulk density, water content, and solid specific gravity testing

TERRATHERM
BRIDGEWATER Thermal Study
Kemron Project Number SH0416
Summary Table for Reheated Treated Samples
Table 14

Sample ID	Description
HC 100	The sample was prepared using a clear 40mL vial. 1.4inches of HC100 treated material and 1.4 inches of glass beads inside. For 90 minutes it was subjected to a water bath to boiling point. The material did not move down the glass beads, no liquefaction occurred. Three beads were tinted green in the process and at the end of testing the material had a slight green tint.
VR 100	The sample was prepared using a clear 40mL vial. 1.4 inches of HC100 treated material and 1.4 inches of glass beads inside. For 90 minutes, it was subjected to a water bath to boiling point. The VR material started migrating down the glass beads at 65.5°C. As time passed the material continued to migrate down the glass beads slowly.

FIGURES

KEMRON
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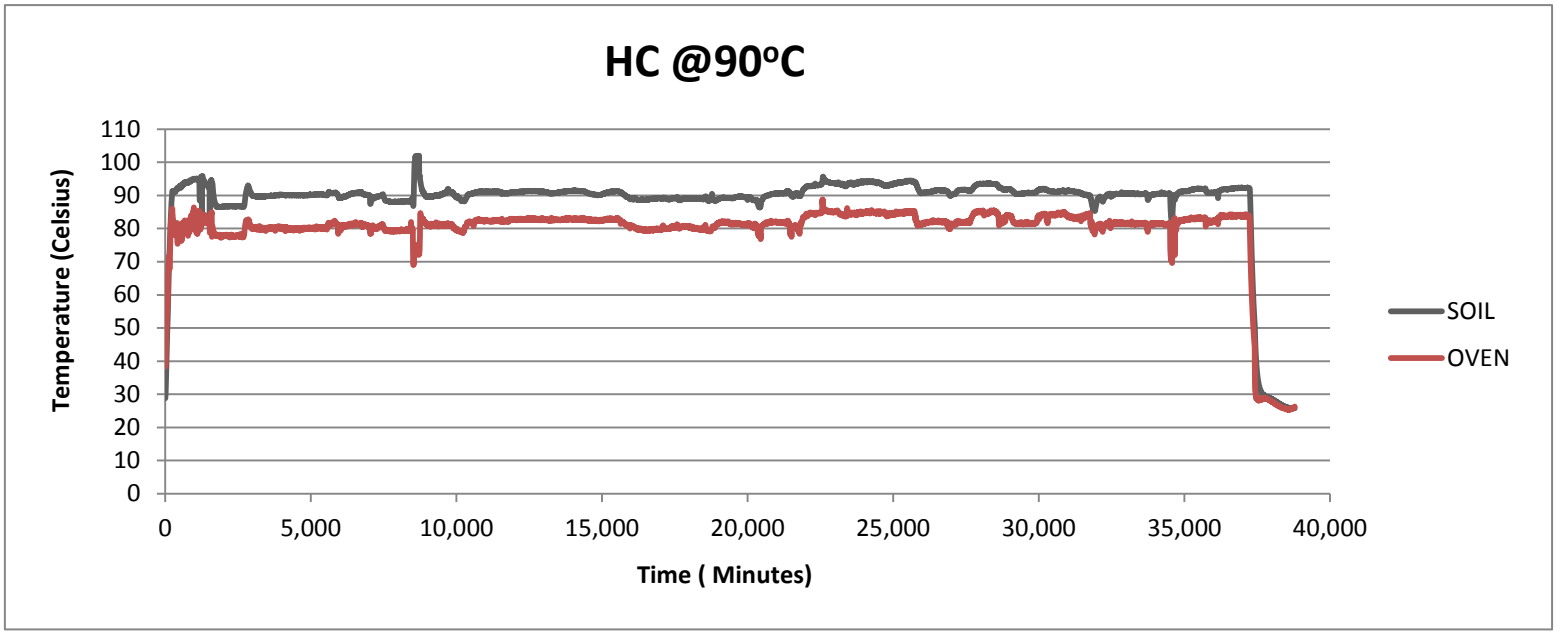
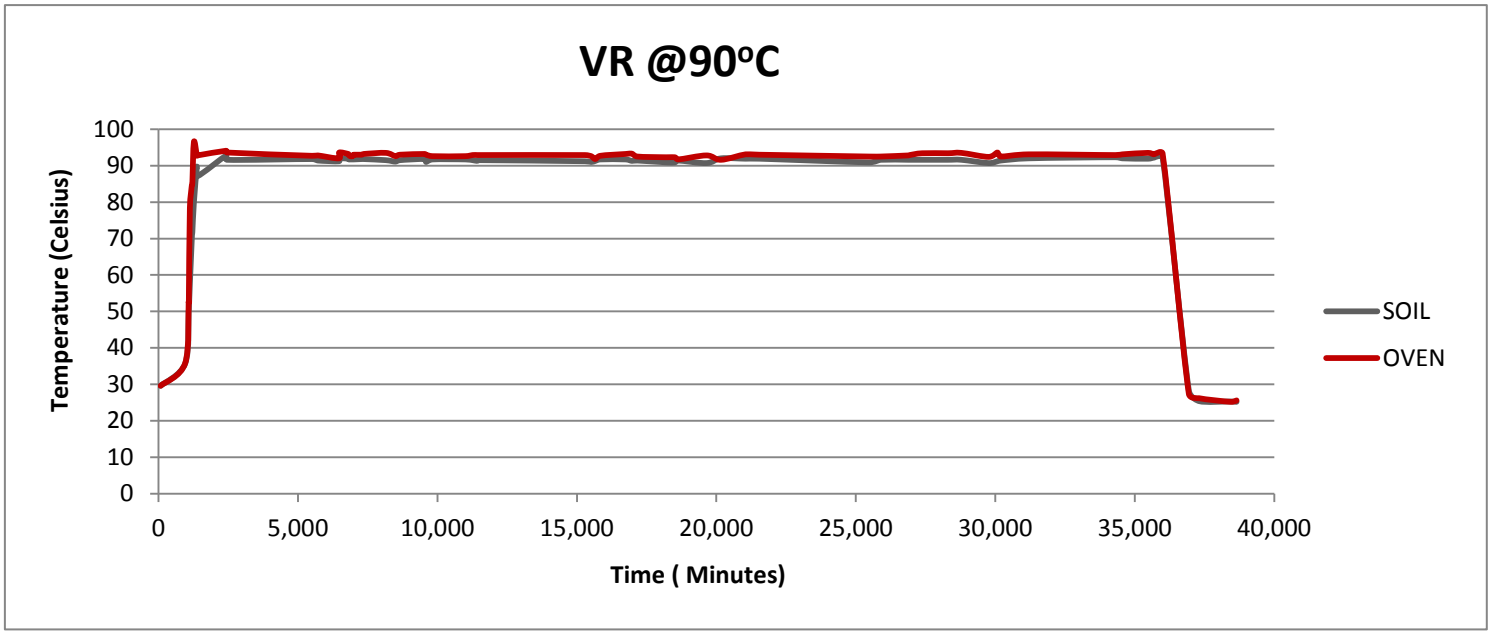
TERRATHERM
BRIDGEWATER
FIGURE 1
HC 90°C

Temperature Monitoring



TERRATHERM
BRIDGEWATER
FIGURE 2
VR 90°C

Temperature Monitoring



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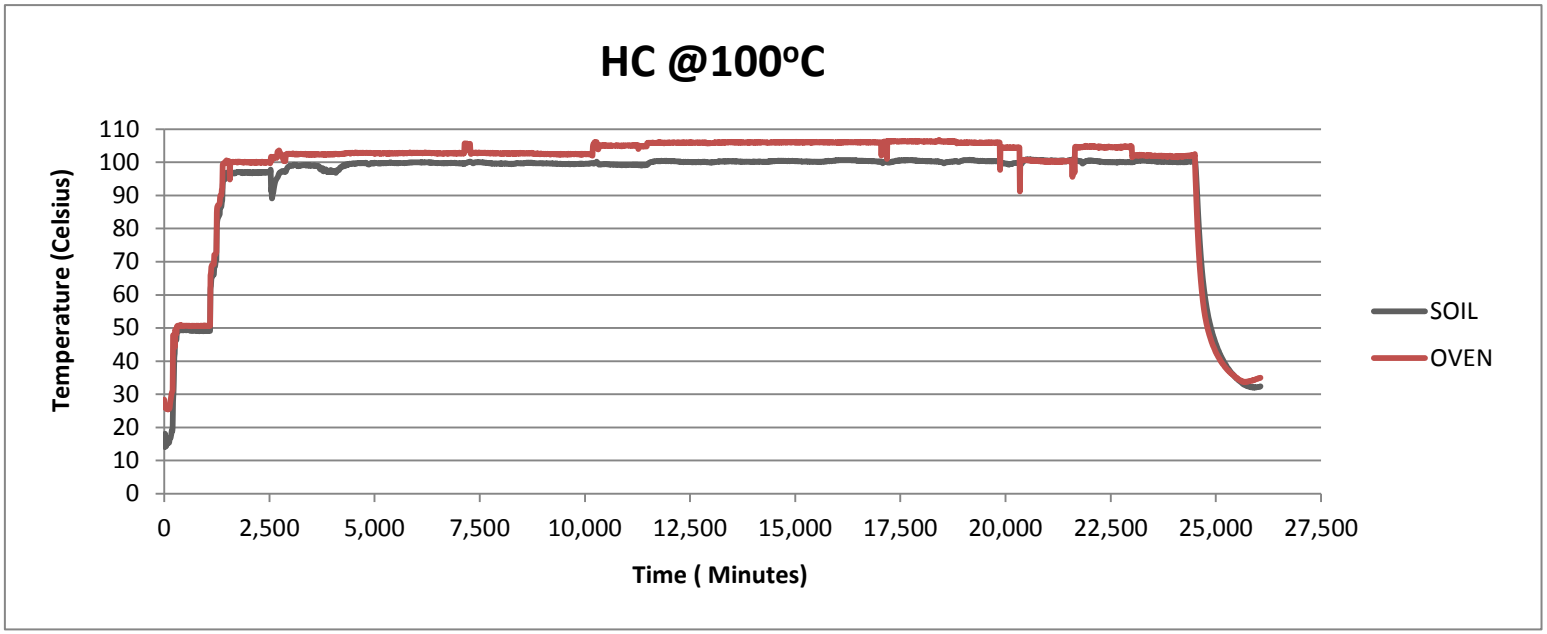
TERRATHERM
BRIDGEWATER
FIGURE 3
HC 100°C

Temperature Monitoring



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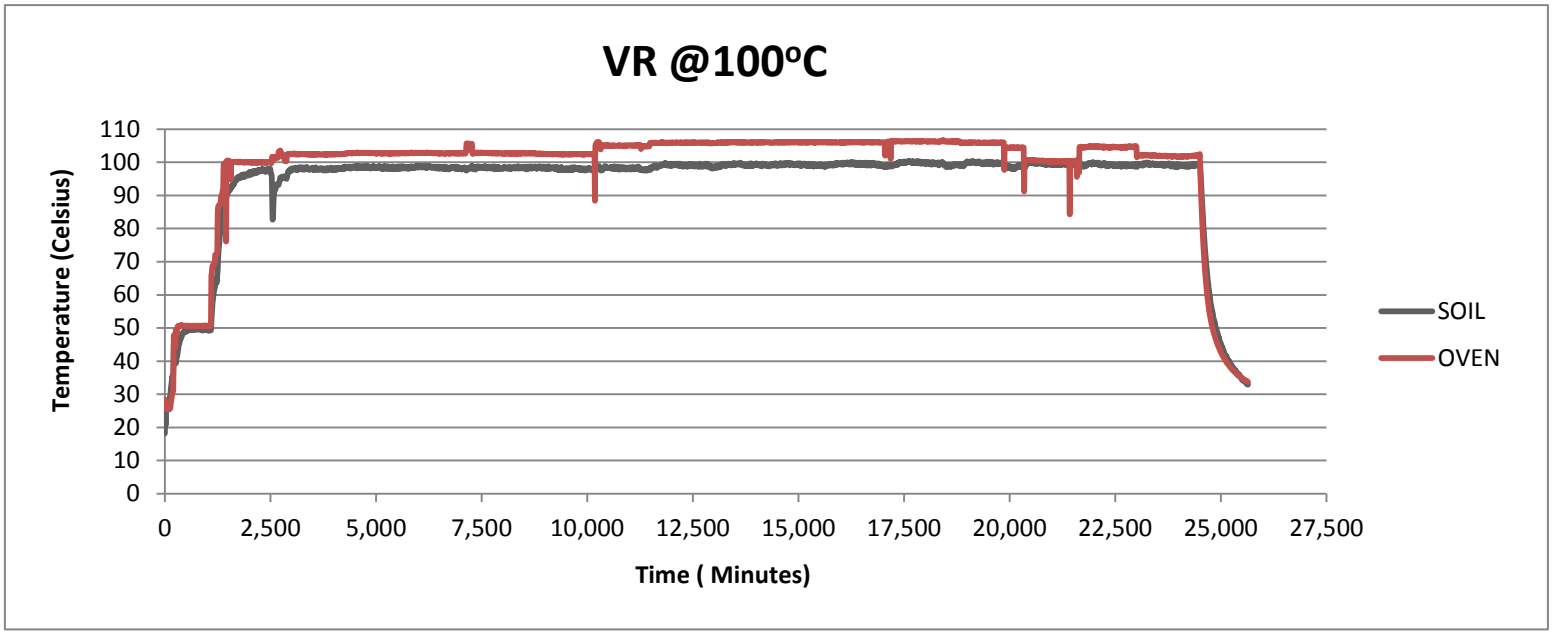
TERRATHERM
BRIDGEWATER
FIGURE 4
VR 100°C

Temperature Monitoring



APPENDIX A

WORK PLAN

TREATABILITY STUDY WORK PLAN

BRIDGEWATER, NEW JERSEY

KEMRON PROJECT #: SE0416

May 14, 2012

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TABLE OF CONTENTS

1.0 INTRODUCTION 1
2.0 TEST SAMPLES 2
2.1. Sample Receipt and Handling 3
2.1.1. Sample Homogenization 3
2.2. Untreated Material Characterization Testing 4
3.0 VICSCOUS RUBBERY MATERIAL PROPERTIES TESTING 5
4.0 THERMAL STABILITY TESTING (WATER BATH HEATING) 6
5.0 ISTD THERMAL TREATMENT SIMULATIONS WITH AIR FLOW 6
(REACTOR TESTING) 6
5.1. Trial Run – Summary of Testing 6
5.2. Full Simulations – Summary of Testing 7
5.3. Testing 9
5.3.1. Treated Soil Testing 10
5.3.2. Air Testing 11
5.3.3. Condensate Testing 1
6.0 ISTD BULK THERMAL TREATMENT 2
6.1. Bulk Homogenization 2
6.2. Bulk Thermal Treatment Testing 3
7.0 DATA MANAGEMENT 5
7.1. Data Recording 6
7.2. Data Entry 6
7.3. Data Entry Review 6
7.4. Data Review 6
7.5. Data Transformation 7
7.6. Data Reduction 7
7.7. Data Analysis 7
7.8. Data Storage and Retrieval 7
8.0 HEALTH AND SAFETY 7
9.0 RESIDUAL WASTE MANAGEMENT 9
10.0 PROJECT REPORTING 9

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TABLES

Table 1 Suggested soil quantities.
Table 2 Untreated Physical Properties Testing
Table 3 Untreated Chemical Analysis
Table 4 Viscous Rubbery Material Physical Property Testing
Table 5 Material Properties Testing for Treated Materials (excluding trial test)
Table 6 Chemical Characterization of Thermally Treated Soils (excluding trial test)
Table 7 Summary of Off-Gas Grab Sampling and Analysis (post-condenser)
Table 8 Summary Shipping, Preservation and Holding time requirements for Off-Gas sampling
Table 9. Condensate Analysis

FIGURES

Figure 1. Soil reactor in the testing furnace
Figure 2. Typical Vapor collection system. The oven to the right contains the soil container.
Figure 3. Bulk Treatment Diagram – Arrangement of Containers in a Single Heating Event.

Figure 4. Photo of Reactors in Oven.

Figure 5. Off-gas System.

ATTACHMENTS

Attachment 1 Testing and Reporting Schedule
Attachment 2 KEMRON Testing SOPs
Attachment 3 Subcontract Chemical Analysis Quality Control Documentation

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1.0 INTRODUCTION

The Bridgewater NJ Treatability Study, as outlined in this Treatability Study Work Plan (TSWP), has been developed based on information provided by TerraTherm, and will be performed to meet the following technical objectives:

1. Determine the effect of heating on the chemical composition of Impoundment 2 materials. Specific test objectives for viscous-rubbery (VR) and hard-crumbly (HC) include:

    a. Evaluate the change in chemical composition of impoundment materials before and after the heating.
    b. Characterize the chemical composition of vapor produced during thermal treatment.
    c. Assess leaching characteristics of impoundment materials following thermal treatment.
    d. Characterize the chemical composition of liquid effluent and condensate resulting from thermal treatment.

2. Determine the effect of heating on the physical properties of impoundment material. Specific test objectives include:
    a. Measure the corresponding change in viscous rubbery and hard crumbly compressive strength before and after thermal treatment.
    b. Determine relative change in hard crumbly porosity resulting from thermal treatment.
    c. Measure the effect of increasing temperature on the specific gravity and viscosity of the viscous rubbery material and the hard crumbly layer should liquefaction of this material occur during sample heating.
    d. Qualitatively assess apparent change in material characteristics before and after heating.
    e. Assess the physical stability of viscous rubbery material with respect to hard crumbly material during heating, and evaluate the potential for homogenization during and after thermal treatment.

3. Heat treat bulk quantities of impoundment materials as directed by CH2M HILL for subsequent evaluation under a solidification/stabilization study conducted by others.

Testing will be completed in three phases of work. The first phase of work will allow for a trial thermal test to determine if the prescribed off-gas and condensate collection protocols are suitable, or if modifications are necessary for the subsequent testing. The following summarizes the Phases of Work:

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- Phase I:
  - Untreated Material Characterization (physical properties and chemical testing) (See Section 2,2)
  - Density and Viscosity of the viscous rubbery material during heating (See Section 3.0)
  - Material Stability Evaluation during heating (See Section 4.0)
  - Thermal Treatment Trial Run Evaluation assessing off-gas and condensate analyses (See Section 5.1)
- Phase II
  - Thermal Treatment Evaluations assessing chemical composition of off-gas and condensate collected (See Section 5.3)
  - Treated Soil Physical Property and Chemical Testing (See Section 5.3)
- Phase III
  - Heat treat bulk quantities of impoundment material (See Section 6.0)

The following sections of this TSWP present information regarding the tasks and protocols that will be followed in completing the treatability study designed to address all project technical objectives. All testing conducted during this study will be performed by KEMRON Environmental Services, Inc, located in Atlanta, Georgia, and analytical testing will be completed by ESC, a NJ certified laboratory, Air Toxics, Galson Labs or CAS Labs as defined later in this document.

2.0 TEST SAMPLES

The following test samples will be collected by CH2MHill and shipped to KEMRON's Atlanta, GA laboratory for testing (1359-A Ellsworth Industrial Blvd, Atlanta, GA 30318 USA). All samples will be forwarded under proper chain of custody.

Materials to be provided for the Treatability study include:

(1) the viscous rubbery (VR) material, and
(2) the hard crumbly (HC) material.

These samples should be representative of heavily impacted site materials. Table 1 outlines the approximate sample quantities of each material that will be supplied to KEMRON.

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Table 1. Suggested test material quantities.

	VR	HC
Minimum Sample Quantities (gallons)	30	30

2.1. Sample Receipt and Handling

Upon receipt by KEMRON, the untreated site materials will be photographed, logged in, and placed into refrigerated secure storage (maintained at a temperature of 4ºC + 2ºC). The remainder of this section presents information on the sampling, handling, preparation and characterization of the untreated materials utilized in the treatability study (Phases I and II). The establishment of the baseline level of constituents of concern completed during the untreated material characterization is important for comparing and determining the effectiveness of the various treatment processes evaluated. The analyses also allow verification that the samples are representative and consistent with conditions anticipated during full-scale activities. All untreated material characterization testing will be completed and evaluated by TerraTherm prior to completing the trial thermal evaluation.

2.1.1. Sample Homogenization

The homogenization procedures stated in this section will be performed on each sample material for all protocols excluding the bulk thermal treatment presented in section 6.0 (refer to section 6.0 for handling procedures for the bulk thermal treatment, Phase III). The homogenization will be completed for test protocols through section 5 unless the nature of the matrix of the site material precludes effective homogenization.

Homogenized is completed prior to any testing to obtain a uniform starting material. All homogenization activities will be conducted on the chilled materials in order to reduce potential volatilization of compounds of concern. KEMRON understands that some volatilization of contaminants may occur during homogenization activities. However, due to the small quantities of site materials that will be utilized for bench-scale treatment simulations, and analytical evaluations, thorough homogenization of the site samples is critical for accurate and meaningful results. As such, KEMRON believes that proper homogenization outweighs the risk of potential contaminant loss during the homogenization activities.

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Homogenization of the site test materials will be conducted by placing the each specific test material into a large mixing bin. The test material will then be gently mixed by hand using stainless steel utensils. Once initially homogenized, KEMRON will remove a small aliquot of the HC sample material for Particle Size Distribution testing in accordance with the American Society of Testing and Materials (ASTM) method D422. After removal of the grain size test sample, the remaining test material will be further homogenized. Any large or agglomerated particles will either be broken into more manageable sizes, or solid particles will be removed from the test material. Note that KEMRON identifies oversized debris as being larger than 0.5 inches in diameter. All material removed from the site test material will be recorded for future information disclosure. Any free liquid present in the site material, at this stage of homogenization, will be re-incorporated in the test material during homogenization, as possible. Following the removal of oversized debris, KEMRON will evenly distribute the test material within the homogenization pan. The test material will then be divided into 16 equal sections, 4 of these sections will then be removed from the pan and placed into a second mixing container and homogenized again. All untreated characterization samples will be taken from these aliquots. Any remaining test material not utilized for untreated material characterization testing will be returned to the appropriate shipping containers and placed into refrigerated storage.

2.2. Untreated Material Characterization Testing

KEMRON will perform characterization testing of the untreated material as outlined in the initial SOW. The following is a summary of physical properties testing to be performed on the untreated site materials:

Table 2. Untreated Physical Properties Testing

	# samples	Method	Samples analyzed	Total # of Tests
Bulk density	2	ASTM D7263	VR, HC	2
Porosity	1	ASTM D7263 Appendix X1[(A)]	HC	1
Water content	2	ASTM D2216	VR, HC	2
Solid Specific Gravity	2	ASTM D854	VR, HC	2
Particle size distribution	1	ASTM D422	HC	1
Triaxial cell data (confined compressive strength)[(B)]	2	ASTM D4767 MOD	VR, HC	2
Unconfined compressive strength	2	ASTM D2166	VR, HC	2
Hydraulic Conductivity[(C)]	1	ASTM 5084	HC	1

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(A) = calculated per method ASTM D7263 Appendix X1 using data from bulk density, water content, and solid specific gravity testing.
(B) = tested at one pressure, specifically 3 psi +/- 1 psi for the VR material and 5 psi +/- 1 psi for the HC material
(C) = consolidated at 5 psi

In addition to the physical properties testing, aliquots of each untreated material will be forwarded to ESC for chemical characterization as specified in Table 3.

Table 3. Untreated Chemical Analysis.

Contaminants Tested*	# samples	Method	# analysis/ sample	Samples analyzed	Total # of analyses
Total VOC + TICs + thiophenes + napthalene(A)	2	EPA 8260B	3	VR, HC	6
Total SVOC + TICs	2	EPA 8270C	3	VR, HC	6
Total TAL Metals	2	EPA 6010	3	VR, HC	6
Headspace VOC analysis	2	See Table 6	See Table 6	VR, HC	See Table 6
Total Organic Carbon	2	LYDKHN	1	VR, HC	2
Soil pH(B)	2	EPA 9045	3	VR, HC	6

(A) = thiophenes included using a 1-point calibration and same for naphthalene if not already included in calibration
(B) = sample slurry may require longer slurry durations than prescribed in the method, or sample may need to be crushed prior to slurry generation

All ESC laboratory standard operating procedures, precision and accuracy, and method detection limits are presented in Attachment 4.

3.0 VICSCOUS RUBBERY MATERIAL PROPERTIES TESTING

Viscosity and density of the VR material will be tested as a function of temperature as outlined in Table 4 (See Attachment 2 for the testing standard operating procedure). Visual observations and photographs will be collected to document the testing and video recording, as appropriate. Bulk (apparent) specific gravity will be provided in addition to the density. If the hard and crumbly material liquefies during heating as observed from later phases of work (i.e., Section 4 Thermal Stability Testing), the hard and crumbly material will also be tested for the density and viscosity as stated in Table 4.

Table 4. Viscous Rubbery Material Physical Property Testing.

Parameter	Method
Density: 30, 50, 70 90°C	ASTM D 7263 MOD
Viscosity: 30, 50, 70 90°C	ATG-SOP-039

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4.0 THERMAL STABILITY TESTING (WATER BATH HEATING)

The HC material will be placed beneath the VR material in a viewable (i.e., clear) column suitable for heating in a water bath. Four of these columns will be prepared. Each column will be placed into a water bath at room temperature heated to the prescribed temperature (30, 50, 70 or 90°C) and held at the prescribed temperature for up to 24 hours or longer, as deemed appropriate by the laboratory personnel. Following removal from the water bath, the material will be extruded from the column to observe more closely any integration of the phases during heating.

Temperatures will be monitored during heating at 5-minute intervals (note this is a higher frequency of data collection since the changes to the material in the column can be rapid). At each 10°C increase in temperature, off gas concentrations will be measured by an FID. After reaching the target temperature, additional FID readings will be collected approximately every hour for 4 to 8 hours. Throughout the process, observations of the material including any off-gassing will be recorded. Photographs will be included in the documentation as well as video, as appropriate. See Attachment 2 for the standard operating procedure.

Note if liquefaction of the HC material occurs, viscosity/density will be performed at the temperature of liquefaction (see Section 3). In this instance, bulk specific gravity will also be performed.

5.0 ISTD THERMAL TREATMENT SIMULATIONS WITH AIR FLOW (REACTOR TESTING)

All standard operating procedures for testing are found in Attachments 2 – 4. Analytical laboratory method detection limits and analyte lists are included in Attachment 5.

5.1. Trial Run – Summary of Testing

Untreated material characterization results should be approved by TerraTherm prior to moving forward with testing in Section 5.

A trial run of the VR will be completed prior to full simulations. The testing will include heating the VR material in a reactor to 100°C and holding at 100°C for 2 days. Off-gas testing and condensate testing will occur. See Section 5.3.

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The trial test will help assess the following tasks to make any necessary modifications for the 7-day tests:

- Use of the tedlar bag collection after the condenser;
- FID determination of off-gas collected in the tedlar bags and appropriateness of detector for mix of VOCs present, i.e, will the data be useful or will alternative detection methods be necessary;
- Use of summa canisters after the condenser, specifically, any difficulty with residue build up at the regulator, understanding the frequency of summa canister exchange (i.e., can we increase / decrease collection time or skip a day of collection and still get useful results?);
- Is it likely testing may extend beyond 7 days; and, if so, should additional summa canisters, cartridges, and tedlar bags be available?
- Analysis of collected samples to test for interferences, detection levels, dilution required, sample volumes required, and related laboratory procedures for all off-gas and condensate collection and analysis methods.

Following the Trial test, a summary of findings will be generated by Kemron and reported along with untreated material characterization, the thermal stability testing and the viscosity and density testing (see Section 10).

5.2. Full Simulations – Summary of Testing

The VR and VC will each be oven heated individually to both 90°C and 100°C and held for 7 days with an air-flow of approximately 10 milliliters per minute (ml/min) passing over the test material to aid in the removal of off-gases from the system. Each test will provide information regarding potential contaminants present in condensed off-gas vapors (i.e., condensate) released from testing, potential contaminants present in non-condensed vapors, and physical and chemical characteristics of each treated test material.

Testing will be performed using a stainless steel box reactor to contain the test sample being treated and a suitable over for heating to 100°C. A stainless steel line will be attached to a compression fitting on the lid of the reactor to carry pressurized breathing quality air into the reactor. The air flow will be regulated to approximately 10 ml/min using an air manometer. A Type “K” thermocouple will be inserted through a second compression fitting on the reactor lid and will be adjusted so that the tip of the thermocouple resides in the middle of the test material mass. A second thermocouple will be placed within the air space of the oven at a location near the reactor to record the furnace temperature during the testing. Finally, a stainless steel off-gas line will be connected to a third fitting on

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the reactor lid to carry off-gas vapors from the rector during testing. The off-gas line will then be connected to a coldwater condenser and subsequent off-gas sampling media. Figure 1 shown below is a typical example of a box reactor with connected air lines and thermocouple similar what will be utilized in this study.

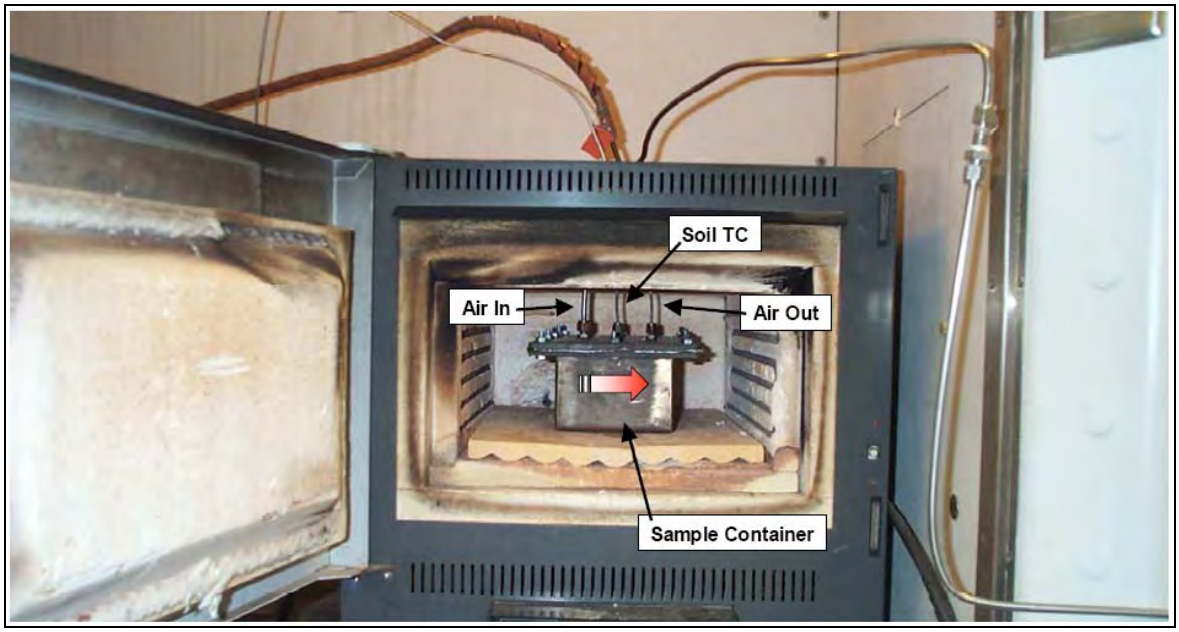

Figure 1. Soil reactor in the testing furnace

The off-gas system will consist of stainless steel tubing to carry vapors from the reactor to a cold water condenser. The off-gas tubing will be insulated or heated using electrical heating tape to reduce condensing of gases within the tubing. Vapors will be condensed by a cold water Graham condenser. Condensed vapors will be collected in a glass vacuum flask placed in a cool water bath to minimize any evaporation of liquids. Throughout the treatment process, KEMRON will record the test material and ambient oven temperatures at 10 minute intervals using a Dual Thermocouple Datalogger. The photograph in Figure 2 below is an example of the treatment system including the off-gas collection system that will be used in these tests.

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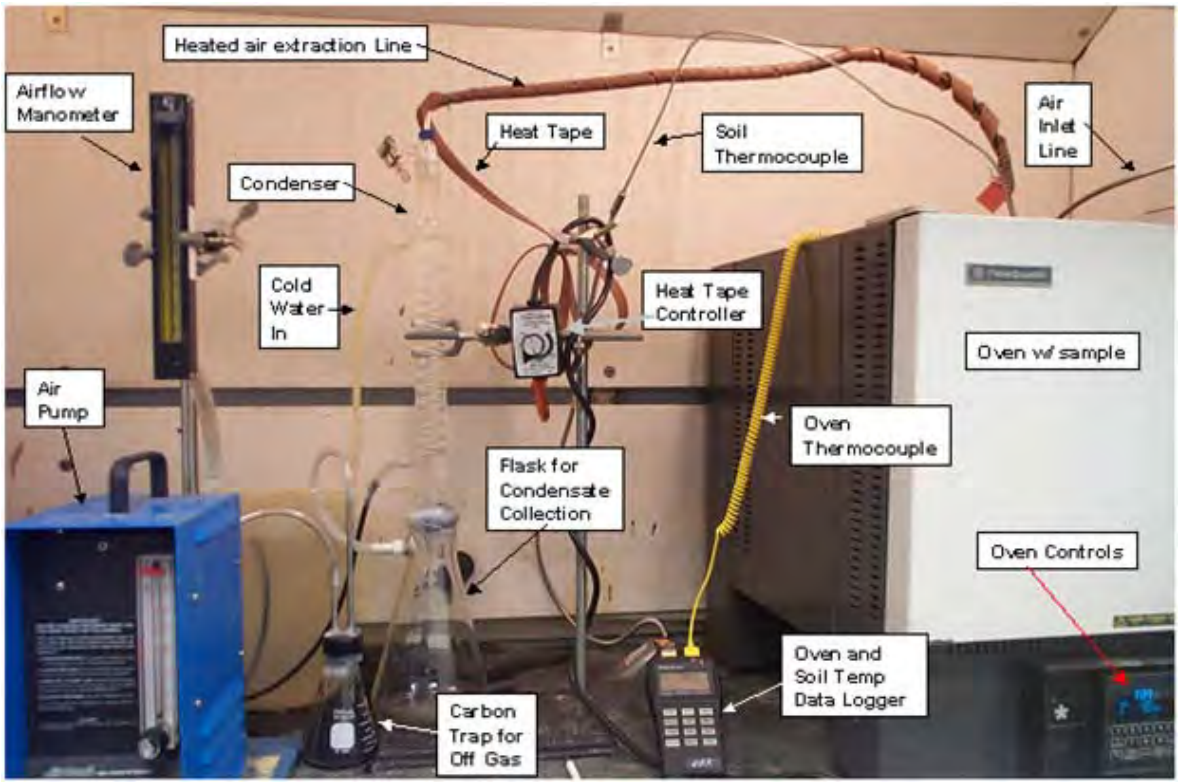

Figure 2.Typical Vapor collection system. The oven to the right contains the soil container.

5.3. Testing

Prior to initiating the thermal treatment simulations, each untreated site material will again be homogenized. The additional homogenization will be performed on the chilled site materials, and will be conducted in a similar manner to that previously outlined. This homogenization activity will be conducted to re-incorporate any liquids which had separated during storage, and to further ensure uniform samples for testing. Approximately 2,500 grams of each untreated material will be utilized for the thermal simulations.

KEMRON will record the weight of the empty reactor box, including the lid, carbon gasket, and the 12 nuts and bolts utilized to secure the lid to the reactor body. The test material will be placed into the box reactor and the surface of the test material will smoothed into a level surface, to the extent possible. The height of the test material within the reactor will be recorded. The reactor will then be assembled and the weight will be recorded.

Throughout each test, KEMRON will also collect various air samples for analyses. These air samples will be collected at a point located in the off-gas

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system after the condensate collection flask. KEMRON will utilize a vacuum flask for the condensate collection flask. The condensed liquids will enter through the top of the flask and any subsequent non-condensed off-gases will be exited through the vacuum nipple located on the side of the flask neck.

5.3.1. Treated Soil Testing

At the conclusion of each thermal evaluation, the soil reactor will be removed from the oven and chilled to 4°C prior to analytical sampling. After being chilled, the weight of the reactor will be recorded. Photographs of the treated material will be taken and the height of the treated test material within the reactor will be measured. A comparison between the initial height of the untreated material within the reactor and the resulting height of the treated material will provide an estimation regarding potential slump or heave of the material during full-scale activities. The test material will then be removed, homogenized, and photographed. Specific notes should be taken as to the degree that the treated materials are able to be homogenized. Photographs and, if appropriate, videos of the treatment materials should be taken.

Excluding the trail test, aliquots of the treated materials will then be sampled for both physical property testing and chemical testing according to Tables 5 and 6, respectively. Note that triplicate analyses are included for VOC, SVOC and metals, in order to reduce the uncertainty related to sample heterogeneity. Physical Property testing will be completed by Kemron in Atlanta GA. The chemical analyses will be performed by ECS Laboratories.

Note that off-gas air samples and condensate samples may be forwarded to the appropriate analytical laboratory to meet sample holding time requirements. These analytical shipments may occur before the thermal simulation has been concluded.

The SPLP leaching tests will provide data to evaluate concentrations of contaminants leaching into water that would come in contact with the in-situ treated materials. TCLP leaching analysis will provide data to evaluate concentrations of contaminants that would leach if in a landfill.

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Table 5. Material Properties Testing for Treated Materials (excluding trial test).

	Method	# of Thermal Tests (90°C, 100°C)	Samples analyzed	Total # of Tests
Bulk density	ASTM D7263	2	VR, HC	4
Porosity	ASTM D7263 Appendix X1 (A)	2	VR (B), HC	4
Water content	ASTM D2216	2	VR, HC	4
Solid Specific Gravity	ASTM D854	2	VR, HC	4
Particle size distribution	ASTM D422	2	HC (B)	4
Triaxial cell data (confined compressive strength)(C)	ASTM D4767 MOD	2	VR, HC	4
Unconfined compressive strength	ASTM D2166	2	VR, HC	4
Hydraulic Conductivity(D)	ASTM D5084	2	VR, HC	4
Reheating treated sample	See Footnote (E)	100°C only	VR, HC	2

(A) = calculated per method ASTM D7263 Appendix X1, using data from bulk density, water content, and solid specific gravity testing.
(B) = treated VR material will be included if matrix appears conducive to testing
(C) = tested at 1 pressure, specifically 3psi +/- 1 psi for the VR material and 5psi +/- 1 psi for the HC material
(D) = consolidated at 5 psi
(E) = Procedure: (1) Collect cooled treated sample and place in a test tube or similar device with white clear glass beads below the sample. (2) Heat the test tube in a water bath to see if the solid reliquifies during reheating. (3) Observe any movement of the material into the glass beads below. (4) Document with pictures and video if necessary.

Table 6. Chemical Characterization of Thermally Treated Soils (excluding trial test).

	Method	# of Thermal Tests (90°C, 100°C)	Samples analyzed	# analysis/ sample	Total # of Analyses
Total VOC + TICs + thiophenes + napthalene(A)	EPA 8260B	2	VR, HC	3	12
Total SVOC + TICs	EPA 8270	2	VR, HC	3	12
Total TAL Metals	EPA 6010	2	VR, HC	3	12
TCLP VOCs + TICs + thiophenes + napthalene(A)	EPA 1311/8260B	2	VR, HC	1	4
TCLP SVOCs + TICs	EPA 1311/8270C	2	VR, HC	1	4
TCLP TAL Metals	EAP 1311/6010	2	VR, HC	1	4
SPLP VOCs + TICs + thiophenes + napthalene(A)	EPA 1312/8260B	2	VR, HC	1	4
SPLP SVOCs + TICs	EPA 1312/8260B	2	VR, HC	1	4
SPLP TAL Metals	EPA 1312/6010	2	VR, HC	1	4
Headspace VOC analysis	See Table 7	2	VR, HC	See Table 7	See Table 7
Total organic carbon	LYDKHN	2	VR, HC	1	4
Soil pH(B)	EPA 9045	2	VR, HC	3	12

(A) = thiophenes included using a 1-point calibration and the same for naphthalene if not already included in calibration
(B) = sample slurry may require longer slurry durations than prescribed in the method, or sample may need to be crushed prior to slurry generation

5.3.2. Air Testing

Off-gas analyses to be conducted on each treatment include:

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- FID/Direct Read Instrument: The off-gas is collected in one Tedlar bag (if possible) with suitable volumes to analyze for bulk VOCs, H_2S, and SO_2. This testing will allow for an understanding of the bulk mass removal versus temperature.

- TO-15 Analysis: Canisters and regulators are obtained from Air Toxics to continuously collect approximately 12 hours of off-gas produced from the thermal tests. This includes a 6-Liter liter Summa Canister with 7.5 ml/minute flow controller. TO-15 analyses will also be completed by collection in Tedlar bags.

- Aldehydes Profile Analysis: Testing is completed per NIOSH method 2016 modified at Galson Labs. Sample collection is completed using a cartridge supplied by Galson Labs. Collection rates will be those used for the treatability testing, i.e., 10ml/min. The recommended minimum volume for testing is 1L. Total ug are reported unless the volume collected is provided to Galson Labs. Kemron will calculate the volume of off-gas collected for each sample collection.

- Inorganic Acid Gas Profile Analysis: Testing is completed per NIOSH method 7903 modified at Galson Labs. Sample collection is completed using a cartridge and pump supplied by Galson Labs. Collection rates will be those used for the treatability testing, i.e., 10ml/min. Recommend minimum volume collected is 3L. Total ug are reported unless the volume collected is provided to Galson Labs. Kemron will be required to calculate the volume of off-gas collected for each sample collection.

- Sulfur Reducing Compounds Analysis: Testing is completed per ASTM method 5504 at Columbia Analytical Services (CAS) Labs. The off-gas is collected in one tedlar bag made by Zefon or provided by CAS Labs. The minimum volume needed for testing is 25 ml.

Table 7 summarizes the off-gas sampling and analyses and frequencies. Table 8 summarizes the shipping, preservation and holding time requirements. The flow rates and durations of collection will be recorded for each air sampling event.

Because of the low air-flow rate to be utilized in these tests, and due to the fact that the splitting of the air column exiting the condensate collection flask is problematic, the off-gas sampling will be conducted progressively. The trial test

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will be analyzed first to determine the overall air sampling protocols for the four remaining thermal tests.

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Table 7. Summary of Off-Gas Grab Sampling and Analysis (post-condenser)

		Ambient (T_o)	Sample Heating [A] (°C)				Target Treatment Temp (90 or 100°C) (Day)							Ambient (T_f)			
Analysis Type	**Target**		**30**	**50**	**70**	**90**	**1**	**2**	**3**	**4**	**5**	**6**	**7**		**Total**	**Collection Method**	**Laboratory**
PHASE I of TESTING: Trial Run (VR Material @ 100°C)																	
TO-15	VOCs + naphthalene[B][C]	1[D]													1	TB	Air Toxics
TO-15	VOCs + naphthalene[B][C]						1	1							2	SC	Air Toxics
Tedlar Bag	Total VOC, H_2S, SO_2	1[E]	1	1	1	1	1	1							7	TB	Kemron
NIOSH 2016M	Aldehydes	1[E]					1	1							3	C	Galson Labs
NIOSH 7903M	Inorganic Acid Gases	1[E]					1	1							3	C	Galson Labs
ASTM 5504	Reduced Sulfur Analysis	1[E]					1	1							3	TB	CAS Labs
PHASE II of TESTING: Thermal Treatment Simulation (VR and HC Material @ 90°C)																	
TO-15	VOCs + naphthalene[B][C]													2[D]	2	TB	Air Toxics
TO-15	VOCs + naphthalene[B][C]						2		2			2			6	SC	Air Toxics
Tedlar Bag	Total VOC, H_2S, SO_2	2[E]	2	2	2	2	2	2	2	2	2	2	2	2[E]	26	TB	Kemron
NIOSH 2016M	Aldehydes						2		2			2		2[E]	8	C	Galson Labs
NIOSH 7903M	Inorganic Acid Gases						2		2			2		2[E]	8	C	Galson Labs
ASTM 5504	Reduced Sulfur Analysis						2		2			2		2[E]	8	TB	CAS Labs
PHASE II of TESTING: Thermal Treatment Simulation (VR and HC Material @ 100°C)																	
TO-15	VOCs + naphthalene[B][C]	2[D]												2[D]	4	TB	Air Toxics
TO-15	VOCs + naphthalene[B][C]						2		2			2			6	SC	Air Toxics
Tedlar Bag	Total VOC, H_2S, SO_2	2[E]	2	2	2	2	2	2	2	2	2	2	2	2[E]	26	TB	Kemron
NIOSH 2016M	Aldehydes	2[E]					2		2			2		2[E]	10	C	Galson Labs
NIOSH 7903M	Inorganic Acid Gases	2[E]					2		2			2		2[E]	10	C	Galson Labs
ASTM 5504	Reduced Sulfur Analysis	2[E]					2		2			2		2[E]	10	TB	CAS Labs

SC = summa canister TB = Tedlar Bag C = Cartridge VR = Viscous and rubbery HC = Hard and crumbly T_o = starting ambient temperature T_f = concluding ambient temperature

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(A) = hold treatment at each of these temperatures until all off-gas testing is completed
(B) = assume approximately a 12 hour collection time
(C) = include a 1-point calibration for naphthalene
(D) = samples will be developed by placing an aliquot of the test soil into a 40 ml vial with a septum cap. At a time to be specified, Air Toxics LTD laboratory will remove the headspace air via a needle inserted into the vial septum. The air sample will then be directly injected into the analytical instrument.
(E) = samples will be collected while the sample is in the test reactor and at ambient temperatures either before heating begins (To) or after the treated sample cools down to ambient temperatures (Tf)

Table 8. Summary Shipping, Preservation and Holding time requirements for Off-Gas sampling

Analysis Type	Target	Collection Method	Laboratory	Sample Holding Time	Shipping Container	Overnight shipping required?	Shipping Preservative	Lab notification prior to submittal required
TO-15	VOCs + naphthalene(B)(C)	TB	Air Toxics	3 day	Standard Fedex Box	Yes	No ice	Y
TO-15	VOCs + naphthalene(B)(C)	SC	Air Toxics	30 days	LWC	No	No ice	Y
Direct read	Total VOC, H_2S, SO_2	TB	Kemron	N/A	N/A	N/A	N/A	Y
NIOSH 2016M	Aldehydes	C	Galson Labs	35 days @ 5C	LWC	No	Ice required	Y
NIOSH 7903M	Inorganic Acid Gases	C	Galson Labs	21 days @ RT	LWC	No	No ice	Y
ASTM 5504	Reduced Sulfur Analysis	TB	CAS Labs	24 hours	Standard Fedex Box	Yes	No ice	Y

SC = summa canister TB = Tedlar Bag C = Cartridge LWC = light-weight container N/A = not applicable

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5.3.3. Condensate Testing

The effluent liquids from each of the tests will be collected in separate containers/condenser flasks corresponding to the heating intervals ending at the following temperatures: 30, 50, 70 and 90°C; and each day of the prescribed heating at 90°C or 100°C. The specific analyses to be completed are presented in the "Interval Testing" section of Table 9. (*Note: clean flask/collection device should be used for each interval to prevent carry over between collection intervals*). Additional testing will be completed by combining or reconstituting the entire condensate volume. The specific analyses to be completed are presented in the "Reconstituted Sample Testing" section of Table 9.

When collecting the condensates, KEMRON will remove the collected condensate from the treatment system as prescribed above, record the weight of the condensate and visual observations regarding clarity, color and the number of phases. Photos and videos, if appropriate, should be taken of the material. The condensates will be placed into refrigerated storage and combined with additional condensate collected throughout each individual test. The condensate analysis will be collected in appropriate laboratory prepared containers and sent out for analytical testing according to Table 9.

Note that in the event that insufficient quantities of condensate are collected to perform all of the above outlined analyses, TerraTherm may be required to select specific candidate analyses based on the available volume of condensate.

Table 9. Condensate Testing/Protocols for Interval and Reconstituted Sampling and Analysis.

	# measurements			
	Phase I	**Phase II**	**Phase II**	
Interval Testing	**trail run – 100°C (1 sample)**	**90°C test (2 samples)**	**100°C test (2 samples)**	**Method**
Weight of condensate collected	6	20 total	22 total	Balance
Observations recorded (layering, color, clarity, odor, presence of any vapors above the condensate, etc. and photographs/video)	6	20 total	22 total	Observation, digital photography
Estimated percentage by volume/weight of any layering	6	20 total	22 total	Observation
pH of the aqueous condensate layer[(A)]	6	20 total	22 total	pH Electrode, EPA 9040
pH of the non-aqueous condensate layer[(A)]	6	20 total	22 total	pH Electrode, EPA 9040
Reconstituted Sample Testing	**trail run – 100°C**	**90°C test**	**100°C test**	**Method**
Weight of condensate collected	1	2 total	2 total	Balance

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	# measurements			
	Phase I	**Phase II**	**Phase II**	
Observations recorded (layering, color, clarity, odor, presence of any vapors above the condensate, etc. and photographs/video)	1	2 total	2 total	Observation, digital photography
Quantify percentage by weight of any layering	1	2 total	2 total	Balance
pH of the aqueous condensate layer(A) (triplicate)	3	6 total	6 total	pH Electrode, EPA 9040
pH of the non-aqueous condensate layer(A) (triplicate)	3	6 total	6 total	pH Electrode, EPA 9040
Total VOC + TICs + thiophenes + napthalene(A)(B)	1	2 total	2 total	EPA 8260
Total SVOCs + TICs(A)	1	2 total	2 total	EPA 8270

(A) = sample quantities may not allow for analysis or may require modifications to the procedure.
(B) = thiophenes included using a 1-point calibration and same for naphthalene if not already included in calibration

6.0 PHASE III - ISTD BULK THERMAL TREATMENT

Subsequent testing will be completed by CH2MHill using thermally treated soils. Large quantities of treated VR and HC materials are needed, i.e., 25 gallons for each material, and will be heated under similar conditions as the heating protocols used for the treatability tests stated previously in this document. Following heating, samples will be shipped to a location as provided by CH2MHill.

6.1. Material Handling

Material in each container will be handled to the minimum extent possible. It is expected that quantities are sufficient for heating (i.e., 4 – 4.5 gallons/container); however, should quantities be more or less than appropriate for treatment, the bulk quantities will be adjusted. The Teflon liner containing site material will be transferred to a steel container in preparation for heating. Each steel container will be secured with a lid designed with a clamping apparatus to remain closed during heating.

6.2. Equipment Design

It is expected that four steel containers of site material will be heated simultaneously as depicted in Figure 3. The four treatment containers (reactors) will each be fitted with three Swagelok type ports, one for the connection of a 0.25 inch line for the removal of off-gases to the off-gas collection system, one 0.25 inch line for the connection of a pressure relief system (in the event of a pressurization of the treatment reactors), and one port for the insertion of a temperature thermocouple. The four off-gas lines, one from each reactor, will be combined using a manifold system which will be connected to a 0.5 inch master

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off-gas line, and the four pressure relief lines will also be connected via a manifold and the master line will then be inserted into a water column which will allow KEMRON to monitor pressure fluctuations in the system. Additionally, a pressure transducer connected to the master off-gas line will also provide pressure information which will aid in KEMRON's safety monitoring of the testing. The laboratory and area around the treatment system will be monitored for H_2S releases using a multiRAE gas detector at two locations which will be operated continuously during testing. The off-gases from the master off-gas line will be passed through a cold water condenser, and any non-condensable gases will then pass through a 1 Normal (N) sodium hydroxide impinger, and finally be passed through an activated carbon scrubber prior to being released into the laboratory fume hood. The entire oven will be secured such with a clamp to ensure door remains closed during heating. The entire system will be leak checked prior to heating.

6.3. Bulk Thermal Treatment Testing

Heating will occur for 7 days at 100°C (see sections 5.2). Temperatures will be monitored at the center of the volume of soil during heating. Pictures will document materials before and after treatment. Sample moisture will be determined before and after heating as a measure of comparison to Phases II of testing. Off-gas vapors from the entire system, i.e., master off-gas line will be monitored daily for total VOCs using a handheld instrument. This is a very important monitoring step, as extending the heating duration may be required if the VOCs are not reducing significantly before the 7-day heating duration is completed. Following heating, each container will be allowed to cool at which time the contents of each individual container will be homogenized to the extent possible. At this time, each container will be packaged and shipped to the destination as prescribed by CH2MHill.

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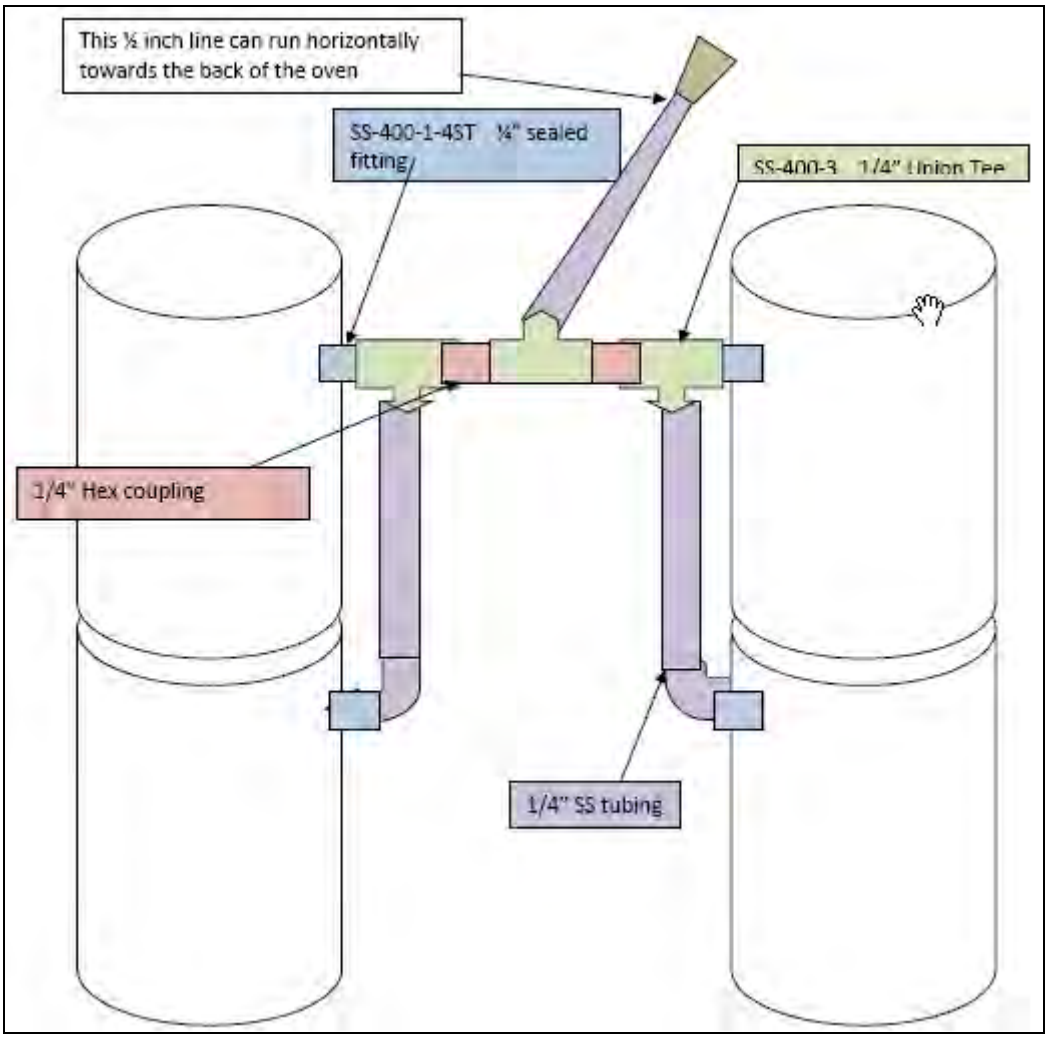

Figure 3.Bulk Treatment Diagram– Arrangement of Containers in a Single Heating Event.

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Figure 4.Photo of Reactors in Oven

Figure 5. Off-gas System

7.0 DATA MANAGEMENT

A large quantity of data will be generated during the treatability study. KEMRON maintains a data management system that will meet three basic objectives, which include 1) serving as a readily available and organized data source, 2) to provide easy retrieval of data and other pertinent information, and 3) to develop a comprehensive database of information that will show the effectiveness of treatment for the site materials.

KEMRON maintains a multi-file system for all treatability studies which includes a project file, a data file and project computer files. The project file is maintained by the Project Manager. This file contains all administrative information, final project data, deliverables associated with individual analyses, and all reports and correspondences. The data files are maintained by the appropriate task managers. These files contain the current treatability data sheets and all information pertinent to conducting each analysis. All data is also stored in the appropriate computer files as part of KEMRON's standard operating procedures.

In addition, KEMRON maintains all records necessary for maintaining compliance as a small hazardous waste generator. The following information is maintained at KEMRON and reported as needed to the EPA per 40 CFR 261.4:

1. The name, address and EPA identification number of the generator or sample collector of the waste sample;

2. The date the shipment was received by KEMRON;

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3. The quantity of waste received;

4. The date the treatability study was initiated and the amount of as-received waste used;

5. The date the treatability study was completed; and

6. The date any unused materials or study residuals were returned to the site for appropriate action.

Quality data is the foundation of a successful treatability study. How the data is handled is also critical to the overall quality of a project. The data management process at KEMRON includes the following steps: data recording, technical review, data entry and data entry review, data transformation, data reduction, data analysis, data storage and retrieval.

7.1. Data Recording

Any data collected in the treatability or geotechnical testing laboratories is recorded. The recording of data occurs with indelible ink in a permanent project record, or electronically in a specific project data folder. Likewise the subcontracted analytical laboratory also records data in permanent project records in the laboratory.

7.2. Data Entry

All data collected in the treatability or geotechnical laboratories and any data received from an analytical laboratory is entered into project tables. If electronic data deliverables (EDD) are received from the laboratory, the data entry entails data transfer from the EDD to the project tables.

7.3. Data Entry Review

All data entry events are verified independently from the data entry process.

7.4. Data Review

This step is an objective review of the geotechnical, treatability and analytical data. This step;

a. compares the data collected with historical data to determine if there is a consistent trend,
b. compares data with points in a treatment group to see if there is consistency among the values,
c. for analytical data, a review of the quality control (QC) associated with the analysis is completed.

The goal of the data validation is to determine if all data points are to be utilized for the given project or if some need qualifying for use.

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7.5. Data Transformation

Any data collected that needs to be converted from the data collected into a useful data point automatically occurs in the project data table. Formulas are present in the table that have been verified and found appropriate for use.

7.6. Data Reduction

Any data collected or data transformed that consists of multiple data points that are then further manipulated to provide one number to work with (average, standard deviation, etc.) All data reductions automatically occur in the project data table. Formulas are present in the table that have been verified and found appropriate for use.

7.7. Data Analysis

The data collected and/or transformed is evaluated to determine if the treatability study objectives are met. The data analysis is specified in Section 4.0. Following data analysis, the data is used as the basis for conclusions and recommendations that are the final product of the treatability study report. Data analysis will be completed at various stages of the project. Following the data analysis of the screening stage candidate mixtures will be reviewed for their ability to achieve the site treatment criteria and modified if necessary.

7.8. Data Storage and Retrieval

KEMRON will maintain records for a period of 5 years following the completion of the treatability study. These records will be available for inspection or review by TerraTherm and/or any appointed representative

The interpretation of data from the study will generally be performed as specified in the *Guide for Conducting Treatability Studies Under CERCLA*, (EPA/540/R-92/071a, October 1992). Ultimately, data will be expected to provide effective evaluation of the treatment technology with regards to potential full-scale application.

The data is compiled from each testing phase and summarized in tabular and/or graphical form. As suggested by the EPA document, independent variables, which are controlled by the experimenter, and dependent variables, which fluctuate as a result of changing the independent variables, are plotted in tabular form such that multiple variables can be evaluated concurrently. Furthermore, by graphically reporting data, KEMRON can more easily evaluate the varying technologies to determine data objectives.

8.0 HEALTH AND SAFETY

A site-specific Health and Safety Plan (HSP) is required for all hazardous waste operations involving employee exposure to safety and/or health hazards. Since

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KEMRON will not be performing any on-site operations, KEMRON has not developed a site-specific HSP. Rather, all laboratory operations performed using the site materials will fall under KEMRON's Corporate Health and Safety Plan (HASP). The following sections present a brief overview of the health and safety considerations associated with this treatability study.

The health and safety of all laboratory personnel is a primary concern during the testing and analysis of potentially hazardous wastes. The Bridgewater Enhanced Treatability Study will involve personnel from KEMRON's laboratory located in Atlanta, Georgia. KEMRON's health and safety in this laboratory is monitored and enforced in specific procedures which are addressed in KEMRON's *Chemical Hygiene Plan for Laboratory Applications* (CHP). This CHP describes specific responsibilities, training requirements, equipment, personal protective equipment, laboratory operating procedures, emergency procedures and medical monitoring. Its flexibility allows unanticipated project-specific problems to be addressed while assuring adequate and suitable worker protection. The CHP, implemented by KEMRON, provides personnel with protection from the health hazards presented by hazardous chemicals and meets the requirements of 29 CFR 1910.1450. It also outlines the policies to manage and monitor possible employee exposure to ensure the levels are below the limits prescribed in 29 CFR 1910.1450 Subpart Z.

Supervisors, instrument operators and technicians engaged in laboratory operations must satisfy the training requirements in 29 CFR 1910.120 (e) and must participate in a medical surveillance program, as described in 29 CFR 1910.120 (f). Laboratory personnel must be trained with regard to container labeling and Material Safety Data Sheets (MSDS) in accordance with the OSHA hazard communication standard in 29 CFR 1910.1200. Before any treatability studies are initiated, the Laboratory Safety Officer will conduct a briefing to ensure that all staff associated with this project is apprised of the CHP. Periodic inspections during the course of the study are conducted to determine compliance with, and the effectiveness of, the CHP.

The safety and health hazards associated with bench-scale studies are relatively minor because of the small volumes of waste that are subjected to testing. In general, KEMRON adheres closely to documented and proven laboratory SOPs and industry safe practices.

The primary focus on laboratory safety is the reduction of exposure to hazardous substances. Specific hazards which may be encountered during treatability studies include the following:

1. Chemical exposure (inhalation, absorption or ingestion of contaminated soils, sludge or liquids).

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2. Fires, explosions or spills.

3. Generation of toxic or asphyxiating gases.

4. Physical hazards such as sharp objects or slippery surfaces.

5. Electrical hazards such as high-voltage equipment.

9.0 RESIDUAL WASTE MANAGEMENT

At the completion of testing, all unused or residual site testing material will be disposed of in accordance with EPA regulatory requirements. KEMRON is characterized as a Small Quantity Waste Generator and is licensed as such. All analytical and physical residuals will also be disposed of in accordance with KEMRON's standard operating procedures or those of our subcontract laboratories.

10.0 PROJECT REPORTING

Throughout performance of the bench-scale treatability study, KEMRON will provide TerraTherm with interim communications summarizing the results of testing available and outlining future testing options. Specially, Phases I and II of work as outlined in Section 1 of this document will be reported sequentially upon completion of the work prescribed.

See Attachment 1 for the testing schedule.

Upon completion of the entire study, KEMRON will develop a detailed bench-scale treatability study report that will describe and/or summarize the following: (1) procedures; (2) quality assurance (QA)/QC steps; (3) test results; (4) discussion of results; and (5) conclusion. The report will be organized in a format developed by TerraTherm and KEMRON to present the data in a relevant user friendly format.

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ATTACHMENT 1

Testing and Reporting Schedule

Benchmark Completion Dates:

(1) Laboratory Work plan - TBD

- (1.1) Untreatd Material Characterization
- (1.2) Thermal Stability Assessment
- (1.3) Physical Property Assessment
- (1.4) Thermal Treatment - Trial Run - TBD

(2.0) Thermal Treatment

- (2.1) Treatment Residual Stability Analysis
- (2.2) Treated Material Characterization

(3.0) Bulk Material Thermal Treatment. – May 14, 2012

(4.0) Reporting

All testing will be completed 14 weeks following receiving a notice to proceed by CH2MHill. Note that TerraTherm will have 2 additional weeks to prepare a deliverable for the project.

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ATTACHMENT 2

Kemron Testing SOPs

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SOP LIST

	SOP Title	Method	Lab	Notes	Precision & Accuracy and MDLs
1	Sample Receiving	In-house	KEMRON		
2	Sample Homogenization	In-house	KEMRON	Untreated and treated. Important: Specific notes should be taken as to the degree that the treated materials are able to be homogenized as well as photo and, if appropriate, video coverage of the treatment materials.	
3	Bulk density	ASTM D7263	KEMRON		
4	Porosity	Calculated[(A)]	KEMRON		
5	Water content	ASTM D2216	KEMRON		
6	Solid Specific Gravity	ASTM D854	KEMRON		
7	Particle size distribution	ASTM D422	KEMRON		
8	Triaxial cell data (confined compressive strength)	ASTM D4767 MOD	KEMRON	tested at 1 pressure, specifically 3psi +/- 1 psi for the VR material and 5psi +/- 1 psi for the HC material	
9	Unconfined compressive strength	ASTM D2166	KEMRON		
10	Hydraulic Conductivity	ASTM 5084	KEMRON	consolidated at 5 psi	
11	Density @ 30, 50, 70, 90°C	ASTM D1298/1481	KEMRON		
12	Vicosity @ 30, 50, 70, 90°C	ASTM D445	KEMRON		
13	Total VOC + TICs + thiophenes + napthalene	EPA 8260B		thiophenes included using a 1-point calibration and same for naphthalene if not already included in calibration	Obtain
14	Total SVOC + TICs	EPA 8270C			Obtain
15	Total TAL Metals	EPA 6010			Obtain
16	TCLP	EPA 1311			Obtain
17	SPLP	EPA 1312			Obtain
18	Total Organic Carbon	LYDKHN			Obtain
19	Soil pH	EPA 9045	KEMRON	sample slurry may require longer slurry durations than prescribed in the method, or sample may need to be crushed prior to slurry generation	
20	Liquid and Non-aqueous liquid pH	EPA 9040	KEMRON		
21	Water Bath testing @ 30, 50, 70, 90°C	In-House	KEMRON	VR layered on top of HC; use glass tube, Temperatures of the site material and water bath will be recorded at 5 minute intervals during heating. Following heating and subsequent cooling or partial cooling it may be necessary to extrude material from the column to observe more closely any integration of the phases during heatingRecord observations of the material and any off-gassing including photographs / video.	
22	ISTD Laboratory Evaluation procedure	In-house	KEMRON / TERRATHER	Trial @ 100C. 7 day test at 100C, 7 day test at 90C See Work Plan	

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	SOP Title	Method	Lab	Notes	Precision & Accuracy and MDLs
			M		
23	FID/Direct Read Instrument	In-house	KEMRON	The off-gas is collected in one tedlar bag (if possible) with suitable volumes to analyze for bulk VOCs, H2S and SO2. This testing will allow for an understanding of the bulk mass removal versus temperature. Samples will be collected while the sample is in the test reactor and at ambient temperatures either before or after sample heating or during sample heating.	
24	TO-15 Analysis	TO-15 (summa and headspace)	Air Toxics	Canisters and regulators are obtained from Air Toxics to continuously collect approximately 12 hours of off-gas produced from the thermal tests. The test method is TO-15. Two collection methods are being performed in this SOW: soil headspace analysis includes placing an aliquot of the test soil into a 40 ml vial with a septum cap. At a time to be specified, Air Toxics LTD laboratory will remove the headspace air via a needle inserted into the vial septum. The air sample will then be directly injected into the analytical instrument. Off-gas testing includes connecting a summa canister to the effluent stream after the condenser and collecting the off-gas. The canister and regulator are specific to the test.	Obtain
25	Aldehydes Profile Analysis	NIOSH 2016 modified	Galson Labs	Sample collection is completed using a cartridge supplied by Galson Labs. Collection flow rates and durations should be verified by Galson Labs. Samples will be collected while the sample is in the test reactor and at ambient temperatures either before or after sample heating or during sample heating.	Obtain
26	Inorganic Acid Gas Analysis	NIOSH 7903 modified	Galson Labs	Sample collection is completed using a cartridge supplied by Galson Labs. Collection flow rates and durations should be verified by Galson Labs.. Samples will be collected while the sample is in the test reactor and at ambient temperatures either before or after sample heating or during sample heating.	Obtain
27	Sulfur Reducing Compounds Analysis	ASTM 5504	CAS Labs	The off-gas is collected in one tedlar bag made by Zefon or provided by CAS Labs. The minimum volume needed for testing is 25 ml. Samples will be collected while the sample is in the test reactor and at ambient temperatures either before or after sample heating or during sample heating.	Obtain
28	Interval Condensate Sampling	In-house	KEMRON	The effluent liquids from each of the tests will be collected in separate containers/condenser flasks corresponding to the heating intervals ending at the following temperatures: 30, 50, 70 and 90°C; and each day of the prescribed heating at 90°C or 100°C. This totals 10/11/6 measurements per the 90°C/100°C/trial run tests, respectively. (Note:	

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	SOP Title	Method	Lab	Notes	Precision & Accuracy and MDLs
				clean flask/collection device should be used for each interval to prevent carry over between collection intervals). All observations should be recorded upon reconstituting. Photos and videos, if appropriate, should be included. Use a balance to obtain weight of condensate collected. Observations recorded (layering, color, clarity, odor, presence of any vapors above the condensate, etc. and (photographs/video). Estimated percentage by volume/weight of any layering. pH of the aqueous and non-aqueous condensate layer	
29	Reconstituted Condensate Sampling	In-house	KEMRON	Each of the interval effluents collected will be combined to generate a reconstituted condensate sample. All observations should be recorded upon reconstituting. Photos and videos, if appropriate, should be included. Use a balance to obtain weight of condensate collected. Observations recorded (layering, color, clarity, odor, presence of any vapors above the condensate, etc. and (photographs/video). Quatify percentage by volume/weight of any layering. pH of the aqueous and non-aqueous condensate layer, pH of the aqueous and non-aqueous condensate layer . Total VOC + TICs + thiophenes + naphthalene (thiophenes included using a 1-point calibration and same for naphthalene if not already included in calibration). Total SVOCs + TICs.	
30	Reheating treated sample	In-house	KEMRON	100°C only. Procedure: (1) Collect cooled treated sample and place in a test tube or similar device with white clear glass beads below the sample. (2) Heat the test tube in a water bath to see if the solid reliquifies during reheating. (3) Observe any movement of the material into the glass beads below. (4) Document with pictures and video if necessary.	

KEMRON ENVIRONMENTAL SERVICES

PROCEDURE TITLE SHEET

Procedure Number	Revision	Effective Date	Number of Pages	Copy Number
Sample Receipt	1	January 1, 2012	8	

Title:

Sample Receiving, Storage, and Disposal

Description of Revision

Routine Update

Prepared By _____ Date _____

Approved By _____ Date _____

QA/QC Officer

Approved By _____ Date 1/1/12

Laboratory Director/Manager

PROTIT03.WPW Rev 0 (4/94)

TABLE OF CONTENTS

		Page
	PURPOSE	3
	SCOPE	3
1.0	INTRODUCTION	4
2.0	DEFINITIONS	4
3.0	SAFETY PRECAUTIONS	5
4.0	RESPONSIBILITIES	5
	4.1 Laboratory Manager	5
	4.2 Environmental Scientist	5
5.0	PROCEDURE	6
	5.1 Documentation	6
	5.2 Sample Receipt	6
6.0	SAMPLE STORAGE	7
7.0	SAMPLE DISPOSAL	8
Attachment 1	Sample Login Report Form	9
Attachment 2	Sample Chain of Custody Record (COC)	10

Sample Management

PURPOSE

This procedure describes the process of receiving, documenting, and storing of all samples received at **KEMRON Environmental Services, Inc. (KEMRON).** By following the guidelines in this procedure, KEMRON will assure samples are handled in a safe, timely manner while maintaining custody consistent with the customer's request. The procedure defines the duties and responsibilities associated with the handling and storing of samples that are in KEMRON possession, and associated storage methods.

SCOPE

This procedure is applicable to all samples received at **KEMRON**

1.0 INTRODUCTION

Samples shall be tracked from the time of sample receipt until the samples are either disposed of or returned to the client. All documentation related to any samples in **KEMRON** possession will be monitored while the samples are active, then secured or archived when the project is completed.

2.0 DEFINITIONS

2.1 **Custody** - A sample is under custody if:

a) It is in your actual possession, or
b) It is in your view, after being in your physical possession, or
c) It was in your possession and then locked or sealed to prevent tampering, or
d) It is in a secure area.

2.2 **Secure area** - A space having restricted access (e.g., a locked room) where materials are safely kept to prevent tampering. However, due to the KEMRON small size, dedicating a full time employee to ensure this level of security is not feasible. Presently, the sample retrieval procedure works on the honor system through the tacit agreement of all employees involved in handling the individual samples.

2.3 **Sample security** - Ensuring the sample is not compromised by unauthorized personnel. The goal is to maintain an evidentiary chain of possession for the sample from the time of collection to the time of disposal/return.

2.4 **KES #** - A sequential number assigned to incoming projects designed to track that project throughout testing.

2.5 **Controlled Area** - An area designated for sample receipt and storage. Unnecessary articles are not allowed in this area to curtail the possible spread of any loose contamination. Also, gloves must be worn at all times when handling samples within the Controlled Area.

2.6 **Sample Login**- The specific activity of logging individual samples of a project into the Laboratory System.

2.7 **Sample Login - Report** The report generated from the Sample Login activity described above.

3.0 SAFETY PRECAUTIONS

Samples should be regarded as potentially hazardous and must be handled with caution to ensure safety and prevent contamination. Lab coats, gloves, and safety glasses shall be worn at all times when handling samples.

Samples that have a foul smell or are known to contain a high level of contaminants should be hand
"Laboratory Safety Program."

Any sample suspected of exhibiting radioactive characteristics must be handled in strict accordance with KEMRON radioactive materials program. KEMRON Radiation Safety Officer (RSO) must be notified immediately upon receipt of materials suspected of exhibiting radioactive characteristics.

4.0 RESPONSIBILITIES

4.1 Laboratory Manager

The Laboratory Manager is responsible for training all employees in sample receipt protocols. KEMRON has not designated one specific person or position for sample clerk. Rather, all employees are expected to understand the appropriate sample receipt protocols. Typically, however, sample receiving activities are performed by an Environmental Scientist. For the purpose of this SOP, the term Environmental Scientist will refer to those with sample receipt responsibilities.

4.2 Environmental Scientist

The duties and responsibilities of the Environmental Scientist (ES) concerning sample receipt shall include, but not be limited to, the following:

4.2.1 Inspecting all sample shipping containers delivered. He/She shall check for the presence/absence and condition of custody seals, locks, container breakage and any integrity problems.

4.2.2 Placing the shipping container(s) in the Controlled Area.

4.2.3 Monitoring and recording temperatures of all incoming, non-waste sample shipping containers and transferring appropriate temperatures to the Chain-of-Custody (COC).

4.2.4 Removing samples from shipping containers and having them available for Project Management evaluation.

4.2.5 Creating the Sample Login and entering into Laboratory Information Management System (LIMS).

4.2.6 Label all incoming samples.

4.2.7 Arrange for the return of clients' sample shipping containers.

4.2.8 Storing completed and approved samples.

4.2.9 Monitoring the temperature of the Sample Receiving Refrigerators and Freezers.

4.2.10 Cleaning and storing **KEMRON** sample shipping containers.

5.0 PROCEDURE

5.1 Documentation

Using an indelible, black ink pen, laboratory personnel shall document any service activity performed on a sample. Logbooks, worksheets, or printed forms shall be used to record this information. These records shall be signed (initialed) and dated. They shall contain appropriate sample identifying information (e.g.,KES#, sample IDs).

5.2 Sample Receipt

5.2.1 The ES shall inspect the sample shipping containers for damage and note the shipping container integrity and other observable deficiencies. All samples shall be taken to the Sample Receipt work area in the treatability laboratory. Any clients who hand deliver samples shall, upon sample receipt by KEMRON receive a signed and dated copy of the COC.

5.2.2 The ES shall verbally notify the appropriate Project Manager (PM) of the samples' arrival. The ES shall again inspect the shipping containers. He/She shall check for the presence/absence and condition of custody seals, locks, container breakage, and any integrity problems. If problems with the shipping container are observed, the problem(s) are forwarded to the Project Manager for resolution. The customer shall then be notified of these problems. At this point, the ES shall begin filling in the Sample Login Report Form (see Attachment 1).

5.2.3 The ES shall place the shipping container within the Controlled Area and clean the shipping container of any obvious surface contamination. Remove all air bills, freight invoices and shipping documents from the

5.2.4 After removing the shipping container seals, open the shipping container and take the internal temperature using a calibrated thermometer, if applicable. Note the temperature on the Chain-of-Custody (COC). Then, the COC is signed by the ES as the official received date and time. If a shipping container is not preserved between 4°± 2° C and preservation is required, the actual temperature is also recorded on a PRF and forwarded to Project Management for resolution. In the event a COC does not accompany the samples, one will be generated by the ES at this time (see Attachment 3).

5.2.5 On the counter in the controlled area, samples containers are opened and any physical characteristics (smell, color, presence of organic material, etc. are recorded on the sample login sheets. Also at this time the samples are weighed, and if necessary, organic content is determined using a PID meter. The samples are then arranged in sequential order according to sample labels and checked against the COC.

5.2.6 Using the Sample Login Report Form, the ES enters all of the applicable information from the COC and any site specific information.

5.2.7 Labels are generated which contain a unique **KEMRON** sample ID number. Each label is placed on the appropriate sample container.

5.2.8 The labeled sample containers are then transferred to appropriate storage locations. Samples requiring refrigeration are stored in the walk-in cooler at 4°C± 2°C. Radioactive materials are stored in KEMRON Radioactive Materials Laboratory in strict accordance with KEMRON Radioactive Materials Program.

5.2.9 The ES shall arrange for the return of shipping containers to the customer and, at the appropriate time, the proper disposal of the samples.

6.0 SAMPLE STORAGE

6.1 The ES shall store samples in the appropriate storage locations within Sample Receiving. Sample storage shall be documented by recording all relevant information in the Sample Control Log at the time of storage.

6.2 All controlled sample storage locations shall be monitored on every working day.

All refrigerators must be controlled at 4°±2°C. All freezers must be controlled at ≤-10°C. To insure documentation, all temperatures will be recorded in the Temperature Logbook. If any controlled storage location is out of limits, the QA Officer must be notified.

6.3 Sample Storage Requirements

6.3.1 Inorganic Analysis

6.3.1.1 All soil/sediment samples for metals may be stored at room temperature until needed.

6.3.2 Organic Analysis - Volatiles

6.3.2.1 All samples for volatiles analysis must be immediately

6.3.2.2 All samples must be refrigerated at 4°± 2°C.

6.3.3 Organic Analysis - Semivolatiles/Pesticides/PCBs

6.3.3.1 All samples for semivolatiles, pesticide or PCB analysis must be refrigerated at 4°± 2°C.

6.3.4 Radioactive Materials

6.3.4.1 All samples that have been identified as being radioactive Or that are being utilized in a radioactive study must be stored in accordance with the current permit.

6.4 If any controlled storage location is in an "out-of-control" situation (concerning temperature), employees shall notify the appropriate personnel and ensure that a corrective action plan is implemented.

7.0 SAMPLE DISPOSAL

7.1 Samples will be stored in the appropriate location and manner until completion of the project and the samples have been released by the appropriate Project Manager.

7.2 Samples may be stored at other intervals per contractual requirements.

7.3 Whenever possible, KEMRON will return all unused or residual materials to the client or the site. Samples will be returned using all necessary shipping protocols. Samples that can not be returned to the site or the client will be disposed of per section 7.4.

7.4 Samples shall be disposed of in a manner consistent with their matrix and contaminant type and level. The waste generated shall be stored in the Waste Management area and disposed of in a quarterly cycle. The waste material will be characterized and disposed of by an independent disposal company. Disposal dates and manifests shall be maintained in the Laboratory Managers office.

1.0 SUMMARY

This Standard Operating Procedure (SOP) establishes a standard method for performing sample homogenization.

2.0 SCOPE

This procedure provides all departments with a method for homogenization of treated and untreated samples materials.

3.0 EQUIPMENT

Pan or bucket large enough to contain all material to be homogenized.
Sieve, if sieving is required for the sample material.

4.0 PROCEDURE

4.1 Pass the material through the specified sieve (usually ½-inch) into the large container.

4.2 After all material has been sieved and/or placed in the large container, thoroughly mix, either by hand or gentle mechanical mixing.

4.3 Return the material to smaller containers, as necessary.

4.4 Weigh each container, and record container weights and tare weights in the project notebook.

4.5 Store samples as specified in the project scope of work.

5.0 HEALTH AND SAFETY

Laboratory safety procedures, as defined in KEMRON's Chemical Hygiene Plan, are followed during moisture content determinations. A copy of this plan is maintained by

the Corporate Health and Safety Coordinator, and is reviewed and executed by all KEMRON personnel.

ATG-SOP-059
SH0416 MOD 1
Four-Point Sample Homogenization
Bridgewater NJ Thermal Treatability Study
SH-0416
2/2/12

1. Homogenize the material per AGT-SOP-059.

2. Draw lines on the surface of the sample to separate into 16 different sections.

3. Randomly choose four of the sections, place into a clean container, and re-homogenize.

4. Document the homogenization process by taking photographs and/or video, as appropriate.

5. Document any irregularities or difficulties with homogenizing any of the materials.

STANDARD OPERATING PROCEDURES FOR DETERMINING BULK DENSITY OF HOMOGENIZED SAMPLES

1.0 SUMMARY

This Standard Operating Procedure (SOP) establishes a standard method for determining the bulk and dry density of a solid waste sample. The analyses will be conducted in general accordance with guidelines established by the American Society for Testing and Materials (ASTM) in ASTM D7263. It is intended to provide data for solid waste processing plants. This SOP also includes, data acquisition, quality assurance / quality control, and health and safety concerns.

2.0 EQUIPMENT

Balance (sensitive to 0.01 grams)
2"-4" Plastic mold
Stainless steal spoon

3.0 TESTING PROCEDURE

3.1 Make sure sample has been covered and sealed from collection time until testing time, to prevent moisture loss.

3.2 Homogenize the sample, and screen out fragments larger than ½". If the client wishes to know the bulk density of the material including the fragments greater than ½ inch, continue with the procedure, replacing the mold with a 3"x6".

3.3 Label the mold with the job number and test name.

3.4 Place the mold on the scale to obtain the tare weight. Indicate the tare weight on the mold with a marker. Fill the mold 1/3 full, and manually tamp the mold by lifting it approximately 2.5" above the ground and dropping it squarely. Repeat this process by adding another 1/3 until the mold is overly full.

3.5 After the mold has been tamped on the last addition draw a rigid straightedge across the top of the mold to level the contents.

3.6 Weigh the filled mold to the nearest 0.1g and calculate the bulk density to three significant figures on the testing data sheet. Repeat this test two more times, for a total of three tests.

4.0 DATA ACQUISITION

4.1 Assign the test a computer tracking code in accordance with KEMRON's *Procedure for Sample Tracking for Analyses Associated with Physical Properties Testing*. Indicate the tracking code on the testing data sheet.

4.2 Calculate the bulk density as follows:

Bulk Density = (W- Wt) / V

Where:
W = the weight of the mold full
Wt = the weight of the mold empty
V = the volume of the mold (tare weight)

The bulk density is reported as the average of the determinations

5.0 HEALTH AND SAFETY CONSIDERATIONS

Laboratory safety procedures, as defined in KEMRON's Chemical Hygiene Plan, are followed during density testing. A copy of this plan is maintained by the Corporate Health and Safety Coordinator, and is reviewed and executed by all KEMRON personnel.

6.0 QUALITY ASSURANCE / QUALITY CONTROL

6.1 The data calculated by the spreadsheet is checked by an individual not involved with the testing to ensure that no mistakes have been incorporated into the spreadsheet.

6.2 The physical properties laboratory director, then manually and visually

checks the material tested and compares his or her observations to the test results reported. The reviewing laboratory director is ultimately responsible for all final review and quality control of the analyses and the data generated. Upon final approval of the data and data interpretations, the director will initialize the original data sheets. All original data sheets and analyzed data will be maintained in the physical properties project files. A copy of the finalized test results will be submitted to the appropriate project manager and the client.

7.0 REFERENCES

ASTM D7263 (reapproved 1992) *Standard Test Methods for Laboratory Determination of the Density (Unit Weight) of Soil Specimens.*

STANDARD OPERATING PROCEDURES FOR DETERMINING POROSITY OF HOMOGENIZED SAMPLES

1.0 SUMMARY

This Standard Operating Procedure (SOP) establishes a standard method for determining the porosity of a solid waste sample. The analyses will be conducted in general accordance with guidelines established by the American Society for Testing and Materials (ASTM) in ASTM D7263, Appendix X1. This SOP also includes data acquisition, quality assurance / quality control, and health and safety concerns.

2.0 EQUIPMENT

Balance (sensitive to 0.01 grams)
2"-4" Plastic mold
Stainless steal spoon

3.0 TESTING PROCEDURE

3.1 Conduct a Moisture Content test according to SOP No. PP-03.

3.2 Conduct a Density test according to SOP No. ATG-SOP-057.

3.3 Conduct a Solid Specific Gravity test according to SOP No. PP-02.

4.0 DATA ACQUISITION

4.1 Assign the test a computer tracking code in accordance with KEMRON's *Procedure for Sample Tracking for Analyses Associated with Physical Properties Testing*. Indicate the tracking code on the testing data sheet.

4.2 Calculate the porosity as follows:

$$n = (1 - ((\rho_m/(1 + w/100)) \times G_s)) \times 100$$

Where:
n = porosity, %

ρ_m = density of total (moist) soil specimen (g/cm^3), as determined by Test Method D7263

w = water content of the soil specimen (in percent), as determined by Test Method D2216

G_s = the specific gravity of soil solids in the soil specimen, as determined by Test Method D854

5.0 HEALTH AND SAFETY CONSIDERATIONS

Laboratory safety procedures, as defined in KEMRON's Chemical Hygiene Plan, are followed during porosity testing. A copy of this plan is maintained by the Corporate Health and Safety Coordinator, and is reviewed and executed by all KEMRON personnel.

6.0 QUALITY ASSURANCE / QUALITY CONTROL

6.1 The data calculated by the spreadsheet is checked by an individual not involved with the testing to ensure that no mistakes have been incorporated into the spreadsheet.

6.2 The physical properties laboratory director, then manually and visually checks the material tested and compares his or her observations to the test results reported. The reviewing laboratory director is ultimately responsible for all final review and quality control of the analyses and the data generated. Upon final approval of the data and data interpretations, the director will initialize the original data sheets. All original data sheets and analyzed data will be maintained in the physical properties project files. A copy of the finalized test results will be submitted to the appropriate project manager and the client.

7.0 REFERENCES

ASTM D7263 (reapproved 1992) *Standard Test Methods for Laboratory Determination of the Density (Unit Weight) of Soil Specimens.*

1.0 SUMMARY

This Standard Operating Procedure (SOP) establishes a standard method for performing a moisture content determination.

2.0 SCOPE

This procedure provides all departments with a method for determining the moisture content of a sample as defined by the American Society of Testing and Materials (ASTM) in accordance with ASTM D 2216-05 and the Environmental Protection Agency (EPA) in accordance with Method 8001. The procedure also addresses data acquisition, health and safety, and quality control/quality assurance considerations.

3.0 EQUIPMENT

Balance (sensitive to 0.0001 grams)
Oven (capable of maintaining 110°C ± 5°C)
Sample Holder (aluminum tins or glass beaker)

4.0 TESTING PROCEDURE

4.1 Label three standard disposal aluminum weighing tins with the sample number and project name of the material to be tested. As all moisture content analyses are performed in triplicate, label the tins with three different test numbers so that the tins may be distinguished.

4.2 Record the test number of the tin in the space labeled "MOISTURE TIN No." and the weight of each weighing tin to the nearest 0.0001 gram in the space labeled "WT MOISTURE TIN (tare wt)" on KEMRON's standard moisture content determination data sheet.

4.3 Select three representative aliquots of the material and place one in each of the moisture tins.

4.4 Record the weight of each moisture tin with its respective specimen to the

nearest 0.0001 gram in the spaces labeled "WT WET SOIL + TARE".

4.5 Place the specimens in an oven maintained at a constant temperature of 110±5°C and dry overnight (a period of approximately 16 hours) or until the weight of the specimens is constant. A constant mass is defined when two successive periods (greater than 1 hour apart) of drying results in a weight difference of less than 0.1%.

4.6 After the specimens are dried to a constant weight, record the weight of each dry specimen in its respective weighing tin to the nearest 0.0001 gram in the space labeled "WT DRY SOIL + TARE".

5.0 DATA ACQUISITION

5.1 Assign the specimens a computer tracking code in accordance with KEMRON's *Procedure for Sample Tracking for Analyses Associated with Physical Properties Testing*.

5.2 Enter the data obtained in steps 4.1 to 4.6 into the appropriate spaces on the moisture content spreadsheet.

5.3 The spreadsheet calculates the weight of the water of the specimen, the dry weight of the specimen, the ASTM moisture content (as a percent), and the EPA moisture content (as a percent). The equations for ASTM moisture content and EPA moisture content are listed below:

$$\text{ASTM moisture content} = W_w/W_s*100$$

W_w= Weight of water (in grams)
W_s= Weight of dry solid (in grams)

$$\text{EPA moisture content} = W_w/W_t*100$$

W_w= Weight of water (in grams)
W_t= Total weight of specimen (water + solids, in grams)

6.0 HEALTH AND SAFETY

Laboratory safety procedures, as defined in KEMRON's Chemical Hygiene Plan, are followed during moisture content determinations. A copy of this plan is maintained by the Corporate Health and Safety Coordinator, and is reviewed and executed by all KEMRON personnel.

7.0 QUALITY CONTROL / QUALITY ASSURANCE

7.1 The data calculated by the spreadsheet is checked by an individual not involved with the testing to ensure that no mistakes have been incorporated into the spreadsheet.

7.2 The engineer, or physical properties laboratory director, then manually and visually checks the material tested and compares his or her observations to the test results reported. The reviewing engineer or laboratory director is ultimately responsible for all final review and quality control of the analyses and the data generated. Upon final approval of the data and data interpretations, the engineer will initialize the original data sheets. All original data sheets and analyzed data will be maintained in the physical properties project files. A copy of the finalized test results will be submitted to the appropriate project manager and the client.

8.0 REFERENCES

ASTM D 2216-05 — *Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock,* Annual Book of ASTM Standards, 04.08, 2010.

Method 8001 — *Test Methods for Evaluating Solid Waste*, US Environmental Protection Agency, SW-846.

1.0 SUMMARY

This Standard Operating Procedure (SOP) establishes a standard method for performing specific gravity testing.

2.0 SCOPE

This procedure provides all departments with a method for determining the solid specific gravity of treated and untreated materials. The solid specific gravity testing is conducted in general accordance with guidelines established by the American Society for Testing and Materials (ASTM) in ASTM D 854. Calibration of specific gravity testing equipment, health and safety considerations, and quality assurance / quality control issues are also addressed in this SOP.

3.0 EQUIPMENT

Balance (Sensitive to 0.01 grams)
Pycnometer (250 ml volumetric flask)
500 ml beakers (3)
Vacuum Pump (Providing air pressure not greater than 100 mm Hg)
Oven (Capable of maintaining 110 ºC ± 5 ºC)
Sieve #10

4.0 EQUIPMENT CALIBRATION

4.1 Pycnometer (250 ml volumetric flasks) are used for measuring the specific gravity of untreated materials.

4.2 The pycnometer must be calibrated once per year.

4.3 Record the weight of the clean dry pycnometer to the nearest 0.01 gram.

4.4 Fill the pycnometer with deaired, deionized water about ½ inch from the bottom of the pycnometer. Record the weight of the filled pycnometer to the nearest 0.01 gram.

4.5 Measure and record the temperature of the water to the nearest whole degree celsius.

4.6 Enter the data obtained in steps 3.3 to 3.5 into the calibration spreadsheet on the *Treatability Worksheet Disk*. The spreadsheet will automatically calculate the calibrated weight of the pycnometer at normal laboratory temperatures ranging from 15 to 30 ºC. The calculation is as follows:

$$W_a \text{ (at } T_x) = (\gamma_{Tx}/\gamma_{Ti}) \times (W_a \text{ (at } T_i) - W_f) + W_f$$

W_a = Weight of pycnometer and water (in grams)
W_f = Weight of pycnometer (in grams)
γ_{Tx} = Density of water at T_x (in gr/cm^3)
γ_{Ti} = Density of water at T_i, (in gr/cm^3)
T_i = Observed temperature of water (in ºC)
T_x = Other temperatures for calibration (in ºC).

5.0 SAMPLE PREPARATION AND TESTING

5.1 Record the weight of about 100 grams and place in one clean dry 500 ml beaker to the nearest 0.01 gram in the spaces marked (WT EVAPORATING DISH) on the specific gravity data sheet. Label the beakers with the project name, sample number, and test number in the spaces provided.

5.2 Place in the over for about 16 hours at 100˚C. Sieve dried material through a #10 seive.

5.3 Place one aliquot of approximately 20 grams, of the material directly into a pycnometer.

5.4 Add deionized water until the material in the pycnometer is just covered or the pycnometer is approximately half full.

5.5 Remove air trapped in the material by connecting the top of the pycnometer to a vacuum pump in the lab and rolling the pycnometer gently as the vacuum is

applied (Do not exceed air pressures of 100 mm Hg).

5.6 Add deionized water until the meniscus is at the full line in the neck of the pycnometer.

5.7 Clean and dry the outside of the pycnometer with a paper towel.

5.8 Record the weight of the pycnometer, water, and sample to the nearest 0.01 gram on the standard data sheet under the space provided for the correct test number (test #1 to #3).

5.9 Record the temperature of the water in the pycnometer to the nearest whole degree celsius for the same test number.

5.10 Carefully pour the water and sample into the 500 ml beaker labelled with the proper test number. If excess material is left in the pycnometer, extra deionized water can be added to the pycnometer and shaken in the pycnometer. Then this water and material is poured into the same beaker. Note that all of the material originally in the pycnometer must be transferred into the proper beaker.

5.11 Place the beaker in an oven at 110 ± 5 °C until all of the water has been driven off and the weight of the beaker with the testing material is constant.

5.12 Record the weight of the beaker and dry material to the nearest 0.01 gram on the specific gravity data sheet under the proper test number in the space labelled (WT EVAPORATING DISH + DRY SOIL).

5.13 Record the calibration weight of the pycnometer at the temperature obtained during the testing in the space labelled (WT FLASK + WATER). This value can be found on the pycnometer calibration data sheet

5.14 Record the temperature calibration or K value from the calibration data sheet in the space labelled (TEMPERATURE CALIBRATION, K) on the testing data sheet.

5.15 Repeat steps 5.1-5.14 two times.

6.0 DATA ACQUISITION

6.1 Provide the test sample with a computer file tracking code in accordance with KEMRON's SOP, *Procedure for Sample Tracking for Analyses Associated with Physical Properties Testing*.

6.2 Enter the data into the data spreadsheet for specific gravity. The spreadsheet automatically calculates the specific gravity of the material at the measured temperature in accordance with the following equation:

$$G \text{ (at } T_x) = W_s/(W_s + (W_a - W_x))$$

G = Specific gravity at the measured temperature
W_s = Dry weight of the tested material (in grams)
W_a = as before
W_x = Weight of pycnometer + material + water (in grams).

6.3 The spreadsheet then automatically calculates the specific gravity at a temperature of 20 ºC in accordance with the following equation:

$$G \text{ (at } 20\ ^{o}C) = K \times G \text{ (at } T_x)$$

K = Temperature calibration.

6.4 The specific gravity is then reported as the average of the specific gravities at 20 ºC of three tests.

7.0 HEALTH AND SAFETY CONSIDERATIONS

7.1 Laboratory safety procedures, as defined in KEMRON's Chemical Hygiene Plan, are followed during specific gravity testing. A copy of this plan is maintained by the Corporate Health and Safety Coordinator, and is reviewed and executed by all KEMRON personnel.

8.0 QUALITY ASSURANCE / QUALITY CONTROL

8.1 The data calculated by the spreadsheet is checked by an individual not involved with the testing to insure that no mistakes have been incorporated into the spreadsheet.

8.2 The engineer, or physical properties Laboratory Director, then manually and visually checks the material tested and compares his observations to the test results reported. The reviewing engineer or laboratory director is ultimately responsible for all final review and quality control of the analyses and the data generated. Upon final approval of the data and data interpretations, the engineer will initialize the original data sheets. All original data sheets and analyzed data will be maintained in the physical properties project files. A copy of the finalized test results will be submitted to the appropriate project manager or client.

9.0 REFERENCES

ASTM D 854-06 *Standard Test Method for Specific Gravity of Soils*, Annual Book of Standards, Volume 04.08, 2010.

STANDARD OPERATING PROCEDURE FOR PARTICLE SIZE ANALYSES WITH HYDROMETER

1.0 SUMMARY

This Standard Operating Procedure (SOP) establishes a method for performing particle-size analysis of soils with hydrometer.

2.0 SCOPE

This procedure provides all departments with a method to determine the quantitative distribution of particle sizes in soils. The sand sizes (larger than 75 μm) are determined by sieving, while the silt and clay sizes are determined by sedimentation using a hydrometer. The analysis is performed in general accordance with guidelines established by the American Society for Testing and Materials (ASTM) in ASTM D 422.

3.0 EQUIPMENT

Balance (Sensitive to 0.01 grams)
Oven (Capable of maintaining 110 EC ∀ 5 EC)
Stirring Apparatus (Conforming to ASTM D 422 specifications)
Hydrometer (Graduated to read grams per liter of suspension)
Thermometer (Accurate to 0.5 EC)
Sedimentation Cylinder (A glass cylinder 18 inches in height, 2.5 inches in diameter with 1000 ml. capacity)
Beaker (250 ml. capacity, numbered)
Sieves (A series of sieves of square mesh woven -wire cloth, conforming to the requirements of ASTM E11)

4.0 MATERIALS

Sodium metaphosphate
Distilled or demineralized water

5.0 SAMPLE PREPARATION AND TESTING

STANDARD OPERATING PROCEDURE FOR PARTICLE SIZE ANALYSES WITH HYDROMETER

5.1 Record the number of a 250 ml. beaker in the space marked (TARE NUMBER) on the grain size distribution data sheet.

5.2 Weigh the beaker to the nearest 0.01 gram and record the weight on the data sheet in the space marked (TARE WEIGHT)

5.3 Select about 100 to 120 grams of a representative soil sample for a sandy material, and about 70 to 80 grams for a clayey material and place the sample in the 250 ml. beaker.

5.5 Record the weigh of the soil and the beaker the nearest 0.01 grams.

5.6 Record the color of the soil on the data sheet.

5.7 Place the sample in an oven maintained at a constant temperature of 110 ∀ 5EC and dry overnight for a period of approximately 16 hours to a constant weight.

5.8 Record the weight of the beaker and dry soil.

5.9 Cover the dried sample with exactly 5.0 grams of sodium metaphosphate and add distilled water. Allow to soak for at least 16 hour.

5.10 At the end of the soaking period, stir the sample with a spatula or a glass stirring rod to break up any lumps and transfer the soil-water slurry from the beaked into the dispersion cup. Insure that any residue from the beaker is washed into the cup with distilled water. If the sample contains coarse particles, the particles should separated first over a # 10 sieve and then returned to the beaker.

5.11 Add distilled water if necessary so the dispersion cup is more then half full.

5.12 Stir for a period of 1 minute.

5.13 Immediately after dispersion, wash the sample over a # 200 sieve until the

wash water appears clear and collect the material passing # 200 in a pan.

5.14 Carefully transfer material passing the #200 sieve from the pan to the sedimentation cylinder washing with distilled water and making sure that no residue is left in the pan.

5.15 Wash the material retained on the #200 sieve back into the beaker and place it in the oven to dry to a constant weigh.

5.16 Add distilled or demineralized water to the glass sedimentation cylinder until the total volume is 1000 ml.

5.17 Using a rubber stopper over the open end of the cylinder turn the cylinder upside down and back for a period of 1 minute (1 turn per second) to complete the agitation.

5.18 At the end of 1 minute set the cylinder down and take hydrometer and temperature readings at 2,5,15,30, 60, 250 and 1440 minutes. To take hydrometer readings, carefully insert the hydrometer about 20 seconds before the reading is due. As soon as the reading is taken remove the hydrometer and place it with a spinning motion in a graduated cylinder of clean distilled or demineralized water.

5.19 Transfer the sample portion retained on # 200 sieve (oven dried in step 5.15) to a set of nested sieves placing it on the uppermost (coarsest) sieve. A full set of sieves should include the following:

δ - in.(19.0 - mm)	No.40 (425 - µm)
No. 4 (4.75 - mm)	No.60 (250 - µm)
No.10 (2.00 - mm)	No. 140 (106 - µm)
No.20 (850 - µm)	No. 200 (75 - µm)

5.20 Secure the set of sieves containing the sample in the mechanical sieve shaker and set the timer for a minimum of 5 minutes.

5.21 Determine the mass retained on each sieve by removing each fraction into a tared pan (placed on the balance), making sure all material is transferred from the sieve (use a wire brush to get it all out of the sieve), and recording the weight cumulatively starting with the coarsest sieve.

5.22 If a portion of the sample is retained on the δ - inch sieve, this portion should be separated further into a series of fractions using sieves with openings from 2 -inch. up to 3 -inches. Start with the smallest sieve opening at which all the material passes.

6.0 DATA ACQUISITION

6.1 Data reduction is conducted using the GeoSystems software for Particle - Size Analysis which generates a Grain-Size distribution curve.

7.0 REFERENCES

ASTM D 422 *Standard Test Method for Particle-Size Analysis of Soils,* Annual Book of Standards, Volume 04.08, 2010.

STANDARD OPERATING PROCEDURE FOR CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST ON COHESIVE SOILS

1.0 SUMMARY

This Standard Operating Procedure (SOP) establishes a method for performing the Consolidated-Undrained Triaxial Compression test on cohesive soils. The procedure is performed in general accordance with American Society of Testing and Materials method ASTM D 4767.

2.0 SCOPE

This procedure provides all departments with a method to determine the strength and stress-strain relationship of either an undisturbed or remolded saturated soil when it is consolidated and sheared undrained at a constant rate of strain. The method provides for the calculation of total and effective stresses and axial compression of the test specimen by measurement of axial load, axial deformation and pore-water pressure. Generally three specimens are tested at three different effective stresses to define a strength envelope.

3.0 EQUIPMENT

Triaxial Chamber
Triaxial Panel - equipped with pressure and vacuum control devices, pressure and vacuum measuring devices and volume change measuring device (burettes)
Pore-Water pressure measuring device (pressure transducer)
Water Deairation Device
Axial Loading Device
Load Frame
Load Cell Trandsducer (appropriate capacity)
Linear Displacement Transducer (minimum travel range 1.2 inches)
Digital Readout
Tube Cutter
Sample Extruder
Calipers (6 inch capacity, accurate to 0.01 inches)
Balance (Sensitive to 0.01 grams)

STANDARD OPERATING PROCEDURE FOR CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST ON COHESIVE SOILS

Oven (Capable of maintaining 110° C $\pm$ 5° C)
Filter Papers
Porous Stones
Latex Membranes
Rubber O-rings (2.5 inch diameter)
Membrane Expander

4.0 CALIBRATION OF APPARATUS

Equipment calibration is performed and maintained as outlined in KEMRON's SOPs for *Hydraulic Conductivity of Solidified Samples* and *Unconfined Compressive Strength of Solidified and Undisturbed Samples.*

5.0 SAMPLE PREPARATION

5.1 Specimen should be cylindrical with a length to diameter ratio of 2:1 and a minimum diameter of 2.8 inches.

5.2 The largest particle size should be less than 1/6 of the specimen diameter.

5.3 Specimens may be prepared by compacting material in at least six layers into a cylindrical mold having dimensions meeting the requirements in 5.1.

5.4 Material required for the specimen should be prepared by thoroughly mixing soil with a sufficient amount of water to obtain the desired moisture content.

5.5 Store material in a covered container for at least 16 hours and verify the moisture content.

5.6 Specimen may be compacted to the desired density by kneading or tamping each layer.

STANDARD OPERATING PROCEDURE FOR CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST ON COHESIVE SOILS

5.7 Top of each layer should be scarified prior to the addition of material for next layer.

5.8 Undisturbed samples obtained by shelby tube sampling are extruded by means of a horizontal or vertical extruder.

5.9 The sample should be extruded in the same direction of travel as the sample entered the tube (from bottom of the tube to the top).

5.10 It will be necessary to cut a 6 inch section from the tube with a tube cutter if the vertical extruder is used, since only a six inch piece of tube can fit in the extruder.

5.11 If a horizontal extruder is used, care should be taken to avoid bending stresses due to gravity.

5.12 Handle specimens carefully to minimize changes in cross section or moisture content.

5.13 Once the sample has been extruded from the shelby tube or mold, trim the sample to the desired length. It is important that the sample is level at both ends, without protrusions. This will ensure even loading. Retain the trimmings for a moisture content determination.

5.14 Measure the length and diameter of the sample in triplicate to the nearest 0.01 inch. Record the values on the appropriate triaxial data sheet.

5.15 Weigh the entire sample to the nearest 0.01 grams and record the mass on the trixial data sheet.

STANDARD OPERATING PROCEDURE FOR CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST ON COHESIVE SOILS

6.0 PROCEDURE

6.1 Place a moist towel on the chamber base around the bottom pedestal (this will protect the groove and 0-rings in the chamber base from dirt and grit which may cause the chamber to leak).

6.2 Assemble sample in the following order: bottom pedestal, porous stone, filter paper, sample, filter paper, porous stone, top cap.

6.3 Check the latex membrane for leaks by filling with water and observing.

6.4 Place the membrane on the membrane expander, connect the vacuum line to the expander, and check if the membrane is smooth against the expanders inside wall.

6.5 Place the membrane around the sample and release the vacuum slowly to prevent disturbance of the sample.

6.6 Seal the top and bottom of the membrane with O-rings, then place a second membrane on the sample following steps 6.4 through 6.6.

6.7 Check that the specimen cap, specimen and porous stones are centered on the specimen base.

6.8 Attach lines from the effluent (lines to pipette and annulus) to the top pedestal, hand tighten, and then tighten a quarter of a turn with a wrench.

6.9 Reassemble the triaxial chamber, taking care that the axial load piston is pulled out and locked before putting on top of the chamber. This will prevent damaging the sample with the piston while securing the top of the chamber.

6.10 Hand tighten chamber bolts evenly to seal the chamber.

STANDARD OPERATING PROCEDURE FOR CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST ON COHESIVE SOILS

6.11 Unlock the axial load piston and bring it into contact with the top cap. Twist the piston lightly, making sure that it fits into the indention of the top cap and then lock the piston. During this procedure take care not to apply a load to the sample.

6.12 Vent the chamber by placing a quick connect in the quick connect outlet on the top of the chamber and connecting the chamber to the chamber burette on the panel.

6.13 Fill the chamber with deaired water from the panel.

6.14 Bleed the air from the system.

6.15 Saturate the sample by applying back pressure to the specimen pore water in accordance with KEMRON SOP titled *Procedure for Hydraulic Conductivity of Solidified Samples.*

6.16 Measure the pore pressure parameter B in accordance with KEMRON SOP titled *Procedure for Hydraulic Conductivity of Solidified Samples.*

6.17 Specimen should be considered saturated if the value of B is equal to or greater than 0.95.

6.18 Upon achieving saturation, initiate consolidation in accordance with KEMRON SOP titled *Procedure for Hydraulic Conductivity of Solidified Samples.*

6.19 The consolidation pressure (effective stress) is selected by the engineer.

6.20 Plot the burette readings (volume change) versus the logarithm or square root of elapsed time, verify that consolidation is complete and determine the time of 50% primary consolidation $t_{50,}$ in accordance with the

STANDARD OPERATING PROCEDURE FOR CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST ON COHESIVE SOILS

procedure outlined in ASTM test method D 2435. T_{50} is used to determine a suitable strain rate.

6.21 Once the consolidation curve reflects that consolidation is complete and approval is obtained from the engineer in charge, axial shear can be initiated.

6.22 Adjust the load frame for triaxial testing. Unscrew the bottom and top attachments and change the LVDT to the down position with the LVDT depressed about 3/4 of the travel range.

6.23 By opening or closing the appropriate valves, isolate the specimen so that during shear the specimen pore-water pressure will be measured by the pressure transducer and no drainage will occur. Disconnect the saturation lines from the panel in order to move the chamber to the load frame.

6.24 If necessary, replace the tubing connecting the chamber and the panel chamber burette (supplying chamber pressure) with longer tubing in order to reach the load frame. During shear the chamber pressure should remain constant.

6.25 Place the triaxial chamber in the load frame, align the piston with the load cell, bring the top of the piston in contact with the load cell and observe that the digital load display does not exceed 1-2 lbs.

6.26 Unlock the piston and re-zero the load and deflection displays.

6.27 Begin loading at a strain rate of 0.06 inches/minute until the piston comes in contact with the top cap, fitting in its indentation. Record the reading on the deflection display as ΔH. Care should be taken during this process not to apply an axial load greater than 1-2 lbs. Once you observe the sample taking on a load, stop and re-zero the load and deflection displays.

STANDARD OPERATING PROCEDURE FOR CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST ON COHESIVE SOILS

6.28 Select the appropriate strain rate, calculated based on the consolidation curve. A suitable strain may be calculated by dividing the estimated failure strain by ten times the value of $t_{50,}$ however the strain rate for a triaxial CU test with pore pressure test should not be faster that 0.007 inches/minute for a sample 5.8 inches high.

6.29 Check that the deflection and load displays are reading zero, then record the initial pore pressure reading.

6.30 Begin axial loading, record load, deformation and pore pressure readings at increments of 0.1% strain to 1% strain and thereafter at every 1%. Take sufficient readings to define the stress-strain curve and continue the loading to 15% strain.

6.31 When shear is completed, reduce the chamber and back pressure to zero.

6.32 With specimen drainage valves remaining closed, quickly remove the specimen and latex membranes from the chamber and determine the final moisture content of the total sample.

6.33 Prior to placing the specimen in the oven to dry, sketch a picture or take a photograph of the specimen showing the mode of failure.

7.0 DATA ACQUISITION

Data reduction is conducted using the Geosystem software for axial shear. The program generates Mohrs stress envelope based on total and effective stresses, p-q diagrams, and the stress versus strain plot. The specimens initial and final parameters are calculated using this program.

STANDARD OPERATING PROCEDURE FOR CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST ON COHESIVE SOILS

8.0 HEALTH AND SAFETY

Laboratory safety procedures, as defined in KEMRON's *Chemical Hygiene Plan*, are followed during Consolidation-Undrained Triaxial Compression Test on Cohesive Soils testing. A copy of this plan is maintained by the Corporate Health and Safety Coordinator, and is reviewed and executed by all KEMRON personnel.

9.0 QUALITY ASSURANCE / QUALITY CONTROL

9.1 The data calculated by the program is checked by an individual not involved with the testing to ensure that no mistakes have been incorporated into the spreadsheet.

9.2 The engineer, or physical properties laboratory director, then manually and visually checks the material tested and compares his or her observations to the test results reported. The reviewing engineer or laboratory director is ultimately responsible for all final review and quality control of the analyses and the data generated. Upon final approval of the data and data interpretations, the engineer will initialize the original data sheets. All original data sheets and analyzed data will be maintained in the physical properties project files. A copy of the finalized test results will be submitted to the appropriate project manager and the client.

10.0 REFERENCES

ASTM D 2216 Method for Laboratory Determination of Water Content of Soil, Rock and Soil Aggregate Mixtures
ASTM D 2435 Test Method for One-Dimensional Consolidation Properties of
ASTM D 4767 Test Method for Consolidated Undrained Triaxial Compression Test on Cohesive Soils

1.0 SUMMARY

This Standard Operating Procedure (SOP) establishes a standard method for testing and evaluating the unconfined compressive strength (UCS) of solidified and undisturbed samples. This procedure provides all departments with a method for determining the UCS of a sample as defined by the American Society of Testing and Materials (ASTM) in accordance with either ASTM D 2166 or D 1633. This SOP addresses protocols for preparation of the sample, performance of the UCS test, and acquiring and reporting data. Quality assurance / quality control issues and health and safety considerations are also addressed.

2.0 EQUIPMENT

Load Frame (maximum capacity 10,000 pounds)
Load Cell Transducer (maximum capacity 6,000 pounds)
Linear Displacement Transducer (displacement range = 2.034 inches)
Digital Readout
Sample Extruder
Calipers (6 inch capacity, sensitive to 0.01 inches)
Balance (sensitive to 0.01 grams)
Oven (capable of maintaining 110ºC ±5ºC)
Aluminum Tins

3.0 EQUIPMENT CALIBRATION AND PREPARATION

3.1 The load cell is calibrated once a year by the manufacturer, or more frequently if deemed necessary by the laboratory director. Records of calibrations performed by Brainard Killman are available in the KEMRON Equipment Manual for UCS testing.

3.2 The UCS test equipment is prepared prior to each test.

3.2.1 Adjust the load frame until the test specimen will fit between the top and bottom plates. This can be done by raising and lowering the hexagonal adjustment nuts which secure the load cell assembly. Alternately, the sample can be fitted into

the load frame by simply turning the load frame switch to the right or **up** position. To increase the speed of movement depress the button labeled **Rapid up*dn**. Additionally, use a level to verify that the hexagonal adjustment nuts which secure the load cell assembly are at even heights. This helps to insure that the sample will be crushed in a uniform manner. It is also important to begin testing with the bottom plate in the lowest position possible to assure the maximum travel capabilities of the load frame.

3.2.2 Clear the maximum previous load by simultaneously pressing the ⮜ and **S** buttons on the top liquid crystal display (LCD). This LCD is attached to the load cell and records the pressure being applied to the sample.

3.2.3 Tare the load frame by pressing the ⮟ button on the top LCD.

3.2.4 Set the control drive to the proper loading rate by pressing ⇑ or ⇓ arrows on the control drive. The control drive is the LCD attached to the load frame. The proper loading rate for UCS testing is defined as 1% strain per minute [Note: the loading rate for 2 inch (diameter) by 4 inch (height) samples should be 0.04 inches/minute and for 3 inch (diameter) by 6 inch (height) samples should be 0.06 inches/minute]. The load drive will only display the loading rate while the load frame is in motion.

4.0 SAMPLE PREPARATION

4.1 Put on appropriate PPE.

4.2 Carefully extrude the solidified sample from the cylindrical mold. For information on creating solidified samples, see KEMRON's SOP titled *Sample Preparation and Treatment*. If the sample to be analyzed is in an undisturbed sampling tube, it will be necessary to cut a 6 inch section from the tube. The bottom 2 inches of the tube should not be used for testing.

4.3 Once the sample has been extruded from the mold or tube, trim the sample to the desired length being careful to maintain at least a 2:1 ratio of height to

diameter. It is important that the sample is level at both ends, without any protrusions to ensure even loading.

4.4 Measure the height and diameter of the sample in triplicate to the nearest 0.01 inch. Record these values on the appropriate UCS data sheet. For height, measure diameter at 120˚ intervals. For length measure top, middle, and bottom.

4.5 Weigh the entire sample to the nearest 0.01 grams and record the mass on the UCS data sheet.

5.0 TESTING PROCEDURE

5.1 Place the sample on the base plate of the loading frame and raise the sample by turning the loading frame switch to **up** until the sample is securely held between the top and bottom plate. Care should be taken to avoid applying any pressure on the sample at this stage of the test. Insure that the sample is centered between these plates.

5.2 Lower the dial gauge close to its minimum point. Tare the dial gauge by depressing the ⩛ button on the lower LCD. Also, reset the maximum measured deformation by simultaneously depressing the ⩓ and **S** button.

5.3 Tare the load frame by pressing the ⩛ button on the top LCD. Reset the maximum applied load by simultaneously depressing the ⩓ and **S** button on the top LCD.

5.4 Verify that the proper loading rate is being used for the sample.

5.5 Make sure Up/Down button is not lit. Begin testing by turning the load frame switch to the left or **up** position. Record the deformation (lower LCD) at incremental loads (upper LCD) by reading the two LCD's simultaneously.

5.6 Continue to raise the load frame recording the load versus the deformation until several successive decreases in load occur signifying that the sample has failed or until not less than 15% strain has been achieved, then sketch on sample on

the data sheet. For a four inch length sample, strain (lower LCD) should reach at least 0.600.

5.7 Once the sample has failed by meeting either of the above criteria, turn the load frame switch to the right or **down** position and lower the bottom plate of the load frame until the sample can be removed from the load frame. The **rapid down** button can be depressed in order to lower the bottom plate in less time. Be careful not to let the load frame overtravel.

5.8 Record the maximum load by depressing the ⮝ button on the top LCD.

5.9 Perform a moisture content, in accordance with the procedures outlined in KEMRON's SOP titled *Procedure for Performing a Moisture Content Determination of Solidified and Soil Samples,* on material taken from the center of the crushed sample. Record all data from the moisture content determinations on the above-referenced data sheet.

6.0 DATA ACQUISITION AND REPORTING

6.1 Assign the sample a computer tracking code in accordance with KEMRON's SOP titled *Procedure for Sample Tracking for Analyses Associated with Physical Properties Testing.*

6.2 Enter the dimensions and weight of the sample measured in Sections 5.3 and 5.4. Also, enter the data corresponding to the moisture content determination. The computer automatically calculates the average height and diameter, the bulk density and dry density in accordance with KEMRON's SOP titled *Procedure for Performing Bulk and Dry Density Testing of Solidified and Undisturbed Samples.* The computer calculates the moisture content in accordance with KEMRON's SOP titled *Procedure for Performing a Moisture Content Determination of Solidified and Soil Samples.*

6.3 Enter the deformation readings and corresponding loads into the appropriate space in the spreadsheet. The computer calculates the stress in pounds per square inch (psi) and the strain in percent (%) using the following three equations:

$$\%E = D/H_o x\ 100$$

%E	=	% strain
D	=	Deformation (in inches)
H_o	=	Initial height of the sample (in inches)

$$A_{corr} = A_o/1\text{-}E$$

A_{corr}	=	Corrected cross-sectional area of the sample (in in^2)
A_o	=	Initial cross-sectional area of the sample (in in^2)
E	=	(%E)/100

$$\sigma = P/A_{corr}$$

σ	=	Stress [in pounds per square inch (psi)]
P	=	Load (in pounds)

The maximum stress of the sample is then recorded by the spreadsheet. A plot of the stress/strain curve is made by the spreadsheet.

6.4 Prior to finalization of the UCS data report, input the proper client identification number onto the graph. A three page data report is generated by the computer. The first page presents the recorded data and the data calculated by the computer. The second page presents the stress strain curve generated by the computer. The third page presents a summary of unconfined compressive strength testing, bulk density, wet density and moisture content.

7.0 HEALTH AND SAFETY CONSIDERATIONS

Proper PPE- Gloves and safety glasses.
Laboratory safety procedures, as defined in KEMRON's Chemical Hygiene Plan, are followed during UCS testing. A copy of this plan is maintained by the Corporate Health and Safety Coordinator, and is reviewed and executed by all KEMRON personnel.

8.0 QUALITY ASSURANCE / QUALITY CONTROL

8.1 The data calculated by the spreadsheet is checked by an individual not involved with the testing to insure that no mistakes have been incorporated into the spreadsheet.

8.2 The engineer, or physical properties laboratory director, then manually and visually checks the material tested and compares his or her observations to the test results reported. The reviewing engineer or laboratory director is ultimately responsible for all final review and quality control of the analyses and the data generated. Upon final approval of the data and data interpretations, the engineer will initialize the original data sheets. All original data sheets and analyzed data will be maintained in the physical properties project files. A copy of the finalized test results will be submitted to the appropriate project manager and the client.

9.0 REFERENCES

ASTM D 2166 *Standard Test Method for Unconfined Compressive Strength of Cohesive Soil,* Annual Book of Standards, Volume 04.08, March 1992.

ASTM D 1633 *Standard Test Method for Compressive Strength of Molded Soil-Cement Cylinders,* Annual Book of Standards, Volume 04.08, March 1992.

1.0 SUMMARY

This Standard Operating Procedure (SOP) establishes a standard method for determining the hydraulic conductivity of solidified samples. The procedure is performed in general accordance with American Society of Testing and Materials method ASTM D 5084-03 C.

2.0 SCOPE

This procedure provides all departments with a method for determining the hydraulic conductivity of solidified samples. The method also addresses equipment calibration and preparation, sample preparation and set up, saturation, consolidation, permeation, sample break-down, data acquisition, equipment cleaning and storage, quality control/assurance, safety and health considerations, and references.

Several terms and symbols are used in this SOP in describing the procedure for conducting hydraulic conductivity testing. The following list gives an explanation of the terms and symbols employed in the procedure.

N - Capital letters in bold italics represent panel and permeameter valves as labeled in figure 1.

vent - Small letters in underlined italics represent valve positions as labeled in figure 1.

15 - Underlined numbers represent valves as labeled in figure 2.

3.0 EQUIPMENT CALIBRATION AND PREPARATION

3.1 The panels are calibrated once every six months.

3.1.1 The volume of water held in the annulus per ml measured on the pipette has been determined for each position on each panel. This was done by filling the annulus with water to the zero mark on the pipette and lowering the water level in the pipette to approximately 24. Then valve ***N*** was turned to *both* until the water level in the annulus fell by

1 ml as measured by the marks on the pipette (refer to figure 1 for valve and valve position). The amount of water in the annulus, as measured per ml in the pipette, can be read as the amount of water increase in the pipette.

3.1.2 The baseline hydraulic conductivity for each panel is determined by running a calibration permeability test. The calibration test is set up in general accordance with this SOP. A sample, however, is not used. Instead, two porous stones and two filter papers are set up in the permeameter without a sample between the two filter papers.

3.1.3 The annulus and the pipette are used during calibration tests to measure influent and effluent water volume. In addition, saturation and consolidation are assumed to be immediate. In all other respects the test is run in the same manner as described in the remainder of this standard operating procedure.

3.1.4 The most recent panel calibration data can be found in the KEMRON Equipment Manual

3.2 The first step in equipment preparation is to drain all water from panel pipettes and annuluses (Note: pipettes and annuluses should be kept empty during panel down times). This is done by turning valve ***N*** to ***both***, valve ***P*** to ***off***, and valve ***O*** to ***drain***.

3.3 Make deaired water.

3.3.1 Drain all water from the Nold Deaerator by turning valve ***E*** to ***drain*** and valve ***D*** to ***vent***.

3.3.2 Fill Nold Deaerator with fresh water by turning valve ***D*** to ***vent*** and valve ***E*** to ***fill***. The Deaerator is full when the water level has come within approximately 4 inches of the top, at which point valve ***D*** is turned to the ***off*** position. Be careful not to overfill the deaerator.

3.3.3 Turn on panel vacuum pump and then turn valve ***D*** to ***vacuum***.

3.3.4 Plug in the Nold Deaerator and allow it to run for approximately five minutes until the release of dissolved air has been slowed.

3.3.5 Unplug the Nold Deaerator followed by switching off the vacuum pump.

3.3.6 Turn valve ***D*** slowly to *vent*, thereby releasing the vacuum.

3.4 Place the porous stones in a beaker filled with deionized water.

3.5 Clean perm cells (perm cells should already be clean) and check pore pressure gauge connections to insure that they are connected with the proper calibrated position on the pore pressure transducer. Information concerning which pore pressure transducer connects to which outlet in the digital readout can be found in the Kiber Equipment Manual.

4.0 SAMPLE PREPARATION AND TEST SET UP

4.1 Assign a computer tracking code to the sample.

4.2 Extrude solidified samples from plastic molds in the following manner:

4.2.1 Cut the bottom of the mold off with a utility knife.

4.2.2 Cut the remainder of the mold from the sample being careful not to scar the sides of the sample with the utility knife.

4.3 Record the initial conditions of the sample.

4.3.1 Trim the top and bottom of the sample equivalent amounts to attain the desired sample height (Note: The sample should have a minimum diameter and height of 1 inch and shall be at least 6 times greater than the largest particle size within the specimen)

4.3.2 Measure and record the height and diameter of the sample in triplicate

to the nearest one hundredth of one inch on the permeability set up sheet. The sample should be at least 1:1 ratio but not much more. Therefore, In some cases the sample may need to be cut down to satisfy the 1:1 ratio.

4.3.3 Measure and record the weight of the sample to the nearest one hundredth of one gram.

4.4 Set up sample in permeameter.

4.4.1 Disassemble permeameter (Note: Set chamber wall on its side only!)

4.4.2 Place a moist paper towel on the chamber base around the bottom pedestal (Note: This protects the groove and o-ring in the chamber base from dirt and grit which may cause the chamber to leak).

4.4.3 Assemble sample in the following order: bottom pedestal, porous stone, wetted filter paper, sample, wetted filter paper, porous stone, and top pedestal (refer to figure 3).

4.44 Dry plastic membrane and apply talc powder to the inside and outside of the membrane.

4.4.5 Take 3" diameter metal cylinder and stretch the membrane over the bottom lips approximately ½ inch.

4.4.6 Turn on the vacuum and open the crimp.

4.4.7 Pull the membrane over the top lip.

4.4.8 Ensure a smooth surface on the inside. Uncrimp the vacuum hose and turn off the vacuum.

4.4.9 Place the metal cylinder over the sample in the apparatus and release the membrane over the top lip and then the bottom lip.

4.4.10 Put rubber grommet around the bottom position of the metal cylinder.

Place cylinder over the sample. Slide off the plastic grommet and glide it into the groove on the bottom pedestal. Wrap the membrane up over the plastic grommet.

4.4.11 Repeat 4.4.10 but now place over the top pedestal.

4.4.12 Place rubber bands around the sample. Ensure that the rubber band is above the bottom plastic grommet and below the top plastic grommet.

4.4.13 Attach lines to effluent (lines to pipette and annulus in position 3) to top pedestal, hand tighten, and then tighten a quarter of a turn with a wrench (be sure not to over tighten).

4.4.14 Clean the top and bottom of chamber walls with a soft cloth or moist paper towel (Note: The addition of a small amount of vacuum grease to the top and bottom of the chamber walls may be necessary to avoid leaks during testing).

4.4.15 Reassemble permeameter. Rotate the plastic cylinder to make sure that there is no dirt in the grooves. Place the cover on.

4.4.16 Hand tighten chamber bolts evenly to seal the chamber. Tighten each bolt slowly making sure that you apply even pressure to each bolt until they all are securely tightened. (Note: Do not tighten these bolts using a wrench).

4.4.17 Vent chamber by placing a quick connect in quick connect outlet 16 on the top of the chamber and connect the chamber to the 1st position on the panel using a 1/4" hose between quick connect outlet ***Q*** on the panel in position 1 and quick connect 15 on the chamber base.

4.4.18 Fill the chamber with deaired water from 1st position on the panel by turning valve ***N*** to *off*, valve ***O*** to H_2O, and valve ***P*** to *on*. When water begins to come out of the quick connect on top of the chamber,

disconnect it and turn valve ***P*** and ***O*** to *off*.

4.5 The permeability equipment is supplied with all teflon tubing and steel connections. Still, if the sample is extremely contaminated or a hazardous permeant is to be used for the test, a bladder system arrangement can be implemented to avoid allowing contaminants into the panels. A supplementary SOP explains the procedure for setting up a bladder system.

4.6 Bleed the air from the system.

4.6.1 To fill the columns, turn valve ***N*** to *both* and then valve ***O*** to H_2O (be careful not to overfill the columns).

4.6.2 Turn the valves on the panel as follows: valve ***M*** position 1 and 2 to *pressure* and for position 3 the should be on off (because position 2 is on autoload and should be the same as 3). Valve ***S*** to *bridge*, valve ***N*** to *both* for all positions, valve ***O*** to *off* for all positions, and valve ***P*** to *on* for all positions.

4.6.3 Adjust the pressure on position 2 to 5psi and position 3 to 7psi.

4.6.4 Open valve ***P*** to on for all positions and open valve 11. Then open valves 12 and 10. Record the time. Wait about 20 minutes.

4.6.5 Turn all valves off (12,10,11,13).

4.6.6 Turn valves 10 and 11 on at the same time and let about 2-3 ml bleed out the lines at a time then close valves 10 and 11. Turn valves 12 and 13 on at same time and let about 2-3 ml bleed out the lines at a time then close valves 12 and 13. Repeat this process alternating valve pairs 10 and 11 with 12 and 13. (BE SURE NOT TO LET ALL THE WATER DRAIN OUT OF THE COLUMNS) Some samples may take more then 12 mls to bleed. If the water gets low, turn valve

M to *vent* valve ***N*** to both and valve **O** to water and refill the columns

4.6.7 When all the air is out of the lines turn valves 12,10,11,and 13 off.

4.6.8 Close the pore pressure transducer bolt by screwing down and hand tightening.

4.6.3 Turn the valves on the permeameter as follows: valves 10, 11, 12 and 13 to *on* (valve is on when turned all the way to the left and off when turned all the way to the right). Then slowly open the pore pressure transducer connected over valves 11 and 13. This is done by unscrewing the top bolt.

4.6.4 Open and close valves 11 and 13 letting water flow out of the pore pressure transducer until no air is detected coming from the open pore pressure transducer and no air is visible in any of the system lines (Note: Do not let the pipette or annulus run out of water while bleeding the system of air).

4.6.5 Close the pore pressure transducer bolt by screwing down and hand tightening.

5.0 SATURATION

5.1 Turn valve ***K*** to *regulator 1* (Note: For panels #2 and #3 turn valve ***K*** to *auxiliary*). Position the panel valves as follows: valve ***M*** to *vent*, and valve ***O***, ***N*** and ***P*** to *off*.

5.2 Adjust chamber pressure to 2 psi by turning regulator 1 to the right. Then turn valves in the 1st position as follows: valve ***M*** to *pressure*, valve ***N*** to *both*, valve ***O*** to *off*, valve ***P*** to *on*.

5.3 Turn valve ***S*** (bridge valve) to ***bridge on*** position and valve ***K*** to ***regulator 2*** (digital readout should display 0 psi). Turn valve ***R*** to ***auto load on***.

5.4 Turn valve ***M*** in the 2nd position to ***pressure*** and valve ***N*** in the 2nd and 3rd position to ***both***. Valve ***O*** should still be at ***off*** for all positions, and valve ***M*** should be ***off*** for position 3.

5.5 Turn valve ***P*** to ***on*** for 2nd and 3rd positions, turn valves 12 and 10 on permeameter to ***on***.

5.6 Adjust back pressure to 5 psi with ***regulator 2*** and check cell pressure by turning valve ***K*** to ***regulator 1*** (should read 7 psi-adjust to 7 psi with Regulator 1). Record the time, date, cell pressure, and back pressure on the 2nd page of the permeability data sheets.

5.7 Turn on the pressure transducer and set to read the pore pressure for the correct panel. Pore pressure transducer is set up with button 1 reading panel 2, button 2 reading panel 3, and button 3 reading panel 1. Open valve 11 on permeameter and record pore pressure in the column labeled saturation pore pressure.

5.8 After 15 to 30 minutes close valve 10 and 12 on permeameter. Observe the pressure transducer readout for about 2 minutes to ensure that the pore pressure is not changing. A dropping pore pressure is an indication that the sample did not reached equilibrium at the given pressure and needs more time, an increasing pore pressure closed may indicate a leak in the membrane or air in the lines. If the pore pressure readings are not fluctuating to and raise cell pressure and back pressure 10 psi by turning ***regulator 2*** to the right. Once the cell pressure has been raised 10 psi, read the pore pressure displayed on the transducer and record this value under the column labeled test pore pressure. Turn valve 10 and 12 on the permeameter to the ***on*** position and record the new saturation pore pressure, the new cell pressure, the new back pressure, the time, and the technician's initials.

5.9 Check the B value at this point and note percent saturation. (Note: Kiber's standard procedure is to increase the back pressure in increments of 10 psi,

however if the requested consolidation pressure less than 10 psi, the maximum value of an increment in back pressure shall be sufficiently low as not to exceed the consolidation pressure.) Repeat step 5.8 until the sample is adequately saturated.

5.10 Verified saturation by measuring the B value. When computing the B values for the sample, the saturation data and the sample set up data are input into the permeability spreadsheet (see section 9.0 data acquisition).

5.11 If the B value (see section 9.4.4 for the equation) for the sample, as computed by the spreadsheet, reflects that the sample is done saturating (in general B ≥0.95), the engineer in charge will approve the sample for consolidation.

6.0 CONSOLIDATION

6.1 Turn valve ***P*** in all positions to *off* and valve ***K*** to *regulator 1*. Raise the cell pressure to the level necessary to develop the desired effective stress by turning regulator 1 to the right until the display reads the chosen pressure. Check that the back pressure is has not changed by turning valve ***K*** to *regulator 2* (adjust pressure if necessary and recheck cell pressure).

6.2 Turn valve ***M*** in the 1st and 2nd position to *vent*. Raise the water level in the annulus in all three positions to the zero mark by turning valve ***N*** to *annulus* and valve ***O*** to H_2O, making sure not to overfill. Lower the water level in the pipettes in the 2nd and 3rd positions until it reads about 24 to 25 ml by turning valve ***N*** to *pipette* and valve ***O*** to *drain*. Raise the water level in the pipette in the 1st position until it is between about 0 and 5 by turning valve ***N*** to *pipette* and valve ***O*** to H_2O. Leave valve ***N*** on *pipette* for all positions.

6.3 Turn valve ***M*** in the 1st and 2nd position to *pressure*. Record the time and the water levels in the cell pipette (1st position), the influent pipette (2nd position), and the effluent pipette (3rd position) in the appropriate places on sheet 3 of the data sheets.

6.4 Open valve ***P*** in all positions at the same time and record the water level in all

pipettes at 15 seconds, 30 seconds, 1 minute, 2 minutes, 5 minutes, 15 minutes, and 1 hour. Thereafter, resetting the columns may become necessary. Periodically record the water level in all pipettes at 1 to 2 hour intervals.

6.5 Plot the consolidation curve by inputting the data acquired at regular intervals into the permeability spreadsheet (see section 9.0).

6.6 Once the consolidation curve reflects that consolidation is complete and approval is obtained from the engineer in charge, permeation can be initiated.

7.0 PERMEATION

7.1 Close valve ***P*** in all positions and turn the bridge valve ***S*** to *off*.

7.2 Raise the water level in position 2 to approximately zero by turning valve ***M*** to *vent*, valve ***N*** to *pipette*, and valve ***O*** to H_2O in the 2nd position.

7.3 Lower the water level in position 3 to approximately 24 or 25 by turning valve ***M*** to *vent*, valve ***N*** to *pipette*, and valve ***O*** to *drain* in the 3rd position.

7.4 Check to see that valve ***M*** in all positions is turned to *pressure*, valve ***N*** in all positions is turned to *pipette*, valve ***O*** in all positions is turned to *off*, and valve ***S*** is turned to *off*. Also check the pressures for all regulators to confirm that the values correspond to those listed above.

7.5 Record the time, the date, the water levels in the pipettes in positions 2 and 3, the tester's initials, and the pressures at which all the regulators are set on the permeability data sheet number 5 of 6.

7.6 Turn valve ***P*** to *on* in all positions simultaneously and begin permeation.

7.7 In order to obtain data in a reasonable time frame the hydraulic gradient may be increased by applying a ΔP to the saturation burettes in the following manner:

7.8 Decrease the pressure on the effluent side to by 1 psi by turning valve ***K*** to

regulator 3, valve ***M*** in position 3 to *pressure*, and by turning regulator 3 to the right until the digital display reads the desired pressure

7.9 Increase the pressure on the influent side by 1 psi by turning valve ***K*** to *regulator 2*, valve ***M*** in position 2 to *pressure*, and by rotating regulator 2 to the right until the digital display reads the desired pressure.

7.10 Adjust the cell pressure back to the desired level by turning valve ***K*** to *regulator 1*, valve ***M*** in position 1 to *pressure*, and by rotating regulator 1 to the left or right.

7.11 Check to see that valve ***M*** in all positions is turned to *pressure*, valve ***N*** in all positions is turned to *pipette*, valve ***O*** in all positions is turned to *off*, and valve ***S*** is turned to *off*. Also check the pressures for all regulators to confirm that the values correspond to those listed above.

7.12 Record the time, the date, the water levels in the pipettes in positions 2 and 3, the tester's initials, and the pressures at which all the regulators are set on the permeability data sheet number 5 of 6.

7.13 Turn valve ***P*** to *on* in all positions simultaneously and begin permeation.

7.14 Record the time, the date, the tester's initials, the water levels in the pipettes in position 2 and 3, and the regulator pressures at periodic intervals ranging from 10 minutes to several hours depending on how fast the water in the pipettes is moving.

7.15 Input the data into the permeability spreadsheet as it is obtained (see section 9.0 for data entry).

7.12 At the end of each working day, reset the water levels in positions 2 and 3, turn valve ***P*** in all positions to *off*, turn valve ***S*** to *on*, and lower the back pressure to the original consolidation levels

7.13 In the mornings follow steps 7.8 to 7.13.

7.14 When the water levels in the pipettes in positions 2 and 3 are approximately even, reset the water levels as in steps 7.1 to 7.3. Record the time of reset and the new pipette water levels, then reopen valve ***P*** in all positions and continue permeation as before.

7.15 Periodically review the permeability values and the influent/effluent ratios calculated by the spreadsheet for the data input in step 7.11. If at leas four perm values computed by the spreadsheet are within 25 % of the average and the influent/effluent ratios are between 0.75 and 1.25 the perm can be considered complete.

7.16 Obtain the approval of the engineer in charge prior to termination of permeability testing.

8.0 SAMPLE BREAKDOWN

8.1 Close valve 12 and 10 on the permeameter by turning the valves all the way to the right.

8.2 Turn valve ***M*** in position 3 to *off* and turn valve ***S*** to *on*.

8.3 Lower the pressure in regulator 3 to 0 psi by turning valve ***K*** to *regulator 3* and rotating *regulator 3* to the left until the display reads 0.

8.4 Slowly lower the back pressure by turning valve ***K*** to *regulator 2* and rotating regulator 2 to the left until the digital display reads approximately 0 psi.

8.5 Slowly lower the remaining cell pressure to 0 psi by turning valve ***K*** to *regulator 1* and rotating *regulator 1* to the left until the digital display reads 0.

8.6 Turn valve ***N*** in all positions to *off*.

8.7 Connect a hose from quick connect ***G*** on the panel to quick connect 16 on the permeameter.

8.8 Turn valve ***O*** to *drain* and valve ***P*** to *on* in position 1. Turn valve ***F*** to *force*

drain to drain the water from the permeameter.

8.9 Once the water has drained from the permeameter, turn valve ***F*** to *off* and disconnect the hose at quick connect ***G*** and 16.

8.10 Disassemble the permeameter being careful to place the acrylic body of the device on its side.

8.11 Remove the O-rings and the latex membranes from the sample.

8.12 Remove the sample and measure the height three times, the diameter three times, the weight, and the moisture content of the sample. The moisture content is determined using the entire specimen. Record these values on data sheet 1 of 6 in the columns marked final specimen conditions.

9.0 DATA ACQUISTION

9.1 Call up the base permeability spreadsheet which is under the file name "000_PRM" on the disk labeled *Worksheets Disk* in the treatability office.

9.2 Enter all pertinent project information at the top of page 1 of 6 on the permeability spreadsheet. This data will automatically appear on the remaining pages of the spreadsheet.

9.3 Once saturation has been initiated, input sample set up data.

9.3.1 The sample set up data is input on page 1 of 6 of the spreadsheet. This includes the three diameters, three heights, the weight, and the moisture content recorded during step 4.2.

9.3.2 The spreadsheet automatically calculates the average diameter of the specimen and the average height. Based on these calculations the area, the volume, and the bulk unit weight are automatically computed.

9.3.3 The moisture content is computed automatically by the spreadsheet with the input of the weight of the moisture tin, the wet weight of the

soil plus the moisture tin, and the dry weight of the soil plus the moisture tin. From this value the initial dry unit weight of the sample is computed by the spreadsheet.

9.4 Input the saturation data as it becomes available.

9.4.1 The saturation data is entered on page 2 of 6 of the spreadsheet.

9.4.2 The test date, the initials of the technician running the test, the applied cell pressure, the applied back pressure, the saturation pore pressure, and the test pore pressure are input into the spreadsheet.

9.4.3 The spreadsheet calculates the change in cell pressure, the change in pore pressure and the B-Value at each point during saturation.

9.4.4 The B-Value is computed using the following equation:

$$\frac{CP2 - CP1}{PP2 - PP1}$$

CP1 = Initial Cell Pressure before raising the pressure.
CP2 = New Cell Pressure after the cell pressure has been raised.
PP1 = Initial Pore Pressure.
PP2 = New Pore Pressure.

9.5 The consolidation data is inputted as it becomes available.

9.5.1 The test date, technician's initials, the time (military), the elapsed time, and the water levels in all three pipettes are input into the spreadsheet on page 3 of 6.

9.5.2 The spreadsheet automatically computes the total time, the log time, the water in ml entering in pipette 1, the total water in ml exiting in pipettes 2 and 3, and the ratio of water entering in pipette 1 to the water leaving in pipettes 2 and 3.

9.5.3 The total water being pushed out of the sample is then graphed verse the log time automatically on page 4 of 6 of the spreadsheet.

9.6 The permeation data is inputted as it becomes available.

9.6.1 The test date, the technician's initials, the time (military), the influent and effluent water levels, and the gauge pressures are all inputted on page 5 of 6 of the spreadsheet.

9.6.2 The spreadsheet automatically calculates elapsed time, change in influent water level, change in effluent water level, hydraulic gradient, and the hydraulic conductivity of the sample. All of these calculations are displayed on page 6 of 6 of the permeability spreadsheet.

9.6.3 The equation used by the spreadsheet to calculate the hydraulic gradient is explained below:

$$G = \frac{(\Delta p/0.036)*2.54 + (\text{effluent water level} - \text{influent water level})}{l}$$

Δp = Difference in pressure between regulator 2 and regulator 3 in psi
G = Hydraulic gradient
l = Sample height in cm

9.6.4 The equation used by the spreadsheet to calculate the hydraulic conductivity is explained below:

$$k = \frac{al*\ln(G_1/G_2)}{2A*60*\Delta t}$$

k = Hydraulic conductivity cm/sec
a = Area of pipette cm^2
l = Length of sample cm
A = Area of sample cm^2
G_1 = Gradient at time 1
G_2 = Gradient at time 2

9.6.5 The average value of the hydraulic conductivity is computed and

displayed on the permeability spreadsheet on the summary page.

9.7 Input the final data from the breakdown of the sample.

9.7.1 The three final diameters and the three final heights measured are input on page 1 of 6 of the spreadsheet. The spreadsheet computes the average final height and final diameter.

9.7.2 The final weight and moisture content are entered on page 1 of 6 of the permeability spreadsheet. The final area, volume, bulk unit weight, and dry unit weight are then computed by the spreadsheet.

9.8 The summary page of the permeability spreadsheet displays the initial and final dry unit weight and moisture content as well as the average hydraulic conductivity.

10.0 EQUIPMENT CLEANUP AND STORAGE

10.1 The O-rings, latex membranes, top platen, and porous stones are decontaminated by thorough washing with a mild Alconox solution.

10.2 The latex membranes are dried with a paper towel. Some baby powder is then sprinkled over both sides of the membrane. The membranes are stored in folded paper towels in the left perm drawer below the panels

10.3 The O-rings are stored in the right perm drawer below the panels.

10.4 The base of the permeameter is cleaned with a soft cloth dipped in a mild Alconox solution. The base of the permeameter is then washed with water and dried with a paper towel.

10.5 The acrylic body and the top cap of the permeameter can be washed at the sink with a mild Alconox solution.

10.6 The permeameter is then reassembled with the porous stones.

10.7 All of the water is drained from the pipettes and annuluses on the panel by turning valve M to vent in all positions, valve N to both in all positions, and valve O to drain in all positions.

10.8 Several volumes of water are flushed in and out of the pipettes and annuluses of the panel. The pipettes and annuluses are then left empty of water.

11.0 SAFETY AND HEALTH CONSIDERATIONS

11.1 The general health and safety procedures prescribed by KEMRON's Laboratory Health and Safety Plan should be followed at all times while working in the laboratory.

12.0 QUALITY CONTROL / QUALITY ASSURANCE

12.1 Each step of the test is reviewed and approved by a registered engineer.

12.2 The general guidelines for insuring quality recommended by ASTM D 5084 are used in determining if a test is complete.

13.0 REFERENCES

13.1 ASTM D 5084-03 *Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter*.

13.2 U.S. Army Corp of Engineers Manual EM 1110-2-1906, Appendix VII.

13.3 EPA Method 9100.

ASTM D7263 (Method B)
SH0416 MOD 1
Density Testing at Various Temperatures
Bridgewater NJ Thermal Treatability Study
SH-0416
2/1/12
Rev 1

1. Remove the material from the cooler. Allow the material to reach ambient temperature.

2. Record the tare weight of one 2x4-inch cylindrical mold. Fill the mold to within approximately ½ inch from the top. Measure the height of the material in triplicate with a caliper. Weigh and record data. Temperatures to be evaluated will be 30, 50, 70, and 90 Celsius (C).

3. Place the samples in an oven set at the target temperature of 90 C.

4. Using a temperature probe, check the temperature of the heating material at approximately 15-minute intervals.

5. Monitor the material temperature until it reaches the target temperature (one each at 30 C, 50 C, 70 C, and 90 C). Once the target temperature is reached, remove, measure the sample height in triplicate, and weigh the sample.

6. Data is recorded on the Density Data sheet indicating the corresponding temperature. Significant observations during the test are also recorded on the Data Sheet.

1.0 SUMMARY

This Standard Operating Procedure establishes a standard method for operating the Brookfield Dial Viscometer, Model No. RVT.

2.0 SCOPE

This procedure provides all departments with a method for determining the viscosity of liquid and sludge-like materials.

3.0 EQUIPMENT

Brookfield RVT Viscometer Kit (mPa·S)
Spindles 1 through 7

4.0 ASSEMBLY

4.1 Refer to the Brookfield Engineering Laboratories, Inc., Operating Instructions, Manual No. M/85-150-P700, for assembly instructions.

5.0 CALIBRATION

5.1 The instrument is periodically sent to Brookfield for factory calibration.

6.0 TESTING PROCEDURE

6.1 Mount the guard leg (if used) on the viscometer. It's especially important to use the guard leg when using spindles #1 and #2.

6.2 Place 500 ml of sample into a 600-ml beaker. Ensure the sample is completely homogenized prior to testing.

6.3 Choose a spindle to use in the test. Use the higher numbered spindles for more viscous material, and the lower numbered spindles for less viscous material. To avoid trapping air bubbles under the disc-type spindles, immerse the spindle in a

diagonal path, slowly dragging the spindle across the fluid surface. Bring the spindle to an upright position and screw into the viscometer shaft.

6.4 Lower and center the spindle in the test material until the "meniscus" of the fluid is at the center of the immersion groove on the spindle's shaft.

6.5 Turn the motor switch "ON" to energize the viscometer drive motor. Allow time for the reading to stabilize. The reading needs to be between 10% and 100%. If the reading is not within this range, adjust the spindle speed up or down. If the meter reading is still out of range, attach a different spindle and repeat the procedure.

6.6 Note the spindle number, the spindle speed, and the viscometer reading. Refer to the table on page 7 of the operating manual, or the FACTOR FINDER included in the viscometer kit, to calculate the viscosity in mPa·s.

6.7 Turn the viscometer switch "OFF" when changing a spindle, changing samples, etc. Remove spindle before cleaning.

7.0 HEALTH AND SAFETY

Laboratory safety procedures, as defined in KEMRON's Chemical Hygiene Plan, are followed during viscosity testing. A copy of this plan is maintained by the Corporate Health and Safety Coordinator, and is reviewed and executed by all KEMRON personnel.

8.0 QUALITY CONTROL / QUALITY ASSURANCE

9.1 The data calculated by the spreadsheet is checked by an individual not involved with the testing to ensure that no mistakes have been incorporated into the spreadsheet.

9.2 The engineer, or physical properties laboratory director, then manually and visually checks the material tested and compares his or her observations to the test results reported. The reviewing engineer or laboratory director is ultimately

responsible for all final review and quality control of the analyses and the data generated. Upon final approval of the data and data interpretations, the engineer will initialize the original data sheets. All original data sheets and analyzed data will be maintained in the physical properties project files. A copy of the finalized test results will be submitted to the appropriate project manager and the client.

Procedure for Viscosity Testing at Various Temperatures with Off Gas Measurements
Bridgewater NJ Thermal Treatability Study
SH-0416
1/11/11

1. Remove the material from the cooler. Allow the material to reach ambient temperature.

2. Record the tare weight of 4- 600 ml beakers. Fill one beaker ¾ full of material, weigh and record. Fill the other 3 beakers with the same weight of material as the first sample. Temperatures to be evaluated will be 30, 50, 70 and 90 Celsius (C).

3. Place the 30 and 50 C samples in the water bath with a thermostat in the material.

4. Place the 70 and 90 C sample in an oven set at the target temperature of 90 C with a thermostat in the material.

5. Monitor the material temperatures until it reaches the target temperature (one each at 30 C, 50 C, 70 C, and 90 C).

6. Ensure the material is still at the target temperature and conduct viscosity testing using the Brookfield Dial Viscometer, Model RVT. Record the viscosity of the material at the target temperature. In the event the material is not at the target temperature, place the material back in the oven and monitor until the target temperature is reached and then conduct the viscosity testing.

7. Data is recorded on the attached Data Sheet. Significant observations during the test should be recorded on the Data Sheet.

GULF COAST ANALYTICAL LABORATORIES, INC
GCMS - VOLATILES
STANDARD OPERATING PROCEDURE

PROCEDURES: GCMSV-003
PAGE: 1 OF 21
EFFECTIVE DATE: 09/14/11
APPROVED BY:
QA/QC APPROVED:

SUBJECT — SCOPE AND APPLICATION

This is a purge and trap GC/MS method, which quantitatively identifies purgeable organic compounds. A list of target analytes is available in the LIMS.

A 5-mL water sample is purged, with helium at ambient temperature. The purgeable compounds are transferred to the vapor phase and are carried to the trap. Once the purging has been completed, the trap is heated and back flushed with helium to desorb the purgeable compounds onto the column. The compounds are then separated by their molecular weight, the column phasing and increasing temperature, and then detected by a mass spectrometer.

MATRIX — Water and Solids

REFERENCE — SW846 Methods 8260B, 5030B, 5030C, 5035A, 8000B, 8000C
NOTE: For North Carolina and South Carolina projects, Method SW846 8260B and 8000B must be used.

ANALYTE LIST — Refer to Appendix A

PRESERVATIVE — Cool <6°C Aqueous pH <2 with HCl and/or $Na_2S_2O_3$ (unless unpreserved requested)
Acrolein and Acrylonitrile pH 4-5 with $Na_2S_2O_3$, if unpreserved holding time is 3 days.

HOLDING TIME — Water - 14 days from sample collection when preserved in HCl
Solid - 14 days from sample collection
Solid – Encore™ Samplers – 48 hours to preservation/then 14 days to analysis

Water samples that are target for Styrene, Vinyl chloride, and 2-CVE must be collected without HCL preservation and analyzed within 7 days of collection. If samples for these analytes are received with HCl preservative, the data must be qualified with a narrative in the final report.

Specific projects may require non-acid preservation of water samples. If water samples are unpreserved the analysis must be performed in 7 days.

Water samples must be checked for pH preservation after analysis unless a vial

was provided for a pH check at sample receiving. Record the pH on the batch sheet. If the sample has a pH greater than 2 and the sample was analyzed after 7 days, narrate results.

DEFINITIONS See Appendix C

SAFETY Each employee is directly responsible for complete awareness of all health hazards associated with every chemical that he/she uses. The employee must be aware of these hazards, and all associated protective wear and spill clean-up procedures PRIOR TO the use of any chemical. In all cases, the applicable material safety data sheet (MSDS) and the supervisor or safety officer should be consulted. The bottle labels also provide important information that must be noted. Personnel performing this procedure may be working with flammables, poisons, toxins, carcinogens, teratogens, mutagens, and biohazards. In particular, approved gloves, safety glasses, and lab coats must be worn. In addition to other measures, solvents and chemicals must be handled in ventilated hoods.

INTERFERENCES Contamination can be related to impurities in the purge gas and solvent vapors in the lab. The system is shown to be free from contamination by running a reagent blank each 12-hour period.

Samples can be contaminated by diffusion of vapors through the septum seal during shipment and storage. A field blank can be prepared during sample collection and can act as a check for this type of contamination. Holding blanks are analyzed every two weeks to provide an additional check for this type of contamination. These holding blanks are stored in coolers C22, C30, and C4.

Contamination can also be seen when a low level sample is analyzed immediately after a high level sample. Freedom from contamination must be established before sample analysis is considered valid. After analysis of a sample containing high concentrations of volatile organic compounds, a blank should be analyzed to check for contamination. Alternatively, if the sample following the high concentration sample does not contain the volatile organic compounds present in the high level sample above quantitation limits, freedom from contamination has been established. If the blank or preceding sample shows contamination, analyze blanks until an acceptable blank is achieved and/or clean the purge vessel and bake trap. Reanalyze samples with potential carryover contamination.

INSTRUMENTATION & APPARATUS Agilent 6890 and 7890 GC with a 5973 or 5975 Mass Spectrometer coupled with a Teledyne Tekmar purge and trap and autosampler

HP5890 GC with 5972 Mass Spectrometer coupled with a Velocity XPT concentrator using a Solatek 72 or
Each instrument is assigned a maintenance logbook. All maintenance performed on the instrument must be recorded.

Target data acquisition system

Restek (Cat no. 19915) RTX-VMS 30m, 0.25um ID, 1.4 um df

Gas-tight syringes

Electronic Balance – capable of weighing to 0.01g

Volumetric flasks

44 mL VOA vials

2 mL autosampler vials

Glass culture tubes

Pasteur pipets

Magnetic stir bars

Scoopula spatulas

pH paper

REAGENTS

All organic solvent shall be of pesticide grade or equivalent. Label all containers and squeeze bottles with reagent ID, lot, and expiration date.
Water

Methanol – purge and trap reagent grade or equivalent

Blank sand

Sodium bisulfate

STANDARDS

All standards used must be pure material or from prepared certified solutions. The certificate of analysis shall be kept on file. Follow manufacturer's instruction for standard expiration and storage. Label all working standards using completed standard labels.

The following describes the standards used and their preparation:

1. All stock standards are received in glass sealed ampules.
   A. The following stock standards are used, as necessary to prepare solutions for calibration, CCV, LCS, and MS samples:
      A.1 Stock standard solutions – 1000mg/L (8260 mix)- Ultra Part# DWM-588 - commercially prepared certified solutions in methanol, stored at -15ºC ± 5ºC, until the documented manufacturer's expiration date.
      A.2 Stock standard solutions – 2000mg/L (ketone mix)- Ultra Part# CUS 12327 - commercially prepared certified solutions in 4:1 methanol/water, stored at -15ºC ± 5ºC until the documented manufacturer's expiration date.
      A.3 Stock standard – 2000 mg/L custom mix Ultra Part# CUS 12326 – commercially prepared certified solution in methanol, stored at -15ºC ± 5ºC, until the documented manufacturer's expiration date.
      A.4 Stock standard – Acrolein/Acrylonitrile (A–2000 mg/L; Vinyl Acetate – 400 mg/L) (AAV) NSI Part# Q2143 – commercially prepared certified solution in water, stored at 4ºC ± 2ºC, until the documented manufacturer's expiration date.
      A.5 Stock standard – 2-Chloroethyl vinyl ether (CVE)NSI Part# 17-04-15 – 1000 mg/L - commercially prepared certified solutions in methanol, stored at -15ºC ± 5ºC, until the documented manufacturer's expiration date.
      A.6 Stock standard – Appendix IX compounds – 2 mixes – 2500/200 mg/L Ultra Part# CUS 12032 and CUS 11407 – commercially prepared certified solutions in methanol, stored at -15ºC ± 5ºC, until the documented manufacturer's expiration date.
      A.7 Stock standard solutions – oxygenate mix (4 mixes – Ultra Part# CUS 11575, CUS 11651, CUS 11389, CUS 11390 - commercially prepared certified solutions in methanol, stored at -15ºC ± 5ºC, until the documented manufacturer's expiration date.
      A.8 Additional standards may be run that are project specific. All standards shall be certified and stored according to the manufacturer's instructions.

   B. Independent stock standards – standard mixes identical to those listed above from a secondary source or a secondary lot number from the same manufacturer. These standards are used to prepare the ICVs.

   C. Stock IS/SS mix – 5000 mg/L – Ultra Part# STM-541-1 – commercially prepared certified solution in methanol, stored at -15ºC ± 5ºC, until the documented manufacturer's expiration date. This solution is also used to prepare BFB tune check solution.

2. Secondary standards – Secondary standards are prepared by diluting the stock standard as described below. The first three standards listed in Table 1 and labeled 8260 are prepared together then transferred to 2mL ampule vials with minimum headspace and stored at –15°C ±5°C. These standards may be stored for up to 14 days. However, please note that for the individual vials, they should not be used for more than 7 days once opened. All other secondary standards are prepared as listed in Table 1, and then transferred to 2mL ampule vials with minimum headspace and stored at –15°C ±5°C. These standards may be stored for up to 6 months or until the manufactures expiration, whichever is sooner. Procedure for Volatile standard preparation:

   A. Assemble the necessary glassware, syringes and solvent. Purge and trap reagent grade methanol shall be used for all VOA standard preparation.

   B. Ensure that all glassware and syringes are clean and free of moisture by rinsing with at least three aliquots of methanol. Volumetric glassware should never be stored in or placed in heated ovens. The use of dedicated glass will help prevent cross-contamination of standards.

   C. Fill the volumetric glassware to volume with Methanol. Remove the appropriate amount of Methanol that will be replaced by the standard volume. Addition of standards shall proceed by adding the more highly volatile compounds last to prevent compound loss.

   D. Add the proper volume of standards using a syringe. Minimum agitation should occur upon adding the standard solution.

   E. After the addition of standard, the volumetric flask should be diluted until the meniscus reaches the calibration mark.

   F. Insert the glass stopper and mix by inverting three times.

   G. Cool the flask and its contents to approximately 5°C.

   H. Using a Pasteur pipette, transfer the standard to a 2 mL ampule. Seal the ampule immediately.

   I. Standards may be stored in mininert vials with minimal headspace.

   J. Label the vial with the following information:

      Standard Name
      Standard ID #
      Initials of Person Preparing Sample
      Date of Preparation
      Expiration Date

K. Store the vial the same as the stock standard.

L. Dispose of excess materials in accordance with established laboratory procedures.

M. Always quantitate new standards against known standards to ensure accurate concentration levels.

N. Fill out the standards logbook in accordance with proper laboratory.

O. A combined solution containing the internal standards and surrogates is prepared as the secondary standard. IS/SS is added automatically by the Solatek autosampler.

O.1 Internal standards - The recommended internal standards are Fluorobenzene, Chlorobenzene-d5, and 1,4-Dichlorobenzene-d4. Each calibration standard, blank, LCS, and sample undergoing GC/MS analysis must be spiked with 50 ug/L of the internal standard spiking solution prior to analysis. Different internal standards may be used as necessary.

O.2 Surrogate standards – The recommended surrogates are Toluene d-8, Bromofluorobenzene, 1,2 – Dichloroethane-d4, and Dibromofluoromethane. Each, blank, LCS, and sample undergoing GC/MS analysis should be spiked with 50 ug/L of the surrogate spiking solution prior to analysis. Different surrogate standards may be used as necessary.

Table 1
Secondary Standards

	Stock Conc.	Initial Vol.	Final Vol.	Final Conc.	Solvent
8260 mix	2000 mg/L	1.25 mL	10 mL	250 mg/L	Methanol
8260 custom	2000 mg/L	1.25 mL	10 mL	250 mg/L	Methanol
8260 Ketones	2000 mg/L	1.25 mL	10 mL	250 mg/L	Methanol
CVE	1000 mg/L	2.5 mL	10 mL	250 mg/L	Methanol
AAV	2000/400 mg/L	1.25 mL	10 mL	250/50 mg/L	Deionized water
APP IX Mix 1	2500 mg/L	1.0 mL	10 mL	250 mg/L	Methanol

	Stock Conc.	Initial Vol.	Final Vol.	Final Conc.	Solvent
APP IX Mix 2	various	2.5 mL	10 mL	various	Methanol
Oxygenate Mix 1	2000 mg/L	1.25 mL	10mL	250 mg/L	Methanol
Ethanol	250,000 mg/L	2.0 mL	10 mL	50,000 mg/L	Methanol
3,3-Dimethylebutanol	25,000 mg/L	2.0 mL	10 mL	5,000 mg/L	Methanol
IS/SS	5000 mg/L	2.5 mL	250 mL	50 mg/L	Methanol

3. The following working standards are prepared from the secondary standards and diluted in reagent water:
   A. Calibration standards are prepared at a minimum of five concentrations for all target compounds and surrogates (additional concentrations may be analyzed) from the secondary dilution of stock standards. Prepare these standards in deionized water. The calibration standards are prepared immediately before use at concentrations of 5, 20, 50, 100, and 200 ug/L for solids and waters using a 5mL purge. For waters using a 25mL purge prepare the standards at concentrations of 1, 2, 5, 10, and 25 ug/L. Each standard is prepared in a volumetric flask or a 5ml gas tight syringe. Lower concentration standards may be required to meet project requirements. The 8260 mix, ketones, gases, CVE, AAV, and surrogate standards (250 ug/L) are combined. The three APP IX mixes are also combined and are calibrated separately. Analysis of analytes not contained in any of the aforementioned standards may be calibrated for in combination with the 8260 mix, ketones, gases, CVE, and AAV if sufficient resolution is achieved, or may be calibrated for separately. 44mL of each standard is transferred to a 44mL VOA vial for water calibrations performed using the Solatek 72 autosampler. 5mL of each standard is transferred to a 44mL low bleed septa vial for solid calibrations.

   B. Initial calibration verification standard – Prepare a 50 ug/L standard from the secondary dilution of the independent stock standard (250/50 mg/L). The mixes are combined in the same manner as the calibration standards.

   C. LCS and Matrix Spiking Standards – spike at a concentration of 10 ug/L (25 mL purge) and 50 ug/L (5 mL purge and solids) using the working standards. For South Carolina, DOD, and AFCEE project, the LCS must be spiked with all target analytes.

RECOMMENDED CONDITIONS

The following lists conditions that may be used in the lab.
The analyst is allowed to modify settings to optimize operating conditions.

GC Instrument Conditions
Oven Temperature: 35°C
Rate A: 25°C/min to 180°C
Rate B: 45°C/min to 245°C
Hold: 2.26 min
Carrier Gas - Helium

Purge & Trap Conditions
Purge: 11 minutes at 30°C
Desorb Preheat: 205°C
Desorb: 1.5 minutes at 250°C
Bake: 6.5 minutes at 260°C

CHEMSTATION PROCEDURE

Due to shift overlaps which creates the probability that more than one analyst will be accessing a given instrument during a 12-hour tune sample batch, GCAL utilizes a master username and password to access Chemstation software. The password expires every 30 days and access to the passwords is granted by the GCMSV supervisor.

To Log In to Chemstation:

1. Enter “gcmsv” for the user name.
2. Obtain password from the GCMSV supervisor and enter the password when prompted by the Chemstation software.

To Change a Password

1. When a current password has expired, Windows prompts the user to enter current credentials including user name and password.
2. Once this information has been entered, the user is then notified that the password has expired and must be changed.
3. Enter a new password into the software when prompted, confirm the new password, and notify the GCMSV supervisor of the password change.

Chemstation Use

1. Chemstation use is limited to those employees who have been given password access by the GCMSV supervisor and are involved in the process of data production in the GCMSV laboratory. New employees are not granted password access until the GCMSV supervisor is satisfied that the

employee has been properly trained on its use. All employees listed on current organizational chart maintained by the QA/QC department are eligible for password access if granted by the GCMSV supervisor.

2. To create an audit trail, each line in the sequencing file represents a unique sample injection. The analyst that is programming the Chemstation and loading a particular sample must include their initials in the miscellaneous information field as part of the sample sequence. This information is then transferred to Target which is used for all data acquisition. Sequence files must be saved by analytical batch and include the date in the name. On days when multiple batches are performed, letters should be added to the data to denote different analytical batches. The format for individual sample sequencing is as follows:

TYPE	Vial	Data File	Method	Sample Name
"Sample"	Autosampler Position	Unique sequential ascending number	"8260"	GCAL sample number

Miscellaneous Information
GCAL Batch Number*Dilution Factor*Analyst Initials

* Please note, only the vial, datafile, sample name, and miscellaneous information fields are edited when programming sequences. Type and method fields always remain the same for each sequence file.

PROCEDURE

1. Procedures for instrument tuning

   A. The instrument should be tuned using FC-43 (perfluorotributylamine) such that all tuning criteria for BFB can be met (Table 2). Before analysis begins, each instrument must be tuned checked by direct injecting 2 uL of a solution containing 25 mg/L BFB or by purging an amount equivalent to 50ng of BFB standard.

   B. The mass spectrum of 4-Bromoflurorobenzene (BFB) is acquired by using the average of three scans: the peak apex scan and the scans immediately preceding and following the apex. Background subtraction is required using a single scan no more than 20 scans prior to the elution of BFB. The tune method is hard coded to perform the above functions and is checked manually if BFB tune criteria fails.

   C. The BFB tuning criteria in Table 2 must be met before proceeding with analysis. If these criteria cannot be met, the instrument should be manually tuned with FC-43. If tune criteria is still not met instrument maintenance is performed.

D. Once the BFB tune criteria have been met, the instrument is considered to be tuned for a twelve-hour period starting from the injection time of the BFB.

E. The instrument must be retuned before the twelve-hour period has elapsed if any major adjustments are made to the mass spectrometer that may affect the tuning criteria.

Table 2
BFB ACCEPTANCE CRITERIA

M/Z	ION ABUNDANCE CRITERIA
50	15 - 40% OF MASS 95
75	30 - 60% OF MASS 95
95	BASE PEAK, 100% RELATIVE ABUNDANCE
96	5 – 9% OF MASS 95
173	LESS THAN 2% OF MASS 174
174	50 - 120 OF MASS 95
175	5 – 9% OF MASS 174
176	>95 BUT <101% OF MASS 174
177	5 – 9% OF MASS 176

2. Procedures for initial calibration
   A. The initial calibration standards are prepared at a minimum of five different concentrations from the secondary dilution. Additional standards are usually included for specific compounds including a 0.2ppb, 0.4ppb, 1ppb, 2ppb, and 10ppb.

      The calibration range is defined as the on-column concentration range.
      1. At least five contiguous points must be used (six if a quadratic curve fit is employed).
      2. Calibration acceptance criteria must be met as described below.
      3. The lowest calibration point must support the lowest reporting limit needed in the associated samples.
      4. The QC spike amount must be within the calibration range.

   B. The standards are analyzed in the following sequence:

      B.1. BFB (50 NG)
      B.2. 5 PPB initial calibration
      B.3. 20 PPB initial calibration
      B.4. 50 PPB initial calibration
      B.5. 100 PPB initial calibration
      B.6. 200 PPB initial calibration

Note: These are the routine concentrations analyzed. In all cases the standards shall be run from lowest concentration to highest, or a blank shall be run following a high concentration standard (standards greater than 50 ppb) to establish a contaminant free instrument.

C. Once the five levels of standards have been analyzed, the validity of the initial calibration must be verified by comparing the SPCCs and CCC's to the following criteria.

C.1. Calibration check compounds (CCC) listed below must be ≤ 30 % RSD.

CCC's	% RSD
1,1-Dichloroethene	<30%
Chloroform	<30%
1,2-Dichloropropane	<30%
Toluene	<30%
Ethylbenzene	<30%
Vinyl Chloride	<30%

C.2. System Performance Check Compounds (SPCC) must have a minimum (RF) as indicated. All SPCC's must be evaluated at each level of the calibration curve to insure that compound instability and degradation are checked as required by the method.

SPCC's	MINIMUM RF
Chloromethane	0.1
1,1-Dichloroethane	0.1
Bromoform	0.1
1,1,2,2-Tetrachloroethane	0.3
Chlorobenzene	0.3

D. Additionally one of the following options must meet criteria. The analyst will judge criteria in the order given or with prior knowledge of the behavior of target compounds. One of the following must pass before a calibration is considered acceptable:

D.1 All target analytes have an RSD less than 15%.

D.2 A first order least square regression may be used if $r^2 \geq 0.995$. The curve shall not be forced through zero. The analyst should check the y-intercept (b). If the intercept is greater than half the reporting limit, this option cannot be used.

D.3 A quadratic curve fit is used with the coefficient of determination $r^2 \geq 0.990$. A minimum of a six-point calibration is used if this option is chosen and the curve shall not be forced through zero. The analyst should check the y-intercept (b). If the intercept is greater than half the reporting limit, this option cannot be used. The quadratic calibration option is not allowed for South Carolina

projects.

D.4 Alternatively, if the analyte is listed as a poor performer and does not meet the criteria listed above, the data may be reported with a narrative if authorized by the client. NOTE: Compounds cannot be classified as poor performers for South Carolina projects.

D.5. If a CCC compound is a target analyte, then it must exhibit and average %RSD of <15%. If the average %RSD is >15% but <30%, it may be evaluated using a linear or quadratic curve fit.

E. If the initial calibration does not conform to the above listed criteria, corrective action must be taken.

F. The position of the retention time should be set using the mid-point of an initial calibration, and must be checked and reset as necessary after source cleaning or column maintenance.

3. Initial Calibration Verification

A. Immediately following the initial calibration procedure or before sample analysis, the analyst shall perform initial calibration verification (ICV). This will consist of a solution containing all target analytes prepared from a standard that is independent (second source) from the standards used for the initial calibration.

B. The ICV must be analyzed following the initial calibration. The ICV must exhibit a recovery of 70-130%, except for the targets listed in Table 3, which must be recovered between 60-140%. Recovery requirements may differ on a project specific basis. See SOP GEN-019. All analytes must exhibit a recovery of 70-130% for South Carolina samples.

C. If any target analyte recovery is outside the control limits, corrective action must be taken (project specific exceptions may apply). This may include instrument maintenance, re-analysis of the ICV or initial calibration, or re-preparation of the standards involved. If the target fails high and is not present in the associated samples, the data may be reported with a narrative.

4. Procedures for Continuing Calibration

A. The 50 PPB continuing calibration is analyzed in each batch after acceptable BFB tune and before samples. The following criteria shall be achieved before sample analysis:

A.1 CCC's must meet the specified criteria for all target analytes. Calibration Check Compounds (CCC's) are allowed no greater than 20% difference from the initial calibration if calibration option 2.D.1 or 2.D.4 is used or % drift ≤20% if a linear or quadratic calibration option was used. The quadratic calibration option is not allowed for South Carolina projects.

A.2 System performance-check compounds (SPCC's) are required to maintain a relative response factor (RF) as indicated in 2C.2.

A.3 All target analytes should have a %Difference ≤ 20% from the initial calibration if calibration options 2.D.1 or 2.D.4 were used or %Drift ≤20% of expected value if a linear or quadratic calibration option was used. All targets must have difference/drift ≤ 30%. Project specific limits may apply and are listed in the LIMS. The quadratic calibration option is not allowed for South Carolina projects.

NOTE: For Exxon samples any %differences/drift that exceed 20% for target analytes but meet the 30% in house criteria, should be narrated in the final report.

A.4 Some compounds have been classified as poor performers due to poor purging efficiency. These analytes are listed in Table 3 and are acceptable at ≤40% difference/drift. Poor performer exceptions are not allowed for South Carolina samples.

Table 3
Targets that exhibit poor purging efficiency

Acetone	Ethyl acetate
Acetonitrile	2-Hexanone
Acrolein	Isobutyl alcohol
Acrylonitrile	Methacrylonitrile
2-Butanone	4-methyl-2-pentanone
t-Butyl alcohol	Pentachloroethane
1,2-Dibromo-3chloropropane	Propionitrile
1,4-Dichloro-2-butene	Benzal chloride
1,4-Dioxane	1-Nitropropene
2-Chloropropene	1,3 Butadiene
Isopropyl ether	Tetrahydrofuran
2-Nitropropane	2,2,4-Trimethylpentane
2-Chloroethylvinyl ether	Ethyl ether
2-Butanol	Ethyl methacrylate
Cyclohexanone	Dicyclopentadiene
3-Dichloro-1-propene	n-Butanol
Allyl chloride	Methyl methacrylate
Chloroprene	Dichlorodifluoromethane
Bromomethane	TBA
3,3-Dimethylbutanol	t-Amyl Alcohol
Ethanol	Ethyl tertbutyl ether
tert amylmethyl ether	Tertbutyl formate

A.5 If the target analyte (not a CCC) has failed, the RF has increased, and there are no hits during sample analysis, the data is reportable with a narrative. Note: no failures are allowed for South Carolina projects.

A.6 The retention time for any internal standard shall not vary any more than 30 seconds from the mid- point standard of the most recent initial calibration.

A.7 The internal standard area must not deviate by more than a factor of two (-50% to + 100%) from the mid-point standard of the most recent initial calibration.

A.8 Project specific criteria may apply and may be more stringent. See SOP GEN-019.

B. If specified criteria are not met, corrective action must be taken. If no source of the problem can be determined after corrective action has been taken, a new initial calibration must be generated.

5. The purpose of the method blank is to ensure that the analytical system is free of contamination and carryover. The method blank is run at least once per batch (not to exceed 20 samples) before sample analysis. The method blank shall be handled in exactly the same manner as the samples that it represents.
   A. The following are a description of the three types of method blanks commonly used in routine analysis and the analysis and evaluation of storage blanks.
      A.1 Water - Water blanks require no special preparation. Fill a VOA vial with reagent water. Place the full 44 mL VOA vial on the SOLATek autosampler. 5 uL of the internal standard/surrogate standard will be added automatically.
      A.2 Low-level soil – Low-level soil method blanks require special preparation techniques. Place the 5.0 grams of sand in a 44 mL vial and add 5.0 mL of deionized water. Place on the autosampler. The SOLATek will add 5.0 mL of deionized water and the internal/surrogate standards.
      A.3 Medium/High level soil – medium/high level soil blanks are prepared by weighing 5.0 grams of sand into a 44 ml VOA vial. Add 5.0 ml Methanol. Shake the vial to extract any volatiles into the solvent. A 1000 uL extract aliquot is diluted to 50ml in a volumetric flask with deionized water. Place on the autosampler. The autosampler will add an amount of internal standard/ surrogate solution equivalent to 50ug/L. Document preparation of blank in logbook.
      A.4 Storage Blanks – A set of at least two storage blanks filled with reagent water are kept in each cooler used to store samples. Storage blanks are analyzed every two weeks. If there is detection above ½ the reporting limit, analyze the second vial to confirm the

detection. If the results are confirmed immediately notify QA of the affected blank, cooler tested, and storage time. All data must be filed in the appropriate logbook.

B. To prove a contaminant free system, no target analytes shall be detected in the method blank above one half the reporting limit except for common laboratory contaminants, which shall be less than the reporting limit. If any target analytes are detected above this level, data shall not be reported and samples must be re-extracted and re-analyzed unless the following apply:
   B.1 If a target analyte is detected above the reporting limit, data may be reported if the concentration is not greater than 10% of the measured concentration in associated samples. Include a narrative with the data.
   B.2 If a target analyte is detected in the method blank but there are no hits in the samples, the data may be reported with a narrative.
   B.3 If re-analysis is not possible, flag the associated samples and include a narrative in the report. Document the action taken.
C. The source of blank contamination shall be investigated and measures taken to eliminate future contamination.
D. Project specific criteria may apply and may be more stringent. See SOP GEN-019.

6. Procedure for Laboratory Control Spike (LCS/LCSD). An LCS and LCSD are included in each batch of up to 20 samples to demonstrate the system is in control. An LCSD is not required if an MS/MSD is performed. Routinely the LCS/LCSD will be spiked with the full list of 8260 analytes at 50ug/L. The CCV performed that day may be used as the LCS if allowed by the project. Check with the project manager for project specific spiking criteria; some projects may require all target analytes are spiked. The LCS is assessed using the following criteria:

NOTE: For all sample batches involving Exxon samples, the LCS/LCSD pair analysis must be independent of the CCV analysis.

A. The percent recovery is calculated for all analytes spiked (see Calculation section). Recoveries are compared to the appropriate control limits. In-house control limits are used if project specific limits have not been requested, and are available in the LIMS. Project specific control limits may be requested; check with the project manager for limits needed. For South Carolina samples, all analytes must be recovered at 70-130% of the expected value.

B. If a recovery is above the upper control limit and the sample results are below the reporting limit, the data may be reported with a narrative. All analytes must pass for South Carolina samples.

C. If a recovery is below the lower control limit, the batch must be re-analyzed unless it meets the requirements of a sporadic failure (see below). If a re-extraction is not possible due to insufficient sample volume, report the data with a narrative. All analytes must pass for South Carolina samples.

D. If the full list of target analytes is spiked, a small number of sporadic failures will be allowed. The failure cannot include a primary compound of interest as defined by the client. See Table 4 for the number of allowable failures. The failures are noted in the case narrative. These failures shall be monitored to ensure randomness. This shall be defined as not exceeding failure in 1 of 3 LCS determinations. If the same analyte fails repeatedly and is not included in Table 3, locate the source of the problem and perform corrective action. All analytes must pass for South Carolina samples.

Table 4
Number of Allowable Failures

Number of Analytes	Failures Allowed
<11	0
11-30	1
31-50	2
51-70	3
71-90	4
>90	5

E. If an LCS and an LCSD are analyzed, calculate precision using the RPD in the Calculation section, equation 2. Substitute the LCS and LCSD results for the MS/MSD. Precision is assessed using the criteria in the LIMS.

7. Procedures for Matrix Spikes

A. Analyze one matrix spike/matrix spike duplicate (MS/MSD) pair with each batch of up to 20 samples processed together. The purpose of the spikes is to confirm the matrix being analyzed is not interfering with the recovery of the analytes.

B. The MS/MSD spike includes the full 8260 list of analytes; the spiking level is 50 ug/L. Check with the project manager for project specific spiking criteria; some projects may require all target analytes are spiked.

C. Calculate % recovery for all compounds using Calculations equations 1 and 2. All compounds are evaluated to determine acceptance of the

MS/MSD. Acceptance criteria for MS/MSD are located in Appendix B of this SOP.

D. Whenever the MS and/or MSD recoveries are outside the control limits, check the LCS and LCSD to verify the system was in control, and include this in the case narrative.

E. Precision is calculated as %RPD. Acceptance criteria are listed in the LIMS. Failures are noted in the narrative.

F. Review data to verify that a lab error has not occurred (wrong spike amount, not spiked) before automatically identifying a failure as matrix interference.

G. If recoveries for both the MS/MSD are outside the control limits and the recoveries are similar, the data is reportable with a narrative stating the LCS recoveries were acceptable. The failure is attributed to sample matrix.

H. Native sample concentrations may be high in comparison to the spiking concentration and therefore an accurate recovery cannot be calculated. Document this in the case narrative. Additionally, soil weights may vary significantly for some MS/MSD pairs and will affect the RPD calculation.

8. QC and Sample Preparation:
   A. Aqueous sample - place the full 44 mL VOA vial on the SOLATek autosampler. 5 uL of the internal standard/surrogate standard will be added automatically. All dilutions must be prepared using volumetric flasks or performed by the autosampler. To prepare MB and LCS/LCSD samples use reagent water.

   B. Low-level soil – SOLATek autosampler is used, place the 5.0 grams of sample in a 44 mL vial and add 5.0 mL of reagent water. Place on the autosampler. The SOLATek will add 5.0 mL of reagent water and the internal/surrogate standards. To prepare LCS/LCSD samples use blank sand.

   C. Medium/High level soil and Concentrated Waste – medium/high level soil and concentrated waste samples are prepared by weighing 5.0 grams of sample into a 44 ml VOA vial. Add 5.0 ml Methanol. Shake the vial to extract the volatiles into the solvent. A 1000 uL extract aliquot is diluted into a 50ml volumetric flask containing deionized water. The contents are then transferred to a 44ml VOA vial. The SOLATEK autosampler will add the internal standard/surrogate solution to yield a concentration of 50ug/L. To prepare LCS/LCSD samples use reagent

water.

D. EnCore™ sampler (En Chem, Inc)
   D.1 Preservation – A 200g/L sodium bisulfate solution is prepared by weighing 200g of sodium bisulfate and bringing this to volume with deionized water, in a 1L volumetric flask. 5mL of this solution is added to a VOA vial and a magnetic stirring bar. Record the lot # of the sodium bisulfate solution in the sample prep logbook. Tare the balance. Dispense the contents of the EnCore™ sampler into the vial and record the weight of the sample.
   D.2 Load the vial onto the SOLATek autosampler. The autosampler will add 5 mL of deionized water containing the internal standard and surrogate standard.

9. Sample Analysis:
   A. Samples may be screened by GCAL.
      A.1 Reasons for screening may include but are not limited to the following:
         A.1.1 Inconsistent historical data
         A.1.2 Physical appearance of the sample
         A.1.3 Client notification of suspected high concentration of VOC's
         A.1.4 No historical data

      A.2 Samples that are deemed necessary for screening must have adequate volume for the screening process and the subsequent volume for the reportable analysis.

      A.3 Screening data is not reportable, as the screening analysis is performed on an instrument that has not met acceptable criteria for reportable analysis. The screening data may be provided upon client request, if applicable.

      A.4 The screening process is performed in an attempt to prevent contamination of instrumentation performing reportable analysis, thus reducing the possibility of carryover contamination from samples containing high levels of VOC's and resulting in instrument down time.

      A.5 Screening analyses are typically performed at a dilution factor in the range of 20 to 1000. Dilution factors may be performed outside of this range. Screening dilutions may be determined by, but are not limited to the following:
         A.5.1 Client notification of suspected high concentrations of VOC's
         A.5.2 Physical appearance of the sample

A.5.3 Historical data from similar projects

B. All samples are spiked with the following surrogates: 1,2-Dichloroethane-d4, Toluene-d8, Dibromofluoromethane, and Bromofluorobenzene
   B.1 All surrogates recoveries must be within the ranges as listed in Table 5 below.
   B.2 If any surrogate is below QC limits and target analytes are present, then the sample must be reanalyzed. If the same surrogate still fails in the same manner, then matrix interference is indicated and is included in the case narrative.
   B.3 If the recoveries for surrogates are above the upper control limits and no target analytes are detected, the sample is reported with a case narrative indicating surrogate recovery above control limits.
   B.3 Control limits are updated annually. Project specific control limits and corrective action may apply and may be more stringent. See SOP GEN-019. All project specific limits shall be in the LIMS.

Table 5

Surrogate	Water Recovery Limits	Solid Recovery Limits
1,2-Dichloroethane-d4	71-127	62-125
4-Bromofluorobenzene	78-130	62-127
Dibromofluoromethane	77-127	65-130
Toluene-d8	76-134	71-132

C. Internal Standards (IS) - All samples are spiked with Fluorobenzene, Chlorobenzene-d5, and 1,4-Dichlorobenzene-d4.
   C.1 The Internal Standard area for any internal standard must not deviate by more than (-50% to + 100%) from the daily CCV.
   C.2 The retention time of the IS in the sample must not shift greater than $\pm$ 0.5 min of the retention time of the corresponding IS in the CCV.
   C.3 If the sample fails any of the IS criteria it must be reanalyzed at the same dilution. If it is apparent that the IS is outside criteria due to interference from sample matrix, then contact the client to determine a course of action.
   C.4 Project specific criteria may apply and may be more stringent. DOD and AFCEE projects require the internal standard response drift be evaluated using the most recent ICAL mid-point with control limits of –50 to +100%.

D. All dilutions are prepared in volumetric flasks or by using the dilution feature on the autosampler. Dilute samples so that the on-column amount is approximately in the mid-range of the calibration curve.

E. Load samples onto Solatek 72 autosampler. Sample sequences should be

saved for future review, if needed.

F. Targets are qualitatively identified based on the retention time and on comparison of the analytes mass spectrum with a reference mass spectrum. A reference mass spectrum is generated using the same conditions of the method. In the reference mass spectrum three characteristic ions are identified, one of which is the primary characteristic ion. If there are not three ions, than any ion over 30% relative intensity may be used. The target is said to be present when the following criteria are met:
   F.1 The intensities of the characteristic ion(s) maximize within one scan.
   F.2 The RRT is within ±0.06 RRT units of the RRT of the standard.
   F.3 The relative intensities of the characteristic ion(s) agree within 30% of the relative intensities of these ions in the reference spectrum.
   F.4 Structural isomers may be identified as individual isomers if the height of the valley between them is less than 25% of the sum of the two peak heights.

G. Samples are quantitated once a positive identification has been made. The quantitation will be based on the area of the primary characteristic ion's EICP and the associated internal standard. Calculations are described in the calculation section. The quantitation ion used shall be the ion listed in the reference method(s) unless there are interferences. Qualifier ions shall be used as a replacement, if possible. If the quantitation ion used is not the ion listed in the reference method, this shall be documented and the documentation stored in the lab.

H. TICS may be reported if requested by manually entering data into the LIMS. If no TICS were found, and the client requested a TIC search, this shall be noted in LIMS. A data system library search is used for identification, and the concentration is estimated using an RF of 1 and the area and concentration of the internal standard with the closest retention time.

I. Manual integrations shall be performed as appropriate. The supervisor reviews manual integrations and the raw data is flagged. For additional information see SOP QA-010.

CALCULATIONS 1. MS % REC = $\frac{\text{MS Concentration-Sample Concentration}}{\text{spike added}} \times 100$

2. MSD % REC = $\frac{\text{MSD Concentration-Sample Concentration}}{} \times 100$

spike added

3. % RPD = $\frac{\text{MS-MSD}}{\frac{\text{MS + MSD}}{2}} \times 100$

4. Response Factor = $\frac{A_s \times C_{is}}{A_{is} \times C_s}$

$\overline{\text{As}}$ = Peak Area of analyte or surrogate
Ais = Peak Area of Internal standard
Cs = Concentration of the analyte or surrogate
Cis = Concentration of Internal standard

5. %Recovery = $\frac{\text{Concentration Found}}{\text{Concentration Added}} \times 100$

6. Concentration using RF:

Concentration (µg/L) = $\frac{(A_s)(C_{is})(D)}{(A_{is})(RF)(1000)}$

Concentration (mg/kg) = $\frac{(A_s)(Cis)(D)}{(A_{is})(RF)(W_s)(1000)}$

A_s = Area of peak for the analyte in sample
D = Dilution factor
RF = Mean Response factor from initial calibration (area/ng)
A_{is} = Area of internal standard in sample
C_{is} = Concentration of internal standard
W_s = Weight of sample

7. Concentration using linear curve fit:

Concentration (µg/L) = $[m(A_S/A_{IS})+b]C_{IS}D$

Concentration (mg/kg) =$[m(A_S/A_{IS})+b]C_{IS}D(5/W_S)$

m = Inverse of slope
A_s = Area of peak for the analyte in sample
A_{is} = Area of internal standard in sample
b = Intercept of the y-axis
C_{is} = Concentration of internal standard
D = Dilution factor
W_s = Weight of sample

8. For quadratic curve fit see Target3 Data Analysis Software Reference Guide page 3-17. The quadratic calibration option cannot be used for South Carolina projects.

9. Concentration of TICS:
Concentration (mg/kg) = $\frac{(A_s)(C_{is})(D)}{(A_{is})(1000)}$

A_s = Area of peak for the analyte in sample
D = Dilution factor
A_{is} = Area of internal standard in sample
C_{is} = Concentration of internal standard
W_s = Weight of sample (if aqueous sample $W_s = 1$ and report in (µg/L)

10. Calculations for various hydrocarbon ranges. See Appendix B

11. % Difference = $[(RF_I - RF_C) / RF_I\} \ 100$

RF_I = Average response factor from initial calibration
RF_C = Response factor from current verification check standard

12. % Drift = $\frac{|\text{Measured Conc} - \text{Spike Conc}|}{\text{Spike Conc}} * 100$

13. % RSD = (SD / X) 100

RSD = Relative Standard Deviation
X = mean of 5 initial RF's for a compound
SD = Standard Deviation of average RF's for a compound

REPORTING LIMIT Samples analyzed by Method 8260B have a routine reporting limit of 5 ppb for all analytes of interest with the exception of the following compounds:

Acetone – 25 ppb
Acetonitrile – 100 ppb
Acrolein – 25 ppb
Acrylonitrile – 25 ppb
1,4-Dioxane – 200 ppb
Isobutanol – 100 ppb
Methyl Ethyl Ketone – 25 ppb
Methyl Methacrylate – 100 ppb
Propionitrile – 100 ppb
Methylene Chloride – 10 ppb
Benzal Chloride – 20 ppb
n-Butyl Alcohol – 100 ppb
Ethyl Acetate – 100 ppb
Ethyl Ether – 100 ppb

Cyclohexanone – 100 ppb
Cyclohexane – 100 ppb
1,3-Butadiene – 10ppb
1,3-Dichloropropene – 10 ppb
1-nitropropane – 10 ppb
2-methyltetrahydrofuran – 20 ppb
2-methyltetrahydropyran – 10 ppb
2-nitropropane – 20
2-H-tetrahydropyran – 20 ppb
Allyl Chloride – 25 ppb
Chloroprene – 80 ppb
Cumene hydroperoxide – 20 ppb
Ethylene oxide – 100 ppb
Tetrahydrofuran – 100 ppb
Sec-Butanol – 10 ppb
t-Butanol – 10 ppb

Lower limits may be achieved for specific projects. Reporting limits are achieved by running a low level standard at the same level as the reporting limit. The RL should be at least 2X the MDL. Specific project criteria may apply. See SOP GEN-019.

DATA REVEIW

For data review procedures and checklist, please see SOP QA-002.

SOFTWARE TROUBLESHOOTING

The Tekmar Solatek 72 instruments utilize Tekmar software VOC TEKLINK Version 2.4.4647 to control the autosampler and purge and trap function. The Agilent GC/MS's utilize Agilent software MSD Chemstation Version D.02.00.275 to control the instrument and transfer data acquisition to Target Data Integration software. Target software is utilized to calculate all data. In the event of software malfunction for the Tekmar Solatek 72, please contact Tekmar technical support for troubleshooting help. In the event of software malfunction for the GC/MS, please contact Agilent technical support for troubleshooting help. In the event of software malfunction when using Target, please contact GCAL's IT Director for troubleshooting help.

METHOD PERFORMANCE

1. The method detection limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the value is above zero. The MDL actually achieved in a given analysis will vary depending on instrument sensitivity and matrix effects.

2. This method has been tested using purge-and-trap (Method 5030) in a single laboratory using spiked water. Using a wide-bore capillary column, water was spiked at concentrations between 0.5 and 10 ug/L. Single laboratory accuracy and precision data are presented for the method analytes in Table 6 of the 8260 method. Calculated MDLs are present in Table 1 of the 8260 method.

3. The method was tested using purge-and-trap (Method 5030) with water spiked at 0.1 to 0.5 ug/L and analyzed on a cryofocussed narrow-bore column. The accuracy and precision data for these compounds are presented in Table 7 of the 8260 method. MDL values were also calculated from these data and are presented in Table 2 of the 8260 method.

4. Single laboratory accuracy and precision data were obtained for the Method 5035 analytes in three soil matrices; sand; a soil collected 10 feet below the surface of a hazardous landfill, called C-Horizon; and a surface garden soil. Sample preparation was by Method 5035. Each sample was fortified with the analytes at a concentration of 4 ug/kg. These data are listed in Tables 17, 18, and 19 of the 8260 method. All data were calculated using fluorobenzene as the internal standard added to the soil sample prior to extraction. This causes some of the results to be greater than 100% recovery because the precision of results is sometimes as great as 28%.

5. In general, the recoveries of the analytes from the sand matrix are the highest, the C-Horizon soil results are somewhat less, and the surface garden soil recoveries are the lowest. This is due to the greater adsorptive capacity of the garden soil. This illustrates the necessity of analyzing matrix spike samples to assess the degree of matrix effects.

6. The recoveries of some of the gases, or very volatile compounds such as vinyl chloride, trichlorofluoromethane and 1,1-dichloroethene are somewhat greater than 100%. This is due to the difficulty encountered in fortifying the soil with these compounds, allowing an equilibration period, extracting them with a high degree of precision. Also, the garden soil results in Table 19 of the 8260 method include some extraordinary high recoveries for some aromatic compounds, such as toluene, xylenes, and trimethylbenzenes. This is due to contamination of the soil prior to sample collection, and to the fact that no background was subtracted.

POLLUTION PREVENTION

See QAPP Section 10.2

WASTE

MANAGEMENT See SOP GEN-009

Appendix A -8260 Analyte List

Acetone
Acetonitrile
Acrolein
Acrylonitrile
Benzene
Bromobenzene
Bromochloromethane
Bromodichloromethane
Bromoform
Bromomethane
2-Butanone (MEK)
n-Butylbenzene
sec-Butylbenzene
tert-Butylbenzene
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chloroethane
2-Chloroethylvinylether
Chloroform
Chloromethane
2-Chlorotoluene
4-Chlorotoluene
1,2-Dibromo-3-chloropropane
Dibromochloromethane
1,2-Dibromoethane
Dibromomethane
1,2 Dichlorobenzene
1,3 Dichlorobenzene
1,4 Dichlorobenzene
Dichlorodifluoromethane
1,1-Dichloroethane
1,2 Dichloroethane
1,1-Dichloroethene
cis-1,2-Dichloroethene
trans-1,2-Dichloroethene
1,2-Dichloropropane
1,3-Dichloropropane
2,2-Dichloropropane
1,1-Dichloropropene
cis-1,3-Dichloropropylene
trans-1,3-Dichloropropene
Ethylbenzene
2-Hexanone
Hexachlorobutadiene
Isopropylbenzene
p-Isopropyltoluene
Methylene Chloride
4-Methyl-2-pentanone
Methyl tert-butyl ether
Naphthalene
n-Propylbenzene
Styrene
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethene
Toluene
1,2,3-Trichlorobenzene
1,2,4-Trichlorobenzene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethene
Trichlorofluoromethane
1,2,3-Trichloropropane
1,2,4-Trimethylbenzene
1,3,5-Trimethylbenzene
Vinyl acetate
Vinyl chloride
m+p-Xylene
o-Xylene
Xylenes, total
1-Chlorohexane
DIPE
ETBE
TAME
tert-Butyl alcohol
1,2-Diethyl Benzene
1,3-Diethylbenzene
1,4-Diethylbenzene
Total Diethylbenzene

Appendix B

1. Calculations for Total Other VOC's

   The total ion chromatogram of a method 8260B gas chromatographic/mass spectrometric (GC/MS) analysis is integrated and peaks attributed to target analytes, internal standards, surrogates, and those compounds which may elute before Dichlorodifluoromethane and those compounds which may elute after 1,2,3-Trichlorobenzene are subtracted from the total peak area of the chromatogram. The total concentration of non-target volatile organic components is calculated and reported by relating the resultant ion peak area to the total ion peak area of an intern standard (Fluorobenzene) of known concentration (50ppb). An area report is loaded from the Samba server into the Filemaker program. After entering the minimum and maximum retention times (corresponding to the elution times of Dichlorodifluoromethane and 1,2,3-Trichlorobenzene, respectively) and the appropriate dilution factor, the area report is imported and results are generated.

2. Calculations for Other VOC's C6 and Lower

   The total ion chromatogram of a method 8260B gas chromatographic/mass spectrometric (GC/MS) analysis is integrated. A sum of all peak areas beginning with the elution of Dichlorodifluoromethane and ending with the elution of Hexane is generated. The total concentration of C6 components is calculated and reported by relating the resultant C6 area to the peak area of an internal standard (Fluorobenzene) of know concentration (50ppb). An area report is loaded from the Samba server into the Filemaker program. After entering the minimum and maximum retention times (corresponding with the elution times of Dichlorodifluoromethane and 1,2,3-Trichlorobenzene), the retention time for Hexane, and the appropriate dilution factor, the area report is imported and results are generated.

3. Calculations for Other VOC's C7 and Higher

   The total ion chromatogram of a method 8260B gas chromatographic/mass spectrometric (GC/MS) analysis is integrated. A sum of all peak areas beginning with the elution of Hexane and ending with the elution of 1,2,3-Trichlorobenzene is generated. The total concentration of C7 components is calculated and reported by relating the resultant C7 area to the peak area of an internal standard (Fluorobenzene) of know concentration (50ppb). An area report is loaded from the Samba server into the Filemaker program. After entering the minimum and maximum retention times (corresponding with the elution times of Dichlorodifluoromethane and 1,2,3-Trichlorobenzene), the retention time for Hexane, and the appropriate dilution factor, the area report is imported and results are generated.

Appendix C

Glossary

ACCEPTANCE LIMITS – data quality limits specified by the test method or generated by the laboratory. Specified limits placed on an item, process, or service defined in the requirement document.

ACCURACY – a measure of how close a measured value is to a known true value. Accuracy is assessed by means of reference samples and percent recoveries of spiked samples. The degree of agreement between an observed value and an accepted reference value. Accuracy includes combination of random error (precision) and systematic error (bias) components which are due to sampling and analytical operations; a data quality indicator.

ALIQUOT – a discrete, measure, or representative portion of a sample taken for analysis.

ANALYTE – the chemical element or compound an analyst seeks to determine; the chemical element of interest.

ANALYTICAL BATCH – the basic unit for analytical quality control, defined as samples that are analyzed together with the same method sequence and the same lots of reagents and with the manipulations common to each sample within the same time period or in continuous sequential time periods. Samples in each batch should be of similar composition (e.g., groundwater, sludge, ash).

ANALYTICAL SAMPLE – any solution or media introduced into an instrument on which an analysis is performed, excluding instrument calibration, initial calibration verification, initial calibration blank, continuing calibration verification, and continuing calibration blank. The following are all analytical samples: undiluted and diluted samples (EPA and non-EPA), predigestion spike samples, duplicate samples, serial dilution samples, analytical spike samples, post digestion spike samples, interference check samples (ICS), CRDL standard for AA(CRA), CRDL standard for ICP(CRI), laboratory control sample(LCS), preparation blank(PB), and linear range analysis sample(LRS).

ANALYST – the designated individual who performs the “hands on” analytical methods and associated techniques and who is the one responsible for applying required laboratory practices and other pertinent quality controls to meet the required level of quality.

AREA UNITS – a term used in gas chromatography that indicates the peak area of a compound exiting a chromatographic column. The size or area of the peak is proportional to the amount of analyte in the sample.

ATOMIC ABSORPTION (AA) – a technique for analyzing metal using an element-specific lamp that emits a characteristic light spectrum. A sample is heated in a flame or graphite furnace and the light beam is passed through it. When the sample absorbs light, an energy loss is detected and is translated into a concentration of metal in the sample. This technique detects one metal at a time.

AUDIT – a systematic check to determine the quality of some function or activity. Two basic types are performance audits and system audits. Perform audits involve a quantitative comparison of the laboratory's results to those of a proficiency sample containing known concentration of analytes. A system audit is a qualitative evaluation that normally consists of an onsite review of a lab's quality assurance system and physical facilities.

BACKGROUND CORRECTION – a technique usually employed relative to metals analysis, which compensates for variable background contribution to the instrument signal in the determination of trace elements.

BATCH – environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents. A batch is composed of a maximum of twenty environmental samples. A preparation batch is composed of environmental sample of the same matrix, meeting the above-mentioned criteria and with a maximum time between the start of processing the first and last sample in the batch to be 24 hours. An analytical batch is composed of prepared environmental samples (extracts, digestates or concentrates) and/or those samples not requiring preparation, which are analyzed together as a group using the same calibration curve or factor. An analytical batch can include samples originating from various environmental matrices.

BIAS – the deviation of the mean of replicate analytical measurements from a reference analyte concentration. Relative bias is represented by analytical measurement mean minus the reference analyte concentration and the difference divided by the reference analyte concentration. See accuracy and precision.

4-BROMO-FLUOROBENZENE (BFB) – the compound used to check the tuning of the instrument, and is used as a surrogate compound spiked into every sample for volatile analysis. A compound utilized in EPA gas chromatography/mass spectrometry (GC/MS) volatile methods to establish mass spectral instrument performance.

BIOCHEMICAL OXYGEN DEMAND (BOD) – A measure of the amount of oxygen consumed in the biochemical processes that break down organic matter in water. A larger BOD value indicates a greater degree of organic pollution. A related term, BOD5, is the amount of dissolved oxygen consumed in five days.

BIOSEED – the bacterial culture used to inoculate a sample for testing.

BLANK – an artificial sample designed to monitor the introduction of artifacts into the measurement process. For aqueous samples, reagent water is used as a blank matrix. There are several types of blanks, which monitor a variety of processes:1.) *laboratory blank* is taken through sample preparation and analysis only. It is a test for contamination in sample preparation and analyses. 2.) *storage blank* is stored and analyzed with samples at the laboratory. It is a test for contamination in sample storage as well as sample preparation and analysis. 3.) *trip blank* is shipped to and from the field with the sample containers. It is not opened in the field and, therefore, provides a test for contamination from sample preservation, site conditions, and transport as well as sample storage, preparation, and analysis. It is most commonly used for volatile organics. 4.) *field blank* is opened in the field and tests for contamination from the atmosphere as well as those activities listed under the trip blank.

BNA – base, neutral and acid extractable compounds. The term base, neutral and acid refer to the pH condition of the sample undergoing extraction. Certain compounds extract more efficiently from water under acidic conditions. Such compounds are often referred to as "acid extractables."

CALIBRATE – to determine, by measurement or comparison with a standard, the correct value of each scale reading on a meter or other device, or the correct value for each setting of a control knob. The levels of the applied calibration standard should bracket the range of planned or expect sample measurements.

CALIBRATION – The systematic determination of the relationship of the response of the measurement system to the concentration of the analyte of interest. Instrument calibration performed before any samples are analyzed is called the initial calibration. Subsequent checks on the instrument calibration performed throughout analysis are called continuing calibration verification.

CALIBRATION BLANK (CB) – a volume of reagent water in the same matrix as the calibration standards but without the analyte.

CALIBRATION CURVE – the graphical relationship between the known values, such as concentrations, of a series of calibration standards and their analytical response.

CALIBRATION METHOD – a defined technical procedure for performing a calibration.

CALIBRATION STANDARD – a certified material used to calibrate an instrument.

CERTIFIED REFERENCE MATERIAL (CRM) – reference material, one or more of whose property values are certified by a technically valid procedure, accompanied by or traceable to a certificate or other documentation which is issued by a certifying body. (ISO Guide 30)

CONTINUING CALIBRATION VERIFICATION (CCV) – used to evaluate the performance of the instrument system with respect to a defined set of method criteria. The CCVs are used to verify instrument performance during analysis. The CCV shall be prepared from the same stock standard solution used to prepare the calibration curve.

CHAIN-OF-CUSTODY–Procedures and associated documents designed to trace the custody of a sample from the point of origin to final disposition, with the intent of legally demonstrating that custody remained intact and the tampering or substitutions were precluded.

CHEMICAL OXYGEN DEMAND (COD) – A measure of the oxygen required to oxidize all compounds in water, both organic and inorganic.

COMBINED STANDARD UNCERTAINTY – The standard uncertainty of the analytical measurement result that is the sum in quadrature (square-root-of-the-sum-of-the-squares) of the component standard uncertainties.

CORRECTIVE ACTION – the action taken to eliminate the causes of an existing non-conformity, defect, or other undesirable situation to prevent reoccurrence.

COVERAGE FACTOR – the numerical factor used as a multiplier of the combined standard uncertainty to expand the uncertainty corresponding to a specific level of confidence. The Student's *t*-distribution is used for determining the coverage factor.

DEMONSTRATION OF CAPABILITY (DOC) – a procedure used to establish the ability of the analyst to generate acceptable accuracy.

DEIONIZED WATER (DI) – water from which the majority of ions have been removed. Water that is contaminant free and used in the laboratory, the resistivity should be ≤ 18 megaohms.

DISSOLVED METALS –- metallic elements determined on a water sample that has been passed through a 0.45-um filter.

DISSOLVED OXYGEN (DO) – the oxygen freely available in water, an indicator of water quality.

DISSOLVED SOLIDS – disintegrated organic and inorganic material contained in water. Excessive amounts make water unfit to drink or use in industrial processes.

DRY WEIGHT – the weight of a sample based on percent solids. The weight of a sample after drying in an oven at a specified temperature.

DUPLICATE MEASUREMENT – a duplicate measurement is a second measurement made on the same or identical sample of material to assist in the evaluation of measurement of variance.

DUPLICATE SAMPLE – two samples taken from the same population and carried through certain stages of sampling and testing. Duplicate sample include field co-located duplicate samples, field-split duplicate samples, and laboratory duplicate subsamples.

EXPANDED UNCERTAINTY – the quantity defining an interval enveloping the analytical measurement that captures a large fraction of the distribution of analyte concentrations that could be attributable to the quantity measured. The combined standard uncertainty is multiplied by the coverage factor to calculate the expanded uncertainty.

EXTERNAL STANDARDS – a method of quantifying chromatographic data in which standards of known concentration are analyzed prior to unknown samples. The chromatographic peak area (or height) of a sample component is compared to a calibration curve of a peak area constructed from the standard data for that component. This comparison allows the concentration of the component in the sample to be determined.

FECAL COLIFORM BACTERIA – bacteria found in mammals' intestinal tracts. Their presence in water or sludge is an indicator of pollution and possible contamination by pathogens.

FLAME IONIZATION DETECTOR (FID) – a gas chromatography detector in which the column effluent gas is mixed with hydrogen and burned in air or oxygen. The ions and electrons produced in the flame generate an electric current proportional to the amount of materials in the detector. The FID responds to nearly all organic compounds, but it does not respond to air and water, which makes it exceptionally suited to environmental analysis.

FLASHPOINT – the lowest temperature at which a flammable liquid gives off sufficient vapor to form an ignitable mixture with air near its surface or within a vessel. Combustion does not continue.

GAS CHROMATOGRAPHY (GC) – a technique for detecting organic compounds by using their physical and chemical properties to separate a mixture. The compounds are identified and quantified with various types of detectors as they exit the chromatograph. Selection of detectors is dependent on the particular compounds of interest.

GAS CHROMATOGRAPHY MASS SPECTROMETRY (GCMS) – a technique in which sample analytes are bombarded with electrons as they exit a gas chromatography column and are fragmented into characteristics ion patterns. The mass spectrometer is the detector. It can determine which fragments are present and therefore the identity of the compounds.

GLUCOSE GLUTAMIC ACID (GGA) – used as a laboratory control standard in BOD procedures.

GRAPHITE FURNACE – a technique used for the analysis of metals. An atomic absorption spectrophotometer heats the sample within a graphite tube using an electrical current. It is also commonly called a flameless furnace and generally provides greater sensitivity for certain metals than flame or inductively coupled argon plasma techniques.

GRAVIMETRIC - analyses based on the direct or indirect weighing of the analyte in question. This technique usually requires the use of an analytical balance with a sensitivity of 0.1 mg or better.

HALL ELECTROLYTIC CONDUCTIVITY DETECTOR – an element-selective gas chromatography detector primarily intended for trace analysis of organic compounds containing chlorine, nitrogen or sulfur. In operation, this detector pyrolyzes the column effluent gas into soluble electrolytes that are dissolved in a stream of deionized liquid. The observed change in electrical conductivity, proportional to the amount of material present, is measured.

HAZARDOUS WASTE – waste regulated under RCRA that can pose a substantial or potential hazard to human health or the environment when improperly managed. Such wastes possess at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity) or appear on special EPA hazardous waste lists. The term is not interchangeable with hazardous substances or material.

HEADSPACE - Any area in a container not completely filled by the sample in which gases can collect.

HEAVY METALS – metallic elements with high atomic weights, i.e., mercury, chromium, cadmium, arsenic, and lead. They can damage the health of plants and animals at low concentrations and tend to accumulate in the food chain.

HOLDING TIME – the maximum times that samples may be held before analysis and still be considered valid or not compromised. The storage time allowed between sample collection and sample analysis when the designated preservation and storage techniques are employed.

HYDROCARBONS – chemical compounds that consist entirely of carbon and hydrogen.

ICP – Inductively coupled plasma is a type of instrument used for metals analysis. Because the temperature of the plasma is considerable higher (10,000^{o}K) than the temperature of a flame atomic absorption spectrophotometer, it is especially useful for refractory metals. Some instruments are also capable of performing simultaneous multielement analysis.

ICP-MS - Inductively coupled plasma mass spectrometry (ICP-MS) is a type of mass spectrometry highly sensitive and capable of the determination of a range of metals and several non-metals at concentrations below one part in 10^{12} (part per trillion). It is based on coupling together an inductively coupled plasma as a method of producing ions with a mass spectrometer as a method of separating and detecting the ions. In trace elemental analysis, the method has advantages of high speed, precision and sensitivity.

IGNITABLE – capable of burning or causing a fire.

INORGANIC CHEMICALS – chemical substances of mineral origin, unlike organic chemicals whose structure relies on carbon atoms.

INITIAL CALIBRATION VERIFICATION (ICV) - also referred to as the Independent Calibration Verification for this laboratory. A standard solution used to verify the calibration curve derived from a source independent of the instrument calibration standard. The ICV is use to quantify second source standard variance and bias.

INSTRUMENT CALIBRATION STANDARD - a reference material used to standardize an analytical instrument.

INSTRUMENT DETECTION LIMIT (IDL) - a term utilized in the EPA Inorganic Contract Laboratory Program. The IDL is three times the standard deviation obtained for the analysis of a standard solution (each analyte in reagent water) at a concentration of three to five times that of the IDL on three nonconsecutive days with seven consecutive measurements per day. The IDL is the concentration equivalent to a signal, due to the analyte of interest, which is the smallest signal that can be distinguished from background noise by a particular instrument. The IDL should always be below the method detection limit, and is not used for compliance data reporting, but may be used for statistical data analysis and comparing the attributes of different instruments.

INSTRUMENT PERFORMANCE CHECK - The analyses of one of the ICSs to verified initial and continuing calibration (CCV). The IPC is used to quantify the instrumental testing repeatability variance and bias.

INSTRUMENT TUNING - a technique used in gas chromatography/mass spectrometry procedures to verify that the instrument is properly calibrated to produce reliable mass spectral information. See 4-Bromofluorobenzene under "B".

INTERNAL STANDARDS - compounds added to every standard, blank, matrix spike, matrix spike duplicate, sample (for volatile organics), and sample extract (for semivolatiles) at a known concentration, prior to analysis. Internal standards are used as the basis for quantification of the target compound.

IONIZATION - Utilized in mass spectrometry to fragment analyte molecules into smaller segments. These smaller mass segments are then separated and plotted to form a "mass spectrum" which is used to identify the parent molecule. Electron impact is one example of ionization used in mass spectrometry. In more technical terms. Ionization is the process by which neutral atoms or groups of atoms become electrically charged, either positively or negatively, by the loss or gain of electrons.

ISOMERS - chemical compounds with the same molecular weight and atomic composition by differing molecular structure, e.g., n-pentane and 2-methylbutane.

LABORATORY CONTROL SAMPLE (LCS) - a clean-matrix reference sample spiked with a standard with an established analyte concentration. The LCS is carried through the entire chemical preparation and testing procedures. The LCS is used to quantify the variance and bias of the chemical preparation and instrumental testing stages without matrix interference. Also called a Laboratory fortified blank (LFB).

LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) – a duplicate of the laboratory control sample in a clean matrix that is carried through the entire chemical preparation and testing procedures.

LABORATORY DUPLICATE SAMPLE (LAB DUPLICATE) - a portion of the collected sample that is carried through the chemical preparation and testing. The laboratory duplicate subsample is used to quantify the variance of the chemical preparation and instrumental testing stages with matrix interferences.

LEACHATE - a liquid that results from water collecting contaminants as it trickles through wastes, agricultural pesticides or fertilizers. Leaching may occur in farming areas, feedlots, and landfills, and may result in hazardous substances entering surface water, groundwater or soil.

LDEQ – Louisiana Department of Environmental Quality

LIBRARY SEARCH - a technique in which an unknown mass spectrum of a compound is compared to the mass spectra of compounds contained in a computer library in an effort to identify the compound. Compounds identified in this manner are referred to as tentatively identified compounds (TICs).

LIMIT OF DETECTION (LOD) – an estimate of the minimum amount of a substance that an analytical process can reliable detect. An LOD is analyte and matrix specific and may be laboratory dependent.

LIMIT OF QUANTIATION (LOQ) – the minimum levels, concentrations, or quantities of a target variable (e.g. target analyte) that can be reported with a specified degree of confidence..

LIMS – laboratory information management system. Horizons is the LIMS used by GCAL.

LINEAR CALIBRATION RANGE – the concentration range over which the instrument response is linear.

LOG-IN - the receipt and initial management of an environmental sample. It generally includes identifying who sent the sample; maintaining chain-of-custody; checking report and invoice information; recording analysis requested, including methodology and special instructions; and assigning a discreet in-lab identification, usually a number or bar code.

MASS SPECTRUM - a plot of ion mass/charge ratio versus intensity. A fragmentation pattern results from the particles whose mass distribution is characteristic of the parent molecule. Qualitative information is provided by a mass spectrum.

MATERIAL SAFETY DATA SHEET (MSDS) - a compilation of information required under the OSHA Communication Standard on the identity of hazardous chemicals and their associated health and physical hazards, exposure limits and precautions.

MATRIX - The physical characteristics or state of a sample – e.g., water, soil, sludge.

MATRIX INTERFERENCE - the influence of the sample matrix or sample components upon the ability of qualitatively identifies and quantitatively measures compounds in environmental samples.

MATRIX MODIFIERS - chemicals added to samples for metals analysis, which are used to lessen the effects of chemical interference, viscosity and surface tension.

MATRIX SPIKE (MS) – aliquot of a sample fortified (spiked) with known quantities of specific compounds and subjected to the entire analytical procedure in order to indicate the appropriateness of the method for the matrix by measuring recovery of the spike. Matrix spiked samples are used to quantify the variance and bias of the chemical preparation and testing stages with matrix interference.

MATRIX SPIKE DUPLICATE (MSD) - a second aliquot of the same matrix as the matrix spike that is spiked to determine the precision of the method.

METHOD DETECTION LIMIT (MDL) - the minimum concentration of compound that can be measured and reported within 99% confidence that the value is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

MUST – denotes a mandatory requirement.

NARRATIVE - in an analytical report, a descriptive documentation of any problems encountered in processing the samples, along with corrective action taken and problem resolution.

NUTRIENT - any substance assimilated by living things that promote growth. The term is generally applied to nitrogen and phosphorus in wastewater, but is also applied to other essential and trace elements.

ORGANIC - generally, any compound that contains carbon bonded to a hydrogen or halogen atom.

OXIDATION - the process in chemistry whereby electrons are removed from a molecule.

PCBs - Polychlorinated biphenyl, a group of toxic persistent chemicals used in transformers and capacitors for insulating purposes and in gas pipeline systems as a lubricant. Sale of PCBs for new uses was banned by law in 1979.

PERCENT RECOVERY - a measure of accuracy that is calculated as the measured value relative to the true value expressed as a percent.

PERFORMANCE AUDIT - a quantitative evaluation of a measurement system that involves the analysis of standard reference samples or materials which are certified as to their chemical composition or physical characteristics.

PROFICIENCY TEST (PT) SAMPLE - a sample of known composition (unknown to the laboratory), provided by an external source, which is used to evaluate lab performance. For certification purposes the PT sample is purchased from an approved provider.

pH - a numerical designation of relative acidity and alkalinity. A pH of 7.0 indicates precise neutrality. Progressively higher values indicate increasing alkalinity and lower values increasing acidity.

POLLUTANT - generally, any substance introduced into the environment that adversely affects the usefulness of a resource.

PRACTICAL QUANTITATION LIMIT (PQL) - the lowest level that can be reliable achieved within specified limits of precision and accuracy routine laboratory operating conditions. The lowest concentration or amount of the target analyte that can be identified, measured, and reported with confidence that the analyte concentration is not a false positive value.

PRECISION - a measure of the ability to reproduce analytical results. It is generally determined through the analysis of duplicate samples. The degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves; a data quality indicator. Precision is usually expressed as standard deviation, variance or range in either absolute or relative terms.

PRESERVATIVE - a chemical or reagent added to a sample to prevent or slow decomposition or degradation of a target analyte or a physical process. Physical and chemical preservation may be used in tandem to prevent sample deterioration.

PURGE AND TRAP - a technique used in the analysis of volatile organic where analytes are purged from a sample by means of an inert gas and trapped on a sorbent column. The sorbent is then flashheated and the analytes are transferred onto a gas chromatographic column for separation and identification.

PURGEABLE ORGANIC - an organic compound that is generally less than 20% soluble in water and has a boiling point at or below 200°C. A volatile organic. An organic compound is generally considered to be purgeable if it can be removed from water using the purging process.

QC BASED NESTED APPROACH - a procedure for estimating the uncertainty of measurement using quality control data. The procedure is described in SOP QA-013.

QUALITY ASSURANCE (QA) - all those planned and systematic actions necessary to provide adequate confidence in laboratory results. An integrated system of activities involving planning, quality control, quality assessment, reporting and quality improvement to ensure that a product or service meets the defined standards of quality with a stated level of confidence.

QUALITY ASSURANCE PROGRAM PLAN - a written assembly of management policies, objectives, principle and general procedures that outlines how the laboratory intends to generate data of known and accepted quality.

QUALITY CONTROL (QC) – the overall system of technical activities whose purpose to measure and control the quality of a product or service so that it meets the needs of the users.

QUALITY CONTROL CHART - a graph of analytical measurement results for a specific QC standard plotted sequentially with upper and lower control limits (±3SD). A central line that is the best estimate of the average variable plotted, and upper and lower marginal exceedence limits (±4SD) are usually included in the Quality Control Chart. The chart may also include upper and lower warning limits (±2SD).

QUALITY SYSTEM – a structured and documented management system describing the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan of an organization for ensuring quality in its work processes, products (items) and services. The quality system provides the framework for planning, implement and assessing work performed by the organization and for carrying out required QA and QC.

r^2 – Correlation Coefficient Squared – paramet6er used to evaluate the fit of linear or quadratic regression curve fit of initial calibration data.

RAW DATA – any original information from a measurement activity or study recorded in a laboratory note book, worksheets, records, memoranda, notes, or exact copies thereof that are necessary for the

reconstruction and evaluation of the report of the activity or study. Raw data may include photography, microfilm or microfilm copies, computer printouts, magnetic media, including dictated observations, and recorded data from automated instruments.

REACTIVITY - the tendency of a chemical to explode under normal management conditions, to react violently when mixed with water, or to generate toxic gases.

REAGENT WATER - water in which an interference is not observed at or above the minimum quantitation limit of interest.

REFERENCE MATERIAL - a traceable standard with an established analyte concentration. Material or substance whose property values are sufficiently homogenous, stable and well established to be used for the calibration of an apparatus, the assessment of a measurement method or for assigning values to materials (ISO Guide 30)

REFERENCE METHOD – a method of known and documented accuracy and precision issued by an organization recognized as competent to do so.

RELATIVE RETENTION TIME – a measure of the shift in retention time of an analyte when referenced to an internal standard.

RELATIVE RESPONSE FACTOR (RRF) - a measure of the relative mass spectral response of an analyte compared to its internal standard. RRFs are determined by analysis of standards and are used in the calculation of concentrations of analytes in samples.

REPLICATE ANALYSES - two or more results representing the same sample parameter. Replicate analyses are used to quantify the analytical measurement repeatability precision.

RPD – Relative Percent Difference, a relative difference between two analyses calculated by dividing the absolute difference of thos two results by the average of therir two values, then multiplying by 100.

RESOLUTION - the degree of separation between peaks eluting from a chromatographic column. Sufficient resolution between peaks is required for proper quantitation of unknown analytes.

RETENTION TIME - a term used in gas and liquid chromatography describing the time elapsed from the sample injection until the specific compound elutes or exits the chromatographic column at the detector. Each compound has a characteristics retention time on a specific column; therefore, this information is used to qualitatively identify the compounds in the sample.

SAMPLE – portion of material collect for chemical analysuis, identified by a unique number assigned by the LIMS.

SHALL – denotes a requirement that is mandatory whenever the criterion for conformance with the specification requires that there be no deviation. This does not prohibit the use of alternative approaches or methods for implementing the specification so long as the requirement is fulfilled.

SHOULD – denotes a guideline or recommendation whenever noncompliance with the specification is permissible.

SOLID WASTE – non-liquid, non-soluble materials, ranging from municipal garbage to industrial waste, that contain complex, and sometimes hazardous, substances. Solid wastes include sewage sludge, agricultural refuse, demolition wastes, mining residues, and even liquids and gases in containers.

SOLVENT - a substance, usually liquid, capable of dissolving or dispersing one or more other substances.

SPIKE – a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery efficiency or for other quality control purposes.

STANDARD CURVE - a curve that plots concentrations of known analyte standards versus the instrument response to the analyte. Calibration standards are prepared by diluting the stock analyte solution in graduated amounts that cover the expected range of the samples being analyzed. The calibration standards must be prepared by using the same type of acid or solvent at the same concentration as for the samples following sample preparation. This is applicable to organic and inorganic chemical analyses.

STANDARD OPERATING PROCEDURE - a detailed written description of how a laboratory executes a particular procedure or method intended to standardize its performance.

STANDARDIZED REFERENCE MATERIAL (SRM) – a certified reference material produced by the U.S. National Institute of Standards and Technology or other equivalent organization and characterized for absolute content, independent of analytical metho9d.

STANDARD UNCERTAINTY - the analytical measurement uncertainty expressed as a standard deviation. The relative standard deviation represents the relative standard uncertainty.

SURROGATE - an organic compound similar to the analyte of interest in chemical composition, extraction and chromatography, but not normally found in environmental samples. Primarily used in chromatography techniques, the surrogate is spiked into quality control blanks, calibration and check standards, samples (including duplicated and QC reference samples) and spiked samples before analysis. A percent recovery is calculated for each surrogate.

SUSPENDED SOLIDS - small pollutant particles that float on the surface of, or are suspended in, sewage or other liquids. They resist removal by conventional means.

TARGET COMPOUND - specific compounds that are to be quantified in a sample based on a standard list of potential compounds.

TENTATIVELY IDENTIFIED COMPOUNDS (TICs) - compounds detected in samples that are not target compounds, internal standards, system monitoring compounds or surrogates. TICs usually consist of up to 30 peaks that are greater than 10% of the peak areas, or heights, of the nearest internal standard. They are subjected to mass spectral library searches for tentative identification. A client may specify the number of unknown peaks in its samples it wishes the laboratory to tentatively identify.

TOTAL METALS - metallic elements that have been digested prior to analysis.

TYPE A EVALUATION UNCERTAINTY - the method of evaluation of uncertainty by the statistical analysis of a series of test results.

TYPE B EVALUATION OF UNCERTAINTY - the method of evaluation of uncertainty by means other than statistical analysis.

UNCERTAINTY - the parameter associated with the analytical measurement results that characterizes the dispersion of the values that could be reasonable attributed to the quantity measured.

UNCERTAINTY INTERVAL - the range of analyte concentrations that an analytical measurement could represent at a specified level of confidence. The relative standard deviation is used to represent the relative standard uncertainty in the QC-based Nested Approach.

VALIDATION –the process for evaluating the completeness, correctness, and conformance/compliance of a specific data set against the method, procedural, or contractual specifications. It essentially evaluates performance against predetermined specifications.

VOA - volatile organic analysis

VOA BOTTLE - a vial used to contain samples for volatile organic analysis.

VOLATILE COMPOUNDS - compounds amendable to analysis by purge and trap. Synonymous with purgeable compounds.

VOLATILE ORGANIC COMPOUND (VOC) - any organic compound that participates in atmospheric photochemical reactions, except for those designated by the EPA Administrator as having negligible photochemical reactivity.

WET CHEMISTRY - procedures that involve distillations, colorimetric determinations and titrimetric measurements. Examples are chloride, nitrates, sulfates and biochemical oxygen demand.

SUBJECT SCOPE AND APPLICATION

EPA Method 8270C (SW-846) is used to quantitatively analyze most neutral, acidic and basic (BNA) organic compounds that are soluble in methylene chloride and capable of being eluted without derivatization as sharp peaks from a gas chromatographic fused-silica capillary column coated with a slightly polar silicone. Such compounds include polynuclear aromatic hydrocarbons, chlorinated hydrocarbons and pesticides, phthalate esters, organophosphate esters, nitrosamines, haloethers, ethers, aldehydes, ketones, anilines, pyridines, quinolines, aromatic nitro compounds and phenols, including nitrophenols. BNAs are generally extracted using SOPs EXT-001 for solids and EXT-003 for aqueous samples. High-level wastes are prepared by waste dilution. A list of target analytes is available in the LIMS.

Theory & Principle - Gas chromatographic analysis utilizing Mass Selective Detectors eliminates, to a great extent, the secondary column and detector for confirmation. Mass selective detectors ionize each compound to produce its own unique mass fragmentation profile. Direct injection by autosampler is the introduction method for samples to be analyzed via EPA Method 8270 (SW-846). The polarity of the column phase, molecular weight and temperature determine the elution order. The end of the column is positioned so that the eluting compounds are ionized immediately. The ensuing charged ions are directed along an electronically charged quadruple to the electron multiplier, where the signal is amplified. The MSD can be used in selective ion monitoring and scan mode. In the scan mode, the detector scans for all ions in a selected range. The resulting ion fragmentation profiles are compound fingerprints. The selective ion-monitoring (SIM) mode allows for the detection of two to three selected ions per compound in each retention window resulting in lower detection limits. Isomeric compounds must also depend upon retention times as a determining factor. Semi-volatile analysis primarily involves medium to high molecular weight compounds that are readily soluble in methylene chloride. The BNA sample preparation process utilizes the very polar methylene chloride, to extract the target compounds. Helium is used as the carrier gas.

MATRIX Water and Solid Extracts

REFERENCE SW846 8270C and 8000B

HOLDING TIME & PRESERVATIVE	Waters - store at 4±2°C for up to but not exceeding seven days before extraction. Hold up to 40 days after extraction at –15 ± 5°C in sealed vials. Protect from light. Solids - store at 4±2°C for up to but not exceeding fourteen days before extraction. Hold up to 40 days after extraction at –15 ± 5°C in sealed vials. Protect from light.
DEFINITIONS	See SOP GEN-016
SAFETY	Each employee is directly responsible for complete awareness of all health hazards associated with every chemical that he/she uses. The employee must be aware of these hazards, and all associated protective wear and spill clean-up procedures PRIOR TO the use of any chemical. In all cases consult the applicable material safety data sheet (MSDS) and the supervisor or safety officer. The bottle labels also provide important information that must be noted. Personnel performing this procedure may be working with flammables, poisons, toxins, carcinogens, teratogens, mutagens, and biohazards. In particular, approved gloves, safety glasses, and lab coats must be worn. In addition to other measures, solvents and chemicals must be handled in ventilated hoods.
INTERFERENCES	Interferences due to contamination are monitored by analysis of a method blank performed with each batch. Interferences with the parent (quantitation) ion may occur with co-elution and must be monitored by the analyst.
INSTRUMENTATION & APPARATUS	Agilent 5975-6890N GC/MS with autosampler Target data acquisition system RTX 5sil MS columns 30m, 0.25mm ID, 0.25um df Volumetric flasks Syringes – gas-tight Pasteur pipets Disposable glass micropipettes 2 mL autosampler vials with crimp tops Bottles – amber glass with PTFE-lined screw tops or crimp tops
REAGENTS	All organic solvent shall be of pesticide grade or equivalent. Label all containers and squeeze bottles with reagent ID, lot, and expiration date. Methylene chloride (DCM) Helium gas

STANDARDS

All standards used must pure material or from prepared certified solutions. The certificate of analysis shall be kept on file. Follow manufacturer's instruction for standard expiration and storage. Label all working standards using completed standard labels.

1. All stock standards are received in glass sealed ampoules.
   A. The following stock standards are used to prepare solutions for calibration and CCV samples:
      A.1 Stock calibration standard - A custom-made stock standard (TCL-200 ug/ml level) is purchased from NSI. It is stored in an amber vial in the freezer at -15° ± 5°C, until the documented manufacturer's expiration date. This standard includes the surrogates.
      A.2 Stock calibration standards – 2000 ug/mL – for Appendix IX compounds – commercially prepared stored at -15ºC ± 5ºC until the documented manufacturer's expiration date.
      A.3 Additional standards may be run that are project specific. All standards shall be certified and stored according to the manufacturer's instructions.

   B. Independent stock standards – standard mixes identical to those listed above from a secondary source or a different lot number from the same manufacturer. These standards are used to prepare the ICV.

   C. Stock Internal Standard Mixture: 4000 ug/mL – commercially prepared in methylene chloride, stored at -15ºC ± 5ºC until the documented manufacturer's expiration date.

   D. Tuning Standard: 500 ug/mL – commercially prepared in methylene chloride, stored at -15ºC ± 5ºC until the documented manufacturer's expiration date.

2. Working standards – working standards are prepared by diluting the stock standard as described below.

   A. Assemble the necessary glassware, syringes and solvent. Spectroscopic grade methylene chloride is used in making all standards.

   B. Ensure that all glassware and syringes are clean and free of moisture by rinsing with at least three aliquots of methylene chloride. Volumetric glassware must never be stored in or placed in heated ovens. The use of dedicated glass will help prevent cross-contamination of standards.

   C. Fill the volumetric glassware to approximately 75 percent volume.

   D. Add the proper volume of standards using a syringe.

E. After the addition of standard, dilute to the calibration mark in the volumetric flask

F. Insert the glass stopper and mix.

G. Using a Pasteur pipette, transfer the standard to a 2 mL ampoule. Seal the ampoule immediately.

H. Label the vial with the following information:
Expiration Date
Standard ID #

I. Store the vial the same as the stock standard.

J. Dispose of excess materials in accordance with established laboratory procedures.

K. Always quantitate new standards against known standards to ensure accurate concentration levels.

L. Fill out the standards logbook in accordance with proper laboratory procedure and enter required information in LIMS.

3. The working standards are prepared in the following manner:

A. Working Appendix IX standards – prepare a 200ug/mL standard mix from the 2000ug/mL stock standards.

B. Working standards from 0.2 ug/mL to 160 ug/mL are prepared as needed before a calibration is performed. They are stored in amber vials in the freezer at -15° ± 5°C. To make 1.0 mL of each "working standard" of a calibration, do the following:

- Dilute 1 µL of TCL-200 to a final volume of 1.0 mL with DCM to make a 0.2 µg/mL standard.
- Dilute 5 µL of TCL-200 to a final volume of 1.0 mL with DCM to make a 1.0 µg/mL standard.
- Dilute 10 µL of TCL-200 to a final volume of 1.0 mL with DCM to make a 2.0 µg/mL standard.
- Dilute 50 µL of TCL-200 to a final volume of 1.0 mL with DCM to make a 10.0 µg/mL standard.
- Dilute 250 µL of TCL-200 to a final volume of 1.0 mL with DCM to make a 50.0 µg/mL standard.
- Dilute 400 µL of TCL-200 to a final volume of 1.0 mL with DCM to make a 80.0 µg/mL standard.
- Dilute 600 µL of TCL-200 to a final volume of 1.0 mL with DCM to make a 120.0 µg/mL standard.

- Dilute 800 µL of TCL-200 to a final volume of 1.0 mL with DCM to make a 160.0 µg/mL standard.
- The high concentration standard is the stock standard – 200 ug/mL
- Add 10 µL of 4000 ng/µL Internal Standard Mix to each 1.0mL of the "working standard" before shooting

To make the calibration standards for SIM analysis, the TCL standard is used to make the following working and calibration standards.

- Dilute 500 µL of TCL-200 to 5.0 mL using DCM to make a 20 µg/mL standard.
- Dilute 5 µL of 20 µg/mL standard to 5.0 mL using DCM to make a 0.1 µg/mL standard.
- Dilute 25 µL of 20 µg/mL standard to 5.0 mL using DCM to make a 0.5 µg/mL standard.
- Dilute 50 µL of 20 µg/mL standard to 5.0 mL using DCM to make a 1.0 µg/mL standard.
- Dilute 250 µL of 20 µg/mL standard to 5.0 mL using DCM to make a 5.0 µg/mL standard.
- Dilute 500 µL of 20 µg/mL standard to 5.0 mL using DCM to make a 10.0 µg/mL standard.
- The high concentration standard is the 200 µg/mL standard.

C. The Appendix IX calibration standards are prepared in the same manner from the 200ug/mL working standard. The 200 ug/mL standard will serve as the high concentration standard.

D. Additional stock standards shall be purchased for compounds not included in the mixes.

GC RECOMMENDED CONDITIONS

The following lists conditions that may be used in the lab. Conditions vary for each instrument. Adjustments are made when new columns are installed. The analyst is allowed to modify settings to optimize operating conditions.

Initial Temperature: 40°C

Rate A: ~40°C/min to ~245°C
Hold: ~4 to 5 minutes

Injector Temperature: ~ 250°C
Injection volume: 1 uL

PROCEDURE

Analysis Procedure

1. Injection port maintenance is performed every day of use at a minimum. This includes replacement of septa and liner.
2. Tuning - Before analysis begins each GC/MS must meet tuning

criteria specified in the method. A solution containing 50 ug/ml each of Decafluorotriphenylphosphine (DFTPP), 4,4'-DDT, Pentachlorophenol and Benzidine is analyzed. The DFTPP tuning criteria listed below must be met before proceeding with analysis. DDT breakdown shall not exceed 20% and is calculated as:

$$\%\text{Breakdown} = \frac{\text{area DDE + area DDD}}{\text{area DDE + area DDD + area DDT}} \times 100$$

Evaluate the tailing factor for Benzidine and Pentachlorophenol. Check that response is normal and that there is not excessive tailing. If tailing is observed, calculate tailing factors using the equations in EPA 625 Figure 13. The calculated tailing factor for Benzidine and for pentachlorophenol shall be less than 2.0. Excess tailing indicates the need for instrument maintenance. If there is no visible tailing document this.

Analyze The DFTPP result using three scans, the apex and the scan prior and following the apex and subtracting the background no more than 20 scans prior to elution of the DFTPP peak. If the DFTPP fails the criteria listed below, then the analyst shall re-tune the instrument, then run another DFTPP. If the DFTPP still fails the criteria, the analyst shall perform instrument maintenance. These criteria must be met once for every 12 hours of analysis time.

DFTPP KEY ION ABUNDANCE CRITERIA

MASS	ION ABUNDANCE CRITERIA
51	30 TO 60% of mass 198
68	less than 2% of mass 69
69	mass 69 relative abundance
70	less than 2% of mass 69
127	40 to 60% of mass 198
197	less than 1% of mass 198
198	base peak, 100% relative abundance
199	5 to 9% of mass 198
275	10 to 30% of mass 198
365	greater than 1% of mass 198
441	present but less than mass 443
442	greater than 40% of mass 198
443	17 to 23% of mass 442

3. Calibration - The initial calibration consists of a series of standards analyzed at the concentration noted in the Standards Section 3.B-D. An initial calibration curve for each target analyte must be analyzed and evaluated before any peak for

that analyte can be quantitated.

The calibration range is defined as the on-column concentration range adjusted for sample prep. Because nine calibration standards are used, the analyst has the option of eliminating several of the points using the criteria below. Within the following requirements the analyst may select the points that improve linearity, obtain the calibration range needed for a specific project, or maintain the default calibration range (10-200ug/mL):

a) At least five contiguous points must be used (six if a quadratic curve fit is employed).
b) Calibration acceptance criteria must be met as described below.
c) The lowest calibration point must support the lowest reporting limit needed in the associated samples.
d) The QC spike amount must be within the calibration range.

Replacing points in the middle of a curve is not allowed unless the analyst can document a technical issue at the time of analysis or spiking of the standard. The new point must be analyzed in the same analytical batch. If the problem appears to be associated with a single standard, that one standard may be reanalyzed. Replacing the standard may be necessary in some cases.
Prepare the calibration standards and Add 10 µL of 4000 ug/ml Internal Standard Mix to each.

When performing analysis in the SIM mode, use the same retention windows used in scan analysis and at least two of the ions listed in Table 1 of SW-846 8270C. The primary ion is used for quantitation and the secondary ion(s) as confirmation.

In addition, when performing SIM analysis the following minimum response factors should be met for the PAH compounds. The method allows for a maximum of 2 of these compounds to not meet this requirement.

Acenaphthene	0.9	Dibenz(a,h)anthracene	0.4
Acenaphthylene	0.9	Fluoranthene	0.6
Anthracene	0.7	Fluorene	0.9
Benzo(a)anthracene	0.8	Indeno(1,2,3-cd)pyrene	0.5
Benzo(a)pyrene	0.7	2-Methylnapthene	0.4
Benzo(b)fluoranthene	0.7	Naphthalene	0.7
Benzo(g,h,i)perylene	0.5	Phenathrene	0.7
Benzo(k)fluoranthene	0.7	Pyrene	0.6
Chrysene	0.7		

The calibration curve is now ready for analysis.

The acceptance criteria for initial calibration must be satisfied before analysis of samples begin. Select projects may have additional or more stringent criteria that must be achieved for the applicable samples. See SOP GEN-019.

A. Initial Calibration Acceptance Criteria:
    A.1 Calibration Check Compounds must be less than 30% RSD.
    A.2 System Performance Check Compounds must have an (RF) of 0.05 or greater

CCC's	SPCC's
Acenaphthene	N-Nitroso-di-n-propylamine
Hexachlorobutadiene	Hexachlorocyclopentadiene
Di-n-octylphthalate	2,4-Dinitrophenol
Benzo(a)pyrene	4-Nitrophenol
2,4-Dichlorophenol	
2,4,6-Trichlorophenol	
Phenol	
Fluoranthene	
1,4-Dichlorobenzene	
N-Nitroso-di-n-phenylamine	
4-Chloro-3-methylphenol	
2-Nitrophenol	
Pentachlorophenol	

B. Additionally one of the following options must be met. Always attempt to meet calibration criteria using the average response factor. If the average response factor does not pass, options B.2 and B.3 are evaluated, but do not need to be evaluated in the order listed (if historical results indicate that quadratic fits are appropriate for a particular analyte, that option may be selected without evaluating linear). Option B.4 may be used for some projects if the other options are not successful. The calibration options and requirements are as follows:
    B.1 Average Response Factor Calibration. For each of the standards, calculate the response factor of each compound. Calculate the average of a minimum of five response factors and the standard deviation across the selected five response factors. Use the average RF and the standard deviation to calculate the percent relative standard deviation (%RSD). All equations can be found in the Calculation section. When the five (or more) response factors of the standards demonstrate less than 15% RSD for a target analytes, linearity through the origin can be assumed. If the RSD for any analyte is greater than 15%, the analyst may wish to review the results for those analytes to ensure that the problem is not associated with just one of the initial calibration standards.
    B.2 For those compounds that the RSD exceeds 15%, a linear regression equation that is not forced through the origin may be used. The coefficient of determination

must be at least 0.995 for the curve to be acceptable. As part of the evaluation, check the y-intercept (b) and any negative factors (b or M). Negative factors may result in false negatives and positives. Large shifts in the y-intercept from zero will impact the data. If the intercept is greater than half the reporting limit, this option shall not be used. Check the required reporting limit and any impacts on the data. False positives shall be indicated in the case narrative.

B.3 A quadratic curve fit may be used if the coefficient of determination $r^2 \geq 0.990$. A minimum of a six-point calibration is used if this option is chosen and the curve shall not be forced through zero. As part of the evaluation, check the y-intercept (b) and any negative factors (b or M). Negative factors may result in false negatives and positives. Large shifts in the y-intercept from zero will impact the data. If the intercept is greater than half the reporting limit, this option shall not be used. Check the required reporting limit and any impacts on the data. False positives shall be indicated in the case narrative.

B.4 If the %RSD is greater than 15% for any analyte of interest, the initial calibration may still be acceptable if the following conditions are met:

a. The mean of the RSD values for <u>all</u> analytes in the calibration is ≤15%.

b. Mean RSD = $\frac{\text{Sum of RSD value for each analyte}}{\text{Total \# analytes}}$

c. Mean RSD criterion applies to all analytes in the standards, regardless of whether or not they are of interest for a specific project.

d. The maximum RSD allowed for any compound is 50%, except for poor performers as defined in Appendix A. For poor performers which exceed 50%, narrate exceedences in the final report.

<u>Note:</u> the use of this calibration option is not acceptable for some projects. If this option is used, include the analytes that did not pass the first three options in the report narrative.

C. If the calibration criteria are not met, possible corrective action includes cleaning the injection port, cutting off the first 4 inches of column or source cleaning, and adjusting the calibration range.

D. Check the position of the retention time by using the mid-point of an initial calibration. Check and reset as necessary after source cleaning or column maintenance.

3. INITIAL CALIBRATION VERIFICATION

Immediately following the initial calibration procedure or before sample analysis, the analyst shall perform initial calibration verification (ICV). This will consist of a solution containing all target analytes prepared from a standard that is independent from the initial calibration.

The ICV must be analyzed following the initial calibration. The ICV recovery must be 70-130% except for the compounds listed in Appendix A, which must meet a percent recovery of 50-150%. Specific project criteria may apply that must be achieved for the associated samples. See SOP GEN-019.

If any target analyte recovery is outside the control limits, corrective action must be taken. This may include instrument maintenance, re-analysis of the ICV or initial calibration, or re-preparation of the standards involved. If holding time or agreed project due dates will not be met because of ICV failure, the client must be contacted and approve of proceeding with the analysis. Note all failures in the case narrative.

4. CONTINUING CALIBRATION VERIFICATION –

If the instrument has been previously calibrated, then a continuing calibration is required. A mid-level standard, 50 ug/mL for scan and 0.5 ug/mL for SIM is analyzed and checked against the initial calibration for verification every 12 hours. CCC's and SPCC's must meet the specified criteria. Calibration Check Compounds must have a %D of ≤20. SPCC's are required to maintain a relative response factor (RF) of 0.05. If there are any deviations, the calibration check standard must be re-analyzed or if necessary, column maintenance should be performed. If the calibration check standard still fails the criteria, then another initial calibration must be run.

All other targets must have a %difference/drift ≤ 30% except for method defined poor performers, listed in Appendix A. Project specific limits may apply that must be achieved for the associated samples. See SOP GEN-019.

The retention time for any internal standard shall not vary any more than 30 seconds from the last calibration check (12 hours). The extracted Ion Current Profile area for any internal standard must not deviate by more than a factor of two.

5. SAMPLE ANALYSIS

Samples can be analyzed after an acceptable CCV. Add 10 uL of the internal standard mixture to each extract before analysis.

Compound identification – positive hits are achieved by the following criteria:

A. The quantitation ion used shall be the ion listed in the reference method unless there are interferences. Qualifier ions shall be used as a replacement, if possible. If the quantitation ion used is not the ion listed in the reference method, this shall be documented.
B. The characteristic m/z's must maximize within one scan of each other.
C. The retention time of the compound in the sample must be within ± 0.50 minutes of the retention time of that compound in the standard and have an RRT of ± 0.06.
D. The relative abundance of the three characteristic m/z's in the sample must fall within ± 30% of the relative abundances of that parameter in the standard.
E. Structural isomers can be differentiated only if the height between the baseline and the valley between the pairs is less than 25% of the sum of the two peak heights. Otherwise they must be reported as isomeric pairs.
F. If samples have compounds that are above the calibration range, the sample must be diluted. A portion of the sample, measured with a syringe, is diluted to one mL with DCM. Additional internal standard is added to maintain a concentration of 40μg/L. Surrogate recovery is affected and is considered diluted out of the sample with a dilution of 10X or greater. The dilution factor is recorded in Target and used to calculate analyte concentrations and to adjust reporting limits and MDLs. Multiple dilutions are required for some projects. Report multiple dilutions as required. If historical values indicate that the sample needs to be performed at multiple dilutions and all analytes must be reported at the lowest reporting limit possible, the sample extract may be prepared and performed at multiple dilutions without screening.
G. Manual integrations shall be performed as appropriate. Manual integrations undergo several layers of review and the raw data is flagged. For additional information see SOP QA-010.
H. Monitor drift by using the internal standard report in target to check the % Difference of internal area response and retention time. Internal area response must be between -50 to 100% of the internal standard response in the mid-point of the ICAL. Retention time must be within ± 0.5 minutes. If the criteria are not met reanalyze at a dilution for the affected analytes or report with a narrative. Project specific limits may apply. See SOP GEN-019.

QUALITY CONTROL METHOD BLANK

1. The method blank (extraction blank) is analyzed with each preparatory batch to demonstrate the extraction procedure did

not introduce contamination. Run batch QC in the same analytical batch whenever possible. The batch QC must be analyzed with at least one client sample from the prep batch. This blank also establishes the instrument to be free of contamination.

2. No target analytes should be detected in the method blank above one half the reporting limit. If any target analytes are detected, data shall not be reported and samples must be re-extracted and re-analyzed unless the following apply.
   A. If a target analyte is detected above the reporting limit, data may be reported if the concentration is not greater than 5% of the measured concentration in associated samples. Include a narrative with the data.
   B. If a target analyte is detected in the method blank but there are no hits in the samples, the data may be reported with a narrative.

SURROGATES

1. The surrogates are used to verify that each sample was properly extracted and is not adversely affected by the sample matrix. A surrogate is a non-target compound that is chemically similar to the analytes. The surrogates used are listed in the table below. Surrogates are spiked in each sample at the levels listed in Table 1. Some samples use the same extract for scan and SIM analysis. In these cases the surrogates will be spiked at the scan level.

2. Control limits are evaluated after sample analysis. Determine for each sample the project-required limits. If no specific limits are needed, evaluate the recoveries using step 3. If specific limits are needed evaluate using step 4. Evaluate limits as soon as possible to allow necessary repreps to be performed within holding time.

3. Laboratory derived control limits are listed in the LIMS. One surrogate in each fraction (base-neutral or acid) may have a recovery outside the control limits. When this occurs, report the data with a narrative. If more than one surrogate recovery for each fraction is below the lower control limit, re-extract and re-analyze the sample. If the recoveries are outside control limits in the re-extract sample, then indicate in the case narrative and state that the recovery was outside the control limits due to sample matrix. If re-extraction cannot be performed due to insufficient sample, report the data with a narrative. If the surrogate recovery is above the control limits and the sample results are less than the reporting limit, the data may be reported with a narrative.

4. Project specific recovery limits may apply that must be achieved for the associated samples. See SOP GEN-019. Some

projects require reprep and/or reanalysis if any surrogate fails recovery criteria either high or low. Check project criteria before proceeding.

Table 1
Surrogates

Surrogates	Scan Conc. mg/L (On column)	SIM Conc mg/L (On column)
Acid Surrogates:		
2-Fluorophenol	100	2
Phenol-d5	100	2
2,4,6-Tribromophenol	100	2
Base – Neutral Surrogates:		
Nitrobenzene-d5	50	1
2-Fluorobiphenyl	50	1
Terphenyl-d14	50	1

LABORATORY CONTROL STANDARD (LCS/LCSD)

1. A LCS and LCSD are included in each preparatory batch to demonstrate the system is in control. Routinely the LCS/LCSD will be spiked with the full list of analytes. The control limits for waters and solids are available in the LIMS. Control limits may be project specific and must be achieved for the associated samples. See SOP GEN-019. Evaluate the data and perform corrective action based on the project limits. Run batch QC in the same analytical batch whenever possible. The batch QC must be analyzed with at least one client sample from the prep batch.

2. If a recovery is above the upper control limit and the sample results are below the reporting limit, the data may be reported with a narrative. Check project criteria. Required corrective action may differ in different projects and must be followed for associated samples.

3. If a recovery is below the lower control limit or precision fails, the entire batch must be re-extracted and re-analyzed. If a re-extraction is not possible due to insufficient sample volume, report the data with a narrative.

4. If the full list of target analytes is spiked, a small number of sporadic failures will be allowed. The failure cannot include a primary compound of interest. See Table 2 for the number of allowable failures. The failures are noted in the case narrative. These failures shall be monitored by the QA Department to ensure randomness. This shall be defined as not exceeding failure in 1 of 3 LCS determinations.

Table 2

Number of Allowable Failures

Number of Analytes	Failures Allowed
<11	0
11-30	1
31-50	2
51-70	3
71-90	4
>90	5

MATRIX SPIKES (MS/MSD)

1. The purpose of the MS/MSD is to assess the performance of the method for a particular sample matrix. The recovery criteria for waters and solids are available in the LIMS and are typically the same as the LCS recovery criteria. Project specific recovery and RPD limits may apply, and the data evaluated and corrective action performed based on project requirements.

2. The MS/MSD spike includes the full list of analytes.

3. Whenever the MS and/or MSD recoveries are outside the control limits, check that the LCS and LCSD passed criteria to verify the system was in control. If the LCS and LCSD recoveries and precision are acceptable then continue processing the data. If the LCS and/or LCSD failed then follow the procedure in the LCS section.

4. Review data to verify that a lab error has not occurred (wrong spike amount, not spiked) before automatically identifying a failure as matrix interference.

5. If recoveries for both the MS/MSD are outside the control limits and the recoveries are similar, the data is reportable with a narrative stating the LCS recoveries were acceptable. The failure is attributed to sample matrix.

6. Precision is calculated as %RPD. Acceptance criteria are listed in the LIMS. Failures are noted in the narrative.

7. Native sample concentrations may be high in comparison to the spiking concentration and therefore an accurate recovery cannot be calculated. Document this in the case narrative.

8. Spikes may be diluted out in the analysis process. Document this in the case narrative. The spike is diluted out if the dilution is a 10X or greater. MS/MSD are analyzed at the same dilution as the parent sample.

SAMPLE RE-EXTRACTION

Samples are to be re-extracted due to failed QC or due to the sample results. When a MB, LCS, or LCSD fails to meet criteria, the entire batch is sent to extractions for re-extraction. If the MS, MSD, or surrogates fail criteria, only the affected samples are sent to extractions. Particular samples may be re-extracted if the sample results do not match historical values, if a sample and a duplicate do not match, or if physical differences are noted in samples. If samples are re-extracted outside of method specified holding times, both analyses are reported. To request sample/batch re-extraction, do the following:

1. If the extract has been analyzed, process the file and load to LIMS.
2. Enter the code “RP” into the analysis code; this will schedule new sample prep.
3. Complete the Re-extraction Request and Tracking Form (attached) and submit a copy to extraction supervisor.
4. When new extracts are brought to the lab, complete the original Re-extraction Request and Tracking Form and report the data appropriately.
5. If additional sample is not available to re-prep, check with project manager to determine appropriate action to report the available data.
6. If two sets of data will be reported, see login to obtain a re-extracted sample number.

CALCULATIONS

1. $$\text{MS \% REC} = \frac{\text{MS Concentration-Sample Concentration}}{\text{spike added}} \times 100$$

2. $$\text{MSD \% REC} = \frac{\text{MSD Concentration-Sample Concentration}}{\text{spike added}} \times 100$$

3. $$\text{\% RPD} = \frac{\text{MS-MSD}}{(\text{MS+MSD})/2} \times 100$$

LCS/LCSD results are substituted to calculate %RPD between LCS and LCSD. Results are calculated using the concentration (not percent recovery).

4. $$\text{Response Factor} = \frac{A_s \times C_{is}}{A_{is} \times C_s}$$

As = Peak Area of analyte or surrogate
Ais = Peak Area of Internal standard
Cs = Concentration of the analyte or surrogate
Cis = Concentration of Internal standard

5. Surrogate/LCS Recovery = $\frac{\text{Concentration Found}}{\text{Concentration Added}} \times 100$

6. Concentration using RF:

Concentration (µg/L) = $\frac{(A_s)(C_{is})(D)(V_t)}{(A_{is})(RF)(V_s)}$

Concentration (µg/kg) = $\frac{(A_s)(C_{is})(D)(V_t)}{(A_{is})(RF)(W_s)}$

A_s = Area of peak for the analyte in sample
D = Dilution factor
RF = Mean Response factor from initial calibration
A_{is} = Area of internal standard in sample
C_{is} = Concentration of internal standard in µg/mL
W_s = Weight of sample extracted in g
V_t = Total volume of concentrated extract in µL
V_s = Volume of aqueous sample extracted in mL

7. Concentration using linear curve fit:

Concentration (µg/L) = $[m(A_S/A_{IS})+b]C_{IS}D$

Concentration (mg/kg) = $[m(A_S/A_{IS})+b]C_{IS}D(5/W_S)$

m = Inverse of slope
A_s = Area of peak for the analyte in sample
A_{is} = Area of internal standard in sample
b = Intercept of the y-axis
C_{is} = Concentration of internal standard in µg/mL
D = Dilution factor
W_s = Weight of sample extracted

8. Concentration using a quadratic curve fit:

Concentration (mg/kg) = $[b + a(A_S/A_{IS}) + a_2(A_S/A_{IS})^2]C_{IS}D(5/W_S)$

9. Concentration of TICS:

Concentration (mg/kg) = $\frac{(A_s)(C_{is})(D)}{(A_{is})(1000)}$

A_s = Area of peak for the analyte in sample
D = Dilution factor
A_{is} = Area of internal standard in sample
C_{is} = Concentration of internal standard
W_s = Weight of sample (if aqueous sample W_s = 1 and report in (µg/L)

10. % Difference = $[(RF_I - RF_C) / RF_I\}$ X 100 where:
RF_I = Average response factor from initial calibration
RF_C = Response factor from current verification check standard

11. % Drift = $\frac{\text{Calculated Conc. – Theoretical Conc).}}{\text{Theoretical Conc.}} * 100$

12. % RSD = (SD / X) X 100 Where:
RSD = Relative Standard Deviation
X = mean of 5 initial RF's for a compound
SD = Standard Deviation of average RF's for a compound

REPORTING LIMITS

Quantitation limits (PQLs) are defined by the low-level calibration standard. Default reporting limits are employed for reporting and cannot be lower than the PQL. The PQL cannot be lower than the estimated MDL and project specific requirements may define the relationship between the PQL and the MDL that must be achieved for the associated samples. See SOP GEN-019.

DATA REVIEW

For data review procedures and checklist, please see SOP QA-002

SOFTWARE TROUBLESHOOTIN

The Agilent GC/MS’s utilizes Agilent software MSD Chemstation Version D.02.00.275 to control the instrument and transfer data acquisition to Target Data Integration software. Target software is utilized to calculate all data. In the event of software malfunction for the MSD Chemstation, please contact Agilent technical support for troubleshooting help. In the event of software malfunction when using Target, please contact GCAL’s IT Director for troubleshooting help.

METHOD PERFORMANCE

Method 8250 (the packed column version of Method 8270) was tested by 15 laboratories using organic-free reagent water, drinking water, surface water, and industrial wastewater spiked at six concentrations ranging from 5 to 1,300 ug/L. Single operator accuracy and precision, and method accuracy were found to be directly related to the concentration of the analyte and essentially independent of the sample matrix. Linear equations to describe these relationships are presented in Table 7 of Method 8270C. These values are presented as guidance only and are not intended as absolute acceptance criteria.

Internal control limits are generated for laboratory QC samples including LCS/LCSD, MS/MSD, and surrogates.

POLLUTION PREVENTION

See QAPP Section 10.2

WASTE MANAGEMENT

See SOP GEN-009

APPENDIX A POOR PERFORMING COMPOUNDS

Benzidine	1,4-Naphthoquinone	4-Nitroquinoline-1-oxide
Benzoic Acid	m-Dinitrobenzene	Parathion
2-Picoline	Pentachlorobenzene	Metapyriline
n-Nitrosomethylethylamine	2-Naphthylamine	Isodrin
Methyl methanesulfonate	2,3,4,6-Tetrachlorophenol	Aramite
n-Nitrosodiethylamine	1-Naphthylamine	p-(Dimethylamino) azobenznen
Ethyl methanesulfonate	Thionazin	Chlorobenzilate
Pentachloroethane	5-Nitro-o-toluidine	Famphur
o-Toluidine	Tetraethyl dithiopyrophosphate	3,3’-Dimethylbenzidine
n-Nitrosomorpholine	Diallate	2-Acetylaminofluorene
n-Nitrosopiperidine	Phorate	7,12-Dimethylbenz(a)anthracene
o,o,o-Triethylphosphoroate	sym-Trinitrobenzene	Hexachlorophene
α,α-Dimethylphenethylamine	Phenacetin	3-Methylcholanthrene
Hexachloropropene	Dimethoate	Acrylamide
2,6-Dichlorophenol	Pentachloronitrobenzene	n-Nitrosopyrrolidine
n-Nitrosodi-n-butylamine	4-Aminobiphenyl	Phthalic Acid/Anhydride
p-Phenylenediamine	Pronamide	1,4-Dinitrobenzene
Isosafrole	Dinoseb	Kepone
1,2,4,5-Tetrachlorobenzene	Disulfoton	4,4-Methylenebis(2-chloroaniline)
Safrole	Methyl Parathion	tris-2,3-Dibromopropylphosphate
Maleic Anhydride	Benzaldehyde	

GULF COAST ANALYTICAL LABORATORIES, INC
METALS
STANDARD OPERATING PROCEDURE

PROCEDURE: MET-010
PAGE: 1 of 16
EFFECTIVE DATE: 11/25/11
APPROVED BY:
QA/QC APPROVED:

SUBJECT — SCOPE AND APPLICATION

This method covers the operation of the Perkin Elmer 5300DV and 4300DV ICPs. The procedure is applicable for the analysis of aqueous samples, TCLP extracts, EPTOX extracts, soils, solids, and domestic or industrial wastes for Dissolved or Total metals. The sample is analyzed after preparation by the appropriate EPA, SW846, NIOSH, or ASTM procedure. Elements currently analyzed using these methods are listed in Table I.

MATRIX — Water and Solid

REFERENCES — EPA (EMMC) 200.7 - Determination of Metals and Trace Metals in Water and Wastes by ICP-Atomic Emission Spectrometry, Revision 4.4 (EPA Region VI Approval) (A)

SW846 6010C – for South Carolina and North Carolina Projects
SW846 6010B
Perkin Elmer Instrument Manuals
WinLab Software Guide

SAMPLE COLLECTION — Samples may be collected and stored in plastic or glass containers.

HOLDING TIME & PRESERVATION — Dissolved Metals (waters)– Filtered through a 0.45 um membrane filter then HNO_3 to pH < 2; Digestion required for 200.7 (SOP MET-005)-6 months. Analyst must wait at least 24 hours before digesting.

Total Metals (waters)- HNO_3 to pH < 2; Digestion required (SOP MET-005)–6 months

Total Metals (solids) – Cool 4°C; Digestion required (SOP MET-004, MET-018)–6 months

DEFINITIONS — See Appendix A for Glossary.

SAFETY — Each employee is directly responsible for complete awareness of all health hazards associated with every chemical that he/she uses. The employee must be aware of these hazards and all associated protective wear and spill clean-up procedures PRIOR TO the use of any chemical. In all cases, the applicable material safety data sheet

(MSDS) and your supervisor or safety officer should be consulted. The bottle labels also provide important information that must be noted. Personnel performing this procedure may be working with flammables, poisons, toxins, carcinogens, teratogens, mutagens, and biohazards. In particular, approved gloves, safety glasses, and lab coats must be worn. In addition to other measures prescribed by the division, solvents must be handled in ventilated hoods.

INTERFERENCES

Several interferences are possible. These include:

1. Spectral Interferences can be categorized as (1) overlap of a spectral line from another element; (2) unresolved overlap of molecular band spectra; (3) background contribution from continuous or recombination phenomena; and (4) background contribution from stray light from the line emission of high concentration elements. The first of these effects can be compensated by utilizing a computer correction of the raw data, requiring the monitoring and measurement of the interfering element. The second effect may require selection of an alternate wavelength. The third and fourth effects can usually be compensated by a background correction adjacent to the analyte line.

   Automatic interference correction for condition (1) above is done by the instrument software. The analyst does not have to manually do the correction. Background correction intervals to correct conditions (3) and (4) have likewise been automatically set up in the instrument software.

2. Physical Interferences are generally considered to be effects associated with the sample nebulization and transport processes. Such properties as change in viscosity and surface tension can cause significant inaccuracies especially in samples that may contain high dissolved solids or acid concentrations. If these types of interferences are present, they must be reduced by diluting the sample, using a peristaltic pump and/or using an internal standard element.

3. Chemical Interferences are characterized by molecular compound formation, ionization effects and solute vaporization effects. Normally these effects are not pronounced with the ICP technique; however, if observed they can be minimized by careful selection of operating conditions (that is, incident power,

observation position, and so forth), by buffering of the sample, by matrix matching, and by standard addition procedures. These types of interferences can be highly dependent on matrix type and the specific analyte element.

APPARATUS

Perkin Elmer 5300DV/4300DV Inductively Coupled Plasma with WinLab 32 software
Perkin Elmer As 90 Autosampler
Peristaltic pump and tubing
Autosampler tubes
Mechanical pipets and pipet tips
Volumetric Flasks - Class A
Argon and compressed air supply with pressure controls

ANALYTE LIST

See Appendix I.

REAGENTS AND STANDARDS

Deionized water from Millipore Synergy UV water polisher - monitored daily.

Concentrated Nitric acid - Trace metals grade, label with date opened and enter into reagent logbook

Concentrated hydrochloric acid – Trace metals grade, label with date opened and enter into reagent logbook

5% Nitric Acid - prepared from the Trace metals grade concentrate

6% Nitric Acid/10% Hydrochloric Acid – Calibration Blank

Stock standard metals solutions (1000 mg/L) - commercially prepared, label with date opened.

Custom mixed standards – commercially prepared, label with date opened.

Calibration standards: A custom made solution for calibrations standards is used. See Table I for the elements included and concentration. Prepare all standards in the 6% Nitric Acid/10% Hydrochloric Acid.

Continuing Calibration Verification (CCV) standard – is prepared using the calibration standard. The CCV includes equal aliquots of the calibration standard and 6% Nitric Acid/10% Hydrochloric Acid.

Second Source Stock Standards – Two, multi-element custom solutions-commercially prepared.

Initial Calibration Verification (ICV) standard - Dilute the appropriate amount of the second source multi-element stock solution to volume with 6% Nitric Acid/10% Hydrochloric Acid. The concentration of the elements in the stock solutions vary in concentration, therefore the analyst should prepare this solution such that the majority of the elements are in the middle of the calibration range.

Interference solution stock standards - available commercially.

Interferent Calibration Solution A (ICSA) - Pipet 8.0 mL of the interferent stock Spex Int. A-1 into a 200 mL volumetric flask and dilute to volume with 6% Nitric Acid/10% Hydrochloric Acid. Final concentrations are: Al, Ca, Mg - 200 mg/L; Fe - 80 mg/L.

Interferent Calibration Solution B (ICSAB) - Pipet 8.00 mL of the interferent stock Spex Int. A-1, 2.0 mL of interferent stock Spex Int. B-1, and 2 mL of interferent stock Spex Int. B-2 standards into a 200 mL volumetric flask and dilute to volume with 3% Nitric Acid/6% Hydrochloric Acid. Final concentrations of interferents are as above; concentrations of minor elements are either 0.500 or 1.00 mg/L.

Internal Standard – 5 mg/L Yttrium, 5 mg/L Scandium

Low-level Calibration Verification Standard composed of two custom-made standards prepared at the reporting limit.

All solutions are prepared in labeled, dedicated glassware. The glassware is rinsed in an acid solution to clean.

All reagents used must be entered in the reagent logbook. Standards prepped are entered into the standard prep logbook.

INSTRUMENT SET-UP

1. Check Argon and compressed air supply.

2. Check wash solution in autosampler flush container. Fill if necessary (5% Nitric Acid).

3. Check drain bottle below instrument. Empty if necessary.

4. Connect the peristaltic pump tubing between the posts on the pump (Sample pump and internal standard pump). Close the platens.

5. Restart the computer. Select the Optima ICON on the Windows Desktop. Select a workspace. Select a method.

6. Select the Plasma ICON. Select "ON" button. Allow Plasma to warm up 45 minutes.

7. Set up bench sheet by filling in the positions with the samples to be analyzed. Include the standard identification numbers for the calibration standards, ICV, ICSA, and ICSAB on the bench sheet (Attachment 1).

8. Load the autosampler by filling the tubes (10 mL will suffice) and inserting them into the positions corresponding to those on the bench sheet. Verify all blank, standard and QC sample tubes are filled.

9. Open a sample information file on the set up window and enter the analytical sequence. <SAVE>. Open a Results file - name by date (YYMMDD).

10. If the torch compartment has been opened, go to Tools pull down menu. Select “Spectrometer Control”. Aspirate a 5mg/L Y solution. Select “Optimize X-Y”. Select “Hg Realign”. Record the Hg intensity in the maintenance log.

11. Go to analyze in the Analysis Control Window.

CALIBRATION AND SAMPLE ANALYSIS

1. Select "Analyze All". Instrument will calibrate and continue with QC and sample analysis. The calibration is at one point with a blank. It is verified with an ICV, LLICV, CCV and CCB. Once data is collected, and instrument QC is evaluated, the data can be posted. This is performed by direct upload of data using LIMSLink Software.
2. SHUT DOWN - If an additional run will not be performed select “auto-shutdown” from the system pull down menu.
3. Samples are diluted if above linear range as described in QC section 12 of this SOP.

4. Replicates are evaluated for all runs. If the RSD is more than 5%, each replicate is evaluated. If an outlier is determined, it may be excluded. This is documented on the metals run log and in the raw data.

REPORTING LIMITS

The following charts indicate reporting limits for EPA 200.7, SW-846 6010, TCLP extracts, SPLP extracts and UTS analyses:

EPA 200.7:

ANALTYE	WATER (mg/L)
Aluminum	0.2
Antimony	0.06
Arsenic	0.01
Barium	0.01
Beryllium	0.005
Boron	1
Cadmium	0.005
Calcium	0.1
Chromium	0.01
Cobalt	0.01
Copper	0.01
Iron	0.1
Lead	0.015
Lithium	0.05
Magnesium	0.1
Manganese	0.015
Molybdenum	0.03
Nickel	0.04
Potassium	0.5
Selenium	0.04
Silver	0.01
Sodium	1
Strontium	0.05
Thallium	0.02
Tin	0.025
Titanium	0.1
Vanadium	0.02
Zinc	0.02
Zirconium	0.01

SW-846, 6010:

ANALTYE	WATER (mg/L)	SOLID (mg/kg)
Aluminum	0.2	8
Antimony	0.06	2.4
Arsenic	0.01	1.6
Barium	0.01	0.4

Beryllium	0.005	0.2
Boron	1	40
Cadmium	0.005	0.2
Calcium	0.1	30
Chromium	0.01	0.4
Cobalt	0.01	0.4
Copper	0.01	0.4
Iron	0.1	4
Lead	0.015	0.6
Lithium	0.05	2
Magnesium	0.1	4
Manganese	0.015	0.6
Molybdenum	0.03	1.2
Nickel	0.04	1.6
Potassium	0.5	20
Selenium	0.04	1.6
Silver	0.01	0.4
Sodium	1	40
Strontium	0.05	0.4
Thallium	0.02	0.8
Tin	0.025	4
Titanium	0.1	4
Vanadium	0.02	0.8
Zinc	0.02	0.8
Zirconium	0.01	0.4

TCLP, UTS, SPLP Extracts:

ANALTYE	TCLP (mg/L)	UTS (mg/L)	SPLP (mg/L)
Aluminum	----	----	0.2
Antimony	0.06	0.1	0.06
Arsenic	0.2	0.14	0.01
Barium	1	1	0.01
Beryllium	0.005	0.01	0.005
Boron	----	----	1
Cadmium	0.01	0.01	0.005
Calcium	----	----	0.1
Chromium	0.05	0.05	0.01
Cobalt	----	----	0.01
Copper	----	----	0.01
Iron	----	----	0.1
Lead	0.1	0.075	0.015
Lithium	----	----	0.05
Magnesium	----	----	0.1
Manganese	----	----	0.015
Molybdenum	----	----	0.03
Nickel	0.04	0.05	0.04
Potassium	----	----	0.5

Selenium	0.1	0.1	0.04
Silver	0.05	0.01	0.01
Sodium	----	----	----
Strontium	----	----	0.05
Thallium	0.02	0.02	0.02
Tin	----	----	0.025
Titanium	----	----	0.1
Vanadium	0.02	0.02	0.02
Zinc	0.02	0.1	0.02
Zirconium	----	----	0.01

NOTE: Reporting limits may vary according to specific project requirements.

QUALITY CONTROL &
DATA ACCEPTANCE CRITERIA

1. The Initial Calibration Verification (ICV) standard recoveries must be 95-105% for 200.7 and 90-110% for 6010. This is performed daily following the initial calibration. The ICV standard should be prepared from an independent (second source) material at or near the mid-range of the calibration curve.

2. Analyze a Initial Calibration Blank (ICB) to verify all concentrations are below the reporting limit. The concentration must be $\leq \pm$ the reporting limit. For DOD projects, concentrations must be less than the LOD. Additional requirements may apply and may be more stringent. See SOP GEN-019.

3. Analyze a Low-level Initial Calibration Verification (LLICV) prepared at or below the project required reporting limit. The recovery for this check standard must be 70-130% for 6010C or 50-150% for 6010B. Project specific limits may be required, see SOP GEN-019. For DOD projects, recoveries must be 80-120%.

4. The ICSA solution is used to monitor the interelement correction factors for the common interferents (Fe, Ca, Mg, Al). This solution is not required in the methods but will be used to evaluate elements that are not spiked in the ICSAB. The concentration for these elements must be $\leq \pm$ LOD for DOD projects. The ICSA concentration must be less than or equal the reporting limit and greater than or equal to −2 times the reporting limit. Additional requirements may apply and may be more stringent. See SOP GEN-019.

5. All elements in the ICSAB solution should have

recoveries of 80-120%. Results falling outside these limits may indicate the need for re-generation of the inter-element correction factors (IECs).

6. Continuing Calibration Verification standards (CCV), Continuing Calibration Blanks (CCB), and for 6010C Low-level Continuing Calibration Verification (LLCCV) are run at the beginning of the analytical run. The first CCV recovery must be 95-105% and all other CCV recoveries for the analytical run must be 90-110% for 200.7. For 6010B and 6010C, the CCV recoveries for all target analytes –90-110% for 6010. For 6010C, the recovery for the LLCCV must be 70-130% for all analytes. The RSD between the replicates should not be greater than 5%. If this is exceeded evaluate to determine if re-analysis is necessary. The CCB concentration should never exceed the reporting limit. If a CCV and/or CCB is outside control limits, re-analyze one time (additional runs are acceptable if a documented reason for the failure is available) and if the values are still outside the control limits, recalibrate and re-run the previous 10 samples. Results are reportable with a narrative if the CCB fails and there are no hits in the associated samples. Additional requirements may apply and may be more stringent. See SOP GEN-019.

7. Method Blank – one Method Blank is prepped with each batch of 20 or fewer samples. The concentration of each element should never exceed the reporting limit for all associated samples. Detected levels of elements in the method blank must be less than the reporting limit or <10% of the sample concentrations for the data to be reported. For DOD projects, the method blank should be less than ½ the reporting limit or <10% of the measured amount in the samples. If the data is reported make a note of the problem in the case narrative. Find the source of the problem and correct and re-analyze if possible. Additional requirements may apply and may be more stringent. See SOP GEN-019.

   NOTE: Blanks (2500) maybe placed prior to a CCV/CCB to complete a block of ten positions before another prep batch is analyzed and to leave positions open for reruns.

8. A Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD-if required for project or if insufficient sample if available for a matrix

duplicate or MS/MSD) is prepped with each batch of 20 or fewer samples. The recovery must be 80 - 120% for 6010B&C waters and solids, 85-115% for 200.7, and 70-130% for 6010B&C organics. The LCS/LCSD RPD should be ≤ 20%. If the LCS recovery is outside the control limits, the sample batch must be re-prepped. Samples may be reported if the LCS fails high with no hits in associated samples. Report with a narrative describing the failure.

9. The Relative Percent Difference (RPD) for matrix duplicates must be ≤ 20%, unless the sample concentration is less than five times the detection limit or the sample matrix is determined to be heterogeneous. Additional requirements may apply and may be more stringent. See SOP GEN-019.

10. Matrix Spike (MS) and Matrix Spike Duplicate (MSD) recoveries must be 75 - 125% for 6010B&C water and solids, 70-130% for 200.7 and 6010B&C organics. The MS/MSD RPD should be ≤ 20%. For DOD projects, the MS control limits are the same as the applicable LCS limits. MSD's are prepped and analyzed if there is sufficient sample. If the recovery is outside these limits, the data should be flagged. A spike is not applicable if the sample concentration is greater than 4 times the spike level. Interference checks shall be performed for samples with spike recoveries outside the control limits. If a TCLP extract spike recovery for a regulated metal is <50% and the sample concentration is within 20% of the regulatory level the sample must be reanalyzed by the method of standard additions. Additional requirements may apply and may be more stringent. See SOP GEN-019.

11. For solid samples that require Antimony analysis – If the MS and MSD recovery for Antimony are outside of the control limits of 75-125%, the data should be flagged. In addition, if the recovery for Antimony is <10%, the samples should be reprepped for Antimony only, using the optional procedure for Antimony found in SOP MET-004. Also, if historical data for a particular sample indicates low recoveries for Antimony, the analyst should proceed directly to the optional steps.

12. Interference checks:

    A. Dilution Test - Perform a 5x dilution on one sample per batch. The concentrations of the elements in

the sample to be diluted should be greater than 50 times the IDL for 200.7 and 10x the LOQ for 6010C for it to be applicable. The neat sample concentration and five times the diluted sample concentration should agree within 10%. If not, a chemical or physical interference should be suspected.

B. Post-Digestion Spike – Analyte is added to a portion of a digested sample, or its dilutions. A post-digestion spike is also performed on all samples with MS/MSD recoveries outside control limits. If the recovery is outside control limits of 80-120% for 6010C, 75-125% for 6010B or 85-115% for 200.7, all data for the batch will be flagged by including a narrative with the data. Internal standardization is utilized therefore the method of standard additions is not required. A post-digestion spike is required for each sample batch. It is usually performed on the sample chosen as the matrix spike.

13. Samples with interferent or analyte concentrations greater than the determined instrument linear range will be diluted and reanalyzed. Target analytes must always be diluted to within the linear range of the instrument. Samples must be diluted for non-target analytes only if that analyte is an interferent for a target analyte. Dilutions for interferents above the linear range should only be performed if a correction factor is in effect for target analytes. Do not over dilute. Perform the minimum dilution possible to dilute within the linear range of the instrument for any analyte. For 200.7, dilute samples with concentrations >90% linear range. Additional requirements may apply and may be more stringent. See SOP GEN-019.

14. Review the Internal standard recovery for each sample. Perkin Elmer recommends recovery limits of 50-150%. Review the data thoroughly before accepting or rejecting data based on these control limits. Determine if high or low recoveries are due to instrument drift by reviewing the internal standard recoveries for CCV’s and CCB’s. This will eliminate performing unnecessary dilutions if the sample is reanalyzed. High recoveries may be the result of a clogged sample uptake tube or an empty sample vial. Extremely high recoveries can result from the presence of the internal standard element in the original

sample. If this is suspected, reanalyze the sample without the internal standard, or re-analyze using a different IS such as scandium. If the analyst determines the recovery is outside the control limits due to a matrix interference, then the sample must be reanalyzed diluted.

15. Determine IEC's semi-annually.

16. Determine linear ranges semi-annually. Spike at historical values. Each metal must be recovered at 90-110%.

17. Determine MDL's annually using the requirements of SOP QA-009. MDL's shall be determined more frequently if there is a change to the method or instrumentation that may alter the sensitivity of the measurement. An MDL study is performed for each instrument. MDL's should be less than ½ the reporting limit, but cannot be higher than the reporting limit. The MDL's are confirmed by the analysis of a lower limit of quantitation check sample (LOD check). The LOD check is prepared like a sample and spiked at 1 – 4 times the MDL. The LOD must be positive to pass. The LOQ's must be spiked at the concentration of the LLICV. Recoveries must be 80-120%.

18. Determine IDLs annually.

MAINTENANCE

1. Clean the nebulizer periodically in a 5% Nitric acid solution. Sonication of the nebulizer in this solution is also helpful in removing deposits or particulate matter.

2. Clean the torch periodically by soaking in 10% HNO_3.

3. Sample pump tubing should be inspected every day and changed when showing signs of wear.

4. The purge window may fog slightly over time. Remove and clean with methanol.

5. Check the water level in the chiller.

6. A Perkin Elmer service engineer performs scheduled periodic maintenance every six months.

7. All other maintenance shall be documented in the instrument maintenance log. If a particular problem

occurs, document the problem and the solution.

CALCULATIONS

1. Sample Concentration –

$$\text{mg/L or mg/kg analyte in sample} = A \frac{Vf}{Vi} \times d$$

A = mg/L analyte in processed sample
Vf = final volume of sample (mL)
Vi = initial volume (mL) or weight (g) of sample
d = dilution factor (if required)

The units may be converted to ug/L or ug/kg

2. Matrix spike and Matrix Spike Duplicate Recovery

$$\% \text{ Recovery} = \frac{(SSR - SR)}{SA} \times 100$$

SSR = spiked sample result
SR = sample result
SA = spike added

3. Matrix Duplicate Relative Percent Difference (RPD)

$$RPD = \frac{SR - SDR}{\frac{(SR+SDR)}{2}} \times 100$$

SR = Sample result
SDR = sample duplicate result
$\frac{(SR+SDR)}{2}$ = average of SR and SDR

TABLE I

ELEMENT	WAVELENGTH 5300DV	WAVELENGTH 4300DV*	CALIBRATION STANDARD CONC mg/L
Ag	328.067	328.072	1.00
Al	308.218	308.219	10.0
As	193.696	193.694	1.00
B	249.672	249.677	5.00
Ba	233.527	233.524	1.00
Be	313.105	313.104	1.00
Ca	315.887	315.887	10.0
Cd	214.438	214.436	1.00

ELEMENT	WAVELENGTH 5300DV	WAVELENGTH 4300DV*	CALIBRATION STANDARD CONC mg/L
Ce	418.660	418.660	1.00
Co	228.613	228.617	1.00
Cr	267.706	267.713	1.00
Cu	324.751	324.753	1.00
Fe	259.938	259.938	10.0
K	766.496	766.526	20.0
Li	670.783	670.813	1.00
Mg	279.078	279.076	10.0
Mn	257.605	257.609	1.00
Mo	202.031	202.032	1.00
Na	589.597	589.622	40.0
Ni	231.605	231.602	1.00
Pb	220.352	220.353	1.00
Sb	206.830	206.834	1.00
Se	196.024	196.026	1.00
Si	251.609	251.612	1.00
Sn	189.928	189.924	1.00
Sr	421.560	421.563	1.00
Ti	337.277	337.277	1.00
Tl	190.800	190.799	1.00
V	290.878	290.881	1.00
Zn	213.857	213.856	1.00
Zr	343.821	343.818	1.00

*Al, Ca, Fe, Na, Li, K, Sr, Mg are analyzed in the radial mode

SOFTWARE TROUBLESHOOTING

All ICP instruments at GCAL utilize Perkin Elmer software WINLAB32 Version 3.1.0.0107 to control the instrument and perform all data calculations. In the event of software malfunction, please contact Perkin Elmer technical support

or GCAL's IT Director for troubleshooting help.

METHOD PERFORMANCE (METHOD 6010)

1) In an EPA round-robin Phase 1 study, seven laboratories applied the ICP technique to acid-distilled water matrices that had been spiked with various metal concentrates. Table 4 of Method 6010 lists the true values; the mean reported values, and the mean percent relative standard deviations.

2) Performance data for aqueous solutions and solid samples from a multi-laboratory study (9) are provided in Tables 5 and 6 of Method 6010.

METHOD PERFORMANCE (METHOD 200.7)

1) Listed in Table 4 of Method 200.7 are typical single laboratory total recoverable MDLs determined for the recommended wavelengths using simultaneous ICP-AES and the operating conditions given in Table 5 of Method 200.7. The MDLs were determined in reagent blank matrix (best case situation). PTFE beakers were used to avoid boron and silica contamination from glassware with the final dilution to 50 mL completed in polypropylene centrifuged tubes. The listed MDLs for solids are estimates and were calculated from the aqueous MDL determinations.

2) Data obtained from single laboratory method testing are summarized in Table 6 of Method 200.7 for five types of water samples consisting of drinking water, surface water, ground water, and two wastewater effluents. The data presented cover all analytes except cerium and titanium. Samples were prepared using the procedure described in Section 11.2. For each matrix, five replicate aliquots were prepared, analyzed and the average of the five determinations used to define the sample background concentration of each analyte. In addition, two pairs of duplicates were fortified at different concentration levels. For each method analyte, the sample background concentration, mean percent recovery, standard deviation of the percent recovery, and relative percent difference between the duplicate fortified samples are listed in Table 6 of Method 200.7. The variance of the five replicate sample background determinations is included in the calculated standard deviation of the percent recovery when the analyte concentration in the sample was greater than the MDL. The tap and well waters were processed in Teflon and quartz beakers and diluted in polypropylene centrifuged tubes. The nonuse of borosilicate glassware is reflected in the precision and recovery data for born and silica in those two sample types.

3) Data obtained from single laboratory method testing are summarized in Table 7 of Method 200.7 for three solid samples consisting of EPA 884 Hazardous Soil, SRM 1645 River Sediment, and EPA 286 Electroplating Sludge. Samples were prepared using the procedure described in Section 11.3. For each method analyte,

the sample background concentration, mean percent recovery of the fortified additions, the standard deviation of the percent recovery, and relative percent difference between duplicate additions were determined as described in Section 13.2. Data presented are for all analytes except cerium, silica and titanium. Limited comparative data to other methods and SRM materials are presented in reference 23 of Section 16.0.

4) Performance data for aqueous solutions independent of sample preparation from a multi-laboratory study are provided in Table 8 of Method 200.7.

5) Listed in Table 9 of Method 200.7 are regression equations for precision and bias for 25 analytes abstracted from EPA Method Study 27, a multi-laboratory validation study of Method 200.7. The equations were developed from data received from 12 laboratories using the total recoverable sample preparation procedure on reagent water, drinking water, surface water and 3 industrial effluents. For a complete review and description of the study see reference 16 of Section 16.0.

POLLUTION PREVENTION See QAPP Section 10.2

WASTE MANAGEMENT See SOP GEN-009

Appendix I

Aluminum
Antimony
Arsenic
Barium
Beryllium
Boron
Cadmium
Calcium
Chromium
Cobalt
Copper
Hardness
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Potassium
Selenium
Silicon
Silver
Sodium
Strontium
Thallium
Tin
Titanium
Vanadium
Zinc
Zirconium

APPENDIX A

GLOSSARY

ACCEPTANCE LIMITS – data quality limits specified by the test method or generated by the laboratory. Specified limits placed on an item, process, or service defined in the requirement document.

ACCURACY – a measure of how close a measured value is to a known true value. Accuracy is assessed by means of reference samples and percent recoveries of spiked samples. The degree of agreement between an observed value and an accepted reference value. Accuracy includes combination of random error (precision) and systematic error (bias) components which are due to sampling and analytical operations; a data quality indicator.

ALIQUOT – a discrete, measure, or representative portion of a sample taken for analysis.

ANALYTE – the chemical element or compound an analyst seeks to determine; the chemical element of interest.

ANALYTICAL BATCH – the basic unit for analytical quality control, defined as samples that are analyzed together with the same method sequence and the same lots of reagents and with the manipulations common to each sample within the same time period or in continuous sequential time periods. Samples in each batch should be of similar composition (e.g., groundwater, sludge, ash).

ANALYTICAL SAMPLE – any solution or media introduced into an instrument on which an analysis is performed, excluding instrument calibration, initial calibration verification, initial calibration blank, continuing calibration verification, and continuing calibration blank. The following are all analytical samples: undiluted and diluted samples (EPA and non-EPA), predigestion spike samples, duplicate samples, serial dilution samples, analytical spike samples, post digestion spike samples, interference check samples (ICS), CRDL standard for AA(CRA), CRDL standard for ICP(CRI), laboratory control sample(LCS), preparation blank(PB), and linear range analysis sample(LRS).

ANALYST – the designated individual who performs the "hands on" analytical methods and associated techniques and who is the one responsible for applying required laboratory practices and other pertinent quality controls to meet the required level of quality.

AREA UNITS – a term used in gas chromatography that indicates the peak area of a compound exiting a chromatographic column. The size or area of the peak is proportional to the amount of analyte in the sample.

ATOMIC ABSORPTION (AA) – a technique for analyzing metal using an element-specific lamp that emits a characteristic light spectrum. A sample is heated in a flame or graphite furnace and the light beam is passed through it. When the sample absorbs light, an energy loss is detected and is translated into a concentration of metal in the sample. This technique detects one metal at a time.

AUDIT – a systematic check to determine the quality of some function or activity. Two basic types are performance audits and system audits. Perform audits involve a quantitative comparison of the laboratory's results to those of a proficiency sample containing known concentration of analytes. A system audit is a qualitative evaluation that normally consists of an onsite review of a lab's quality assurance system and physical facilities.

BACKGROUND CORRECTION – a technique usually employed relative to metals analysis, which compensates for variable background contribution to the instrument signal in the determination of trace elements.

BATCH – environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents. A batch is composed of a maximum of twenty environmental samples. A preparation batch is composed of environmental sample of the same matrix, meeting the above-mentioned criteria and with a maximum time between the start of processing the first and last sample in the batch to be 24 hours. An analytical batch is composed of prepared environmental samples (extracts, digestates or concentrates) and/or those samples not requiring preparation, which are analyzed together as a group using the same calibration curve or factor. An analytical batch can include samples originating from various environmental matrices.

BIAS – the deviation of the mean of replicate analytical measurements from a reference analyte concentration. Relative bias is represented by analytical measurement mean minus the reference analyte concentration and the difference divided by the reference analyte concentration. See accuracy and precision.

4-BROMO-FLUOROBENZENE (BFB) – the compound used to check the tuning of the instrument, and is used as a surrogate compound spiked into every sample for volatile analysis. A compound utilized in EPA gas chromatography/mass spectrometry (GC/MS) volatile methods to establish mass spectral instrument performance.

BIOCHEMICAL OXYGEN DEMAND (BOD) – A measure of the amount of oxygen consumed in the biochemical processes that break down organic matter in water. A larger BOD value indicates a greater degree of organic pollution. A related term, BOD5, is the amount of dissolved oxygen consumed in five days.

BIOSEED – the bacterial culture used to inoculate a sample for testing.

BLANK – an artificial sample designed to monitor the introduction of artifacts into the measurement process. For aqueous samples, reagent water is used as a blank matrix. There are several types of blanks, which monitor a variety of processes: 1.)*laboratory blank* is taken through sample preparation and analysis only. It is a test for contamination in sample preparation and analyses. 2.)*storage blank* is stored and analyzed with samples at the laboratory. It is a test for contamination in sample storage as well as sample preparation and analysis. 3.)*trip blank* is shipped to and from the field with the sample containers. It is not opened in the field and, therefore, provides a test for contamination from sample preservation, site conditions, and transport as well as sample storage, preparation, and analysis. It is most commonly used for volatile organics. 4.)*field blank* is opened in the field and tests for contamination from the atmosphere as well as those activities listed under the trip blank.

BNA – base, neutral and acid extractable compounds. The term base, neutral and acid refer to the pH condition of the sample undergoing extraction. Certain compounds extract more efficiently from water under acidic conditions. Such compounds are often referred to as "acid extractables."

CALIBRATE – to determine, by measurement or comparison with a standard, the correct value of each scale reading on a meter or other device, or the correct value for each setting of a control knob. The levels of the applied calibration standard should bracket the range of planned or expect sample measurements.

CALIBRATION – The systematic determination of the relationship of the response of the measurement system to the concentration of the analyte of interest.

Instrument calibration performed before any samples are analyzed is called the initial calibration. Subsequent checks on the instrument calibration performed throughout analysis are called continuing calibration verification.

CALIBRATION BLANK (CB) – a volume of reagent water in the same matrix as the calibration standards but without the analyte.

CALIBRATION CURVE – the graphical relationship between the known values, such as concentrations, of a series of calibration standards and their analytical response.

CALIBRATION METHOD – a defined technical procedure for performing a calibration.

CALIBRATION STANDARD – a certified material used to calibrate an instrument.

CERTIFIED REFERENCE MATERIAL (CRM) – reference material, one or more of whose property values are certified by a technically valid procedure, accompanied by or traceable to a certificate or other documentation which is issued by a certifying body. (ISO Guide 30)

CONTINUING CALIBRATION VERIFICATION (CCV) – used to evaluate the performance of the instrument system with respect to a defined set of method criteria. The CCVs are used to verify instrument performance during analysis. The CCV shall be prepared from the same stock standard solution used to prepare the calibration curve.

CHAIN-OF-CUSTODY–Procedures and associated documents designed to trace the custody of a sample from the point of origin to final disposition, with the intent of legally demonstrating that custody remained intact and the tampering or substitutions were precluded.

CHEMICAL OXYGEN DEMAND (COD) – A measure of the oxygen required to oxidize all compounds in water, both organic and inorganic.

COMBINED STANDARD UNCERTAINTY – The standard uncertainty of the analytical measurement result that is the sum in quadrature (square-root-of-the-sum-of-the-squares) of the component standard uncertainties.

CORRECTIVE ACTION – the action taken to eliminate the causes of an existing non-conformity, defect, or other undesirable situation to prevent reoccurrence.

COVERAGE FACTOR – the numerical factor used as a multiplier of the combined standard uncertainty to expand the uncertainty corresponding to a specific level of confidence. The Student's *t*-distribution is used for determining the coverage factor.

DEMONSTRATION OF CAPABILITY (DOC) – a procedure used to establish the ability of the analyst to generate acceptable accuracy.

DEIONIZED WATER (DI) – water from which the majority of ions have been removed. Water that is contaminant free and used in the laboratory, the resistivity should be ≤ 18 mega ohms.

DISSOLVED METALS -- metallic elements determined on a water sample that has been passed through a 0.45-um filter.

DISSOLVED OXYGEN (DO) – the oxygen freely available in water, an indicator of water quality.

DISSOLVED SOLIDS – disintegrated organic and inorganic material contained in water. Excessive amounts make water unfit to drink or use in industrial processes.

DRY WEIGHT – the weight of a sample based on percent solids. The weight of a sample after drying in an oven at a specified temperature.

DUPLICATE MEASUREMENT – a duplicate measurement is a second measurement made on the same or identical sample of material to assist in the evaluation of measurement of variance.

DUPLICATE SAMPLE – two samples taken from the same population and carried through certain stages of sampling and testing. Duplicate sample include field co-located duplicate samples, field-split duplicate samples, and laboratory duplicate subsamples.

EXPANDED UNCERTAINTY – the quantity defining an interval enveloping the analytical measurement that captures a large fraction of the distribution of analyte concentrations that could be attributable to the quantity measured. The combined standard uncertainty is multiplied by the coverage factor to calculate the expanded uncertainty.

EXTERNAL STANDARDS – a method of quantifying chromatographic data in which standards of known concentration are analyzed prior to unknown samples. The chromatographic peak area (or height) of a sample component is compared to a calibration curve of a peak area constructed from the standard data for that component. This comparison allows the concentration of the component in the sample to be determined.

FECAL COLIFORM BACTERIA – bacteria found in mammals' intestinal tracts. Their presence in water or sludge is an indicator of pollution and possible contamination by pathogens.

FLAME IONIZATION DETECTOR (FID) – a gas chromatography detector in which the column effluent gas is mixed with hydrogen and burned in air or oxygen. The ions and electrons produced in the flame generate an electric current proportional to the amount of materials in the detector. The FID responds to nearly all organic compounds, but it does not respond to air and water, which makes it exceptionally suited to environmental analysis.

FLASHPOINT – the lowest temperature at which a flammable liquid gives off sufficient vapor to form an ignitable mixture with air near its surface or within a vessel. Combustion does not continue.

GAS CHROMATOGRAPHY (GC) – a technique for detecting organic compounds by using their physical and chemical properties to separate a mixture. The compounds are identified and quantified with various types of detectors as they exit the chromatograph. Selection of detectors is dependent on the particular compounds of interest.

GAS CHROMATOGRAPHY MASS SPECTROMETRY (GCMS) – a technique in which sample analytes are bombarded with electrons as they exit a gas chromatography column and are fragmented into characteristics ion patterns. The mass spectrometer is the detector. It can determine which fragments are present and therefore the identity of the compounds.

GLUCOSE GLUTAMIC ACID (GGA) – used as a laboratory control standard in BOD procedures.

GRAPHITE FURNACE – a technique used for the analysis of metals. An atomic absorption spectrophotometer heats the sample within a graphite tube using an electrical current. It is also commonly called a flameless furnace and

generally provides greater sensitivity for certain metals than flame or inductively coupled argon plasma techniques.

GRAVIMETRIC - analyses based on the direct or indirect weighing of the analyte in question. This technique usually requires the use of an analytical balance with a sensitivity of 0.1 mg or better.

HALL ELECTROLYTIC CONDUCTIVITY DETECTOR – an element-selective gas chromatography detector primarily intended for trace analysis of organic compounds containing chlorine, nitrogen or sulfur. In operation, this detector pyrolyzes the column effluent gas into soluble electrolytes that are dissolved in a stream of deionized liquid. The observed change in electrical conductivity, proportional to the amount of material present, is measured.

HAZARDOUS WASTE – waste regulated under RCRA that can pose a substantial or potential hazard to human health or the environment when improperly managed. Such wastes possess at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity) or appear on special EPA hazardous waste lists. The term is not interchangeable with hazardous substances or material.

HEADSPACE - Any area in a container not completely filled by the sample in which gases can collect.

HEAVY METALS – metallic elements with high atomic weights, i.e., mercury, chromium, cadmium, arsenic, and lead. They can damage the health of plants and animals at low concentrations and tend to accumulate in the food chain.

HOLDING TIME – the maximum times that samples may be held before analysis and still be considered valid or not compromised. The storage time allowed between sample collection and sample analysis when the designated preservation and storage techniques are employed.

HYDROCARBONS – chemical compounds that consist entirely of carbon and hydrogen.

ICP – Inductively coupled plasma is a type of instrument used for metals analysis. Because the temperature of the plasma is considerable higher (10,000°K) than the temperature of a flame atomic absorption spectrophotometer, it is especially useful for refractory metals. Some instruments are also capable of performing simultaneous multielement analysis.

ICP-MS - Inductively coupled plasma mass spectrometry (ICP-MS) is a type of mass spectrometry highly sensitive and capable of the determination of a range of metals and several non-metals at concentrations below one part in 10^{12} (part per trillion). It is based on coupling together an inductively coupled plasma as a method of producing ions with a mass spectrometer as a method of separating and detecting the ions. In trace elemental analysis, the method has advantages of high speed, precision and sensitivity.

IGNITABLE – capable of burning or causing a fire.

INORGANIC CHEMICALS – chemical substances of mineral origin, unlike organic chemicals whose structure relies on carbon atoms.

INITIAL CALIBRATION VERIFICATION (ICV) - also referred to as the Independent Calibration Verification for this laboratory. A standard solution used to verify the calibration curve derived from a source independent of the instrument calibration standard. The ICV is use to quantify second source standard variance and bias.

INSTRUMENT CALIBRATION STANDARD - a reference material used to standardize an analytical instrument.

INSTRUMENT DETECTION LIMIT (IDL) - a term utilized in the EPA Inorganic Contract Laboratory Program. The IDL is three times the standard deviation obtained for the analysis of a standard solution (each analyte in reagent water) at a concentration of three to five times that of the IDL on three nonconsecutive days with seven consecutive measurements per day. The IDL is the concentration equivalent to a signal, due to the analyte of interest, which is the smallest signal that can be distinguished from background noise by a particular instrument. The IDL should always be below the method detection limit, and is not used for compliance data reporting, but may be used for statistical data analysis and comparing the attributes of different instruments.

INSTRUMENT PERFORMANCE CHECK - The analyses of one of the ICSs to verified initial and continuing calibration (CCV). The IPC is used to quantify the instrumental testing repeatability variance and bias.

INSTRUMENT TUNING - a technique used in gas chromatography/mass spectrometry procedures to verify that the instrument is properly calibrated to produce reliable mass spectral information. See 4-Bromofluorobenzene under "B".

INTERNAL STANDARDS - compounds added to every standard, blank, matrix spike, matrix spike duplicate, sample (for volatile organics), and sample extract (for semivolatiles) at a known concentration, prior to analysis. Internal standards are used as the basis for quantification of the target compound.

IONIZATION - Utilized in mass spectrometry to fragment analyte molecules into smaller segments. These smaller mass segments are then separated and plotted to form a "mass spectrum" which is used to identify the parent molecule. Electron impact is one example of ionization used in mass spectrometry. In more technical terms. Ionization is the process by which neutral atoms or groups of atoms become electrically charged, either positively or negatively, by the loss or gain of electrons.

ISOMERS - chemical compounds with the same molecular weight and atomic composition by differing molecular structure, e.g., n-pentane and 2-methylbutane.

LABORATORY CONTROL SAMPLE (LCS) - a clean-matrix reference sample spiked with a standard with an established analyte concentration. The LCS is carried through the entire chemical preparation and testing procedures. The LCS is used to quantify the variance and bias of the chemical preparation and instrumental testing stages without matrix interference. Also called a Laboratory fortified blank (LFB).

LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) – a duplicate of the laboratory control sample in a clean matrix that is carried through the entire chemical preparation and testing procedures.

LABORATORY DUPLICATE SAMPLE (LAB DUPLICATE) - a portion of the collected sample that is carried through the chemical preparation and testing. The laboratory duplicate subsample is used to quantify the variance of the chemical preparation and instrumental testing stages with matrix interferences.

LEACHATE - a liquid that results from water collecting contaminants as it trickles through wastes, agricultural pesticides or fertilizers. Leaching may occur in farming areas, feedlots, and landfills, and may result in hazardous substances entering surface water, groundwater or soil.

LDEQ – Louisiana Department of Environmental Quality

LIBRARY SEARCH - a technique in which an unknown mass spectrum of a compound is compared to the mass spectra of compounds contained in a computer library in an

effort to identify the compound. Compounds identified in this manner are referred to as tentatively identified compounds (TICs).

LIMIT OF DETECTION (LOD) – an estimate of the minimum amount of a substance that an analytical process can reliable detect. An LOD is analyte and matrix specific and may be laboratory dependent.

LIMIT OF QUANTIATION (LOQ) – the minimum levels, concentrations, or quantities of a target variable (e.g. target analyte) that can be reported with a specified degree of confidence..

LIMS – laboratory information management system. Horizons is the LIMS used by GCAL.

LINEAR CALIBRATION RANGE – the concentration range over which the instrument response is linear.

LOG-IN - the receipt and initial management of an environmental sample. It generally includes identifying who sent the sample; maintaining chain-of-custody; checking report and invoice information; recording analysis requested, including methodology and special instructions; and assigning a discreet in-lab identification, usually a number or bar code.

MASS SPECTRUM - a plot of ion mass/charge ratio versus intensity. A fragmentation pattern results from the particles whose mass distribution is characteristic of the parent molecule. Qualitative information is provided by a mass spectrum.

MATERIAL SAFETY DATA SHEET (MSDS) - a compilation of information required under the OSHA Communication Standard on the identity of hazardous chemicals and their associated health and physical hazards, exposure limits and precautions.

MATRIX - The physical characteristics or state of a sample – e.g., water, soil, sludge.

MATRIX INTERFERENCE - the influence of the sample matrix or sample components upon the ability of qualitatively identifies and quantitatively measures compounds in environmental samples.

MATRIX MODIFIERS - chemicals added to samples for metals analysis, which are used to lessen the effects of chemical interference, viscosity and surface tension.

MATRIX SPIKE (MS) – aliquot of a sample fortified (spiked) with known quantities of specific compounds and subjected to the entire analytical procedure in order to indicate the appropriateness of the method for the matrix by measuring recovery of the spike. Matrix spiked samples are used to quantify the variance and bias of the chemical preparation and testing stages with matrix interference.

MATRIX SPIKE DUPLICATE (MSD) - a second aliquot of the same matrix as the matrix spike that is spiked to determine the precision of the method.

METHOD DETECTION LIMIT (MDL) - the minimum concentration of compound that can be measured and reported within 99% confidence that the value is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

MUST – denotes a mandatory requirement.

NARRATIVE - in an analytical report, a descriptive documentation of any problems encountered in processing the samples, along with corrective action taken and problem resolution.

NUTRIENT - any substance assimilated by living things that promote growth. The term is generally applied to nitrogen and phosphorus in wastewater, but is also applied to other essential and trace elements.

ORGANIC - generally, any compound that contains carbon bonded to a hydrogen or halogen atom.

OXIDATION - the process in chemistry whereby electrons are removed from a molecule.

PCBs - Polychlorinated biphenyl, a group of toxic persistent chemicals used in transformers and capacitors for insulating purposes and in gas pipeline systems as a lubricant. Sale of PCBs for new uses was banned by law in 1979.

PERCENT RECOVERY - a measure of accuracy that is calculated as the measured value relative to the true value expressed as a percent.

PERFORMANCE AUDIT - a quantitative evaluation of a measurement system that involves the analysis of standard reference samples or materials which are certified as to their chemical composition or physical characteristics.

PROFICIENCY TEST (PT) SAMPLE - a sample of known composition (unknown to the laboratory), provided by an external source, which is used to evaluate lab performance. For certification purposes the PT sample is purchased from an approved provider.

pH - a numerical designation of relative acidity and alkalinity. A pH of 7.0 indicates precise neutrality. Progressively higher values indicate increasing alkalinity and lower values increasing acidity.

POLLUTANT - generally, any substance introduced into the environment that adversely affects the usefulness of a resource.

PRACTICAL QUANTITATION LIMIT (PQL) - the lowest level that can be reliable achieved within specified limits of precision and accuracy routine laboratory operating conditions. The lowest concentration or amount of the target analyte that can be identified, measured, and reported with confidence that the analyte concentration is not a false positive value.

PRECISION - a measure of the ability to reproduce analytical results. It is generally determined through the analysis of duplicate samples. The degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves; a data quality indicator. Precision is usually expressed as standard deviation, variance or range in either absolute or relative terms.

PRESERVATIVE - a chemical or reagent added to a sample to prevent or slow decomposition or degradation of a target analyte or a physical process. Physical and chemical preservation may be used in tandem to prevent sample deterioration.

PURGE AND TRAP - a technique used in the analysis of volatile organic where analytes are purged from a sample by means of an inert gas and trapped on a sorbent column. The sorbent is then flashheated and the analytes are transferred onto a gas chromatographic column for separation and identification.

PURGEABLE ORGANIC - an organic compound that is generally less than 20% soluble in water and has a boiling point at or below 200°C. A volatile organic. An organic compound is generally considered to be purgeable if it can be removed from water using the purging process.

QC BASED NESTED APPROACH - a procedure for estimating the uncertainty of measurement using quality control data. The procedure is described in SOP QA-013.

QUALITY ASSURANCE (QA) - all those planned and systematic actions necessary to provide adequate confidence in laboratory results. An integrated system of activities involving planning, quality control, quality assessment, reporting and quality improvement to ensure that a product or service meets the defined standards of quality with a stated level of confidence.

QUALITY ASSURANCE PROGRAM PLAN - a written assembly of management policies, objectives, principle and general procedures that outlines how the laboratory intends to generate data of known and accepted quality.

QUALITY CONTROL (QC) – the overall system of technical activities whose purpose to measure and control the quality of a product or service so that it meets the needs of the users.

QUALITY CONTROL CHART - a graph of analytical measurement results for a specific QC standard plotted sequentially with upper and lower control limits (±3SD). A central line that is the best estimate of the average variable plotted, and upper and lower marginal exceedence limits (±4SD) are usually included in the Quality Control Chart. The chart may also include upper and lower warning limits (±2SD).

QUALITY SYSTEM – a structured and documented management system describing the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan of an organization for ensuring quality in its work processes, products (items) and services. The quality system provides the framework for planning, implement and assessing work performed by the organization and for carrying out required QA and QC.

r^2 – Correlation Coefficient Squared – paramet6er used to evaluate the fit of linear or quadratic regression curve fit of initial calibration data.

RAW DATA – any original information from a measurement activity or study recorded in a laboratory note book, worksheets, records, memoranda, notes, or exact copies thereof that are necessary for the reconstruction and evaluation of the report of the activity or study. Raw data may include photography, microfilm or microfilm copies, computer printouts, magnetic media, including dictated observations, and recorded data from automated instruments.

REACTIVITY - the tendency of a chemical to explode under normal management conditions, to react violently when mixed with water, or to generate toxic gases.

REAGENT WATER - water in which an interference is not observed at or above the minimum quantitation limit of interest.

REFERENCE MATERIAL - a traceable standard with an established analyte concentration. Material or substance whose property values are sufficiently homogenous, stable and well established to be used for the calibration of an apparatus, the assessment of a measurement method or for assigning values to materials (ISO Guide 30)

REFERENCE METHOD – a method of known and documented accuracy and precision issued by an organization recognized as competent to do so.

RELATIVE RETENTION TIME – a measure of the shift in retention time of an analyte when referenced to an internal standard.

RELATIVE RESPONSE FACTOR (RRF) - a measure of the relative mass spectral response of an analyte compared to its internal standard. RRFs are determined by analysis of standards and are used in the calculation of concentrations of analytes in samples.

REPLICATE ANALYSES - two or more results representing the same sample parameter. Replicate analyses are used to quantify the analytical measurement repeatability precision.

RPD – Relative Percent Difference, a relative difference between two analyses calculated by dividing the absolute difference of those two results by the average of their two values, then multiplying by 100.

RESOLUTION - the degree of separation between peaks eluting from a chromatographic column. Sufficient resolution between peaks is required for proper quantitation of unknown analytes.

RETENTION TIME - a term used in gas and liquid chromatography describing the time elapsed from the sample injection until the specific compound elutes or exits the chromatographic column at the detector. Each compound has a characteristics retention time on a specific column; therefore, this information is used to qualitatively identify the compounds in the sample.

SAMPLE – portion of material collect for chemical analysis, identified by a unique number assigned by the LIMS.

SHALL – denotes a requirement that is mandatory whenever the criterion for conformance with the specification requires that there be no deviation. This does not prohibit the use of alternative approaches or methods for implementing the specification so long as the requirement is fulfilled.

SHOULD – denotes a guideline or recommendation whenever noncompliance with the specification is permissible.

SOLID WASTE – non-liquid, non-soluble materials, ranging from municipal garbage to industrial waste, that contain complex, and sometimes hazardous, substances. Solid wastes include sewage sludge, agricultural refuse, demolition wastes, mining residues, and even liquids and gases in containers.

SOLVENT - a substance, usually liquid, capable of dissolving or dispersing one or more other substances.

SPIKE – a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery efficiency or for other quality control purposes.

STANDARD CURVE - a curve that plots concentrations of known analyte standards versus the instrument response to the analyte. Calibration standards are prepared by diluting the stock analyte solution in graduated amounts that cover the expected range of the samples being analyzed. The calibration standards must be prepared by using the same type of acid or solvent at the same concentration as for the samples following sample preparation. This is applicable to organic and inorganic chemical analyses.

STANDARD OPERATING PROCEDURE - a detailed written description of how a laboratory executes a particular procedure or method intended to standardize its performance.

STANDARDIZED REFERENCE MATERIAL (SRM) – a certified reference material produced by the U.S. National Institute of Standards and Technology or other equivalent organization and characterized for absolute content, independent of analytical method.

STANDARD UNCERTAINTY - the analytical measurement uncertainty expressed as a standard deviation. The relative standard deviation represents the relative standard uncertainty.

SURROGATE - an organic compound similar to the analyte of interest in chemical composition, extraction and chromatography, but not normally found in environmental samples. Primarily used in chromatography techniques, the surrogate is spiked into quality control blanks, calibration and check standards, samples (including duplicated and QC reference samples) and spiked samples before analysis. A percent recovery is calculated for each surrogate.

SUSPENDED SOLIDS - small pollutant particles that float on the surface of, or are suspended in, sewage or other liquids. They resist removal by conventional means.

TARGET COMPOUND - specific compounds that are to be quantified in a sample based on a standard list of potential compounds.

TENTATIVELY IDENTIFIED COMPOUNDS (TICs) - compounds detected in samples that are not target compounds, internal standards, system monitoring compounds or surrogates. TICs usually consist of up to 30 peaks that are greater than 10% of the peak areas, or heights, of the nearest internal standard. They are subjected to mass spectral library searches for tentative identification. A client may specify the number of unknown peaks in its samples it wishes the laboratory to tentatively identify.

TOTAL METALS - metallic elements that have been digested prior to analysis.

TYPE A EVALUATION UNCERTAINTY - the method of evaluation of uncertainty by the statistical analysis of a series of test results.

TYPE B EVALUATION OF UNCERTAINTY - the method of evaluation of uncertainty by means other than statistical analysis.

UNCERTAINTY - the parameter associated with the analytical measurement results that characterizes the dispersion of the values that could be reasonable attributed to the quantity measured.

UNCERTAINTY INTERVAL - the range of analyte concentrations that an analytical measurement could represent at a specified level of confidence. The relative standard deviation is used to represent the relative standard uncertainty in the QC-based Nested Approach.

VALIDATION –the process for evaluating the completeness, correctness, and conformance/compliance of a specific data set against the method, procedural, or contractual specifications. It essentially evaluates performance against predetermined specifications.

VOA - volatile organic analysis

VOA BOTTLE - a vial used to contain samples for volatile organic analysis.

VOLATILE COMPOUNDS - compounds amendable to analysis by purge and trap. Synonymous with purgeable compounds.

VOLATILE ORGANIC COMPOUND (VOC) - any organic compound that participates in atmospheric photochemical reactions, except for those designated by the EPA Administrator as having negligible photochemical reactivity.

WET CHEMISTRY - procedures that involve distillations, colorimetric determinations and titrimetric measurements. Examples are chloride, nitrates, sulfates and biochemical oxygen demand.

GULF COAST ANALYTICAL LABORATORIES, INC. PROCEDURE: EXT-026
EXTRACTIONS PAGE: 1 OF 5
STANDARD OPERATING PROCEDURE EFFECTIVE DATE: 3/1/11
APPROVED BY:
QA/QC APPROVED:

SUBJECT

SCOPE AND APPLICATION

This Standard Operating Procedure describes method 1311 that is designed to determine the mobility of both organic and inorganic analytes present in samples of liquid, solids and multiphasic wastes. This procedure is not applicable to volatile analytes.

PURPOSE

For liquid samples (i.e., those containing <0.5% dry solid material), the sample, after filtration through a 0.6 to 0.8 um glass fiber filter is defined as the extract. For samples containing >0.5% dry solids, the liquid is separated from the solid phase and stored for later analysis. The solid phase is then extracted with a specific amount of the appropriate extraction fluid. After the appropriate extraction time, the liquid is filtered off and recombined, if compatible, with the initial liquid portion of the sample collected. If there was no initial liquid phase, the filtrate obtained is defined as the extract. In the event these two are not compatible, then they must be analyzed separately and the proper layer percentages assigned to each fraction.

MATRIX

Water and Solid

REFERENCE

SW846 1311

PRESERVATIVE

Cool to 4°C, if Volatiles are to be extracted

SAMPLE COLLECTION

Samples may be collected in plastic or glass containers. When volatiles are being analyzed care should be taken to minimize their loss.

HOLDING TIME

From field collection to TCLP extraction:
- Volatiles - 14 days
- Semivolatiles - 14 days
- Mercury - 28 days
- Metals - 180 days

From TCLP extraction to Preparative extraction:
- Semivolatiles - 7 days
- Not applicable for other analytes

From Preparative extraction to Determinative analysis:
- Volatiles - 14 days
- Semivolatiles - 40 days
- Mercury - 28 days
- Metals - 180 days

DEFINITIONS

See SOP GEN-016

SAFETY

Each employee is directly responsible for complete awareness of all health hazards associated with every chemical that he/she uses. The employee must be aware of these hazards, and all associated protective wear and spill clean-up procedures PRIOR TO the use of any chemical. In all cases, the applicable material safety data sheet (MSDS) and your supervisor or safety officer should be consulted. The bottle labels also provide important information that must be noted. Personnel performing this procedure may be working with flammables, poisons, toxins, carcinogens, teratogens, mutagens, and biohazards. In particular, approved gloves, safety glasses, and lab coats must be worn. In addition to other measures prescribed by the division, solvents must be handled in ventilated hoods.

APPARATUS

Agitation apparatus capable of end-over-end rotation @ 30 ±2 rpm
Plastic extraction bottles (metals only) - TCLP jug
Teflon extraction bottles - TCLP jug
Filter holder - 150mm polypropylene
Glass fiber filters, 150mm, 0.6 to 0.8 um nominal pore size
pH meter (accurate to "0.01 pH unit)
pH electrode with automatic temperature compensation
Analytical balance - accurate to 0.01 grams
Spatula
4oz wide-mouth jar
Hot plate/ magnetic stirrer
Magnetic stir bars
Graduated cylinders - 1000 mL glass
Vacuum manifold and pump
1 mm and 9.5 mm sieves
1 L Plastic bottles (metals extract)
1 L Amber glass bottles (organics extract)

REAGENTS

All reagents shall be reagent grade or equivalent. Label all containers and squeeze bottles with reagent ID, lot, and expiration date.

Deionized water
Glacial acetic acid
Sodium hydroxide 50%
Hydrochloric acid (1N) - 8.3 mL HCl to 100 mL DI water
1:1 Nitric acid
pH Buffers (calibration)

EXTRACTION FLUID #1
20 liters DI water
114 mL Acetic acid
70 mL 50% NaOH
pH = 4.93 ± 0.05 pH units(4.88-4.98)

EXTRACTION FLUID #2
20 liters DI water
114 mL Acetic acid
pH = 2.88 ± 0.05 pH units(2.83-2.93)
Record in the preparation logbook and assign a laboratory ID.

PROCEDURE

A. Determination of percent solids:

1. Liquid wastes - wastes with <0.5% solids after filtration through a 0.6 to 0.8 um glass fiber filter is defined as the TCLP extract.

2. 100% solids - samples that will yield no liquid when subjected to pressure filtration. Homogenize the sample by pouring the contents of the sample container onto a piece of butcher paper, chop and mix with a tongue depressor or spatula. Remove any foreign objects such as sticks, leaves, or rocks. If the particle size is > 9.5 mm, perform particle size reduction by crushing, grinding, or cutting the sample. The sample may be sieved to verify proper particle size.

3. Multiphasic - a determination of the % solids must be performed as outlined below:

   a. Weigh a 0.8 um filter and place on the screen of the filter apparatus. Assemble the filter apparatus.
   b. Weigh a wide mouth quart jar.
   c. Weigh a minimum of 100 grams of sample and record the weight in the logbook. Allow to settle or centrifuge.
   d. Place the jar under the filter apparatus.
   e. Pour the liquid sample into the filtering apparatus followed by the solid portion of the sample. If there is obvious residue left in the cup, reweigh the cup and subtract the weight of the residue from the weight of the sample to be filtered.
   f. Apply pressure to the Millipore filter apparatus to 10 psi. Filter until no liquid passes through the filter for 2 minutes. Increase the pressure in 10 psi increments up to 50 psi. After each incremental increase of 10 psi, if no liquid has passed through the filter for 2 minutes, proceed to the next 10 psi increment.
   g. Relieve the pressure from the filter apparatus when the gas flows through the filter or when there is more than 2 minutes between drops of filtrate at 50 psi.
   h. Weigh the jar and filtrate. Subtract the weight of the jar from the jar and filtrate weight. This is the liquid phase.
   i. Subtract the liquid phase from the weight of the total sample. This is the solid phase.

$$\% \text{ Solids} = \frac{\text{weight of solid phase}}{\text{total weight of sample}} \times 100$$

If the % solids is >0.5%, determine if the solid needs particle size reduction. Follow the procedure in step 2 to perform particle size reduction. If it is noticed that the filtrate may be entrained in the filter then remove the solid phase and filter and dry at 100 ± 20°C cycles until two successive weightings are within ± 1% of each other. Calculate the % dry solids. If the % dry solids are <0.5%, then the filtrate is the TCLP extract. The worksheet in Appendix 1 can be used to calculate % solids.

B. Determination of extraction fluid

Solids from samples which are 100% solid or >0.5% solids (solid portion) are prepared and extracted as follows.

1. Label with the sample number, a 4oz wide-mouth jar and TCLP jug. A plastic TCLP jug may be used if the extract is to be analyzed for metals only. If organics will be analyzed, a Teflon TCLP jug must be used.

2. Weigh a small sub-sample of the solid phase of the waste and reduce to a particle size of approximately 1 mm. Sieve if necessary. Transfer 5.0 grams of sample into the 4oz wide-mouth jar.

3. Add 96.5 mL (± 1 mL) of DI water to the 4 oz wide-mouth jar. Add a stir bar, and place the sample on a magnetic stirrer and stir vigorously for 5 minutes. Measure and record the pH in the TCLP log book. If the pH is <5, extraction fluid #1 shall be used. If the pH measured is >5, add 3.5 mL of 1.0 N HCL to the jar and slurry the mixture. Heat to 50°C. Hold at this temperature for 10 minutes. Remove from the hot plate and measure the pH. If the measured pH is <5, then extraction fluid #1 will be used. If it is >5, then extraction fluid #2 must be used. Record the fluid used in the logbook.

C. Extraction:

1. Weigh 100g of 100% solids into the labeled TCLP jug. Weigh 100g of % solid sample, filter, and place the filter and solids into the labeled TCLP jug. Store the liquid phase at 4°C. If there are not 100g of the solid or % solid sample, contact client services immediately and wait for further instructions. Do not perform TCLP extraction on a smaller sample aliquot without authorization from the client.

2. Slowly add the appropriate extraction fluid in the amount of 20 times the sample weight (accounting for % solids).

3. Secure the bottle in the agitation device and rotate at 30 rpm for 18 ± 2 hours. The temperature must be maintained at 23 ± 2°C during the TCLP extraction. Document the max and min temperature in the TCLP logbook.

4. After rotation, allow the sample to stand and settle for at least 30 minutes before filtration.

5. Assemble a filtration vessel and filter the sample through a new acid rinsed filter paper. Vacuum filtration can only be used for wastes with <10% solids content.

6. After the sample has been filtered, for 100% solids, the filtrate is the TCLP extract. For % solid samples, combine the filtrate with the initial liquid phase if compatible. If incompatible, each phase is prepped and analyzed separately.

7. Record the pH. Preserve the metals aliquot of the extract to a pH of <2 with 1:1 Nitric acid. This step will be performed by the metals prep analyst. Store extracts at 4°C until ready to proceed with the preparation and/or analysis procedures required for the analytes of interest.

8. Notify metals prep analyst of TCLP extracted samples needing metals analysis. Extract samples for semivolatile analysis using the applicable SOP.

METHOD PERFORMANCE

Many TCLP precision (reproducibility) studies have been performed, and have shown that, in general, the precision of the TCLP is comparable to or exceeds that of the EP Toxicity test and that method precision is adequate. One of the more significant contributions to poor precision appears to be related to sample homogeneity and inter-laboratory variation (due to the nature of waste materials).

1) *Metals* – The results of a multi-laboratory study are shown in Table 6 of Method 1311, and indicate that a single analysis of a waste may not be adequate for waste characterization and identification requirements.

2) *Semivolatile Organic Compounds* – The results of two studies are shown in Tables 7 and 8 of Method 1311. Single laboratory precision was excellent with greater than 90 percent of the results exhibiting an RSD less than 25 percent. Over 85 percent of all individual compounds in the multi-laboratory study fell in the RSD range of 20-120 percent. Both studies concluded that the TCLP provides adequate precision. It was also determined that the high acetate content of the extraction fluid did not present problems (i.e., column degradation of the gas chromatograph) for the analytical conditions used.

POLLUTION PREVENTION

See QAPP Section 10.2

WASTE MANAGEMENT

See SOP GEN-009

TCLP CALCULATION SHEET

Sample ID		Description:			
A) cup					
B) filter					
C) prefiltrate bottle					
D) original sample (>100g)		- E result =			
E) cup+ leftover sample		- A =			
F) Bottle + prefiltrate		- C =		= weight of liquid phase	
G) Sample (D result) - liquid (F result) =		weight of solid =		/sample x 100 =	%solid
H) dried filter + solids		- B =		/sample x 100 =	%dry solid

Procedure:

Sample ID		Description:			
A) cup					
B) filter					
C) prefiltrate bottle					
D) original sample (>100g)		- E result =			
E) cup+ leftover sample		- A =			
F) Bottle + prefiltrate		- C =		= weight of liquid phase	
G) Sample (D result) - liquid (F result) =		weight of solid =		/sample x 100 =	%solid
H) dried filter + solids		- B =		/sample x 100 =	%dry solid

Procedure:

Sample ID		Description:			
A) cup					
B) filter					
C) prefiltrate bottle					
D) original sample (>100g)		- E result =			
E) cup+ leftover sample		- A =			
F) Bottle + prefiltrate		- C =		= weight of liquid phase	
G) Sample (D result) - liquid (F result) =		weight of solid =		/sample x 100 =	%solid
H) dried filter + solids		- B =		/sample x 100 =	%dry solid

Procedure:

Sample ID		Description:			
A) cup					
B) filter					
C) prefiltrate bottle					
D) original sample (>100g)		- E result =			
E) cup+ leftover sample		- A =			
F) Bottle + prefiltrate		- C =		= weight of liquid phase	
G) Sample (D result) - liquid (F result) =		weight of solid =		/sample x 100 =	%solid
H) dried filter + solids		- B =		/sample x 100 =	%dry solid

Procedure:

GCAL
STANDARD OPERATING PROCEDURE
REVIEW FORM

GCAL

Standard Operating Procedure for

SPLP method 1312

Procedure: EXT-070

Revision: 3

Effective Date: 2/1/10

Reviewed By/Date: [signature] 3/4/11

Approved By/Date: JDT 3/4/11

NO Changes

GULF COAST ANALYTICAL LABORATORIES, INC.
EXTRACTIONS
STANDARD OPERATING PROCEDURE

PROCEDURE: EXT-070
PAGE: 1 OF 6
EFFECTIVE DATE: 2/1/10
APPROVED BY:
QA/QC APPROVED: JDT

SUBJECT — SCOPE AND APPLICATION

This Standard Operating Procedure describes method 1312 that is designed to determine the mobility of both organic and inorganic analytes present in samples of liquid, solids and multiphasic wastes. This procedure is not applicable to volatile analytes.

For liquid samples (i.e., those containing <0.5% dry solid material), the sample, after filtration through a 0.6 to 0.8 um glass fiber filter is defined as the extract. For samples containing >0.5% dry solids, the liquid is separated from the solid phase and stored for later analysis. The solid phase is then extracted with a specific amount of the appropriate extraction fluid. The extraction fluid employed is a function of the region of the country where the sample site is located if the sample is a soil. If the sample is a waste or wastewater, the extraction fluid employed is a pH 4.2 solution. After the appropriate extraction time, the liquid is filtered off and recombined, if compatible, with the initial liquid portion of the sample collected. If there was no initial liquid phase, the filtrate obtained is defined as the extract. In the event these two are not compatible, then they must be analyzed separately and the proper layer percentages assigned to each fraction.

MATRIX — Water and Solid

REFERENCE — SW846 1312

SAMPLE COLLECTION — Samples should be collected in appropriate containers. Sufficient sample should be available for the preliminary evaluation of the percent solids if required and for the extraction procedure. When volatiles are being analyzed care should be taken to minimize their loss.

PRESERVATIVE — Cool to 4°C unless refrigeration results in irreversible physical change to the waste.

HOLDING TIME — From field collection to SPLP extraction:
- Semi-volatiles - 14 days
- Mercury - 28 days
- Metals - 180 days

From SPLP extraction to Preparative extraction:
- Semi-volatiles - 7 days
- Not applicable for other analytes

From Preparative extraction to Determinative analysis:
- Semi-volatiles - 40 days

Mercury - 28 days
Metals - 180 days

DEFINITIONS — See SOP GEN-016

SAFETY — Each employee is directly responsible for complete awareness of all health hazards associated with every chemical that he/she uses. The employee must be aware of these hazards, and all associated protective wear and spill clean-up procedures PRIOR TO the use of any chemical. In all cases, the applicable material safety data sheet (MSDS) and your supervisor or safety officer should be consulted. The bottle labels also provide important information that must be noted. Personnel performing this procedure may be working with flammables, poisons, toxins, carcinogens, teratogens, mutagens, and biohazards. In particular, approved gloves, safety glasses, and lab coats must be worn. In addition to other measures prescribed by the division, solvents must be handled in ventilated hoods.

APPARATUS

Agitation apparatus capable of end-over-end rotation @ 30 ±2 rpm.
Plastic extraction bottles (metals only) - TCLP jug
Teflon or glass extraction bottles - TCLP jug
Filter Holder (stainless steel) - capable of supporting a glass fiber filter and able to exerting pressures of up to 50 psi
Filter holder for use with vacuum pump
Borosilicate glass fiber filters, 150mm, 0.6 to 0.8 um nominal pore size - acid wash if metals are analytes
pH meter (accurate to ± 0.05 pH units)
pH electrode with automatic temperature compensation
Analytical balance - accurate to 0.01 grams
Spatula
9.5 mm sieves
Wide mouth quart jars - glass (plastic may be used for metals only)
1 L Plastic bottles (metals extract)
1 L Amber glass bottles (organics extract)

REAGENTS — All reagents shall be reagent grade or equivalent. Label all containers and squeeze bottles with reagent ID, lot, and expiration date.

Deionized water
Sulfuric acid - concentrated
Nitric acid - concentrated
Sulfuric acid/nitric acid (60/40 weight percent mixture) - H_2SO_4/HNO_3 - Cautiously mix 60g of concentrated Sulfuric and 40 g of concentrated Nitric acid. If preferred, a more dilute H_2SO_4/HNO_3 acid mixture may be prepared and used
pH Buffers (calibration)

EXTRACTION FLUID #1 - This fluid is made by adding the 60/40 weight percent mixture of Sulfuric and Nitric acids (or a suitable dilution) to Deionized water until the pH is 4.20 ± 0.05. The fluid is used to

determine the leachability of soil from a site that is east of the Mississippi River, and the leachability of wastes. Note: Solutions are unbuffered and exact pH may not be attained.

EXTRACTION FLUID #2 - This fluid is made by adding the 60/40 weight percent mixture of Sulfuric and Nitric acids (or a suitable dilution) to Deionized water until the pH is 5.00 ± 0.05. The fluid is used to determine the leachability of soil from a site that is west of the Mississippi River.

PROCEDURE

PRELIMINARY EVALUATIONS

Perform preliminary evaluations on a minimum 100 gram aliquot of sample. This aliquot may not actually undergo extraction. The preliminary evaluations include: (1) determination of percent solids; (2) determination of whether the waste contains insignificant solids and is, therefore its own extract after filtration; and determination if the solid portion of the waste requires particle size reduction.

1. Determination of percent solids: percent solids are defined as that fraction of a waste sample (as a percentage of the total sample) from which no liquid may be forced out by an applied pressure;

   A. 100% solids - samples that will yield no liquid when subjected to pressure filtration. Homogenize the sample by pouring the contents of the sample container onto a piece of butcher paper, chop and mix with a tongue depressor or spatula. Remove any foreign objects such as sticks, leaves, or rocks. If the particle size is > 9.5 mm, perform particle size reduction by crushing, grinding, or cutting the sample. The sample may be sieved to verify proper particle size. Filamentous (paper, cloth, similar) waste materials should have a surface area per gram of material of 3.1 cm^2 or greater. Actual measurement of surface area is not required, nor is it recommended.

   B. Liquid or Multiphasic - a determination of the % solids must be performed as outlined below:

      1. Weigh a 0.8 um filter and place on the screen of the filter apparatus. Assemble the filter apparatus.

      2. Weigh a wide mouth quart jar.

      3. Weigh a minimum of 100 grams of sample in the jar and record this weight in the logbook. Allow to settle or centrifuge.

      4. Place the jar under the filter apparatus.

      5. Pour the liquid sample into the filtering apparatus followed by the solid portion of the sample. Spread the sample evenly over the surface of the filter. If filtration of the waste at 4°C reduces the amount of expressed liquid over what would be

expressed at room temperature, then allow the sample to warm up to room temperature in the device before filtering. If there is obvious residue left in the jar, reweigh the jar and subtract the weight of the residue from the weight of the sample to be filtered.

6. Gradually apply pressure of 1-10 psi, until the air or pressurizing gas moves through the filter. If this point is not reached under 10 psi, and if no additional liquid has passed through the filter in any 2-minute interval, slowly increase the pressure in 10 psi increments to a maximum of 50 psi. After each incremental increase of 10 psi, if no additional liquid has passed through the filter in any 2-minute interval, proceed to the next 10 psi increment. When the pressurizing gas begins to move through the filter, or when liquid flow has ceased at 50 psi (filtration does not result in any additional filtrate within any 2-minute period), stop the filtration. Note: instantaneous application of high pressure can degrade the glass fiber filter and may cause premature plugging. Note: some samples, such as oily wastes and some paint wastes, will obviously contain some material that appears to be a liquid, but even after applying pressure filtration, this material may not filter. If this is the case, the material within the filtration device is defined as a solid. Do not replace the original filter with a fresh filter under any circumstances. Use only one filter.

7. Weigh the jar and filtrate. Subtract the weight of the jar from the jar and filtrate weight. This is the liquid phase.

8. Subtract the liquid phase from the weight of the total sample. This is the solid phase.

$$\% \text{ Solids} = \frac{\text{weight of solid phase}}{\text{total weight of sample}} \times 100$$

If the % solids are equal to or greater than 0.5%, determine if the solid needs particle size reduction. Follow the procedure in 1 (A) to perform particle size reduction. If it is noticed that filtrate may be entrained in the filter then remove the solid phase and filter and dry at 100 ± 20°C cycles until two successive weighings are within ±1% of each other. Calculate the % dry solids.

%dry solids =

$$\frac{\text{(Weight Of dry sample + filter)- Weight of filter}}{\text{Initial weight of sample}} \times 100$$

If the % dry solids is <0.5%, then the filtered liquid is the SPLP extract. Additional sample may be filtered to generate sufficient liquid to support all required analyses. If the percent dry solids is greater than 0.5%, repeat the filtration process using a fresh aliquot of sample. Use

sufficient sample to generate at least 100 g of solid material for the extraction process. Perform particle size reduction for the solid portion if necessary.

2. Determination of extraction fluid

   A. For soils, if the sample is from a site that is east of the Mississippi River, extraction fluid #1 should be used. If the sample is from a site west of the Mississippi river, extraction fluid #2 should be used.

   B. For wastes, extraction fluid #1 should be used.

   C. For Cyanide-containing wastes and/or soils, Deionized water must be used because leaching of Cyanide containing samples under acidic conditions may result in the formation of Hydrogen Cyanide gas.

EXTRACTION

Solids from samples which are 100% solid or >0.5% solids (solid portion) are prepared and extracted as follows.

1. Weigh 100g of 100% solids into the labeled TCLP jug (plastic for metals only; Teflon or glass if organics will be analyzed). Weigh the appropriate amount of % solid samples to yield 100 g of solid, filter, and place the filter and solids into the labeled TCLP jug. Store the liquid phase at 4°C.

2. Slowly add the appropriate extraction fluid in the amount of 20 times the sample weight (accounting for % solids).

3. Secure the bottle in the agitation device and rotate at 30 rpm for 18 ± 2 hours. The temperature of the room in which extraction takes place shall be maintained at 23 ± 2°C during the extraction period.

4. After rotation, allow the sample to stand and settle for at least 30 minutes before filtration.

5. Assemble a filtration vessel and filter the sample through a new acid rinsed filter paper. During the final filtration of the extract, the glass fiber filter may be changed to facilitate filtration. Vacuum filtration can only be used for wastes with <10% solids content. If using the pressure filtration method, gradually apply pressure to a maximum of 50 psi.

6. After the sample has been filtered, for 100% solids, the filtrate is the SPLP extract. For % solid samples, combine the filtrate with the initial liquid phase if compatible. If incompatible, each phase is prepped and analyzed separately. The volumes of the individual phases must be determined and the results combined mathematically by using a simple volume-weighted average:

$$\text{Final analyte concentration} = \frac{(V1)(C1) + (V2)(C2)}{V1 + V2}$$

Where:
V1 = the volume of first phase (L)
C1 = the concentration in the first phase (mg/L)
V2 = the volume of second phase (L)
C2 = the concentration in the second phase (mg/L)

7. Record the pH. Preserve the metals aliquot of the extract to a pH of <2 with 1:1 Nitric acid. Preservation will be performed by the metals prep analyst.

8. Store extracts at 4°C until ready to proceed with the preparation and/or analysis procedures required for the analytes of interest. Transfer the extract to the appropriate laboratory for preparation for analysis.

QUALITY CONTROL

1. A minimum of one blank (using the same extraction fluid as used for the samples) should be performed for every 20 extractions that are conducted.

2. A matrix spike should be performed for each waste type. Follow the matrix spike guidance in the preparatory and analytical procedures. Matrix spikes are added after filtration of the extract. Matrix spies should not be added prior to the extraction of the sample.

3. Follow all QC requirements for the preparatory and analytical methods.

METHOD PERFORMANCE

1. Precision results for semi-volatiles and metals: An eastern soil with high organic content and a western soil wit low organic content were used for the semi-volatiles and metal leaching experiments. Both types of soils were analyzed prior to contaminant spiking. The results are shown in Table 6 of the method. The concentration of contaminants leached form the soils were reproducible, as shown by the moderate relative standard deviations (RSDs) of the recoveries (averaging 29% for the compounds and elements analyzed.

2. Performance for the analytical methods is included in each SOP.

POLLUTION PREVENTION — See QAPP Section 10.2

WASTE MANAGEMENT — See SOP GEN-009

GULF COAST ANALYTICAL LABORATORIES, INC.
WET LAB
STANDARD OPERATING PROCEDURE

PROCEDURE: WL-057
PAGE: 1 OF 4
EFFECTIVE DATE: 10/11/10
APPROVED BY:
QA/QC APPROVED:

SUBJECT — SCOPE AND APPLICATION

To identify quantities of Total Organic Carbon in sediment, soil and organic waste.

MATRIX — Solid

REFERENCE — SW846 9060M, Lloyd Kahn method

PRESERVATION — None

HOLDING TIME — 28 days

DEFINITIONS — See SOP GEN-016

SAFETY — Each employee is directly responsible for complete awareness of all health hazards associated with every chemical that he/she uses. The employee must be aware of these hazards and all associated protective wear and spill clean-up procedures PRIOR TO the use of any chemical. In all cases, the applicable material safety data sheet (MSDS) and your supervisor or safety officer should be consulted. The bottle labels also provide important information that must be noted. Personnel performing this procedure may be working with flammables, poisons, toxins, carcinogens, teratogens, mutagens, and biohazards. In particular, approved gloves, safety glasses, and lab coats must be worn. In addition to other measures prescribed by the division, solvents must be handled in ventilated hoods.

REAGENTS
25% Phosphoric Acid
Oxygen, Compressed
D-Glucose, Anhydrous

APPARATUS
Shimadzu TOC-V_{CSH}
ASI-V Autosampler
Solid sample module SSM-5000A
Ivory Boats
Muffle Furnace
Aluminum Pan
Spatula
Tweezers
Crucibles
Analytical Balance
Oven - 103-105°C
Mortar and pestle

INSTRUMENT TURN ON PROCEDURE

TOC Instrument

1. Turn on with the white switch on the right side.
2. Turn on TC/IC furnace on the right side of the sampler.
3. Check Oxygen supply. If quantity is below 200 psi, then replace the cylinder tank.
4. Allow 10-15 minutes to warm-up. TC furnace should be 900°C and IC furnace should be 200°C.
5. Open TC and IC port and check for empty boats.

CALIBRATION

From the main menu, select #1 calibration. Use a file number that is empty to store the calibration curves, one in each file. Amount select is 1 (weight). For TC, the standard concentration is 40.0% for all levels. The amount is 0.00 mg for 1st, 0.5 mg for 2nd, 25.0 mg for 3rd 50.0 mg for 4th and 75.0 mg for 5th.

PROCEDURE

1) Clean sample boats by putting then in the muffle furnace for 15 minutes. Allow sample boats to cool.
2) Homogenize the contents of each sample prior to pulling an aliquot for drying. Dry an aliquot of each sample in an oven at 103-105°C overnight or until dry. Do NOT dry organic liquid samples in oven. Use a clean mortar and pestle to grind and homogenize each sample.
3) Weigh 0.1 grams for each sample into a boat and 0.025 grams for the CCV and LCS. Record the weight to 3 decimal place on the batch sheet.
4) Add enough drops of 25% H3PO4 to thoroughly mix with samples in the boat and place back in the oven for 5 minutes.
5) Go to "New" and select, "TOC-SSM" and hit, "Connect". Highlight the first row. Right click "go" to insert for multiple samples.
6) Select the calibration curve and select the last ICAL.
7) Hit, "Next" and put in the number of samples. Hit, "Finish" and scan the samples. Insert the CCV and hit, "Start". Enter the weight of the samples in mg and press, "Start".
8) Put the sample boat in the SSM and push the boat forward. When completed, the instrument will instruct you to pull the boat back to cool and then back to the start position.

9) Run Method Blank on TC side - Make sure weight in system is 1000 mg. Push sample boat into muffle furnace. Press next (F1) and wait for beep. After beep, press start and wait for beep again. Wait for "COMPLETE" to appear on screen, then pull the sample boat out of the muffle furnace.

NOTE: TC side of muffle furnace is controlled with the blue handle and the IC side of the muffle furnace is controlled with the green handle.

10) Repeat above method blank procedure on the IC side.

11) Run CCV on TC side - weigh 0.0250 - 0.0260 g (9000-1000 mg/kg) of D-Glucose, Anhydrous. Clear file from IC side. Make sure weight in system is 1000 mg. Push sample boat into the muffle furnace. Press next, (sample #2 should appear on screen) wait for beep. After beep, press start and wait for beep again. Wait for "COMPLETE" to appear on screen, then pull sample boat out of the muffle furnace.

12) Run Laboratory Control Standard (LCS) for TC side - weigh 0.0050 - 0.0052 g (~2000 mg/kg) of D-Glucose, Anhydrous in sample boat. Clear file from IC side. Make sure weight in system is 1000 mg. Push sample boat into the muffle furnace. Press next, (sample #4 should appear on screen) wait for beep. After beep, press start and wait for beep again. Wait for "COMPLETE" to appear on screen, then pull sample boat out of the muffle furnace.

NOTE: For additional measurements of same sample, press start. Push sample boat in furnace and press start again.

13) Weigh 0.1 g of sample in sample boat. Place sample in sample port. (Smaller amounts of sample may be used)

14) Make sure current calibration files are loaded on both sides and sample weight in system is 100 mg.

15) If a sample has an area count of all 9's, sample must be rerun by going to General Condition, changing unit code to percent. Return to Sample Measurement, reweigh sample in sample boat and replace in the sample port.

CALCULATION

TOC mg/kg or wt% = IR (TC - IR (IC)
IR = Instrument reading
(verify the sample weight was entered correctly)

REPORTING LIMIT

200 mg/kg

QUALITY CONTROL

1) Analyze one method blank with each batch of 20 or fewer samples.

2) Analyze a CCV and CCB at the beginning, end, and after every 10 samples. The recovery must be 90-110%. If the recovery is outside the control limits, reanalyze and if recovery is still outside the control limits the instrument must be recalibrated. The previous 10 samples must be reanalyzed.

3) Analyze a LCS with each batch of 20 or fewer samples. The recovery must be 69-128%.

4) Duplicate one of every 20 or fewer samples. The RPD must be ≤25. Samples that contain sand or shells are difficult to homogenize and do not duplicate well.

METHOD PERFORMANCE

19 LCS at a concentration of 2000 mg/kg have been analyzed by the laboratory with a mean recovery of 98 % and a standard deviation of 9.7.

POLLUTION PREVENTION

See QAPP Section 10.2

WASTE MANAGEMENT

See SOP GEN-009

STANDARD OPERATING PROCEDURE FOR pH DETERMINATION OF SOIL

1.0 SUMMARY

This Standard Operating Procedure (SOP) establishes a method for performing the pH Determination for soils and wastes using a pH meter; based on EPA standard procedure 9045D. Testing is performed using a representative sample of stabilized or unstabilized soil, sludge, sediment, or filter cake. The sample is then extracted using deionized water and the resultant pH measured.

2.0 SCOPE

This procedure provides all departments with a method to perform pH determination of soil and waste samples. Wastes may be solids, sludges, or non-aqueous liquids. The following sections of this SOP list the specific procedures and equipment required to perform the pH Determination for soils and wastes.

3.0 EQUIPMENT and MATERIALS

3.1 pH Meter (with means for temperature compensation).
3.2 Glass electrode with temperature compensation.
3.3 Reference electrode: a silver-silver chloride is used (may be built in with glass electrode).
3.4 50 ml Beaker.
3.5 Analytical balance capable of weighing 0.1 g.
3.6 Deionized water.
3.7 pH buffers (pH = 4, 7 and 10)
3.8 Thermometer, or temperature sensor

4.0 CALIBRATION OF APPARATUS

4.1 Prior to performing the pH Determination, calibrate the pH meter according to manufacturer's instructions. The pH meter should be calibrated at a minimum of once per day.
4.2 Equipment must be calibrated using a minimum of two points, readings must be within 0.05 pH units of the buffer solution value.
4.3 Verify that the buffer solution has not reached expiration date on container.

5.0 SAMPLE PREPARATION PROCEDURE

5.1 Obtaining Sample

Material to be collected for testing should be representative of the material being tested. For untreated material testing, bulk aliquots should be homogenized prior to sub sampling for analysis, and all oversized materials should be removed. Oversized materials are particles in excess of 3/8 inch in diameter. For treated material testing, samples should be collected which are considered representative of the treated material. Analyses of the treated material should be performed at uniform time periods after treatment. Treated samples should be collected and analyzed within four hours of treatment

5.2 Preparing Sample

In a 50-ml beaker combine 20g of soil and 20ml deionized water, cover, and continuously stir the suspension for 5 min.

-if working with hygroscopic soil or salts and all the water is absorbed additional dilution is allowed, begin sample prep again with 20g waste and 40ml water.

The aqueous phase is used for the pH measure. To obtain this measurment let the soil suspension stand for 1 hr to allow the suspended clay settle out from the suspension, or filter, or place in centrifuge.

6.0 TESTING PROCEDURE

6.1 Testing pH of the sample with a glass electrode

Immerse just deep enough into the clear supernatant solution to establish full contact with the sensor.

6.2 Sample should be within 2˚C of the buffer solution

7.0 HEALTH AND SAFETY

Laboratory safety procedures, as defined in Kemron's *Chemical Hygiene Plan*, are followed during pH Determination. Additionally, any site-specific health and safety protocol must be adhered to during testing. A copy of Kemron's *Chemical Hygiene Plan* is maintained by the Corporate Health and Safety Coordinator, and is reviewed and executed by all Kemron personnel.

8.0 REPORTING

8.1 Note and record "pH measured in deionized water at __ C" where __˚C is the temperature at which the test was conducted.

8.2 Record the pH reading on the physical properties data sheet and report the final average pH.

9.0 REFERENCE

9.1 EPA Method 9040D

STANDARD OPERATING PROCEDURE FOR pH DETERMINATION OF LIQUIDS

1.0 SUMMARY

This Standard Operating Procedure (SOP) establishes a method for performing the pH Determination for soils and wastes using a pH meter; based on EPA standard procedure 9040C. Testing is performed using a representative aqueous. The pH is measured and reported.

2.0 SCOPE

This procedure provides all departments with a method to perform pH determination of aqueous wastes and multiphase wastes, where the aqueous phase is at least 20% of the total volume.

3.0 EQUIPMENT and MATERIALS

3.1 pH Meter (with means for temperature compensation).
3.2 Glass electrode with temperature compensation. or
reference electrode: a silver-silver chloride is used (may be built in with glass electrode).
3.3 50 ml Beaker.
3.4 Stir bar
3.5 Deionized water.
3.6 pH buffers (pH = 4, 7 and 10)
3.7 Thermometer, or temperature sensor

4.0 CALIBRATION OF APPARATUS

4.1 Prior to performing the pH Determination, calibrate the pH meter according to manufacturer's instructions. The pH meter should be calibrated at a minimum of once per day.
4.2 Equipment must be calibrated using a minimum of two points, readings must be within 0.05 pH units of the buffer solution value.
4.3 Verify the calibrated buffer solution has not exceeded the expiration date.

5.0 SAMPLE PREPARATION PROCEDURE

5.1 Obtain enough aqueous sample in a clean dry beaker to allow the glass electrode of the sensor to be fully immersed. Allow the sample to reach a temperature with in 2 ˚C of the pH standard solution.

5.2 Add stir bar and keep the solution stirring at a moderate continuous rate for the duration of the measurements.

6.0 TESTING PROCEDURE

6.1 Testing pH of the sample with a glass electrode
Rinse the sensor. With deionized water and blot with Kimwipe before and after each measurement collected.
6.2 Immerse the electrode just deep enough into the clear supernatant solution to establish full contact with the sensor.
6.3 keep the sensor in the solution until the readings stabilize and the screen indicates “ready” then collect reading.
6.4 Repeat measurements until four sample values are obtained that don’t differ by more than 0.1 pH units.

7.0 HEALTH AND SAFETY

Laboratory safety procedures, as defined in Kemron’s *Chemical Hygiene Plan*, are followed during pH Determination. Additionally, any site-specific health and safety protocol must be adhered to during testing. A copy of Kemron’s *Chemical Hygiene Plan* is maintained by the Corporate Health and Safety Coordinator, and is reviewed and executed by all Kemron personnel.

8.0 REPORTING

8.1 note and record the sample pH and temperature
8.2 Record pH readings on the pH physical properties data sheet and report the average final pH

9.0 REFERENCES

9.1 EPA Method 9040C

TITLE: WATER BATH TESTING AT 30, 50, 70, AND 90 DEGREES C, SPECIFIC TO KEMRON PROJECT NO. SH-0416

Department:	Physical Properties
S. O. P. No.	0416-003
Revision No.	0
Superseding Date:	None
Effective Date:	February 2, 2012
Page:	1 of 2

1.0 SUMMARY

This Standard Operating Procedure establishes a standard method for heating samples to 30, 50, 70, and 90 degrees C in a water bath.

2.0 SCOPE

This procedure is specific to KEMRON Project No. SH-0416, TerraTherm Bridgewater, NJ, Acid Tar Thermal.

3.0 EQUIPMENT

Water bath capable of heating to 100 degrees C
Clear glass container, such as a 50-ml graduated cylinder.

4.0 TESTING PROCEDURE

4.1 Place an aliquot of the HC (hard and crumbly) material into the cylinder. Fill the cylinder about 1/3 full.

4.2 Place a similarly-sized aliquot of the VR (viscous and rubbery) material in the cylinder, on top of the HC layer.

4.3 Place the cylinder into the water bath, and begin heating. Use a thermometer to monitor the temperature of the water bath, and a separate thermometer to monitor the temperature of the sample material.

4.4 Record temperatures of the water bath and sample material every 5 minutes during heating.

4.5 When the material reaches temperatures of 30 C, 50 C, 70 C, and 90 C, observe and record any observations, such as physical changes in the material, off-gassing, etc. Take photographs and/or video as necessary.

5.0 HEALTH AND SAFETY

Laboratory safety procedures, as defined in KEMRON's Chemical Hygiene Plan, are followed during testing. A copy of this plan is maintained by the Corporate Health and Safety Coordinator, and is reviewed and executed by all KEMRON personnel.

6.0 QUALITY CONTROL / QUALITY ASSURANCE

6.1 The data calculated by the spreadsheet is checked by an individual not involved with the testing to ensure that no mistakes have been incorporated into the spreadsheet.

6.2 The engineer, or physical properties laboratory director, then manually and visually checks the material tested and compares his or her observations to the test results reported. The reviewing engineer or laboratory director is ultimately responsible for all final review and quality control of the analyses and the data generated. Upon final approval of the data and data interpretations, the engineer will initialize the original data sheets. All original data sheets and analyzed data will be maintained in the physical properties project files. A copy of the finalized test results will be submitted to the appropriate project manager and the client.

TITLE: OFF-GAS ANALYSIS USING DIRECT-READ FID, SPECIFIC TO KEMRON PROJECT NO. SH-0416

Department:	Physical Properties
S. O. P. No.	0416-004
Revision No.	0
Superseding Date:	None
Effective Date:	2 February 2012
Page:	1 of 2

1.0 SUMMARY

This Standard Operating Procedure establishes a standard method for analyzing off-gasses generated during thermal tests, including bulk VOCs, H_2S, and SO_2, using a Photovac MicroFID.

2.0 SCOPE

This procedure is specific to KEMRON Project No. SH-0416, TerraTherm Bridgewater, NJ, Acid Tar Thermal.

3.0 EQUIPMENT

Photovac MicroFID
Tedlar bag

4.0 TESTING PROCEDURE

4.1 Collect a sample of off-gas from the thermal system (post-condensate) at the target temperature as indicated in the site-specific scope of work (SOW) using a 1-liter Tedlar bag.

4.2 Attach the instrument to the Tedlar bag, and perform the reading according to manufacturer's instructions.

4.3 Record the concentrations for bulk VOCs, H_2S, and SO_2 on the appropriate data sheet for the sample.

5.0 HEALTH AND SAFETY

Laboratory safety procedures, as defined in KEMRON's Chemical Hygiene Plan, are followed during testing. A copy of this plan is maintained by the Corporate Health and Safety Coordinator, and is reviewed and executed by all KEMRON personnel.

6.0 QUALITY CONTROL / QUALITY ASSURANCE

6.1 The data calculated by the spreadsheet is checked by an individual not involved with the testing to ensure that no mistakes have been incorporated into the spreadsheet.

6.2 The engineer, or physical properties laboratory director, then manually and visually checks the material tested and compares his or her observations to the test results reported. The reviewing engineer or laboratory director is ultimately responsible for all final review and quality control of the analyses and the data generated. Upon final approval of the data and data interpretations, the engineer will initialize the original data sheets. All original data sheets and analyzed data will be maintained in the physical properties project files. A copy of the finalized test results will be submitted to the appropriate project manager and the client.

11.0 TO-14A/TO-15 – VOLATILE ORGANIC COMPOUNDS

This method involves full scan GC/MS analysis of whole air samples collected in evacuated stainless steel canisters. Samples are analyzed for volatile organic compounds using EPA Method TO-14A/TO-15 protocols. An aliquot of the sample is withdrawn from the canister through a mass flow controller and concentrated using a hydrophobic multisorbent bed. The hydrophobic multisorbent bed functions as a drying system which removes water from the sample stream prior to analysis by full scan GC/MS. During analysis, the sample may be focused onto a cryogenic cooled column and/or a cryogenic cooled sleeve for analysis by full scan GC/MS.

Air Toxics maintains three TO-14A/TO-15 full scan configurations and one SIM configuration. (See section 12.0 for the TO-14A/TO-15 SIM configuration). The '5&20' configuration is designed for high moisture soil gas and ppmv range vapor matrices. The '5&20' refers to the base reporting limits achievable via this method (5 ppbv and 20 ppbv). Samples can be efficiently analyzed without dilution at concentrations up to 5 ppmv. The second configuration is referred to as TO-15 (or Quad) and is set up to meet the reporting limits described in EPA Method TO-15 (0.5 ppbv to 2 ppbv). This application is used primarily for ppbv-level soil gas and ambient air. The third configuration is referred to as 'Low-level' and is optimized reporting limits below those listed in Method TO-15 with reporting limits in the 0.1 ppbv to 0.5 ppbv range. This 'Low-level' application is often used for indoor air applications. The 'Low-level' application is not designed for soil gas applications due to high levels of moisture and potentially high VOC concentrations.

Certain compounds are not included in ATL's standard target analyte list. These compounds are communicated at the time of client proposal request. Unless otherwise directed, ATL reports these non-standard compounds with partial validation. Validation includes a 3-point calibration with the lowest concentration defining the reporting limit, no second source verification is analyzed, and no method detection limit study is performed unless previous arrangements have been made. In addition, stability of the non-standard compound during sample storage is not validated. Full validation may be available upon request.

Air Toxics Ltd. takes no modifications of technical significance to Method TO-15 for the 'Quad' and 5&20 configurations. The modifications for TO-15 Low-level are listed in Table 11.1.A. Since Air Toxics applies TO-15 methodology to all Summa canisters regardless of whether TO-14A or TO-15 is specified by the project, Air Toxics performs a modified version of method TO-14A as detailed in Table 11.1.B. Please note that Methods TO-14A and TO-15 were validated for specially treated canisters. As such, the use of Tedlar bags for sample collection is outside the scope of the method and not recommended for ambient or indoor air samples. It is the responsibility of the data user to determine the usability of TO-14A (and TO-15) results generated from Tedlar bags.

Table 11.1.A Summary of TO-15 'Low Level' Method Modifications

Requirement	TO-15 ' Low Level'	ATL Modifications
Initial Calibration	≤ 30% RSD with 2 compounds allowed out to ≤ 40% RSD.	≤ 30% RSD with 4 compounds allowed out to ≤ 40%.
Blanks and standards	Zero Air	Nitrogen

Table 11.1.B Summary of TO-14A Method Modifications

Requirement	TO-14A	ATL Modifications
Sample Drying System	Nafion Drier	Multibed hydrophobic sorbent
Blank acceptance criteria	< 0.2 ppbv	< RL
BFB absolute abundance criteria	Within 10% of that from the previous day.	CCV internal standard area counts are compared to ICAL, corrective action for > 40% D.
Daily CCV	70-130% for listed 39 VOCs.	70-130%. ATL's 62 standard compound list exceeding this criterion and associated data will be flagged and narrated. If more than two compounds from the standard list recover outside of 70-130%, corrective action will be taken. Unless prior client approval; under no circumstances will samples be analyzed if any compound exceeds 60-140%.
Initial Calibration	≤ 30% RSD for listed 39 VOCs	≤ 30% RSD with 2 of ATL's 62 standard compounds allowed out to ≤ 40%..

The standard target analyte list, Limit of Quantitation, QC criteria, and QC summary can be found in Tables 11.2 – 11.6.

Table 11.2 Method TO-14A/TO-15 Analyte List

Analyte	RL (ppbv) LL/TO-15/5&20	%RSD	Acceptance Criteria	
			LCS (%R)	Precision Limits (Max. RPD)
1,1,2,2-Tetrachloroethane	0.1/0.5/5.0	30%	70 - 130	≤ 25
1,1,2-Trichloroethane	0.1/0.5/5.0	30%	70 - 130	≤ 25
1,1-Dichloroethane	0.1/0.5/5.0	30%	70 - 130	≤ 25
1,1-Dichloroethene	0.1/0.5/5.0	30%	70 - 130	≤ 25
1,2,4-Trichlorobenzene	0.5/2.0/20	30%	70 - 130	≤ 25
1,2,4-Trimethylbenzene	0.1/0.5/5.0	30%	70 - 130	≤ 25
1,2-Dibromoethane (EDB)	0.1/0.5/5.0	30%	70 - 130	≤ 25
1,2-Dichlorobenzene	0.1/0.5/5.0	30%	70 - 130	≤ 25
1,2-Dichloroethane	0.1/0.5/5.0	30%	70 - 130	≤ 25
1,2-Dichloropropane	0.1/0.5/5.0	30%	70 - 130	≤ 25
1,3,5-Trimethylbenzene	0.1/0.5/5.0	30%	70 - 130	≤ 25
1,3-Dichlorobenzene	0.1/0.5/5.0	30%	70 - 130	≤ 25
1,4-Dichlorobenzene	0.1/0.5/5.0	30%	70 - 130	≤ 25
Benzene	0.1/0.5/5.0	30%	70 - 130	≤ 25
Bromomethane	0.1/0.5/5.0	30%	70 - 130	≤ 25
Carbon Tetrachloride	0.1/0.5/5.0	30%	70 - 130	≤ 25
Chlorobenzene	0.1/0.5/5.0	30%	70 - 130	≤ 25

Analyte	RL (ppbv) LL/TO-15/5&20	%RSD	Acceptance Criteria	
			LCS (%R)	Precision Limits (Max. RPD)
Chloroethane	0.1/0.5/5.0	30%	70 - 130	≤ 25
Chloroform	0.1/0.5/5.0	30%	70 - 130	≤ 25
Chloromethane	0.1/2.0/20	30%	70 - 130	≤ 25
α-Chlorotoluene (Benzyl Chloride)	0.1/0.5/5.0	30%	70 - 130	≤ 25
cis-1,2-Dichloroethene	0.1/0.5/5.0	30%	70 - 130	≤ 25
cis-1,3-Dichloropropene	0.1/0.5/5.0	30%	70 - 130	≤ 25
Dichloromethane	0.2/0.5/5.0	30%	70 - 130	≤ 25
Ethylbenzene	0.1/0.5/5.0	30%	70 - 130	≤ 25
Freon 11 (Trichlorofluoromethane)	0.1/0.5/5.0	30%	70 - 130	≤ 25
Freon 113 (Trichlorotrifluoroethane)	0.1/0.5/5.0	30%	70 - 130	≤ 25
Freon 114	0.1/0.5/5.0	30%	70 - 130	≤ 25
Freon 12 (Dichlorodifluoromethane)	0.1/0.5/5.0	30%	70 - 130	≤ 25
Hexachlorobutadiene	0.5/2.0/20	30%	70 - 130	≤ 25
m,p-Xylene	0.1/0.5/5.0	30%	70 - 130	≤ 25
Methyl Chloroform (1,1,1-Trichloroethane)	0.1/0.5/5.0	30%	70 - 130	≤ 25
o-Xylene	0.1/0.5/5.0	30%	70 - 130	≤ 25
Styrene	0.1/0.5/5.0	30%	70 - 130	≤ 25
Tetrachloroethene	0.1/0.5/5.0	30%	70 - 130	≤ 25
Toluene	0.1/0.5/5.0	30%	70 - 130	≤ 25
trans-1,3-Dichloropropene	0.1/0.5/5.0	30%	70 - 130	≤ 25
Trichloroethene	0.1/0.5/5.0	30%	70 - 130	≤ 25
Vinyl Chloride	0.1/0.5/5.0	30%	70 - 130	≤ 25

Table 11.3 Method TO-14A/TO-15 Analyte List

Analyte	RL (ppbv) LL/TO-15/ 5&20	%RSD	Acceptance Criteria	
			LCS (%R)	Precision Limits
1,3-Butadiene	0.1/0.5/5.0	30%	60 – 140	≤ 25
1,4-Dioxane	0.1/2.0/20	30%	60 – 140	≤ 25
2-Butanone (Methyl Ethyl Ketone)	0.1/0.5/5.0	30%	60 – 140	≤ 25
2-Hexanone	0.5/2.0/20	30%	60 – 140	≤ 25
4-Ethyltoluene	0.1/0.5/5.0	30%	60 – 140	≤ 25

Analyte	RL (ppbv) LL/TO-15/ 5&20	%RSD	Acceptance Criteria	
			LCS (%R)	Precision Limits
4-Methyl-2-Pentanone (MIBK)	0.1/0.5/5.0	30%	60 – 140	≤ 25
Acetone	0.5/2.0/20	30%	60 – 140	≤ 25
Bromodichloromethane	0.1/0.5/5.0	30%	60 – 140	≤ 25
Bromoform	0.1/0.5/5.0	30%	60 – 140	≤ 25
Carbon Disulfide	0.5/0.5/5.0	30%	60 – 140	≤ 25
Cyclohexane	0.1/0.5/5.0	30%	60 – 140	≤ 25
Dibromochloromethane	0.1/0.5/5.0	30%	60 – 140	≤ 25
Ethanol	0.5/2.0/20	30%	60 – 140	≤ 25
Heptane	0.1/0.5/5.0	30%	60 – 140	≤ 25
Hexane	0.1/0.5/5.0	30%	60 – 140	≤ 25
Isopropanol (2-Propanol)	0.5/2.0/20	30%	60 – 140	≤ 25
Methyl t-Butyl Ether (MTBE)	0.1/0.5/5.0	30%	60 – 140	≤ 25
Propylene	0.5/2.0/20	30%	60 – 140	≤ 25
Tetrahydrofuran	0.5/0.5/5.0	30%	60 – 140	≤ 25
trans-1,2-Dichloroethene	0.1/0.5/5.0	30%	60 – 140	≤ 25
2,2,4-Trimethylpentane	0.5/0.5/5.0	30%	60 – 140	≤ 25
Cumene	0.1/0.5/5.0	30%	60 – 140	≤ 25
Propylbenzene	0.1/0.5/5.0	30%	60 – 140	≤ 25
3-Chloroprene	0.5/2.0/20	30%	60 – 140	≤ 25
Naphthalene	0.5/2.0/20	30%	60 – 140	≤ 25
TPH (Gasoline) or NMOC (Hexane/Heptane)	10/25/100	One Point Calibration	NA	≤ 25

Table 11.4 Internal Standards

Analyte	Accuracy (% R)
Bromochloromethane	60 - 140
1,4-Difluorobenzene	60 - 140
Chlorobenzene-d_5	60 - 140

Table 11.5 Surrogates

Analyte	Accuracy (% R)
1,2-Dichloroethane-d_4	70 – 130
Toluene-d_8	70 – 130
4-Bromofluorobenzene	70 – 130

Table 11.6 Summary of Calibration and QC Procedures for Methods TO-14A/TO-15

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Tuning Criteria	Every 24 hours, or every 12 hours if project requires.	SW – 846 tune criteria.	Correct problem then repeat tune.
5-Point Calibration	Prior to sample analysis.	% RSD ≤ 30 with two compounds allowed out to ≤ 40% RSD for QUAD and 5&20 (4 allowed out for LL).	Correct problem then repeat Initial Calibration Curve.
LCS	After each initial calibration curve, and daily, prior to sample analysis.	Recoveries for 90% of "Standard" compounds must be 70-130%; for 80% of "Non-standard" compounds, recoveries must be 60-140%. No recovery may be <50%. * If specified by the client in-house generated control limits may be used.	Check the system and reanalyze the standard. Re-prepare the standard if necessary. Re-calibrate the instrument if the criteria cannot be met.
Continuing Calibration Verification (CCV)	At the start of each day and, if required by a specific project, every 12 hours.	For QUAD and 5&20: 70-130%. Compounds exceeding this criterion and associated data will be flagged and narrated with the exception of high bias associated with non-detects. If more than two compounds from the standard list recover outside of 70-130%, corrective action will be taken. Unless prior client approval; under no circumstances will samples be analyzed if any compound exceeds 60-140%. For **Low Level** analysis the above applies except corrective action will be taken if more than four compounds from the standard list recover outside of 70-130%.	Perform maintenance and repeat test. If the system still fails the CCV, perform a new 5 point calibration curve.
Laboratory Blank	After the CCV/LCS.	Results less than the laboratory reporting limit.	Inspect the system and re-analyze the blank.

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Internal Standard (IS)	As each standard, blank, and sample is being loaded.	Retention time (RT) for blanks and samples must be within ±0.33 min of the RT in the CCV and within ±40% of the area counts of the daily CCV internal standards.	**For blanks:** inspect the system and reanalyze the blank. Analysis is discontinued until the blank meets the IS criteria. **For samples:** re-analyze the sample. If the ISs are within limits in the re-analysis, report the second analysis. If ISs are out-of-limits a second time, dilute the sample until ISs are within acceptance limits and narrate.
Surrogates	As each standard, blank, and sample is being loaded.	70 - 130%. * If specified by the client in-house generated control limits may be used.	**For blanks:** inspect the system and reanalyze the blank. Analysis is discontinued until the blank meets the surrogate recovery criteria **For samples:** re-analyze the sample unless obvious matrix interference is documented. If the %R is within limits in the re-analysis, report the second analysis. If %R is out-of-limits a second time, then narrate results.
Laboratory Control Spike Duplicate (LCSD)	1 dup/analytical batch.	RPD ≤25%.	Inspect the system and re-analyze; if out again, narrate.

S) ″ *ECT: ALDE+, DES b¸ HPLC

SOP ID: LC-SOP-4

A) ' +OR: M" ha ˙ Jorda0
SECTIO% S) PERVISOR: ***Michael Jordan***
1 A O22ICER: W 0/ y F rro
LABORA' O&, DIRECTOR: Mary Una045t

1.0 P) &POSE

' ." 5 doc78 nt de5 ri˜ 5 t. ana˙¸ 5"5 of A˙/ . ¸/ 56Sa8 p˙ i5 c˘˙˙ t / on D%P+ (di0"trophe0¸ ˙. ¸/ ra: "0 ; s"˜" a ge˙ t7˜ 5 (S<C 226-119), D%P+ s"˜" a ge˙ t7˜ 5 w"th oz˘0 s rubber (S<C 226-120), Wat rs S p-Pak, A55ay P- (M571A' ; and S<C P- () - EA 500-100) or eB7"va˙ nt a0/ ana˙¸ : / by HPLC. T. fol˙˘? "04 ana˙¸ t 5 are appl" a˜˙ t˘ t." 5 8 thod:

2orma˙/ . ¸/ A ta˙/ . ¸/ Propiona˙/ . ¸/
Crotona˙/ . ¸/ But¸ ra˙/ . ¸/ ″ 0: a˙/ . ¸/
(5ova˙ ra˙/ . ¸/ Va˙ ra˙/ . ¸/

' . l"8 "t of quant"fi at"˜0 i5 approxi8 at ˙y 0.04 to 1.0 µg/5a8 p˙ a0/ vari 5 by ana˙¸ t and m /"a u5 /6

2.0 RESPO%SIBIL(' IES

2.1 ' . ana˙¸ 5t operat"04 t. HPLC i5 re5pons"˜˙ for fol˙˘? "ng t. operat"04 proc dure5 (s t"˜0 9), perform"04 t. reB7"e/ qua˙"ty ontrol c. °5 (5 t"˜0 12), a0/ perform"04 ma"nt na0 (s $ a˙5on LC-SOP-18, current reˆ"5"˜0;6

2.2 ' . S t"˜0 Supervi5or i5 re5pon5"˜˙ for tra"0"04 ana˙¸ 5t5 in t. proper operat"˜0 and ma"0t na0 of t. HPLC. T. S t"˜0 Supervi5or i5 a˙5˜ re5pons"˜˙ for obta"0"04 out5"/ t .0" "a05 for 8 a"nt 0a0 and troubl 5hoot"04 that cannot be perform / by in-.˘75 staff.

D6# DE2(%(' IO%S

& fer to t. defi0"t"˜05 in Ga˙5˜0E5SOP L1 -DE2(%E (current reˆ"5"˜0;6

4.0 - E' +OD S) - - A&,

' . m /"a from t. D%P+ (di0"trophe0¸ ˙. ¸ dra: "0 ; s"˜" a ge˙ t7˜ 5 (S<C 226-119), A55ay P- (M571A' ; and S<C P- () - EA-100) or eB7"va˙ nt "5 tra05ferre/ int˘ a la˜ ˙ / 4.0 mL via˙ and i5 extra t / in 2 mL of a t˘0"tri˙ 6T. Wat rs S p-Pak i5 e˙ut / w"t. 10 mL a t˘0"tr"˜ int˘ a 10 8 L c˙a55 A vol78 tri la˜ ˙ / fla5k. T. extra t5 are t. 0 sha° n for 30 8 "07t 56T. extra t5 from a˙˙ m / "a are fi˙t re/ int˘ 1.8 mL target via˙5 a0/ ana˙¸ : / by HPLC u5"04 an ultraˆ"˘˙ t det tor.

˘6# (%' E&2ERE%CES

Compounds pre5 nt in t. t 5t at8 ˇ5phere haˆ"04 chromatographi ret nt"ˇ0 t"8 5 s"8 "ar to t. cˇ8 pounds of int re5t ma¸ int rfere6 Effort5 5.ˇ7· d be ma/ tˇ haˆ t. c·" nt provi/ informat"ˇ0 on ot. r c. 8 " a·5 ˜ "04 us d at t. sa8 pl"04 lˇ at"ˇ06 S s t"on 9.1 for spe "fi "nt rfere0 5 if appl" a˜· 6

=6# SA2E' ,

6.1 Safety gla55 5 w"th s"/ s." ·/5 m75t be worn at a·· t"8 5 i0 t. ·aborator¸ 6La˜ coat5 and glˆˆ 5 s.ˇ7· d be worn a5 appropriat 6

6.2 & fer to t. Ga·5on Laboratori 5 H¸ 4" 0 P·an Safety Manua· 9 urrent reˆ"5"ˇ0; and re· vant MSDSE5for a//" t"ona· informat"ˇ06

@6# - A' ERIALS A%D APPARA') S

(EB7'va· 0t5 may be s7˜5t"tut / unl 55 not / ot. rw"5 6;

7.1 4.0 mL cˇ ar s re? cap via·5 (Sun Sri cata·ˇ4 #200-492)

7.2 4.0 mL via· ra °5

@6D ˝· a ° T flon- oat / s re? caps for 4.0 mL via·5 (Sun Sri cata·ˇ4 #200-568)

7.4 1.8 mL gla55 target via·5 (%at"ona· S " nt"fi cata·ˇ4 #C4011-1)

@6ˇ 11 m8 cri8 p caps for target via·5 (Sun Sri cata·ˇ4 #200-101)

@6= 1.8 mL via· ra °5

@6@ 1.0 – 5.0 mL a/H75ta˜· pipett

@6C +"gh P rforma0 L"B7'/ Chromatograph w"th autˇ5a8 p· r, Photˇ/" ˇ/ array (PDA) det tor and data s¸ 5t 8

@6 Cl a0 Cla55 A 10 mL gla55 vol78 tri fla5k. For c· a0"04 proc dure5>refer tˇ LC-SOP-19, current reˆ"5"ˇ0

7.10 10 mL c·a55 A vol78 tri fla5°5

7.11 10 mL vol78 tri fla5k ra °

7.12 Cl a0 20 mL gla55 jar w"t. pla5t" t flon-·"0 / cap

7.13 Variˇ75 graduat / ga5 t"ght s¸ r"04 5

7.14 D"5posa˜· Pa5t ur P"pett 5 (2"5. r S " nt"fi Cat6No. 13-678-20B)

7.15 - ha0" a· sha° r

7.16 E· tron" cri8 per (A4'" nt T .0ˇ· ˇ4" 5 cata·ˇ4 #5183-4763)

7.17 Ana·¸ t" a· Col78 0: Supe· ˇ A5 nt"5 Expre55 C_{1C} 2.7 um (P%: 53816-U;

7.18 Analytical Column (UPLC): Waters ACQUITY UPLC BEH C18 1.7um 2.1x100mm.

7.19 <"8 W"pe5

7.20 %IS' tra a˜· t"8 r

7.21 L7 r-Lok t"p 3m· s¸ ri04 5 (BD s¸ r"04 cata·ˇ4 # 309585)

7.22 Supe· ˇ Supe·guard A5 nt"5 C_{1C} 2 c8 x 4.0 m8 3 µ8 (P%: 581378-U;

C6# REA$ E%' S A%D S' A%DA&DS

8.1 - '"·"-1 wat r – 18.2 MΩ

8.2 D 5orbing Sˇ· ut"on: A tˇ0"tri· >HPLC gra/ from F"5. r 9 ata·ˇ4 #A C;

C6D - ˇ˜" ˙ Pha5 : Gra/" nt of A t˘0"tri˙ and M"¨"-1 wat r

8.4 Pri8 ar¸ and S ondary sourc of A˙/ .¸ / 5>Supe˙ ˇ and Re5t k a . a c˘0 ntrat"˜0 of 100 ppm6

%ot : E05ure that a¨ s˘˙^ nt5 and m˘˜ " pha5 5 are fre5.˙¸ prepare/ and current6Refer to Ga˙5on LC-SOP-37 (current re^"5"˜0;6

6# PROCED) RE

9.1 A%AL, ' ICAL S) - - A&,

METHOD RANGE:	. 4 – 6 . µg
LOQ	SKC ˘ ˘ 6˜^ ˘ ˙ SKC ˘ ˘ 6˜^ ^ ˝ : .^ µg ¸ ° ˜ ss !" #$% & ' (#˜$ °) SKC Assa(+, ^ : .˘ µg˙ -# ") %r 0C˘1ORM .^ µg 2 *) /s S "˘3* k: ^ . µg SKC + ˜^ : .^ µg
DESORPT0D EF10C0ENC5	C. 6 " . ¸ ° & * ° & 6 &$ & " ° & °) R %/ °# DE !) ¸ &$ s $ L0MS
L0 EAR RA GE	. ^ – 7 . µg8mL
SAMPLER – MATR09 CODE	SKC ˘ ˘ 6˜^ ˘ :^ ˝ ^ ;˙ SKC ˘ ˘ 6˜^ ^ ˝ :+^) SKC Assa(+, ^ :˝ +) SKC + ˜^ :, 4) 2 *) /s S "˘3* k :, <;
BACKGRO> D CORRECT0D	R %r). ?L.) @ /$%*)$ ° s" $ LC %˜& r . ° G* ˜1. ° B 3¸ ' ˜$ D/$C
0 TER1ERENCE	.) * " " ˜$%* ' ˜

9.2 (%S' &) - E%' A' IO% (EB7˙va˙ nt i05trum 0tat"˜0 ma¸ be 57˜5t"tut /6;

9.2.1 - ˇ˜" ˙ Pha5 : Gra/" nt of A t˘0"tri˙ (B cha00 ˙; a0/ - "¨"-1 wat r (A cha00 ˙;6

$ ra/" nt Ta˜˙ for A˙/ .¸ / Profi˙ us"ng HPLC				
' "8 (m"06;	%A	I˝	%C	%D
#	˘#	˘#	#	#
2	˘#	˘#	#	#
C	=#	40	#	#
17	˘	˘	#	#
20	˘	˘	#	#

21	ˇ#	ˇ#	#	#

$ ra/" nt Ta~· for Forma·/ . ¸ / a0/ A ta·/ . ¸ / us"ng HPLC				
' "8 (m"06;	%A	I˝	%C	%D
#	48	52	#	#
2	48	52	#	#
ˇ6=	43	ˇ@	#	#
=6=	#	100	#	#
	#	100	#	#
10	48	52	#	#

$ ra/" nt Ta~· for A·/ .¸ / Profi· us"ng UPLC				
' "8 (m"06;	%A	I˝	%C	%D
#	ˇD	47	#	#
1.5	ˇD	47	#	#
ˇ	Dˇ	=ˇ	#	#
ˇ6ˇ	ˇD	47	#	#
@	ˇD	47	#	#

$ ra/" nt Ta~· for Forma·/ . ¸ / a0/ A ta·/ . ¸ / us"ng UPLC				
' "8 (m"06;	%A	I˝	%C	%D
#	ˇD	47	#	#
2	ˇD	47	#	#
2.5	#	100	#	#
D6ˇ	ˇD	47	#	#

+ PLC ana·¸ t" a· cˇ0/" t"˜05

9.2.2 2·ˇ? Rat : 0.5 mL/8 "07t

9.2.3 (0H t"˜0 Vˇ· 78 : 10 µL

9.2.4 Ana·¸ t" a· Col78 0: Supe· ˇ A5 nt"5 Expre55 C_{1C} 2.7 78 (P%: 53816-U;

9.2.5 Col78 0 T 8 p rature for A·/ .¸ / 5: 25ºC

9.2.6 D t tor: UV A~ 5orba0 – 360 nm

9.2.7 Run T"8 : 13.5m"06for forma·/ . ¸ / and a ta·/ . ¸ / L 25m"06for t. a·/ .¸ / profi· .

) PLC Ana·¸ t" a· Condit"˜05

9.2.8 (0H t"˜0 vol78 : 3 uL

9.2.9 2·ˇ? Rat : 0.5 mL/8 "07t

9.2.10 Ana·¸ t" a· c˘· 78 0: Wat rs A B7'ty UPLC BE+ C_{18} 1.7um 2.1 x 100m8 (P%: 186002352).

9.2.11 Col78 0 T 8 p rature: 25˘C

9.2.12 D t tor: UV A/ 5orba0 L360nm6

9.2.13 Run t'8 : 3.5m'06for forma·/ .¸/ and a ta·/ .¸/ L 7.0m'06for t. a·/ .¸ / profi· 6

6D CALIBRA' IO% C) RVE PREPA&A' IO%

9.3.1 Prepare A·/ .¸ / standard s˘· ut'˜05 us"ng st˘ k (s t'˜0 8). T." 5 ca·"brat'˜0 curve c˘^ rs ana·¸ 5'5 for forma·/ .¸/ a0/ a ta·/ .¸/ 6

9.3.2) 5'ng L(- S, ge0 rat a standard I+ num˜ r. Print t. a55˘ "at / la˜ · a0/ atta . it to t. gla55 jar.

6D6D ' . c˘0 ntrat'˜05 of standard us d and a55˘ "at / vol78 for t. standard l ^ ·5 are s.˘? n in t. ta˜· be·˘? 6 Ca·"brat'˜0 standards are prepare/ u5'04 1.8 mL gla5s '0H t'˜0 via·56La˜ · a·· standard conta'0 rs6

Standard L ^ ·	Standard Conc ntrat'˜0 (ppm;	Standard V˘· 78 9JL;	2"na· V˘· 78 98L;	Approxi8 at ' arget Conc ntrat'˜0 9Jg/8 L;
1	1.0	10	1.0	0.01
2	10	˘#	1.0	#6˘
D	10	100	1.0	1.0
4	100	25	1.0	2.5
˘	100	100	1.0	10.0
=	100	D##	1.0	D#

9.4 SA- PLE PREPARA' IO%

9.4.1 Prior t˘ prepari04 sa8 p· 5>de5orpt'˜0 and aut˘5a8 p· r onta'0 rs are la˜ · / a0/ pla / in appropriat ra °56T. / 5orpt'˜0 conta'0 rs are ordere/ in t. ra k, fi·'04 t. · ft-8 ˘5t c˘· 78 0 of t. ra ° from front t˘ ba k and t. 0 fi·'04 t. c˘· 78 0 of t. ra k i8 8 /"at ·¸ next to it>aga'n, from front to ba °6 Conta'0 rs are pla / i0 t. ra °5 i0 t. 5a8 order a5 t. ana·¸ t" a· s B7 0 >w." . i5 bri fl¸ / 5 ri˜ / in s t'˜0 9.6. T. order of c·" nt sa8 p· 5 are ordere/ ba5 d on priority (rush sa8 pl 5 first), t. 0 in order of a5 0/"04 l˘4"0 num˜ rs>and t. 0 by c·" nt sa8 pl 078 ˜ r

9.4.2 S<C 226-119, S<C 226-120

Open t. S<C 226-119. S<C 226-120 or eB7'va· nt t7˜ 75'ng t. Dre8 · sa? . Re8 ˘^ and di5 ard t. front gla5s ? ˘·· reta'0 r (S<C 226-120 re8 ˘^ oz˘0 s rubber first;6 E05ure that re8 ova· t˘·· i5 thoroughly c· a0 / w't. / 5orbi04 s˘· ut'˜0 before u5'04 to re8 ˘^ ea . s t"on of t7˜ 6Tra05fer t. front s t'˜0 of m / "a int˘ a pre-la˜ · /

4 mL gla55 via·6Re8 ˇ^ and di5 ard t. m"//· gla55 wˇˇ·
5 parator. Tra05fer t. ba ° s t"on of t. t7˜ into a
5 parat >pre-·a˜ · / 4 mL gla55 via·. Add 2 mL of di·7 nt
95 t"˜0 8.2) to ea . i0/"^"dua·>pre-la˜ · / 4 mL gla55 via·
a0/ cap t"ght·¸ 6

9.4.3 A55ay P- (M571A' ;

Open t. A55ay P- mˇ0 "tor or eB7'va· 0t b¸ us"04
oppos"t end of t? : rs6Re8 ˇ^ and di5 ard t. s re 0
that cˇ^ rs t. sa8 pl"04 wafer. Aft r ope0"04 ea .
8 ˇ0"tor, e05ure that t. t? : rs ha^ be 0 thoroughl¸
· a0 / w"th de5orbing sˇ· ut"˜0 in order tˇ re/7 ri5k of
onta8 "0at"˜06 Tra05fer t. wafer intˇ a pre-la˜ · / 4 mL
4·a55 via·6Add 2 mL of di·7 nt (5 t"˜0 8.2) to ea .
"0/"^"dua·>pre-la˜ · / 4 mL gla55 via· and cap t"ght·¸ 6

9.4.4 S< C P- (U- EA-100)

Open t. S< C P- () - EA-100) mˇ0"tor by us"ng oppos"t
0/ of t? : rs. Aft r ope0"04 ea . mˇ0"tor e05ure that t.
t? : rs ha^ be 0 thoroughly c· a0 / w"th de5orbi04
5ˇ· ut"˜0 in order to re/7 ri5k of conta8 "nat"˜06 Tra05fer
t. front s t"˜0 of m /"a intˇ a pre-la˜ · / 4 mL gla5s
^"a·6Be a75 t. m /"a ha5 t? o s t"˜05 (a front and a
ba °;>t. front can be det r8 "0 / a5 t. wafer cˇ·5 5t tˇ
t. c·"p of t. ba/4 or t. wafer that doe5 not ha^ a
"0/ nt / mark in t. c nt r. T. ba k s t"˜0 i5 at t. e0/
of t. mˇ0"tor furt. 5t from t. c·"p a0/ doe5 ha^ an
"0/ nt / mark in t. c nt r. Tra05fer t. ba ° wafer into a
5 parat >pre-·a˜ · / 4 mL gla55 via·. Add 2 mL of di·7 nt
95 t"˜0 8.2) to ea . i0/"^"dua·>pre-la˜ · / 4 mL gla55 via·
a0/ cap t"ght·¸ 6

9.4.5 3 at rs S p-Pa°

Open pa ka4 conta"0"04 S p-Pak cartri/4 b¸ us"04
utt"04 e/4 . E05ure that t. cutt"04 e/4 u5 d is
thoroughly c· a0 / w"t. de5orbing sˇ· ut"˜0 in order to
re/7 t. ri5k of conta8 "nat"˜06 P·a open end of
artri/4 on c· a0 10 mL c·a55 A vol78 tri fla5k, pl74 e0/
"5 fa "04 upward. Re8 ˇ^ plug and pla L7 r-Lok t"p
D8L s¸ ri04 over pl74 end. Ma° sure L7 r-Lok t"p i5
fl75h w"t. unders"/ of cartri/4 6U5"ng a c· a0 Pa5t ur
P"pett >pipett di·7 nt intˇ open s¸ r"04 6T." 5 w"˜· a··ˇ?
/"·7 nt to gra^"ty fe d through cartri/4 6D"ut to vol78
? "t. de5orbing sˇ· ut"˜0 (5 t"˜0 8.2). Parafi·8 top of 10
8 L vol78 tri fla5k and vort ! for 30 s ˇ0/5 . Tra05fer
5a8 pl intˇ pre-la˜ · / 4 mL gla55 via· and cap t"ght·¸ 6

9.4.6 P·a t. via·5 on t. m ha0" a· sha° r a0/ sha° for 30
8 "07t 5>Wat rs S p-Pak sa8 pl 5 do not ne d tˇ be pla /
on sha° r. Re ord sha° t"8 5>N(S' tra a˜· t"8 r s ria·
078 ˜ r and a·· ot. r reB7'ed infor8 at"˜0 in t. L(- S
M$a8 pl Prep" s re n. U5"ng a 3 mL s¸ ri04 fitt / w"t. a

0.22 µ8 s¸ ri04 fi·t r, fi·t r ea . extra t into a s parat > pre-·a˜ · / 1.8 mL gla55 target via· and cap w"t. a s"ˆ r ri8 p cap. Refer t˘ SOP IL-PREP (current reˆ"5"on).

6˜ S, S' E- S) (' ABIL(' ,

9.5.1 EB7""brat t. c˘· 78 0 w"th m˘˜" · pha5 at t. operat"04 fl˘? rat of 0.5 mL/8 "0 unt"· a sta˜· ba5 ·"0 a0/ ba kpre55ure i5 a ." ˆ /6 In t." 5 order, i0H t an e·7 nt ˜· a0°>a DLS and a CCV6

%ot : Col78 0 effi " 0 y (s t"˜0 9.5.2), ta""04 fa tor 95 t"˜0 9.5.3), and ret nt"˜0 t"8 (s t"˜0 9.5.4) crit ria 5.˘7· d be m t for t. CCV prior to stari04 a s B7 0 6

9.5.2 Col78 0 Effi " 0 ¸

' . t. oret" a· plat 5 (N) for ana·¸ t pea°5 i0 t. hromatogra8 of t. CCV i0H t"˜0 s.˘7· d be ≥ 2000 plat 5 for A·/ .¸/ 5 w. n ca· 7·at / a ordi04 to t. fol·˘? "04 equat"on:

$$\% = 5.54(t/3_{\cdot\#I};^2$$

3 . re (t) i5 t. ret nt"˜0 t"8 of an ana·¸ t a0/ ($W_{\cdot\#I}$) i5 t. peak w"dt. at 50% he"ght (ha·f w"dth) of an ana·¸ t pea°6 t and w are m a5ure/ i0 t. sa8 unit56

6˘6D ' a""04 Fa tor

' . ta""04 fa tor (T_f) for ana·¸ t pea°5 s.˘7· d be $0.8 \le T_f \le 1.2$ w. n ca· 7·at / a ordi04 to t. fol·˘? "04 equat"on:

$$T_f \; o \; W_{\#6\#\cdot} / (2f)$$

3 . re ($W_{\#6\#\cdot}$) i5 t. w"dt. of an ana·¸ t pea° at 5% of t. pea° he"ght6And (f) i5 t. di5ta0 bet? 0 t. perpe0/" 7·ar dra? n from t. ana·¸ t E5peak ma! "8 78 and t. l a/"04 e/4 of t. pea° m a5ure/ at 5% of t. pea° . "ght6$W_{\#605}$ a0/ f are m a5ure/ in t. sa8 unit56

9.5.4 & t nt"˜0 T"8 Crit ria

' . ret nt"˜0 t"8 of ana·¸ t pea°5 obta"0 / from t. CCV "0H t"˜0 s.˘7· d be w"t." 0 ± 0.5 m"nut 5 w. 0 c˘8 pare/ t˘ t. ret nt"˜0 t"8 5 obta"0 / from t. i0"t"a· ca·"brat"˜0 urve6M"nor m˘˜" · pha5 cha04 5 (± 5% orga0" 8 ˘/" f" r) may be ma/ i0 order to m t ret nt"˜0 t"8 rit ria6

%ot : Not"fy y˘7 r supervi5or if a0y of t. 5 reB7"e8 nt5 annot be m t>it ma¸ be ne 55ary to repla t. guard and/or ana·¸ t" a· c˘· 78 0 or re8 a° t. m˘˜" · pha5 .

6= (%*ECTIO% SE1) E%CE

A t¸ pi a· i0H t"˜0 s B7 0 i5 a5 fol·˘? 5:

1) E˙7 nt
2) DLS
D; CCV
4) D"˜7 nt
˘; - /"a Bla0°
=; BS
@; BSD
C; Sa8 pl 5
; CCV

%ot : Reˆ" ? a0y QC a0/ s˛ 5t 8 s7"ta˜" ˙"t˛ c. °5 prior t˘ runni04 any sa8 pl 56 Reˆ" ? and eva˙uat a¨ data for a pta˜¨ hromatograph˛ 6Refer t˘ t. appropriat i05trum nt SOP for / ta" / operat"ona˙ i05truct"˜056

10.0 DOC) - E%' A' IO%
& fer to Ga˙5on LC-SOP-5 (current reˆ"5"˜0;6

11.0 CALCULA' IO%S
& fer to SOP LC-SOP-5 (current reˆ"5"on). Sa8 pl 5 that are a˜ˇˆ t. ¨"0 ar ra04 of t. ca¨"brat"˜0 curve m75t be di˙ut / and reana˙˛ : /6 Conc ntrat"˜05 be¨˘? t. l˘? 5t standard are report / a5<LO1 .

Sa8 pl re57˙t5 are ca˙ 7˙at / b˛ t. fol¨˘? "ng equat"˜05:

$$8\ g/8^{3}O = \frac{(S - MB)}{(V)} \qquad ppm = \frac{8\ g/8^{D} \times 24.45}{m^{\check{}}\cdot 6wt6}$$

3 . re:
S = sa8 pl >ug V = a"r vol78 in l"t rs
R- B = m /"a blank, ug
- 3 Forma˙/ . ˛ / = 30.03 g/8 ˘ ¨ - 3 A ta˙/ . ˛ / = 44.06 g/8 ˘¨
- 3 Propiona˙/ . ˛ / = 58.08 g/8 ˘ ¨ M3 Va˙ ra˙/ . ˛ / = 86.13 g/8 ˘ ¨
- 3 Crotona˙/ . ˛ / = 70.09 g/8 ˘ ¨ - 3 But˛ ra˙/ . ˛ / = 72.11 g/8 ˘ ¨
- 3 Be0: a˙/ . ˛ / = 106.12 g/8 ˘¨ - 3 Isova˙ ra˙/ . ˛ / = 86.13 g/8 ˘¨

R- /"a blank corre t"˜0 i5 perform / only w. n t. re i5 a know0 ."5tori a˙ ba kground on t. m /"a6

12.0 1) AL(' , CO%' ROL CHECKS A%D CRITERIA
12.1 (0"t"a˙ Ca¨"brat"˜0
Ca¨"brat t. i05trum nt w"th a m"0"8 78 of 5 standards, one of ? ." . i5 at or be¨˘? t. LO1 aft r a ount"04 for sa8 pl / 5orpt"˜0 vol78 and/or m /"a lot corre t"˜06 Refer to LC-SOP-5, s t"˜0 9.3 for ca¨"brat"˜0 curve crit ria a0/ QC-SOP-12 for rit ria to re8 ˘ˆ a ca¨"brat"˜0 point (current reˆ"5"˜05;6
12.2 Curve V rifi at"˜0

' . curve m75t be verifi / w"th standard l ^ ˙ 5 (s t"˜0 9.3) that "5 ma/ us"ng t. s ondary sourc standard. T. re ˇ^ ry m75t ˜ w"t." n in-.ˇ7 5 control l"8 "t5 or defa7˙t l"8 "t5 of 80-120% if ˙ 55 tha0 20 data point5 are ava"˜a˜ ˙ 6

12.3 Cont"07"04 Ca˙"brat"˜0 V rifi at"˜0 (CCV;
CCVE5are prepare/ at 5.0ug, us"ng t. s ondary sourc standard. A CCV m75t be run at t. be4"00"04 a0/ end of t. ana˙¸ t" a˙ 5 B7 0 and e^ ry 20 sa8 pl i0H t"˜05 (not i0 ˙7/"04 a55ˇ "at / qua˙"t¸ control c. °5;6 E˙aps / t"8 bet? 0 CCV5 m75t not ! / 12 hours. Re ˇ^ ri 5 m75t be w"t." n in-.ˇ7 5 l"8 "t5 or / fa7˙t l"8 "t5 of 80-120% if l 55 tha0 20 data point5 are ava"˜a˜ ˙ 6

12.4 D t t"˜0 L"8 "t Standard (DLS;
A DLS i5 prepare/ at 0.02ug, us"ng a pri8 ary or s ondary sourc 5tandard. A DLS m75t be run w"th ea . bat . of sa8 pl 5 or a 8 "0"8 78 of onc e^ ry 24 hour5. Re ˇ^ ri 5 m75t be w"t." 0 in-.ˇ75 l"8 "t5 or defa7˙t l"8 "t5 of 70-130% if l 55 tha0 20 data point5 are ava"˜a˜˙ 6

12.5 ˝˙ a0° Spi° /˝˙ a0° Spi° Dupl" at (BS/BSD;
& fer to s t"˜0 9.4 for BS/BSD sa8 p˙ preparat"˜06 T. BS a0/ BSD are spi° d us"ng t. pri8 ar¸ or s ondary sourc standard.
' . BS and BSD are spi° / w"th 50ul of 100 µg/8 L stˇ k to y" ˙/ a spi° of 5 µg. Prepare a BS a0/ BSD for e^ ry 50 sa8 p˙ 5 per 8 atri! and for e^ ry preparat"˜0 e^ nt6Re ˇ^ ri 5 m75t be w"t." 0 "n-.ˇ7 5 l"8 "t5 or defa7˙t l"8 "t5 of 75-125% if l 55 than 20 data point5 are ava"˜a˜˙ 6If a s"40"fi ant l ^ ˙ of ba kground i5 ˇ˜5 rved, a m /"a lot verifi at"˜0 m75t be perform /6

%ot : S p-Pak m /"a M) S' be spi° / w"th a s"/ port ne /˙ 5¸ r"04 to pre^ nt m /"a c˙ˇ44"04 t. ne /˙ duri04 spi°"046

12.6 - /"a Bla0°
& fer to s t"˜0 9.4 for m /"a bla0° preparat"˜06 Prepare a m /"a ˜˙ a0° for e^ ry 50 sa8 pl 5 per matri! a0/ e^ ry preparat"˜0 e^ nt6
' . re57˙t m75t be be˙ˇ? t. det t"˜0 l"8 "t unl 55 t. m /"a lot ha5 be 0 e5ta˜˙ "5. / to conta"0 a ba kground. If a s"40"fi ant l ^ ˙ of ba kground i5 ob5 rve/> a m / "a lot verifi at"˜0 m75t be perform /6

12.7 Sa8 pl 5
& fer to s t"˜0 9 for sa8 pl preparat"˜06 Clˇ5 ˙y mˇ0"tor t. pea° 5¸ 8 8 tr¸ >e05ure that pea°5 ha^ no int rfere0 5 i6 . pea° 5.ˇ7˙ / rs. A˙5o re^" ? a˙˙ wa^ ˙ ngt.5 (w. re ava"˜a˜˙ ; tˇ e05ure t. re57˙t5 are s"8 "˜"ar and mˇ0 "tor spe tra˙ feature5 w"t." 0 t. hromatograph" re57˙t56

13.0 CORRECTIVE ACTIO%
Any t"8 qua˙"ty control sa8 pl 5 fa˙˙ out5"/ of t. "r e5ta˜˙ "5. / control ˙"8 "t5>a corre t"˜ a t"˜0 m75t be ta° 06 Corre t"˜ a t"˜05 ma¸ i0 ˙7/ > but are not l"8 "t / tˇ> i05trum nt ma"0t na0 >i05trum nt re- a˙"brat"˜0>

or re8 a°"04 a0/ reana˙¸ : "04 qua¨"t¸ control sa8 p˙ 56A¨ corre t"˜ a t"˜05 m75t be doc78 nt / and reˆ" ? / b¸ supervi5ory and qua¨"t¸ a55ura0 staff.

14.0 3 AS' E DISPOSAL

& fer to SOP L2-DISPO (current reˆ"5"˜0; and LC-SOP-1 (current reˆ"5"˜0;6

15.0 RE2ERE%CES

NIOS+ 2016, March 15, 2003 (i557 2)

16.0 M t.˘/ M˘/" fi at"˜05

16.1 NIOSH 2016 uses 6 to 10 media blanks per sample set. Galson LC-SOP-4 uses 1 media blank per 50 samples.

16.2 NIOSH 2016 extracts in 10mL of acetonitrile. Galson LC-SOP-4 extracts in 2mL of acetonitrile for sampling badges and charcoal tubes.

16.3 NIOSH 2016 uses a 20uL injection volume. Galson LC-SOP-4 uses a 5uL injection volume.

16.4 NIOSH 2016 calibrates with samplers fortified with standard solutions of formaldehyde in water. Galson LC-SOP-4 uses prederivitized standards made at 100ppm in acetonitrile.

16.5 NIOSH 2016 calibrates daily. Galson LC-SOP-4 calibrates annually or as needed.

16.6 NIOSH 2016 prepares the samples by eluting with 10mL acetonitrile. Since this method was written focusing on the preparation of Waters sep-pak media only, it should be known that Galson follows this same procedure with sep-pak media. Galson LC-SOP-4 differs when dealing with samples on filters, badges and charcoal tubes. For these media types we desorb the samples in 2mL acetonitrile and then place them on a mechanical shaker for 30min.

GALSON LABORATORIES STANDARD OPERATING PROCEDURE

SUBJECT: !" # $ % " IC ACID' by N!# ' (ME*(# D 7903

SOP ID: II-N7903

AUTHOR: ° ^ Ba+,
SECTION SUPERVISOR: * i- S˜hroe/ r
QA OFFICER: 0 ndy F rro
LABORATORY DIRECTOR:) ary Unangst

1.0 PURPOSE

*hi3 - t.˘/ i3 app^i˜a°^ to t. ana˜″3i3 of f˘,˘ ri/ 4˜. ^ori/ 4br˘ - i/ 4nitrat 4phosphat and 3,^ fat ions45 hi˜h ar r port d a3 . ″/ rof^uori˜ a˜i/ 4. ″/ r˜˜ .^ ori˜ a˜i/ 4. ″/ r˘+ n °r˘ - i/ 4 nitri˜ a˜i/4 phosphori˜ a˜id and 3, ^furi˜ a˜id r 3p ˜ti˘ ˜″6

2.0 RESPONSIBILITIES

2.16 *. ana˜″3t3 ˘r t ˜hni˜ians ar r 3pon3i°^ f˜r f˜^˜5 ing t. ana˜″ti˜a^ and pr paration pr˜˜ /, r 3 out^ined in thi3 /˜˜ ,- nt6

2.26 *. ' ˜tion ' upervi3or i3 r 3ponsi°^ f˜r ns, ring that t. ana˜″3t3 and t ˜hni˜ians . a˘ ° n proper˜″ trained in t. pr˜˜ dur 3 ˘, t^ined in thi3 /˜˜ , - nt6*. ' ˜tion ' uper˘ i3or i3 a^3˘ r 3pon3i°^ f˜r n3uring that t. ana˜″3t3 and t ˜hni˜ians ar f˜^˜5 ing t. out^ine/ pr˜˜ /, r 36

3.0 DEFINITIONS

$ f r to t. / finitions in %a^3on'3 ' # 8 9: -DE1!" E4˜urr nt r vi3ion.

4.0 METHOD SUMMARY

*hi3 - t.˘/ / 3˜ri° 3 t. ana˜″ti˜a^ and pr paration pr˜˜ dur 3 f˜r 3a- pl 3 that r ;, ir . ″drof^uori˜ a˜i/4 . ″dr˜˜ .^ ori˜ a˜i/ 4. ″/ r˘+ n br˘- i/ 4nitri˜ a˜i/ 4pho3phori˜ a˜id and 3,^ furi˜ a˜id ana˜″3i3 ˘ia ion ˜. r˘ - atograph″6

5.0 INTERFERENCES

&˘ - pounds pr 3 nt in t. t 3t at- ˘3pher ha˘ing ˜. r˘ - atographi˜ r t ntion ti- 3 3i- i^ar t˘ t. ˜˘ - pounds of int r 3t - a″ int rf r 6 Effort3 3.˘, ^d ° - a/ to ha˘ t. ˜^i nt provi/ inf˜r- ation on ˘t. r˜. - i˜a^3 ° ing ,3 d at t. 3a- pling ˜˜ ation. ' 3 ˜tion 96l for 3pe˜ifi˜ int rf r nc 3 if app^i˜a°^ 6

6.0 SAFETY

6.16 ~i/3 ar xtr - ^y~~rr~3i~ to 3¸ in, ″ 3 and - ,~ ~,3 - - °rane36 (andl 5 ith ~ar 6

6.26 ' af t″ +^a33 3 5 ith 3i/ 3. i ^/3 ar r quir d at a^^ ti- 3 in t. ^a°~ rator″ 69 ab ~oat3 and +~~ 3 3.~, ^d ° 5 orn a3 appropriat 6

6.36 $ f r to t. %a^3on 9 aboratori 3 (″+i ne 8^an ' af t″) anua^ and r ^ vant) ' D' 736

7.0 MATERIALS AND APPARATUS

<Equiva^ nt3 - ay ° 3,°3 tit, t d unl 33 not d ot. r5 i3 6=

7.16 20-- 9 hi+. -/ nsit″ po~″ t. ″^ n <(D8E=3~inti^^ation ~ia^3 and 5 hit ur a 3~r 5 ~aps 5 it. ~one-3haped p^a3ti~ ^in r <1i3. r ~ata^og # 03-337-23C=

7.26 ' ~inti^^ation ~ia^ ra~¸ 3

7.36 1.5 - 9 8~~″ via^3 5 ith ~aps and 3 pta <Dionex ~ata^og 061696=

7.@6 · ~ton Di~kinson 3 - 9 9, r-9 ok p^a3ti~ / i3posa°^ 3″ringe <1i3. r ~ata^og # 14-823-40)

7.?6 0.45 µ- po~″t traf^uor~ t. ″^ ne <8*1E=fi^t r3 <Bpert x &ata^og # 9445613)

7.66 $ pipett 5 ith appropriat di^, nt

7.76 !on ~hr~- atograph 5 ith a, t~3a- pl r and / ata 3″3t -

7.A6 &^ an &^a33 +^a33~~ ^, - tri~ f^a3¸3: 10 - 9425 - 9450 - 9 and 4 9

7.96 Vari~,3 a/C, 3ta°^ ~~ ^, - pipett 3 5 ith di3posa°^ tips

7.106 Vari~,3 3iD " a^+ ne °~ tt^ 3

7.116 Dr - ^ 3a5

8.0 REAGENTS AND STANDARDS

<Equiva^ nt3 - ay ° 3,°3 tit, t d unl 33 not d ot. r5 i3 6=

A@6) i^^i-: 5 at r – 18.2) Ω-~-

A@6 ' t~~ k ^, nt: 0.1) " a(&#3 / 068) " a2&#3 pur~ha3 d fr~- Dionex <ata^og # 056937)6

A@6 E^, nt: 1@0 -) " a(&#3 / A@0 -) " a2&#3

!n a 4 9 ~~^ ,- tri~ f^a3¸4 di^ut 40 - 9 of 3t~~k ^, nt <061) " a(&#3 / 0.8) " a2&#3=to 4 9 5 ith) i^^i-: 5 at r6D ga3 5 ith . ^i,- 3parging f~r 15-20 - inut 36

A@6 8ri- ary ' our~ ' tandard: 1000 ppm - , ^ti-- i 3~^ution pur~ha3 d fr~- !norgani~ V ntur 3 <ata^og # % 9' -!& 9-1=

A@6 ' ~ondar″ ' our~ ' tandard: 1000 ppm - , ^ti-- i 3tandard 3~^ution pur~ha3 d fr~- ' pe & rti8r p <ata^og # V%&" F-5-100)

Note: Ensure that all reagents and standards are current and not expired6

9.0 PROCEDURE

9.16 ANALYTICAL SUMMARY

METHOD RA GE	F uoride: 1 – 100 ˘ ˘ ˆ ˙ oride: 1 – 100 ˘ ˘ ″ ro¸ ide: 1 – 100 ˘ ˘ i°r˜ °e: 1 – 100 ˘ ˘ ˙ o! " ˙ ˜ °e: 1 – 100 ˘ ˘ #u $ °e: 1 – 100 ˘ ˘
%O&	F uoride: 10 ˘ ˘ ˆ ˙ oride: 10 ˘ ˘ ″ ro¸ ide: 10 ˘ ˘ i°r˜ °e: 10 ˘ ˘ ˙ o! " ˙ ˜ °e: 10 ˘ ˘ #u $ °e: 10 ˘ ˘
DE#OR T'O EFF'ˆ 'E ˆ (	o° Re) uired
% EAR RA GE	F uoride: 0*1 – 10 ˘ ˘ ¸ % ˆ ˙ oride: 0*1 – 10 ˘ ˘ ¸ % ″ ro¸ ide: 0*1 – 10 ˘ ˘ ¸ % i°r˜ °e: 0*1 – 10 ˘ ˘ ¸ % ˙ o! " ˙ ˜ °e: 0*1 – 10 ˘ ˘ ¸ % #u $ °e: 0*1 – 10 ˘ ˘ ¸ %
#AM %ER – MATR', ˆ ODE	#- ˆ . . / 01001 #i i2˜ Ge Tu3e – M˜ °ri4 ˆ ode: 11. #u" eco OR″ O 51 #i i2˜ Ge Tu3e – M˜ °rix ˆ ode: 167 #- ˆ . . 501608916 ¸ ¸ TFE Fi °er : i°˙ M ri; ˘ – M˜ °ri4 ˆ ode: <
″ Aˆ - GRO= D ˆ ORREˆ T'O	F uoride: o ˆ ˙ oride: o ″ ro¸ ide: o i°r˜ °e: o ˙ o! " ˙ ˜ °e: o #u $ °e: (e!
' TERFERE ˆ E	˜ r°icu ˜ °e ! ˜ °s o$˜ °˙ e ˜ cids : i ˘ i>e ˜ " osi°i>e i; °er$ere; ce*ˆ ˙ ori; e or ˙ ?" o2˙ ori°e io; i; °er$ere : i°˙ 2˙ oride de°er¸ i; ˜ °io; ˜ ; d 3ro¸ i; e i; °er$eres : i°˙ 3ro¸ ide* #i i2˜ ˘ e : i co e2°2˜ * 10@ o$°˙ e $ree 2˙ ori; e ˜ ; d 3ro¸ i; e i; ˜ ; ˜ ° o! " ˙ ere* Ace˜ °e9$or¸ ˜ °e ˜ ; d " ro" io; ˜ °e ˙ ˜ >e e u°io; °i¸ es si¸ i ˜ r °o $uoride ˜ ; d 2˙ oride*

9.26 INSTRUMENTATION

(Equivalent instrumentation may be substituted.)

9.261.) obiˆ 8ha3 : 1.0 -) " a(&#3 / A60 -) " a2&#3

9.262. 1˜5 $at : !3˜˜ rati˜ at 160 - 9/- inut

9.263. ' a- pl * - peratur : - bi nt

9.266@6!nj ˜tion V˜ˆ,- : 50 G9 ***(ICS-1500; ICS-1600; ICS-2000)***

9.26?6 na˜″ ti˜aˆ &˜ˆ,- n: Dion x ' 14A47µ- 44 - - x 250 - - <ataˆog # 056904)

9.266. &˜ˆ, - n * - peratur : 35 ˘ &

9.267. Dionex ' $' 300, 4 - - ' ^f $ + nerating ' uppr 33or <ata^og # 064554)

9.26A6' uppr 33~r &urr nt: *″pi~a^^y 8 - 50 -

9.269. D t ~tor: &onductivit″

9.2610. D t ~tor * - peratur : 35 ˙&

9.2611. $un *i- : pproxi- at ^″ 14 - inut 3

9.2612. pproxi- at $ t ntion *i- 3: l^uori/ ion: pproxi- at ~″ 269 - inut 3
&.^ ori/ ion: pproxi- at ^y @56 - inut 3
˙ r~ - i/ ion: pproxi- at ^y ?69 - inut 3
" itrat ion: pproxi- at ~″ 666 - inut 3
8.~3 phat ion: ppr~ i- at ^y 9.5 - inut 3
' ,^ fat ion: pproxi- at ~″ 1165 - inut 3

9.36 CALIBRATION CURVE PREPARATION

9.361. 2 3ing t. pri- ary 3our~ 1000 ppm - ,^ ti-- i 3tandard 3~^ution <3 3 ~tion A6) pr par a 10 pp- 3tandard a3 f~^~5 36

2 3ing a 100-1000 G9 a/C, 3ta°^ pipett 4transf r 500 G9 of 1000 pp- pri- ary 3~, r~ 3tandard t~ a 50 - 9 +^a33 ˇ~^ ,- tri~ f^a3¸6 Di^, t t. ~ont nt3ˇf t. ˇ~ ^, - tri~ f^a3k ,3 ing) i^^i-: 5 at r up to t. ˇ~^ ,- tri~ - ar¸6 ' ha¸ t. ˇ~ ^, - tri~ f^a3k to nsur a unif~r- 3~^, tion. *ransf r t. 3tandard to an appropriat ^″ 3iD d " a^+ ne °~ tt^ 62 3ing 9!) ' 4+ nerat a 3tandard !(num° r6 $ f r to %a^3on !&-' # 8-12, ~urr nt r vi3ion. 8rint t. a33~~iat d ^a° ^and atta~h it to t. " a^+ ne bott^ 6

963.26 *. ~onc ntration ~f t. 3t~~k 3tandard , 3 d and t. a33~~iat d ~~ ^, - for t. 3tandar/ ^ ˇ ^3ar 3.~5 n in t. ta°^ ° ~~5 6&a^ibration 3tandar/3 ar pr par d ,3 ing 10 - 9 +^a33 ˇ~^ ,- tri~ f^a3¸3 62 3ing 9!) ' 4+ nerat a 3tandard !(num° r for a~h 3tandar/ ^ ˇ ^6$ f r to %a^3on !&-' # 8-124~, rr nt r vi3ion. 9a° ^a^^ 3tandard ~ontainer36

' tandar/ 9 ˇ ^	' tandard &onc ntration <Gg/- 9=	' tandar/ V~^,- <- 9=	1ina^ V~^, - <- 9=	*ar+ t &onc ntration <Gg/- 9=
1	10	0.1	10	0.1
2	10	0.?	10	0.?
3	10	1.0	10	1.0
@	10	3.0	10	3.0
?	10	?60	10	?60
6	10	-	-	1060

" ot : For standard 1 ˇ ^6 us t. 10 ppm pri- ary sourc m,^ ti-- i standard that 5 a3 prepare/ in st p 9.3.1.

9.@6 SAMPLE PREPARATION

9.@61. 8rior to pr paring 3a- pl 34/ 3~rption and aut~3a- pl r ~ontainer3 ar ^a° ^d and p^a~ / in t. appropriat ra~¸36*. / 3orption ~ontainer3 ar or/ r d in t. ra~¸4fi^^ing t.

bott˘ - r˘5 of t. ra˜k fr˘ - ^ ft to right and t. n fi^^ing t. r˘5 of t. ra˜k i- - diat ^″ a°˘˘ 4again, fr˘- ^ ft to right6&ontainer3 ar p^a˜ d in t. ra˜¸ 3 in t. 3a- ˘r/ r a3 t. ana^″ti˜a^ 3 ;, nc 45 hi˜h i3 bri f˜″ / 3˜ri° d in 3 ˜tion 9.66*. or/ r ˘f ˜^i nt 3a- pl 3 ar ba3 d on priorit″ <r, 3h 3a- pl 3 fir3t=4t. n in or/ r ˘f a3˜ nding ˜˜+in num° r34and t. n °″ ˜^i nt 3a- pl num° r69 oad t. pr -^a° ^ d aut˘3 a- pl r ˘ia^3 in t. aut˘3a- pl r tra″ in t. 3a- or/ r a3 t. ana^″ti˜a^ 3 ;, nc 6

96@266 **SKC 226-10-03 Silica Gel Tube:**

2 3ing t. Dr - ^ 3a5 4op n t. 3a- pl t,° 6$ - ˘˘ and / i3˜ard t. +^a33 5 ˜˜^ pl,+ 6 *ransf r t. pr -fi^t r and front 3or° nt 3 ˜tion fr˘ - t. 3a- pl t,° into t. appropriat pr -^a° ^ d 20-- 9 (D8E 3˜inti^^ation ˘ia^6 *. n r - ˘˘ and / i3˜ard t. ˜ nt r +^a33 5 ˜˜^ pl,+ 6 *ransf r t. ba˜k 3or° nt 3 ˜tion into a 3 parat pr -^a° ^ d 20-- 9 (D8E 3˜inti^^ation ˘ia^6

dd 10 - 9 of) i^^i-: 5 at r to a˜h indivi/, a^4pr -^a° ^ d 20 - 9 (D8E 3˜inti^^ation ˘ia^6&ap t. via^3 and pla˜ t. - in a 100 ˘& 5 at r bath f˜r 10 - inut 36 $ ˜or/ / 3orption ti- 3 and a^^˘t. r r ;, ir d infor- ation in t. 9!) ' HBa- pl pr p 3˜r nI6 $ f r to %a^3on !&-' # 8-124˜, rr nt r ˘i3ion62 3ing a 3 - 9 3″ringe fitt d 5 ith a 0645 µ- 8*1E 3″ringe fi^t r4fi^t r a˜h tra˜t into a 3 parat 4pr -^a° ^ d 1.5 - 9 aut˘3a- pl r po^″via^ and ˜ap6

96@366 **Supelco ORBO 53 Silica Gel Tube:**

2 3ing t. Dr - ^ 3a5 4op n t. 3a- pl t,° 6$ - ˘˘ and / i3˜ard t. +^a33 5 ˜˜^ pl,+ 6 *ransf r t. pr -fi^t r and front 3or° nt 3 ˜tion fr˘ - t. 3a- pl t,° into t. appropriat pr -^a° ^ d 20-- 9 (D8E 3˜inti^^ation ˘ia^6 *. n r - ˘˘ and / i3˜ard t. ˜ nt r +^a33 5 ˜˜^ pl,+ 6 *ransf r t. ba˜k 3or° nt 3 ˜tion into a 3 parat pr -^a° ^ d 20 - 9 (D8E 3˜inti^^ation ˘ia^6

dd 10 - 9 of) i^^i-: 5 at r to a˜h indivi/, a^4pr -^a° ^ d 20 - 9 (D8E 3˜inti^^ation ˘ia^6&ap t. via^3 and pla˜ t. - in a 100 ˘& 5 at r bath f˜r 10 - inut 36 $ ˜or/ / 3orption ti- 3 and a^^˘t. r r ;, ir d infor- ation in t. 9!) ' HBa- pl pr p 3˜r nI6 $ f r to %a^3on !&-' # 8-124˜, rr nt r ˘i3ion62 3ing a 3 - 9 3″ringe fitt d 5 ith a 0645 µ- 8*1E 3″ringe fi^t r4fi^t r a˜h tra˜t into a 3 parat 4pr -^a° ^ d 1.5 - 9 aut˘3a- pl r po^″via^ and ˜ap6

96@666 **SKC 225-1709, 37 mm PTFE Filter with PMP ring:**

$ - ˘˘ t. 81*E fi^t r fr˘- it3 ˜ontainer and tran3f r it to t. appropriat pr -^a° ^ / 20 - 9 (D8E 3˜inti^^ation via^6 dd 10 - 9 of) i^^i-: 5 at r to a˜h pr -^a° ^ d 20 - 9 (D8E 3˜inti^^ation ˘ia^6&ap t. via^3 and a^^˜5 t. - to 3tand for 30 - inut 36 $ ˜˘r/ / 3orption ti- 3 and a^^˘t. r r ;, ir d infor- ation in t. 9!) ' HBa- pl pr p 3˜r nI6 $ f r to %a^3on !&-' # 8-124˜, rr nt r ˘i3ion62 3ing a 3 - 9 3″ringe fitt d 5 ith a 0645 µ- 8*1E 3″ringe fi^t r4fi^t r a˜h tra˜t into a 3 parat 4pr -^a° ^ d 1.5 - 9 aut˘3a- pl r po^″via^ and ˜ap6

9.?6 SYSTEM SUITABILITY

96?616 Equi^ibrat t. ˜˜^,- n 5 ith ^, nt <1.0 -) " a(&#3 / A60 -) " a2&#3=at t. operating f˜5 rat of 160 - 9/- inut unti^a 3ta°^ ba3 ^ine i3 a˜hi ˘ / 6!n thi3 or/ r4inj ˜t an ^, nt °^ank4a D9' 4and a &&V6

" ot : &˘ˆ, - n ffi˜i nc˝ <3 ˜tion 9.?62)4taiˆing fa˜t˘r <3 ˜tion 96?63=4and r t ntion ti- <3 ˜tion 9.?6@=rit ria 3.˘,ˆ d ° - t f˘r t. &&V pri˘r to 3tarting a 3 ;, nc 6

9.?62. **Column Efficiency**

*. t. ˘r ti˜aˆ plat 3 <" =for t. anaˆ˝t peak in t. ˜hr˘- atogra- ˘f t. &&V inj ˜tion 3.˘, ˆd ° ≥ 6000 pˆat 3 for (" # 3 5 . n ˜aˆ˜,ˆ at d a˜˜or/ ing to t. f˘ˆˆ˜5 ing quation:

" = ?6?@t/0 ?0%=2

5 . r t i3 t. r t ntion ti- of an anaˆ˝t

and 0 50% i3 t. peak 5 idth at 50% . i+. t < aˆf 5 idt. =of an anaˆ˝t p ak

t and 0 ar - a3ur / in t. 3a- unit3

9.?63. **Tailing Factor**

. taiˆing fa˜tor < f=for (" # 3 3.˘,ˆ d ° 069 L * f L 1.5 5 . n ˜aˆ˜, ˆat d a˜˜ording t˘ t. f˘ˆˆ˜5 ing quation:

* f J 0 0.05 / <2f=

5 . r 0 0.0? i3 t. 5 i/ th ˘f an anaˆ˝t peak at ?K ˘f t. peak . ight

and f i3 t. di3tanc ° t5 n t. perp ndi˜, ˆar dra5 n fr˘- t. anaˆ˝t 73 peak - axi- , - and t. ˆ ading /+ ˘f t. p ak - a3ur d at ?K of t. peak . i+. t

0 0.05 and f ar - a3ur / in t. 3a- unit3

9.?6@6 **Retention Time Criteria**

*. r t ntion ti- of anaˆ˝t pea¸3 obtained fr˘- t. &&V inj ˜tion 3.˘, ˆd ° 5 it. in M 160 - inut 5 . n ˜˘- par / to t. r t ntion ti- 3 obtained fr˘- t. initiaˆ˜aˆibration ˜, r˘ 6

" ot : " otif˝ ˝˘ur 3upervi3or if an˝ ˘f t. 3 r ;, ir - nt3 ˜annot ° - t6!t - a˝ ° ne˜ 33ar˝ to r pˆa˜ t. guard and/or anaˆ˝ti˜aˆ˜˘ˆ, - n(3=or r - a¸ t. - ˘biˆ pha3 6

9.66 INJECTION SEQUENCE

t˝pi˜aˆ inC˜tion 3 ;, nc i3 a3 f˘ˆˆ˜5 3:

1) Eˆ, nt
2) D9'
3) &&V
@= Diˆ, nt
?=) dia ˙ ˆank
6) ˙ '
7) ˙ ' D
A= ' a- pl 3
9) &&V

1or ~^i nt-3p ~ifi~ r ;, ir - nt343 for- : &-1# $) -35, ~urr nt r ˇ i3ion6

" ot : $ vi 5 an″ : & and 3″ 3t - 3, ita°i^it″ ~. ~¸3 prior to running an″ 3a- pl 36 $ vi 5 and va^uat ~hr˘ - atography f~ r a~~ pta°i^it″ and prop r int +ration.

$ f r to t. appropriat instr, - nt ' # 8 f~ r operating instr, ~tion36

10.0 DOCUMENTATION

$ f r to %a^3on !&-' # 8-@4urr nt r vi3ion

11.0 CALCULATIONS

$ f r to %a^3on !&-' # 8-@4urr nt r vi3ion. ' a- pl 3 that ar a°~˘ t. ^inear range ˘ f t. ~a^ibration ~ur˘ - ,3 t ° di^ut d and r ana~″ D /6 &onc ntration3 ° ^~5 t. ^~5 3t 3tandard ar r port d a3 N9# : 6' a- pl r 3,^ t3 ar ~a~, ^at d °″ t. f~^~5 ing quations:

&onver3ion fa~tor fr~ - anion to a~i/ : <r f r to 3 ~tion 16 in t. " !#' (7903 - t.˘/=

(1: 16053	(&^: 16028
(38# @ 1.032	(˙ r: 16012
(" # 3: 16016	(2' # @ 1.021

$$- g/- ^3 = \frac{\ll 1\text{-}O)\ 1 = + < \text{-}O)\ \dot{} =}{V} \qquad pp- = \frac{- g/- ^3 \times 246@?}{- ˘^65\ t6}$$

" ot : (38# 4 and (2' # 4 ar r port d in - g/- ^3

0 . r :

1 = 1ront 3 ~tion4ug

O) 1 = ˘ ra+ - dia °^ank ba~¸+round front 3 ~tion, ,+

˙ =) dia °^ank4,+

O) ˙ = ˘ ra+ - dia °^ank ba~kground ba~k 3 ~tion, ,+

V = air ~˘ ^, - 4^it r

) 0 (1 = 20.01	) 0 (&^ = 36646	) 0 (38# @= 97699
) 0 (˙ r = 80692	) 0 (" # 3= 63.01	) 0 (2' # @= 98608

**) dia °^ank ~orr ~tion i3 perfor- / onl″ for (2' # @6

D 3orption ffi~i nc″ i3 not r quir d for thi3 - t.˘/6

12.0 QUALITY CONTROL CHECKS AND CRITERIA

12.16 Initia^ Ca^ibration

&a^i°rat t. in3tr,- nt 5 ith a - ini- , - of 5 3tandar/3 4one ˘ f 5 hi~h i3 at or ° ~5 t. 9# : aft r a~~ounting for 3a- pl / 3orption ~˘ ^, - and/or - dia ~t ~orr ~tion6 $ f r to !&-' # 8-4 for ~a^ibration ~ur˘ ~rit ria and : &-' # 8-12 for ~rit ria to r - ~˘ a ~a^ibration point6 $ f r to %a^3on !&-' # 8-12 ~urr nt r ˘ i3ion for in3tr,~ tions on t. /~~ , - ntation ˘ f 3tandar/3 6

12.26 Curve Verification

*. ˜, r˘ - , 3t ° ˘ rifi d 5 ith 3tandard ^ ˘ ^3 3 and 4 <3 3 ˜tion 9.3=that ar - a/ ,3 ing t. 3 ˜ondar″ 3˜, r˜ 3tandar/6 *. ˘ rifi˜ation ˜rit ria ar ba3 d on ˜a˜˜, ^at d in-.˘,3 ˜ontr˘^ ^i- it3 for t. 3pe˜ifi˜ ana^″t 6

12.36 Continuing Calibration Verification (CCV)

12.361. &&V3 ar pr par d at t. 3a- ˜onc ntration a3 3tandard ^ ˘ ^4 <3 3 ˜tion 963)6

12.362. 2 3ing t. 1000 pp- 3 ˜ondar″ 3˜, r˜ - ,^ti-- i 3tandar/4 pr par a 10 pp- 3tandar/ 3˜^, tion a3 f˜^˜5 3:

2 3ing a 100 – 1000 G9 a/C,3 ta°^ pipett 4transf r 500 G9 of t. 1000 ppm 3 ˜ondar″ 3our˜ 3tandard to a 50 - 9 +^a33 ˘˜^ ,- tri˜ f˜a3¸6 Di^, t t. ˜ont nt3 ˘f t. ˘˘ ^, - tri˜ f˜a3k ,3 ing) i^i-: 5 at r up to t. ˘˘ ^, - tri˜ - ar¸6 ' ha¸ t. ˘˜^ ,- tri˜ f˜a3k t˜ nsur a unif˜r- 3˜^, tion6*ran3f r t. 3tandard to an appropriat ˜″-3iD d " a^+ ne bott^ 62 3ing 9!) ' 4+ nerat a 3tandard !(nu- ° r6$ f r to %a^3on !&-' # 8-124 ˜urr nt r ˘i3ion68rint t. a33˜˜ iat d ^a° ^and atta˜h it to t. " a^+ ne bott^ 6

12.363. 2 3ing t. 10 pp- 3 ˜ondar″ 3˜, r˜ - ,^ti-- i 3tandar/4 pr par a 3 pp- 3tandar/ 3˜^, tion a3 f˜^˜5 36

2 3ing a 2 – 10 - 9 a/ C,3 ta°^ pipett 4transf r 7.5 - 9 ˘f t. 10 pp- 3 ˜ondar″ 3˜, r˜ - ,^ti-- i 3tandard to a 25 - 9 +^a33 ˘˜^ ,- tri˜ f˜a3¸6 Di^, t t. ˜ont nt3 ˘f t. ˘˜^ ,- tri˜ f˜a3k ,3 ing) i^i-: 5 at r up to t. ˘˘ ^, - tri˜ - ar¸6 ' ha¸ t. ˘˜^ ,- tri˜ f˜a3k to n3ur a unifor- 3˜^ution. *ransf r t. 3tandard to an appropriat ˜″-3iD / " a^+ ne bott^ 62 3ing 9!) ' 4+ nerat a 3tandard !(nu- ° r6$ f r to %a^3on !&-' # 8-12, ˜urr nt r ˘i3ion68rint t. a33˜˜ iat d ^a° ^and atta˜h it to t. " a^+ ne bott^ 6

12.366@6 &&V - , 3t ° run at t. ° ginning and nd ˘f t. ana˜″ti˜a^3 ;, n˜ 4and a - axi- , - of ˘ r″ 20 3a- pl inj ˜tion3 <not inc^,/ ing a33˜˜ iat d qua^it″ ˜ontr˘^ ˜. ˜¸3=6*. ^aps d ti- ° t5 n &&V3 - , 3t not ˜ d 12 .˘, r36$ ˜˜˘ ri 3 - ,3 t ° 5 ithin in-.˘, 3 ^i- it3 or / fa,^t ^i- it3 of 80 -120K if ^ 33 than 20 / ata point3 ar avai^a°^ 6

12.@6 Detection Limit Standard (DLS)

12.@61. D9' i3 pr par d t. 3a- a3 3tandard ^ ˘ ^3 <3 3 ˜tion 963)6

12.@62. 2 3ing t. 10 pp- 3 ˜ondar″ 3˜, r˜ - ,^ti-- i 3tandard fr˘- 3t p1263.24pr par a 1 pp- 3tandard 3˜^ution a3 f˜^˜5 3:

2 3ing a 2 – 10 - 9 ˘r 1 – 5 - 9 a/C,3 ta°^ pipett 4transf r 265 - 9 ˘f t. 10 pp- 3 ˜ondar″ 3˜, r˜ - ,^ti-- i 3tandard to a 25 - 9 +^a33 ˘˜^ ,- tri˜ f˜a3¸6 Di^, t t. ˜ont nt3 of t. ˘˘ ^, - tri˜ f˜a3k ,3 ing) i^i-: 5 at r up to t. ˘˜^ ,- tri˜ - ar¸6 ' ha¸ t. ˘˜^ ,- tri˜ f˜a3k to ns, r a unifor- 3˜^ution. *ransf r t. 3tandard to an appropriat ˜″-3iD d " a^+ ne bott^ 62 3ing 9!) ' 4+ nerat a 3tandard !(nu- ° r6$ f r to %a^3on !&-' # 8-124˜urr nt r vi3ion. 8rint t. a33˜˜ iat d ^a° ^and atta˜h it to t. " a^+ ne bott^ 6

12.@63. D9' - ,3 t ° run 5 ith a˜h 3 t of 3a- pl 3 and a - ini- , - ˘f ˘ r″ 24 hour36*. r ˜˜˘ r″ - , 3t ° 5 ithin 70 –130K 6

12.?6 Blank Spike/Blank Spike Duplicate (BS/BSD)

126?616 SKC 226-10-03 Silica Gel Tube & Supelco ORBO 53 Silica Gel Tube:

$ f r to 3 ˜tion 9.4 for ˙ ' /˙ ' D pr paration6*. ˙ ' and ˙ ' D ar 3pi¸ d 5 ith 30 G9 of t. pri- ar″ or 3 ˜ondar″ 3˜, r˜ 1000 pp- - ,ˆ ti-- i 3tandar/ 45 hi˜h i3 ;, ivaˆ nt t˘ 3tandard ˆ ˘ ˆ 4 <3 3 ˜tion 9.3=6# nl″ t. front 3 ˜tion of t. 3iˆi˜a + ˆ t,° i3 3pi¸ /6 8r par a ˙ ' and ˙ ' D f˜r ˘ r″ 50 3a- pl 3 per - atrix and f˜r ˘ r″ pr paration ˘ nt6 $ ˜˜˘ ri 3 - ,3 t ° 5 ithin in-.˘,3 ˆi- it3 ˘r / fa,ˆ t ˆi- it3 of 75-125% if ˆ 33 than 20 data point3 ar avaiˆa°ˆ 6!f a 3ignifi˜ant ˆ ˘ ˆ of ba˜kground i3 ˘°3 r˘ /4 a - dia ˜˘t ˘ rifi˜ation - , 3t ° perfor- /6

12626**SKC 37 mm PTFE Filter with PMP ring:**

$ f r to 3 ˜tion 9.4 for ˙ ' /˙ ' D pr paration6*. ˙ ' and ˙ ' D ar 3pi¸ d 5 ith 30 G9 of t. pri- ar″ or 3 ˜ondar″ 3˜, r˜ 1000 pp- - ,ˆ ti-- i 3tandar/ 45 hi˜h i3 ;, ivaˆ nt t˘ 3tandard ˆ ˘ ˆ 4 <3 3 ˜tion 9.3=6# nl″ a 3ingˆ 8* 1E fiˆt r i3 3pi¸ /6 8r par a ˙ ' and ˙ ' D for ˘ r″ 50 3a- pl 3 per - atri and f˜r ˘ r″ pr paration ˘ nt6$ ˜˘˘ ri 3 - , 3t ° 5 it. in in-.˘,3 ˆi- it3 ˘r / fa,ˆ t ˆi- it3 of 75-125% if ˆ 33 than 20 data point3 ar avaiˆa°ˆ 6!f a 3ignifi˜ant ˆ ˘ ˆ of ba˜¸+round i3 ˘°3 r˘ / 4a - dia ˆot ˘ rifi˜ation - , 3t ° perfor- /6

12.66 **Media Blank**

$ f r to 3 ˜tion 964 f˜r - dia °ˆank pr paration68r par a - dia °ˆank f˜r ˘ r″ 50 3a- pl 3 per - atri and ˘ r″ pr paration ˘ nt6*. r 3,ˆ t - , 3t ° ° ˜˜5 t. / t ˜tion ˆi- it unl 33 it ha3 ° n 3ta°ˆi3. d that t. - dia ˜˘t ˜ontains ba˜¸+round. !f a 3ignifi˜ant ˆ ˘ ˆ of ba˜kground i3 ˘°3 r˘ d a - dia ˆot ˘ rifi˜ation - ,3 t ° perfor- /6

13.0 CORRECTIVE ACTION

ny ti- quaˆit″ ˜ontr˘ˆ 3a- pl 3 faˆˆ˘, t3i/ of t. ir 3ta°ˆi3. d ˜ontr˘ˆ ˆi- it3 a ˜orr ˜ti˘ a˜tion - , 3t ° ta¸ n6 &orr ˜ti˘ a˜tions - a″ incˆ,/ 4but ar not ˆi- it / t˘4instr, - nt - aint nanc 4instr,- nt r -˜aˆibration, or r - aking and r anaˆ″Dng quaˆit″ ˜ontr˘ˆ 3a- pl 36 ˆˆ˜orr ˜ti˘ a˜tion3 - , 3t ° /˜˜ ,- nt / and r ˘i 5 d °″ 3uper˘i3or″ and ;, aˆit″ a33uranc 3taff6

$ f r to ' # 8 9 : -&# $ $ E&* 4˜, rr nt r vi3ion.

14.0 SAMPLE AND WASTE DISPOSAL

$ f r to ' # 8 9 1-D!' 8# 4˜urr nt r ˘i3ion6

15.0 REFERENCES

" !#' (79034 ,+,3 t 1994 <133, 2)

16.0 METHOD MODIFICATIONS

16.1 *. " !#' (7903 - t.˘/ 3tat 3 to add 6 to 8 - 9 of ˆ, nt4t. n . at t. 3a- pl f˜r 10 - inut 3 in boiˆing 5 at r6 ˆ˜˜5 t. 3a- pl to ˜˜˜ˆ 4t. n bring it to a 10 - 9 finaˆ ˘˘ ˆ, - and 3ha¸ vigor˘, 3˜″6*. in-.˘,3 - t.˘/ 3tat 3 to add 10 - 9 ˘f) iˆi-: 5 at r t. n . at in a 100 P& ° ath 5 at r for 10 - inut 36

16.2 *. " !#' (7903 - t.˘/ 3tat 3 to ~a^ibrat dai^″6 %a^3on ~a^ibrat 3 annua^^″ and ˘ rifi 3 t. initia^ ~a^ibration 5 ith / ai^″ ~. ~k 3tandar/3 6 ***The check standards must pass established internal control limits.***

16.3 *. " !#' (7903 - t.˘/ 3tat 3 to ,3 a 167 -) " a(&#3/168 -) " a2&#3 ^, nt6*. in-.˘,3 - t.˘/ ,3 3 a 1.0 -) " a(&#3/A60 -) " a2&#3 ^, nt6

16.4 *. " !#' (7903 - t.˘/ 3tat 3 to ,3 an ^, nt f~5 rat of 3.0 - 9/- inut 6*. in-.˘,3 - t.˘/ ,3 3 an ^, nt f~5 rat of 1.0 - 9/- inut 6

16.5 *. " !#' (7903 - t.˘/ 3tat 3 to ,3 a 167 -) " a(&#3/1.8 -) " a2&#3 / 3orption 3~^˘ nt6*. in- .˘,3 - t.˘/ ,3 3) i^^i-: 5 at r a3 t. / 3orption 3~^˘ nt6

16.6 *. " !#' (7903 - t.˘/ 3tat 3 to ,3 a 15 - 9 ~ ntrif,+ t,° a3 t. / 3orption ~ontainer6 *. in-.˘,3 - t.˘/ ,3 3 a 20 - 9 (D8E 3~inti^^ation ˘ia^6

16.7 *. " !#' (7903 - t.˘/ 3tat 3 to 3ubtra~t t. a˘ ra+ - a33 of t. - dia °^ank front and ba~k 3 ~tions fr˘- t. - a33 of t. 3a- pl front and ba~k 3 ~tions a3 part of t. ~a~˘,^ation ,3 d to / t r- ine t. 3a- pl ~on~ ntration6*. in-.˘,3 - t.˘/ 3,° tra~t3 t. a˘ ra+ ba~¸+round of a~h ana^″t 45 hi~h i3 / t r- ine/ °″ perfor- ing a - dia ^~t ˘ rifi~ation.

16.8 The NIOSH 7903 method states the use of an HPIC-AS4A analytical column and HPIC-AG4A guard column. The in house method uses a Dionex AS14A analytical column and no guard column.

Method Summary

Standard Operating Procedure for Analysis of Reduced Sulfur Compounds in a Gaseous Matrix by Gas Chromatography with Sulfur Chemiluminescence Detection per ASTM D 5504 and SCAQMD Method 307

ALS/Columbia Analytical SOP #VOA-S307M_SCD

Samples are introduced into the system using a gas-tight syringe. Reduced sulfur compounds in these gaseous samples are separated by gas chromatography and are combusted in a fuel-rich environment to yield sulfur monoxide and other products (1). The effluent from the combustion furnace is directed to the chemiluminescence analyzer where the sulfur monoxide is reacted with ozone to produce electronically excited sulfur dioxide and oxygen (2). The excited sulfur dioxide relaxes with emission of light in the blue and ultraviolet regions of the spectrum (3). This light is detected with a blue-sensitive photomultiplier tube. Results are quantitated against the initial calibration (ICAL) curve for methyl mercaptan (for analytes not included in the ICAL) or the client may request to have the results reported as total reduced sulfur as hydrogen sulfide.

(1) Sulfur Compound + H_2/Air ⟶ SO + products
(2) SO + O_3 ⟶ SO_2* + O_2
(3) SO_2* ⟶ SO_2+ Hν

where
Hν = chemilunisescent light energy.
SO_2* = electronically excited SO_2

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TITLE: INTERVAL CONDENSATE SAMPLING AND RECONSTITUTION, SPECIFIC TO KEMRON PROJECT NO. SH-0416

Department:	Physical Properties
S. O. P. No.	0416-001
Revision No.	0
Superseding Date:	None
Effective Date:	February 2, 2012
Page:	1 of 2

1.0 SUMMARY

This Standard Operating Procedure establishes a standard method for sampling and reconstituting condensate that is collected from the thermal testing conducted during KEMRON Project No. SH-0416.

2.0 SCOPE

This procedure is specific to KEMRON Project No. SH-0416, TerraTherm Bridgewater, NJ, Acid Tar Thermal.

3.0 EQUIPMENT

Flasks
Scale

4.0 TESTING PROCEDURE

4.1 During the heating phase of the thermal test, remove the condensate collection flask when the material reaches the following temperatures: 30 C, 50 C, 70 C, and 90 C. Return a separate clean flask in order to collect the next interval of condensate.

4.2 After the material has reached its target temperature (either 90 or 100 C), transfer condensate into a separate clean flask once per day for the duration of the thermal testing.

4.3 Record the tare weight of each flask, and the weight of the flask with condensate on the monitoring data sheet.

4.4 Record any observations each time condensate is collected, including layering, color, clarity, odor, presence of any vapors above the condensate, etc. Estimate the percentage by volume of any layering.

4.5 Determine the pH of the aqueous and non-aqueous (if present) layers of

condensate in each interval sample, using EPA Method 9040C.

4.6 Document the appearance of the condensate by taking photographs and/or video, as appropriate.

4.7 After all data and observations have been recorded for each interval, transfer the condensate to a flask that is large enough to hold all the condensate that is anticipated to be collected for the duration of the test. Add condensate from each interval to the larger collection flask, combining it with the condensate from the previous intervals.

4.8 Cover the openings of the flask with plastic, and place in the walk-in cooler maintained at 4 degrees C.

4.9 Record any observations during sample reconstitution, including layering, color, clarity, odor, presence of any vapors above the condensate, etc. . After reconstitution is complete (at the end of the thermal testing), record the total weight of condensate collected, and quantify the percentage by volume of any layering.

4.10 Record the pH of the aqueous and non-aqueous (if present) layers of condensate in the reconstituted sample.

4.11 Document the appearance of the reconstituted condensate by taking photographs and/or video, as appropriate.

4.12 Sample the reconstituted condensate for laboratory analysis as specified in the project scope of work.

5.0 HEALTH AND SAFETY

Laboratory safety procedures, as defined in KEMRON's Chemical Hygiene Plan, are followed during testing. A copy of this plan is maintained by the Corporate Health and Safety Coordinator, and is reviewed and executed by all KEMRON personnel.

6.0 QUALITY CONTROL / QUALITY ASSURANCE

6.1 The data calculated by the spreadsheet is checked by an individual not involved with the testing to ensure that no mistakes have been incorporated into the spreadsheet.

6.2 The engineer, or physical properties laboratory director, then manually and visually checks the material tested and compares his or her observations to the test results reported. The reviewing engineer or laboratory director is ultimately responsible for all final review and quality control of the analyses and the data generated. Upon final approval of the data and data interpretations, the engineer will initialize the original data sheets. All original data sheets and analyzed data will be maintained in the physical properties project files. A copy of the finalized test results will be submitted to the appropriate project manager and the client.

TITLE: REHEATING COOLED TREATED THERMAL SAMPLES, SPECIFIC TO KEMRON PROJECT NO. SH-0416

Department:	Physical Properties
S. O. P. No.	ATG-416-002
Revision No.	0
Superseding Date:	None
Effective Date:	January 30, 2012
Page:	1 of 2

1.0 SUMMARY

This Standard Operating Procedure establishes a standard method for collecting cooled treated samples after thermal testing, reheating them in a water bath, and observing and documenting any physical changes to the material.

2.0 SCOPE

This procedure is specific to KEMRON Project No. SH-0416, TerraTherm Bridgewater, NJ, Acid Tar Thermal.

3.0 EQUIPMENT

Water bath capable of heating to 100 degrees C
Test tube and stand to hold test tube upright in water bath
Clear glass beads

4.0 TESTING PROCEDURE

4.1 Place enough clear glass beads in the bottom of a test tube to fil it approximately ¼full.

4.2 Collect cooled treated sample from the thermal test and place in the test tube above the glass beads until the test tube is approximately ¾ full.

4.3 Heat the test tube in a water bath to see if the solid reliquifies during reheating. Document any changes that are observed, as well as the temperatures at which they occur. The testing is terminated at 100 degrees C.

4.4 Observe any movement of the material into the glass beads below, and document.

4.5 Take photographs and video as necessary to document changes to the sample.

5.0 HEALTH AND SAFETY

Laboratory safety procedures, as defined in KEMRON's Chemical Hygiene Plan, are followed during testing. A copy of this plan is maintained by the Corporate Health and Safety Coordinator, and is reviewed and executed by all KEMRON personnel.

6.0 QUALITY CONTROL / QUALITY ASSURANCE

6.1 The data calculated by the spreadsheet is checked by an individual not involved with the testing to ensure that no mistakes have been incorporated into the spreadsheet.

6.2 The engineer, or physical properties laboratory director, then manually and visually checks the material tested and compares his or her observations to the test results reported. The reviewing engineer or laboratory director is ultimately responsible for all final review and quality control of the analyses and the data generated. Upon final approval of the data and data interpretations, the engineer will initialize the original data sheets. All original data sheets and analyzed data will be maintained in the physical properties project files. A copy of the finalized test results will be submitted to the appropriate project manager and the client.

ATTACHMENT 3

Subcontract Chemical Analysis Quality Control Documentation

Data contained on this sheet shall not be disclosed without prior approval from KEMRON Environmental Services, Inc. (Proprietary)

Analyte	CAS Number	Limit of Quantitation (PQL) ppb	Limit of Detection (LOD) ppb	Detection Limit (MDL) ppb	Screening Standard	Accuracy Control Limit (%R)	Precision Control Limit RPD
Matrix: Groundwater **Analytical Group:** 8260B							
Acetone	67-64-1	5	1.0	0.322		40-140	0-30
Benzene	71-43-2	5	0.2	0.049		80-120	0-30
Bromobenzene	108-86-1	5	0.2	0.095		75-125	0-30
Bromochloromethane	74-97-5	5	0.5	0.238		65-130	0-30
Bromodichloromethane	75-27-4	5	0.2	0.071		75-120	0-30
Bromoform	75-25-2	5	0.5	0.278		70-130	0-30
Bromomethane	74-83-9	5	0.5	0.276		30-145	0-30
2-Butanone	78-93-3	5	0.5	0.235		30-150	0-30
n-Butylbenzene	104-51-8	5	0.2	0.068		70-135	0-30
sec-Butylbenzene	135-98-8	5	0.2	0.0881		70-125	0-30
tert-Butylbenzene	98-06-6	5	0.2	0.058		70-130	0-30
Carbon disulfide	75-15-0	5	0.2	0.19		35-160	0-30
Carbon tetrachloride	56-23-5	5	0.2	0.056		65-140	0-30
Chlorobenzene	108-90-7	5	0.2	0.055		80-120	0-30
Chloroethane	75-00-3	5	0.5	0.279		60-135	0-30
Chloroform	67-66-3	5	0.2	0.062		65-135	0-30
Chloromethane	74-87-3	5	0.2	0.076		40-125	0-30
2-Chlorotoluene	95-49-8	5	0.2	0.09		56-124	0-30

Analyte	CAS Number	Limit of Quantitation (PQL) ppb	Limit of Detection (LOD) ppb	Detection Limit (MDL) ppb	Screening Standard	Accuracy Control Limit (%R)	Precision Control Limit RPD
4-Chlorotoluene	106-43-4	5	0.2	0.046		69-132	0-30
Dibromochloromethane	124-48-1	5	0.2	0.133		60-135	0-30
1,2-Dibromo-3-chloropropane	96-12-8	5	0.2	0.023		50-130	0-30
1,2-Dibromoethane	106-93-4	5	0.2	0.169		70-130	0-30
Dibromomethane	74-95-3	5	0.2	0.197		75-125	0-30
1,2-Dichlorobenzene	95-50-1	5	0.2	0.086		70-120	0-30
1,3-Dichlorobenzene	541-73-1	5	0.2	0.08		75-125	0-30
1,4-Dichlorobenzene	106-46-7	5	0.2	0.058		75-125	0-30
1,2-Dichloroethane	107-06-2	5	0.2	0.121		80-120	0-30
Dichlorodifluoromethane	75-71-8	5	0.2	0.088		30-155	0-30
1,1-Dichloroethane	75-34-3	5	0.2	0.064		70-135	0-30
1,1-Dichloroethene	75-35-4	5	0.2	0.183		70-130	0-30
1,2-Dichloroethene (total)	540-59-0	10	0.4	0.2		60-140	0-30
Cis-1,2-Dichloroethene	156-59-2	5	0.2	0.104		70-125	0-30
Trans-1,2-Dichloroethene	156-60-5	5	0.2	0.096		60-140	0-30
1,2-Dichloropropane	78-87-5	5	0.2	0.114		75-125	0-30
1,3-Dichloropropane	142-28-9	5	0.2	0.133		75-125	0-30
2,2-Dichloropropane	594-20-7	5	0.2	0.112		70-135	0-30
1,1-Dichloropropene	563-58-6	5	0.2	0.071		75-130	0-30
trans-1,3-Dichloropropene	10061-02-6	5	0.2	0.068		55-140	0-30

Analyte	CAS Number	Limit of Quantitation (PQL) ppb	Limit of Detection (LOD) ppb	Detection Limit (MDL) ppb	Screening Standard	Accuracy Control Limit (%R)	Precision Control Limit RPD
cis-1,3-Dichloropropene	10061-01-5	5	0.2	0.105		70-130	0-30
Diisopropyl ether	108-20-3	5	2	0.105		60-140	0-30
Ethylbenzene	100-41-4	5	0.2	0.18		75-125	0-30
Hexachlorobutadiene	87-68-3	5	0.2	0.347		50-140	0-30
2-Hexanone (MBK)	591-78-6	5	1.0	0.302		75-125	0-30
Isopropylbenzene	98-82-8	5	0.2	0.058		75-125	0-30
4-Isopropyltoluene	99-87-6	5	0.2	0.175		75-130	0-30
4-Methyl-2-pentanone (MIBK)	108-10-1	5	0.5	0.142		60-135	0-30
Methylene chloride	75-09-2	5	0.5	0.102		55-140	0-30
Methyl Iodide	74-88-4	5	0.2	0.064		43-157	0-30
Methyl-tert-butyl ether	1634-04-4	5	0.2	0.084		65-125	0-30
Naphthalene	91-20-3	5	0.2	0.175		65-135	0-30
n-Propylbenzene	103-65-1	5	0.2	0.069		70-130	0-30
Styrene	100-42-5	5	0.2	0.058		65-135	0-30
1,1,1,2-Tetrachloroethane	630-20-6	5	0.2	0.15		80-130	0-30
1,1,2,2-Tetrachloroethane	79-34-5	5	0.2	0.112		65-130	0-30
Tetrachloroethene	127-18-4	5	0.5	0.141		45-150	0-30
Toluene	108-88-3	5	0.2	0.078		75-120	0-30
1,2,3-Trichlorobenzene	87-61-6	5	0.2	0.107		55-140	0-30
1,2,4-Trichlorobenzene	120-82-1	5	0.2	0.138		65-135	0-30

Analyte	CAS Number	Limit of Quantitation (PQL) ppb	Limit of Detection (LOD) ppb	Detection Limit (MDL) ppb	Screening Standard	Accuracy Control Limit (%R)	Precision Control Limit RPD
1,1,2-Trichloroethane	79-00-5	5	0.2	0.179		75-125	0-30
1,1,1-Trichloroethane	71-55-6	5	0.2	0.078		65-130	0-30
Trichloroethene	79-01-6	5	0.2	0.094		70-125	0-30
Trichlorofluoromethane	75-69-4	5	0.2	0.094		60-145	0-30
1,2,3-Trichloropropane	96-18-4	5	0.2	0.063		75-125	0-30
1,2,4-Trimethylbenzene	95-63-6	5	0.2	0.08		75-130	0-30
1,3,5-Trimethylbenzene	108-67-8	5	0.2	0.053		75-130	0-30
Vinyl acetate	108-05-4	5	0.5	0.197		66-145	0-30
Vinyl chloride	75-01-4	5	0.2	0.104		50-145	0-30
m,p-Xylene	136777-61-2	10	0.4	0.099		75-130	0-30
o-Xylene	95-47-6	5	0.2	0.077		75-130	0-30
Xylenes (total)	1330-20-7	10	0.4	0.176		75-130	0-30
1,2-Dichloroethane-d4 (Surrogate)	17060-07-0	NA	NA	NA		70-120	NA
4-Bromofluorobenzene (Surrogate)	460-00-4	NA	NA	NA		75-120	NA
Dibromofluoromethane (Surrogate)	1868-53-7	NA	NA	NA		85-115	NA
Toluene-d8 (Surrogate)	2037-26-5	NA	NA	NA		85-120	NA
Matrix: Soil **Analytical Group:** 8260B							
Acetone	67-64-1	25	2	1.08		20-160	0-30
Benzene	71-43-2	5	0.5	0.106		75-125	0-30

Analyte	CAS Number	Limit of Quantitation (PQL) ppb	Limit of Detection (LOD) ppb	Detection Limit (MDL) ppb	Screening Standard	Accuracy Control Limit (%R)	Precision Control Limit RPD
Bromobenzene	108-86-1	5	0.5	0.147		65-120	0-30
Bromochloromethane	74-97-5	5	0.5	0.241		70-125	0-30
Bromodichloromethane	75-27-4	5	0.2	0.135		70-130	0-30
Bromoform	75-25-2	5	0.5	0.214		55-135	0-30
Bromomethane	74-83-9	5	2	0.638		30-160	0-30
2-Butanone	78-93-3	5	2	0.635		30-160	0-30
n-Butylbenzene	104-51-8	5	0.5	0.142		65-140	0-30
sec-Butylbenzene	135-98-8	5	0.5	0.108		65-130	0-30
tert-Butylbenzene	98-06-6	5	0.5	0.138		65-130	0-30
Carbon disulfide	75-15-0	5	0.5	0.361		45-160	0-30
Carbon tetrachloride	56-23-5	5	0.5	0.205		65-135	0-30
Chlorobenzene	108-90-7	5	0.5	0.179		75-125	0-30
Chloroethane	75-00-3	5	0.5	0.244		40-155	0-30
Chloroform	67-66-3	5	0.5	0.225		70-125	0-30
Chloromethane	74-87-3	5	2	0.565		50-130	0-30
2-Chlorotoluene	95-49-8	5	0.5	0.173		70-130	0-30
4-Chlorotoluene	106-43-4	5	0.5	0.11		75-125	0-30
Dibromochloromethane	124-48-1	5	0.5	0.191		65-130	0-30
1,2-Dibromo-3-chloropropane	96-12-8	5	2	0.697		40-135	0-30
1,2-Dibromoethane	106-93-4	5	2	0.548		70-125	0-30

Analyte	CAS Number	Limit of Quantitation (PQL) ppb	Limit of Detection (LOD) ppb	Detection Limit (MDL) ppb	Screening Standard	Accuracy Control Limit (%R)	Precision Control Limit RPD
Dibromomethane	74-95-3	5	0.5	0.194		75-130	0-30
1,2-Dichlorobenzene	95-50-1	5	0.5	0.254		75-120	0-30
1,3-Dichlorobenzene	541-73-1	5	0.5	0.141		70-125	0-30
1,4-Dichlorobenzene	106-46-7	5	0.5	0.142		70-125	0-30
1,2-Dichloroethane	107-06-2	5	0.5	0.182		70-135	0-30
Dichlorodifluoromethane	75-71-8	5	0.5	0.119		35-135	0-30
1,1-Dichloroethane	75-34-3	5	0.5	0.176		75-125	0-30
1,1-Dichloroethene	75-35-4	5	0.5	0.307		65-135	0-30
1,2-Dichloroethene (total)	540-59-0	10	1	0.234		65-125	0-30
Cis-1,2-Dichloroethene	156-59-2	5	0.5	0.129		65-125	0-30
Trans-1,2-Dichloroethene	156-60-5	5	0.5	0.319		65-135	0-30
1,2-Dichloropropane	78-87-5	5	0.5	0.123		70-120	0-30
1,3-Dichloropropane	142-28-9	5	0.5	0.134		75-125	0-30
2,2-Dichloropropane	594-20-7	5	0.5	0.304		65-135	0-30
1,1-Dichloropropene	563-58-6	5	0.5	0.198		70-135	0-30
trans-1,3-Dichloropropene	10061-02-6	5	0.5	0.475		65-125	0-30
cis-1,3-Dichloropropene	10061-01-5	5	0.5	0.326		70-125	0-30
Diisopropyl ether	108-20-3	5	5	0.613		70-130	0-30
Ethylbenzene	100-41-4	5	0.5	0.219		75-125	0-30
Hexachlorobutadiene	87-68-3	5	0.5	0.152		55-140	0-30

Analyte	CAS Number	Limit of Quantitation (PQL) ppb	Limit of Detection (LOD) ppb	Detection Limit (MDL) ppb	Screening Standard	Accuracy Control Limit (%R)	Precision Control Limit RPD
2-Hexanone (MBK)	591-78-6	5	2	0.707		45-145	0-30
Isopropylbenzene	98-82-8	5	0.5	0.093		75-130	0-30
4-Isopropyltoluene	99-87-6	5	0.5	0.085		75-135	0-30
4-Methyl-2-pentanone (MIBK)	108-10-1	5	0.5	0.225		45-145	0-30
Methylene chloride	75-09-2	10	0.5	0.481		55-140	0-30
Methyl Iodide	74-88-4	5	5	1.23		42-156	0-30
Methyl-tert-butyl ether	1634-04-4	5	0.5	0.239		50-135	0-30
Naphthalene	91-20-3	5	0.5	0.175		40-125	0-30
n-Propylbenzene	103-65-1	5	0.5	0.11		65-135	0-30
Styrene	100-42-5	5	0.5	0.412		75-125	0-30
1,1,1,2-Tetrachloroethane	630-20-6	5	0.5	0.215		75-125	0-30
1,1,2,2-Tetrachloroethane	79-34-5	5	0.5	0.197		55-130	0-30
Tetrachloroethene	127-18-4	5	0.5	0.204		65-140	0-30
Toluene	108-88-3	5	0.5	0.264		70-125	0-30
1,2,3-Trichlorobenzene	87-61-6	5	0.5	0.113		60-135	0-30
1,2,4-Trichlorobenzene	120-82-1	5	0.5	0.145		65-130	0-30
1,1,2-Trichloroethane	79-00-5	5	0.5	0.171		60-125	0-30
1,1,1-Trichloroethane	71-55-6	5	0.5	0.192		70-135	0-30
Trichloroethene	79-01-6	5	0.5	0.174		75-125	0-30
Trichlorofluoromethane	75-69-4	5	0.5	0.204		25-185	0-30

Analyte	CAS Number	Limit of Quantitation (PQL) ppb	Limit of Detection (LOD) ppb	Detection Limit (MDL) ppb	Screening Standard	Accuracy Control Limit (%R)	Precision Control Limit RPD
1,2,3-Trichloropropane	96-18-4	5	0.5	0.164		63-130	0-30
1,2,4-Trimethylbenzene	95-63-6	5	0.5	0.119		65-135	0-30
1,3,5-Trimethylbenzene	108-67-8	5	0.5	0.114		65-135	0-30
Vinyl acetate	108-05-4	5	0.5	0.221		59-146	0-30
Vinyl chloride	75-01-4	5	0.5	0.25		60-125	0-30
m,p-Xylene	136777-61-2	5	1	0.355		80-125	0-30
o-Xylene	95-47-6	5	0.5	0.144		75-125	0-30
Xylenes (total)	1330-20-7	10	1.5	0.499		75-125	0-30
1,2-Dichloroethane-d4 (Surrogate)	17060-07-0	NA	NA	NA		62-125	NA
4-Bromofluorobenzene (Surrogate)	460-00-4	NA	NA	NA		85-120	NA
Dibromofluoromethane (Surrogate)	1868-53-7	NA	NA	NA		65-130	NA
Toluene-d8 (Surrogate)	2037-26-5	NA	NA	NA		85-115	NA

Analyte	CAS Number	Limit of Quantitation (PQL) µg/L	Limit of Detection (LOD) µg/L	Detection Limit (MDL) µg/L	Screening Standard	Accuracy Control Limit (%R)	Precision Control Limit RPD
Matrix: Water **Analytical Group:** 8270C							
1,2,4-Trichlorobenzene	120-82-1	10	0.50	0.2340		35-105	0-30
1,2-Dichlorobenzene	95-50-1	10	0.50	0.2590		35-100	0-30
1,2Diphenylhydrazine/Azobenzene	122-66-7	10	0.50	0.2780		60-120	0-30
1,3-Dichlorobenzene	541-73-1	10	0.50	0.2740		30-100	0-30
1,4-Dichlorobenzene	106-46-7	10	0.50	0.2550		30-100	0-30
2,4,5-Trichlorophenol	95-95-4	10	0.50	0.3170		50-110	0-30
2,4,6-Trichlorophenol	88-06-2	10	0.50	0.2750		50-115	0-30
2,4-Dichlorophenol	120-83-2	10	0.50	0.2170		50-105	0-30
2,4-Dimethylphenol	105-67-9	10	1.20	0.6940		30-110	0-30
2,4-Dinitrophenol	51-28-5	50	5	2.60		15-140	0-30
2,4-Dinitrotoluene	121-14-2	10	0.50	0.2630		50-120	0-30
2,6-Dinitrotoluene	606-20-2	10	0.50	0.3520		50-115	0-30
2-Chloronaphthalene	91-58-7	10	0.50	0.2210		50-105	0-30

Analyte	CAS Number	Limit of Quantitation (PQL) µg/L	Limit of Detection (LOD) µg/L	Detection Limit (MDL) µg/L	Screening Standard	Accuracy Control Limit (%R)	Precision Control Limit RPD
2-Chlorophenol	95-57-8	10	0.50	0.2760		35-105	0-30
2-Methylnaphthalene	91-57-6	10	0.50	0.2550		45-105	0-30
2-Nitroaniline	88-74-4	50	0.50	0.1980		50-115	0-30
2-Nitrophenol	88-75-5	10	0.50	0.3570		40-115	0-30
3,3'-Dichlorobenzidine	91-94-1	20	0.50	0.2970		20-110	0-30
3-Nitroaniline	99-09-2	50	0.50	0.2260		20-125	0-30
4,6-Dinitro-2-methylphenol	534-52-1	50	5	1.98		40-130	0-30
4-Bromophenyl phenyl ether	101-55-3	10	0.50	0.3370		50-115	0-30
4-Chloro-3-methylphenol	59-50-7	10	0.50	0.2340		45-110	0-30
4-Chloroaniline	106-47-8	10	0.50	0.4630		15-110	0-30
4-Chlorophenyl phenyl ether	7005-72-3	10	0.50	0.2680		50-110	0-30
4-Nitroaniline	100-01-6	50	0.50	0.2210		35-120	0-30
4-Nitrophenol	100-02-7	50	5	1.83		10-120	0-30
Acenaphthene	83-32-9	10	0.50	0.2680		45-110	0-30
Acenaphthylene	208-96-8	10	0.50	0.3030		50-105	0-30
Anthracene	120-12-7	10	0.50	0.3160		55-110	0-30

Analyte	CAS Number	Limit of Quantitation (PQL) µg/L	Limit of Detection (LOD) µg/L	Detection Limit (MDL) µg/L	Screening Standard	Accuracy Control Limit (%R)	Precision Control Limit RPD
Benzo(a)anthracene	56-55-3	10	0.50	0.3160		55-110	0-30
Benzo(a)pyrene	50-32-8	10	0.50	0.1250		55-110	0-30
Benzo(b)fluoranthene	205-99-2	10	0.50	0.2170		45-120	0-30
Benzo(g,h,i)perylene	191-24-2	10	0.50	0.2150		40-125	0-30
Benzo(k)fluoranthene	207-08-9	10	0.50	0.2360		45-125	0-30
Benzoic acid	65-85-0	50	1.20	0.91		20-120	0-30
Benzyl alcohol	100-51-6	10	0.50	0.3550		30-110	0-30
Bis(2-Chloroethoxy)methane	111-91-1	10	0.50	0.29		45-105	0-30
Bis(2-Chloroethyl)ether	111-44-4	10	0.50	0.2880		35-110	0-30
Bis(2-Chloroisopropyl)ether	108-60-1	10	0.50	0.2570		25-130	0-30
Bis(2-Ethylhexyl)phthalate	117-81-7	10	0.50	0.1910		40-125	0-30
Butyl benzyl phthalate	85-68-7	10	0.50	0.1650		45-115	0-30
Carbazole	86-74-8	10	0.50	0.2320		50-115	0-30
Chrysene	218-01-9	10	0.50	0.4330		55-110	0-30
Di-n-butyl phthalate	84-74-2	10	0.50	0.1890		55-115	0-30
Di-n-octyl phthalate	117-84-0	10	0.50	0.1670		35-135	0-30

Analyte	CAS Number	Limit of Quantitation (PQL) µg/L	Limit of Detection (LOD) µg/L	Detection Limit (MDL) µg/L	Screening Standard	Accuracy Control Limit (%R)	Precision Control Limit RPD
Dibenz(a,h)anthracene	53-70-3	10	0.50	0.2170		40-125	0-30
Dibenzofuran	132-64-9	10	0.50	0.2270		55-105	0-30
Diethyl phthalate	84-66-2	10	0.50	0.3030		40-120	0-30
Dimethyl phthalate	131-11-3	10	0.50	0.2550		25-125	0-30
Fluoranthene	206-44-0	10	0.50	0.2670		55-115	0-30
Fluorene	86-73-7	10	0.50	0.2880		50-110	0-30
Hexachlorobenzene	118-74-1	10	0.50	0.2490		50-110	0-30
Hexachlorobutadiene	87-68-3	10	0.50	0.1920		25-105	0-30
Hexachlorocyclopentadiene	77-47-4	10	0.50	0.1740		16-120	0-30
Hexachloroethane	67-72-1	10	0.50	0.2990		30-95	0-30
Indeno(1,2,3-cd)pyrene	193-39-5	10	0.50	0.1570		45-125	0-30
Isophorone	78-59-1	10	0.50	0.38		50-110	0-30
Naphthalene	91-20-3	10	0.50	0.2930		40-100	0-30
Nitrobenzene	98-95-3	10	0.50	0.3290		45-110	0-30
Pentachlorophenol	87-86-5	50	0.50	0.1680		40-115	0-30
Phenanthrene	85-01-8	10	0.50	0.3040		50-115	0-30

Analyte	CAS Number	Limit of Quantitation (PQL) µg/L	Limit of Detection (LOD) µg/L	Detection Limit (MDL) µg/L	Screening Standard	Accuracy Control Limit (%R)	Precision Control Limit RPD
Phenol	108-95-2	10	0.50	0.15		10-120	0-30
Pyrene	129-00-0	10	0.50	0.4860		50-130	0-30
m,p-Cresol	1319-77-3MP	10	0.50	0.3520		30-110	0-30
n-Nitrosodi-n-propylamine	621-64-7	10	0.50	0.3040		35-130	0-30
n-Nitrosodimethylamine	62-75-9	10	0.50	0.3040		25-110	0-30
n-Nitrosodiphenylamine	86-30-6	10	0.50	0.3640		50-110	0-30
o-Cresol	95-48-7	10	0.50	0.3290		40-110	0-30
2,4,6-Tribromophenol (Surrogate)	118-79-6	NA	NA	NA		40-125	NA
2-Fluorobiphenyl (Surrogate)	321-60-5	NA	NA	NA		50-110	NA
2-Fluorophenol (Surrogate)	367-12-4	NA	NA	NA		20-110	NA
Nitrobenzene-d5 (Surrogate)	4165-60-0	NA	NA	NA		40-110	NA
Phenol-d5 (Surrogate)	4165-62-2	NA	NA	NA		10-100	NA
Terphenyl-d14 (Surrogate)	1718-51-0	NA	NA	NA		50-135	NA

Analyte	CAS Number	Limit of Quantitation (PQL) µg/kg	Limit of Detection (LOD) µg/kg	Detection Limit (MDL) µg/kg	Screening Standard	Accuracy Control Limit (%R)	Precision Control Limit RPD
Matrix: Soil **Analytical Group:** 8270C							
1,2,4-Trichlorobenzene	120-82-1	330	33.30	11.30		45-110	0-30
1,2-Dichlorobenzene	95-50-1	330	33.30	11.10		45-95	0-30
1,2Diphenylhydrazine/Azobenzene	122-66-7	330	16.70	11.70		49-120	0-30
1,3-Dichlorobenzene	541-73-1	330	33.30	12.50		40-100	0-30
1,4-Dichlorobenzene	106-46-7	330	33.30	10.40		35-105	0-30
2,4,5-Trichlorophenol	95-95-4	330	66.70	22.30		50-110	0-30
2,4,6-Trichlorophenol	88-06-2	330	167	78.70		45-110	0-30
2,4-Dichlorophenol	120-83-2	330	66.70	35.40		45-110	0-30
2,4-Dimethylphenol	105-67-9	330	330	233		30-105	0-30
2,4-Dinitrophenol	51-28-5	1650	330	152		15-120	0-30
2,4-Dinitrotoluene	121-14-2	330	66.70	20		50-115	0-30
2,6-Dinitrotoluene	606-20-2	330	33.30	26.60		50-110	0-30
2-Chloronaphthalene	91-58-7	330	33.30	10.60		45-105	0-30
2-Chlorophenol	95-57-8	330	33.30	11.60		45-105	0-30

Analyte	CAS Number	Limit of Quantitation (PQL) µg/kg	Limit of Detection (LOD) µg/kg	Detection Limit (MDL) µg/kg	Screening Standard	Accuracy Control Limit (%R)	Precision Control Limit RPD
2-Methylnaphthalene	91-57-6	330	33.30	8.96		45-105	0-30
2-Nitroaniline	88-74-4	1650	66.70	24		45-120	0-30
2-Nitrophenol	88-75-5	330	33.30	24.50		15-140	0-30
3,3'-Dichlorobenzidine	91-94-1	660	333	306		24-127	0-30
3-Nitroaniline	99-09-2	1650	66.70	22		25-110	0-30
4,6-Dinitro-2-methylphenol	534-52-1	1650	330	150		30-135	0-30
4-Bromophenyl phenyl ether	101-55-3	330	33.30	18.50		45-115	0-30
4-Chloro-3-methylphenol	59-50-7	330	33.30	31.50		45-115	0-30
4-Chloroaniline	106-47-8	330	33.30	22.20		20-120	0-30
4-Chlorophenyl phenyl ether	7005-72-3	330	33.30	18.70		45-110	0-30
4-Nitroaniline	100-01-6	1650	167	163		35-115	0-30
4-Nitrophenol	100-02-7	1650	167	93.10		15-140	0-30
Acenaphthene	83-32-9	330	33.30	11.80		45-110	0-30
Acenaphthylene	208-96-8	330	33.30	13.10		45-105	0-30
Anthracene	120-12-7	330	33.30	11.40		55-105	0-30
Benzo(a)anthracene	56-55-3	330	33.30	25.80		50-110	0-30

Analyte	CAS Number	Limit of Quantitation (PQL) µg/kg	Limit of Detection (LOD) µg/kg	Detection Limit (MDL) µg/kg	Screening Standard	Accuracy Control Limit (%R)	Precision Control Limit RPD
Benzo(a)pyrene	50-32-8	330	33.30	12.30		50-110	0-30
Benzo(b)fluoranthene	205-99-2	330	33.30	30.40		45-115	0-30
Benzo(g,h,i)perylene	191-24-2	330	16.70	10.50		40-125	0-30
Benzo(k)fluoranthene	207-08-9	330	33.30	13.40		45-125	0-30
Benzoic acid	65-85-0	1650	167	68		14-124	0-30
Benzyl alcohol	100-51-6	330	167	45.10		20-125	0-30
Bis(2-Chloroethoxy)methane	111-91-1	330	33.30	25.80		45-110	0-30
Bis(2-Chloroethyl)ether	111-44-4	330	33.30	24.30		40-105	0-30
Bis(2-Chloroisopropyl)ether	108-60-1	330	33.30	20.60		20-115	0-30
Bis(2-Ethylhexyl)phthalate	117-81-7	330	33.30	19.60		45-125	0-30
Butyl benzyl phthalate	85-68-7	330	16.70	5.93		50-125	0-30
Carbazole	86-74-8	330	33.30	20		45-115	0-30
Chrysene	218-01-9	330	33.30	14.50		55-110	0-30
Di-n-butyl phthalate	84-74-2	330	16.70	13.10		55-110	0-30
Di-n-octyl phthalate	117-84-0	330	16.70	4.44		40-130	0-30
Dibenz(a,h)anthracene	53-70-3	330	16.70	11.50		40-125	0-30

Analyte	CAS Number	Limit of Quantitation (PQL) µg/kg	Limit of Detection (LOD) µg/kg	Detection Limit (MDL) µg/kg	Screening Standard	Accuracy Control Limit (%R)	Precision Control Limit RPD
Dibenzofuran	132-64-9	330	33.30	10.70		50-105	0-30
Diethyl phthalate	84-66-2	330	33.30	20.30		50-115	0-30
Dimethyl phthalate	131-11-3	330	16.70	14.10		50-110	0-30
Fluoranthene	206-44-0	330	16.70	6.52		55-115	0-30
Fluorene	86-73-7	330	33.30	12.90		50-110	0-30
Hexachlorobenzene	118-74-1	330	66.70	19.10		45-120	0-30
Hexachlorobutadiene	87-68-3	330	33.30	20		40-115	0-30
Hexachlorocyclopentadiene	77-47-4	330	167	120		48-116	0-30
Hexachloroethane	67-72-1	330	33.30	15.90		35-110	0-30
Indeno(1,2,3-cd)pyrene	193-39-5	330	33.30	30.90		40-120	0-30
Isophorone	78-59-1	330	33.30	11.60		45-110	0-30
Naphthalene	91-20-3	330	33.30	13.20		40-105	0-30
Nitrobenzene	98-95-3	330	33.30	18.40		40-115	0-30
Pentachlorophenol	87-86-5	1650	167	126		25-120	0-30
Phenanthrene	85-01-8	330	33.30	10.60		50-110	0-30
Phenol	108-95-2	330	33.30	19.80		40-100	0-30

Analyte	CAS Number	Limit of Quantitation (PQL) µg/kg	Limit of Detection (LOD) µg/kg	Detection Limit (MDL) µg/kg	Screening Standard	Accuracy Control Limit (%R)	Precision Control Limit RPD
Pyrene	129-00-0	330	33.30	15.30		45-125	0-30
m,p-Cresol	1319-77-3MP	330	167	46.60		40-105	0-30
n-Nitrosodi-n-propylamine	621-64-7	330	33.30	15.10		40-115	0-30
n-Nitrosodimethylamine	62-75-9	330	66.70	45.30		20-115	0-30
n-Nitrosodiphenylamine	86-30-6	330	33.30	10.50		50-115	0-30
o-Cresol	95-48-7	330	33.30	11.70		40-105	0-30
2,4,6-Tribromophenol (Surrogate)	118-79-6	NA	NA	NA		35-125	NA
2-Fluorobiphenyl (Surrogate)	321-60-5	NA	NA	NA		45-105	NA
2-Fluorophenol (Surrogate)	367-12-4	NA	NA	NA		35-105	NA
Nitrobenzene-d5 (Surrogate)	4165-60-0	NA	NA	NA		35-100	NA
Phenol-d5 (Surrogate)	4165-62-2	NA	NA	NA		40-100	NA
Terphenyl-d14 (Surrogate)	1718-51-0	NA	NA	NA		30-125	NA

Analyte	CAS Number	Limit of Quantitation (PQL) ppm	Limit of Detection (LOD) ppm	Detection Limit (MDL) ppm	Screening Standard	Accuracy Control Limit (%R)	Precision Control Limit RPD
Matrix: Water **Analytical Group:** TAL Metals							
Aluminum	7429-90-5	0.2	0.09	0.023		80-120	20
Antimony	7440-36-0	0.06	0.015	0.004		80-120	20
Arsenic	7440-38-2	0.01	0.01	0.003		80-120	20
Barium	7440-39-3	0.01	0.005	0.002		80-120	20
Beryllium	7440-41-7	0.005	0.0003	0.00008		80-120	20
Cadmium	7440-43-9	0.005	0.0004	0.0001		80-120	20
Calcium	7440-70-2	0.1	0.09	0.024		80-120	20
Chromium	7440-47-3	0.01	0.001	0.0003		80-120	20
Cobalt	740-48-4	0.01	0.002	0.0005		80-120	20
Copper	740-50-8	0.01	0.006	0.0017		80-120	20
Iron	7439-89-6	0.1	0.1	0.0027		80-120	20
Lead	7439-92-1	0.015	0.01	0.0028		80-120	20
Magnesium	7439-95-4	0.1	0.048	0.012		80-120	20
Manganese	7439-96-5	0.015	0.003	0.0008		80-120	20
Mercury	7439-97-6	0.0002	0.0002	0.00007		80-120	20
Nickel	7440-02-0	0.04	0.003	0.0008		80-120	20
Potassium	7440-09-7	0.5	0.1	0.041		80-120	20

Analyte	CAS Number	Limit of Quantitation (PQL) ppm	Limit of Detection (LOD) ppm	Detection Limit (MDL) ppm	Screening Standard	Accuracy Control Limit (%R)	Precision Control Limit RPD
Selenium	7782-49-2	0.04	0.015	0.0038		80-120	20
Silver	7440-22-4	0.01	0.0025	0.0006		75-120	20
Sodium	7440-23-5	1	0.2	0.0557		80-120	20
Thallium	7440-28-0	0.02	0.01	0.0026		80-120	20
Vanadium	7440-62-2	0.02	0.0049	0.0012		80-120	20
Zinc	7440-66-6	0.02	0.02	0.0059		80-120	20
Matrix: Soil **Analytical Group:** TAL Metals							
Aluminum	7429-90-5	8	2.4	0.63		80-120	20
Antimony	7440-36-0	2.4	0.24	0.12		80-120	20
Arsenic	7440-38-2	1.6	0.4	0.088		80-120	20
Barium	7440-39-3	0.4	0.048	0.011		80-120	20
Beryllium	7440-41-7	0.2	0.01	0.003		80-120	20
Cadmium	7440-43-9	0.2	0.02	0.01		80-120	20
Calcium	7440-70-2	30	2	0.92		80-120	20
Chromium	7440-47-3	0.4	0.04	0.012		80-120	20
Cobalt	740-48-4	0.4	0.04	0.02		80-120	20
Copper	740-50-8	0.4	0.16	0.03		80-120	20
Iron	7439-89-6	4	1.6	0.91		80-120	20
Lead	7439-92-1	0.6	0.2	0.07		80-120	20

Analyte	CAS Number	Limit of Quantitation (PQL) ppm	Limit of Detection (LOD) ppm	Detection Limit (MDL) ppm	Screening Standard	Accuracy Control Limit (%R)	Precision Control Limit RPD
Magnesium	7439-95-4	4	2	1.34		80-120	20
Manganese	7439-96-5	0.6	0.08	0.039		80-120	20
Mercury	7439-97-6	0.01	0.01	0.0046		80-120	20
Nickel	7440-02-0	1.6	0.1	0.031		80-120	20
Potassium	7440-09-7	20	4	1.82		80-120	20
Selenium	7782-49-2	1.6	0.6	0.19		80-120	20
Silver	7440-22-4	0.4	0.08	0.035		75-120	20
Sodium	7440-23-5	40	8	3.51		80-120	20
Thallium	7440-28-0	0.8	0.2	0.1		80-120	20
Vanadium	7440-62-2	0.8	0.15	0.05		80-120	20
Zinc	7440-66-6	0.6	0.6	0.33		80-120	20
Matrix: Soil **Analytical Group:** TOC							
TOC	NA	200	200	50		69-128	0-25

11.0 TO-14A/TO-15 – VOLATILE ORGANIC COMPOUNDS

This method involves full scan GC/MS analysis of whole air samples collected in evacuated stainless steel canisters. Samples are analyzed for volatile organic compounds using EPA Method TO-14A/TO-15 protocols. An aliquot of the sample is withdrawn from the canister through a mass flow controller and concentrated using a hydrophobic multisorbent bed. The hydrophobic multisorbent bed functions as a drying system which removes water from the sample stream prior to analysis by full scan GC/MS. During analysis, the sample may be focused onto a cryogenic cooled column and/or a cryogenic cooled sleeve for analysis by full scan GC/MS.

Air Toxics maintains three TO-14A/TO-15 full scan configurations and one SIM configuration. (See section 12.0 for the TO-14A/TO-15 SIM configuration). The '5&20' configuration is designed for high moisture soil gas and ppmv range vapor matrices. The '5&20' refers to the base reporting limits achievable via this method (5 ppbv and 20 ppbv). Samples can be efficiently analyzed without dilution at concentrations up to 5 ppmv. The second configuration is referred to as TO-15 (or Quad) and is set up to meet the reporting limits described in EPA Method TO-15 (0.5 ppbv to 2 ppbv). This application is used primarily for ppbv-level soil gas and ambient air. The third configuration is referred to as 'Low-level' and is optimized reporting limits below those listed in Method TO-15 with reporting limits in the 0.1 ppbv to 0.5 ppbv range. This 'Low-level' application is often used for indoor air applications. The 'Low-level' application is not designed for soil gas applications due to high levels of moisture and potentially high VOC concentrations.

Certain compounds are not included in ATL's standard target analyte list. These compounds are communicated at the time of client proposal request. Unless otherwise directed, ATL reports these non-standard compounds with partial validation. Validation includes a 3-point calibration with the lowest concentration defining the reporting limit, no second source verification is analyzed, and no method detection limit study is performed unless previous arrangements have been made. In addition, stability of the non-standard compound during sample storage is not validated. Full validation may be available upon request.

Air Toxics Ltd. takes no modifications of technical significance to Method TO-15 for the 'Quad' and 5&20 configurations. The modifications for TO-15 Low-level are listed in Table 11.1.A. Since Air Toxics applies TO-15 methodology to all Summa canisters regardless of whether TO-14A or TO-15 is specified by the project, Air Toxics performs a modified version of method TO-14A as detailed in Table 11.1.B. Please note that Methods TO-14A and TO-15 were validated for specially treated canisters. As such, the use of Tedlar bags for sample collection is outside the scope of the method and not recommended for ambient or indoor air samples. It is the responsibility of the data user to determine the usability of TO-14A (and TO-15) results generated from Tedlar bags.

Table 11.1.A Summary of TO-15 'Low Level' Method Modifications

Requirement	TO-15 ' Low Level'	ATL Modifications
Initial Calibration	≤ 30% RSD with 2 compounds allowed out to ≤ 40% RSD.	≤ 30% RSD with 4 compounds allowed out to ≤ 40%.
Blanks and standards	Zero Air	Nitrogen

Table 11.1.B Summary of TO-14A Method Modifications

Requirement	TO-14A	ATL Modifications
Sample Drying System	Nafion Drier	Multibed hydrophobic sorbent
Blank acceptance criteria	< 0.2 ppbv	< RL
BFB absolute abundance criteria	Within 10% of that from the previous day.	CCV internal standard area counts are compared to ICAL, corrective action for > 40% D.
Daily CCV	70-130% for listed 39 VOCs.	70-130%. ATL's 62 standard compound list exceeding this criterion and associated data will be flagged and narrated. If more than two compounds from the standard list recover outside of 70-130%, corrective action will be taken. Unless prior client approval; under no circumstances will samples be analyzed if any compound exceeds 60-140%.
Initial Calibration	≤ 30% RSD for listed 39 VOCs	≤ 30% RSD with 2 of ATL's 62 standard compounds allowed out to ≤ 40%..

The standard target analyte list, Limit of Quantitation, QC criteria, and QC summary can be found in Tables 11.2 – 11.6.

Table 11.2 Method TO-14A/TO-15 Analyte List

Analyte	RL (ppbv) LL/TO-15/5&20	%RSD	Acceptance Criteria	
			LCS (%R)	Precision Limits (Max. RPD)
1,1,2,2-Tetrachloroethane	0.1/0.5/5.0	30%	70 - 130	≤ 25
1,1,2-Trichloroethane	0.1/0.5/5.0	30%	70 - 130	≤ 25
1,1-Dichloroethane	0.1/0.5/5.0	30%	70 - 130	≤ 25
1,1-Dichloroethene	0.1/0.5/5.0	30%	70 - 130	≤ 25
1,2,4-Trichlorobenzene	0.5/2.0/20	30%	70 - 130	≤ 25
1,2,4-Trimethylbenzene	0.1/0.5/5.0	30%	70 - 130	≤ 25
1,2-Dibromoethane (EDB)	0.1/0.5/5.0	30%	70 - 130	≤ 25
1,2-Dichlorobenzene	0.1/0.5/5.0	30%	70 - 130	≤ 25
1,2-Dichloroethane	0.1/0.5/5.0	30%	70 - 130	≤ 25
1,2-Dichloropropane	0.1/0.5/5.0	30%	70 - 130	≤ 25
1,3,5-Trimethylbenzene	0.1/0.5/5.0	30%	70 - 130	≤ 25
1,3-Dichlorobenzene	0.1/0.5/5.0	30%	70 - 130	≤ 25
1,4-Dichlorobenzene	0.1/0.5/5.0	30%	70 - 130	≤ 25
Benzene	0.1/0.5/5.0	30%	70 - 130	≤ 25
Bromomethane	0.1/0.5/5.0	30%	70 - 130	≤ 25
Carbon Tetrachloride	0.1/0.5/5.0	30%	70 - 130	≤ 25
Chlorobenzene	0.1/0.5/5.0	30%	70 - 130	≤ 25

Analyte	RL (ppbv) LL/TO-15/5&20	%RSD	Acceptance Criteria	
			LCS (%R)	Precision Limits (Max. RPD)
Chloroethane	0.1/0.5/5.0	30%	70 - 130	≤ 25
Chloroform	0.1/0.5/5.0	30%	70 - 130	≤ 25
Chloromethane	0.1/2.0/20	30%	70 - 130	≤ 25
α-Chlorotoluene (Benzyl Chloride)	0.1/0.5/5.0	30%	70 - 130	≤ 25
cis-1,2-Dichloroethene	0.1/0.5/5.0	30%	70 - 130	≤ 25
cis-1,3-Dichloropropene	0.1/0.5/5.0	30%	70 - 130	≤ 25
Dichloromethane	0.2/0.5/5.0	30%	70 - 130	≤ 25
Ethylbenzene	0.1/0.5/5.0	30%	70 - 130	≤ 25
Freon 11 (Trichlorofluoromethane)	0.1/0.5/5.0	30%	70 - 130	≤ 25
Freon 113 (Trichlorotrifluoroethane)	0.1/0.5/5.0	30%	70 - 130	≤ 25
Freon 114	0.1/0.5/5.0	30%	70 - 130	≤ 25
Freon 12 (Dichlorodifluoromethane)	0.1/0.5/5.0	30%	70 - 130	≤ 25
Hexachlorobutadiene	0.5/2.0/20	30%	70 - 130	≤ 25
m,p-Xylene	0.1/0.5/5.0	30%	70 - 130	≤ 25
Methyl Chloroform (1,1,1-Trichloroethane)	0.1/0.5/5.0	30%	70 - 130	≤ 25
o-Xylene	0.1/0.5/5.0	30%	70 - 130	≤ 25
Styrene	0.1/0.5/5.0	30%	70 - 130	≤ 25
Tetrachloroethene	0.1/0.5/5.0	30%	70 - 130	≤ 25
Toluene	0.1/0.5/5.0	30%	70 - 130	≤ 25
trans-1,3-Dichloropropene	0.1/0.5/5.0	30%	70 - 130	≤ 25
Trichloroethene	0.1/0.5/5.0	30%	70 - 130	≤ 25
Vinyl Chloride	0.1/0.5/5.0	30%	70 - 130	≤ 25

Table 11.3 Method TO-14A/TO-15 Analyte List

Analyte	RL (ppbv) LL/TO-15/ 5&20	%RSD	Acceptance Criteria	
			LCS (%R)	Precision Limits
1,3-Butadiene	0.1/0.5/5.0	30%	60 – 140	≤ 25
1,4-Dioxane	0.1/2.0/20	30%	60 – 140	≤ 25
2-Butanone (Methyl Ethyl Ketone)	0.1/0.5/5.0	30%	60 – 140	≤ 25
2-Hexanone	0.5/2.0/20	30%	60 – 140	≤ 25
4-Ethyltoluene	0.1/0.5/5.0	30%	60 – 140	≤ 25

Analyte	RL (ppbv) LL/TO-15/ 5&20	%RSD	Acceptance Criteria	
			LCS (%R)	Precision Limits
4-Methyl-2-Pentanone (MIBK)	0.1/0.5/5.0	30%	60 – 140	≤ 25
Acetone	0.5/2.0/20	30%	60 – 140	≤ 25
Bromodichloromethane	0.1/0.5/5.0	30%	60 – 140	≤ 25
Bromoform	0.1/0.5/5.0	30%	60 – 140	≤ 25
Carbon Disulfide	0.5/0.5/5.0	30%	60 – 140	≤ 25
Cyclohexane	0.1/0.5/5.0	30%	60 – 140	≤ 25
Dibromochloromethane	0.1/0.5/5.0	30%	60 – 140	≤ 25
Ethanol	0.5/2.0/20	30%	60 – 140	≤ 25
Heptane	0.1/0.5/5.0	30%	60 – 140	≤ 25
Hexane	0.1/0.5/5.0	30%	60 – 140	≤ 25
Isopropanol (2-Propanol)	0.5/2.0/20	30%	60 – 140	≤ 25
Methyl t-Butyl Ether (MTBE)	0.1/0.5/5.0	30%	60 – 140	≤ 25
Propylene	0.5/2.0/20	30%	60 – 140	≤ 25
Tetrahydrofuran	0.5/0.5/5.0	30%	60 – 140	≤ 25
trans-1,2-Dichloroethene	0.1/0.5/5.0	30%	60 – 140	≤ 25
2,2,4-Trimethylpentane	0.5/0.5/5.0	30%	60 – 140	≤ 25
Cumene	0.1/0.5/5.0	30%	60 – 140	≤ 25
Propylbenzene	0.1/0.5/5.0	30%	60 – 140	≤ 25
3-Chloroprene	0.5/2.0/20	30%	60 – 140	≤ 25
Naphthalene	0.5/2.0/20	30%	60 – 140	≤ 25
TPH (Gasoline) or NMOC (Hexane/Heptane)	10/25/100	One Point Calibration	NA	≤ 25

Table 11.4 Internal Standards

Analyte	Accuracy (% R)
Bromochloromethane	60 - 140
1,4-Difluorobenzene	60 - 140
Chlorobenzene-d_5	60 - 140

Table 11.5 Surrogates

Analyte	Accuracy (% R)
1,2-Dichloroethane-d_4	70 – 130
Toluene-d_8	70 – 130
4-Bromofluorobenzene	70 – 130

Table 11.6 Summary of Calibration and QC Procedures for Methods TO-14A/TO-15

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Tuning Criteria	Every 24 hours, or every 12 hours if project requires.	SW – 846 tune criteria.	Correct problem then repeat tune.
5-Point Calibration	Prior to sample analysis.	% RSD ≤ 30 with two compounds allowed out to ≤ 40% RSD for QUAD and 5&20 (4 allowed out for LL).	Correct problem then repeat Initial Calibration Curve.
LCS	After each initial calibration curve, and daily, prior to sample analysis.	Recoveries for 90% of "Standard" compounds must be 70-130%; for 80% of "Non-standard" compounds, recoveries must be 60-140%. No recovery may be <50%. * If specified by the client in-house generated control limits may be used.	Check the system and reanalyze the standard. Re-prepare the standard if necessary. Re-calibrate the instrument if the criteria cannot be met.
Continuing Calibration Verification (CCV)	At the start of each day and, if required by a specific project, every 12 hours.	For QUAD and 5&20: 70-130%. Compounds exceeding this criterion and associated data will be flagged and narrated with the exception of high bias associated with non-detects. If more than two compounds from the standard list recover outside of 70-130%, corrective action will be taken. Unless prior client approval; under no circumstances will samples be analyzed if any compound exceeds 60-140%. For **Low Level** analysis the above applies except corrective action will be taken if more than four compounds from the standard list recover outside of 70-130%.	Perform maintenance and repeat test. If the system still fails the CCV, perform a new 5 point calibration curve.
Laboratory Blank	After the CCV/LCS.	Results less than the laboratory reporting limit.	Inspect the system and re-analyze the blank.

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Internal Standard (IS)	As each standard, blank, and sample is being loaded.	Retention time (RT) for blanks and samples must be within ±0.33 min of the RT in the CCV and within ±40% of the area counts of the daily CCV internal standards.	**For blanks:** inspect the system and reanalyze the blank. Analysis is discontinued until the blank meets the IS criteria. **For samples:** re-analyze the sample. If the ISs are within limits in the re-analysis, report the second analysis. If ISs are out-of-limits a second time, dilute the sample until ISs are within acceptance limits and narrate.
Surrogates	As each standard, blank, and sample is being loaded.	70 - 130%. * If specified by the client in-house generated control limits may be used.	**For blanks:** inspect the system and reanalyze the blank. Analysis is discontinued until the blank meets the surrogate recovery criteria **For samples:** re-analyze the sample unless obvious matrix interference is documented. If the %R is within limits in the re-analysis, report the second analysis. If %R is out-of-limits a second time, then narrate results.
Laboratory Control Spike Duplicate (LCSD)	1 dup/analytical batch.	RPD ≤25%.	Inspect the system and re-analyze; if out again, narrate.

Galson LOQ Study

01/30/2012 11:01

Loq ID: 10812
Department: 15
Matrix: 51
Instrument: LC6
Lot #: 5142
Product: IC-VALERALD
Parm Stored: VALERALDEHYDE

Comments:

Desorption Solvent: ACETONITRILE
Desorption Vol (mL): 2

Method: MET7098
Analyst: MWJ

LOQ Create Date: 27-MAY-08
Next Verification Date: 20-DEC-12

DE:
Ave. Total (ug): .1025
Adj. Ave. Total (ug): .1025
Std Dev: .0056
Ave. % Rec.: 99.3097
Adj. Ave. % Rec.: 99.3097
MDL: .0176
LOQ (ug): .1

E-SPIKE Exclusion Flag: N

Initial Study

Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Manual
WG130164-10	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2987540.pdf	.09985030824	IH65802-1	.0999	96.7741935484	
WG130164-11	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2987541.pdf	.09950523481	IH65802-1	.0999	96.3870967742	
WG130164-12	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2987542.pdf	.09739646078	IH65802-1	.0999	94.3548387097	
WG130164-13	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2987543.pdf	.1043519841	IH65802-1	.0999	100.645161290	
WG130164-14	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2987544.pdf	.1114362088	IH65802-1	.0999	108.387096774	

Verifications

Date	Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Pass	Manual
30-SEP-09	WG157984-3	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699022.pdf	.1064126653	IH121882-3	.10013	90.59829060		
30-SEP-09	WG157984-4	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699023.pdf	.1189400056	IH121882-3	.10013	101.7094017		
30-SEP-09	WG157984-5	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699024.pdf	.1012193847	IH121882-3	.10013	86.32478632		
30-SEP-09	WG157984-6	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699025.pdf	.1014853018	IH121882-3	.10013	86.32478632		
30-SEP-09	WG157984-7	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699026.pdf	.09852160853	IH121882-3	.10013	84.10256410		
18-NOV-10	WG186663-2	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569324.pdf	.1003759612	IH179663-5	.10013	87.46355685		
18-NOV-10	WG186663-3	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569325.pdf	.09469249971	IH179663-5	.10013	82.74052478		
18-NOV-10	WG186663-4	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569326.pdf	.09352618676	IH179663-5	.10013	81.69096210		
18-NOV-10	WG186663-5	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569327.pdf	.1070257963	IH179663-5	.10013	93.58600583		

18-NOV-10	WG186663-6	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569328.pdf	.09270421383	IH179663-5	.10013	80.99125364
20-DEC-11	WG214818-3	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214276.pdf	.1023548615	IH243463-1	.0998	98.31371301
20-DEC-11	WG214818-4	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214277.pdf	.09683277625	IH243463-1	.0998	92.58670060
20-DEC-11	WG214818-5	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214278.pdf	.09933212666	IH243463-1	.0998	94.97295577
20-DEC-11	WG214818-6	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214279.pdf	.1026999919	IH243463-1	.0998	98.31371301
20-DEC-11	WG214818-7	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214280.pdf	.1041487807	IH243463-1	.0998	99.26821508

Galson LOQ Study

01/30/2012 11:01

Loq ID: 10816
Department: 15
Matrix: 51
Instrument: LC6
Lot #: 5142
Product: IC-ISOVALERALD
IC-ISVLRALD
Parm Stored: ISOVALERALDEHYDE

Comments:

Desorption Solvent: ACETONITRILE
Desorption Vol (mL): 2

Method: MET7098
Analyst: MWJ

LOQ Create Date: 27-MAY-08
Next Verification Date: 20-DEC-12

DE:
Ave. Total (ug): .1012
Adj. Ave. Total (ug): .1012
Std Dev: .0043
Ave. % Rec.: 98.8442
Adj. Ave. % Rec.: 98.8442
MDL: .0136
LOQ (ug): .1

E-SPIKE Exclusion Flag: N

Initial Study

Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Manual
WG130164-10	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2987540.pdf	.09499968279	IH65802-1	.0999	92.6298701299	
WG130164-11	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2987541.pdf	.1015182573	IH65802-1	.0999	99.3506493506	
WG130164-12	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2987542.pdf	.09915504321	IH65802-1	.0999	96.7207792208	
WG130164-13	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2987543.pdf	.1056028123	IH65802-1	.0999	103.246753247	
WG130164-14	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2987544.pdf	.104841029	IH65802-1	.0999	102.272727273	

Verifications

Date	Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Pass	Manual
30-SEP-09	WG157984-3	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699022.pdf	.08734721282	IH121882-3	.10013	73.07262570		
30-SEP-09	WG157984-4	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699023.pdf	.1166411791	IH121882-3	.10013	97.20670391		
30-SEP-09	WG157984-5	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699024.pdf	.09114427899	IH121882-3	.10013	76.25698324		
30-SEP-09	WG157984-6	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699025.pdf	.08576202189	IH121882-3	.10013	71.81564246		
30-SEP-09	WG157984-7	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699026.pdf	.08474227425	IH121882-3	.10013	70.89385475		
18-NOV-10	WG186663-2	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569324.pdf	.1127389551	IH179663-5	.10013	113.7583893		
18-NOV-10	WG186663-3	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569325.pdf	.1146077439	IH179663-5	.10013	114.7651007		
18-NOV-10	WG186663-4	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569326.pdf	.1028847614	IH179663-5	.10013	103.6912752		
18-NOV-10	WG186663-5	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569327.pdf	.1182911076	IH179663-5	.10013	118.7919463		

18-NOV-10	WG186663-6	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569328.pdf	.1160332535	IH179663-5	.10013	116.7785235
20-DEC-11	WG214818-3	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214276.pdf	.1169766427	IH243463-1	.10013	117.2736385
20-DEC-11	WG214818-4	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214277.pdf	.1149700801	IH243463-1	.10013	115.2689609
20-DEC-11	WG214818-5	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214278.pdf	.1038793195	IH243463-1	.10013	104.2432342
20-DEC-11	WG214818-6	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214279.pdf	.1083554978	IH243463-1	.10013	108.2525894
20-DEC-11	WG214818-7	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214280.pdf	.1139314266	IH243463-1	.10013	114.2666221

Galson LOQ Study

01/30/2012 11:01

Loq ID: 10811
Department: 15
Matrix: 51
Instrument: LC6
Lot #: 5142
Product: IC-BENZALD
Parm Stored: BENZALDEHYDE

Comments:

Desorption Solvent: ACETONITRILE
Desorption Vol (mL): 2

Method: MET7098
Analyst: MWJ

LOQ Create Date: 27-MAY-08
Next Verification Date: 20-DEC-12

DE:
Ave. Total (ug): .0987
Adj. Ave. Total (ug): .0987
Std Dev: .0034
Ave. % Rec.: 100.8915
Adj. Ave. % Rec.: 100.8915
MDL: .0106
LOQ (ug): .1

E-SPIKE Exclusion Flag: N

Initial Study

Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Manual
WG130164-10	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2987540.pdf	.09302302735	IH65802-1	.0999	95.0323239197	
WG130164-11	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2987541.pdf	.09943797633	IH65802-1	.0999	101.565158217	
WG130164-12	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2987542.pdf	.1008183426	IH65802-1	.0999	103.096291256	
WG130164-13	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2987543.pdf	.1015437743	IH65802-1	.0999	104.117046614	
WG130164-14	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2987544.pdf	.09852637183	IH65802-1	.0999	100.646478394	

Verifications

Date	Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Pass	Manual
30-SEP-09	WG157984-3	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699022.pdf	.09820837283	IH121882-3	.0999	92.15625000		
30-SEP-09	WG157984-4	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699023.pdf	.1080417902	IH121882-3	.0999	101.25		
30-SEP-09	WG157984-5	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699024.pdf	.1027067855	IH121882-3	.0999	96.56250000		
30-SEP-09	WG157984-6	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699025.pdf	.1137908993	IH121882-3	.0999	106.875		
30-SEP-09	WG157984-7	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699026.pdf	.1082040366	IH121882-3	.0999	101.25		
18-NOV-10	WG186663-2	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569324.pdf	.1020489664	IH179663-5	.0999	96.83544304		
18-NOV-10	WG186663-3	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569325.pdf	.09984542708	IH179663-5	.0999	94.84177215		
18-NOV-10	WG186663-4	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569326.pdf	.1007163319	IH179663-5	.0999	95.88607595		
18-NOV-10	WG186663-5	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569327.pdf	.09957139237	IH179663-5	.0999	94.65189873		

18-NOV-10	WG186663-6	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569328.pdf	.1081715774	IH179663-5	.0999	102.5316456
20-DEC-11	WG214818-3	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214276.pdf	.09694812681	IH243463-1	.0999	109.5220173
20-DEC-11	WG214818-4	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214277.pdf	.09321590987	IH243463-1	.0999	105.3443734
20-DEC-11	WG214818-5	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214278.pdf	.1006495308	IH243463-1	.0999	114.0383892
20-DEC-11	WG214818-6	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214279.pdf	.08854774998	IH243463-1	.0999	100.0376364
20-DEC-11	WG214818-7	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214280.pdf	.09177540509	IH243463-1	.0999	103.7636432

Galson LOQ Study

01/30/2012 11:01

Loq ID: 11031
Department: 15
Matrix: 51
Instrument: LC6
Lot #:
Product: IC-BUTRALD
Parm Stored: BUTYRALDEHYDE

Comments:

Desorption Solvent: ACETONITRILE
Desorption Vol (mL): 2

Method: MET7098
Analyst: AEC

LOQ Create Date: 11-JUN-08
Next Verification Date: 20-DEC-12

DE:

Ave. Total (ug): .0919
Adj. Ave. Total (ug): .0919
Std Dev: .0028

Ave. % Rec.: 91.1706
Adj. Ave. % Rec.: 91.1706

MDL: .0089
LOQ (ug): .1

E-SPIKE Exclusion Flag: N

Initial Study

Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Manual
WG130941-2	/lims/pdf/logins/WG08/WG130941/WG130941_SJ3011710.pdf	.09226538078	IH68082-2	.1	91.5674603175	
WG130941-3	/lims/pdf/logins/WG08/WG130941/WG130941_SJ3011711.pdf	.08719586065	IH68082-2	.1	86.5079365079	
WG130941-4	/lims/pdf/logins/WG08/WG130941/WG130941_SJ3011712.pdf	.09226493214	IH68082-2	.1	91.5674603175	
WG130941-5	/lims/pdf/logins/WG08/WG130941/WG130941_SJ3011713.pdf	.09269915226	IH68082-2	.1	91.9642857143	
WG130941-6	/lims/pdf/logins/WG08/WG130941/WG130941_SJ3011714.pdf	.09495595745	IH68082-2	.1	94.2460317460	

Verifications

Date	Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Pass	Manual
30-SEP-09	WG157984-3	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699022.pdf	.1097546816	IH121882-3	.1001	91.16022099		
30-SEP-09	WG157984-4	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699023.pdf	.1143304587	IH121882-3	.1001	94.47513812		
30-SEP-09	WG157984-5	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699024.pdf	.1117092206	IH121882-3	.1001	92.81767956		
30-SEP-09	WG157984-6	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699025.pdf	.1141555659	IH121882-3	.1001	94.47513812		
30-SEP-09	WG157984-7	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699026.pdf	.1161729411	IH121882-3	.1001	96.13259669		
18-NOV-10	WG186663-2	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569324.pdf	.0945399822	IH179663-5	.1001	84.03560831		
18-NOV-10	WG186663-3	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569325.pdf	.1004899032	IH179663-5	.1001	89.02077151		
18-NOV-10	WG186663-4	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569326.pdf	.09568207229	IH179663-5	.1001	85.10385757		
18-NOV-10	WG186663-5	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569327.pdf	.09740441783	IH179663-5	.1001	86.61721068		

Galson LOQ Study

01/30/2012 11:01

18-NOV-10	WG186663-6	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569328.pdf	.1000416635	IH179663-5	.1001	88.93175074
20-DEC-11	WG214818-3	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214276.pdf	.1066351739	IH243463-1	.099814	103.8834951
20-DEC-11	WG214818-4	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214277.pdf	.1026749134	IH243463-1	.099814	100
20-DEC-11	WG214818-5	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214278.pdf	.1035133326	IH243463-1	.099814	100.9708738
20-DEC-11	WG214818-6	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214279.pdf	.09966740198	IH243463-1	.099814	96.99029126
20-DEC-11	WG214818-7	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214280.pdf	.09933393979	IH243463-1	.099814	96.60194175

Galson LOQ Study

01/30/2012 11:01

Loq ID: 10814
Department: 15
Matrix: 51
Instrument: LC6
Lot #: 5142
Product: IC-CROTALD
Parm Stored: CROTONALDEHYDE

Comments:

Desorption Solvent: ACETONITRILE
Desorption Vol (mL): 2

Method: MET7098
Analyst: MWJ

LOQ Create Date: 27-MAY-08
Next Verification Date: 20-DEC-11

DE:
Ave. Total (ug): .0881 **Ave. % Rec.:** 87.9641 **MDL:** .0146
Adj. Ave. Total (ug): .0881 **Adj. Ave. % Rec.:** 87.9641 **LOQ (ug):** .1
Std Dev: .0046

E-SPIKE Exclusion Flag: N

Initial Study

Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Manual
WG130164-10	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2987540.pdf	.08144547754	IH65802-1	.0999	81.3373253493	
WG130164-11	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2987541.pdf	.09053414583	IH65802-1	.0999	90.4191616766	
WG130164-12	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2987542.pdf	.09012324762	IH65802-1	.0999	90.0199600798	
WG130164-13	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2987543.pdf	.09299286813	IH65802-1	.0999	92.9141716567	
WG130164-14	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2987544.pdf	.08526121887	IH65802-1	.0999	85.1297405190	

Verifications

Date	Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Pass	Manual
30-SEP-09	WG157984-3	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699022.pdf	.1105444022	IH121882-3	.09996	104.0625		
30-SEP-09	WG157984-4	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699023.pdf	.108379786	IH121882-3	.09996	101.25		
30-SEP-09	WG157984-5	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699024.pdf	.1129537497	IH121882-3	.09996	105.9375		
30-SEP-09	WG157984-6	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699025.pdf	.111220917	IH121882-3	.09996	104.0625		
30-SEP-09	WG157984-7	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699026.pdf	.1233962474	IH121882-3	.09996	115.3125		
18-NOV-10	WG186663-2	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569324.pdf	.1178788389	IH179663-5	.09996	114.5631068		
18-NOV-10	WG186663-3	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569325.pdf	.122011714	IH179663-5	.09996	118.4466019		
18-NOV-10	WG186663-4	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569326.pdf	.1200111705	IH179663-5	.09996	116.5048544		
18-NOV-10	WG186663-5	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569327.pdf	.121645343	IH179663-5	.09996	118.4466019		

18-NOV-10	WG186663-6	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569328.pdf	.1153616861	IH179663-5	.09996	111.6504854
20-DEC-11	WG214818-3	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214276.pdf	.1112205704	IH243463-1	.09996	125.1879699
20-DEC-11	WG214818-4	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214277.pdf	.1081823325	IH243463-1	.09996	121.8045113
20-DEC-11	WG214818-5	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214278.pdf	.1032369182	IH243463-1	.09996	116.1654135
20-DEC-11	WG214818-6	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214279.pdf	.1049189418	IH243463-1	.09996	118.4210526
20-DEC-11	WG214818-7	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214280.pdf	.1107543717	IH243463-1	.09996	125.1879699

Galson LOQ Study

01/30/2012 11:01

Loq ID: 10813
Department: 15
Matrix: 51
Instrument: LC6
Lot #: 5142
Product: IC-PROPALD
Parm Stored: PROPIONALDEHYDE

Comments:

Desorption Solvent: ACETONITRILE
Desorption Vol (mL): 2

Method: MET7098
Analyst: MWJ

LOQ Create Date: 27-MAY-08
Next Verification Date: 20-DEC-12

DE:
Ave. Total (ug): .1013
Adj. Ave. Total (ug): .1013
Std Dev: .0004
Ave. % Rec.: 102.9502
Adj. Ave. % Rec.: 102.9502
MDL: .0013
LOQ (ug): .1

E-SPIKE Exclusion Flag: N

Initial Study

Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Manual
WG130164-10	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2987540.pdf	.1008485709	IH65802-1	.0999	102.746693795	
WG130164-11	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2987541.pdf	.1013264646	IH65802-1	.0999	102.746693795	
WG130164-12	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2987542.pdf	.1020016581	IH65802-1	.0999	103.763987792	
WG130164-13	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2987543.pdf	.1012066317	IH65802-1	.0999	102.746693795	
WG130164-14	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2987544.pdf	.1012690176	IH65802-1	.0999	102.746693795	

Verifications

Date	Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Pass	Manual
30-SEP-09	WG157984-3	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699022.pdf	.1054216757	IH121882-3	.10004	101.6129032		
30-SEP-09	WG157984-4	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699023.pdf	.1052340001	IH121882-3	.10004	101.6129032		
30-SEP-09	WG157984-5	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699024.pdf	.1026863565	IH121882-3	.10004	99.67741935		
30-SEP-09	WG157984-6	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699025.pdf	.1048027142	IH121882-3	.10004	101.6129032		
30-SEP-09	WG157984-7	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699026.pdf	.1077716159	IH121882-3	.10004	104.5161290		
18-NOV-10	WG186663-2	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569324.pdf	.09672604082	IH179663-5	.10004	94.80392157		
18-NOV-10	WG186663-3	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569325.pdf	.1090049324	IH179663-5	.10004	106.8627451		
18-NOV-10	WG186663-4	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569326.pdf	.1017803493	IH179663-5	.10004	100		
18-NOV-10	WG186663-5	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569327.pdf	.1027796124	IH179663-5	.10004	100.9803922		

18-NOV-10	WG186663-6	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569328.pdf	.1051796283	IH179663-5	.10004	102.9411765
20-DEC-11	WG214818-3	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214276.pdf	.104990073	IH243463-1	.10004	104.3046358
20-DEC-11	WG214818-4	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214277.pdf	.1006399229	IH243463-1	.10004	100.3311258
20-DEC-11	WG214818-5	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214278.pdf	.1086488248	IH243463-1	.10004	108.2781457
20-DEC-11	WG214818-6	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214279.pdf	.1088161383	IH243463-1	.10004	108.2781457
20-DEC-11	WG214818-7	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214280.pdf	.1043355821	IH243463-1	.10004	103.3112583

Galson LOQ Study

01/30/2012 11:01

Loq ID: 10872
Department: 15
Matrix: 191
51
74
Instrument: LC2
Lot #: 5142
Product: IC-ACETALD
Parm Stored: ACETALDEHYDE

Desorption Solvent: ACETONITRILE
Desorption Vol (mL): 2

Method: MET7098
Analyst: MWJ

LOQ Create Date: 27-MAY-08
Next Verification Date: 20-DEC-12

Comments: PER LISA SWAB...CHANGING LOQ TO 0.1UG....KLD 9/30/08

DE:

Ave. Total (ug): .0423
Adj. Ave. Total (ug): .0423
Std Dev: .0023

Ave. % Rec.: 105.1393
Adj. Ave. % Rec.: 105.1393

MDL: .0073
LOQ (ug): .1

E-SPIKE Exclusion Flag: N

Initial Study

Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Manual
WG130164-2	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2991154.pdf	.04009256355	IH65802-2	.03996	99.4694960212	
WG130164-3	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2991156.pdf	.03977989576	IH65802-2	.03996	98.9721485411	
WG130164-4	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2991158.pdf	.0432740296	IH65802-2	.03996	107.427055703	
WG130164-5	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2991159.pdf	.04301537751	IH65802-2	.03996	107.427055703	
WG130164-6	/lims/pdf/logins/WG08/WG130164/WG130164_SJ2991161.pdf	.04526611043	IH65802-2	.03996	112.400530504	

Verifications

Date	Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Pass	Manual
30-SEP-09	WG157984-11	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699041.pdf	.02153025443	IH121882-4	.039984	48.90909091		
30-SEP-09	WG157984-12	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699049.pdf	.01673559575	IH121882-4	.039984	38.09090909		
30-SEP-09	WG157984-13	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699056.pdf	.0184904123	IH121882-4	.039984	42		
30-SEP-09	WG157984-14	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699064.pdf	.01988397522	IH121882-4	.039984	45.18181818		
30-SEP-09	WG157984-15	/lims/pdf/logins/WG09/WG157984/WG157984_SJ3699072.pdf	.01566427189	IH121882-4	.039984	35.63636364		
18-NOV-10	WG186663-2	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569324.pdf	.09005419609	IH179663-5	.09996	90.82661290		
18-NOV-10	WG186663-3	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569325.pdf	.08667403983	IH179663-5	.09996	87.39919355		
18-NOV-10	WG186663-4	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569326.pdf	.09256250038	IH179663-5	.09996	93.34677419		
18-NOV-10	WG186663-5	/lims/pdf/logins/WG10/WG186	.09465044747	IH179663-5	.09996	95.46370968		

		663/WG186663_SJ4569327.pdf				
18-NOV-10	WG186663-6	/lims/pdf/logins/WG10/WG186663/WG186663_SJ4569328.pdf	.09137754284	IH179663-5	.09996	92.13709677
20-DEC-11	WG214818-3	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214276.pdf	.0759519204	IH243463-1	.09996	82.57877581
20-DEC-11	WG214818-4	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214277.pdf	.07536555501	IH243463-1	.09996	81.92683810
20-DEC-11	WG214818-5	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214278.pdf	.07039289474	IH243463-1	.09996	76.49402390
20-DEC-11	WG214818-6	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214279.pdf	.07972015445	IH243463-1	.09996	86.70771460
20-DEC-11	WG214818-7	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214280.pdf	.08200046431	IH243463-1	.09996	89.09815284

Galson LOQ Study

01/30/2012 11:01

Loq ID: 14231
Department: 15
Matrix: 191
51
Instrument: LC7
Lot #: 6009
Product: IC-FORM
Parm Stored: FORMALDEHYDE

Desorption Solvent: ACETONITRILE
Desorption Vol (mL): 2

Method: MET7098
Analyst: MWJ

LOQ Create Date: 28-OCT-09
Next Verification Date: 20-DEC-12

Comments: LOQ demonstrated at 0.04 ug for CTEH. LOQ changed to 0.1 ug to accomodate other clients

DE:
Ave. Total (ug): .0413
Adj. Ave. Total (ug): .0413
Std Dev: .0042
Ave. % Rec.: 98.7134
Adj. Ave. % Rec.: 98.7134
MDL: .0131
LOQ (ug): .1

E-SPIKE Exclusion Flag: N

Initial Study

Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Manual
WG159829-12	/lims/pdf/logins/WG09/WG159829/WG159829_SJ3741861.pdf	.039	IH125383-7	.040035924	93.0573248408	
WG159829-13	/lims/pdf/logins/WG09/WG159829/WG159829_SJ3741862.pdf	.0431	IH125383-7	.040035924	103.184713376	
WG159829-14	/lims/pdf/logins/WG09/WG159829/WG159829_SJ3741863.pdf	.0353	IH125383-7	.040035924	84.2675159236	
WG159829-15	/lims/pdf/logins/WG09/WG159829/WG159829_SJ3741864.pdf	.0431	IH125383-7	.040035924	103.184713376	
WG159829-16	/lims/pdf/logins/WG09/WG159829/WG159829_SJ3741865.pdf	.046	IH125383-7	.040035924	109.872611465	

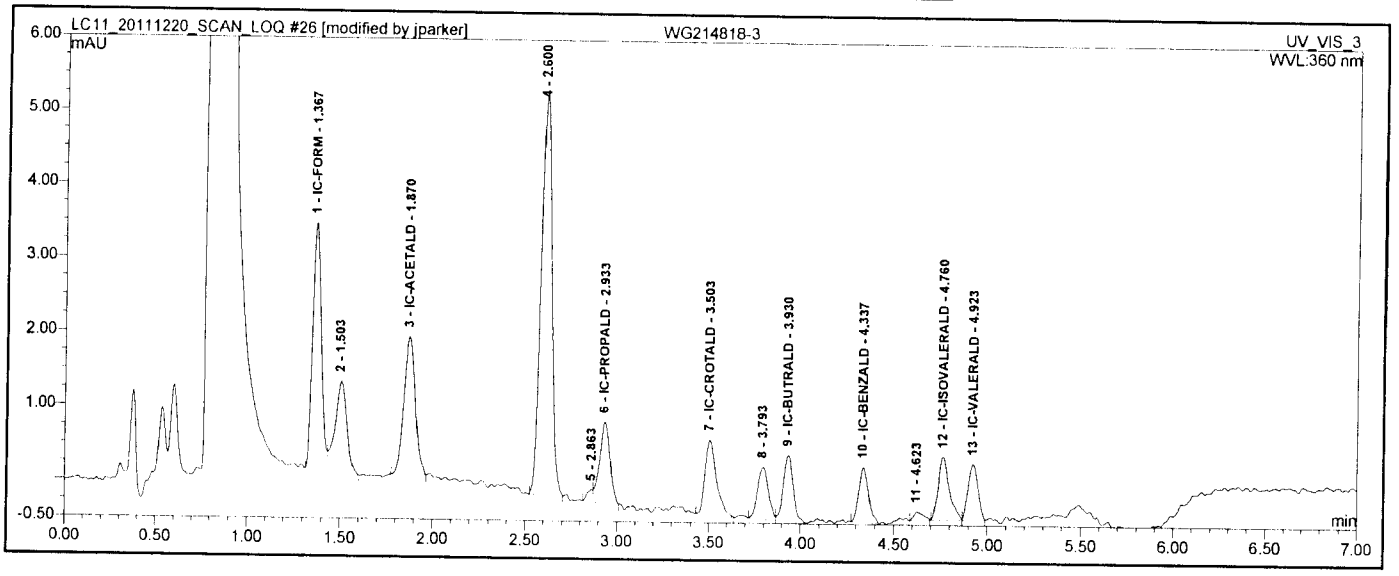
Verifications

Date	Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Pass	Manual
20-DEC-11	WG214818-3	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214276.pdf	.1032474124	IH243463-1	.099957	106.8095403		
20-DEC-11	WG214818-4	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214277.pdf	.1006483781	IH243463-1	.099957	104.7355686		
20-DEC-11	WG214818-5	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214278.pdf	.1035263012	IH243463-1	.099957	107.8465261		
20-DEC-11	WG214818-6	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214279.pdf	.1038091181	IH243463-1	.099957	107.8465261		
20-DEC-11	WG214818-7	/lims/pdf/logins/WG11/WG214818/WG214818_SJ5214280.pdf	.1012820973	IH243463-1	.099957	104.7355686		

WG214818-3

WG214818-3,IH243463-1,50,LCIH2TUBE

Sample Name:	**WG214818-3**	*Injection Volume:*	**3.0**
Vial Number:	**2_C5**	*Channel:*	**UV_VIS_3**
Sample Type:	**BS**	*Lot Correction:*	**0 ug**
Control Program:	**Aldehyde_20101117**	*Standard Method:*	**External**
Quantif. Method:	**Aldehyde_20111123**		
Recording Time:	**12/20/2011 19:08**		
Run Time (min):	**7.00**		



No.	Peak Name	RT min	Area mAU*min	Cal.Type	RF-Value Conc/Area	Offset b	Slope m	Conc ug/mL	*Dilution	*DeVol mL	*Lot Corr ug	Total ug
1	IC-FORM	1.37	0.181	XXLOff	3.928E-1	-2.248E-3	2.546E+0	0.0719	1	2	0.04060	0.1032
2	n.a.	1.50	0.090	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
3	IC-ACETALD	1.87	0.129	XXLOff	5.283E-1	1.373E-3	1.893E+0	0.0677	1	2	0.05940	0.0760
4	n.a.	2.60	0.353	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
5	n.a.	2.86	0.005	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
6	IC-PROPALD	2.93	0.070	XXLOff	7.381E-1	-1.176E-3	1.355E+0	0.0525	1	2	0.00000	0.1050
7	IC-CROTALD	3.50	0.073	XXLOff	7.947E-1	2.840E-3	1.258E+0	0.0556	1	2	0.00000	0.1112
8	n.a.	3.79	0.048	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
9	IC-BUTRALD	3.93	0.056	XXLOff	9.527E-1	-1.635E-4	1.050E+0	0.0533	1	2	0.00000	0.1066
10	IC-BENZALD	4.34	0.043	XXLOff	1.155E+0	1.397E-3	8.654E-1	0.0485	1	2	0.00000	0.0969
11	n.a.	4.62	0.007	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
12	IC-ISOVALERA	4.76	0.059	XXLOff	9.647E-1	-2.097E-3	1.037E+0	0.0585	1	2	0.00000	0.1170
13	IC-VALERALD	4.92	0.045	XXLOff	1.138E+0	4.821E-4	8.789E-1	0.0512	1	2	0.00000	0.1024
Total:			1.159									

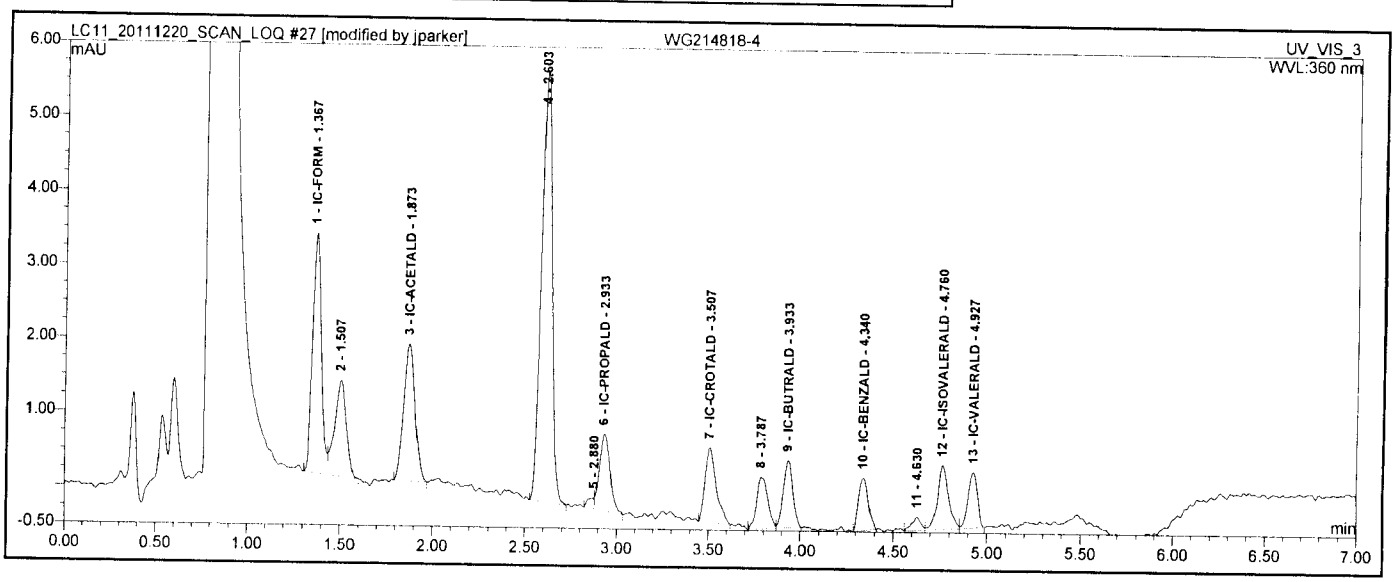
	Group Name	Group Area mAU*min	Cal.Type	RF-Value Conc/Area	Offset b	Slope m	Group Conc ug/mL	*Dilution	*DeVol mL	*Lot Corr ug	Group Total ug
		0.656	XXLOff	1.138E+0	4.821E-4	8.789E-1	n.a.	1	2	0.00000	n.a.

Chromeleon (c) Dionex 1996-2006
Version 6.80 DU10a Build 2826 (171948)

WG214818-4

WG214818-4,IH243463-1,50,LCIH2TUBE

Sample Name:	**WG214818-4**	*Injection Volume:*	**3.0**
Vial Number:	**2_C6**	*Channel:*	**UV_VIS_3**
Sample Type:	**BS**	*Lot Correction:*	**0 ug**
Control Program:	**Aldehyde_20101117**	*Standard Method:*	**External**
Quantif. Method:	**Aldehyde_20111123**		
Recording Time:	**12/20/2011 19:16**		
Run Time (min):	**7.00**		



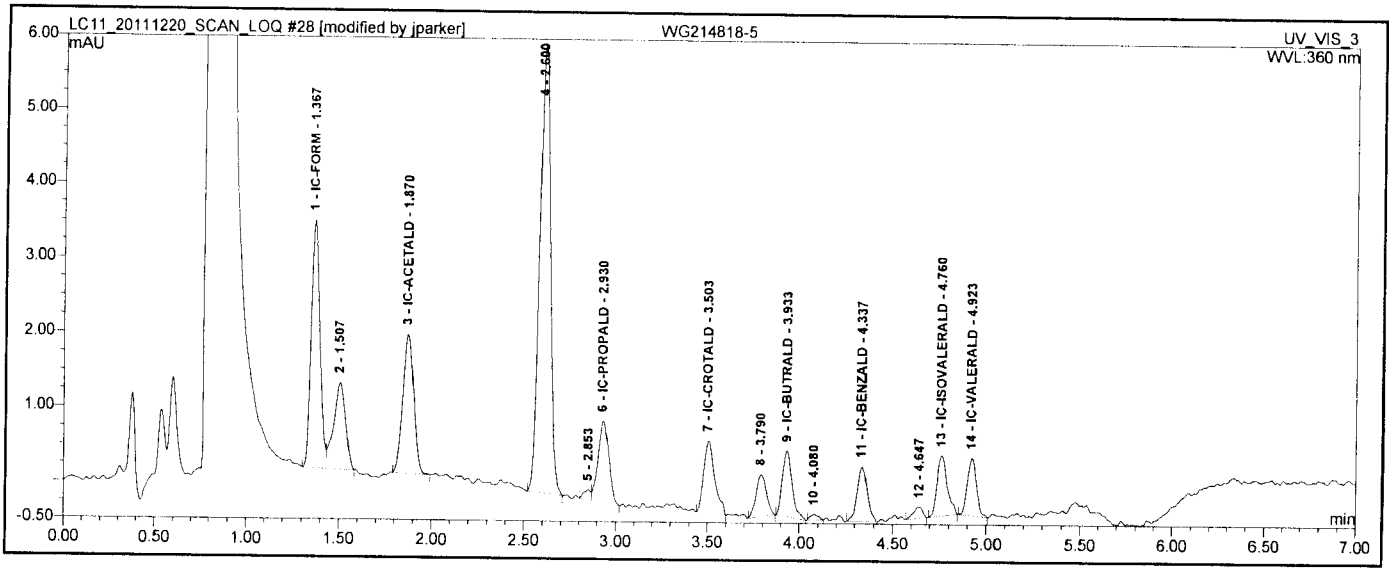
No.	Peak Name	RT min	Area mAU*min	Cal.Type	RF-Value Conc/Area	Offset b	Slope m	Conc ug/mL	*Dilution	*DeVol mL	*Lot Corr ug	Total ug
1	IC-FORM	1.37	0.178	XXLOff	3.928E-1	-2.248E-3	2.546E+0	0.0706	1	2	0.04060	0.1006
2	n.a.	1.51	0.093	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
3	IC-ACETALD	1.87	0.129	XXLOff	5.283E-1	1.373E-3	1.893E+0	0.0674	1	2	0.05940	0.0754
4	n.a.	2.60	0.377	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
5	n.a.	2.88	0.006	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
6	IC-PROPALD	2.93	0.067	XXLOff	7.381E-1	-1.176E-3	1.355E+0	0.0503	1	2	0.00000	0.1006
7	IC-CROTALD	3.51	0.071	XXLOff	7.947E-1	2.840E-3	1.258E+0	0.0541	1	2	0.00000	0.1082
8	n.a.	3.79	0.049	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
9	IC-BUTRALD	3.93	0.054	XXLOff	9.527E-1	-1.635E-4	1.050E+0	0.0513	1	2	0.00000	0.1027
10	IC-BENZALD	4.34	0.042	XXLOff	1.155E+0	1.397E-3	8.654E-1	0.0466	1	2	0.00000	0.0932
11	n.a.	4.63	0.010	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
12	IC-ISOVALERA	4.76	0.057	XXLOff	9.647E-1	-2.097E-3	1.037E+0	0.0575	1	2	0.00000	0.1150
13	IC-VALERALD	4.93	0.043	XXLOff	1.138E+0	4.821E-4	8.789E-1	0.0484	1	2	0.00000	0.0968
Total:			1.175									

	Group Name	Group Area mAU*min	Cal.Type	RF-Value Conc/Area	Offset b	Slope m	Group Conc ug/mL	*Dilution	*DeVol mL	*Lot Corr ug	Group Total ug
		0.640	XXLOff	1.138E+0	4.821E-4	8.789E-1	n.a.	1	2	0.00000	n.a.

WG214818-5

WG214818-5,IH243463-1,50,LCIH2TUBE

Sample Name:	**WG214818-5**	*Injection Volume:*	**3.0**
Vial Number:	**2_C7**	*Channel:*	**UV_VIS_3**
Sample Type:	**BS**	*Lot Correction:*	**0 ug**
Control Program:	**Aldehyde_20101117**	*Standard Method:*	**External**
Quantif. Method:	**Aldehyde_20111123**		
Recording Time:	**12/20/2011 19:24**		
Run Time (min):	**7.00**		



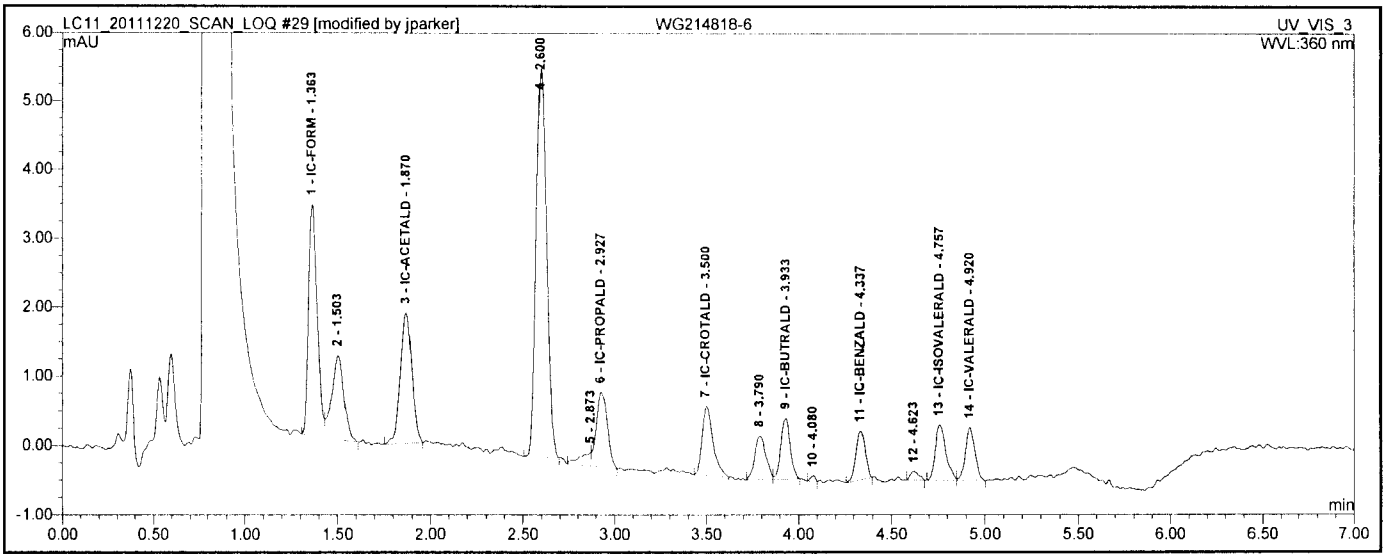
No.	Peak Name	RT min	Area mAU*min	Cal.Type	RF-Value Conc/Area	Offset b	Slope m	Conc ug/mL	*Dilution	*DeVol mL	*Lot Corr ug	Total ug
1	IC-FORM	1.37	0.181	XXLOff	3.928E-1	-2.248E-3	2.546E+0	0.0721	1	2	0.04060	0.1035
2	n.a.	1.51	0.085	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
3	IC-ACETALD	1.87	0.124	XXLOff	5.283E-1	1.373E-3	1.893E+0	0.0649	1	2	0.05940	0.0704
4	n.a.	2.60	0.394	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
5	n.a.	2.85	0.006	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
6	IC-PROPALD	2.93	0.072	XXLOff	7.381E-1	-1.176E-3	1.355E+0	0.0543	1	2	0.00000	0.1086
7	IC-CROTALD	3.50	0.068	XXLOff	7.947E-1	2.840E-3	1.258E+0	0.0516	1	2	0.00000	0.1032
8	n.a.	3.79	0.037	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
9	IC-BUTRALD	3.93	0.054	XXLOff	9.527E-1	-1.635E-4	1.050E+0	0.0518	1	2	0.00000	0.1035
10	n.a.	4.08	0.003	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
11	IC-BENZALD	4.34	0.045	XXLOff	1.155E+0	1.397E-3	8.654E-1	0.0503	1	2	0.00000	0.1006
12	n.a.	4.65	0.009	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
13	IC-ISOVALERA	4.76	0.052	XXLOff	9.647E-1	-2.097E-3	1.037E+0	0.0519	1	2	0.00000	0.1039
14	IC-VALERALD	4.92	0.044	XXLOff	1.138E+0	4.821E-4	8.789E-1	0.0497	1	2	0.00000	0.0993
Total:			1.175									

	Group Name	Group Area mAU*min	Cal.Type	RF-Value Conc/Area	Offset b	Slope m	Group Conc ug/mL	*Dilution	*DeVol mL	*Lot Corr ug	Group Total ug
		0.641	XXLOff	1.138E+0	4.821E-4	8.789E-1	n.a.	1	2	0.00000	n.a.

WG214818-6

WG214818-6,IH243463-1,50,LCIH2TUBE

Sample Name:	**WG214818-6**	*Injection Volume:*	**3.0**
Vial Number:	**2_C8**	*Channel:*	**UV_VIS_3**
Sample Type:	**BS**	*Lot Correction:*	**0 ug**
Control Program:	**Aldehyde_20101117**	*Standard Method:*	**External**
Quantif. Method:	**Aldehyde_20111123**		
Recording Time:	**12/20/2011 19:32**		
Run Time (min):	**7.00**		



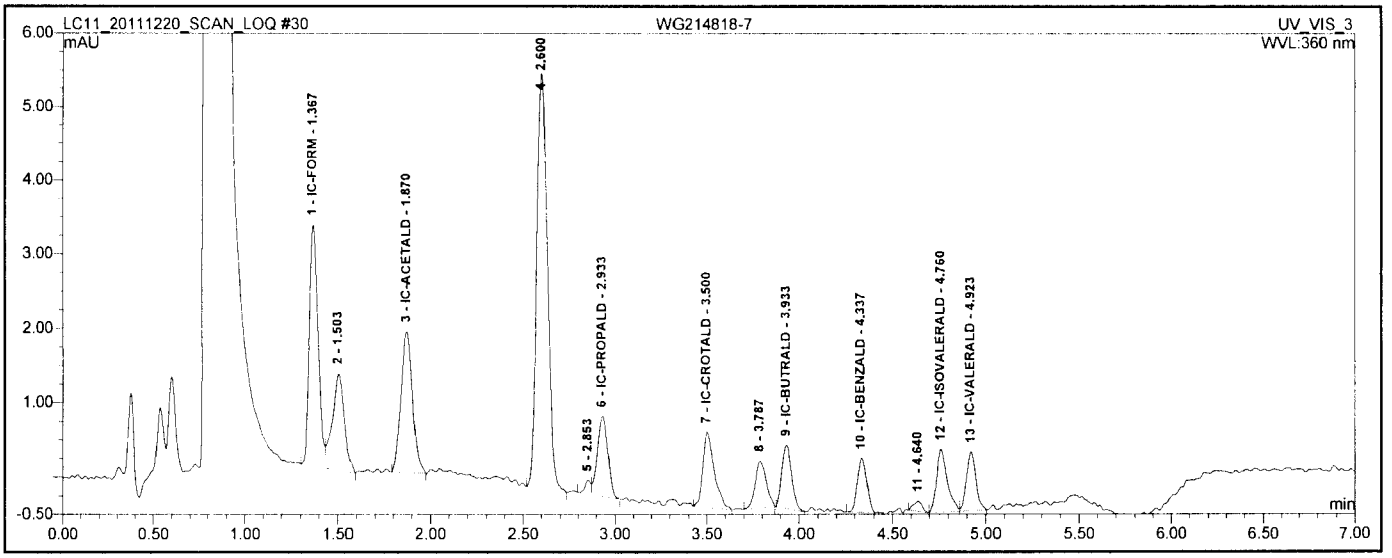
No.	Peak Name	RT min	Area mAU*min	Cal.Type	RF-Value Conc/Area	Offset b	Slope m	Conc ug/mL	*Dilution	*DeVol mL	*Lot Corr ug	Total ug
1	IC-FORM	1.36	0.182	XXLOff	3.928E-1	-2.248E-3	2.546E+0	0.0722	1	2	0.04060	0.1038
2	n.a.	1.50	0.090	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
3	IC-ACETALD	1.87	0.133	XXLOff	5.283E-1	1.373E-3	1.893E+0	0.0696	1	2	0.05940	0.0797
4	n.a.	2.60	0.364	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
5	n.a.	2.87	0.013	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
6	IC-PROPALD	2.93	0.073	XXLOff	7.381E-1	-1.176E-3	1.355E+0	0.0544	1	2	0.00000	0.1088
7	IC-CROTALD	3.50	0.069	XXLOff	7.947E-1	2.840E-3	1.258E+0	0.0525	1	2	0.00000	0.1049
8	n.a.	3.79	0.044	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
9	IC-BUTRALD	3.93	0.052	XXLOff	9.527E-1	-1.635E-4	1.050E+0	0.0498	1	2	0.00000	0.0997
10	n.a.	4.08	0.002	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
11	IC-BENZALD	4.34	0.040	XXLOff	1.155E+0	1.397E-3	8.654E-1	0.0443	1	2	0.00000	0.0885
12	n.a.	4.62	0.007	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
13	IC-ISOVALERA	4.76	0.054	XXLOff	9.647E-1	-2.097E-3	1.037E+0	0.0542	1	2	0.00000	0.1084
14	IC-VALERALD	4.92	0.046	XXLOff	1.138E+0	4.821E-4	8.789E-1	0.0513	1	2	0.00000	0.1027
Total:			1.168									

	Group Name	Group Area mAU*min	Cal.Type	RF-Value Conc/Area	Offset b	Slope m	Group Conc ug/mL	*Dilution	*DeVol mL	*Lot Corr ug	Group Total ug
		0.648	XXLOff	1.138E+0	4.821E-4	8.789E-1	n.a.	1	2	0.00000	n.a.

WG214818-7

WG214818-7,IH243463-1,50,LCIH2TUBE

Sample Name:	**WG214818-7**	*Injection Volume:*	**3.0**
Vial Number:	**2_D1**	*Channel:*	**UV_VIS_3**
Sample Type:	**BS**	*Lot Correction:*	**0 ug**
Control Program:	**Aldehyde_20101117**	*Standard Method:*	**External**
Quantif. Method:	**Aldehyde_20111123**		
Recording Time:	**12/20/2011 19:40**		
Run Time (min):	**7.00**		



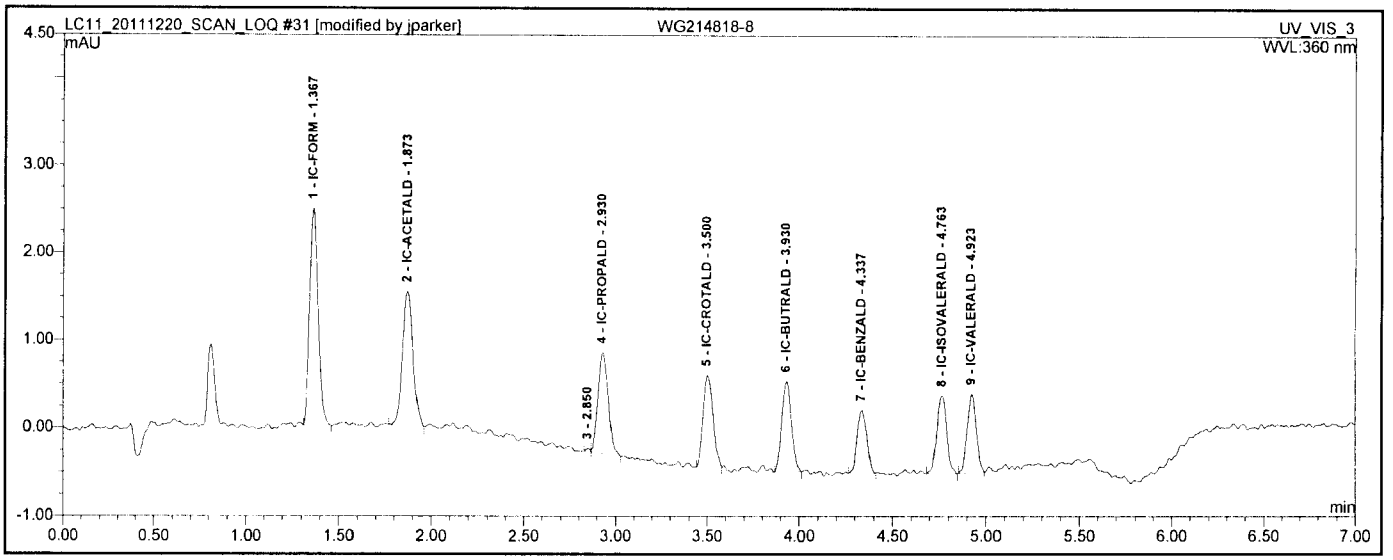
No.	Peak Name	RT min	Area mAU*min	Cal.Type	RF-Value Conc/Area	Offset b	Slope m	Conc ug/mL	*Dilution	*DeVol mL	*Lot Corr ug	Total ug
1	IC-FORM	1.37	0.178	XXLOff	3.928E-1	-2.248E-3	2.546E+0	0.0709	1	2	0.04060	0.1013
2	n.a.	1.50	0.096	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
3	IC-ACETALD	1.87	0.135	XXLOff	5.283E-1	1.373E-3	1.893E+0	0.0707	1	2	0.05940	0.0820
4	n.a.	2.60	0.366	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
5	n.a.	2.85	0.006	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
6	IC-PROPALD	2.93	0.069	XXLOff	7.381E-1	-1.176E-3	1.355E+0	0.0522	1	2	0.00000	0.1043
7	IC-CROTALD	3.50	0.073	XXLOff	7.947E-1	2.840E-3	1.258E+0	0.0554	1	2	0.00000	0.1108
8	n.a.	3.79	0.044	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
9	IC-BUTRALD	3.93	0.052	XXLOff	9.527E-1	-1.635E-4	1.050E+0	0.0497	1	2	0.00000	0.0993
10	IC-BENZALD	4.34	0.041	XXLOff	1.155E+0	1.397E-3	8.654E-1	0.0459	1	2	0.00000	0.0918
11	n.a.	4.64	0.007	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
12	IC-ISOVALERA	4.76	0.057	XXLOff	9.647E-1	-2.097E-3	1.037E+0	0.0570	1	2	0.00000	0.1139
13	IC-VALERALD	4.92	0.046	XXLOff	1.138E+0	4.821E-4	8.789E-1	0.0521	1	2	0.00000	0.1041
Total:			1.171									

	Group Name	Group Area mAU*min	Cal.Type	RF-Value Conc/Area	Offset b	Slope m	Group Conc ug/mL	*Dilution	*DeVol mL	*Lot Corr ug	Group Total ug
		0.652	XXLOff	1.138E+0	4.821E-4	8.789E-1	n.a.	1	2	0.00000	n.a.

WG214818-8

WG214818-8,WG214826,LCIH2TUBE

Sample Name:	**WG214818-8**	*Injection Volume:*	**3.0**
Vial Number:	**2_D2**	*Channel:*	**UV_VIS_3**
Sample Type:	**EBLANK**	*Lot Correction:*	**0 ug**
Control Program:	**Aldehyde_20101117**	*Standard Method:*	**External**
Quantif. Method:	**Aldehyde_20111123**		
Recording Time:	**12/20/2011 19:48**		
Run Time (min):	**7.00**		



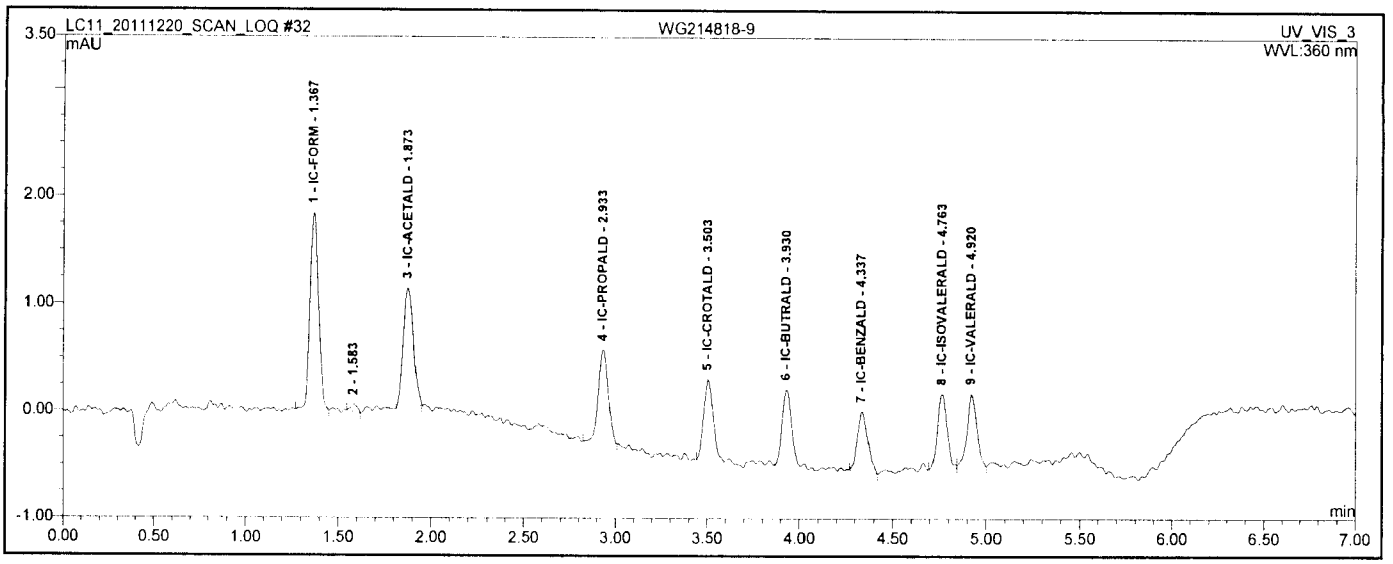
No.	Peak Name	RT min	Area mAU*min	Cal.Type	RF-Value Conc/Area	Offset b	Slope m	Conc ug/mL	*Dilution	*DeVol mL	*Lot Corr ug	Total ug
1	IC-FORM	1.37	0.133	XXLOff	3.928E-1	-2.248E-3	2.546E+0	0.0529	1	2	0.00000	0.1059
2	IC-ACETALD	1.87	0.100	XXLOff	5.283E-1	1.373E-3	1.893E+0	0.0520	1	2	0.00000	0.1040
3	n.a.	2.85	0.001	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
4	IC-PROPALD	2.93	0.073	XXLOff	7.381E-1	-1.176E-3	1.355E+0	0.0550	1	2	0.00000	0.1101
5	IC-CROTALD	3.50	0.065	XXLOff	7.947E-1	2.840E-3	1.258E+0	0.0496	1	2	0.00000	0.0992
6	IC-BUTRALD	3.93	0.063	XXLOff	9.527E-1	-1.635E-4	1.050E+0	0.0598	1	2	0.00000	0.1195
7	IC-BENZALD	4.34	0.043	XXLOff	1.155E+0	1.397E-3	8.654E-1	0.0476	1	2	0.00000	0.0952
8	IC-ISOVALERA	4.76	0.054	XXLOff	9.647E-1	-2.097E-3	1.037E+0	0.0541	1	2	0.00000	0.1082
9	IC-VALERALD	4.92	0.050	XXLOff	1.138E+0	4.821E-4	8.789E-1	0.0566	1	2	0.00000	0.1133
Total:			0.581									

	Group Name	Group Area mAU*min	Cal.Type	RF-Value Conc/Area	Offset b	Slope m	Group Conc ug/mL	*Dilution	*DeVol mL	*Lot Corr ug	Group Total ug
		0.580	XXLOff	1.138E+0	4.821E-4	8.789E-1	n.a.	1	2	0.00000	n.a.

WG214818-9

WG214818-9,WG214826,LCIH2TUBE

Sample Name:	**WG214818-9**	*Injection Volume:*	**3.0**
Vial Number:	**2_D3**	*Channel:*	**UV_VIS_3**
Sample Type:	**EBLANK**	*Lot Correction:*	**0 ug**
Control Program:	**Aldehyde_20101117**	*Standard Method:*	**External**
Quantif. Method:	**Aldehyde_20111123**		
Recording Time:	**12/20/2011 19:56**		
Run Time (min):	**7.00**		



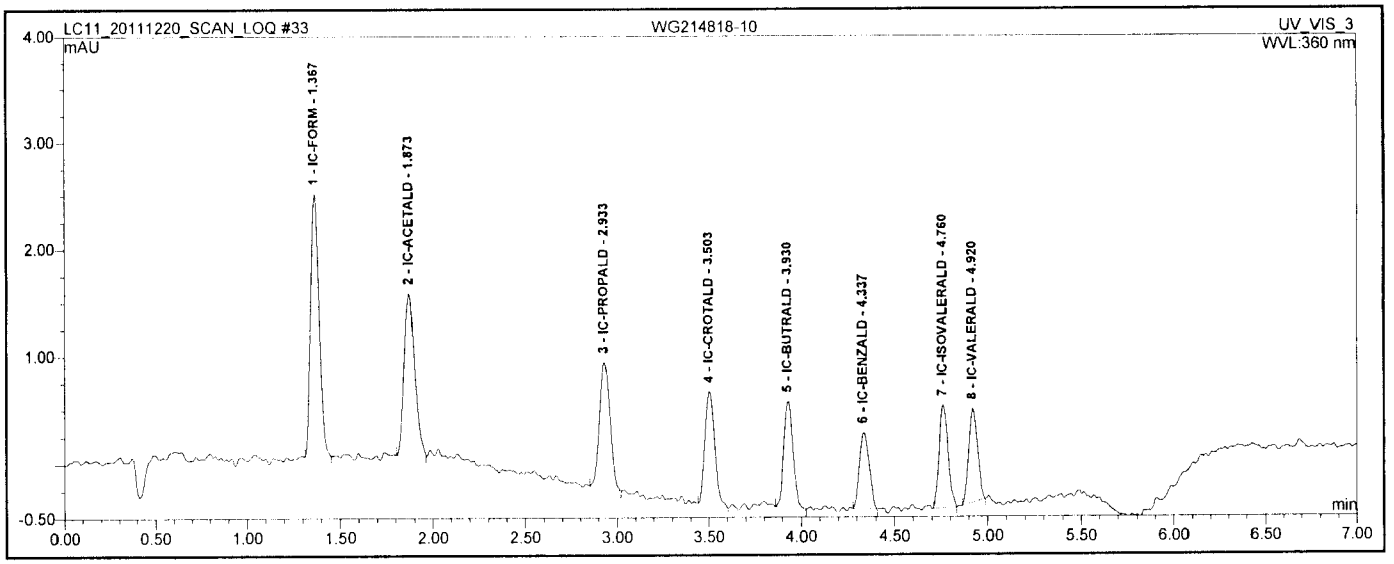
No.	Peak Name	RT min	Area mAU*min	Cal.Type	RF-Value Conc/Area	Offset b	Slope m	Conc ug/mL	*Dilution	*DeVol mL	*Lot Corr ug	Total ug
1	IC-FORM	1.37	0.099	XXLOff	3.928E-1	-2.248E-3	2.546E+0	0.0396	1	2	0.00000	0.0793
2	n.a.	1.58	0.003	n.a.	n.a.	n.a.	n.a.	n.a.	1	2	n.a.	0.0000
3	IC-ACETALD	1.87	0.070	XXLOff	5.283E-1	1.373E-3	1.893E+0	0.0361	1	2	0.00000	0.0721
4	IC-PROPALD	2.93	0.054	XXLOff	7.381E-1	-1.176E-3	1.355E+0	0.0405	1	2	0.00000	0.0811
5	IC-CROTALD	3.50	0.045	XXLOff	7.947E-1	2.840E-3	1.258E+0	0.0338	1	2	0.00000	0.0676
6	IC-BUTRALD	3.93	0.042	XXLOff	9.527E-1	-1.635E-4	1.050E+0	0.0399	1	2	0.00000	0.0799
7	IC-BENZALD	4.34	0.035	XXLOff	1.155E+0	1.397E-3	8.654E-1	0.0393	1	2	0.00000	0.0787
8	IC-ISOVALERA	4.76	0.042	XXLOff	9.647E-1	-2.097E-3	1.037E+0	0.0422	1	2	0.00000	0.0844
9	IC-VALERALD	4.92	0.041	XXLOff	1.138E+0	4.821E-4	8.789E-1	0.0460	1	2	0.00000	0.0921
Total:			0.43									

	Group Name	Group Area mAU*min	Cal.Type	RF-Value Conc/Area	Offset b	Slope m	Group Conc ug/mL	*Dilution	*DeVol mL	*Lot Corr ug	Group Total ug
		0.427	XXLOff	1.138E+0	4.821E-4	8.789E-1	n.a.	1	2	0.00000	n.a.

WG214818-10

WG214818-10,WG214826,LCIH2TUBE

Sample Name:	**WG214818-10**	*Injection Volume:*	**3.0**
Vial Number:	**2_D4**	*Channel:*	**UV_VIS_3**
Sample Type:	**EBLANK**	*Lot Correction:*	**0 ug**
Control Program:	**Aldehyde_20101117**	*Standard Method:*	**External**
Quantif. Method:	**Aldehyde_20111123**		
Recording Time:	**12/20/2011 20:04**		
Run Time (min):	**7.00**		



No.	Peak Name	RT min	Area mAU*min	Cal.Type	RF-Value Conc/Area	Offset b	Slope m	Conc ug/mL	*Dilution	*DeVol mL	*Lot Corr ug	Total ug
1	IC-FORM	1.37	0.130	XXLOff	3.928E-1	-2.248E-3	2.546E+0	0.0519	1	2	0.00000	0.1038
2	IC-ACETALD	1.87	0.096	XXLOff	5.283E-1	1.373E-3	1.893E+0	0.0500	1	2	0.00000	0.0999
3	IC-PROPALD	2.93	0.074	XXLOff	7.381E-1	-1.176E-3	1.355E+0	0.0555	1	2	0.00000	0.1110
4	IC-CROTALD	3.50	0.065	XXLOff	7.947E-1	2.840E-3	1.258E+0	0.0495	1	2	0.00000	0.0991
5	IC-BUTRALD	3.93	0.057	XXLOff	9.527E-1	-1.635E-4	1.050E+0	0.0546	1	2	0.00000	0.1093
6	IC-BENZALD	4.34	0.041	XXLOff	1.155E+0	1.397E-3	8.654E-1	0.0458	1	2	0.00000	0.0916
7	IC-ISOVALERA	4.76	0.053	XXLOff	9.647E-1	-2.097E-3	1.037E+0	0.0536	1	2	0.00000	0.1071
8	IC-VALERALD	4.92	0.048	XXLOff	1.138E+0	4.821E-4	8.789E-1	0.0543	1	2	0.00000	0.1086
Total:			0.565									

	Group Name	Group Area mAU*min	Cal.Type	RF-Value Conc/Area	Offset b	Slope m	Group Conc ug/mL	*Dilution	*DeVol mL	*Lot Corr ug	Group Total ug
		0.565	XXLOff	1.138E+0	4.821E-4	8.789E-1	n.a.	1	2	0.00000	n.a.

Galson LOQ Study

01/30/2012 13:01

Loq ID: 13811
Department: 28
Matrix: 112
174
Instrument: IC6
Lot #:
Product: II-HF
Parm Stored: HYDROFLUORIC ACID

Desorption Solvent:
Desorption Vol (mL): 10

Method: MET11882
Analyst: aab

LOQ Create Date: 03-SEP-09
Next Verification Date: 12-DEC-12

Comments: AS14A Column, Diluent: Water, Eluent: 8mM Na2CO3/1mM NaHCO3

DE:			
Ave. Total (ug): 9.616	**Ave. % Rec.:** 93.6039	**MDL:** 1.8924
Adj. Ave. Total (ug): 9.616	**Adj. Ave. % Rec.:** 93.6039	**LOQ (ug):** 10
Std Dev: .6021		

E-SPIKE Exclusion Flag: N

Initial Study

Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Manual
WG156162-3	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3658992.pdf	10.42705953	12081	10	101.298701299	
WG156162-4	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3658998.pdf	8.997793721	12081	10	87.6623376623	
WG156162-5	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3659003.pdf	9.969244517	12081	10	97.1103896104	
WG156162-6	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3659008.pdf	9.081938646	12081	10	88.4415584416	
WG156162-7	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3659012.pdf	9.604065989	12081	10	93.5064935065	

Verifications

Date	Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Pass	Manual
30-NOV-10	WG187418-5	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505297.pdf	9.19602599	13210	10	89.32038835		
30-NOV-10	WG187418-7	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505299.pdf	8.843095622	13210	10	85.82524272		
30-NOV-10	WG187418-8	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505300.pdf	8.716555737	13210	10	84.66019417		
30-NOV-10	WG187418-9	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505301.pdf	9.335565825	13210	10	90.67961165		
30-NOV-10	WG187418-6	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505298.pdf	8.553638937	13210	10	83.00970874		
12-DEC-11	WG214136-5	/lims/pdf/logins/WG11/WG214136/WG214136_SJ5190787.pdf	9.266826206	15442	10	93.51042367		
12-DEC-11	WG214136-6	/lims/pdf/logins/WG11/WG214136/WG214136_SJ5190788.pdf	9.486902628	15442	10	95.72965703		
12-DEC-11	WG214136-7	/lims/pdf/logins/WG11/WG214136/WG214136_SJ5190789.pdf	9.663946492	15442	10	97.44451917		
12-DEC-11	WG214136-8	/lims/pdf/logins/WG11/WG214136/WG214136_SJ5190790.p	9.049208659	15442	10	91.29119032		

12-DEC-11	WG214136-9	df /lims/pdf/logins/WG11/WG214136/WG214136_SJ5190791.pdf	8.812567776	15442	10	88.87020847

Galson LOQ Study

01/30/2012 13:01

Loq ID: 13831
Department: 28
Matrix: 112
174
Instrument: IC6
Lot #:
Product: II-HCL
Parm Stored: HYDROCHLORIC ACID

Desorption Solvent:
Desorption Vol (mL): 10

Method: MET11882
Analyst: AAB

LOQ Create Date: 03-SEP-09
Next Verification Date: 12-DEC-12

Comments: AS14A Column, Diluent: Water, Eluent: 8mM Na2CO3/1mM NaHCO3

DE:
Ave. Total (ug): 10.693 **Ave. % Rec.:** 105.5921 **MDL:** 1.0042
Adj. Ave. Total (ug): 10.693 **Adj. Ave. % Rec.:** 105.5921 **LOQ (ug):** 10
Std Dev: .3195

E-SPIKE Exclusion Flag: N

Initial Study

Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Manual
WG156162-3	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3658992.pdf	10.33813602	12081	10	101.644736842	
WG156162-4	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3658998.pdf	10.58753143	12081	10	104.605263158	
WG156162-5	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3659003.pdf	11.21204997	12081	10	110.526315789	
WG156162-6	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3659008.pdf	10.67111707	12081	10	105.592105263	
WG156162-7	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3659012.pdf	10.65597128	12081	10	105.592105263	

Verifications

Date	Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Pass	Manual
30-NOV-10	WG187418-5	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505297.pdf	10.82931889	13210	10	104.8543689		
30-NOV-10	WG187418-6	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505298.pdf	10.78466596	13210	10	104.8543689		
30-NOV-10	WG187418-7	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505299.pdf	10.54680543	13210	10	101.9417476		
30-NOV-10	WG187418-8	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505300.pdf	10.82030439	13210	10	104.8543689		
30-NOV-10	WG187418-9	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505301.pdf	10.52206945	13210	10	101.9417476		
12-DEC-11	WG214136-5	/lims/pdf/logins/WG11/WG214136/WG214136_SJ5190787.pdf	10.3516689	15442	10	105.4410274		
12-DEC-11	WG214136-6	/lims/pdf/logins/WG11/WG214136/WG214136_SJ5190788.pdf	10.44373079	15442	10	105.4410274		
12-DEC-11	WG214136-7	/lims/pdf/logins/WG11/WG214136/WG214136_SJ5190789.pdf	10.48402113	15442	10	106.4548834		
12-DEC-11	WG214136-8	/lims/pdf/logins/WG11/WG214136/WG214136_SJ5190790.p	10.43764729	15442	10	105.4410274		

12-DEC-11	WG214136-9	df /lims/pdf/logins/WG11/WG214136/WG214136_SJ5190791.pdf	10.57100605	15442	10	107.4687394

Galson LOQ Study

01/30/2012 13:01

Loq ID: 13832
Department: 28
Matrix: 112
174
Instrument: IC6
Lot #:
Product: II-HBR
Parm Stored: HYDROBROMIC ACID

Desorption Solvent:
Desorption Vol (mL): 10

Method: MET11882
Analyst: AAB

LOQ Create Date: 03-SEP-09
Next Verification Date: 12-DEC-12

Comments: AS14A Column, Diluent: Water, Eluent: 8mM Na2CO3/1mM NaHCO3

DE:	Ave. Total (ug): 10.5575	Ave. % Rec.: 100.5714	MDL: .8317
	Adj. Ave. Total (ug): 10.5575	Adj. Ave. % Rec.: 100.5714	LOQ (ug): 10
	Std Dev: .2646		

E-SPIKE Exclusion Flag: N

Initial Study

Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Manual
WG156162-3	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3658992.pdf	10.28330332	12081	10	98.0952380952	
WG156162-4	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3658998.pdf	10.96425792	12081	10	104.761904762	
WG156162-5	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3659003.pdf	10.54182934	12081	10	100	
WG156162-6	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3659008.pdf	10.62640176	12081	10	100.952380952	
WG156162-7	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3659012.pdf	10.37190861	12081	10	99.0476190476	

Verifications

Date	Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Pass	Manual
30-NOV-10	WG187418-5	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505297.pdf	10.66606456	13210	10	104.2207792		
30-NOV-10	WG187418-6	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505298.pdf	10.2101644	13210	10	99.35064935		
30-NOV-10	WG187418-7	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505299.pdf	10.24859808	13210	10	99.35064935		
30-NOV-10	WG187418-8	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505300.pdf	10.3638718	13210	10	101.2987013		
30-NOV-10	WG187418-9	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505301.pdf	10.16443821	13210	10	99.35064935		
12-DEC-11	WG214136-5	/lims/pdf/logins/WG11/WG214136/WG214136_SJ5190787.pdf	10.7732996	15442	10	102.2082019		
12-DEC-11	WG214136-6	/lims/pdf/logins/WG11/WG214136/WG214136_SJ5190788.pdf	10.94484933	15442	10	103.1545741		
12-DEC-11	WG214136-7	/lims/pdf/logins/WG11/WG214136/WG214136_SJ5190789.pdf	11.07811993	15442	10	105.0473186		
12-DEC-11	WG214136-8	/lims/pdf/logins/WG11/WG214136/WG214136_SJ5190790.p	10.96744745	15442	10	104.1009464		

12-DEC-11	WG214136-9	df /lims/pdf/logins/WG11/WG214136/WG214136_SJ5190791.pdf	10.94795342	15442	10	103.1545741

Galson LOQ Study

01/30/2012 13:01

Loq ID: 13833
Department: 28
Matrix: 112
174
Instrument: IC6
Lot #:
Product: II-HNO3
Parm Stored: NITRIC ACID

Desorption Solvent:
Desorption Vol (mL): 10

Method: MET11882
Analyst: AAB

LOQ Create Date: 03-SEP-09
Next Verification Date: 12-DEC-12

Comments: AS14A Column, Diluent: Water, Eluent: 8mM Na2CO3/1mM NaHCO3

DE:	Ave. Total (ug): 10.8195	Ave. % Rec.: 100.8075	MDL: .9116
	Adj. Ave. Total (ug): 10.8195	Adj. Ave. % Rec.: 100.8075	LOQ (ug): 10
	Std Dev: .29		

E-SPIKE Exclusion Flag: N

Initial Study

Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Manual
WG156162-3	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3658992.pdf	10.42637786	12081	10	96.8944099379	
WG156162-4	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3658998.pdf	11.02280582	12081	10	102.484472050	
WG156162-5	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3659003.pdf	11.08804311	12081	10	103.416149068	
WG156162-6	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3659008.pdf	10.96081021	12081	10	102.484472050	
WG156162-7	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3659012.pdf	10.59921672	12081	10	98.7577639752	

Verifications

Date	Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Pass	Manual
30-NOV-10	WG187418-5	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505297.pdf	10.37365488	13210	10	104.4526281		
30-NOV-10	WG187418-6	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505298.pdf	10.09540593	13210	10	101.4395715		
30-NOV-10	WG187418-7	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505299.pdf	10.05783913	13210	10	101.4395715		
30-NOV-10	WG187418-8	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505300.pdf	10.0714854	13210	10	101.4395715		
30-NOV-10	WG187418-9	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505301.pdf	10.08027478	13210	10	101.4395715		
12-DEC-11	WG214136-5	/lims/pdf/logins/WG11/WG214136/WG214136_SJ5190787.pdf	10.49734697	15442	10	102.2727273		
12-DEC-11	WG214136-6	/lims/pdf/logins/WG11/WG214136/WG214136_SJ5190788.pdf	10.41898246	15442	10	101.2987013		
12-DEC-11	WG214136-7	/lims/pdf/logins/WG11/WG214136/WG214136_SJ5190789.pdf	10.92848659	15442	10	106.1688312		
12-DEC-11	WG214136-8	/lims/pdf/logins/WG11/WG214136/WG214136_SJ5190790.p	10.69979107	15442	10	104.2207792		

12-DEC-11	WG214136-9	df /lims/pdf/logins/WG11/WG214136/WG214136_SJ5190791.pdf	10.5618122	15442	10	103.2467532

Galson LOQ Study

01/30/2012 13:01

Loq ID: 13834
Department: 28
Matrix: 112
174
Instrument: IC6
Lot #:
Product: II-H3PO4
Parm Stored: PHOSPHORIC ACID

Desorption Solvent:
Desorption Vol (mL): 10

Method: MET11882
Analyst: AAB

LOQ Create Date: 03-SEP-09
Next Verification Date: 12-DEC-12

Comments: AS14A Column, Diluent: Water, Eluent: 8mM Na2CO3/1mM NaHCO3

DE:					
	Ave. Total (ug): 10.9612	**Ave. % Rec.:** 111.9646	**MDL:** 1.7672
	Adj. Ave. Total (ug): 10.9612	**Adj. Ave. % Rec.:** 111.9646	**LOQ (ug):** 10
	Std Dev: .5623		

E-SPIKE Exclusion Flag: N

Initial Study

Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Manual
WG156162-3	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3658992.pdf	10.98099844	12081	10	112.168592794	
WG156162-4	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3658998.pdf	10.26044967	12081	10	105.030591434	
WG156162-5	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3659003.pdf	11.76963637	12081	10	120.326308634	
WG156162-6	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3659008.pdf	11.13357905	12081	10	113.188307274	
WG156162-7	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3659012.pdf	10.66145942	12081	10	109.109449354	

Verifications

Date	Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Pass	Manual
30-NOV-10	WG187418-5	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505297.pdf	10.8709621	13210	10	103.1545741		
30-NOV-10	WG187418-6	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505298.pdf	10.26500411	13210	10	97.47634069		
30-NOV-10	WG187418-7	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505299.pdf	10.9842301	13210	10	104.1009464		
30-NOV-10	WG187418-8	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505300.pdf	10.93952129	13210	10	103.1545741		
12-DEC-11	WG214136-5	/lims/pdf/logins/WG11/WG214136/WG214136_SJ5190787.pdf	12.18734743	15442	10	114.375		
12-DEC-11	WG214136-6	/lims/pdf/logins/WG11/WG214136/WG214136_SJ5190788.pdf	12.01056475	15442	10	112.5		
12-DEC-11	WG214136-7	/lims/pdf/logins/WG11/WG214136/WG214136_SJ5190789.pdf	11.3662961	15442	10	106.875		
12-DEC-11	WG214136-8	/lims/pdf/logins/WG11/WG214136/WG214136_SJ5190790.pdf	11.01589376	15442	10	103.125		
12-DEC-11	WG214136-9	/lims/pdf/logins/WG11/WG214136/WG214136_SJ5190791.p	11.30796343	15442	10	105.9375		

30-NOV-10	WG187418-9	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505301.pdf	10.29132566	13210	10	97.47634069

Galson LOQ Study

01/30/2012 13:01

Loq ID: 13835
Department: 28
Matrix: 112
174
Instrument: IC6
Lot #:
Product: II-H2SO4
Parm Stored: SULFURIC ACID

Desorption Solvent:
Desorption Vol (mL): 10

Method: MET11882
Analyst: AAB

LOQ Create Date: 03-SEP-09
Next Verification Date: 12-DEC-12

Comments: AS14A Column, Diluent: Water, Eluent: 8mM Na2CO3/1mM NaHCO3

DE:	Ave. Total (ug): 10.3027	Ave. % Rec.: 94.3354	MDL: 1.1675
	Adj. Ave. Total (ug): 10.3027	Adj. Ave. % Rec.: 94.3354	LOQ (ug): 10
	Std Dev: .3715		

E-SPIKE Exclusion Flag: N

Initial Study

Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Manual
WG156162-3	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3658992.pdf	10.2055	12081	10	93.2926829268	
WG156162-4	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3658998.pdf	9.9663	12081	10	91.1890243902	
WG156162-5	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3659003.pdf	10.8579	12081	10	99.6951219512	
WG156162-6	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3659008.pdf	10.4804	12081	10	96.0365853659	
WG156162-7	/lims/pdf/logins/WG09/WG156162/WG156162_SJ3659012.pdf	10.0035	12081	10	91.4634146341	

Verifications

Date	Sample Num	File Name	Sample Total (ug)	Standard	Standard Total (ug)	Recovery %	Pass	Manual
30-NOV-10	WG187418-5	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505297.pdf	10.96	13210	10	105.7692308		
30-NOV-10	WG187418-6	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505298.pdf	10.8672	13210	10	104.8076923		
30-NOV-10	WG187418-7	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505299.pdf	9.9788	13210	10	95.96153846		
30-NOV-10	WG187418-8	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505300.pdf	10.1457	13210	10	97.11538462		
30-NOV-10	WG187418-9	/lims/pdf/logins/WG10/WG187418/WG187418_SJ4505301.pdf	10.1449	13210	10	97.11538462		
12-DEC-11	WG214136-5	/lims/pdf/logins/WG11/WG214136/WG214136_SJ5190787.pdf	10.6555	15442	10	102.5559105		
12-DEC-11	WG214136-6	/lims/pdf/logins/WG11/WG214136/WG214136_SJ5190788.pdf	9.6164	15442	10	92.20447284		
12-DEC-11	WG214136-7	/lims/pdf/logins/WG11/WG214136/WG214136_SJ5190789.pdf	10.0626	15442	10	96.80511182		
12-DEC-11	WG214136-8	/lims/pdf/logins/WG11/WG214136/WG214136_SJ5190790.p	10.167	15442	10	97.76357827		

12-DEC-11	WG214136-9	df /lims/pdf/logins/WG11/WG214136/WG214136_SJ5190791.pdf	10.1916	15442	10	97.76357827

COLUMBIA ANALYTICAL SERVICES, INC – SIMI VALLEY, CALIFORNIA

Summary of Calibration and Internal Quality Control Procedures for ASTM D 5504			
Quality Control Check	**Minimum Frequency**	**Acceptance Criteria**	**Corrective Action**
Initial Calibration (ICAL) – minimum of five levels, six if utilizing a quadratic determination	Initially and if continuing calibration no longer meets criteria	1) %RSD, ≤25% 2) Linear regression or quadratic, COD ≥0.995	1) May repeat one point (if analyzing 5 levels) or two points (if analyzing 6 levels) 2) Inspect the system for problems and perform required maintenance 3) Repeat initial calibration Problem must be corrected. Samples may not be analyzed until there is a valid ICAL.
Initial Calibration Verification (ICV)	Following every ICAL	%Difference ±30% from expected concentration	Correct problem and verify second source standard. Rerun second source verification. If that fails, correct problem and repeat initial calibration. Problem must be corrected. Samples may not be analyzed until there is a valid ICV.
Continuing Calibration Verification (CCV)	Initial run of batch, every 10 samples, and end of batch (all samples must be bracketed by two CCVs)	%Difference (%D) ±30% from expected concentration	1) Reanalyze CCV 2) Identify and correct problem; re-analyze or where appropriate qualify the data. 3) Repeat initial calibration if CCV corrective action is unsuccessful.
Laboratory Method Blank (MB)	Once every analytical batch of 20 or fewer samples	No detected result greater than the method reporting limit (MRL)	1) Reanalyze blank 2) Identify and correct problem 3) Reanalyze blank and affected samples 4) Qualify data, if necessary
Laboratory Control Sample (LCS)	Once every analytical batch of 20 or fewer samples	Percent recovery (%R) within laboratory generated limits	1) Reanalyze 2) Identify and correct the problem 3) Qualify data
Laboratory Duplicates (LD)	Once every analytical batch of 20 or fewer samples	Relative percent difference (RPD) within laboratory generated limits	1) Analyze third aliquot 2) Flag data if third aliquot is unacceptable
Holding Time (HT)		7 days (Silonite Canisters) 24 hours (Tedlar Bags)	Contact client and qualify data

APPENDIX B
UNTREATED PHYSICAL PROPERTIES
DATA SHEETS

DENSITY DETERMINATION

DATA SHEET

PROJECT:	Bridgewater
PROJECT No.:	SH0416
SAMPLE No.:	IMP2 - VR - Homogenious
TESTING DATE:	6/19/2012
TESTED BY:	MMR
TRACKING CODE:	8186_BD

UNIT WEIGHT (DENSITY)						
1. SAMPLE NO.	A		B		C	
2. WT OF MOLD (tare weight)	18.64	g	18.64	g	18.64	g
3. WT OF MOLD + SOIL	235.56	g	235.56	g	235.56	g
4. WT OF WET SOIL, W	216.92	g	216.92	g	216.92	g
5. DIAMETER OF SPECIMEN, D	1.99	in	2.00	in	2.00	in
6. HEIGHT OF SPECIMEN, H	4.00	in	4.00	in	4.00	in
7. VOLUME OF SPECIMEN	12.49	in^3	12.57	in^3	12.57	in^3
8. WET DENSITY	66.2	pcf	65.8	pcf	65.8	pcf
9. DRY DENSITY	37.3	pcf	41.4	pcf	36.3	pcf
AVERAGE BULK DENSITY	**65.9**	**pcf**				
AVERAGE DRY DENSITY	**38.4**	**pcf**				

MOISTURE CONTENT (Dry & Wet Basis)						
1. MOISTURE TIN NO.	A		B		C	
2. WT MOISTURE TIN (tare weight)	1.32	g	1.33	g	1.32	g
3. WT WET SOIL + TARE	18.37	g	19.58	g	22.89	g
4. WT DRY SOIL + TARE	10.94	g	12.84	g	13.23	g
5. WT WATER, Ww	7.43	g	6.75	g	9.65	g
6. WT DRY SOIL, Ws	9.62	g	11.51	g	11.91	g
7. ASTM MOISTURE CONTENT, W	77.25	%	58.65	%	81.05	%
8. EPA MOISTURE CONTENT, W	43.58	%	36.97	%	44.77	%
AVERAGE ASTM MOISTURE CONTENT	72.32	%				
AVERAGE EPA MOISTURE CONTENT	41.77	%				

http://atlantadocs/ATG/BANK/8000-8499/8186_BD

POCKET VANE SHEAR

REPORT FORM

PROJECT:	Bridgewater
PROJECT No.:	SH0416
TESTING DATE:	6/12/12
TESTED BY:	MMR
TRACKING CODE:	8185_VS

POCKET VANE SHEAR		
SAMPLE NO.	IMP 2-HC-Homoeginzed	
DEPTH (FT)		
TRACKING CODE		
FOOT SIZE (S,M,L)	L	L
INITIAL DIAL READING	0	0
FINIAL DIAL READING	0.75	2.25
DIVISIONS MOVED	0.75	2.25
SHEAR STRENGTH (TSF)	0.015	0.045
AVERAGE SHEAR STRENGTH (TSF)	0.03	

Notes:

Taken from the homogenized material

http://atlantadocs/ATG/BANK/8000-8499/8185_VS

DENSITY DETERMINATION

DATA SHEET

PROJECT:	Bridgewater
PROJECT No.:	SH0416
SAMPLE No.:	IMP2 - HC - Homogenious
TESTING DATE:	6/19/2012
TESTED BY:	MMR
TRACKING CODE:	8185_BD

UNIT WEIGHT (DENSITY)						
1. SAMPLE NO.	A		B		C	
2. WT OF MOLD (tare weight)	18.59	g	18.59	g	18.59	g
3. WT OF MOLD + SOIL	213.54	g	213.54	g	213.54	g
4. WT OF WET SOIL, W	194.95	g	194.95	g	194.95	g
5. DIAMETER OF SPECIMEN, D	2.00	in	2.00	in	2.00	in
6. HEIGHT OF SPECIMEN, H	3.99	in	4.00	in	4.00	in
7. VOLUME OF SPECIMEN	12.52	in^3	12.55	in^3	12.56	in^3
8. WET DENSITY	59.3	pcf	59.2	pcf	59.1	pcf
9. DRY DENSITY	36.6	pcf	38.8	pcf	37.6	pcf
AVERAGE BULK DENSITY	**59.2**	**pcf**				
AVERAGE DRY DENSITY	**37.6**	**pcf**				

MOISTURE CONTENT (Dry & Wet Basis)						
1. MOISTURE TIN NO.	A		B		C	
2. WT MOISTURE TIN (tare weight)	1.34	g	1.32	g	1.32	g
3. WT WET SOIL + TARE	16.29	g	20.86	g	21.16	g
4. WT DRY SOIL + TARE	10.56	g	14.12	g	13.94	g
5. WT WATER, Ww	5.73	g	6.74	g	7.23	g
6. WT DRY SOIL, Ws	9.22	g	12.80	g	12.61	g
7. ASTM MOISTURE CONTENT, W	62.16	%	52.64	%	57.28	%
8. EPA MOISTURE CONTENT, W	38.33	%	34.49	%	36.42	%
AVERAGE ASTM MOISTURE CONTENT	57.36	%				
AVERAGE EPA MOISTURE CONTENT	36.41	%				

http://atlantadocs/ATG/BANK/8000-8499/8185_BD

POCKET VANE SHEAR

REPORT FORM

PROJECT:	Bridgewater
PROJECT No.:	SH0416
TESTING DATE:	7/15/12
TESTED BY:	MMR
TRACKING CODE:	8186_VS

POCKET VANE SHEAR		
SAMPLE NO.	IMP 2-VR-Homoeginzed	
DEPTH (FT)		
TRACKING CODE		
FOOT SIZE (S,M,L)	L	L
INITIAL DIAL READING	0	0
FINIAL DIAL READING	2.25	3
DIVISIONS MOVED	2.25	3
SHEAR STRENGTH (TSF)	0.045	0.06
AVERAGE SHEAR STRENGTH (TSF)	0.0525	

Notes:

Taken from the homogenized material

http://atlantadocs/ATG/BANK/8000-8499/8186_VS

VISCOSITY MONITORING

PROJECT:	Bridgewater
PROJECT No.:	SH-0416
SAMPLE No.:	IMP-2-VR-Untreaded
TESTING DATE:	7/5/2012
TESTED BY:	ZOD
TRACKING CODE:	8228_VS

Beaker	Temperature (˚C)	Direct Read Parameters		Viscosity (cP)
		Speed (RPM)	Spindle	
5	17	2	3	35150
5	17	2	3	10850
2	30	30	2	160
2	30	30	2	148
2	30	30	2	142
3	50	60	3	120
3	50	60	3	148
4	70	60	3	173
4	70	60	3	140
4	70	60	3	197
1	90	50	3	1898
1	90	50	3	1774
1	90	50	3	1832
1	90	50	3	1732

DENSITY DETERMINATION vs TEMPERATURE

DATA SHEET page 1 of 3

PROJECT:	Bridgewater
PROJECT No.:	SH-0416
SAMPLE No.:	IMP2-VR-Untreated
TESTING DATE:	7/3/2012
TESTED BY:	ZOD
TRACKING CODE:	8228-DEN

UNIT WEIGHT (DENSITY) 21°C						
1. SAMPLE NO.	A		B		C	
2. WT OF MOLD (tare weight)	18.64	g	18.64	g	18.64	g
3. WT OF MOLD + SOIL	184.10	g	184.10	g	184.10	g
4. WT OF WET SOIL, W	165.46	g	165.46	g	165.46	g
5. DIAMETER OF SPECIMEN, D	2.00	in	2.00	in	2.00	in
6. HEIGHT OF SPECIMEN, H	3.13	in	3.07	in	3.00	in
7. VOLUME OF SPECIMEN	9.82	in^3	9.65	in^3	9.42	in^3
8. WET DENSITY	64.2	pcf	65.3	pcf	66.9	pcf
9. AVERAGE WET DENSITY	65.5	pcf				

UNIT WEIGHT (DENSITY) 30°C						
1. SAMPLE NO.	A		B		C	
2. WT OF MOLD (tare weight)	18.64	g	18.64	g	18.64	g
3. WT OF MOLD + SOIL	183.15	g	183.15	g	183.15	g
4. WT OF WET SOIL, W	164.51	g	164.51	g	164.51	g
5. DIAMETER OF SPECIMEN, D	2.00	in	2.00	in	2.00	in
6. HEIGHT OF SPECIMEN, H	3.05	in	3.00	in	3.04	in
7. VOLUME OF SPECIMEN	9.58	in^3	9.42	in^3	9.54	in^3
8. WET DENSITY	65.4	pcf	66.5	pcf	65.7	pcf
9. AVERAGE WET DENSITY	65.9	pcf				

DENSITY DETERMINATION vs TEMPERATURE

DATA SHEET page 2 of 3

PROJECT:	Bridgewater
PROJECT No.:	SH-0416
SAMPLE No.:	IMP2-VR-Untreated
TESTING DATE:	7/3/2012
TESTED BY:	ZOD
TRACKING CODE:	8228-DEN

UNIT WEIGHT (DENSITY) 50°C						
1. SAMPLE NO.	A		B		C	
2. WT OF MOLD (tare weight)	18.64	g	18.64	g	18.64	g
3. WT OF MOLD + SOIL	181.94	g	181.94	g	181.94	g
4. WT OF WET SOIL, W	163.30	g	163.30	g	163.30	g
5. DIAMETER OF SPECIMEN, D	2.00	in	2.00	in	2.00	in
6. HEIGHT OF SPECIMEN, H	3.03	in	2.88	in	3.07	in
7. VOLUME OF SPECIMEN	9.52	in^3	9.06	in^3	9.66	in^3
8. WET DENSITY	65.4	pcf	68.7	pcf	64.4	pcf
9. AVERAGE WET DENSITY	66.2	pcf				

UNIT WEIGHT (DENSITY) 70°C						
1. SAMPLE NO.	A		B		C	
2. WT OF MOLD (tare weight)	18.64	g	18.64	g	18.64	g
3. WT OF MOLD + SOIL	180.61	g	180.61	g	180.61	g
4. WT OF WET SOIL, W	161.97	g	161.97	g	161.97	g
5. DIAMETER OF SPECIMEN, D	2.00	in	2.00	in	2.00	in
6. HEIGHT OF SPECIMEN, H	3.05	in	2.97	in	3.02	in
7. VOLUME OF SPECIMEN	9.58	in^3	9.31	in^3	9.48	in^3
8. WET DENSITY	64.4	pcf	66.2	pcf	65.1	pcf
9. AVERAGE WET DENSITY	65.3	pcf				

DENSITY DETERMINATION vs TEMPERATURE

DATA SHEET page 3 of 3

PROJECT:	Bridgewater
PROJECT No.:	SH-0416
SAMPLE No.:	IMP2-VR-Untreated
TESTING DATE:	7/3/2012
TESTED BY:	ZOD
TRACKING CODE:	8228-DEN

UNIT WEIGHT (DENSITY) 90^{0}C						
1. SAMPLE NO.	A		B		C	
2. WT OF MOLD (tare weight)	18.64	g	18.64	g	18.64	g
3. WT OF MOLD + SOIL	176.59	g	176.59	g	176.59	g
4. WT OF WET SOIL, W	157.95	g	157.95	g	157.95	g
5. DIAMETER OF SPECIMEN, D	2.00	in	2.00	in	2.00	in
6. HEIGHT OF SPECIMEN, H	2.86	in	2.95	in	2.89	in
7. VOLUME OF SPECIMEN	8.99	in^3	9.26	in^3	9.08	in^3
8. WET DENSITY	66.9	pcf	65.0	pcf	66.3	pcf
9. AVERAGE WET DENSITY	66.0	pcf				

Notes:

We observed expansion of the sample (approximately 25-30%)

The sample was taped slightly on the table to release air bubbles prior to making height measurements.

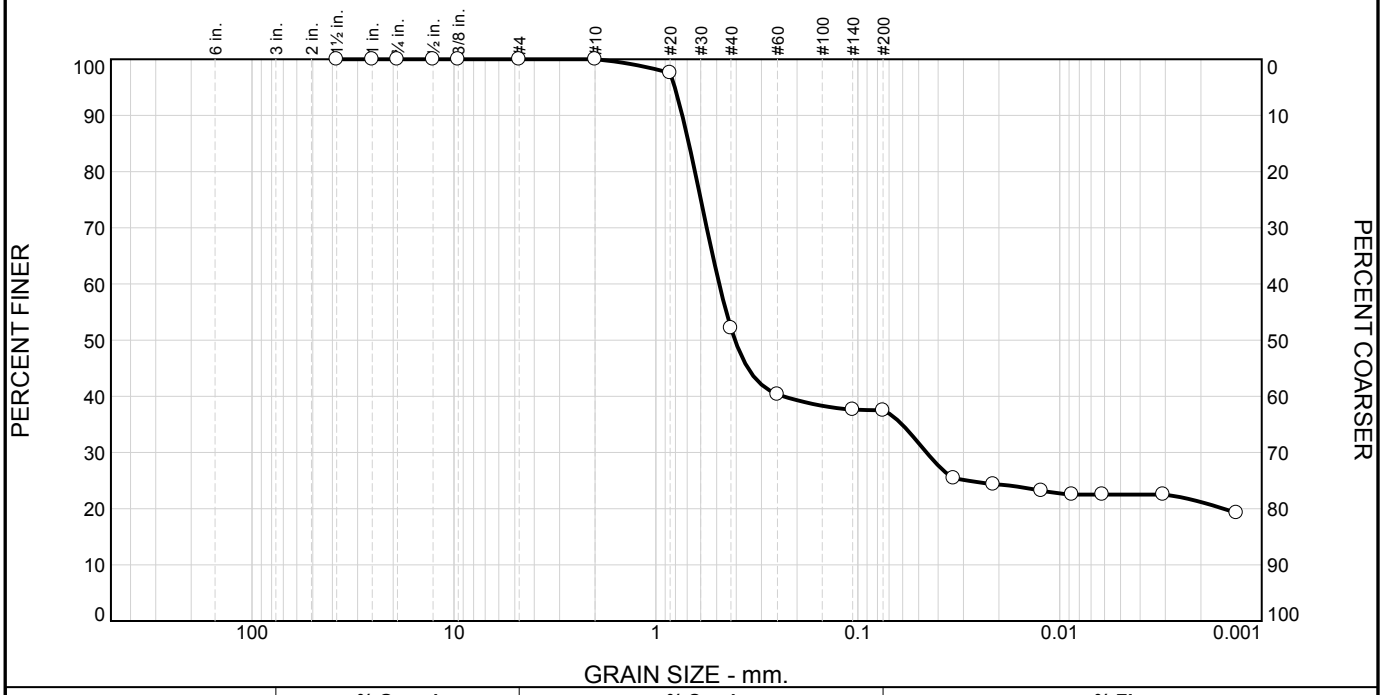
SOLID SPECIFIC GRAVITY

ASTM D 854
DATA SHEET

PROJECT:	BRIDGEWATER
PROJECT No.:	SH0416
TESTING DATE:	6/13/2012
TESTED BY:	MMR
TRACKING CODE:	8185_GS
SAMPLE NO:	IMP2-HC-HOMO-UNTREATED

SOLID SPECIFIC GRAVITY		
1. SAMPLE NUMBER		
2. FLASK NUMBER	6	
3. TEMPERATURE	22.5	°C
4. WT. FLASK & WATER	178.88	g
5. WT. WATER, FLASK & SOIL	202.43	g
6. WT OF SOIL	23.55	g
7. CALIBRATION WATER & FLASK	360.48	g
8. DEAIRED SAMPLE	364.50	g
9. SPECIFIC GRAVITY	1.21	
10. CORRECTION FACTOR K	0.9993	
11. Gs @ 20 °C	1.20	

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	47.9	14.6	15.0	22.5

Test Results (ASTM D 422 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5	100.0		
1.0	100.0		
.75	100.0		
.5	100.0		
.375	100.0		
#4	100.0		
#10	100.0		
#20	97.6		
#40	52.1		
#60	40.3		
#140	37.6		
#200	37.5		
0.0336 mm.	25.4		
0.0213 mm.	24.3		
0.0123 mm.	23.2		
0.0087 mm.	22.5		
0.0062 mm.	22.5		
0.0031 mm.	22.5		
0.0013 mm.	19.3		

* (no specification provided)

Material Description

Black silty sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)=

Coefficients

D_{90}= D_{85}= D_{60}= 0.4861
D_{50}= 0.4058 D_{30}= 0.0457 D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=1.46

Date Received: **Date Tested:** 6/29/12

Tested By: JPM

Checked By: TAJ

Title: Program Manager

Location: Bridgewater
Sample Number: IMP 2 HC

Date Sampled:

KEMRON Environmental Services Inc.
Atlanta, Georgia

Client:
Project: Bridgewater

Project No: SH0416 **Lab ID** 8186_GR

KEMRON ENVIRONMENTAL SERVICES

Project: Bridgewater SH 0416 Sample: VR, HC Untreated
Test: Thermal Stability Testing
Date: 8/25/2012 - 8/26/2012
Target Temperature 30°C

Observations Themal Stability Testing 30°C

Temperature °C	Heating Time (min)	FID (PPM)	Observations
25.6	0	3859	Reading before heating started.
29.4	5	699.3	**(Time 0 at 30°C)** Material texture did not change. Target temperature has been reached.
30	65	325	**(1hr at 30°C)** VR material is beginning to lift from the top of the sample. VR has formed small peaks.
30	125	335.9	**(2hr at 30°C)** VR is continuing to lift from top of sample. Peaks are growing taller. VR has formed a grey layer on top of the sample.
30	185	479.3	**(3hr at 30°C)** VR is continuing to lift but has not reached the top of the water. The peaks have lifted approximately one-third of an inch from the top of the VR sample.
30	245	230.2	**(4hr at 30°C)**VR is continuing to lift but has not reached the top of the water. The peaks have remained approximately one-third of an inch from the top of the VR sample. The material's appearance is the same as it was at 3 hours of heating.
30	1325	416.4	**(22hr at 30°C)** The water, VR, and HC layers are intact. There was no movement in the VR and HC materials. The grey layer that was formed has lifted more.
30	1385	275.3	**(23hr at 30°C)** The water, VR, and HC layers are intact. There was no movement in the VR and HC materials. The grey layer remained the same. The materials appearance is the same as it was at 23 hours of heating.
30	1445	301.8	**(24hr at 30°C)** The water, VR, and HC layers are intact. There was no movement in the VR and HC materials. The grey layer remained the same. The materials appearance did not change at 24 hours of heating at the target temperature. The thermal stability test is complete. The materials did not mix.

Note
*A line was draw in a label to distinguish between the VR and HC in the sample, because the line between materials cannot be seen.
FID readings are colected every 10°C increase in temperature and every hour.

KEMRON
ENVIRONMENTAL SERVICES

Project: Bridgewater SH 0416 Sample: VR, HC Untreated
Test: Thermal Stability Testing
Date: 8/25/2012 - 8/26/2012
Target Temperature 50°C

Observations Themal Stability Testing 50C

Temperature °C	Heating Time (min)	FID (PPM)	Observations
25.6	0	1544	Reading before heating started.
46.6	5	1386	Material texture did not change.
47.3	20		VR material is beginning to lift from the top of the sample. Peaks have formed across the top of the VR material.
45.0	30		VR material is continuing to lift from the top of the sample. The peaks across the top of the VR have remained visible. The material's appearance is the same as it was at 20 minutes of heating.
48.0	40	1416	**(Time 0 at 50°C)** VR material is continuing to lift from the top of the sample. The peaks across the top of the VR have remained visible. The material's appearance is the same as it was at 30 minutes of heating. The target temperature has been reached.
50.0	100	658.4	**(1hr at 50°C)** VR material is continuing to lift from the top of the sample. A grey layer has formed on top of the VR material.
50.0	160	782.4	**(2hr at 50°C)** A layer of the VR has floated to top of the water. The VR material has stopped lifting and there are no visible peaks across the top of the sample.
50	220	816.2	**(3hr at 50°C)** The layer of the VR on top of the water remains. The VR material has stopped lifting and there are no visible peaks across the top of the sample.
50	280	766.7	**(4hr at 50°C)** The layer of the VR on top of the water remains. The VR material has stopped lifting and there are no visible peaks across the top of the sample.
50	1360	571.7	**(22hr at 50°C)** The layer of the VR on top of the water remains. The VR material has stopped lifting and there are no visible peaks across the top of the sample.
50	1420	311.5	**(23hr at 50°C)** The layer of the VR on top of the water remains. The VR material has stopped lifting and there are no visible peaks across the top of the sample.
50	1480	311.5	**(24hr at 50°C)** The water, VR, and HC layers are intact. There was no movement in the VR and HC materials. The grey layer remained the same. The material's appearance is the same as it was at 24 hours of heating. The thermal stability test is complete. Materials did not mixed.

Note

*A line was draw in a label to distinguish between the VR and HC in the sample, because the line between materials cannot be seen.
FID readings are colected every 10°C increase in temperature and every hour.

KEMRON ENVIRONMENTAL SERVICES

Project: Bridgewater SH 0416 Sample: VR, HC Untreated
Test: Thermal Stability Testing
Date: 8/25/2012 - 8/26/2012
Target Temperature 70°C

Observations Themal Stability Testing 70C

Temperature °C	Heating Time (min)	FID (PPM)	Observations
25.6	0	1331	Reading before heating started.
62.3	5	2931	VR material is beginning to lift from the top of the sample.
63.6	15		VR material is continuing to lift from the top of the sample. A line of the VR material is floating to the top of the water.
66.0	40		VR material is continuing to lift from the top of the sample. The VR and HC material shifted up and a small layer of brown water has formed at the bottom of the vial.
66.0	48		VR material is continuing to lift from the top of the sample. The small layer of brown water at the bottom of the vial remains visible. A video of the sample was recorded.
66.0	53		VR material is continuing to lift from the top of the sample. Small peaks have formed across the top of the sample and are stretching toward the top of the water. A grey layer has formed on top of the sample.
68.0	59	2963	**(Time 0 at 70°C)** VR material is continuing to lift from the top of the sample. The peaks that formed at the top of the sample are continuing to grow. The grey layer at the top of the sample remains visible. The target temperature has been reached.
69.0	93		VR material is continuing to lift from the top of the sample. The peaks that formed at the top of the sample are continuing to grow. The grey layer at the top of the sample remains visible.
70.0	119	1534	**(1hr at 70°C)** VR material is continuing to lift from the top of the sample. The peaks that formed at the top of the sample remain visible. The grey layer at the top of the sample remains visible.
70.0	179	1218	**(2hr at 70°C)** A thin layer of VR material is on top of water. The grey layer remains visible. HC material at bottom has not changed.
70.0	239	1328	**(3hr at 70°C)** A thin layer of VR material is on top of water. The grey layer remains visible. HC material at bottom has not changed.
70.0	299	1180	**(4hr at 70°C)** A thin layer of VR material is on top of water. The grey layer remains visible. HC material at bottom has not changed.
70.0	1379	174.6	**(22hr at 70°C)** The water on top of the VR and HC material evaporated. VR and HC material remained at bottom of the vial.
70.0	1439	122.8	**(23hr at 70°C)** VR and HC material remained at bottom of the vial.
70.0	1499	114.9	**(24hr at 70°C)** VR and HC material remained at bottom of the vial. The thermal stability test is complete. The HC ended up with a cover of the VR around it.

Note
*A line was draw in a label to distinguish between the VR and HC in the sample, because the line between materials cannot be seen.
FID readings are colected every 10°C increase in temperature and every hour.

KEMRON ENVIRONMENTAL SERVICES

Project: Bridgewater SH 0416 Sample: VR, HC Untreated
Test: Thermal Stability Testing
Date: 8/25/2012 - 8/26/2012
Target Temperature 90°C

Observations Themal Stabilty Testing 90C

Temperature °C	Heating Time (min)	FID (PPM)	Observations
25.6	0	3467	Reading before heating started.
78.1	10	16,392	VR material is beginning to float to top of water.
80.8	18	35,542	The entire sample of VR and HC material moved up. Bubbles were observed coming out of the sample.
81.4	24		VR and HC material have separated. There is water in the middle of the VR and HC material.
82.4	27		VR and HC material remain separated. The water in between the VR and HC material remains.
82.4	32		VR and HC material continue to move up and down through the water.
82.4	33		VR and HC material begins to come back together but still has water in between.
84.4	35		VR and HC material continues to come back together but appears separated.
89.4	42	>50,000	**(Time 0 at 90°C)** VR and HC material has floated to top of the vial. A brown layer of water has formed at the bottom of the vial. The target temperature has been reached.
90	50		VR and HC material went down to bottom of vial. There is a small layer of VR material at top of water. Water is visible in between the small layer of VR material at the top and the VR and HC material at the bottom.
90	102	>50,000	**(1hr at 90°C)** VR and HC material has floated back to the top of the vial. The brown layer of water is now visible again at the bottom of the vial.
90	162	>50,000	**(2hr at 90°C)** VR and HC material has separated again and the water is now in between the VR and HC material.
90	222	12,614	**(3hr at 90°C)** VR and HC material remain separated with the water in between.
90	282	9,316	**(4hr at 90°C)** VR and HC material remain separated with the water in between.
90	1362	30.6	**(22hr at 90°C)** The water on top of the VR and HC material evaporated. VR material expanded out to the exterior of the vial. The bottom of the vial about half inch of the sample appears to be grey in color.
90	1422	36	**(23hr at 90°C)** The material remains on the exterior of the vial. The bottom of the vial about half inch of the sample still appears to be grey in color.
90	1482	31	**(24hr at 90°C)** The material remains on the exterior of the vial. The bottom of the vial half inch of the sample still appears to be grey in color. The thermal stability test is complete. The VR expand out of the vial, the HC remail in the vial. No aparent mix between materials.

Note
*A line was draw in a label to distinguish between the VR and HC in the sample, because the line between materials cannot be seen.

FID readings are colected every 10°C increase in temperature and every hour.

KEMRON
ENVIRONMENTAL SERVICES

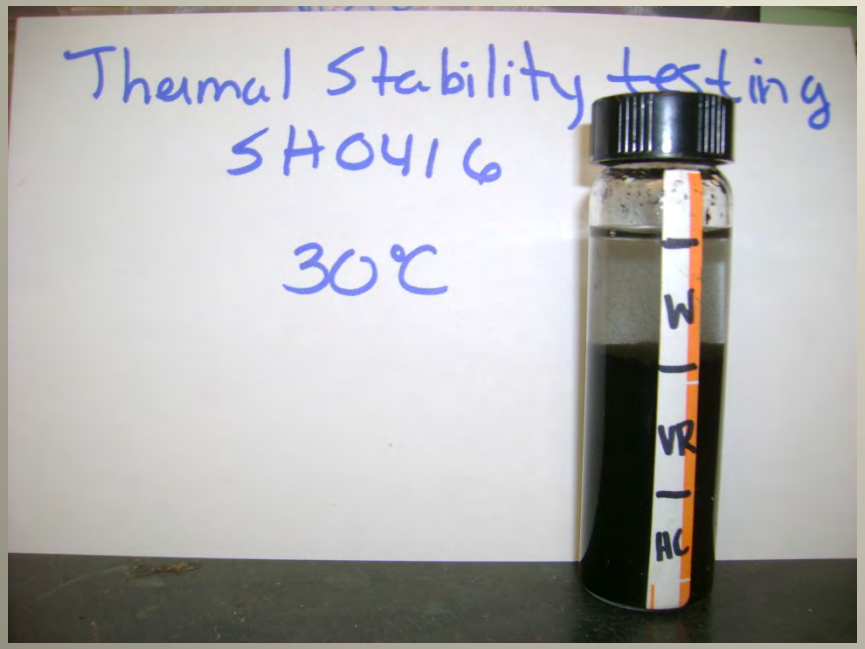
Bridgewater
SH0416

Thermal Stability Testing
Untreated VR & HC

Initial set up for the Test

- Hot plates
- Beakers
- Vials
- Samples
- Thermometers
- Water
- FID

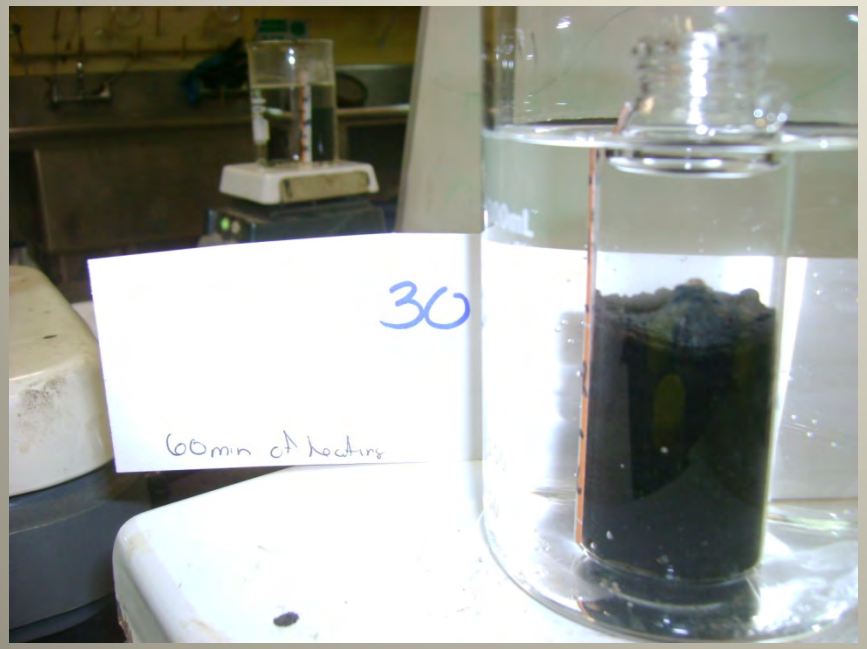
Target Temperature 30°C

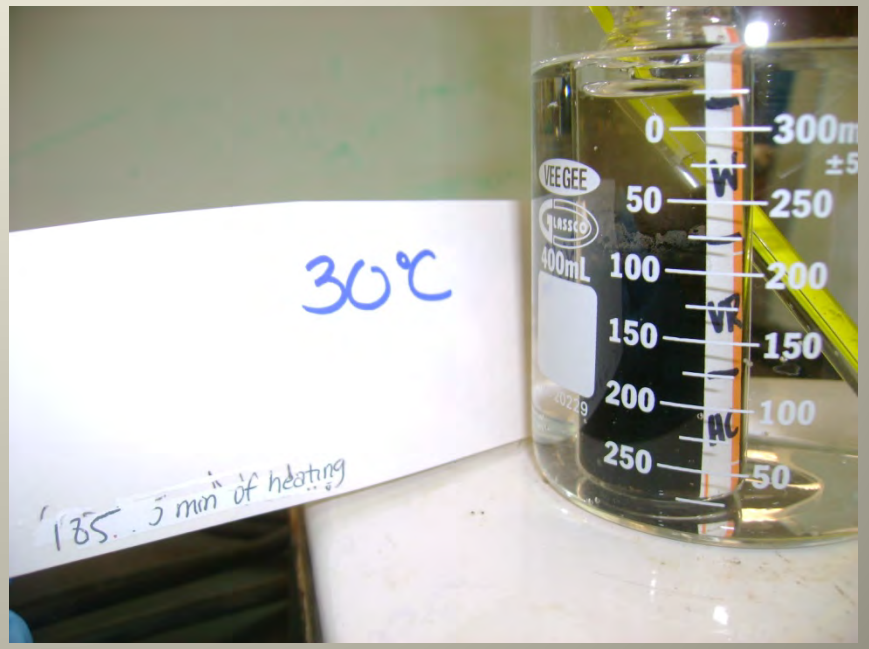


Sample (HC 0.9 inch of material, 0.9 inch of VR and 0.9 inch of water)

Initial set up for the sample. The sample reach the target temperature at 5 minutes of heating.

Target Temperature 30°C

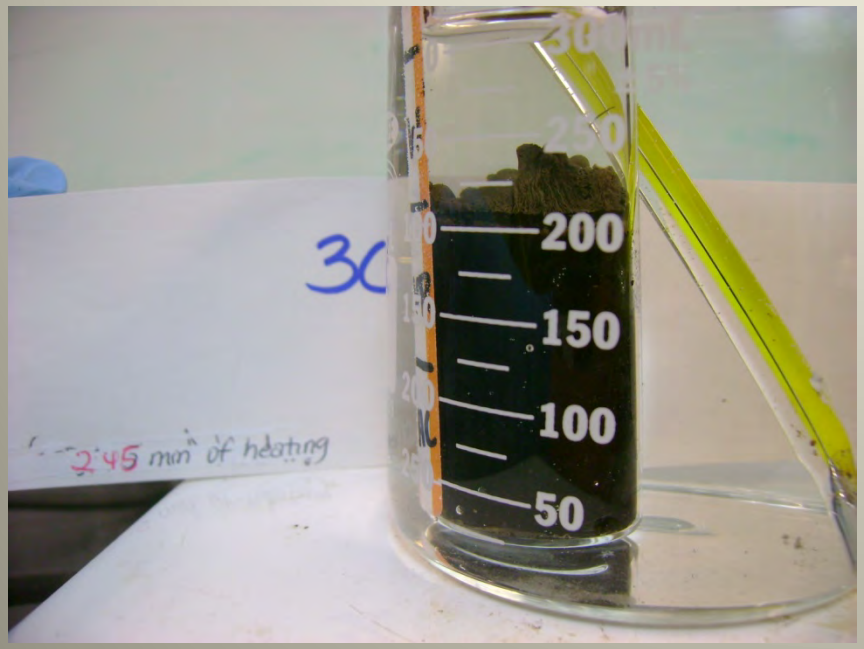




At 60 minutes of heating the VR is beginning to lift from the top of the sample. VR has form small peaks.

VR has formed a gray layer on top of the sample. VR continues to lift but has not reach the top of the water. The peaks have lifted approximately 1/3 of an inch from the top of the VR sample.

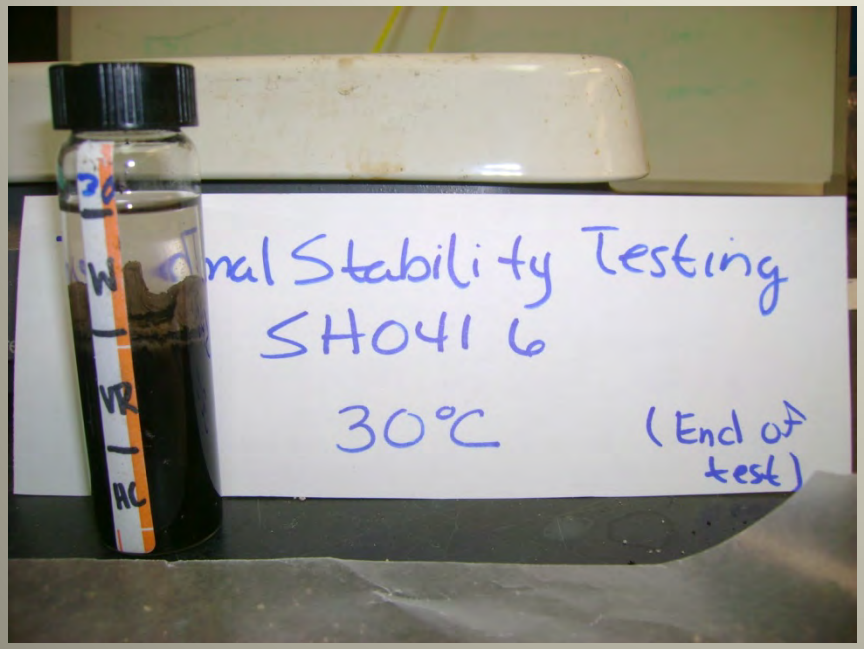
Target Temperature 30°C



At 4 hours in the target temperature the sample appears to be the same as it was at 3 hours.

The next day at 22 hours of heating the water, VR and HC layer are intact. There was no movement in the VR and HC. The gray layer that was formed has lifted more.

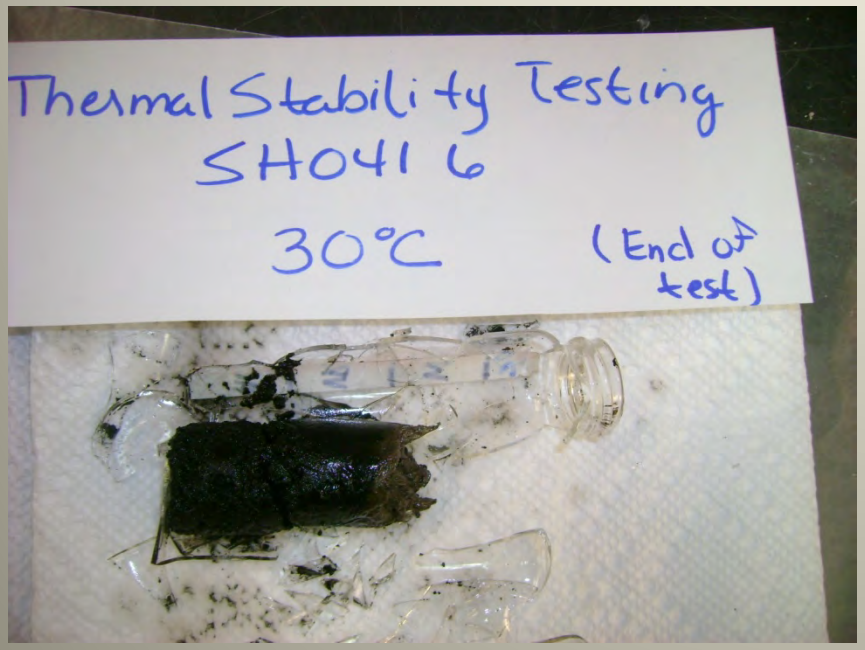
Target Temperature 30°C

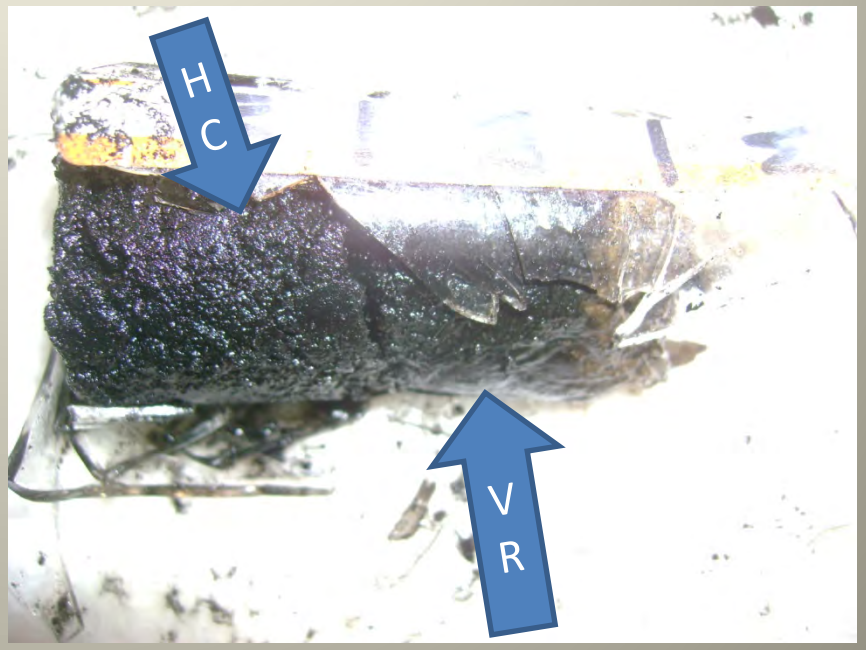


The water, VR and HC are intact. There was no movement in the VR and HC materials.

The gray layer remain the same. The material appearance is the same, heating time at the target temperature was 24 hours.

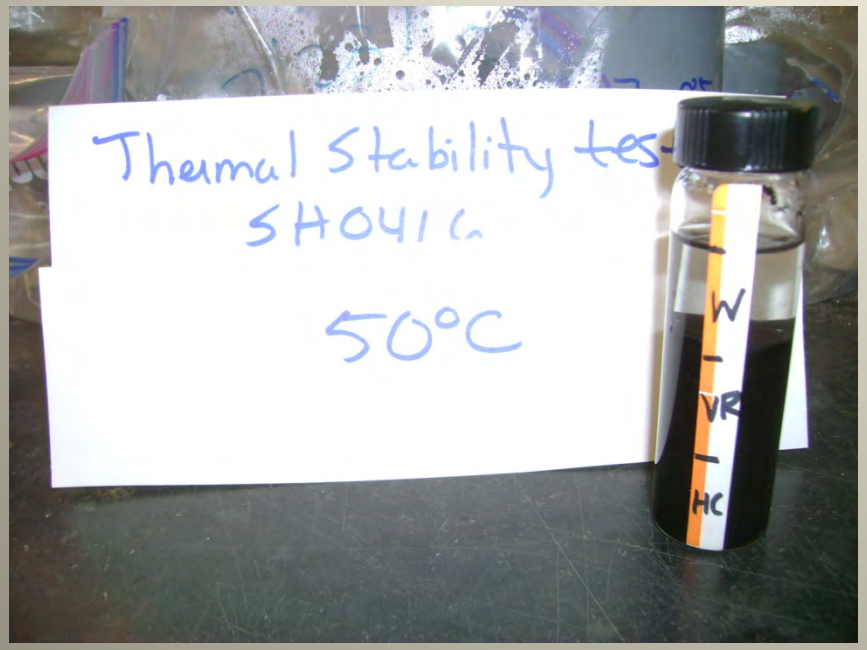
Target Temperature 30°C





Test is complete, the materials did not mix.

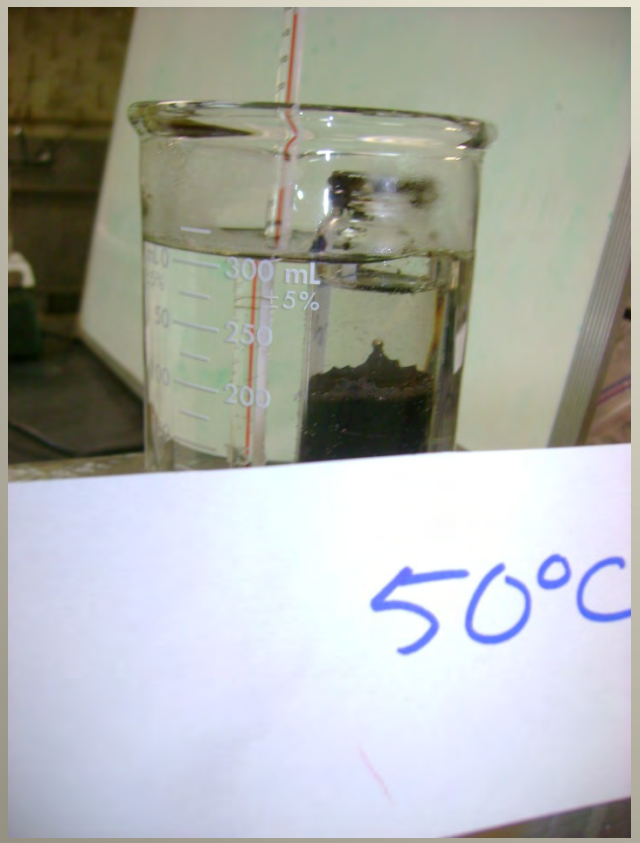
Target Temperature 50°C



Sample (HC 0.9 inch of material, 0.9 inch of VR and 0.9 inch of water)

Initial set up for the sample. The sample reach the target temperature at 40 minutes of heating.

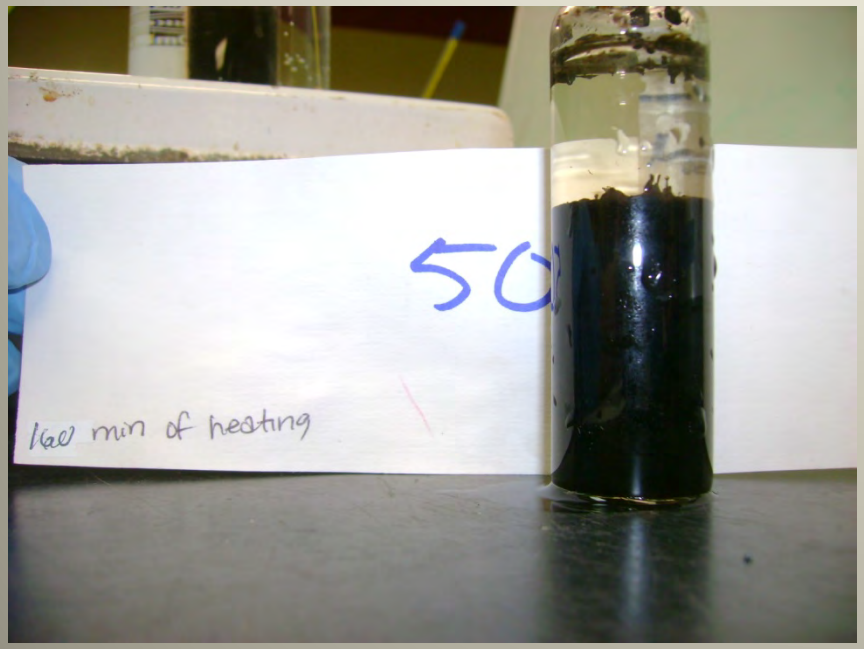
Target Temperature 50°C



At 20 minutes of heating and 47.3 °C the VR material is beginning to lift from the top of the sample. Small peaks have formed across the top of the VR.

VR continues to lift from the top of the sample. A gray layer has formed on top of the VR material.

Target Temperature 50°C



A layer of the VR has floated to the top of the water. The VR has stop lifting and there are no visible peaks across the top layer.

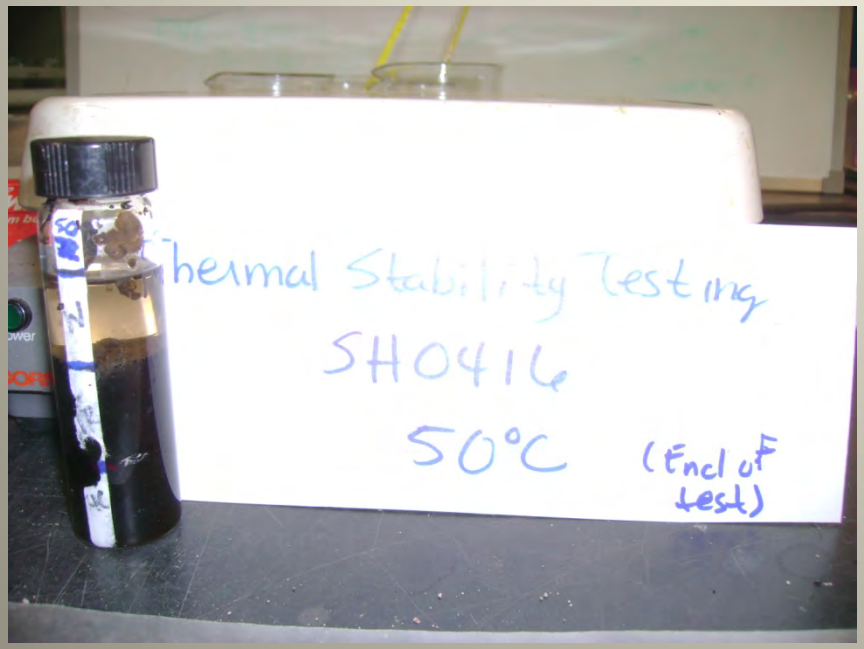
The layer of VR on top of the water remains. The material has been in the target temperature for 3 hours.

Target Temperature 50°C

Sample has not change, still the same as it was a at 3 hours at 50°C

At 22 hours in the target temperature the sample remain the same. Layer of VR on top of the water and no visible peaks across the VR surface.

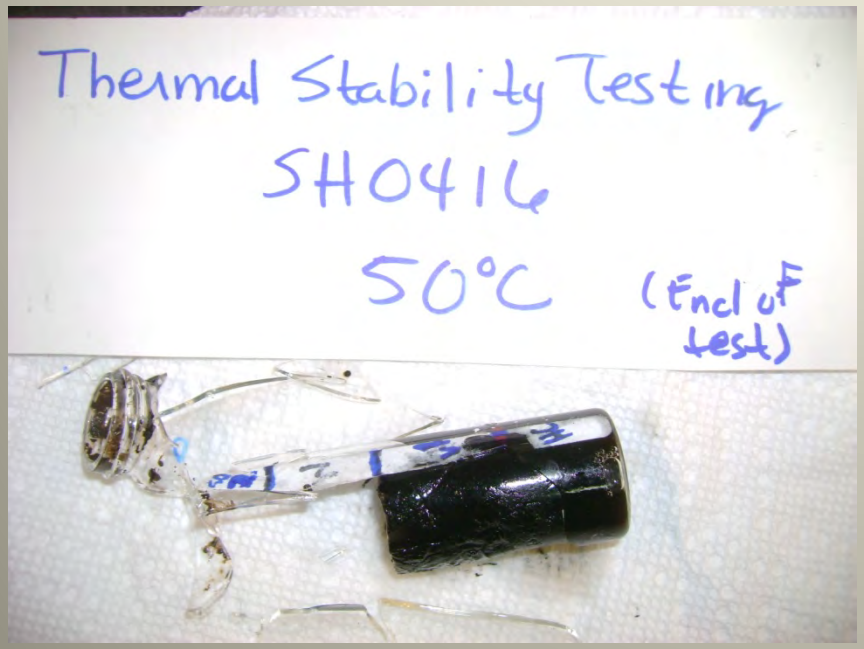
Target Temperature 50°C

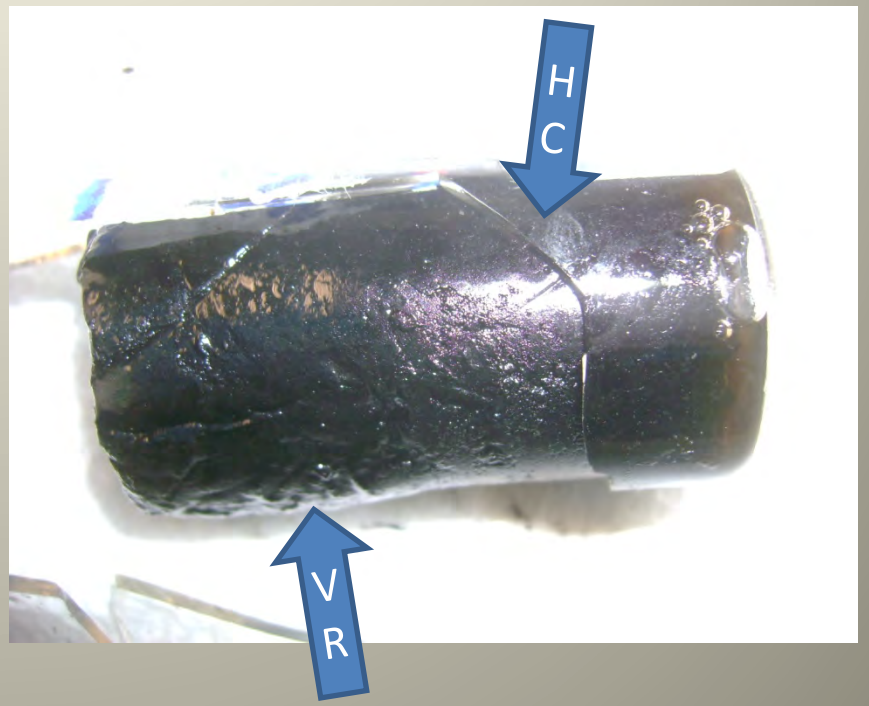


The water, VR and HC are intact. There was no movement in the VR and HC materials.

The gray layer remain. The material appearance is the same, heating time at the target temperature was 24 hours.

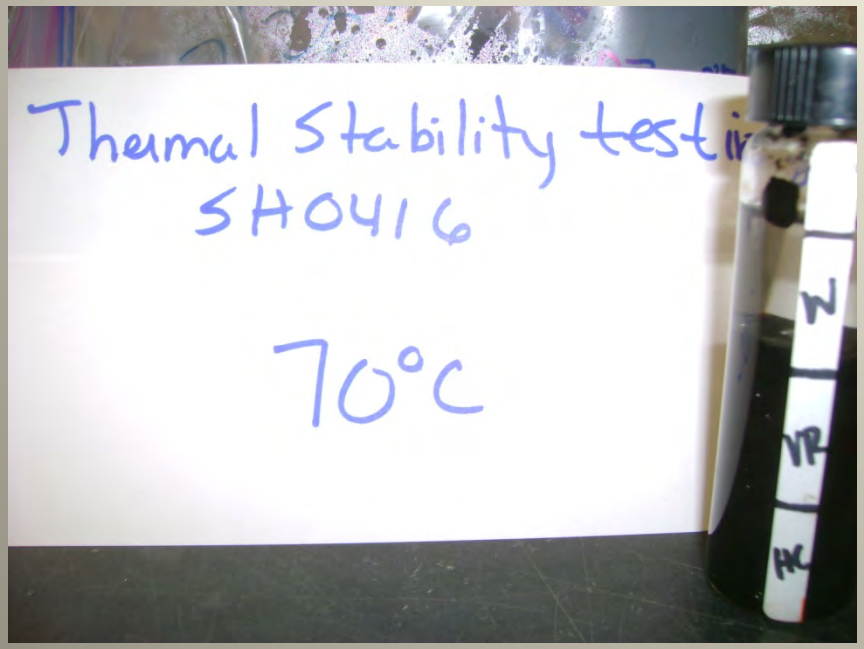
Target Temperature 50°C



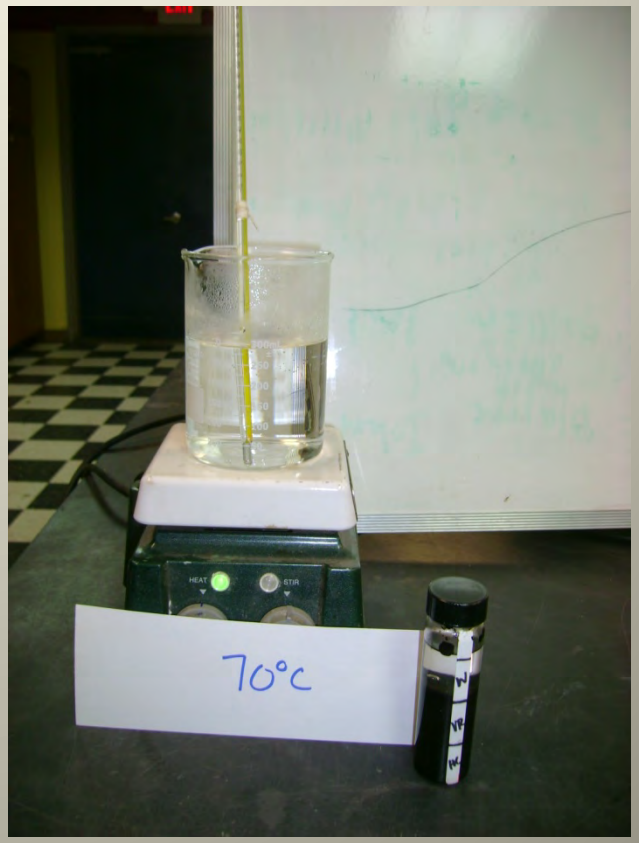


Test is complete, the materials did not mix

Target Temperature 70°C



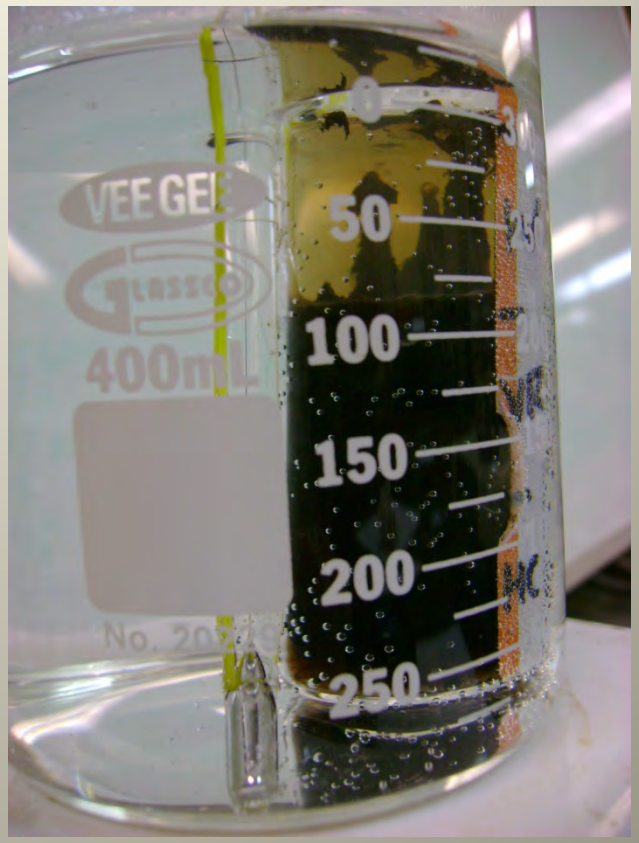
Sample (HC 0.9 inch of material, 0.9 inch of VR and 0.9 inch of water)



Initial set up for the sample. The sample reach the target temperature at 59 minutes of heating.

Target Temperature 70°C

VR is lifting from the top of the sample, a vertical line of the VR material is floating to the top of the water. At 15 minutes of heating and 63.6°C

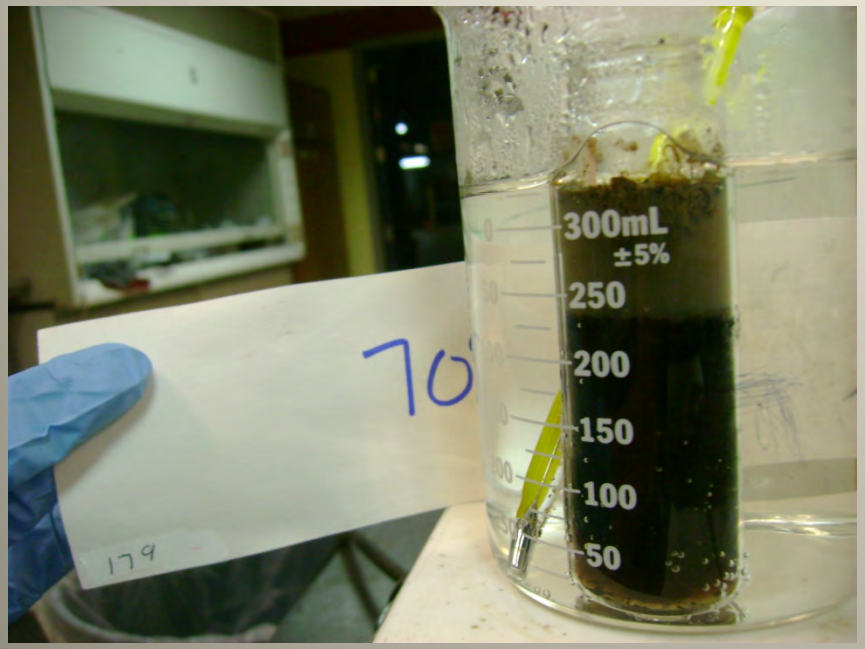


VR is continuing to lift to the top of the sample. The HC and VR had shifted up and a small layer of brown water has formed in the bottom of the vial. At 40 minutes of heating.

Target Temperature 70°C

VR is continuing to lift from the top of the sample. The peaks that formed at the top of the sample are continuing to grow. The gray layer at the top of the sample remains visible, the water. Water looks brown

Target Temperature 70°C



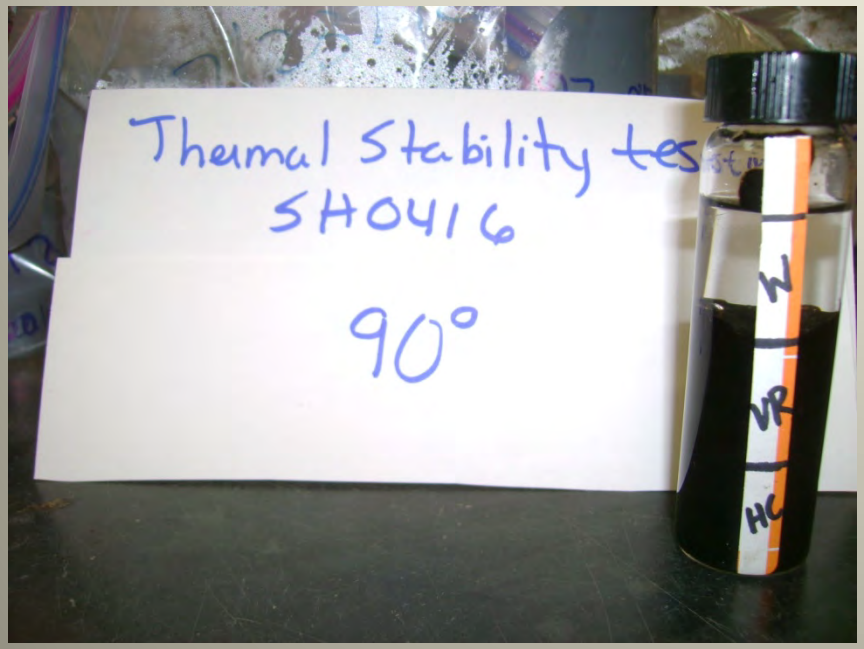
A thin layer of VR material is on top of water. The gray layer remains visible. HC material at the bottom has not change. Is been two hours of heating at the target temperature. Sample remain the same for the next 2 hours.

At 22 hours of heating at the target temperature the water on top of the VR has evaporated. The VR and HC remained at the bottom of the vial.

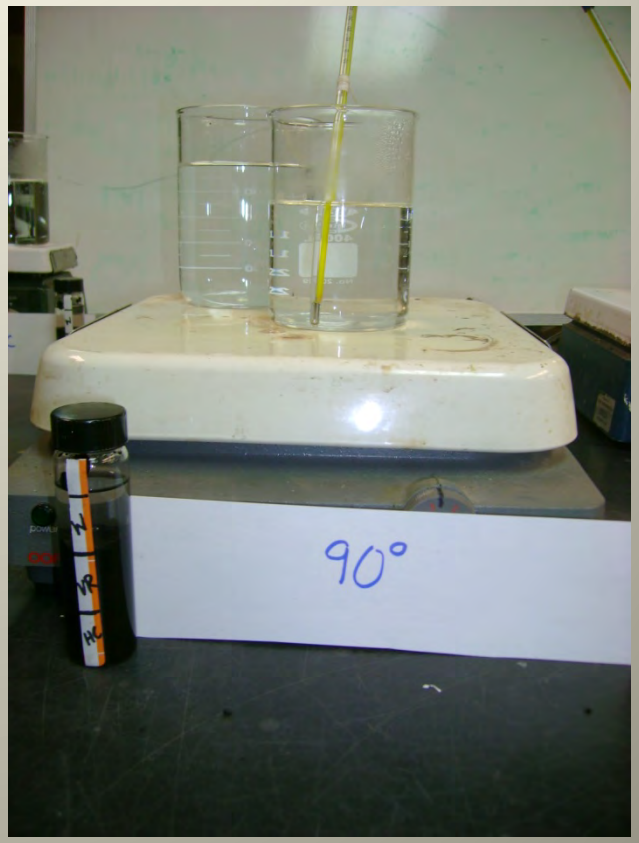
Target Temperature 70°C

VR and HC materials remained at the bottom of the vial. Test is complete, material was keep at the target temperature for 24 hours. The HC ended up with a cover of the VR around it.

Target Temperature 90°C

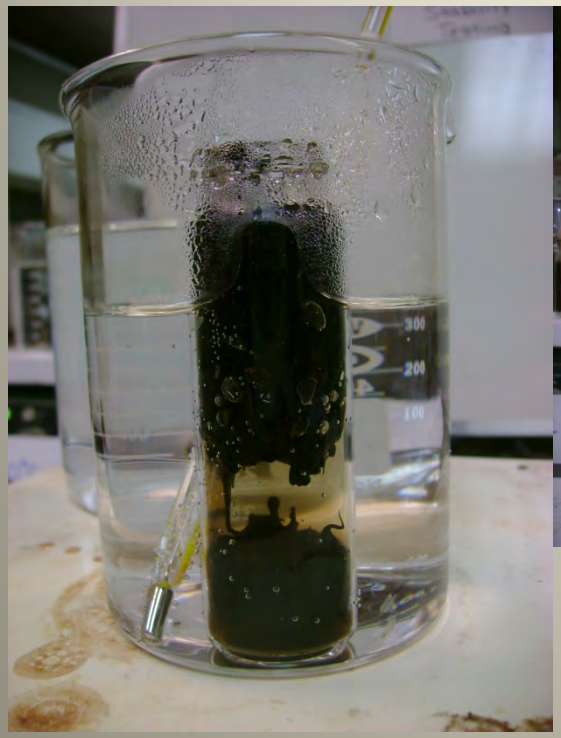


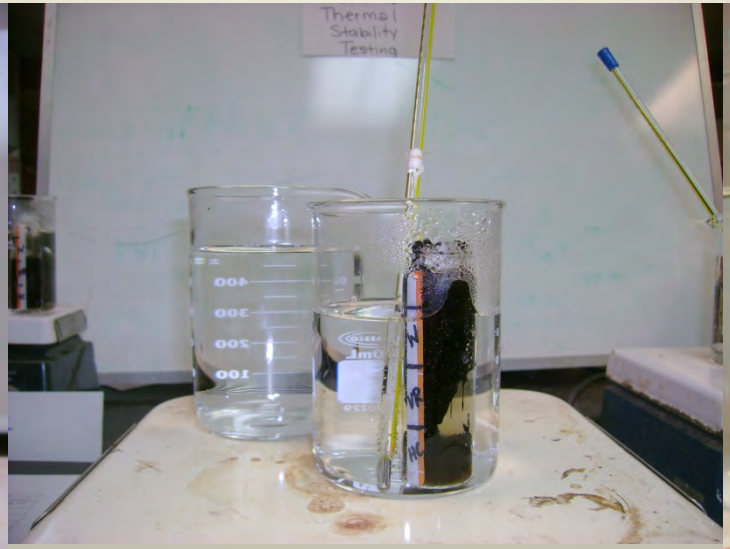
Sample (HC 0.9 inch of material, 0.9 inch of VR and 0.9 inch of water)

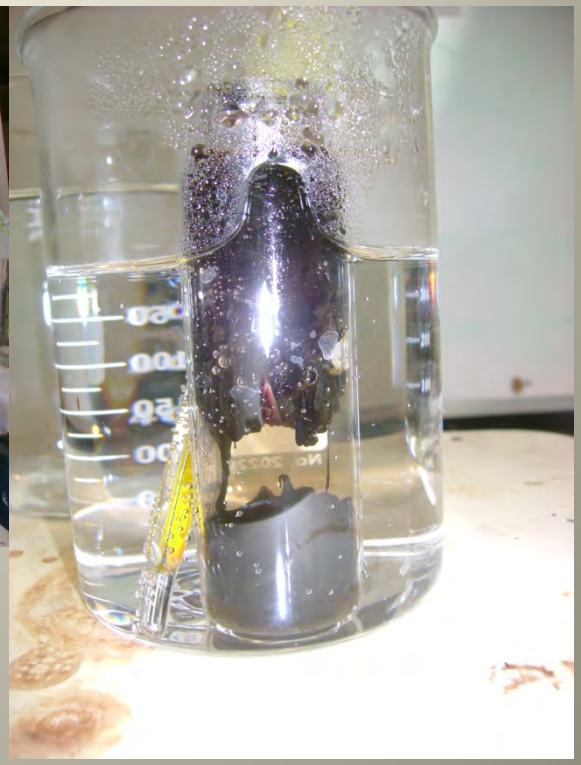


Initial set up for the sample. The sample reach the target temperature at 42 minutes of heating.

Target Temperature 90°C

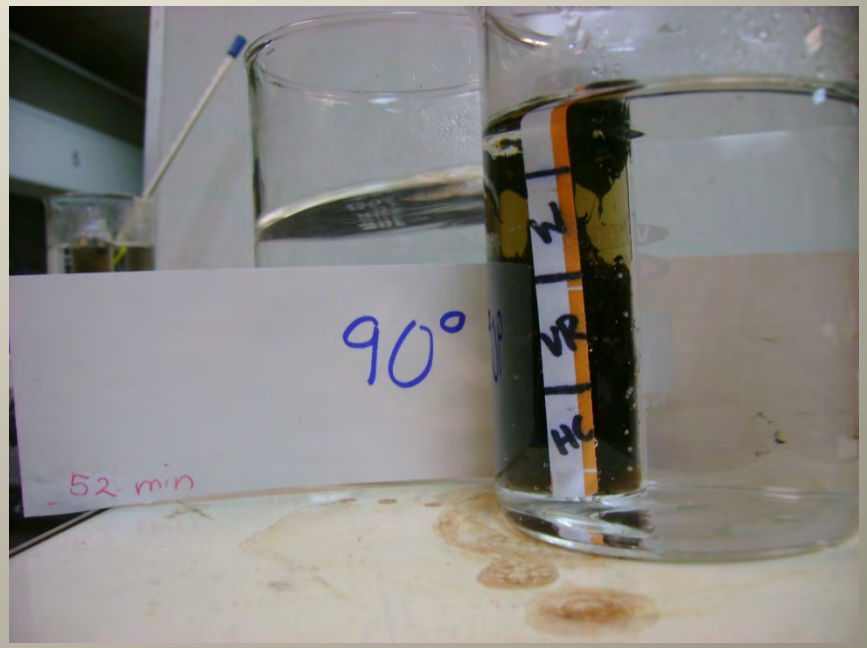






The sample is moving up and the water is going down. Water is in the middle of both materials. The movement of water, HC and VR does not stop. At 10 minutes of heating at 78.1 °C.

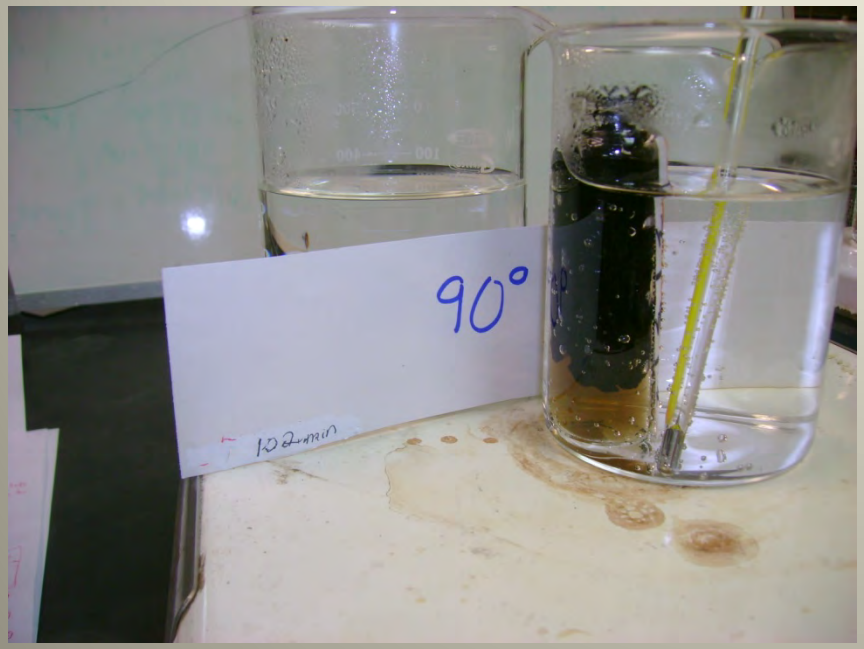
Target Temperature 90°C



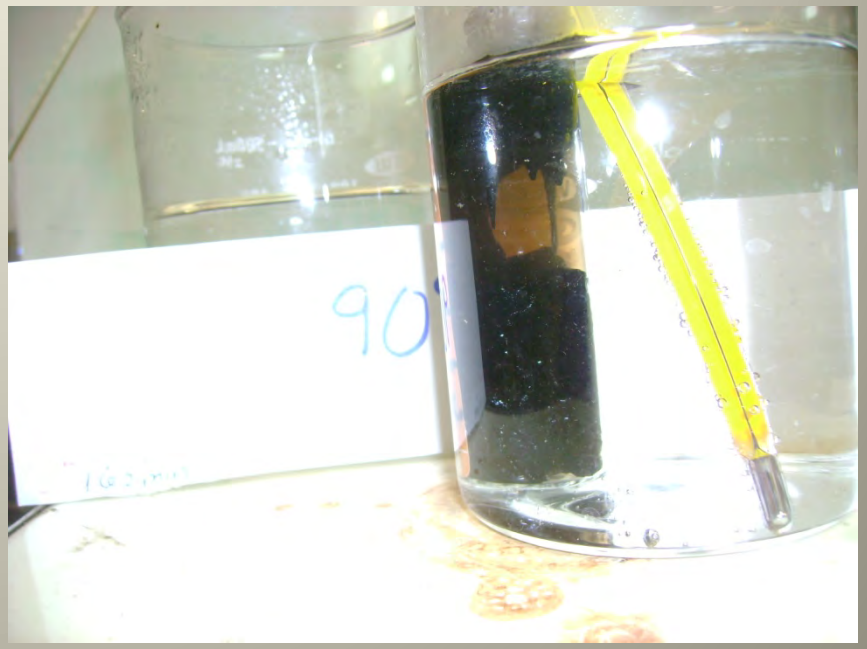
At 32 minutes of heating and 82.4 °C the VR and HC continue to move up and down through the water.

VR and HC went down to the bottom of vial. There is a small layer of VR on top of water. Water is visible in between the small layer of VR material at the top and the VR and HC material at the bottom. Its been 52 minutes of heating.

Target Temperature 90°C

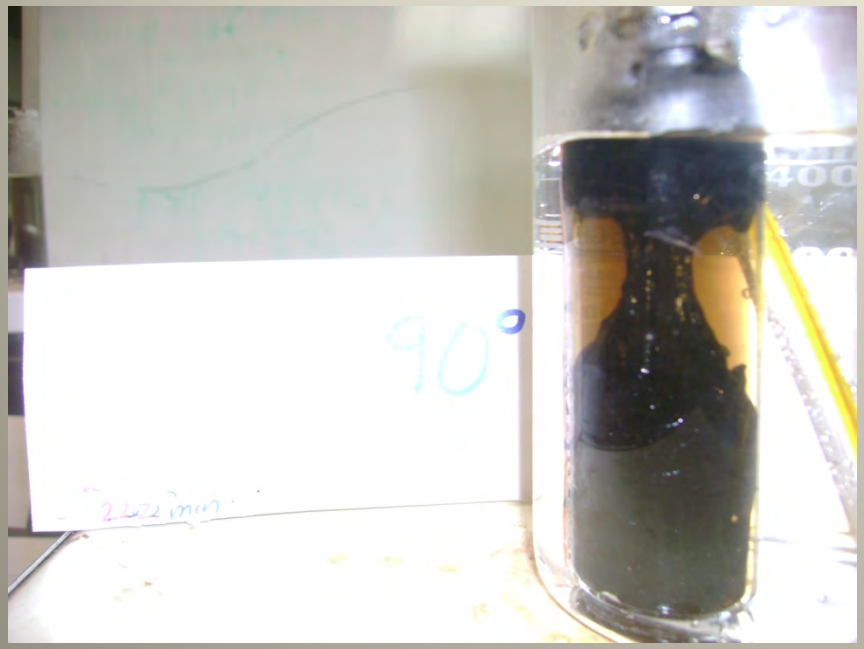


The material is been at the target temperature for an hour. VR and HC floated to the top of vial. The brown water layer now is at the bottom.



VR and HC had separated again and the water is now in between them. The material is been at the target temperature for two hours.

Target Temperature 90°C



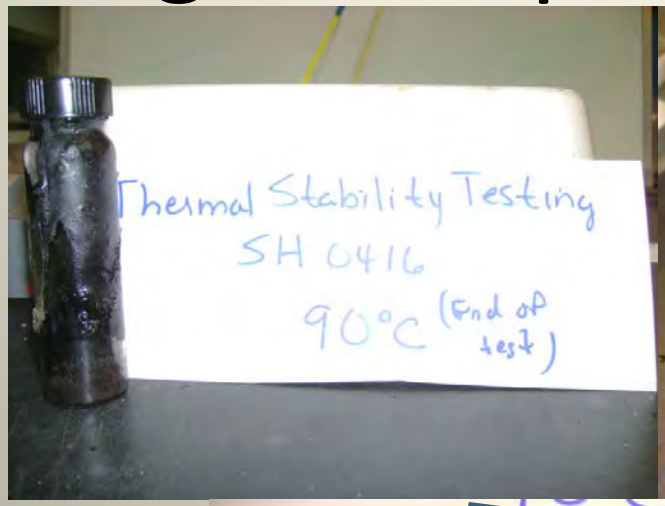
At three hours in the target temperature the materials are moving around the vial. Water remained between the materials.

At four hours in the target temperature the materials are moving around the vial. Water remained between the materials.

Target Temperature 90°C

At 22 hours of heating at the target temperature the VR expanded out of the vial and the water in the sample evaporated. At the bottom of the vial about half an inch appears to be gray color.

Target Temperature 90°C



Test is complete, the sample was at the target temperature for 24 hours. The bottom of the vial about half an inch still color gray. No apparent mixture between the materials.

KEMRON
ENVIRONMENTAL SERVICES

BRIDGEWATER
SH0416

ACID TAR STUDY:
Untreated Physical Properties Characterization

IMP2 - VR

Untreated Material

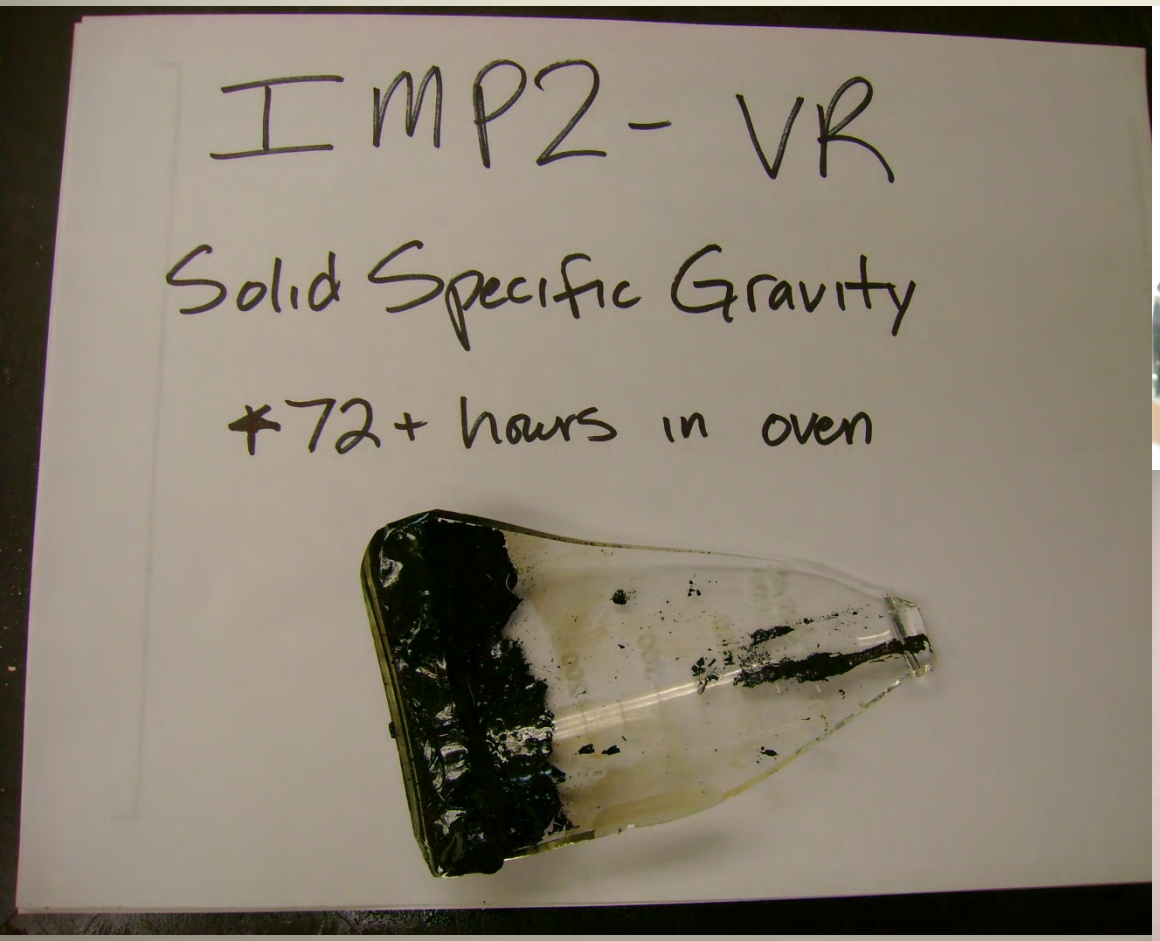
IMP2 – VR

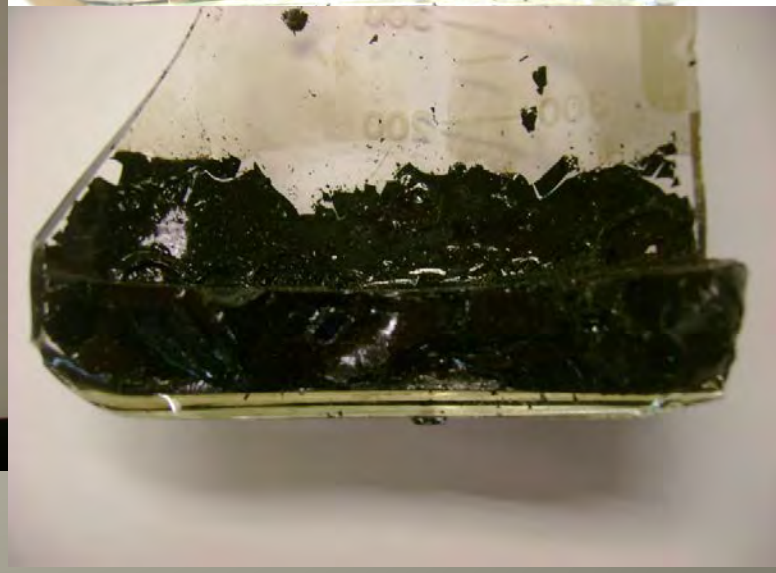
IMP2 - HC

Untreated Material

IMP2 – HC

IMP2 - VR



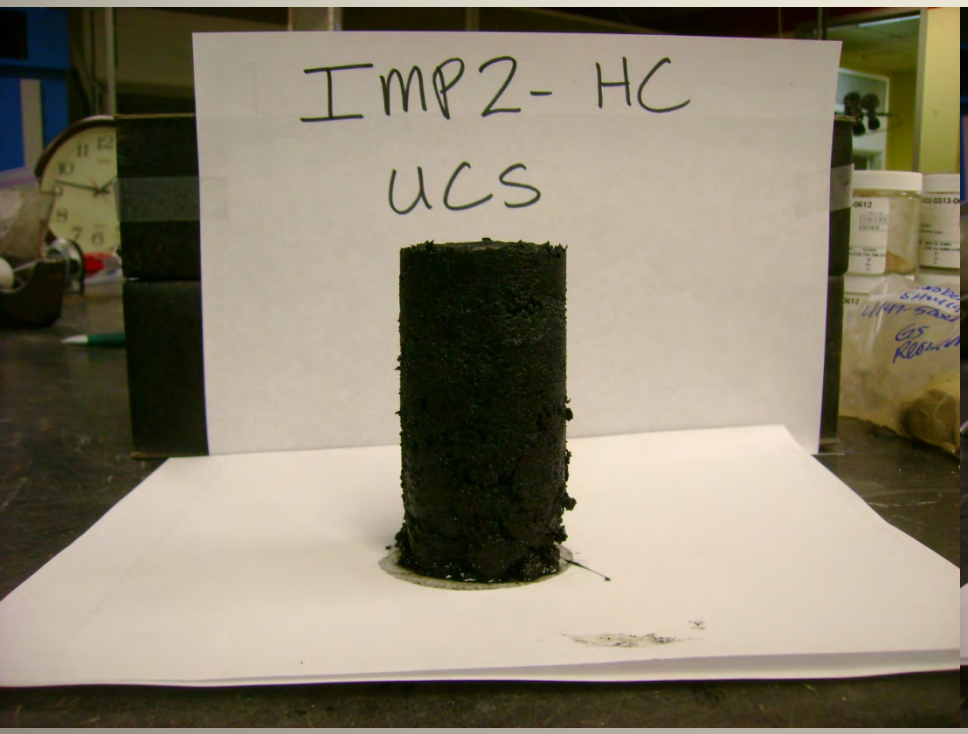


Untreated Material

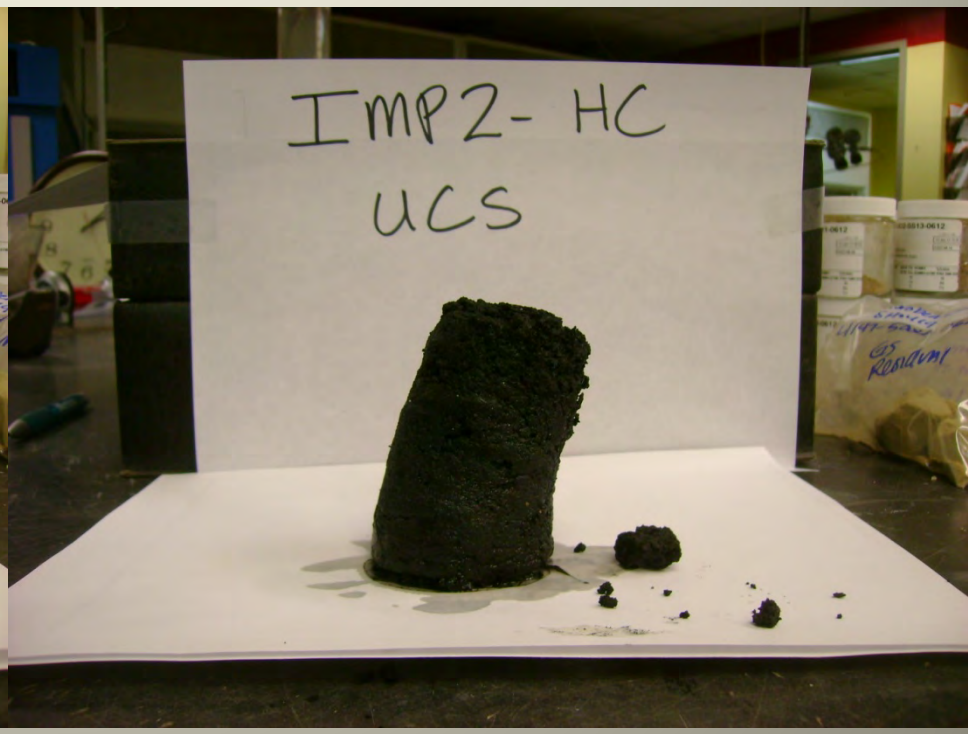
IMP2 – VR

Solid Specific Gravity Sample (unable to remove dried sample to determine specific gravity)

IMP2 - HC



Picture taken immediately after the sampled was removed from mold



Picture taken immediately after USC testing

Untreated Material

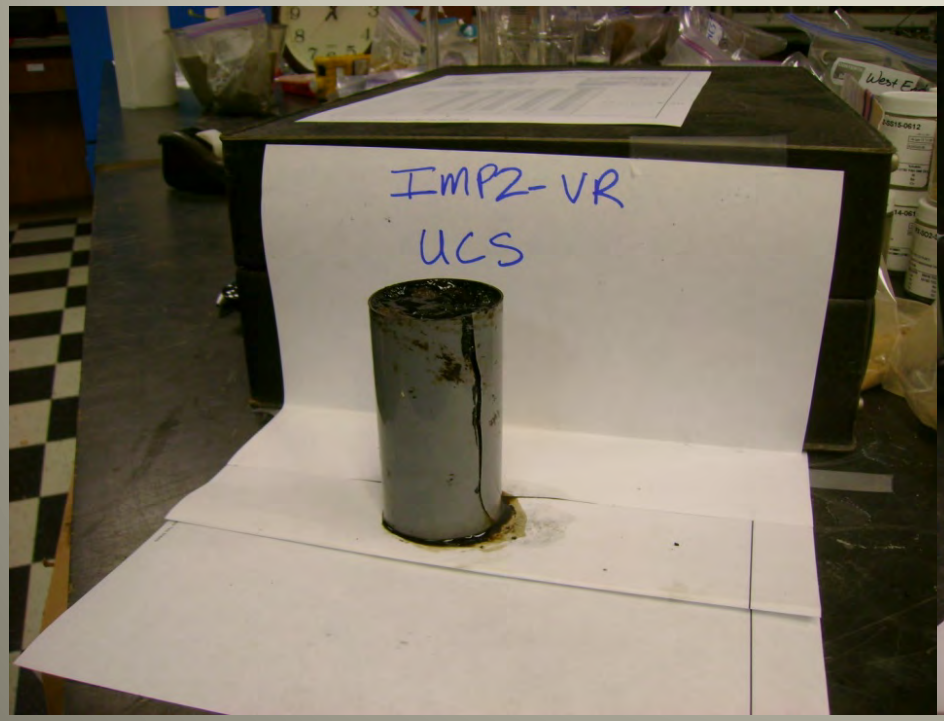
IMP2 – HC

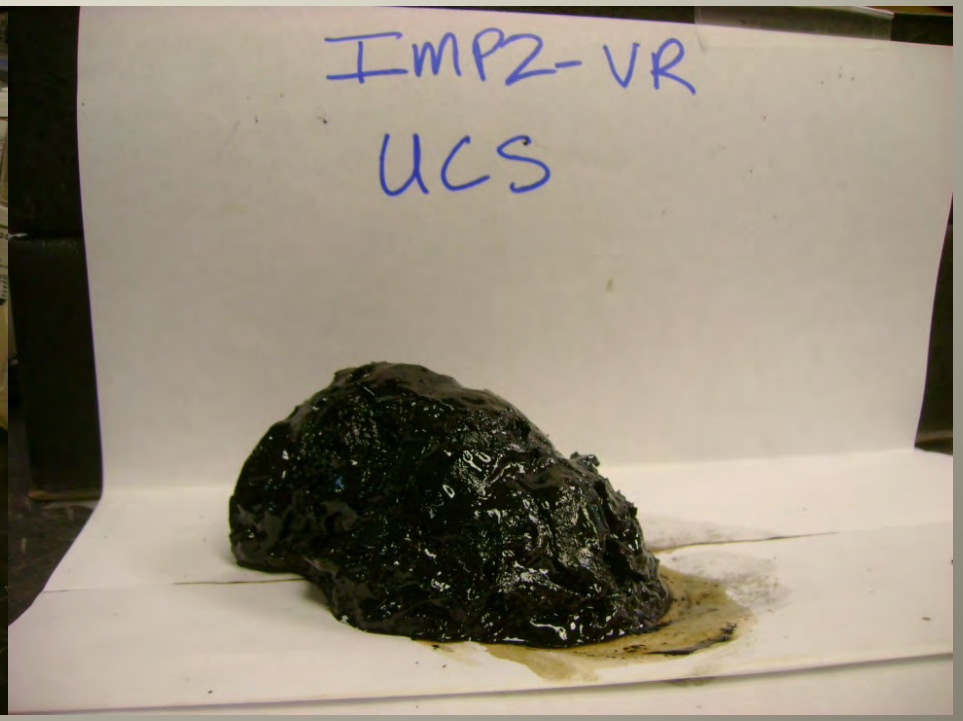
Unconfined Compressive Strength Sample

IMP2 - VR

Picture taken in the mold

Picture taken 4 minutes after sample removed from mold



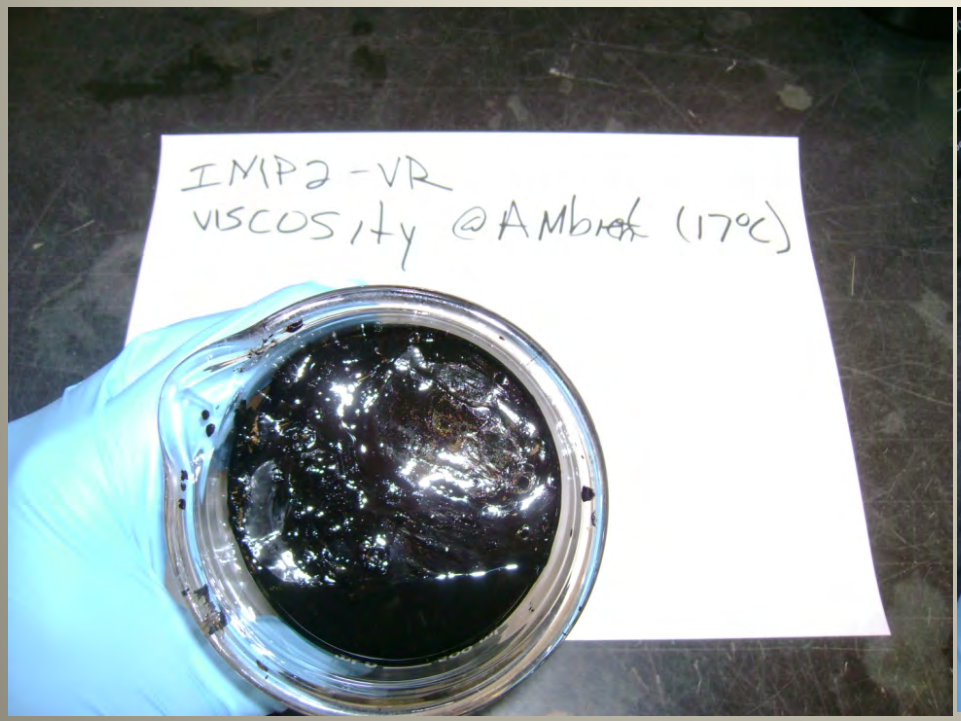


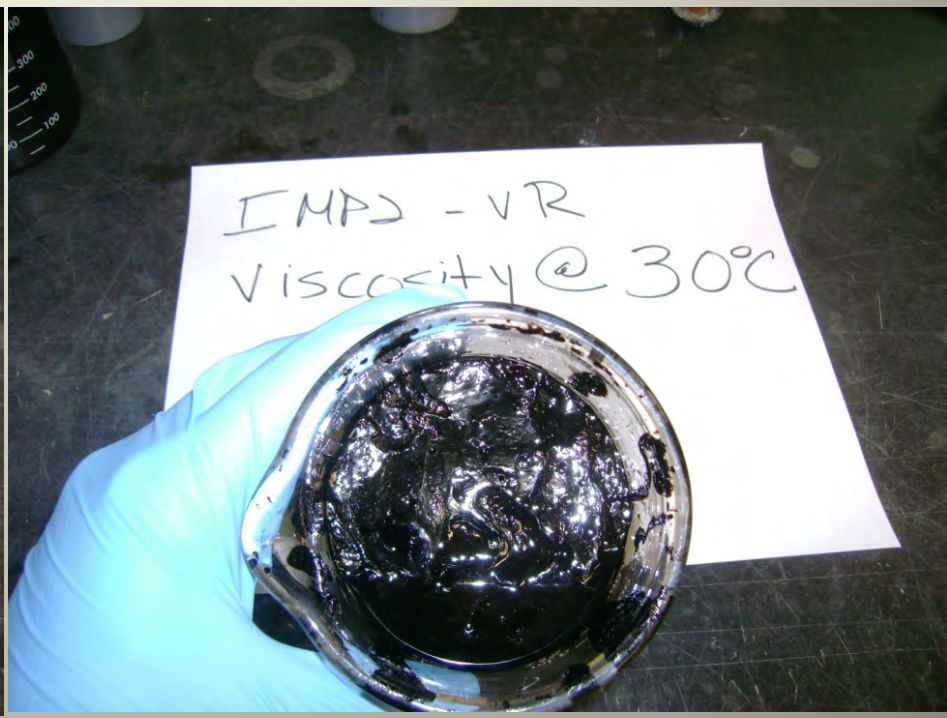
Untreated Material

IMP2 – VR

Unconfined Compressive Strength Sample (fails under own weight

IMP2 - VR





17°C

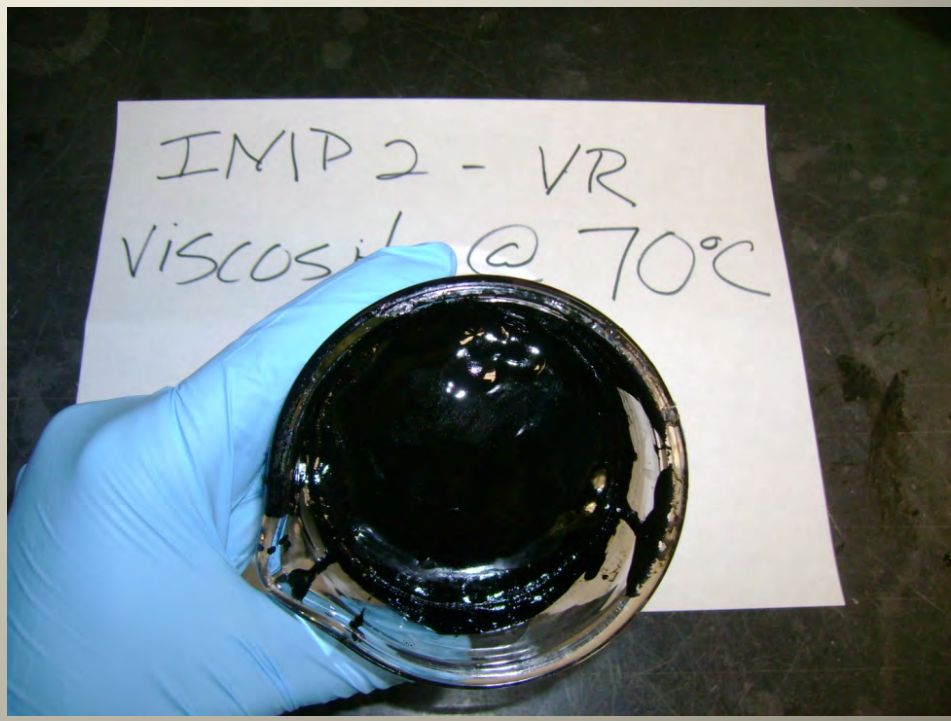
30°C

Untreated Material

IMP2 – VR

Viscosity vs. Temperature Sample . Note the water on the surface and rough surface.

IMP2 - VR



50°C

70°C

Untreated Material

IMP2 – VR

Viscosity vs. Temperature Sample. Note sample surface is becoming smooth with no water on the surface.

IMP2 - VR

90°C

90°C

Untreated Material

IMP2 – VR

Viscosity vs. Temperature Sample. Very smooth surface, no free water

APPENDIX C

UNTREATED CHEMICAL PROPERTIES ANALYTICAL REPORT

NELAP CERTIFICATE NUMBER 01955
DOD ELAP CERTIFICATE NUMBER ADE - 1482

ANALYTICAL RESULTS

PERFORMED BY

GULF COAST ANALYTICAL LABORATORIES, INC.
7979 GSRI Avenue
Baton Rouge, LA 70820

Report Date 06/28/2012

GCAL Report 212061414

Deliver To	KEMRON 1359A Ellsworth Industrial Blv Atlanta, GA 30318 404-601-6927
Attn	Tommy Jordan

Project Bridgewater Acid Tar

CASE NARRATIVE

Client: KEMRON **Report:** 212061414

Gulf Coast Analytical Laboratories received and analyzed the sample(s) listed on the sample cross-reference page of this report. Receipt of the sample(s) is documented by the attached chain of custody. This applies only to the sample(s) listed in this report. No sample integrity or quality control exceptions were identified unless noted below.

VOLATILES MASS SPECTROMETRY

In the SW-846 8260B analysis, all samples had to be diluted to bracket the concentration of target compounds within the calibration range of the instrument. The dilutions are reflected in elevated detection limits.

In the SW-846 8260B analysis, Thiophene is included in the reportable analyte list. As per client instructions, a one point calibration was performed for this analyte. It was not detected in any samples and is reported as ND. This analyte is not included in GCAL's scope of accreditation.

SEMI-VOLATILES MASS SPECTROMETRY

In the SW-846 8270C analysis, all samples had to be diluted to eliminate interference from non-target background. This is reflected in elevated detection limits. The recoveries for the surrogates are reported as diluted out for those analyses performed at a 10 or higher dilution.

METALS

In the SW-846 7471B analysis, a chemical or physical interference necessitated a dilution for all samples. This is reflected in elevated detection limits.

In the SW-846 6010B analysis for prep batch 483320, the MS and/or MSD recoveries are outside the control limits for Iron and Silver. The LCS recovery is within control limits. This indicates the analysis is in control and the sample is affected by matrix interference. A post-digestion spike was performed on the QC sample for this batch with recoveries of 107% for Iron and 83% for Silver. The Sample/Duplicate RPD for Manganese is above the control limit. The heterogeneous nature of the QC sample is believed to be responsible for this. The Sample/Duplicate RPD for Antimony, Arsenic, Cadmium, Calcium, Chromium and Zinc is not applicable because the sample and/or duplicate concentration is less than five times the reporting limit.

Laboratory Endorsement

Sample analysis was performed in accordance with approved methodologies provided by the Environmental Protection Agency or other recognized agencies. The samples and their corresponding extracts will be maintained for a period of 30 days unless otherwise arranged. Following this retention period the samples will be disposed in accordance with GCAL's Standard Operating Procedures.

Common Abbreviations Utilized in this Report

ND	Indicates the result was Not Detected at the specified RDL
DO	Indicates the result was Diluted Out
MI	Indicates the result was subject to Matrix Interference
TNTC	Indicates the result was Too Numerous To Count
SUBC	Indicates the analysis was Sub-Contracted
FLD	Indicates the analysis was performed in the Field
PQL	Practical Quantitation Limit
MDL	Method Detection Limit
RDL	Reporting Detection Limit
00:00	Reported as a time equivalent to 12:00 AM

Reporting Flags Utilized in this Report

J	Indicates the result is between the MDL and RDL
U	Indicates the compound was analyzed for but not detected
B	Indicates the analyte was detected in the associated Method Blank

Sample receipt at GCAL is documented through the attached chain of custody. In accordance with NELAC, this report shall be reproduced only in full and with the written permission of GCAL. The results contained within this report relate only to the samples reported. The documented results are presented within this report.

This report pertains only to the samples listed in the Report Sample Summary and should be retained as a permanent record thereof. The results contained within this report are intended for the use of the client. Any unauthorized use of the information contained in this report is prohibited.

I certify that this data package is in compliance with the NELAC standard and terms and conditions of the contract and Statement of Work both technically and for completeness, for other than the conditions in the case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data submitted has been authorized by the Quality Assurance Manager or his/her designee, as verified by the following signature.

Estimated uncertainty of measurement is available upon request. This report is in compliance with the DOD QSM as specified in the contract if applicable.

Robyn Migues
Technical Director
GCAL REPORT 212061414

THIS REPORT CONTAINS _____ PAGES.

Report Sample Summary

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141401	IMP2-VR-A (UNTREATED)	Solid	06/13/2012 15:20	06/14/2012 09:30
21206141402	IMP2-VR-B (UNTREATED)	Solid	06/13/2012 15:20	06/14/2012 09:30
21206141403	IMP2-VR-C (UNTREATED)	Solid	06/13/2012 15:20	06/14/2012 09:30
21206141404	IMP2-VR (UNTREATED)	Solid	06/13/2012 15:20	06/14/2012 09:30
21206141405	IMP2-HC-A (UNTREATED)	Solid	06/13/2012 15:25	06/14/2012 09:30
21206141406	IMP2-HC-B (UNTREATED)	Solid	06/13/2012 15:25	06/14/2012 09:30
21206141407	IMP2-HC-C (UNTREATED)	Solid	06/13/2012 15:25	06/14/2012 09:30
21206141408	IMP2-HC (UNTREATED)	Solid	06/13/2012 15:25	06/14/2012 09:30

Summary of Compounds Detected

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141401	**IMP2-VR-A (UNTREATED)**	Solid	06/13/2012 15:20	06/14/2012 09:30

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
108-88-3	Toluene	1440000	1.29	ug/Kg
101-81-5	Diphenylmethane	201000	4.07	ug/Kg
620-83-7	Benzene, 1-methyl-4-(phenylmethyl)-	203000	4.42	ug/Kg
21895-16-9	Benzene, 1-methyl-3-[(4-methylpheny	190000	4.53	ug/Kg
778-22-3	Benzene, 1,1'-(1-methylethylidene)b	727000	4.58	ug/Kg
4309-66-4	Stilbene, 4-amino- (E)-	3110000	4.82	ug/Kg
6416-39-3	1H-Indene, 2,3-dihydro-1-methyl-3-p	282000	4.85	ug/Kg
26137-53-1	Naphthalene, 1,2,3-trimethyl-4-prop	613000	4.90	ug/Kg
132-32-1	9H-Carbazol-3-amine, 9-ethyl-	570000	5	ug/Kg
	Unknown	628000	5.07	ug/Kg
100-41-4	Ethylbenzene	60900	1.74	ug/Kg
	Unknown	310000	5.24	ug/Kg
106-42-3	p-Xylene	577000	1.78	ug/Kg
700-88-9	Benzene, cyclopentyl-	47100	3.33	ug/Kg
21777-84-4	Benzene, [2-methyl-1-(1-methylethyl	62900	3.46	ug/Kg
	Unknown	71600	3.58	ug/Kg
827-52-1	Benzene, cyclohexyl-	70400	3.70	ug/Kg
4920-99-4	Benzene, 1-ethyl-3-(1-methylethyl)-	117000	3.81	ug/Kg
934-80-5	Benzene, 4-ethyl-1,2-dimethyl-	134000	3.91	ug/Kg

SW-846 7471B

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	Mercury	1.71	0.10	0.046	mg/kg

SW-846 9045C pH

CAS#	Parameter	Result	RDL	MDL	Units
pH	pH	1.10	1.00	1.00	pH unit

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
95-63-6	1,2,4-Trimethylbenzene	557000J	767000	55200	ug/Kg
95-50-1	1,2-Dichlorobenzene	1650000	767000	42300	ug/Kg
108-67-8	1,3,5-Trimethylbenzene	403000J	767000	57700	ug/Kg
99-87-6	4-Isopropyltoluene	415000J	767000	32200	ug/Kg
71-43-2	Benzene	18900000	767000	23300	ug/Kg
100-41-4	Ethylbenzene	110000J	767000	28100	ug/Kg
98-82-8	Isopropylbenzene (Cumene)	473000J	767000	28400	ug/Kg
91-20-3	Naphthalene	3060000	767000	49200	ug/Kg
108-88-3	Toluene	5570000	767000	23800	ug/Kg
1330-20-7	Xylene (total)	1800000	1530000	61500	ug/Kg
136777-61-2	m,p-Xylene	1300000	767000	45100	ug/Kg
95-47-6	o-Xylene	500000J	767000	20700	ug/Kg
135-98-8	sec-Butylbenzene	504000J	767000	30200	ug/Kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141401	**IMP2-VR-A (UNTREATED)**	Solid	06/13/2012 15:20	06/14/2012 09:30

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
91-57-6	2-Methylnaphthalene	320000	169000	4580	ug/Kg
83-32-9	Acenaphthene	50600J	169000	6030	ug/Kg
62-53-3	Aniline	22300J	169000	15700	ug/Kg
86-73-7	Fluorene	1310000	169000	6590	ug/Kg

SW-846 6010B

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	Aluminum	319	13.6	1.35	mg/kg
7440-36-0	Antimony	1.46J	4.08	0.17	mg/kg
7440-39-3	Barium	7.95	0.68	0.041	mg/kg
7440-41-7	Beryllium	0.017J	0.34	0.0034	mg/kg
7440-43-9	Cadmium	0.078J	0.34	0.015	mg/kg
7440-70-2	Calcium	195	51.1	7.44	mg/kg
7440-47-3	Chromium	5.23	0.68	0.031	mg/kg
7440-48-4	Cobalt	0.24J	0.68	0.017	mg/kg
7440-50-8	Copper	23.5	0.68	0.053	mg/kg
7439-89-6	Iron	881	6.81	1.19	mg/kg
7439-92-1	Lead	62.4	1.02	0.19	mg/kg
7439-95-4	Magnesium	54.0	6.81	0.74	mg/kg
7439-96-5	Manganese	11.3	1.02	0.024	mg/kg
7440-02-0	Nickel	5.42	2.72	0.036	mg/kg
7440-09-7	Potassium	68.1	34.0	3.58	mg/kg
7782-49-2	Selenium	13.8	2.72	0.22	mg/kg
7440-23-5	Sodium	3570	68.1	5.16	mg/kg
7440-28-0	Thallium	1.97	1.36	0.15	mg/kg
7440-62-2	Vanadium	1.05J	1.36	0.026	mg/kg
7440-66-6	Zinc	6.96	1.36	0.73	mg/kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141402	**IMP2-VR-B (UNTREATED)**	Solid	06/13/2012 15:20	06/14/2012 09:30

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
95-63-6	1,2,4-Trimethylbenzene	610000J	820000	59000	ug/Kg
95-50-1	1,2-Dichlorobenzene	2120000	820000	45300	ug/Kg
108-67-8	1,3,5-Trimethylbenzene	466000J	820000	61600	ug/Kg
106-46-7	1,4-Dichlorobenzene	183000J	820000	37900	ug/Kg
71-43-2	Benzene	26300000	820000	24900	ug/Kg
98-82-8	Isopropylbenzene (Cumene)	550000J	820000	30300	ug/Kg
91-20-3	Naphthalene	3810000	820000	52600	ug/Kg
108-88-3	Toluene	7510000	820000	25400	ug/Kg
1330-20-7	Xylene (total)	2270000	1640000	65700	ug/Kg
136777-61-2	m,p-Xylene	1680000	820000	48200	ug/Kg
95-47-6	o-Xylene	591000J	820000	22100	ug/Kg
135-98-8	sec-Butylbenzene	575000J	820000	32300	ug/Kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141402	**IMP2-VR-B (UNTREATED)**	Solid	06/13/2012 15:20	06/14/2012 09:30

SW-846 9045C pH

CAS#	Parameter	Result	RDL	MDL	Units
pH	pH	1.08	1.00	1.00	pH unit

SW-846 6010B

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	Aluminum	323	13.3	1.32	mg/kg
7440-36-0	Antimony	1.05J	4.00	0.16	mg/kg
7440-39-3	Barium	7.51	0.67	0.040	mg/kg
7440-41-7	Beryllium	0.015J	0.33	0.0033	mg/kg
7440-43-9	Cadmium	0.018J	0.33	0.015	mg/kg
7440-70-2	Calcium	209	50.0	7.28	mg/kg
7440-47-3	Chromium	4.75	0.67	0.030	mg/kg
7440-48-4	Cobalt	0.32J	0.67	0.017	mg/kg
7440-50-8	Copper	23.8	0.67	0.052	mg/kg
7439-89-6	Iron	992	6.66	1.17	mg/kg
7439-92-1	Lead	64.9	1.0	0.19	mg/kg
7439-95-4	Magnesium	58.8	6.66	0.72	mg/kg
7439-96-5	Manganese	13.6	1.0	0.023	mg/kg
7440-02-0	Nickel	5.12	2.67	0.035	mg/kg
7440-09-7	Potassium	65.0	33.3	3.51	mg/kg
7782-49-2	Selenium	13.4	2.67	0.22	mg/kg
7440-23-5	Sodium	4260	66.6	5.05	mg/kg
7440-28-0	Thallium	1.93	1.33	0.15	mg/kg
7440-62-2	Vanadium	1.08J	1.33	0.025	mg/kg
7440-66-6	Zinc	7.94	1.33	0.71	mg/kg

SW-846 7471B

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	Mercury	1.96	0.096	0.044	mg/kg

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
108-88-3	Toluene	1590000	1.29	ug/Kg
101-81-5	Diphenylmethane	185000	4.07	ug/Kg
4957-14-6	Benzene, 1,1'-methylenebis[4-methyl	170000	4.53	ug/Kg
778-22-3	Benzene, 1,1'-(1-methylethylidene)b	683000	4.58	ug/Kg
26137-53-1	Naphthalene, 1,2,3-trimethyl-4-prop	2620000	4.82	ug/Kg
	Unknown	516000	4.90	ug/Kg
13688-68-1	9,9-Dimethyl-9-silafluorene	472000	5	ug/Kg
	Unknown	791000	5.07	ug/Kg
55012-80-1	Silane, trimethyl[5-methyl-2-(1-met	345000	5.30	ug/Kg
10544-50-0	Sulfur, mol. (S8)	241000	5.94	ug/Kg
	Unknown	334000	7	ug/Kg
106-42-3	p-Xylene	554000	1.78	ug/Kg
	Unknown	323000	7.42	ug/Kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141402	IMP2-VR-B (UNTREATED)	Solid	06/13/2012 15:20	06/14/2012 09:30

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
700-88-9	Benzene, cyclopentyl-	44400	3.33	ug/Kg
1196-58-3	Benzene, (1-ethylpropyl)-	58800	3.46	ug/Kg
1595-01-3	1-Methyl-4-N-hexylbenzene	66900	3.57	ug/Kg
827-52-1	Benzene, cyclohexyl-	67200	3.70	ug/Kg
	Unknown	94700	3.74	ug/Kg
4218-48-8	Benzene, 1-ethyl-4-(1-methylethyl)-	122000	3.81	ug/Kg
14128-61-1	2-Hexanone, 5-methyl-5-phenyl-	125000	3.91	ug/Kg

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
91-57-6	2-Methylnaphthalene	243000	165000	4480	ug/Kg
83-32-9	Acenaphthene	39100J	165000	5900	ug/Kg
86-73-7	Fluorene	941000	165000	6450	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141403	IMP2-VR-C (UNTREATED)	Solid	06/13/2012 15:20	06/14/2012 09:30

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
91-57-6	2-Methylnaphthalene	589000	329000	8940	ug/Kg
83-32-9	Acenaphthene	94800J	329000	11800	ug/Kg
62-53-3	Aniline	58700J	329000	30700	ug/Kg
86-73-7	Fluorene	2390000	329000	12900	ug/Kg

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
108-88-3	Toluene	3210000	1.29	ug/Kg
778-22-3	Benzene, 1,1'-(1-methylethylidene)b	1410000	4.58	ug/Kg
14064-82-5	Benzenamine, 3-(2-phenylethenyl)-,	5800000	4.82	ug/Kg
26137-53-1	Naphthalene, 1,2,3-trimethyl-4-prop	1110000	4.90	ug/Kg
67598-11-2	N,N-Diethyl-.alpha.-(aminomethylene	1150000	5	ug/Kg
	Unknown	1790000	5.07	ug/Kg
5956-09-2	2H-3,9a-Methano-1-benzoxepin, octah	836000	5.30	ug/Kg
	Unknown	508000	5.37	ug/Kg
10544-50-0	Sulfur, mol. (S8)	515000	5.95	ug/Kg
	Unknown	833000	7	ug/Kg
	Unknown	625000	7.42	ug/Kg
108-38-3	Benzene, 1,3-dimethyl-	1110000	1.78	ug/Kg
21777-84-4	Benzene, [2-methyl-1-(1-methylethyl	119000	3.46	ug/Kg
2132-84-5	Benzene, (1-methylhexyl)-	141000	3.57	ug/Kg
827-52-1	Benzene, cyclohexyl-	146000	3.70	ug/Kg
4920-99-4	Benzene, 1-ethyl-3-(1-methylethyl)-	227000	3.81	ug/Kg
101-81-5	Diphenylmethane	374000	4.07	ug/Kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141403	IMP2-VR-C (UNTREATED)	Solid	06/13/2012 15:20	06/14/2012 09:30

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
605-39-0	2,2'-Dimethylbiphenyl	411000	4.42	ug/Kg
21895-16-9	Benzene, 1-methyl-3-[(4-methylpheny	401000	4.53	ug/Kg

SW-846 6010B

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	Aluminum	360	13.2	1.31	mg/kg
7440-36-0	Antimony	1.31J	3.96	0.16	mg/kg
7440-39-3	Barium	8.16	0.66	0.040	mg/kg
7440-41-7	Beryllium	0.018J	0.33	0.0033	mg/kg
7440-43-9	Cadmium	0.056J	0.33	0.015	mg/kg
7440-70-2	Calcium	234	49.5	7.21	mg/kg
7440-47-3	Chromium	2.76	0.66	0.030	mg/kg
7440-48-4	Cobalt	0.30J	0.66	0.016	mg/kg
7440-50-8	Copper	28.6	0.66	0.051	mg/kg
7439-89-6	Iron	1120	6.60	1.16	mg/kg
7439-92-1	Lead	67.7	0.99	0.19	mg/kg
7439-95-4	Magnesium	63.2	6.60	0.72	mg/kg
7439-96-5	Manganese	15.6	0.99	0.023	mg/kg
7440-02-0	Nickel	5.27	2.64	0.035	mg/kg
7440-09-7	Potassium	65.0	33.0	3.47	mg/kg
7782-49-2	Selenium	13.9	2.64	0.22	mg/kg
7440-23-5	Sodium	4440	66.0	5.00	mg/kg
7440-28-0	Thallium	2.30	1.32	0.15	mg/kg
7440-62-2	Vanadium	1.14J	1.32	0.025	mg/kg
7440-66-6	Zinc	7.13	1.32	0.70	mg/kg

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
95-63-6	1,2,4-Trimethylbenzene	434000	397000	28600	ug/Kg
95-50-1	1,2-Dichlorobenzene	1810000	397000	21900	ug/Kg
108-67-8	1,3,5-Trimethylbenzene	301000J	397000	29900	ug/Kg
99-87-6	4-Isopropyltoluene	234000J	397000	16700	ug/Kg
100-41-4	Ethylbenzene	107000J	397000	14500	ug/Kg
98-82-8	Isopropylbenzene (Cumene)	353000J	397000	14700	ug/Kg
91-20-3	Naphthalene	3360000	397000	25500	ug/Kg
108-88-3	Toluene	5840000	397000	12300	ug/Kg
1330-20-7	Xylene (total)	1590000	795000	31900	ug/Kg
136777-61-2	m,p-Xylene	1190000	397000	23400	ug/Kg
95-47-6	o-Xylene	397000J	397000	10700	ug/Kg
135-98-8	sec-Butylbenzene	358000J	397000	15700	ug/Kg

SW-846 9045C pH

CAS#	Parameter	Result	RDL	MDL	Units
pH	pH	2.03	1.00	1.00	pH unit

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141403	IMP2-VR-C (UNTREATED)	Solid	06/13/2012 15:20	06/14/2012 09:30

SW-846 7471B

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	Mercury	1.77	0.094	0.043	mg/kg

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
71-43-2	Benzene	18100000	795000	24200	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141404	IMP2-VR (UNTREATED)	Solid	06/13/2012 15:20	06/14/2012 09:30

SW-846 9060M

CAS#	Parameter	Result	RDL	MDL	Units
C-012	Total Organic Carbon	815000	200	50.0	mg/kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141405	IMP2-HC-A (UNTREATED)	Solid	06/13/2012 15:25	06/14/2012 09:30

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
108-88-3	Toluene	1850000	1.29	ug/Kg
101-81-5	Diphenylmethane	92700	4.07	ug/Kg
611-43-8	1,1'-Biphenyl, 2,3'-dimethyl-	88100	4.42	ug/Kg
4957-14-6	Benzene, 1,1'-methylenebis[4-methyl	93100	4.53	ug/Kg
778-22-3	Benzene, 1,1'-(1-methylethylidene)b	364000	4.58	ug/Kg
	Unknown	112000	4.75	ug/Kg
26137-53-1	Naphthalene, 1,2,3-trimethyl-4-prop	743000	4.82	ug/Kg
	Unknown	145000	4.90	ug/Kg
132-32-1	9H-Carbazol-3-amine, 9-ethyl-	141000	5	ug/Kg
	Unknown	221000	5.07	ug/Kg
88-58-4	1,4-Benzenediol, 2,5-bis(1,1-dimeth	117000	5.30	ug/Kg
100-41-4	Ethylbenzene	71300	1.74	ug/Kg
10544-50-0	Sulfur, mol. (S8)	198000	5.94	ug/Kg
106-42-3	p-Xylene	547000	1.78	ug/Kg
108-38-3	Benzene, 1,3-dimethyl-	148000	1.89	ug/Kg
98-82-8	Benzene, (1-methylethyl)-	159000	2.04	ug/Kg
95-36-3	1,2,4-Trimethylbenzene	124000	2.37	ug/Kg
1595-01-3	1-Methyl-4-N-hexylbenzene	41500	3.57	ug/Kg
827-52-1	Benzene, cyclohexyl-	53500	3.70	ug/Kg
934-80-5	Benzene, 4-ethyl-1,2-dimethyl-	77500	3.91	ug/Kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141405	**IMP2-HC-A (UNTREATED)**	Solid	06/13/2012 15:25	06/14/2012 09:30

SW-846 7471B

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	Mercury	8.68	0.36	0.16	mg/kg

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
91-57-6	2-Methylnaphthalene	60600J	159000	4320	ug/Kg
83-32-9	Acenaphthene	11600J	159000	5690	ug/Kg
86-73-7	Fluorene	223000	159000	6220	ug/Kg

SW-846 6010B

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	Aluminum	227	12.9	1.27	mg/kg
7440-36-0	Antimony	0.33J	3.86	0.16	mg/kg
7440-38-2	Arsenic	5.95	2.57	0.22	mg/kg
7440-39-3	Barium	5.31	0.64	0.039	mg/kg
7440-41-7	Beryllium	0.015J	0.32	0.0032	mg/kg
7440-70-2	Calcium	97.6	48.2	7.02	mg/kg
7440-47-3	Chromium	6.27	0.64	0.029	mg/kg
7440-48-4	Cobalt	0.18J	0.64	0.016	mg/kg
7440-50-8	Copper	12.5	0.64	0.050	mg/kg
7439-89-6	Iron	639	6.43	1.13	mg/kg
7439-92-1	Lead	59.0	0.96	0.18	mg/kg
7439-95-4	Magnesium	36.3	6.43	0.70	mg/kg
7439-96-5	Manganese	5.59	0.96	0.022	mg/kg
7440-02-0	Nickel	4.56	2.57	0.034	mg/kg
7440-09-7	Potassium	91.2	32.1	3.38	mg/kg
7782-49-2	Selenium	9.67	2.57	0.21	mg/kg
7440-23-5	Sodium	5740	64.3	4.87	mg/kg
7440-28-0	Thallium	0.73J	1.29	0.14	mg/kg
7440-62-2	Vanadium	0.53J	1.29	0.024	mg/kg
7440-66-6	Zinc	4.64	1.29	0.68	mg/kg

SW-846 9045C pH

CAS#	Parameter	Result	RDL	MDL	Units
pH	pH	1.04	1.00	1.00	pH unit

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
71-43-2	Benzene	21400000	1300000	39400	ug/Kg
91-20-3	Naphthalene	1490000	1300000	83200	ug/Kg
108-88-3	Toluene	4260000	1300000	40200	ug/Kg
1330-20-7	Xylene (total)	1670000J	2590000	104000	ug/Kg
136777-61-2	m,p-Xylene	1090000J	1300000	76200	ug/Kg
95-47-6	o-Xylene	583000J	1300000	35000	ug/Kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141406	**IMP2-HC-B (UNTREATED)**	Solid	06/13/2012 15:25	06/14/2012 09:30

SW-846 7471B

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	Mercury	3.36	0.20	0.090	mg/kg

Library Search Semivolatiles

CAS#	Parameter	Result	Retention		Units
108-88-3	Toluene	1850000	1.29		ug/Kg
4575-46-6	Benzene, 1-cyclohexyl-3-methyl-	85200	4.06		ug/Kg
620-83-7	Benzene, 1-methyl-4-(phenylmethyl)-	67000	4.42		ug/Kg
13540-56-2	Benzene, 1,2-dimethyl-4-(phenylmeth	95800	4.53		ug/Kg
778-22-3	Benzene, 1,1'-(1-methylethylidene)b	334000	4.58		ug/Kg
26137-53-1	Naphthalene, 1,2,3-trimethyl-4-prop	671000	4.82		ug/Kg
4309-66-4	Stilbene, 4-amino- (E)-	122000	4.90		ug/Kg
	Unknown	99500	5		ug/Kg
	Unknown	181000	5.07		ug/Kg
55012-80-1	Silane, trimethyl[5-methyl-2-(1-met	105000	5.30		ug/Kg
10544-50-0	Sulfur, mol. (S8)	202000	5.94		ug/Kg
100-41-4	Ethylbenzene	65000	1.74		ug/Kg
108-38-3	Benzene, 1,3-dimethyl-	481000	1.78		ug/Kg
106-42-3	p-Xylene	130000	1.89		ug/Kg
98-82-8	Benzene, (1-methylethyl)-	137000	2.03		ug/Kg
98-51-1	4-tert-Butyltoluene	105000	2.79		ug/Kg
2132-84-5	Benzene, (1-methylhexyl)-	42100	3.57		ug/Kg
827-52-1	Benzene, cyclohexyl-	50900	3.70		ug/Kg
54932-88-6	Benzenepropanoic acid, .alpha.,.alp	63900	3.91		ug/Kg

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
91-57-6	2-Methylnaphthalene	55400J	178000	4840	ug/Kg
83-32-9	Acenaphthene	8320J	178000	6370	ug/Kg
86-73-7	Fluorene	207000	178000	6970	ug/Kg
85-01-8	Phenanthrene	9400J	178000	5720	ug/Kg

SW-846 6010B

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	Aluminum	286	14.4	1.42	mg/kg
7440-36-0	Antimony	0.35J	4.32	0.17	mg/kg
7440-38-2	Arsenic	1.41J	2.88	0.25	mg/kg
7440-39-3	Barium	6.23	0.72	0.043	mg/kg
7440-41-7	Beryllium	0.015J	0.36	0.0036	mg/kg
7440-70-2	Calcium	163	54.0	7.87	mg/kg
7440-47-3	Chromium	8.36	0.72	0.032	mg/kg
7440-48-4	Cobalt	0.20J	0.72	0.018	mg/kg
7440-50-8	Copper	15.4	0.72	0.056	mg/kg
7439-89-6	Iron	776	7.20	1.26	mg/kg
7439-92-1	Lead	76.1	1.08	0.21	mg/kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141406	IMP2-HC-B (UNTREATED)	Solid	06/13/2012 15:25	06/14/2012 09:30

SW-846 6010B

CAS#	Parameter	Result	RDL	MDL	Units
7439-95-4	Magnesium	44.2	7.20	0.78	mg/kg
7439-96-5	Manganese	6.60	1.08	0.025	mg/kg
7440-02-0	Nickel	6.13	2.88	0.038	mg/kg
7440-09-7	Potassium	104	36.0	3.79	mg/kg
7782-49-2	Selenium	10.7	2.88	0.24	mg/kg
7440-22-4	Silver	0.042J	0.72	0.040	mg/kg
7440-23-5	Sodium	6440	72.0	5.46	mg/kg
7440-28-0	Thallium	0.86J	1.44	0.16	mg/kg
7440-62-2	Vanadium	0.79J	1.44	0.027	mg/kg
7440-66-6	Zinc	5.03	1.44	0.77	mg/kg

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
95-63-6	1,2,4-Trimethylbenzene	749000J	1620000	117000	ug/Kg
95-50-1	1,2-Dichlorobenzene	551000J	1620000	89700	ug/Kg
108-67-8	1,3,5-Trimethylbenzene	625000J	1620000	122000	ug/Kg
71-43-2	Benzene	35500000	1620000	49400	ug/Kg
98-82-8	Isopropylbenzene (Cumene)	769000J	1620000	60100	ug/Kg
91-20-3	Naphthalene	1890000	1620000	104000	ug/Kg
108-88-3	Toluene	7220000	1620000	50400	ug/Kg
1330-20-7	Xylene (total)	2410000J	3250000	130000	ug/Kg
136777-61-2	m,p-Xylene	1640000	1620000	95500	ug/Kg
95-47-6	o-Xylene	767000J	1620000	43900	ug/Kg

SW-846 9045C pH

CAS#	Parameter	Result	RDL	MDL	Units
pH	pH	1.06	1.00	1.00	pH unit

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141407	IMP2-HC-C (UNTREATED)	Solid	06/13/2012 15:25	06/14/2012 09:30

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
95-63-6	1,2,4-Trimethylbenzene	733000J	1530000	110000	ug/Kg
95-50-1	1,2-Dichlorobenzene	662000J	1530000	84700	ug/Kg
108-67-8	1,3,5-Trimethylbenzene	607000J	1530000	115000	ug/Kg
71-43-2	Benzene	42400000	1530000	46600	ug/Kg
98-82-8	Isopropylbenzene (Cumene)	778000J	1530000	56800	ug/Kg
91-20-3	Naphthalene	2070000	1530000	98500	ug/Kg
108-88-3	Toluene	9120000	1530000	47600	ug/Kg
1330-20-7	Xylene (total)	2530000J	3070000	123000	ug/Kg
136777-61-2	m,p-Xylene	1740000	1530000	90200	ug/Kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141407	**IMP2-HC-C (UNTREATED)**	Solid	06/13/2012 15:25	06/14/2012 09:30

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
95-47-6	o-Xylene	788000J	1530000	41400	ug/Kg

SW-846 9045C pH

CAS#	Parameter	Result	RDL	MDL	Units
pH	pH	1.06	1.00	1.00	pH unit

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
91-57-6	2-Methylnaphthalene	39100J	85400	2320	ug/Kg
83-32-9	Acenaphthene	5930J	85400	3050	ug/Kg
86-73-7	Fluorene	133000	85400	3340	ug/Kg
85-01-8	Phenanthrene	5240J	85400	2740	ug/Kg

SW-846 7471B

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	Mercury	2.74	0.096	0.044	mg/kg

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
75-00-3	Ethyl Chloride	83400	1.07	ug/Kg
102-46-5	Benzene, 4-(chloromethyl)-1,2-dimet	37400	3.91	ug/Kg
4575-46-6	Benzene, 1-cyclohexyl-3-methyl-	49200	4.06	ug/Kg
4957-14-6	Benzene, 1,1'-methylenebis[4-methyl	53400	4.53	ug/Kg
778-22-3	Benzene, 1,1'-(1-methylethylidene)b	195000	4.58	ug/Kg
	Unknown	55000	4.78	ug/Kg
26137-53-1	Naphthalene, 1,2,3-trimethyl-4-prop	398000	4.82	ug/Kg
	Unknown	78700	4.90	ug/Kg
	Unknown	65900	5	ug/Kg
	Unknown	106000	5.07	ug/Kg
88-58-4	1,4-Benzenediol, 2,5-bis(1,1-dimeth	53700	5.30	ug/Kg
108-88-3	Toluene	1030000	1.29	ug/Kg
10544-50-0	Sulfur, mol. (S8)	97600	5.94	ug/Kg
100-41-4	Ethylbenzene	36100	1.74	ug/Kg
106-42-3	p-Xylene	295000	1.78	ug/Kg
95-47-6	Benzene, 1,2-dimethyl-	78400	1.89	ug/Kg
98-82-8	Benzene, (1-methylethyl)-	83900	2.04	ug/Kg
98-51-1	4-tert-Butyltoluene	72500	2.79	ug/Kg
	Unknown	21400	3.57	ug/Kg
827-52-1	Benzene, cyclohexyl-	27400	3.70	ug/Kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141407	**IMP2-HC-C (UNTREATED)**	Solid	06/13/2012 15:25	06/14/2012 09:30

SW-846 6010B

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	Aluminum	164	13.8	1.36	mg/kg
7440-36-0	Antimony	0.27J	4.14	0.17	mg/kg
7440-38-2	Arsenic	1.93J	2.76	0.24	mg/kg
7440-39-3	Barium	5.69	0.69	0.041	mg/kg
7440-41-7	Beryllium	0.012J	0.34	0.0034	mg/kg
7440-70-2	Calcium	122	51.7	7.54	mg/kg
7440-47-3	Chromium	4.16	0.69	0.031	mg/kg
7440-48-4	Cobalt	0.17J	0.69	0.017	mg/kg
7440-50-8	Copper	12.8	0.69	0.053	mg/kg
7439-89-6	Iron	529	6.90	1.21	mg/kg
7439-92-1	Lead	71.2	1.03	0.20	mg/kg
7439-95-4	Magnesium	31.6	6.90	0.75	mg/kg
7439-96-5	Manganese	4.71	1.03	0.024	mg/kg
7440-02-0	Nickel	3.57	2.76	0.036	mg/kg
7440-09-7	Potassium	65.0	34.5	3.63	mg/kg
7782-49-2	Selenium	10.0	2.76	0.23	mg/kg
7440-22-4	Silver	0.042J	0.69	0.038	mg/kg
7440-23-5	Sodium	4550	69.0	5.23	mg/kg
7440-28-0	Thallium	0.72J	1.38	0.15	mg/kg
7440-62-2	Vanadium	0.63J	1.38	0.026	mg/kg
7440-66-6	Zinc	3.67	1.38	0.73	mg/kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141408	**IMP2-HC (UNTREATED)**	Solid	06/13/2012 15:25	06/14/2012 09:30

SW-846 9060M

CAS#	Parameter	Result	RDL	MDL	Units
C-012	Total Organic Carbon	606000	200	50.0	mg/kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141401	**IMP2-VR-A (UNTREATED)**	Solid	06/13/2012 15:20	06/14/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			100000	06/19/2012 23:33	JCK	483643

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	20700U	767000	20700	ug/Kg
71-55-6	1,1,1-Trichloroethane	36300U	767000	36300	ug/Kg
79-34-5	1,1,2,2-Tetrachloroethane	17500U	767000	17500	ug/Kg
79-00-5	1,1,2-Trichloroethane	20500U	767000	20500	ug/Kg
75-34-3	1,1-Dichloroethane	22800U	767000	22800	ug/Kg
75-35-4	1,1-Dichloroethene	35600U	767000	35600	ug/Kg
563-58-6	1,1-Dichloropropene	37400U	767000	37400	ug/Kg
96-18-4	1,2,3-Trichloropropane	17600U	767000	17600	ug/Kg
120-82-1	1,2,4-Trichlorobenzene	54400U	767000	54400	ug/Kg
95-63-6	**1,2,4-Trimethylbenzene**	**557000J**	**767000**	**55200**	**ug/Kg**
96-12-8	1,2-Dibromo-3-chloropropane	61500U	767000	61500	ug/Kg
106-93-4	1,2-Dibromoethane	22100U	767000	22100	ug/Kg
95-50-1	**1,2-Dichlorobenzene**	**1650000**	**767000**	**42300**	**ug/Kg**
107-06-2	1,2-Dichloroethane	30400U	767000	30400	ug/Kg
540-59-0	1,2-Dichloroethene(Total)	35900U	1530000	35900	ug/Kg
78-87-5	1,2-Dichloropropane	23600U	767000	23600	ug/Kg
108-67-8	**1,3,5-Trimethylbenzene**	**403000J**	**767000**	**57700**	**ug/Kg**
541-73-1	1,3-Dichlorobenzene	39900U	767000	39900	ug/Kg
142-28-9	1,3-Dichloropropane	24200U	767000	24200	ug/Kg
106-46-7	1,4-Dichlorobenzene	35400U	767000	35400	ug/Kg
594-20-7	2,2-Dichloropropane	38200U	767000	38200	ug/Kg
78-93-3	2-Butanone	79400U	767000	79400	ug/Kg
95-49-8	2-Chlorotoluene	33600U	767000	33600	ug/Kg
591-78-6	2-Hexanone	66400U	767000	66400	ug/Kg
106-43-4	4-Chlorotoluene	36000U	767000	36000	ug/Kg
99-87-6	**4-Isopropyltoluene**	**415000J**	**767000**	**32200**	**ug/Kg**
108-10-1	4-Methyl-2-pentanone	20200U	767000	20200	ug/Kg
67-64-1	Acetone	158000U	3830000	158000	ug/Kg
71-43-2	**Benzene**	**18900000**	**767000**	**23300**	**ug/Kg**
108-86-1	Bromobenzene	23900U	767000	23900	ug/Kg
74-97-5	Bromochloromethane	20700U	767000	20700	ug/Kg
75-27-4	Bromodichloromethane	24800U	767000	24800	ug/Kg
75-25-2	Bromoform	24400U	767000	24400	ug/Kg
74-83-9	Bromomethane	46500U	767000	46500	ug/Kg
75-15-0	Carbon disulfide	49800U	767000	49800	ug/Kg
56-23-5	Carbon tetrachloride	31000U	767000	31000	ug/Kg
108-90-7	Chlorobenzene	22800U	767000	22800	ug/Kg
75-00-3	Chloroethane	50800U	767000	50800	ug/Kg
67-66-3	Chloroform	33000U	767000	33000	ug/Kg
74-87-3	Chloromethane	36300U	767000	36300	ug/Kg
124-48-1	Dibromochloromethane	33400U	767000	33400	ug/Kg
74-95-3	Dibromomethane	35400U	767000	35400	ug/Kg
75-71-8	Dichlorodifluoromethane	34300U	767000	34300	ug/Kg
100-41-4	**Ethylbenzene**	**110000J**	**767000**	**28100**	**ug/Kg**
87-68-3	Hexachlorobutadiene	32800U	767000	32800	ug/Kg
98-82-8	**Isopropylbenzene (Cumene)**	**473000J**	**767000**	**28400**	**ug/Kg**
74-88-4	Methyl iodide	189000U	767000	189000	ug/Kg
75-09-2	Methylene chloride	67800U	1530000	67800	ug/Kg
91-20-3	**Naphthalene**	**3060000**	**767000**	**49200**	**ug/Kg**
100-42-5	Styrene	23600U	767000	23600	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141401	**IMP2-VR-A (UNTREATED)**	Solid	06/13/2012 15:20	06/14/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			100000	06/19/2012 23:33	JCK	483643

CAS#	Parameter	Result	RDL	MDL	Units
127-18-4	Tetrachloroethene	45400U	767000	45400	ug/Kg
110-02-1	Thiophene	ND			ug/Kg
108-88-3	**Toluene**	**5570000**	**767000**	**23800**	**ug/Kg**
79-01-6	Trichloroethene	32700U	767000	32700	ug/Kg
75-69-4	Trichlorofluoromethane	40000U	767000	40000	ug/Kg
76-13-1	Trichlorotrifluoroethane	30700U	767000	30700	ug/Kg
108-05-4	Vinyl acetate	21600U	767000	21600	ug/Kg
75-01-4	Vinyl chloride	41700U	767000	41700	ug/Kg
1330-20-7	**Xylene (total)**	**1800000**	**1530000**	**61500**	**ug/Kg**
156-59-2	cis-1,2-Dichloroethene	22700U	767000	22700	ug/Kg
10061-01-5	cis-1,3-Dichloropropene	28400U	767000	28400	ug/Kg
136777-61-2	**m,p-Xylene**	**1300000**	**767000**	**45100**	**ug/Kg**
104-51-8	n-Butylbenzene	35700U	767000	35700	ug/Kg
103-65-1	n-Propylbenzene	113000U	767000	113000	ug/Kg
95-47-6	**o-Xylene**	**500000J**	**767000**	**20700**	**ug/Kg**
135-98-8	**sec-Butylbenzene**	**504000J**	**767000**	**30200**	**ug/Kg**
1634-04-4	tert-Butyl methyl ether (MTBE)	18700U	767000	18700	ug/Kg
98-06-6	tert-Butylbenzene	39300U	767000	39300	ug/Kg
156-60-5	trans-1,2-Dichloroethene	20100U	767000	20100	ug/Kg
10061-02-6	trans-1,3-Dichloropropene	26100U	767000	26100	ug/Kg
110-57-6	trans-1,4-Dichloro-2-butene	79400U	767000	79400	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	4500000	4890000	ug/Kg	109	62 - 127
1868-53-7	Dibromofluoromethane	4500000	4360000	ug/Kg	97	65 - 130
2037-26-5	Toluene d8	4500000	4810000	ug/Kg	107	71 - 132
17060-07-0	1,2-Dichloroethane-d4	4500000	4690000	ug/Kg	104	62 - 125

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			100000	06/19/2012 23:33	JCK	484124

CAS#	Parameter	Result	Retention	Units
	No tics detected	ND		ug/Kg

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/15/2012 05:15	483256	3550C	10	06/15/2012 14:35	JEW	483303

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	5770U	169000	5770	ug/Kg
122-66-7	1,2Diphenylhydrazine/Azobenzen	5970U	169000	5970	ug/Kg
95-95-4	2,4,5-Trichlorophenol	11400U	169000	11400	ug/Kg
88-06-2	2,4,6-Trichlorophenol	40200U	169000	40200	ug/Kg
120-83-2	2,4-Dichlorophenol	18100U	169000	18100	ug/Kg
105-67-9	2,4-Dimethylphenol	119000U	169000	119000	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141401	**IMP2-VR-A (UNTREATED)**	Solid	06/13/2012 15:20	06/14/2012 09:30

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/15/2012 05:15	483256	3550C	10	06/15/2012 14:35	JEW	483303

CAS#	Parameter	Result	RDL	MDL	Units
51-28-5	2,4-Dinitrophenol	77600U	169000	77600	ug/Kg
121-14-2	2,4-Dinitrotoluene	10200U	169000	10200	ug/Kg
606-20-2	2,6-Dinitrotoluene	13600U	169000	13600	ug/Kg
91-58-7	2-Chloronaphthalene	5410U	169000	5410	ug/Kg
95-57-8	2-Chlorophenol	5920U	169000	5920	ug/Kg
91-57-6	**2-Methylnaphthalene**	**320000**	**169000**	**4580**	**ug/Kg**
88-74-4	2-Nitroaniline	12300U	843000	12300	ug/Kg
88-75-5	2-Nitrophenol	12500U	169000	12500	ug/Kg
91-94-1	3,3'-Dichlorobenzidine	156000U	337000	156000	ug/Kg
99-09-2	3-Nitroaniline	11200U	843000	11200	ug/Kg
534-52-1	4,6-Dinitro-2-methylphenol	76600U	843000	76600	ug/Kg
101-55-3	4-Bromophenyl phenyl ether	9450U	169000	9450	ug/Kg
59-50-7	4-Chloro-3-methylphenol	16100U	169000	16100	ug/Kg
106-47-8	4-Chloroaniline	11300U	169000	11300	ug/Kg
7005-72-3	4-Chlorophenyl phenyl ether	9550U	169000	9550	ug/Kg
100-01-6	4-Nitroaniline	83200U	843000	83200	ug/Kg
100-02-7	4-Nitrophenol	47500U	843000	47500	ug/Kg
83-32-9	**Acenaphthene**	**50600J**	**169000**	**6030**	**ug/Kg**
208-96-8	Acenaphthylene	6690U	169000	6690	ug/Kg
62-53-3	**Aniline**	**22300J**	**169000**	**15700**	**ug/Kg**
120-12-7	Anthracene	5820U	169000	5820	ug/Kg
56-55-3	Benzo(a)anthracene	13200U	169000	13200	ug/Kg
50-32-8	Benzo(a)pyrene	6280U	169000	6280	ug/Kg
205-99-2	Benzo(b)fluoranthene	15500U	169000	15500	ug/Kg
191-24-2	Benzo(g,h,i)perylene	5360U	169000	5360	ug/Kg
207-08-9	Benzo(k)fluoranthene	6840U	169000	6840	ug/Kg
100-51-6	Benzyl alcohol	23000U	169000	23000	ug/Kg
111-91-1	Bis(2-Chloroethoxy)methane	13200U	169000	13200	ug/Kg
111-44-4	Bis(2-Chloroethyl)ether	12400U	169000	12400	ug/Kg
108-60-1	Bis(2-Chloroisopropyl)ether	10500U	169000	10500	ug/Kg
117-81-7	Bis(2-Ethylhexyl)phthalate	10000U	169000	10000	ug/Kg
85-68-7	Butyl benzyl phthalate	3030U	169000	3030	ug/Kg
86-74-8	Carbazole	10200U	169000	10200	ug/Kg
218-01-9	Chrysene	7400U	169000	7400	ug/Kg
84-74-2	Di-n-butyl phthalate	6690U	169000	6690	ug/Kg
117-84-0	Di-n-octyl phthalate	2270U	169000	2270	ug/Kg
53-70-3	Dibenz(a,h)anthracene	5870U	169000	5870	ug/Kg
132-64-9	Dibenzofuran	5460U	169000	5460	ug/Kg
84-66-2	Diethyl phthalate	10400U	169000	10400	ug/Kg
131-11-3	Dimethyl phthalate	7200U	169000	7200	ug/Kg
206-44-0	Fluoranthene	3330U	169000	3330	ug/Kg
86-73-7	**Fluorene**	**1310000**	**169000**	**6590**	**ug/Kg**
118-74-1	Hexachlorobenzene	9750U	169000	9750	ug/Kg
87-68-3	Hexachlorobutadiene	10200U	169000	10200	ug/Kg
77-47-4	Hexachlorocyclopentadiene	61300U	169000	61300	ug/Kg
67-72-1	Hexachloroethane	8120U	169000	8120	ug/Kg
193-39-5	Indeno(1,2,3-cd)pyrene	15800U	169000	15800	ug/Kg
78-59-1	Isophorone	5920U	169000	5920	ug/Kg
98-95-3	Nitrobenzene	9400U	169000	9400	ug/Kg
87-86-5	Pentachlorophenol	64300U	843000	64300	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141401	**IMP2-VR-A (UNTREATED)**	Solid	06/13/2012 15:20	06/14/2012 09:30

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/15/2012 05:15	483256	3550C	10	06/15/2012 14:35	JEW	483303

CAS#	Parameter	Result	RDL	MDL	Units
85-01-8	Phenanthrene	5410U	169000	5410	ug/Kg
108-95-2	Phenol	10100U	169000	10100	ug/Kg
129-00-0	Pyrene	7810U	169000	7810	ug/Kg
110-86-1	Pyridine	61300U	169000	61300	ug/Kg
1319-77-3MP	m,p-Cresol	23800U	169000	23800	ug/Kg
621-64-7	n-Nitrosodi-n-propylamine	7710U	169000	7710	ug/Kg
62-75-9	n-Nitrosodimethylamine	23100U	169000	23100	ug/Kg
86-30-6	n-Nitrosodiphenylamine	5360U	169000	5360	ug/Kg
95-48-7	o-Cresol	5970U	169000	5970	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	10000	Diluted Out	ug/Kg	**0***	46 - 123
321-60-8	2-Fluorobiphenyl	10000	Diluted Out	ug/Kg	**0***	47 - 127
1718-51-0	Terphenyl-d14	10000	Diluted Out	ug/Kg	**0***	38 - 167
4165-62-2	Phenol-d5	20000	Diluted Out	ug/Kg	**0***	43 - 123
367-12-4	2-Fluorophenol	20000	Diluted Out	ug/Kg	**0***	51 - 119
118-79-6	2,4,6-Tribromophenol	20000	Diluted Out	ug/Kg	**0***	44 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10	06/15/2012 14:35	JEW	483487

CAS#	Parameter	Result	Retention	Units
108-88-3	**Toluene**	**1440000**	**1.29**	**ug/Kg**
101-81-5	**Diphenylmethane**	**201000**	**4.07**	**ug/Kg**
620-83-7	**Benzene, 1-methyl-4-(phenylmethyl)-**	**203000**	**4.42**	**ug/Kg**
21895-16-9	**Benzene, 1-methyl-3-[(4-methylpheny**	**190000**	**4.53**	**ug/Kg**
778-22-3	**Benzene, 1,1'-(1-methylethylidene)b**	**727000**	**4.58**	**ug/Kg**
4309-66-4	**Stilbene, 4-amino- (E)-**	**3110000**	**4.82**	**ug/Kg**
6416-39-3	**1H-Indene, 2,3-dihydro-1-methyl-3-p**	**282000**	**4.85**	**ug/Kg**
26137-53-1	**Naphthalene, 1,2,3-trimethyl-4-prop**	**613000**	**4.90**	**ug/Kg**
132-32-1	**9H-Carbazol-3-amine, 9-ethyl-**	**570000**	**5**	**ug/Kg**
	Unknown	**628000**	**5.07**	**ug/Kg**
100-41-4	**Ethylbenzene**	**60900**	**1.74**	**ug/Kg**
	Unknown	**310000**	**5.24**	**ug/Kg**
106-42-3	**p-Xylene**	**577000**	**1.78**	**ug/Kg**
700-88-9	**Benzene, cyclopentyl-**	**47100**	**3.33**	**ug/Kg**
21777-84-4	**Benzene, [2-methyl-1-(1-methylethyl**	**62900**	**3.46**	**ug/Kg**
	Unknown	**71600**	**3.58**	**ug/Kg**
827-52-1	**Benzene, cyclohexyl-**	**70400**	**3.70**	**ug/Kg**
4920-99-4	**Benzene, 1-ethyl-3-(1-methylethyl)-**	**117000**	**3.81**	**ug/Kg**
934-80-5	**Benzene, 4-ethyl-1,2-dimethyl-**	**134000**	**3.91**	**ug/Kg**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141401	**IMP2-VR-A (UNTREATED)**	Solid	06/13/2012 15:20	06/14/2012 09:30

SW-846 7471B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/14/2012 19:30	483245	SW-846 7471B	5	06/16/2012 16:34	CLB	483389

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	**Mercury**	**1.71**	**0.10**	**0.046**	**mg/kg**

SW-846 6010B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/16/2012 09:30	483320	SW-846 3050B	1	06/24/2012 03:58	CLB	483998

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	**Aluminum**	**319**	**13.6**	**1.35**	**mg/kg**
7440-36-0	**Antimony**	**1.46J**	**4.08**	**0.17**	**mg/kg**
7440-38-2	Arsenic	0.24U	2.72	0.24	mg/kg
7440-39-3	**Barium**	**7.95**	**0.68**	**0.041**	**mg/kg**
7440-41-7	**Beryllium**	**0.017J**	**0.34**	**0.0034**	**mg/kg**
7440-43-9	**Cadmium**	**0.078J**	**0.34**	**0.015**	**mg/kg**
7440-70-2	**Calcium**	**195**	**51.1**	**7.44**	**mg/kg**
7440-47-3	**Chromium**	**5.23**	**0.68**	**0.031**	**mg/kg**
7440-48-4	**Cobalt**	**0.24J**	**0.68**	**0.017**	**mg/kg**
7440-50-8	**Copper**	**23.5**	**0.68**	**0.053**	**mg/kg**
7439-89-6	**Iron**	**881**	**6.81**	**1.19**	**mg/kg**
7439-92-1	**Lead**	**62.4**	**1.02**	**0.19**	**mg/kg**
7439-95-4	**Magnesium**	**54.0**	**6.81**	**0.74**	**mg/kg**
7439-96-5	**Manganese**	**11.3**	**1.02**	**0.024**	**mg/kg**
7440-02-0	**Nickel**	**5.42**	**2.72**	**0.036**	**mg/kg**
7440-09-7	**Potassium**	**68.1**	**34.0**	**3.58**	**mg/kg**
7782-49-2	**Selenium**	**13.8**	**2.72**	**0.22**	**mg/kg**
7440-22-4	Silver	0.037U	0.68	0.037	mg/kg
7440-23-5	**Sodium**	**3570**	**68.1**	**5.16**	**mg/kg**
7440-28-0	**Thallium**	**1.97**	**1.36**	**0.15**	**mg/kg**
7440-62-2	**Vanadium**	**1.05J**	**1.36**	**0.026**	**mg/kg**
7440-66-6	**Zinc**	**6.96**	**1.36**	**0.73**	**mg/kg**

SW-846 9045C pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	06/16/2012 11:30	OLT	483311

CAS#	Parameter	Result	RDL	MDL	Units
pH	**pH**	**1.10**	**1.00**	**1.00**	**pH unit**

RESULTS REPORTED ON A DRY WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141402	**IMP2-VR-B (UNTREATED)**	Solid	06/13/2012 15:20	06/14/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			100000	06/19/2012 23:52	JCK	483643

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	22100U	820000	22100	ug/Kg
71-55-6	1,1,1-Trichloroethane	38900U	820000	38900	ug/Kg
79-34-5	1,1,2,2-Tetrachloroethane	18700U	820000	18700	ug/Kg
79-00-5	1,1,2-Trichloroethane	22000U	820000	22000	ug/Kg
75-34-3	1,1-Dichloroethane	24400U	820000	24400	ug/Kg
75-35-4	1,1-Dichloroethene	38000U	820000	38000	ug/Kg
563-58-6	1,1-Dichloropropene	40000U	820000	40000	ug/Kg
96-18-4	1,2,3-Trichloropropane	18900U	820000	18900	ug/Kg
120-82-1	1,2,4-Trichlorobenzene	58200U	820000	58200	ug/Kg
95-63-6	**1,2,4-Trimethylbenzene**	**610000J**	**820000**	**59000**	**ug/Kg**
96-12-8	1,2-Dibromo-3-chloropropane	65700U	820000	65700	ug/Kg
106-93-4	1,2-Dibromoethane	23600U	820000	23600	ug/Kg
95-50-1	**1,2-Dichlorobenzene**	**2120000**	**820000**	**45300**	**ug/Kg**
107-06-2	1,2-Dichloroethane	32500U	820000	32500	ug/Kg
540-59-0	1,2-Dichloroethene(Total)	38400U	1640000	38400	ug/Kg
78-87-5	1,2-Dichloropropane	25200U	820000	25200	ug/Kg
108-67-8	**1,3,5-Trimethylbenzene**	**466000J**	**820000**	**61600**	**ug/Kg**
541-73-1	1,3-Dichlorobenzene	42600U	820000	42600	ug/Kg
142-28-9	1,3-Dichloropropane	25900U	820000	25900	ug/Kg
106-46-7	**1,4-Dichlorobenzene**	**183000J**	**820000**	**37900**	**ug/Kg**
594-20-7	2,2-Dichloropropane	40800U	820000	40800	ug/Kg
78-93-3	2-Butanone	84900U	820000	84900	ug/Kg
95-49-8	2-Chlorotoluene	35900U	820000	35900	ug/Kg
591-78-6	2-Hexanone	71000U	820000	71000	ug/Kg
106-43-4	4-Chlorotoluene	38500U	820000	38500	ug/Kg
99-87-6	4-Isopropyltoluene	34400U	820000	34400	ug/Kg
108-10-1	4-Methyl-2-pentanone	21600U	820000	21600	ug/Kg
67-64-1	Acetone	169000U	4100000	169000	ug/Kg
71-43-2	**Benzene**	**26300000**	**820000**	**24900**	**ug/Kg**
108-86-1	Bromobenzene	25600U	820000	25600	ug/Kg
74-97-5	Bromochloromethane	22100U	820000	22100	ug/Kg
75-27-4	Bromodichloromethane	26600U	820000	26600	ug/Kg
75-25-2	Bromoform	26100U	820000	26100	ug/Kg
74-83-9	Bromomethane	49700U	820000	49700	ug/Kg
75-15-0	Carbon disulfide	53300U	820000	53300	ug/Kg
56-23-5	Carbon tetrachloride	33100U	820000	33100	ug/Kg
108-90-7	Chlorobenzene	24400U	820000	24400	ug/Kg
75-00-3	Chloroethane	54300U	820000	54300	ug/Kg
67-66-3	Chloroform	35300U	820000	35300	ug/Kg
74-87-3	Chloromethane	38900U	820000	38900	ug/Kg
124-48-1	Dibromochloromethane	35700U	820000	35700	ug/Kg
74-95-3	Dibromomethane	37900U	820000	37900	ug/Kg
75-71-8	Dichlorodifluoromethane	36700U	820000	36700	ug/Kg
100-41-4	Ethylbenzene	30000U	820000	30000	ug/Kg
87-68-3	Hexachlorobutadiene	35100U	820000	35100	ug/Kg
98-82-8	**Isopropylbenzene (Cumene)**	**550000J**	**820000**	**30300**	**ug/Kg**
74-88-4	Methyl iodide	202000U	820000	202000	ug/Kg
75-09-2	Methylene chloride	72500U	1640000	72500	ug/Kg
91-20-3	**Naphthalene**	**3810000**	**820000**	**52600**	**ug/Kg**
100-42-5	Styrene	25200U	820000	25200	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141402	**IMP2-VR-B (UNTREATED)**	Solid	06/13/2012 15:20	06/14/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			100000	06/19/2012 23:52	JCK	483643

CAS#	Parameter	Result	RDL	MDL	Units
127-18-4	Tetrachloroethene	48500U	820000	48500	ug/Kg
110-02-1	Thiophene	ND			ug/Kg
108-88-3	**Toluene**	**7510000**	**820000**	**25400**	**ug/Kg**
79-01-6	Trichloroethene	34900U	820000	34900	ug/Kg
75-69-4	Trichlorofluoromethane	42800U	820000	42800	ug/Kg
76-13-1	Trichlorotrifluoroethane	32800U	820000	32800	ug/Kg
108-05-4	Vinyl acetate	23100U	820000	23100	ug/Kg
75-01-4	Vinyl chloride	44600U	820000	44600	ug/Kg
1330-20-7	**Xylene (total)**	**2270000**	**1640000**	**65700**	**ug/Kg**
156-59-2	cis-1,2-Dichloroethene	24300U	820000	24300	ug/Kg
10061-01-5	cis-1,3-Dichloropropene	30300U	820000	30300	ug/Kg
136777-61-2	**m,p-Xylene**	**1680000**	**820000**	**48200**	**ug/Kg**
104-51-8	n-Butylbenzene	38200U	820000	38200	ug/Kg
103-65-1	n-Propylbenzene	121000U	820000	121000	ug/Kg
95-47-6	**o-Xylene**	**591000J**	**820000**	**22100**	**ug/Kg**
135-98-8	**sec-Butylbenzene**	**575000J**	**820000**	**32300**	**ug/Kg**
1634-04-4	tert-Butyl methyl ether (MTBE)	20000U	820000	20000	ug/Kg
98-06-6	tert-Butylbenzene	42000U	820000	42000	ug/Kg
156-60-5	trans-1,2-Dichloroethene	21500U	820000	21500	ug/Kg
10061-02-6	trans-1,3-Dichloropropene	27900U	820000	27900	ug/Kg
110-57-6	trans-1,4-Dichloro-2-butene	84900U	820000	84900	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	4920000	5370000	ug/Kg	109	62 - 127
1868-53-7	Dibromofluoromethane	4920000	4680000	ug/Kg	95	65 - 130
2037-26-5	Toluene d8	4920000	5200000	ug/Kg	106	71 - 132
17060-07-0	1,2-Dichloroethane-d4	4920000	4900000	ug/Kg	100	62 - 125

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			100000	06/19/2012 23:52	JCK	484124

CAS#	Parameter	Result	Retention	Units
	No tics detected	ND		ug/Kg

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/15/2012 05:15	483256	3550C	10	06/15/2012 14:51	JEW	483303

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	5650U	165000	5650	ug/Kg
122-66-7	1,2Diphenylhydrazine/Azobenzen	5850U	165000	5850	ug/Kg
95-95-4	2,4,5-Trichlorophenol	11100U	165000	11100	ug/Kg
88-06-2	2,4,6-Trichlorophenol	39300U	165000	39300	ug/Kg
120-83-2	2,4-Dichlorophenol	17700U	165000	17700	ug/Kg
105-67-9	2,4-Dimethylphenol	116000U	165000	116000	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141402	**IMP2-VR-B (UNTREATED)**	Solid	06/13/2012 15:20	06/14/2012 09:30

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/15/2012 05:15	483256	3550C	10	06/15/2012 14:51	JEW	483303

CAS#	Parameter	Result	RDL	MDL	Units
51-28-5	2,4-Dinitrophenol	76000U	165000	76000	ug/Kg
121-14-2	2,4-Dinitrotoluene	9990U	165000	9990	ug/Kg
606-20-2	2,6-Dinitrotoluene	13300U	165000	13300	ug/Kg
91-58-7	2-Chloronaphthalene	5300U	165000	5300	ug/Kg
95-57-8	2-Chlorophenol	5800U	165000	5800	ug/Kg
91-57-6	**2-Methylnaphthalene**	**243000**	**165000**	**4480**	**ug/Kg**
88-74-4	2-Nitroaniline	12000U	825000	12000	ug/Kg
88-75-5	2-Nitrophenol	12200U	165000	12200	ug/Kg
91-94-1	3,3'-Dichlorobenzidine	153000U	330000	153000	ug/Kg
99-09-2	3-Nitroaniline	11000U	825000	11000	ug/Kg
534-52-1	4,6-Dinitro-2-methylphenol	75000U	825000	75000	ug/Kg
101-55-3	4-Bromophenyl phenyl ether	9250U	165000	9250	ug/Kg
59-50-7	4-Chloro-3-methylphenol	15700U	165000	15700	ug/Kg
106-47-8	4-Chloroaniline	11100U	165000	11100	ug/Kg
7005-72-3	4-Chlorophenyl phenyl ether	9350U	165000	9350	ug/Kg
100-01-6	4-Nitroaniline	81500U	825000	81500	ug/Kg
100-02-7	4-Nitrophenol	46500U	825000	46500	ug/Kg
83-32-9	**Acenaphthene**	**39100J**	**165000**	**5900**	**ug/Kg**
208-96-8	Acenaphthylene	6550U	165000	6550	ug/Kg
62-53-3	Aniline	15400U	165000	15400	ug/Kg
120-12-7	Anthracene	5700U	165000	5700	ug/Kg
56-55-3	Benzo(a)anthracene	12900U	165000	12900	ug/Kg
50-32-8	Benzo(a)pyrene	6150U	165000	6150	ug/Kg
205-99-2	Benzo(b)fluoranthene	15200U	165000	15200	ug/Kg
191-24-2	Benzo(g,h,i)perylene	5250U	165000	5250	ug/Kg
207-08-9	Benzo(k)fluoranthene	6700U	165000	6700	ug/Kg
100-51-6	Benzyl alcohol	22500U	165000	22500	ug/Kg
111-91-1	Bis(2-Chloroethoxy)methane	12900U	165000	12900	ug/Kg
111-44-4	Bis(2-Chloroethyl)ether	12100U	165000	12100	ug/Kg
108-60-1	Bis(2-Chloroisopropyl)ether	10300U	165000	10300	ug/Kg
117-81-7	Bis(2-Ethylhexyl)phthalate	9800U	165000	9800	ug/Kg
85-68-7	Butyl benzyl phthalate	2960U	165000	2960	ug/Kg
86-74-8	Carbazole	9990U	165000	9990	ug/Kg
218-01-9	Chrysene	7250U	165000	7250	ug/Kg
84-74-2	Di-n-butyl phthalate	6550U	165000	6550	ug/Kg
117-84-0	Di-n-octyl phthalate	2220U	165000	2220	ug/Kg
53-70-3	Dibenz(a,h)anthracene	5750U	165000	5750	ug/Kg
132-64-9	Dibenzofuran	5350U	165000	5350	ug/Kg
84-66-2	Diethyl phthalate	10100U	165000	10100	ug/Kg
131-11-3	Dimethyl phthalate	7050U	165000	7050	ug/Kg
206-44-0	Fluoranthene	3260U	165000	3260	ug/Kg
86-73-7	**Fluorene**	**941000**	**165000**	**6450**	**ug/Kg**
118-74-1	Hexachlorobenzene	9550U	165000	9550	ug/Kg
87-68-3	Hexachlorobutadiene	9990U	165000	9990	ug/Kg
77-47-4	Hexachlorocyclopentadiene	60000U	165000	60000	ug/Kg
67-72-1	Hexachloroethane	7950U	165000	7950	ug/Kg
193-39-5	Indeno(1,2,3-cd)pyrene	15400U	165000	15400	ug/Kg
78-59-1	Isophorone	5800U	165000	5800	ug/Kg
98-95-3	Nitrobenzene	9200U	165000	9200	ug/Kg
87-86-5	Pentachlorophenol	63000U	825000	63000	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141402	**IMP2-VR-B (UNTREATED)**	Solid	06/13/2012 15:20	06/14/2012 09:30

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/15/2012 05:15	483256	3550C	10	06/15/2012 14:51	JEW	483303

CAS#	Parameter	Result	RDL	MDL	Units
85-01-8	Phenanthrene	5300U	165000	5300	ug/Kg
108-95-2	Phenol	9890U	165000	9890	ug/Kg
129-00-0	Pyrene	7650U	165000	7650	ug/Kg
110-86-1	Pyridine	60000U	165000	60000	ug/Kg
1319-77-3MP	m,p-Cresol	23300U	165000	23300	ug/Kg
621-64-7	n-Nitrosodi-n-propylamine	7550U	165000	7550	ug/Kg
62-75-9	n-Nitrosodimethylamine	22600U	165000	22600	ug/Kg
86-30-6	n-Nitrosodiphenylamine	5250U	165000	5250	ug/Kg
95-48-7	o-Cresol	5850U	165000	5850	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	10000	Diluted Out	ug/Kg	**0***	46 - 123
321-60-8	2-Fluorobiphenyl	10000	Diluted Out	ug/Kg	**0***	47 - 127
1718-51-0	Terphenyl-d14	10000	Diluted Out	ug/Kg	**0***	38 - 167
4165-62-2	Phenol-d5	20000	Diluted Out	ug/Kg	**0***	43 - 123
367-12-4	2-Fluorophenol	20000	Diluted Out	ug/Kg	**0***	51 - 119
118-79-6	2,4,6-Tribromophenol	20000	Diluted Out	ug/Kg	**0***	44 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10	06/15/2012 14:51	JEW	483487

CAS#	Parameter	Result	Retention	Units
108-88-3	**Toluene**	**1590000**	**1.29**	**ug/Kg**
101-81-5	**Diphenylmethane**	**185000**	**4.07**	**ug/Kg**
4957-14-6	**Benzene, 1,1'-methylenebis[4-methyl**	**170000**	**4.53**	**ug/Kg**
778-22-3	**Benzene, 1,1'-(1-methylethylidene)b**	**683000**	**4.58**	**ug/Kg**
26137-53-1	**Naphthalene, 1,2,3-trimethyl-4-prop**	**2620000**	**4.82**	**ug/Kg**
	Unknown	**516000**	**4.90**	**ug/Kg**
13688-68-1	**9,9-Dimethyl-9-silafluorene**	**472000**	**5**	**ug/Kg**
	Unknown	**791000**	**5.07**	**ug/Kg**
55012-80-1	**Silane, trimethyl[5-methyl-2-(1-met**	**345000**	**5.30**	**ug/Kg**
10544-50-0	**Sulfur, mol. (S8)**	**241000**	**5.94**	**ug/Kg**
	Unknown	**334000**	**7**	**ug/Kg**
106-42-3	**p-Xylene**	**554000**	**1.78**	**ug/Kg**
	Unknown	**323000**	**7.42**	**ug/Kg**
700-88-9	**Benzene, cyclopentyl-**	**44400**	**3.33**	**ug/Kg**
1196-58-3	**Benzene, (1-ethylpropyl)-**	**58800**	**3.46**	**ug/Kg**
1595-01-3	**1-Methyl-4-N-hexylbenzene**	**66900**	**3.57**	**ug/Kg**
827-52-1	**Benzene, cyclohexyl-**	**67200**	**3.70**	**ug/Kg**
	Unknown	**94700**	**3.74**	**ug/Kg**
4218-48-8	**Benzene, 1-ethyl-4-(1-methylethyl)-**	**122000**	**3.81**	**ug/Kg**
14128-61-1	**2-Hexanone, 5-methyl-5-phenyl-**	**125000**	**3.91**	**ug/Kg**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141402	**IMP2-VR-B (UNTREATED)**	Solid	06/13/2012 15:20	06/14/2012 09:30

SW-846 7471B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/14/2012 19:30	483245	SW-846 7471B	5	06/16/2012 16:36	CLB	483389

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	**Mercury**	**1.96**	**0.096**	**0.044**	**mg/kg**

SW-846 6010B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/16/2012 09:30	483320	SW-846 3050B	1	06/24/2012 02:46	CLB	483998

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	**Aluminum**	**323**	**13.3**	**1.32**	**mg/kg**
7440-36-0	**Antimony**	**1.05J**	**4.00**	**0.16**	**mg/kg**
7440-38-2	Arsenic	0.23U	2.67	0.23	mg/kg
7440-39-3	**Barium**	**7.51**	**0.67**	**0.040**	**mg/kg**
7440-41-7	**Beryllium**	**0.015J**	**0.33**	**0.0033**	**mg/kg**
7440-43-9	**Cadmium**	**0.018J**	**0.33**	**0.015**	**mg/kg**
7440-70-2	**Calcium**	**209**	**50.0**	**7.28**	**mg/kg**
7440-47-3	**Chromium**	**4.75**	**0.67**	**0.030**	**mg/kg**
7440-48-4	**Cobalt**	**0.32J**	**0.67**	**0.017**	**mg/kg**
7440-50-8	**Copper**	**23.8**	**0.67**	**0.052**	**mg/kg**
7439-89-6	**Iron**	**992**	**6.66**	**1.17**	**mg/kg**
7439-92-1	**Lead**	**64.9**	**1.0**	**0.19**	**mg/kg**
7439-95-4	**Magnesium**	**58.8**	**6.66**	**0.72**	**mg/kg**
7439-96-5	**Manganese**	**13.6**	**1.0**	**0.023**	**mg/kg**
7440-02-0	**Nickel**	**5.12**	**2.67**	**0.035**	**mg/kg**
7440-09-7	**Potassium**	**65.0**	**33.3**	**3.51**	**mg/kg**
7782-49-2	**Selenium**	**13.4**	**2.67**	**0.22**	**mg/kg**
7440-22-4	Silver	0.037U	0.67	0.037	mg/kg
7440-23-5	**Sodium**	**4260**	**66.6**	**5.05**	**mg/kg**
7440-28-0	**Thallium**	**1.93**	**1.33**	**0.15**	**mg/kg**
7440-62-2	**Vanadium**	**1.08J**	**1.33**	**0.025**	**mg/kg**
7440-66-6	**Zinc**	**7.94**	**1.33**	**0.71**	**mg/kg**

SW-846 9045C pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	06/16/2012 11:30	OLT	483311

CAS#	Parameter	Result	RDL	MDL	Units
pH	**pH**	**1.08**	**1.00**	**1.00**	**pH unit**

RESULTS REPORTED ON A DRY WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141403	**IMP2-VR-C (UNTREATED)**	Solid	06/13/2012 15:20	06/14/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			50000	06/20/2012 00:12	EDS	483643

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	10700U	397000	10700	ug/Kg
71-55-6	1,1,1-Trichloroethane	18800U	397000	18800	ug/Kg
79-34-5	1,1,2,2-Tetrachloroethane	9060U	397000	9060	ug/Kg
79-00-5	1,1,2-Trichloroethane	10700U	397000	10700	ug/Kg
75-34-3	1,1-Dichloroethane	11800U	397000	11800	ug/Kg
75-35-4	1,1-Dichloroethene	18400U	397000	18400	ug/Kg
563-58-6	1,1-Dichloropropene	19400U	397000	19400	ug/Kg
96-18-4	1,2,3-Trichloropropane	9140U	397000	9140	ug/Kg
120-82-1	1,2,4-Trichlorobenzene	28200U	397000	28200	ug/Kg
95-63-6	**1,2,4-Trimethylbenzene**	**434000**	**397000**	**28600**	**ug/Kg**
96-12-8	1,2-Dibromo-3-chloropropane	31900U	397000	31900	ug/Kg
106-93-4	1,2-Dibromoethane	11400U	397000	11400	ug/Kg
95-50-1	**1,2-Dichlorobenzene**	**1810000**	**397000**	**21900**	**ug/Kg**
107-06-2	1,2-Dichloroethane	15700U	397000	15700	ug/Kg
540-59-0	1,2-Dichloroethene(Total)	18600U	795000	18600	ug/Kg
78-87-5	1,2-Dichloropropane	12200U	397000	12200	ug/Kg
108-67-8	**1,3,5-Trimethylbenzene**	**301000J**	**397000**	**29900**	**ug/Kg**
541-73-1	1,3-Dichlorobenzene	20700U	397000	20700	ug/Kg
142-28-9	1,3-Dichloropropane	12600U	397000	12600	ug/Kg
106-46-7	1,4-Dichlorobenzene	18400U	397000	18400	ug/Kg
594-20-7	2,2-Dichloropropane	19800U	397000	19800	ug/Kg
78-93-3	2-Butanone	41200U	397000	41200	ug/Kg
95-49-8	2-Chlorotoluene	17400U	397000	17400	ug/Kg
591-78-6	2-Hexanone	34400U	397000	34400	ug/Kg
106-43-4	4-Chlorotoluene	18700U	397000	18700	ug/Kg
99-87-6	**4-Isopropyltoluene**	**234000J**	**397000**	**16700**	**ug/Kg**
108-10-1	4-Methyl-2-pentanone	10500U	397000	10500	ug/Kg
67-64-1	Acetone	81900U	1990000	81900	ug/Kg
108-86-1	Bromobenzene	12400U	397000	12400	ug/Kg
74-97-5	Bromochloromethane	10700U	397000	10700	ug/Kg
75-27-4	Bromodichloromethane	12900U	397000	12900	ug/Kg
75-25-2	Bromoform	12600U	397000	12600	ug/Kg
74-83-9	Bromomethane	24100U	397000	24100	ug/Kg
75-15-0	Carbon disulfide	25800U	397000	25800	ug/Kg
56-23-5	Carbon tetrachloride	16100U	397000	16100	ug/Kg
108-90-7	Chlorobenzene	11800U	397000	11800	ug/Kg
75-00-3	Chloroethane	26300U	397000	26300	ug/Kg
67-66-3	Chloroform	17100U	397000	17100	ug/Kg
74-87-3	Chloromethane	18800U	397000	18800	ug/Kg
124-48-1	Dibromochloromethane	17300U	397000	17300	ug/Kg
74-95-3	Dibromomethane	18400U	397000	18400	ug/Kg
75-71-8	Dichlorodifluoromethane	17800U	397000	17800	ug/Kg
100-41-4	**Ethylbenzene**	**107000J**	**397000**	**14500**	**ug/Kg**
87-68-3	Hexachlorobutadiene	17000U	397000	17000	ug/Kg
98-82-8	**Isopropylbenzene (Cumene)**	**353000J**	**397000**	**14700**	**ug/Kg**
74-88-4	Methyl iodide	97800U	397000	97800	ug/Kg
75-09-2	Methylene chloride	35100U	795000	35100	ug/Kg
91-20-3	**Naphthalene**	**3360000**	**397000**	**25500**	**ug/Kg**
100-42-5	Styrene	12200U	397000	12200	ug/Kg
127-18-4	Tetrachloroethene	23500U	397000	23500	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141403	**IMP2-VR-C (UNTREATED)**	Solid	06/13/2012 15:20	06/14/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			50000	06/20/2012 00:12	EDS	483643

CAS#	Parameter	Result	RDL	MDL	Units
110-02-1	Thiophene	ND			ug/Kg
108-88-3	**Toluene**	**5840000**	**397000**	**12300**	**ug/Kg**
79-01-6	Trichloroethene	16900U	397000	16900	ug/Kg
75-69-4	Trichlorofluoromethane	20700U	397000	20700	ug/Kg
76-13-1	Trichlorotrifluoroethane	15900U	397000	15900	ug/Kg
108-05-4	Vinyl acetate	11200U	397000	11200	ug/Kg
75-01-4	Vinyl chloride	21600U	397000	21600	ug/Kg
1330-20-7	**Xylene (total)**	**1590000**	**795000**	**31900**	**ug/Kg**
156-59-2	cis-1,2-Dichloroethene	11800U	397000	11800	ug/Kg
10061-01-5	cis-1,3-Dichloropropene	14700U	397000	14700	ug/Kg
136777-61-2	**m,p-Xylene**	**1190000**	**397000**	**23400**	**ug/Kg**
104-51-8	n-Butylbenzene	18500U	397000	18500	ug/Kg
103-65-1	n-Propylbenzene	58700U	397000	58700	ug/Kg
95-47-6	**o-Xylene**	**397000J**	**397000**	**10700**	**ug/Kg**
135-98-8	**sec-Butylbenzene**	**358000J**	**397000**	**15700**	**ug/Kg**
1634-04-4	tert-Butyl methyl ether (MTBE)	9700U	397000	9700	ug/Kg
98-06-6	tert-Butylbenzene	20400U	397000	20400	ug/Kg
156-60-5	trans-1,2-Dichloroethene	10400U	397000	10400	ug/Kg
10061-02-6	trans-1,3-Dichloropropene	13500U	397000	13500	ug/Kg
110-57-6	trans-1,4-Dichloro-2-butene	41200U	397000	41200	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	2390000	2610000	ug/Kg	109	62 - 127
1868-53-7	Dibromofluoromethane	2390000	2290000	ug/Kg	96	65 - 130
2037-26-5	Toluene d8	2390000	2550000	ug/Kg	107	71 - 132
17060-07-0	1,2-Dichloroethane-d4	2390000	2360000	ug/Kg	99	62 - 125

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			100000	06/23/2012 18:23	CEK	484016

CAS#	Parameter	Result	RDL	MDL	Units
71-43-2	**Benzene**	**18100000**	**795000**	**24200**	**ug/Kg**

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	4780000	4870000	ug/Kg	102	62 - 127
1868-53-7	Dibromofluoromethane	4780000	4810000	ug/Kg	101	65 - 130
2037-26-5	Toluene d8	4780000	5170000	ug/Kg	108	71 - 132
17060-07-0	1,2-Dichloroethane-d4	4780000	4950000	ug/Kg	104	62 - 125

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141403	**IMP2-VR-C (UNTREATED)**	Solid	06/13/2012 15:20	06/14/2012 09:30

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			50000	06/20/2012 00:12	EDS	484124

CAS#	Parameter	Result	Retention	Units
	No tics detected	ND		ug/Kg

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/15/2012 05:15	483256	3550C	10	06/15/2012 15:08	JEW	483303

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	11300U	329000	11300	ug/Kg
122-66-7	1,2Diphenylhydrazine/Azobenzen	11700U	329000	11700	ug/Kg
95-95-4	2,4,5-Trichlorophenol	22300U	329000	22300	ug/Kg
88-06-2	2,4,6-Trichlorophenol	78500U	329000	78500	ug/Kg
120-83-2	2,4-Dichlorophenol	35300U	329000	35300	ug/Kg
105-67-9	2,4-Dimethylphenol	232000U	329000	232000	ug/Kg
51-28-5	2,4-Dinitrophenol	152000U	329000	152000	ug/Kg
121-14-2	2,4-Dinitrotoluene	20000U	329000	20000	ug/Kg
606-20-2	2,6-Dinitrotoluene	26500U	329000	26500	ug/Kg
91-58-7	2-Chloronaphthalene	10600U	329000	10600	ug/Kg
95-57-8	2-Chlorophenol	11600U	329000	11600	ug/Kg
91-57-6	**2-Methylnaphthalene**	**589000**	**329000**	**8940**	**ug/Kg**
88-74-4	2-Nitroaniline	23900U	1650000	23900	ug/Kg
88-75-5	2-Nitrophenol	24400U	329000	24400	ug/Kg
91-94-1	3,3'-Dichlorobenzidine	305000U	659000	305000	ug/Kg
99-09-2	3-Nitroaniline	22000U	1650000	22000	ug/Kg
534-52-1	4,6-Dinitro-2-methylphenol	150000U	1650000	150000	ug/Kg
101-55-3	4-Bromophenyl phenyl ether	18500U	329000	18500	ug/Kg
59-50-7	4-Chloro-3-methylphenol	31400U	329000	31400	ug/Kg
106-47-8	4-Chloroaniline	22200U	329000	22200	ug/Kg
7005-72-3	4-Chlorophenyl phenyl ether	18700U	329000	18700	ug/Kg
100-01-6	4-Nitroaniline	163000U	1650000	163000	ug/Kg
100-02-7	4-Nitrophenol	92900U	1650000	92900	ug/Kg
83-32-9	**Acenaphthene**	**94800J**	**329000**	**11800**	**ug/Kg**
208-96-8	Acenaphthylene	13100U	329000	13100	ug/Kg
62-53-3	**Aniline**	**58700J**	**329000**	**30700**	**ug/Kg**
120-12-7	Anthracene	11400U	329000	11400	ug/Kg
56-55-3	Benzo(a)anthracene	25700U	329000	25700	ug/Kg
50-32-8	Benzo(a)pyrene	12300U	329000	12300	ug/Kg
205-99-2	Benzo(b)fluoranthene	30300U	329000	30300	ug/Kg
191-24-2	Benzo(g,h,i)perylene	10500U	329000	10500	ug/Kg
207-08-9	Benzo(k)fluoranthene	13400U	329000	13400	ug/Kg
100-51-6	Benzyl alcohol	45000U	329000	45000	ug/Kg
111-91-1	Bis(2-Chloroethoxy)methane	25700U	329000	25700	ug/Kg
111-44-4	Bis(2-Chloroethyl)ether	24200U	329000	24200	ug/Kg
108-60-1	Bis(2-Chloroisopropyl)ether	20600U	329000	20600	ug/Kg
117-81-7	Bis(2-Ethylhexyl)phthalate	19600U	329000	19600	ug/Kg
85-68-7	Butyl benzyl phthalate	5920U	329000	5920	ug/Kg
86-74-8	Carbazole	20000U	329000	20000	ug/Kg
218-01-9	Chrysene	14500U	329000	14500	ug/Kg
84-74-2	Di-n-butyl phthalate	13100U	329000	13100	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141403	**IMP2-VR-C (UNTREATED)**	Solid	06/13/2012 15:20	06/14/2012 09:30

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/15/2012 05:15	483256	3550C	10	06/15/2012 15:08	JEW	483303

CAS#	Parameter	Result	RDL	MDL	Units
117-84-0	Di-n-octyl phthalate	4430U	329000	4430	ug/Kg
53-70-3	Dibenz(a,h)anthracene	11500U	329000	11500	ug/Kg
132-64-9	Dibenzofuran	10700U	329000	10700	ug/Kg
84-66-2	Diethyl phthalate	20300U	329000	20300	ug/Kg
131-11-3	Dimethyl phthalate	14100U	329000	14100	ug/Kg
206-44-0	Fluoranthene	6510U	329000	6510	ug/Kg
86-73-7	**Fluorene**	**2390000**	**329000**	**12900**	**ug/Kg**
118-74-1	Hexachlorobenzene	19100U	329000	19100	ug/Kg
87-68-3	Hexachlorobutadiene	20000U	329000	20000	ug/Kg
77-47-4	Hexachlorocyclopentadiene	120000U	329000	120000	ug/Kg
67-72-1	Hexachloroethane	15900U	329000	15900	ug/Kg
193-39-5	Indeno(1,2,3-cd)pyrene	30800U	329000	30800	ug/Kg
78-59-1	Isophorone	11600U	329000	11600	ug/Kg
98-95-3	Nitrobenzene	18400U	329000	18400	ug/Kg
87-86-5	Pentachlorophenol	126000U	1650000	126000	ug/Kg
85-01-8	Phenanthrene	10600U	329000	10600	ug/Kg
108-95-2	Phenol	19800U	329000	19800	ug/Kg
129-00-0	Pyrene	15300U	329000	15300	ug/Kg
110-86-1	Pyridine	120000U	329000	120000	ug/Kg
1319-77-3MP	m,p-Cresol	46500U	329000	46500	ug/Kg
621-64-7	n-Nitrosodi-n-propylamine	15100U	329000	15100	ug/Kg
62-75-9	n-Nitrosodimethylamine	45200U	329000	45200	ug/Kg
86-30-6	n-Nitrosodiphenylamine	10500U	329000	10500	ug/Kg
95-48-7	o-Cresol	11700U	329000	11700	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	10000	Diluted Out	ug/Kg	**0***	46 - 123
321-60-8	2-Fluorobiphenyl	10000	Diluted Out	ug/Kg	**0***	47 - 127
1718-51-0	Terphenyl-d14	10000	Diluted Out	ug/Kg	**0***	38 - 167
4165-62-2	Phenol-d5	20000	Diluted Out	ug/Kg	**0***	43 - 123
367-12-4	2-Fluorophenol	20000	Diluted Out	ug/Kg	**0***	51 - 119
118-79-6	2,4,6-Tribromophenol	20000	Diluted Out	ug/Kg	**0***	44 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10	06/15/2012 15:08	JEW	483487

CAS#	Parameter	Result	Retention	Units
108-88-3	**Toluene**	**3210000**	**1.29**	**ug/Kg**
778-22-3	**Benzene, 1,1'-(1-methylethylidene)b**	**1410000**	**4.58**	**ug/Kg**
14064-82-5	**Benzenamine, 3-(2-phenylethenyl)-,**	**5800000**	**4.82**	**ug/Kg**
26137-53-1	**Naphthalene, 1,2,3-trimethyl-4-prop**	**1110000**	**4.90**	**ug/Kg**
67598-11-2	**N,N-Diethyl-.alpha.-(aminomethylene**	**1150000**	**5**	**ug/Kg**
	Unknown	**1790000**	**5.07**	**ug/Kg**
5956-09-2	**2H-3,9a-Methano-1-benzoxepin, octah**	**836000**	**5.30**	**ug/Kg**
	Unknown	**508000**	**5.37**	**ug/Kg**
10544-50-0	**Sulfur, mol. (S8)**	**515000**	**5.95**	**ug/Kg**
	Unknown	**833000**	**7**	**ug/Kg**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141403	**IMP2-VR-C (UNTREATED)**	Solid	06/13/2012 15:20	06/14/2012 09:30

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10	06/15/2012 15:08	JEW	483487

CAS#	Parameter	Result	Retention	Units
	Unknown	**625000**	**7.42**	**ug/Kg**
108-38-3	**Benzene, 1,3-dimethyl-**	**1110000**	**1.78**	**ug/Kg**
21777-84-4	**Benzene, [2-methyl-1-(1-methylethyl**	**119000**	**3.46**	**ug/Kg**
2132-84-5	**Benzene, (1-methylhexyl)-**	**141000**	**3.57**	**ug/Kg**
827-52-1	**Benzene, cyclohexyl-**	**146000**	**3.70**	**ug/Kg**
4920-99-4	**Benzene, 1-ethyl-3-(1-methylethyl)-**	**227000**	**3.81**	**ug/Kg**
101-81-5	**Diphenylmethane**	**374000**	**4.07**	**ug/Kg**
605-39-0	**2,2'-Dimethylbiphenyl**	**411000**	**4.42**	**ug/Kg**
21895-16-9	**Benzene, 1-methyl-3-[(4-methylpheny**	**401000**	**4.53**	**ug/Kg**

SW-846 7471B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/14/2012 19:30	483245	SW-846 7471B	5	06/16/2012 16:37	CLB	483389

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	**Mercury**	**1.77**	**0.094**	**0.043**	**mg/kg**

SW-846 6010B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/16/2012 09:30	483320	SW-846 3050B	1	06/24/2012 04:06	CLB	483998

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	**Aluminum**	**360**	**13.2**	**1.31**	**mg/kg**
7440-36-0	**Antimony**	**1.31J**	**3.96**	**0.16**	**mg/kg**
7440-38-2	Arsenic	0.23U	2.64	0.23	mg/kg
7440-39-3	**Barium**	**8.16**	**0.66**	**0.040**	**mg/kg**
7440-41-7	**Beryllium**	**0.018J**	**0.33**	**0.0033**	**mg/kg**
7440-43-9	**Cadmium**	**0.056J**	**0.33**	**0.015**	**mg/kg**
7440-70-2	**Calcium**	**234**	**49.5**	**7.21**	**mg/kg**
7440-47-3	**Chromium**	**2.76**	**0.66**	**0.030**	**mg/kg**
7440-48-4	**Cobalt**	**0.30J**	**0.66**	**0.016**	**mg/kg**
7440-50-8	**Copper**	**28.6**	**0.66**	**0.051**	**mg/kg**
7439-89-6	**Iron**	**1120**	**6.60**	**1.16**	**mg/kg**
7439-92-1	**Lead**	**67.7**	**0.99**	**0.19**	**mg/kg**
7439-95-4	**Magnesium**	**63.2**	**6.60**	**0.72**	**mg/kg**
7439-96-5	**Manganese**	**15.6**	**0.99**	**0.023**	**mg/kg**
7440-02-0	**Nickel**	**5.27**	**2.64**	**0.035**	**mg/kg**
7440-09-7	**Potassium**	**65.0**	**33.0**	**3.47**	**mg/kg**
7782-49-2	**Selenium**	**13.9**	**2.64**	**0.22**	**mg/kg**
7440-22-4	Silver	0.036U	0.66	0.036	mg/kg
7440-23-5	**Sodium**	**4440**	**66.0**	**5.00**	**mg/kg**
7440-28-0	**Thallium**	**2.30**	**1.32**	**0.15**	**mg/kg**
7440-62-2	**Vanadium**	**1.14J**	**1.32**	**0.025**	**mg/kg**
7440-66-6	**Zinc**	**7.13**	**1.32**	**0.70**	**mg/kg**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141403	**IMP2-VR-C (UNTREATED)**	Solid	06/13/2012 15:20	06/14/2012 09:30

SW-846 9045C pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	06/16/2012 06:40	OLT	483333

CAS#	Parameter	Result	RDL	MDL	Units
pH	**pH**	**2.03**	**1.00**	**1.00**	**pH unit**

RESULTS REPORTED ON A DRY WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141404	**IMP2-VR (UNTREATED)**	Solid	06/13/2012 15:20	06/14/2012 09:30

SW-846 9060M

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	06/27/2012 11:25	AEL	484273

CAS#	Parameter	Result	RDL	MDL	Units
C-012	**Total Organic Carbon**	**815000**	**200**	**50.0**	**mg/kg**

RESULTS REPORTED ON A DRY WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141405	**IMP2-HC-A (UNTREATED)**	Solid	06/13/2012 15:25	06/14/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			200000	06/20/2012 00:52	EDS	483643

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	35000U	1300000	35000	ug/Kg
71-55-6	1,1,1-Trichloroethane	61400U	1300000	61400	ug/Kg
79-34-5	1,1,2,2-Tetrachloroethane	29500U	1300000	29500	ug/Kg
79-00-5	1,1,2-Trichloroethane	34700U	1300000	34700	ug/Kg
75-34-3	1,1-Dichloroethane	38600U	1300000	38600	ug/Kg
75-35-4	1,1-Dichloroethene	60100U	1300000	60100	ug/Kg
563-58-6	1,1-Dichloropropene	63200U	1300000	63200	ug/Kg
96-18-4	1,2,3-Trichloropropane	29800U	1300000	29800	ug/Kg
120-82-1	1,2,4-Trichlorobenzene	92000U	1300000	92000	ug/Kg
95-63-6	1,2,4-Trimethylbenzene	93300U	1300000	93300	ug/Kg
96-12-8	1,2-Dibromo-3-chloropropane	104000U	1300000	104000	ug/Kg
106-93-4	1,2-Dibromoethane	37300U	1300000	37300	ug/Kg
95-50-1	1,2-Dichlorobenzene	71500U	1300000	71500	ug/Kg
107-06-2	1,2-Dichloroethane	51300U	1300000	51300	ug/Kg
540-59-0	1,2-Dichloroethene(Total)	60600U	2590000	60600	ug/Kg
78-87-5	1,2-Dichloropropane	39900U	1300000	39900	ug/Kg
108-67-8	1,3,5-Trimethylbenzene	97400U	1300000	97400	ug/Kg
541-73-1	1,3-Dichlorobenzene	67400U	1300000	67400	ug/Kg
142-28-9	1,3-Dichloropropane	40900U	1300000	40900	ug/Kg
106-46-7	1,4-Dichlorobenzene	59800U	1300000	59800	ug/Kg
594-20-7	2,2-Dichloropropane	64500U	1300000	64500	ug/Kg
78-93-3	2-Butanone	134000U	1300000	134000	ug/Kg
95-49-8	2-Chlorotoluene	56700U	1300000	56700	ug/Kg
591-78-6	2-Hexanone	112000U	1300000	112000	ug/Kg
106-43-4	4-Chlorotoluene	60900U	1300000	60900	ug/Kg
99-87-6	4-Isopropyltoluene	54400U	1300000	54400	ug/Kg
108-10-1	4-Methyl-2-pentanone	34200U	1300000	34200	ug/Kg
67-64-1	Acetone	267000U	6480000	267000	ug/Kg
71-43-2	**Benzene**	**21400000**	**1300000**	**39400**	**ug/Kg**
108-86-1	Bromobenzene	40400U	1300000	40400	ug/Kg
74-97-5	Bromochloromethane	35000U	1300000	35000	ug/Kg
75-27-4	Bromodichloromethane	42000U	1300000	42000	ug/Kg
75-25-2	Bromoform	41200U	1300000	41200	ug/Kg
74-83-9	Bromomethane	78500U	1300000	78500	ug/Kg
75-15-0	Carbon disulfide	84200U	1300000	84200	ug/Kg
56-23-5	Carbon tetrachloride	52300U	1300000	52300	ug/Kg
108-90-7	Chlorobenzene	38600U	1300000	38600	ug/Kg
75-00-3	Chloroethane	85800U	1300000	85800	ug/Kg
67-66-3	Chloroform	55700U	1300000	55700	ug/Kg
74-87-3	Chloromethane	61400U	1300000	61400	ug/Kg
124-48-1	Dibromochloromethane	56500U	1300000	56500	ug/Kg
74-95-3	Dibromomethane	59800U	1300000	59800	ug/Kg
75-71-8	Dichlorodifluoromethane	58000U	1300000	58000	ug/Kg
100-41-4	Ethylbenzene	47400U	1300000	47400	ug/Kg
87-68-3	Hexachlorobutadiene	55400U	1300000	55400	ug/Kg
98-82-8	Isopropylbenzene (Cumene)	47900U	1300000	47900	ug/Kg
74-88-4	Methyl iodide	319000U	1300000	319000	ug/Kg
75-09-2	Methylene chloride	115000U	2590000	115000	ug/Kg
91-20-3	**Naphthalene**	**1490000**	**1300000**	**83200**	**ug/Kg**
100-42-5	Styrene	39900U	1300000	39900	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141405	**IMP2-HC-A (UNTREATED)**	Solid	06/13/2012 15:25	06/14/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			200000	06/20/2012 00:52	EDS	483643

CAS#	Parameter	Result	RDL	MDL	Units
127-18-4	Tetrachloroethene	76700U	1300000	76700	ug/Kg
110-02-1	Thiophene	ND			ug/Kg
108-88-3	**Toluene**	**4260000**	**1300000**	**40200**	**ug/Kg**
79-01-6	Trichloroethene	55200U	1300000	55200	ug/Kg
75-69-4	Trichlorofluoromethane	67600U	1300000	67600	ug/Kg
76-13-1	Trichlorotrifluoroethane	51800U	1300000	51800	ug/Kg
108-05-4	Vinyl acetate	36500U	1300000	36500	ug/Kg
75-01-4	Vinyl chloride	70500U	1300000	70500	ug/Kg
1330-20-7	**Xylene (total)**	**1670000J**	**2590000**	**104000**	**ug/Kg**
156-59-2	cis-1,2-Dichloroethene	38300U	1300000	38300	ug/Kg
10061-01-5	cis-1,3-Dichloropropene	47900U	1300000	47900	ug/Kg
136777-61-2	**m,p-Xylene**	**1090000J**	**1300000**	**76200**	**ug/Kg**
104-51-8	n-Butylbenzene	60400U	1300000	60400	ug/Kg
103-65-1	n-Propylbenzene	191000U	1300000	191000	ug/Kg
95-47-6	**o-Xylene**	**583000J**	**1300000**	**35000**	**ug/Kg**
135-98-8	sec-Butylbenzene	51000U	1300000	51000	ug/Kg
1634-04-4	tert-Butyl methyl ether (MTBE)	31600U	1300000	31600	ug/Kg
98-06-6	tert-Butylbenzene	66300U	1300000	66300	ug/Kg
156-60-5	trans-1,2-Dichloroethene	33900U	1300000	33900	ug/Kg
10061-02-6	trans-1,3-Dichloropropene	44000U	1300000	44000	ug/Kg
110-57-6	trans-1,4-Dichloro-2-butene	134000U	1300000	134000	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	8060000	8550000	ug/Kg	106	62 - 127
1868-53-7	Dibromofluoromethane	8060000	8050000	ug/Kg	100	65 - 130
2037-26-5	Toluene d8	8060000	8570000	ug/Kg	106	71 - 132
17060-07-0	1,2-Dichloroethane-d4	8060000	8110000	ug/Kg	101	62 - 125

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			200000	06/20/2012 00:52	EDS	484124

CAS#	Parameter	Result	Retention	Units
	No tics detected	ND		ug/Kg

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/15/2012 05:15	483256	3550C	10	06/15/2012 15:24	JEW	483303

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	5450U	159000	5450	ug/Kg
122-66-7	1,2Diphenylhydrazine/Azobenzen	5640U	159000	5640	ug/Kg
95-95-4	2,4,5-Trichlorophenol	10700U	159000	10700	ug/Kg
88-06-2	2,4,6-Trichlorophenol	37900U	159000	37900	ug/Kg
120-83-2	2,4-Dichlorophenol	17100U	159000	17100	ug/Kg
105-67-9	2,4-Dimethylphenol	112000U	159000	112000	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141405	**IMP2-HC-A (UNTREATED)**	Solid	06/13/2012 15:25	06/14/2012 09:30

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/15/2012 05:15	483256	3550C	10	06/15/2012 15:24	JEW	483303

CAS#	Parameter	Result	RDL	MDL	Units
51-28-5	2,4-Dinitrophenol	73200U	159000	73200	ug/Kg
121-14-2	2,4-Dinitrotoluene	9640U	159000	9640	ug/Kg
606-20-2	2,6-Dinitrotoluene	12800U	159000	12800	ug/Kg
91-58-7	2-Chloronaphthalene	5110U	159000	5110	ug/Kg
95-57-8	2-Chlorophenol	5590U	159000	5590	ug/Kg
91-57-6	**2-Methylnaphthalene**	**60600J**	**159000**	**4320**	**ug/Kg**
88-74-4	2-Nitroaniline	11600U	795000	11600	ug/Kg
88-75-5	2-Nitrophenol	11800U	159000	11800	ug/Kg
91-94-1	3,3'-Dichlorobenzidine	147000U	318000	147000	ug/Kg
99-09-2	3-Nitroaniline	10600U	795000	10600	ug/Kg
534-52-1	4,6-Dinitro-2-methylphenol	72300U	795000	72300	ug/Kg
101-55-3	4-Bromophenyl phenyl ether	8910U	159000	8910	ug/Kg
59-50-7	4-Chloro-3-methylphenol	15200U	159000	15200	ug/Kg
106-47-8	4-Chloroaniline	10700U	159000	10700	ug/Kg
7005-72-3	4-Chlorophenyl phenyl ether	9010U	159000	9010	ug/Kg
100-01-6	4-Nitroaniline	78500U	795000	78500	ug/Kg
100-02-7	4-Nitrophenol	44900U	795000	44900	ug/Kg
83-32-9	**Acenaphthene**	**11600J**	**159000**	**5690**	**ug/Kg**
208-96-8	Acenaphthylene	6310U	159000	6310	ug/Kg
62-53-3	Aniline	14800U	159000	14800	ug/Kg
120-12-7	Anthracene	5490U	159000	5490	ug/Kg
56-55-3	Benzo(a)anthracene	12400U	159000	12400	ug/Kg
50-32-8	Benzo(a)pyrene	5930U	159000	5930	ug/Kg
205-99-2	Benzo(b)fluoranthene	14600U	159000	14600	ug/Kg
191-24-2	Benzo(g,h,i)perylene	5060U	159000	5060	ug/Kg
207-08-9	Benzo(k)fluoranthene	6460U	159000	6460	ug/Kg
100-51-6	Benzyl alcohol	21700U	159000	21700	ug/Kg
111-91-1	Bis(2-Chloroethoxy)methane	12400U	159000	12400	ug/Kg
111-44-4	Bis(2-Chloroethyl)ether	11700U	159000	11700	ug/Kg
108-60-1	Bis(2-Chloroisopropyl)ether	9930U	159000	9930	ug/Kg
117-81-7	Bis(2-Ethylhexyl)phthalate	9440U	159000	9440	ug/Kg
85-68-7	Butyl benzyl phthalate	2860U	159000	2860	ug/Kg
86-74-8	Carbazole	9640U	159000	9640	ug/Kg
218-01-9	Chrysene	6990U	159000	6990	ug/Kg
84-74-2	Di-n-butyl phthalate	6310U	159000	6310	ug/Kg
117-84-0	Di-n-octyl phthalate	2140U	159000	2140	ug/Kg
53-70-3	Dibenz(a,h)anthracene	5540U	159000	5540	ug/Kg
132-64-9	Dibenzofuran	5160U	159000	5160	ug/Kg
84-66-2	Diethyl phthalate	9780U	159000	9780	ug/Kg
131-11-3	Dimethyl phthalate	6790U	159000	6790	ug/Kg
206-44-0	Fluoranthene	3140U	159000	3140	ug/Kg
86-73-7	**Fluorene**	**223000**	**159000**	**6220**	**ug/Kg**
118-74-1	Hexachlorobenzene	9200U	159000	9200	ug/Kg
87-68-3	Hexachlorobutadiene	9640U	159000	9640	ug/Kg
77-47-4	Hexachlorocyclopentadiene	57800U	159000	57800	ug/Kg
67-72-1	Hexachloroethane	7660U	159000	7660	ug/Kg
193-39-5	Indeno(1,2,3-cd)pyrene	14900U	159000	14900	ug/Kg
78-59-1	Isophorone	5590U	159000	5590	ug/Kg
98-95-3	Nitrobenzene	8870U	159000	8870	ug/Kg
87-86-5	Pentachlorophenol	60700U	795000	60700	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141405	**IMP2-HC-A (UNTREATED)**	Solid	06/13/2012 15:25	06/14/2012 09:30

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/15/2012 05:15	483256	3550C	10	06/15/2012 15:24	JEW	483303

CAS#	Parameter	Result	RDL	MDL	Units
85-01-8	Phenanthrene	5110U	159000	5110	ug/Kg
108-95-2	Phenol	9540U	159000	9540	ug/Kg
129-00-0	Pyrene	7370U	159000	7370	ug/Kg
110-86-1	Pyridine	57800U	159000	57800	ug/Kg
1319-77-3MP	m,p-Cresol	22500U	159000	22500	ug/Kg
621-64-7	n-Nitrosodi-n-propylamine	7280U	159000	7280	ug/Kg
62-75-9	n-Nitrosodimethylamine	21800U	159000	21800	ug/Kg
86-30-6	n-Nitrosodiphenylamine	5060U	159000	5060	ug/Kg
95-48-7	o-Cresol	5640U	159000	5640	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	10000	Diluted Out	ug/Kg	**0***	46 - 123
321-60-8	2-Fluorobiphenyl	10000	Diluted Out	ug/Kg	**0***	47 - 127
1718-51-0	Terphenyl-d14	10000	Diluted Out	ug/Kg	**0***	38 - 167
4165-62-2	Phenol-d5	20000	Diluted Out	ug/Kg	**0***	43 - 123
367-12-4	2-Fluorophenol	20000	Diluted Out	ug/Kg	**0***	51 - 119
118-79-6	2,4,6-Tribromophenol	20000	Diluted Out	ug/Kg	**0***	44 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10	06/15/2012 15:24	JEW	483487

CAS#	Parameter	Result	Retention	Units
108-88-3	**Toluene**	**1850000**	**1.29**	**ug/Kg**
101-81-5	**Diphenylmethane**	**92700**	**4.07**	**ug/Kg**
611-43-8	**1,1'-Biphenyl, 2,3'-dimethyl-**	**88100**	**4.42**	**ug/Kg**
4957-14-6	**Benzene, 1,1'-methylenebis[4-methyl**	**93100**	**4.53**	**ug/Kg**
778-22-3	**Benzene, 1,1'-(1-methylethylidene)b**	**364000**	**4.58**	**ug/Kg**
	Unknown	**112000**	**4.75**	**ug/Kg**
26137-53-1	**Naphthalene, 1,2,3-trimethyl-4-prop**	**743000**	**4.82**	**ug/Kg**
	Unknown	**145000**	**4.90**	**ug/Kg**
132-32-1	**9H-Carbazol-3-amine, 9-ethyl-**	**141000**	**5**	**ug/Kg**
	Unknown	**221000**	**5.07**	**ug/Kg**
88-58-4	**1,4-Benzenediol, 2,5-bis(1,1-dimeth**	**117000**	**5.30**	**ug/Kg**
100-41-4	**Ethylbenzene**	**71300**	**1.74**	**ug/Kg**
10544-50-0	**Sulfur, mol. (S8)**	**198000**	**5.94**	**ug/Kg**
106-42-3	**p-Xylene**	**547000**	**1.78**	**ug/Kg**
108-38-3	**Benzene, 1,3-dimethyl-**	**148000**	**1.89**	**ug/Kg**
98-82-8	**Benzene, (1-methylethyl)-**	**159000**	**2.04**	**ug/Kg**
95-36-3	**1,2,4-Trimethylbenzene**	**124000**	**2.37**	**ug/Kg**
1595-01-3	**1-Methyl-4-N-hexylbenzene**	**41500**	**3.57**	**ug/Kg**
827-52-1	**Benzene, cyclohexyl-**	**53500**	**3.70**	**ug/Kg**
934-80-5	**Benzene, 4-ethyl-1,2-dimethyl-**	**77500**	**3.91**	**ug/Kg**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141405	**IMP2-HC-A (UNTREATED)**	Solid	06/13/2012 15:25	06/14/2012 09:30

SW-846 7471B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/14/2012 19:30	483245	SW-846 7471B	20	06/16/2012 16:39	CLB	483389

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	**Mercury**	**8.68**	**0.36**	**0.16**	**mg/kg**

SW-846 6010B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/16/2012 09:30	483320	SW-846 3050B	1	06/24/2012 04:13	CLB	483998

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	**Aluminum**	**227**	**12.9**	**1.27**	**mg/kg**
7440-36-0	**Antimony**	**0.33J**	**3.86**	**0.16**	**mg/kg**
7440-38-2	**Arsenic**	**5.95**	**2.57**	**0.22**	**mg/kg**
7440-39-3	**Barium**	**5.31**	**0.64**	**0.039**	**mg/kg**
7440-41-7	**Beryllium**	**0.015J**	**0.32**	**0.0032**	**mg/kg**
7440-43-9	Cadmium	0.014U	0.32	0.014	mg/kg
7440-70-2	**Calcium**	**97.6**	**48.2**	**7.02**	**mg/kg**
7440-47-3	**Chromium**	**6.27**	**0.64**	**0.029**	**mg/kg**
7440-48-4	**Cobalt**	**0.18J**	**0.64**	**0.016**	**mg/kg**
7440-50-8	**Copper**	**12.5**	**0.64**	**0.050**	**mg/kg**
7439-89-6	**Iron**	**639**	**6.43**	**1.13**	**mg/kg**
7439-92-1	**Lead**	**59.0**	**0.96**	**0.18**	**mg/kg**
7439-95-4	**Magnesium**	**36.3**	**6.43**	**0.70**	**mg/kg**
7439-96-5	**Manganese**	**5.59**	**0.96**	**0.022**	**mg/kg**
7440-02-0	**Nickel**	**4.56**	**2.57**	**0.034**	**mg/kg**
7440-09-7	**Potassium**	**91.2**	**32.1**	**3.38**	**mg/kg**
7782-49-2	**Selenium**	**9.67**	**2.57**	**0.21**	**mg/kg**
7440-22-4	Silver	0.035U	0.64	0.035	mg/kg
7440-23-5	**Sodium**	**5740**	**64.3**	**4.87**	**mg/kg**
7440-28-0	**Thallium**	**0.73J**	**1.29**	**0.14**	**mg/kg**
7440-62-2	**Vanadium**	**0.53J**	**1.29**	**0.024**	**mg/kg**
7440-66-6	**Zinc**	**4.64**	**1.29**	**0.68**	**mg/kg**

SW-846 9045C pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	06/16/2012 06:40	OLT	483333

CAS#	Parameter	Result	RDL	MDL	Units
pH	**pH**	**1.04**	**1.00**	**1.00**	**pH unit**

RESULTS REPORTED ON A DRY WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141406	**IMP2-HC-B (UNTREATED)**	Solid	06/13/2012 15:25	06/14/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			200000	06/20/2012 01:13	EDS	483643

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	43900U	1620000	43900	ug/Kg
71-55-6	1,1,1-Trichloroethane	77000U	1620000	77000	ug/Kg
79-34-5	1,1,2,2-Tetrachloroethane	37000U	1620000	37000	ug/Kg
79-00-5	1,1,2-Trichloroethane	43500U	1620000	43500	ug/Kg
75-34-3	1,1-Dichloroethane	48400U	1620000	48400	ug/Kg
75-35-4	1,1-Dichloroethene	75400U	1620000	75400	ug/Kg
563-58-6	1,1-Dichloropropene	79300U	1620000	79300	ug/Kg
96-18-4	1,2,3-Trichloropropane	37400U	1620000	37400	ug/Kg
120-82-1	1,2,4-Trichlorobenzene	115000U	1620000	115000	ug/Kg
95-63-6	**1,2,4-Trimethylbenzene**	**749000J**	**1620000**	**117000**	**ug/Kg**
96-12-8	1,2-Dibromo-3-chloropropane	130000U	1620000	130000	ug/Kg
106-93-4	1,2-Dibromoethane	46800U	1620000	46800	ug/Kg
95-50-1	**1,2-Dichlorobenzene**	**551000J**	**1620000**	**89700**	**ug/Kg**
107-06-2	1,2-Dichloroethane	64300U	1620000	64300	ug/Kg
540-59-0	1,2-Dichloroethene(Total)	76000U	3250000	76000	ug/Kg
78-87-5	1,2-Dichloropropane	50000U	1620000	50000	ug/Kg
108-67-8	**1,3,5-Trimethylbenzene**	**625000J**	**1620000**	**122000**	**ug/Kg**
541-73-1	1,3-Dichlorobenzene	84500U	1620000	84500	ug/Kg
142-28-9	1,3-Dichloropropane	51300U	1620000	51300	ug/Kg
106-46-7	1,4-Dichlorobenzene	75100U	1620000	75100	ug/Kg
594-20-7	2,2-Dichloropropane	80900U	1620000	80900	ug/Kg
78-93-3	2-Butanone	168000U	1620000	168000	ug/Kg
95-49-8	2-Chlorotoluene	71200U	1620000	71200	ug/Kg
591-78-6	2-Hexanone	141000U	1620000	141000	ug/Kg
106-43-4	4-Chlorotoluene	76400U	1620000	76400	ug/Kg
99-87-6	4-Isopropyltoluene	68200U	1620000	68200	ug/Kg
108-10-1	4-Methyl-2-pentanone	42900U	1620000	42900	ug/Kg
67-64-1	Acetone	335000U	8120000	335000	ug/Kg
71-43-2	**Benzene**	**35500000**	**1620000**	**49400**	**ug/Kg**
108-86-1	Bromobenzene	50700U	1620000	50700	ug/Kg
74-97-5	Bromochloromethane	43900U	1620000	43900	ug/Kg
75-27-4	Bromodichloromethane	52600U	1620000	52600	ug/Kg
75-25-2	Bromoform	51700U	1620000	51700	ug/Kg
74-83-9	Bromomethane	98500U	1620000	98500	ug/Kg
75-15-0	Carbon disulfide	106000U	1620000	106000	ug/Kg
56-23-5	Carbon tetrachloride	65600U	1620000	65600	ug/Kg
108-90-7	Chlorobenzene	48400U	1620000	48400	ug/Kg
75-00-3	Chloroethane	108000U	1620000	108000	ug/Kg
67-66-3	Chloroform	69900U	1620000	69900	ug/Kg
74-87-3	Chloromethane	77000U	1620000	77000	ug/Kg
124-48-1	Dibromochloromethane	70800U	1620000	70800	ug/Kg
74-95-3	Dibromomethane	75100U	1620000	75100	ug/Kg
75-71-8	Dichlorodifluoromethane	72800U	1620000	72800	ug/Kg
100-41-4	Ethylbenzene	59500U	1620000	59500	ug/Kg
87-68-3	Hexachlorobutadiene	69500U	1620000	69500	ug/Kg
98-82-8	**Isopropylbenzene (Cumene)**	**769000J**	**1620000**	**60100**	**ug/Kg**
74-88-4	Methyl iodide	400000U	1620000	400000	ug/Kg
75-09-2	Methylene chloride	144000U	3250000	144000	ug/Kg
91-20-3	**Naphthalene**	**1890000**	**1620000**	**104000**	**ug/Kg**
100-42-5	Styrene	50000U	1620000	50000	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141406	**IMP2-HC-B (UNTREATED)**	Solid	06/13/2012 15:25	06/14/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			200000	06/20/2012 01:13	EDS	483643

CAS#	Parameter	Result	RDL	MDL	Units
127-18-4	Tetrachloroethene	96200U	1620000	96200	ug/Kg
110-02-1	Thiophene	ND			ug/Kg
108-88-3	**Toluene**	**7220000**	**1620000**	**50400**	**ug/Kg**
79-01-6	Trichloroethene	69200U	1620000	69200	ug/Kg
75-69-4	Trichlorofluoromethane	84800U	1620000	84800	ug/Kg
76-13-1	Trichlorotrifluoroethane	65000U	1620000	65000	ug/Kg
108-05-4	Vinyl acetate	45800U	1620000	45800	ug/Kg
75-01-4	Vinyl chloride	88400U	1620000	88400	ug/Kg
1330-20-7	**Xylene (total)**	**2410000J**	**3250000**	**130000**	**ug/Kg**
156-59-2	cis-1,2-Dichloroethene	48100U	1620000	48100	ug/Kg
10061-01-5	cis-1,3-Dichloropropene	60100U	1620000	60100	ug/Kg
136777-61-2	**m,p-Xylene**	**1640000**	**1620000**	**95500**	**ug/Kg**
104-51-8	n-Butylbenzene	75700U	1620000	75700	ug/Kg
103-65-1	n-Propylbenzene	240000U	1620000	240000	ug/Kg
95-47-6	**o-Xylene**	**767000J**	**1620000**	**43900**	**ug/Kg**
135-98-8	sec-Butylbenzene	64000U	1620000	64000	ug/Kg
1634-04-4	tert-Butyl methyl ether (MTBE)	39600U	1620000	39600	ug/Kg
98-06-6	tert-Butylbenzene	83200U	1620000	83200	ug/Kg
156-60-5	trans-1,2-Dichloroethene	42600U	1620000	42600	ug/Kg
10061-02-6	trans-1,3-Dichloropropene	55200U	1620000	55200	ug/Kg
110-57-6	trans-1,4-Dichloro-2-butene	168000U	1620000	168000	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	9030000	9580000	ug/Kg	106	62 - 127
1868-53-7	Dibromofluoromethane	9030000	8660000	ug/Kg	96	65 - 130
2037-26-5	Toluene d8	9030000	9510000	ug/Kg	105	71 - 132
17060-07-0	1,2-Dichloroethane-d4	9030000	8730000	ug/Kg	97	62 - 125

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			200000	06/20/2012 01:13	EDS	484124

CAS#	Parameter	Result	Retention	Units
	No tics detected	ND		ug/Kg

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/15/2012 05:15	483256	3550C	5	06/15/2012 19:18	JEW	483303

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	6100U	178000	6100	ug/Kg
122-66-7	1,2Diphenylhydrazine/Azobenzen	6320U	178000	6320	ug/Kg
95-95-4	2,4,5-Trichlorophenol	12000U	178000	12000	ug/Kg
88-06-2	2,4,6-Trichlorophenol	42500U	178000	42500	ug/Kg
120-83-2	2,4-Dichlorophenol	19100U	178000	19100	ug/Kg
105-67-9	2,4-Dimethylphenol	126000U	178000	126000	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141406	**IMP2-HC-B (UNTREATED)**	Solid	06/13/2012 15:25	06/14/2012 09:30

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/15/2012 05:15	483256	3550C	5	06/15/2012 19:18	JEW	483303

CAS#	Parameter	Result	RDL	MDL	Units
51-28-5	2,4-Dinitrophenol	82100U	178000	82100	ug/Kg
121-14-2	2,4-Dinitrotoluene	10800U	178000	10800	ug/Kg
606-20-2	2,6-Dinitrotoluene	14400U	178000	14400	ug/Kg
91-58-7	2-Chloronaphthalene	5720U	178000	5720	ug/Kg
95-57-8	2-Chlorophenol	6260U	178000	6260	ug/Kg
91-57-6	**2-Methylnaphthalene**	**55400J**	**178000**	**4840**	**ug/Kg**
88-74-4	2-Nitroaniline	13000U	891000	13000	ug/Kg
88-75-5	2-Nitrophenol	13200U	178000	13200	ug/Kg
91-94-1	3,3'-Dichlorobenzidine	165000U	356000	165000	ug/Kg
99-09-2	3-Nitroaniline	11900U	891000	11900	ug/Kg
534-52-1	4,6-Dinitro-2-methylphenol	81000U	891000	81000	ug/Kg
101-55-3	4-Bromophenyl phenyl ether	9990U	178000	9990	ug/Kg
59-50-7	4-Chloro-3-methylphenol	17000U	178000	17000	ug/Kg
106-47-8	4-Chloroaniline	12000U	178000	12000	ug/Kg
7005-72-3	4-Chlorophenyl phenyl ether	10100U	178000	10100	ug/Kg
100-01-6	4-Nitroaniline	88000U	891000	88000	ug/Kg
100-02-7	4-Nitrophenol	50300U	891000	50300	ug/Kg
83-32-9	**Acenaphthene**	**8320J**	**178000**	**6370**	**ug/Kg**
208-96-8	Acenaphthylene	7070U	178000	7070	ug/Kg
62-53-3	Aniline	16600U	178000	16600	ug/Kg
120-12-7	Anthracene	6160U	178000	6160	ug/Kg
56-55-3	Benzo(a)anthracene	13900U	178000	13900	ug/Kg
50-32-8	Benzo(a)pyrene	6640U	178000	6640	ug/Kg
205-99-2	Benzo(b)fluoranthene	16400U	178000	16400	ug/Kg
191-24-2	Benzo(g,h,i)perylene	5670U	178000	5670	ug/Kg
207-08-9	Benzo(k)fluoranthene	7240U	178000	7240	ug/Kg
100-51-6	Benzyl alcohol	24400U	178000	24400	ug/Kg
111-91-1	Bis(2-Chloroethoxy)methane	13900U	178000	13900	ug/Kg
111-44-4	Bis(2-Chloroethyl)ether	13100U	178000	13100	ug/Kg
108-60-1	Bis(2-Chloroisopropyl)ether	11100U	178000	11100	ug/Kg
117-81-7	Bis(2-Ethylhexyl)phthalate	10600U	178000	10600	ug/Kg
85-68-7	Butyl benzyl phthalate	3200U	178000	3200	ug/Kg
86-74-8	Carbazole	10800U	178000	10800	ug/Kg
218-01-9	Chrysene	7830U	178000	7830	ug/Kg
84-74-2	Di-n-butyl phthalate	7070U	178000	7070	ug/Kg
117-84-0	Di-n-octyl phthalate	2400U	178000	2400	ug/Kg
53-70-3	Dibenz(a,h)anthracene	6210U	178000	6210	ug/Kg
132-64-9	Dibenzofuran	5780U	178000	5780	ug/Kg
84-66-2	Diethyl phthalate	11000U	178000	11000	ug/Kg
131-11-3	Dimethyl phthalate	7610U	178000	7610	ug/Kg
206-44-0	Fluoranthene	3520U	178000	3520	ug/Kg
86-73-7	**Fluorene**	**207000**	**178000**	**6970**	**ug/Kg**
118-74-1	Hexachlorobenzene	10300U	178000	10300	ug/Kg
87-68-3	Hexachlorobutadiene	10800U	178000	10800	ug/Kg
77-47-4	Hexachlorocyclopentadiene	64800U	178000	64800	ug/Kg
67-72-1	Hexachloroethane	8590U	178000	8590	ug/Kg
193-39-5	Indeno(1,2,3-cd)pyrene	16700U	178000	16700	ug/Kg
78-59-1	Isophorone	6260U	178000	6260	ug/Kg
98-95-3	Nitrobenzene	9940U	178000	9940	ug/Kg
87-86-5	Pentachlorophenol	68000U	891000	68000	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141406	**IMP2-HC-B (UNTREATED)**	Solid	06/13/2012 15:25	06/14/2012 09:30

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/15/2012 05:15	483256	3550C	5	06/15/2012 19:18	JEW	483303

CAS#	Parameter	Result	RDL	MDL	Units
85-01-8	**Phenanthrene**	**9400J**	**178000**	**5720**	**ug/Kg**
108-95-2	Phenol	10700U	178000	10700	ug/Kg
129-00-0	Pyrene	8260U	178000	8260	ug/Kg
110-86-1	Pyridine	64800U	178000	64800	ug/Kg
1319-77-3MP	m,p-Cresol	25200U	178000	25200	ug/Kg
621-64-7	n-Nitrosodi-n-propylamine	8150U	178000	8150	ug/Kg
62-75-9	n-Nitrosodimethylamine	24500U	178000	24500	ug/Kg
86-30-6	n-Nitrosodiphenylamine	5670U	178000	5670	ug/Kg
95-48-7	o-Cresol	6320U	178000	6320	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	10000	Diluted Out	ug/Kg	**0***	46 - 123
321-60-8	2-Fluorobiphenyl	10000	Diluted Out	ug/Kg	**0***	47 - 127
1718-51-0	Terphenyl-d14	10000	Diluted Out	ug/Kg	**0***	38 - 167
4165-62-2	Phenol-d5	20000	Diluted Out	ug/Kg	**0***	43 - 123
367-12-4	2-Fluorophenol	20000	Diluted Out	ug/Kg	**0***	51 - 119
118-79-6	2,4,6-Tribromophenol	20000	Diluted Out	ug/Kg	**0***	44 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			5	06/15/2012 19:18	JEW	483487

CAS#	Parameter	Result	Retention	Units
108-88-3	**Toluene**	**1850000**	**1.29**	**ug/Kg**
4575-46-6	**Benzene, 1-cyclohexyl-3-methyl-**	**85200**	**4.06**	**ug/Kg**
620-83-7	**Benzene, 1-methyl-4-(phenylmethyl)-**	**67000**	**4.42**	**ug/Kg**
13540-56-2	**Benzene, 1,2-dimethyl-4-(phenylmeth**	**95800**	**4.53**	**ug/Kg**
778-22-3	**Benzene, 1,1'-(1-methylethylidene)b**	**334000**	**4.58**	**ug/Kg**
26137-53-1	**Naphthalene, 1,2,3-trimethyl-4-prop**	**671000**	**4.82**	**ug/Kg**
4309-66-4	**Stilbene, 4-amino- (E)-**	**122000**	**4.90**	**ug/Kg**
	Unknown	**99500**	**5**	**ug/Kg**
	Unknown	**181000**	**5.07**	**ug/Kg**
55012-80-1	**Silane, trimethyl[5-methyl-2-(1-met**	**105000**	**5.30**	**ug/Kg**
10544-50-0	**Sulfur, mol. (S8)**	**202000**	**5.94**	**ug/Kg**
100-41-4	**Ethylbenzene**	**65000**	**1.74**	**ug/Kg**
108-38-3	**Benzene, 1,3-dimethyl-**	**481000**	**1.78**	**ug/Kg**
106-42-3	**p-Xylene**	**130000**	**1.89**	**ug/Kg**
98-82-8	**Benzene, (1-methylethyl)-**	**137000**	**2.03**	**ug/Kg**
98-51-1	**4-tert-Butyltoluene**	**105000**	**2.79**	**ug/Kg**
2132-84-5	**Benzene, (1-methylhexyl)-**	**42100**	**3.57**	**ug/Kg**
827-52-1	**Benzene, cyclohexyl-**	**50900**	**3.70**	**ug/Kg**
54932-88-6	**Benzenepropanoic acid, .alpha.,.alp**	**63900**	**3.91**	**ug/Kg**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141406	**IMP2-HC-B (UNTREATED)**	Solid	06/13/2012 15:25	06/14/2012 09:30

SW-846 7471B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/14/2012 19:30	483245	SW-846 7471B	10	06/16/2012 16:41	CLB	483389

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	**Mercury**	**3.36**	**0.20**	**0.090**	**mg/kg**

SW-846 6010B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/16/2012 09:30	483320	SW-846 3050B	1	06/24/2012 04:21	CLB	483998

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	**Aluminum**	**286**	**14.4**	**1.42**	**mg/kg**
7440-36-0	**Antimony**	**0.35J**	**4.32**	**0.17**	**mg/kg**
7440-38-2	**Arsenic**	**1.41J**	**2.88**	**0.25**	**mg/kg**
7440-39-3	**Barium**	**6.23**	**0.72**	**0.043**	**mg/kg**
7440-41-7	**Beryllium**	**0.015J**	**0.36**	**0.0036**	**mg/kg**
7440-43-9	Cadmium	0.016U	0.36	0.016	mg/kg
7440-70-2	**Calcium**	**163**	**54.0**	**7.87**	**mg/kg**
7440-47-3	**Chromium**	**8.36**	**0.72**	**0.032**	**mg/kg**
7440-48-4	**Cobalt**	**0.20J**	**0.72**	**0.018**	**mg/kg**
7440-50-8	**Copper**	**15.4**	**0.72**	**0.056**	**mg/kg**
7439-89-6	**Iron**	**776**	**7.20**	**1.26**	**mg/kg**
7439-92-1	**Lead**	**76.1**	**1.08**	**0.21**	**mg/kg**
7439-95-4	**Magnesium**	**44.2**	**7.20**	**0.78**	**mg/kg**
7439-96-5	**Manganese**	**6.60**	**1.08**	**0.025**	**mg/kg**
7440-02-0	**Nickel**	**6.13**	**2.88**	**0.038**	**mg/kg**
7440-09-7	**Potassium**	**104**	**36.0**	**3.79**	**mg/kg**
7782-49-2	**Selenium**	**10.7**	**2.88**	**0.24**	**mg/kg**
7440-22-4	**Silver**	**0.042J**	**0.72**	**0.040**	**mg/kg**
7440-23-5	**Sodium**	**6440**	**72.0**	**5.46**	**mg/kg**
7440-28-0	**Thallium**	**0.86J**	**1.44**	**0.16**	**mg/kg**
7440-62-2	**Vanadium**	**0.79J**	**1.44**	**0.027**	**mg/kg**
7440-66-6	**Zinc**	**5.03**	**1.44**	**0.77**	**mg/kg**

SW-846 9045C pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	06/16/2012 06:40	OLT	483333

CAS#	Parameter	Result	RDL	MDL	Units
pH	**pH**	**1.06**	**1.00**	**1.00**	**pH unit**

RESULTS REPORTED ON A DRY WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141407	**IMP2-HC-C (UNTREATED)**	Solid	06/13/2012 15:25	06/14/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			200000	06/20/2012 01:33	EDS	483643

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	41400U	1530000	41400	ug/Kg
71-55-6	1,1,1-Trichloroethane	72700U	1530000	72700	ug/Kg
79-34-5	1,1,2,2-Tetrachloroethane	35000U	1530000	35000	ug/Kg
79-00-5	1,1,2-Trichloroethane	41100U	1530000	41100	ug/Kg
75-34-3	1,1-Dichloroethane	45700U	1530000	45700	ug/Kg
75-35-4	1,1-Dichloroethene	71200U	1530000	71200	ug/Kg
563-58-6	1,1-Dichloropropene	74900U	1530000	74900	ug/Kg
96-18-4	1,2,3-Trichloropropane	35300U	1530000	35300	ug/Kg
120-82-1	1,2,4-Trichlorobenzene	109000U	1530000	109000	ug/Kg
95-63-6	**1,2,4-Trimethylbenzene**	**733000J**	**1530000**	**110000**	**ug/Kg**
96-12-8	1,2-Dibromo-3-chloropropane	123000U	1530000	123000	ug/Kg
106-93-4	1,2-Dibromoethane	44200U	1530000	44200	ug/Kg
95-50-1	**1,2-Dichlorobenzene**	**662000J**	**1530000**	**84700**	**ug/Kg**
107-06-2	1,2-Dichloroethane	60700U	1530000	60700	ug/Kg
540-59-0	1,2-Dichloroethene(Total)	71800U	3070000	71800	ug/Kg
78-87-5	1,2-Dichloropropane	47200U	1530000	47200	ug/Kg
108-67-8	**1,3,5-Trimethylbenzene**	**607000J**	**1530000**	**115000**	**ug/Kg**
541-73-1	1,3-Dichlorobenzene	79800U	1530000	79800	ug/Kg
142-28-9	1,3-Dichloropropane	48500U	1530000	48500	ug/Kg
106-46-7	1,4-Dichlorobenzene	70900U	1530000	70900	ug/Kg
594-20-7	2,2-Dichloropropane	76400U	1530000	76400	ug/Kg
78-93-3	2-Butanone	159000U	1530000	159000	ug/Kg
95-49-8	2-Chlorotoluene	67200U	1530000	67200	ug/Kg
591-78-6	2-Hexanone	133000U	1530000	133000	ug/Kg
106-43-4	4-Chlorotoluene	72100U	1530000	72100	ug/Kg
99-87-6	4-Isopropyltoluene	64400U	1530000	64400	ug/Kg
108-10-1	4-Methyl-2-pentanone	40500U	1530000	40500	ug/Kg
67-64-1	Acetone	316000U	7670000	316000	ug/Kg
71-43-2	**Benzene**	**42400000**	**1530000**	**46600**	**ug/Kg**
108-86-1	Bromobenzene	47900U	1530000	47900	ug/Kg
74-97-5	Bromochloromethane	41400U	1530000	41400	ug/Kg
75-27-4	Bromodichloromethane	49700U	1530000	49700	ug/Kg
75-25-2	Bromoform	48800U	1530000	48800	ug/Kg
74-83-9	Bromomethane	93000U	1530000	93000	ug/Kg
75-15-0	Carbon disulfide	99700U	1530000	99700	ug/Kg
56-23-5	Carbon tetrachloride	62000U	1530000	62000	ug/Kg
108-90-7	Chlorobenzene	45700U	1530000	45700	ug/Kg
75-00-3	Chloroethane	102000U	1530000	102000	ug/Kg
67-66-3	Chloroform	66000U	1530000	66000	ug/Kg
74-87-3	Chloromethane	72700U	1530000	72700	ug/Kg
124-48-1	Dibromochloromethane	66900U	1530000	66900	ug/Kg
74-95-3	Dibromomethane	70900U	1530000	70900	ug/Kg
75-71-8	Dichlorodifluoromethane	68700U	1530000	68700	ug/Kg
100-41-4	Ethylbenzene	56100U	1530000	56100	ug/Kg
87-68-3	Hexachlorobutadiene	65700U	1530000	65700	ug/Kg
98-82-8	**Isopropylbenzene (Cumene)**	**778000J**	**1530000**	**56800**	**ug/Kg**
74-88-4	Methyl iodide	377000U	1530000	377000	ug/Kg
75-09-2	Methylene chloride	136000U	3070000	136000	ug/Kg
91-20-3	**Naphthalene**	**2070000**	**1530000**	**98500**	**ug/Kg**
100-42-5	Styrene	47200U	1530000	47200	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141407	**IMP2-HC-C (UNTREATED)**	Solid	06/13/2012 15:25	06/14/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			200000	06/20/2012 01:33	EDS	483643

CAS#	Parameter	Result	RDL	MDL	Units
127-18-4	Tetrachloroethene	90800U	1530000	90800	ug/Kg
110-02-1	Thiophene	ND			ug/Kg
108-88-3	**Toluene**	**9120000**	**1530000**	**47600**	**ug/Kg**
79-01-6	Trichloroethene	65400U	1530000	65400	ug/Kg
75-69-4	Trichlorofluoromethane	80100U	1530000	80100	ug/Kg
76-13-1	Trichlorotrifluoroethane	61400U	1530000	61400	ug/Kg
108-05-4	Vinyl acetate	43300U	1530000	43300	ug/Kg
75-01-4	Vinyl chloride	83500U	1530000	83500	ug/Kg
1330-20-7	**Xylene (total)**	**2530000J**	**3070000**	**123000**	**ug/Kg**
156-59-2	cis-1,2-Dichloroethene	45400U	1530000	45400	ug/Kg
10061-01-5	cis-1,3-Dichloropropene	56800U	1530000	56800	ug/Kg
136777-61-2	**m,p-Xylene**	**1740000**	**1530000**	**90200**	**ug/Kg**
104-51-8	n-Butylbenzene	71500U	1530000	71500	ug/Kg
103-65-1	n-Propylbenzene	227000U	1530000	227000	ug/Kg
95-47-6	**o-Xylene**	**788000J**	**1530000**	**41400**	**ug/Kg**
135-98-8	sec-Butylbenzene	60400U	1530000	60400	ug/Kg
1634-04-4	tert-Butyl methyl ether (MTBE)	37400U	1530000	37400	ug/Kg
98-06-6	tert-Butylbenzene	78500U	1530000	78500	ug/Kg
156-60-5	trans-1,2-Dichloroethene	40200U	1530000	40200	ug/Kg
10061-02-6	trans-1,3-Dichloropropene	52200U	1530000	52200	ug/Kg
110-57-6	trans-1,4-Dichloro-2-butene	159000U	1530000	159000	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	8900000	9690000	ug/Kg	109	62 - 127
1868-53-7	Dibromofluoromethane	8900000	8730000	ug/Kg	98	65 - 130
2037-26-5	Toluene d8	8900000	9290000	ug/Kg	104	71 - 132
17060-07-0	1,2-Dichloroethane-d4	8900000	8970000	ug/Kg	101	62 - 125

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			200000	06/20/2012 01:33	EDS	484124

CAS#	Parameter	Result	Retention	Units
	No tics detected	ND		ug/Kg

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/15/2012 05:15	483256	3550C	5	06/15/2012 19:35	JEW	483303

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	2920U	85400	2920	ug/Kg
122-66-7	1,2Diphenylhydrazine/Azobenzen	3030U	85400	3030	ug/Kg
95-95-4	2,4,5-Trichlorophenol	5770U	85400	5770	ug/Kg
88-06-2	2,4,6-Trichlorophenol	20400U	85400	20400	ug/Kg
120-83-2	2,4-Dichlorophenol	9160U	85400	9160	ug/Kg
105-67-9	2,4-Dimethylphenol	60300U	85400	60300	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141407	**IMP2-HC-C (UNTREATED)**	Solid	06/13/2012 15:25	06/14/2012 09:30

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/15/2012 05:15	483256	3550C	5	06/15/2012 19:35	JEW	483303

CAS#	Parameter	Result	RDL	MDL	Units
51-28-5	2,4-Dinitrophenol	39300U	85400	39300	ug/Kg
121-14-2	2,4-Dinitrotoluene	5170U	85400	5170	ug/Kg
606-20-2	2,6-Dinitrotoluene	6880U	85400	6880	ug/Kg
91-58-7	2-Chloronaphthalene	2740U	85400	2740	ug/Kg
95-57-8	2-Chlorophenol	3000U	85400	3000	ug/Kg
91-57-6	**2-Methylnaphthalene**	**39100J**	**85400**	**2320**	**ug/Kg**
88-74-4	2-Nitroaniline	6210U	427000	6210	ug/Kg
88-75-5	2-Nitrophenol	6340U	85400	6340	ug/Kg
91-94-1	3,3'-Dichlorobenzidine	79100U	171000	79100	ug/Kg
99-09-2	3-Nitroaniline	5690U	427000	5690	ug/Kg
534-52-1	4,6-Dinitro-2-methylphenol	38800U	427000	38800	ug/Kg
101-55-3	4-Bromophenyl phenyl ether	4780U	85400	4780	ug/Kg
59-50-7	4-Chloro-3-methylphenol	8150U	85400	8150	ug/Kg
106-47-8	4-Chloroaniline	5740U	85400	5740	ug/Kg
7005-72-3	4-Chlorophenyl phenyl ether	4840U	85400	4840	ug/Kg
100-01-6	4-Nitroaniline	42200U	427000	42200	ug/Kg
100-02-7	4-Nitrophenol	24100U	427000	24100	ug/Kg
83-32-9	**Acenaphthene**	**5930J**	**85400**	**3050**	**ug/Kg**
208-96-8	Acenaphthylene	3390U	85400	3390	ug/Kg
62-53-3	Aniline	7970U	85400	7970	ug/Kg
120-12-7	Anthracene	2950U	85400	2950	ug/Kg
56-55-3	Benzo(a)anthracene	6670U	85400	6670	ug/Kg
50-32-8	Benzo(a)pyrene	3180U	85400	3180	ug/Kg
205-99-2	Benzo(b)fluoranthene	7860U	85400	7860	ug/Kg
191-24-2	Benzo(g,h,i)perylene	2720U	85400	2720	ug/Kg
207-08-9	Benzo(k)fluoranthene	3470U	85400	3470	ug/Kg
100-51-6	Benzyl alcohol	11700U	85400	11700	ug/Kg
111-91-1	Bis(2-Chloroethoxy)methane	6670U	85400	6670	ug/Kg
111-44-4	Bis(2-Chloroethyl)ether	6280U	85400	6280	ug/Kg
108-60-1	Bis(2-Chloroisopropyl)ether	5330U	85400	5330	ug/Kg
117-81-7	Bis(2-Ethylhexyl)phthalate	5070U	85400	5070	ug/Kg
85-68-7	Butyl benzyl phthalate	1530U	85400	1530	ug/Kg
86-74-8	Carbazole	5170U	85400	5170	ug/Kg
218-01-9	Chrysene	3750U	85400	3750	ug/Kg
84-74-2	Di-n-butyl phthalate	3390U	85400	3390	ug/Kg
117-84-0	Di-n-octyl phthalate	1150U	85400	1150	ug/Kg
53-70-3	Dibenz(a,h)anthracene	2970U	85400	2970	ug/Kg
132-64-9	Dibenzofuran	2770U	85400	2770	ug/Kg
84-66-2	Diethyl phthalate	5250U	85400	5250	ug/Kg
131-11-3	Dimethyl phthalate	3650U	85400	3650	ug/Kg
206-44-0	Fluoranthene	1690U	85400	1690	ug/Kg
86-73-7	**Fluorene**	**133000**	**85400**	**3340**	**ug/Kg**
118-74-1	Hexachlorobenzene	4940U	85400	4940	ug/Kg
87-68-3	Hexachlorobutadiene	5170U	85400	5170	ug/Kg
77-47-4	Hexachlorocyclopentadiene	31000U	85400	31000	ug/Kg
67-72-1	Hexachloroethane	4110U	85400	4110	ug/Kg
193-39-5	Indeno(1,2,3-cd)pyrene	7990U	85400	7990	ug/Kg
78-59-1	Isophorone	3000U	85400	3000	ug/Kg
98-95-3	Nitrobenzene	4760U	85400	4760	ug/Kg
87-86-5	Pentachlorophenol	32600U	427000	32600	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141407	**IMP2-HC-C (UNTREATED)**	Solid	06/13/2012 15:25	06/14/2012 09:30

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/15/2012 05:15	483256	3550C	5	06/15/2012 19:35	JEW	483303

CAS#	Parameter	Result	RDL	MDL	Units
85-01-8	**Phenanthrene**	**5240J**	**85400**	**2740**	**ug/Kg**
108-95-2	Phenol	5120U	85400	5120	ug/Kg
129-00-0	Pyrene	3960U	85400	3960	ug/Kg
110-86-1	Pyridine	31000U	85400	31000	ug/Kg
1319-77-3MP	m,p-Cresol	12100U	85400	12100	ug/Kg
621-64-7	n-Nitrosodi-n-propylamine	3910U	85400	3910	ug/Kg
62-75-9	n-Nitrosodimethylamine	11700U	85400	11700	ug/Kg
86-30-6	n-Nitrosodiphenylamine	2720U	85400	2720	ug/Kg
95-48-7	o-Cresol	3030U	85400	3030	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	10000	Diluted Out	ug/Kg	**0***	46 - 123
321-60-8	2-Fluorobiphenyl	10000	Diluted Out	ug/Kg	**0***	47 - 127
1718-51-0	Terphenyl-d14	10000	Diluted Out	ug/Kg	**0***	38 - 167
4165-62-2	Phenol-d5	20000	Diluted Out	ug/Kg	**0***	43 - 123
367-12-4	2-Fluorophenol	20000	Diluted Out	ug/Kg	**0***	51 - 119
118-79-6	2,4,6-Tribromophenol	20000	Diluted Out	ug/Kg	**0***	44 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			5	06/15/2012 19:35	JEW	483487

CAS#	Parameter	Result	Retention	Units
75-00-3	**Ethyl Chloride**	**83400**	**1.07**	**ug/Kg**
102-46-5	**Benzene, 4-(chloromethyl)-1,2-dimet**	**37400**	**3.91**	**ug/Kg**
4575-46-6	**Benzene, 1-cyclohexyl-3-methyl-**	**49200**	**4.06**	**ug/Kg**
4957-14-6	**Benzene, 1,1'-methylenebis[4-methyl**	**53400**	**4.53**	**ug/Kg**
778-22-3	**Benzene, 1,1'-(1-methylethylidene)b**	**195000**	**4.58**	**ug/Kg**
	Unknown	**55000**	**4.78**	**ug/Kg**
26137-53-1	**Naphthalene, 1,2,3-trimethyl-4-prop**	**398000**	**4.82**	**ug/Kg**
	Unknown	**78700**	**4.90**	**ug/Kg**
	Unknown	**65900**	**5**	**ug/Kg**
	Unknown	**106000**	**5.07**	**ug/Kg**
88-58-4	**1,4-Benzenediol, 2,5-bis(1,1-dimeth**	**53700**	**5.30**	**ug/Kg**
108-88-3	**Toluene**	**1030000**	**1.29**	**ug/Kg**
10544-50-0	**Sulfur, mol. (S8)**	**97600**	**5.94**	**ug/Kg**
100-41-4	**Ethylbenzene**	**36100**	**1.74**	**ug/Kg**
106-42-3	**p-Xylene**	**295000**	**1.78**	**ug/Kg**
95-47-6	**Benzene, 1,2-dimethyl-**	**78400**	**1.89**	**ug/Kg**
98-82-8	**Benzene, (1-methylethyl)-**	**83900**	**2.04**	**ug/Kg**
98-51-1	**4-tert-Butyltoluene**	**72500**	**2.79**	**ug/Kg**
	Unknown	**21400**	**3.57**	**ug/Kg**
827-52-1	**Benzene, cyclohexyl-**	**27400**	**3.70**	**ug/Kg**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141407	**IMP2-HC-C (UNTREATED)**	Solid	06/13/2012 15:25	06/14/2012 09:30

SW-846 7471B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/14/2012 19:30	483245	SW-846 7471B	5	06/16/2012 16:42	CLB	483389

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	**Mercury**	**2.74**	**0.096**	**0.044**	**mg/kg**

SW-846 6010B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/16/2012 09:30	483320	SW-846 3050B	1	06/24/2012 04:29	CLB	483998

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	**Aluminum**	**164**	**13.8**	**1.36**	**mg/kg**
7440-36-0	**Antimony**	**0.27J**	**4.14**	**0.17**	**mg/kg**
7440-38-2	**Arsenic**	**1.93J**	**2.76**	**0.24**	**mg/kg**
7440-39-3	**Barium**	**5.69**	**0.69**	**0.041**	**mg/kg**
7440-41-7	**Beryllium**	**0.012J**	**0.34**	**0.0034**	**mg/kg**
7440-43-9	Cadmium	0.016U	0.34	0.016	mg/kg
7440-70-2	**Calcium**	**122**	**51.7**	**7.54**	**mg/kg**
7440-47-3	**Chromium**	**4.16**	**0.69**	**0.031**	**mg/kg**
7440-48-4	**Cobalt**	**0.17J**	**0.69**	**0.017**	**mg/kg**
7440-50-8	**Copper**	**12.8**	**0.69**	**0.053**	**mg/kg**
7439-89-6	**Iron**	**529**	**6.90**	**1.21**	**mg/kg**
7439-92-1	**Lead**	**71.2**	**1.03**	**0.20**	**mg/kg**
7439-95-4	**Magnesium**	**31.6**	**6.90**	**0.75**	**mg/kg**
7439-96-5	**Manganese**	**4.71**	**1.03**	**0.024**	**mg/kg**
7440-02-0	**Nickel**	**3.57**	**2.76**	**0.036**	**mg/kg**
7440-09-7	**Potassium**	**65.0**	**34.5**	**3.63**	**mg/kg**
7782-49-2	**Selenium**	**10.0**	**2.76**	**0.23**	**mg/kg**
7440-22-4	**Silver**	**0.042J**	**0.69**	**0.038**	**mg/kg**
7440-23-5	**Sodium**	**4550**	**69.0**	**5.23**	**mg/kg**
7440-28-0	**Thallium**	**0.72J**	**1.38**	**0.15**	**mg/kg**
7440-62-2	**Vanadium**	**0.63J**	**1.38**	**0.026**	**mg/kg**
7440-66-6	**Zinc**	**3.67**	**1.38**	**0.73**	**mg/kg**

SW-846 9045C pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	06/16/2012 06:40	OLT	483333

CAS#	Parameter	Result	RDL	MDL	Units
pH	**pH**	**1.06**	**1.00**	**1.00**	**pH unit**

RESULTS REPORTED ON A DRY WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21206141408	**IMP2-HC (UNTREATED)**	Solid	06/13/2012 15:25	06/14/2012 09:30

SW-846 9060M

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	06/27/2012 11:46	AEL	484273

CAS#	Parameter	Result	RDL	MDL	Units
C-012	**Total Organic Carbon**	**606000**	**200**	**50.0**	**mg/kg**

RESULTS REPORTED ON A DRY WEIGHT BASIS

GC/MS Volatiles Quality Control Summary

Analytical Batch 483643		**Client ID**	MB483643			LCS483643				LCSD483643		
Prep Batch N/A		**GCAL ID**	1076688			1076689				1076690		
		Sample Type	Method Blank			LCS				LCSD		
		Analytical Date	06/19/2012 22:53			06/19/2012 21:12				06/19/2012 21:31		
		Matrix	Solid			Solid				Solid		
SW-846 8260B			**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**			**RPD**
			Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
67-64-1	Acetone		51.5U	51.5	2500	2190	88	38 - 152	2200	88	0.5	30
74-97-5	Bromochloromethane		6.75U	6.75	2500	2570	103	73 - 127	2440	98	5	30
75-27-4	Bromodichloromethane		8.10U	8.10	2500	2540	102	74 - 126	2480	99	2	30
75-25-2	Bromoform		7.95U	7.95	2500	2510	100	67 - 122	2720	109	8	30
74-83-9	Bromomethane		15.2U	15.2	2500	2930	117	48 - 139	3020	121	3	30
75-15-0	Carbon disulfide		16.3U	16.3	2500	2350	94	68 - 133	2230	89	5	30
56-23-5	Carbon tetrachloride		10.1U	10.1	2500	2490	100	71 - 133	2480	99	0.4	30
75-00-3	Chloroethane		16.6U	16.6	2500	2140	86	57 - 144	2170	87	1	30
136777-61-2	m,p-Xylene		14.7U	14.7	5000	4900	98	72 - 128	4980	100	2	30
67-66-3	Chloroform		10.8U	10.8	2500	2450	98	74 - 124	2350	94	4	30
74-87-3	Chloromethane		11.9U	11.9	2500	2020	81	61 - 130	2030	81	0.5	30
124-48-1	Dibromochloromethane		10.9U	10.9	2500	2620	105	74 - 122	2740	110	4	30
74-95-3	Dibromomethane		11.6U	11.6	2500	2430	97	72 - 125	2420	97	0.4	30
75-71-8	Dichlorodifluoromethane		11.2U	11.2	2500	2290	92	59 - 138	2210	88	4	30
75-34-3	1,1-Dichloroethane		7.45U	7.45	2500	2300	92	71 - 126	2220	89	4	30
107-06-2	1,2-Dichloroethane		9.90U	9.90	2500	2440	98	68 - 126	2370	95	3	30
156-59-2	cis-1,2-Dichloroethene		7.40U	7.40	2500	2450	98	72 - 130	2410	96	2	30
156-60-5	trans-1,2-Dichloroethene		6.55U	6.55	2500	2350	94	67 - 134	2230	89	5	30
75-09-2	Methylene chloride		22.1U	22.1	2500	2390	96	66 - 130	2340	94	2	30
78-87-5	1,2-Dichloropropane		7.70U	7.70	2500	2370	95	72 - 129	2320	93	2	30
10061-01-5	cis-1,3-Dichloropropene		9.25U	9.25	2500	2610	104	72 - 129	2600	104	0.4	30
10061-02-6	trans-1,3-Dichloropropene		8.50U	8.50	2500	2660	106	72 - 126	2660	106	0	30
100-41-4	Ethylbenzene		9.15U	9.15	2500	2690	108	74 - 130	2670	107	0.7	30
591-78-6	2-Hexanone		21.7U	21.7	2500	2060	82	47 - 137	2150	86	4	30
98-82-8	Isopropylbenzene (Cumene)		9.25U	9.25	2500	2490	100	74 - 125	2490	100	0	30
78-93-3	2-Butanone		25.9U	25.9	2500	2070	83	47 - 142	2200	88	6	30
74-88-4	Methyl iodide		61.5U	61.5	2500	1880	75	54 - 140	1970	79	5	30
108-10-1	4-Methyl-2-pentanone		6.60U	6.60	2500	2410	96	52 - 136	2470	99	2	30
103-65-1	n-Propylbenzene		37.0U	37.0	2500	2570	103	73 - 137	2700	108	5	30
100-42-5	Styrene		7.70U	7.70	2500	2410	96	72 - 128	2470	99	2	30
127-18-4	Tetrachloroethene		14.8U	14.8	2500	2720	109	70 - 127	2800	112	3	30
630-20-6	1,1,1,2-Tetrachloroethane		6.75U	6.75	2500	2660	106	77 - 122	2690	108	1	30
79-34-5	1,1,2,2-Tetrachloroethane		5.70U	5.70	2500	2290	92	66 - 129	2490	100	8	30

GCAL Report 212061414

GC/MS Volatiles Quality Control Summary

Analytical Batch 483643		**Client ID**	MB483643			LCS483643			LCSD483643			
Prep Batch N/A		**GCAL ID**	1076688			1076689			1076690			
		Sample Type	Method Blank			LCS			LCSD			
		Analytical Date	06/19/2012 22:53			06/19/2012 21:12			06/19/2012 21:31			
		Matrix	Solid			Solid			Solid			
SW-846 8260B		**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
120-82-1	1,2,4-Trichlorobenzene	17.8U	17.8	2500	2390	96	64 - 135	2450	98	2	30
71-55-6	1,1,1-Trichloroethane	11.9U	11.9	2500	2490	100	70 - 130	2420	97	3	30
79-00-5	1,1,2-Trichloroethane	6.70U	6.70	2500	2430	97	74 - 120	2520	101	4	30
75-69-4	Trichlorofluoromethane	13.1U	13.1	2500	2410	96	64 - 141	2340	94	3	30
96-18-4	1,2,3-Trichloropropane	5.75U	5.75	2500	2160	86	63 - 132	2440	98	12	30
95-63-6	1,2,4-Trimethylbenzene	18.0U	18.0	2500	2340	94	75 - 130	2460	98	5	30
108-67-8	1,3,5-Trimethylbenzene	18.8U	18.8	2500	2360	94	74 - 136	2440	98	3	30
75-01-4	Vinyl chloride	13.6U	13.6	2500	2400	96	67 - 131	2280	91	5	30
95-47-6	o-Xylene	6.75U	6.75	2500	2390	96	69 - 133	2460	98	3	30
96-12-8	1,2-Dibromo-3-chloropropane	20.1U	20.1	2500	2030	81	60 - 123	2350	94	15	30
106-93-4	1,2-Dibromoethane	7.20U	7.20	2500	2330	93	74 - 122	2480	99	6	30
108-05-4	Vinyl acetate	7.05U	7.05	2500	2340	94	53 - 140	2320	93	0.9	30
1634-04-4	tert-Butyl methyl ether (MTBE)	6.10U	6.10	2500	2300	92	69 - 126	2280	91	0.9	30
540-59-0	1,2-Dichloroethene(Total)	11.7U	11.7	5000	4790	96	72 - 129	4630	93	3	30
99-87-6	4-Isopropyltoluene	10.5U	10.5	2500	2390	96	71 - 136	2470	99	3	30
1330-20-7	Xylene (total)	20.1U	20.1	7500	7290	97	71 - 129	7450	99	2	30
110-57-6	trans-1,4-Dichloro-2-butene	25.9U	25.9	2500	2080	83	44 - 146	2320	93	11	30
594-20-7	2,2-Dichloropropane	12.5U	12.5	2500	2710	108	74 - 129	2560	102	6	30
76-13-1	Trichlorotrifluoroethane	10.0U	10.0	2500	2480	99	66 - 139	2420	97	2	30
563-58-6	1,1-Dichloropropene	12.2U	12.2	2500	2440	98	70 - 138	2320	93	5	30
142-28-9	1,3-Dichloropropane	7.90U	7.90	2500	2450	98	77 - 121	2560	102	4	30
108-86-1	Bromobenzene	7.80U	7.80	2500	2520	101	73 - 124	2740	110	8	30
95-49-8	2-Chlorotoluene	11.0U	11.0	2500	2620	105	75 - 132	2720	109	4	30
106-43-4	4-Chlorotoluene	11.8U	11.8	2500	2590	104	74 - 133	2710	108	5	30
98-06-6	tert-Butylbenzene	12.8U	12.8	2500	2400	96	72 - 136	2440	98	2	30
135-98-8	sec-Butylbenzene	9.85U	9.85	2500	2350	94	72 - 141	2390	96	2	30
541-73-1	1,3-Dichlorobenzene	13.0U	13.0	2500	2620	105	77 - 127	2760	110	5	30
106-46-7	1,4-Dichlorobenzene	11.6U	11.6	2500	2580	103	74 - 123	2760	110	7	30
104-51-8	n-Butylbenzene	11.7U	11.7	2500	2370	95	68 - 144	2410	96	2	30
95-50-1	1,2-Dichlorobenzene	13.8U	13.8	2500	2640	106	76 - 125	2780	111	5	30
87-68-3	Hexachlorobutadiene	10.7U	10.7	2500	2670	107	71 - 140	2650	106	0.8	30
91-20-3	Naphthalene	16.1U	16.1	2500	2060	82	54 - 132	2330	93	12	30
75-35-4	1,1-Dichloroethene	11.6U	11.6	2500	2400	96	68 - 129	2320	93	3	30

GC/MS Volatiles Quality Control Summary

Analytical Batch	483643	**Client ID**	MB483643			LCS483643				LCSD483643		
Prep Batch	N/A	**GCAL ID**	1076688			1076689				1076690		
		Sample Type	Method Blank			LCS				LCSD		
		Analytical Date	06/19/2012 22:53			06/19/2012 21:12				06/19/2012 21:31		
		Matrix	Solid			Solid				Solid		
SW-846 8260B		**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
71-43-2	Benzene	7.60U	7.60	2500	2420	97	73 - 128	2340	94	3	30
79-01-6	Trichloroethene	10.7U	10.7	2500	2500	100	78 - 127	2450	98	2	30
108-88-3	Toluene	7.75U	7.75	2500	2470	99	74 - 121	2540	102	3	30
108-90-7	Chlorobenzene	7.45U	7.45	2500	2550	102	75 - 121	2620	105	3	30
Surrogate											
460-00-4	4-Bromofluorobenzene	2640	106	2500	2630	105	62 - 127	2720	109		
1868-53-7	Dibromofluoromethane	2430	97	2500	2450	98	65 - 130	2390	96		
2037-26-5	Toluene d8	2630	105	2500	2530	101	71 - 132	2530	101		
17060-07-0	1,2-Dichloroethane-d4	2420	97	2500	2550	102	62 - 125	2420	97		

Analytical Batch	484016	**Client ID**	MB484016			LCS484016				LCSD484016		
Prep Batch	N/A	**GCAL ID**	1078943			1078944				1078945		
		Sample Type	Method Blank			LCS				LCSD		
		Analytical Date	06/23/2012 17:41			06/23/2012 15:57				06/23/2012 16:31		
		Matrix	Solid			Solid				Solid		
SW-846 8260B		**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
71-43-2	Benzene	7.60U	7.60	2500	2600	104	73 - 128	2670	107	3	30
Surrogate											
460-00-4	4-Bromofluorobenzene	2480	99	2500	2630	105	62 - 127	2490	100		
1868-53-7	Dibromofluoromethane	2460	98	2500	2490	100	65 - 130	2590	104		
2037-26-5	Toluene d8	2600	104	2500	2540	102	71 - 132	2710	108		
17060-07-0	1,2-Dichloroethane-d4	2500	100	2500	2550	102	62 - 125	2560	102		

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	483303	**Client ID**	MB483256			LCS483256			LCSD483256			
Prep Batch	483256	**GCAL ID**	1074738			1074739			1074844			
Prep Method	3550C	**Sample Type**	Method Blank			LCS			LCSD			
		Prep Date	06/15/2012 05:15			06/15/2012 05:15			06/15/2012 05:15			
		Analytical Date	06/15/2012 13:25			06/15/2012 14:18			06/15/2012 14:01			
		Matrix	Solid			Solid			Solid			

SW-846 8270C		**Units**	ug/Kg	**Spike**	**Result**	**%R**	**Control Limits %R**	**Result**	**%R**	**RPD**	**RPD Limit**
		Result	**RDL**	**Added**							
208-96-8	Acenaphthylene	13.1U	13.1								
120-12-7	Anthracene	11.4U	11.4								
56-55-3	Benzo(a)anthracene	25.8U	25.8								
205-99-2	Benzo(b)fluoranthene	30.4U	30.4								
207-08-9	Benzo(k)fluoranthene	13.4U	13.4								
191-24-2	Benzo(g,h,i)perylene	10.5U	10.5								
50-32-8	Benzo(a)pyrene	12.3U	12.3								
85-68-7	Butyl benzyl phthalate	5.93U	5.93								
111-91-1	Bis(2-Chloroethoxy)methane	25.8U	25.8								
111-44-4	Bis(2-Chloroethyl)ether	24.3U	24.3								
108-60-1	Bis(2-Chloroisopropyl)ether	20.6U	20.6								
117-81-7	Bis(2-Ethylhexyl)phthalate	19.6U	19.6								
101-55-3	4-Bromophenyl phenyl ether	18.5U	18.5								
86-74-8	Carbazole	20.0U	20.0								
7005-72-3	4-Chlorophenyl phenyl ether	18.7U	18.7								
218-01-9	Chrysene	14.5U	14.5								
53-70-3	Dibenz(a,h)anthracene	11.5U	11.5								
132-64-9	Dibenzofuran	10.7U	10.7								
91-94-1	3,3'-Dichlorobenzidine	306U	306								
120-83-2	2,4-Dichlorophenol	35.4U	35.4								
84-66-2	Diethyl phthalate	20.3U	20.3								
105-67-9	2,4-Dimethylphenol	233U	233								
131-11-3	Dimethyl phthalate	14.1U	14.1								
117-84-0	Di-n-octyl phthalate	4.44U	4.44								
51-28-5	2,4-Dinitrophenol	152U	152								
606-20-2	2,6-Dinitrotoluene	26.6U	26.6								
206-44-0	Fluoranthene	6.52U	6.52								
86-73-7	Fluorene	12.9U	12.9								
118-74-1	Hexachlorobenzene	19.1U	19.1								
87-68-3	Hexachlorobutadiene	20.0U	20.0								
77-47-4	Hexachlorocyclopentadiene	120U	120								
67-72-1	Hexachloroethane	15.9U	15.9								

GCAL Report 212061414

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	483303	**Client ID**	MB483256			LCS483256			LCSD483256			
Prep Batch	483256	**GCAL ID**	1074738			1074739			1074844			
Prep Method	3550C	**Sample Type**	Method Blank			LCS			LCSD			
		Prep Date	06/15/2012 05:15			06/15/2012 05:15			06/15/2012 05:15			
		Analytical Date	06/15/2012 13:25			06/15/2012 14:18			06/15/2012 14:01			
		Matrix	Solid			Solid			Solid			
SW-846 8270C		**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
78-59-1	Isophorone	11.6U	11.6								
193-39-5	Indeno(1,2,3-cd)pyrene	30.9U	30.9								
91-57-6	2-Methylnaphthalene	8.96U	8.96								
95-48-7	o-Cresol	11.7U	11.7								
98-95-3	Nitrobenzene	18.4U	18.4								
88-75-5	2-Nitrophenol	24.5U	24.5								
62-75-9	n-Nitrosodimethylamine	45.3U	45.3								
86-30-6	n-Nitrosodiphenylamine	10.5U	10.5								
85-01-8	Phenanthrene	10.6U	10.6								
95-95-4	2,4,5-Trichlorophenol	22.3U	22.3								
88-06-2	2,4,6-Trichlorophenol	78.7U	78.7								
100-51-6	Benzyl alcohol	45.1U	45.1								
62-53-3	Aniline	30.8U	30.8								
110-86-1	Pyridine	120U	120								
99-09-2	3-Nitroaniline	22.0U	22.0								
100-01-6	4-Nitroaniline	163U	163								
84-74-2	Di-n-butyl phthalate	13.1U	13.1								
122-66-7	1,2Diphenylhydrazine/Azobenzen	11.7U	11.7								
88-74-4	2-Nitroaniline	24.0U	24.0								
91-58-7	2-Chloronaphthalene	10.6U	10.6								
106-47-8	4-Chloroaniline	22.2U	22.2								
1319-77-3MP	m,p-Cresol	46.6U	46.6								
534-52-1	4,6-Dinitro-2-methylphenol	150U	150								
108-95-2	Phenol	19.8U	19.8	3330	2450	74	42 - 120	2890	87	16	40
95-57-8	2-Chlorophenol	11.6U	11.6	3330	2590	78	48 - 120	3050	92	16	40
106-46-7	1,4-Dichlorobenzene	10.4U	10.4	3330	2470	74	42 - 120	2810	84	13	40
621-64-7	n-Nitrosodi-n-propylamine	15.1U	15.1	3330	2250	68	46 - 120	2740	82	20	40
120-82-1	1,2,4-Trichlorobenzene	11.3U	11.3	3330	2530	76	46 - 120	2840	85	12	40
59-50-7	4-Chloro-3-methylphenol	31.5U	31.5	3330	2270	68	46 - 120	2700	81	17	40
83-32-9	Acenaphthene	11.8U	11.8	3330	2530	76	50 - 120	2790	84	10	40
100-02-7	4-Nitrophenol	93.1U	93.1	3330	1990	60	32 - 120	2270	68	13	40
121-14-2	2,4-Dinitrotoluene	20.0U	20.0	3330	2020	61	45 - 120	2410	72	18	40

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	483303	**Client ID**	MB483256	LCS483256	LCSD483256
Prep Batch	483256	**GCAL ID**	1074738	1074739	1074844
Prep Method	3550C	**Sample Type**	Method Blank	LCS	LCSD
		Prep Date	06/15/2012 05:15	06/15/2012 05:15	06/15/2012 05:15
		Analytical Date	06/15/2012 13:25	06/15/2012 14:18	06/15/2012 14:01
		Matrix	Solid	Solid	Solid

SW-846 8270C		**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
87-86-5	Pentachlorophenol	126U	126	3330	2350	71	30 - 124	2650	80	12	40
129-00-0	Pyrene	15.3U	15.3	3330	3090	93	38 - 136	3490	105	12	40
Surrogate											
4165-60-0	Nitrobenzene-d5	1400	84	1670	1280	77	46 - 123	1420	85		
321-60-8	2-Fluorobiphenyl	1510	91	1670	1360	82	47 - 127	1490	89		
1718-51-0	Terphenyl-d14	1570	94	1670	1310	79	38 - 167	1490	89		
4165-62-2	Phenol-d5	3090	93	3330	2560	77	43 - 123	3020	91		
367-12-4	2-Fluorophenol	3070	92	3330	2670	80	51 - 119	3110	93		
118-79-6	2,4,6-Tribromophenol	2870	86	3330	2580	77	44 - 121	2880	86		

Analytical Batch	483303	**Client ID**	SB-2 : 20	1074609MS	1074609MSD						
Prep Batch	483256	**GCAL ID**	21206142601	1074740	1074741						
Prep Method	3550C	**Sample Type**	SAMPLE	MS	MSD						
		Prep Date	06/15/2012 05:15	06/15/2012 05:15	06/15/2012 05:15						
		Analytical Date	06/15/2012 16:14	06/15/2012 16:31	06/15/2012 16:48						
		Matrix	Solid	Solid	Solid						

SW-846 8270C		**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
108-95-2	Phenol	0.00	19.5	3280	2530	77	42 - 120	2440	74	4	40
95-57-8	2-Chlorophenol	0.00	11.4	3280	2740	84	48 - 120	2570	78	6	40
106-46-7	1,4-Dichlorobenzene	0.00	10.2	3280	2500	76	42 - 120	2290	70	9	40
621-64-7	n-Nitrosodi-n-propylamine	0.00	14.9	3280	2470	75	46 - 120	2220	68	11	40
120-82-1	1,2,4-Trichlorobenzene	0.00	11.1	3280	2490	76	46 - 120	2440	74	2	40
59-50-7	4-Chloro-3-methylphenol	0.00	31.0	3280	2670	81	46 - 120	2520	77	6	40
83-32-9	Acenaphthene	0.00	11.6	3280	2560	78	50 - 120	2560	78	0	40
100-02-7	4-Nitrophenol	0.00	91.6	3280	2440	74	32 - 120	2400	73	2	40
121-14-2	2,4-Dinitrotoluene	0.00	19.7	3280	2530	77	45 - 120	2440	74	4	40
87-86-5	Pentachlorophenol	0.00	124	3280	2900	88	30 - 124	2950	90	2	40
129-00-0	Pyrene	0.00	15.0	3280	2970	91	38 - 136	3120	95	5	40
Surrogate											
4165-60-0	Nitrobenzene-d5			1640	1390	85	46 - 123	1320	81		

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	483303	**Client ID**	SB-2 : 20	1074609MS	1074609MSD
Prep Batch	483256	**GCAL ID**	21206142601	1074740	1074741
Prep Method	3550C	**Sample Type**	SAMPLE	MS	MSD
		Prep Date	06/15/2012 05:15	06/15/2012 05:15	06/15/2012 05:15
		Analytical Date	06/15/2012 16:14	06/15/2012 16:31	06/15/2012 16:48
		Matrix	Solid	Solid	Solid

SW-846 8270C		**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
321-60-8	2-Fluorobiphenyl			1640	1340	82	47 - 127	1380	84		
1718-51-0	Terphenyl-d14			1640	1280	78	38 - 167	1370	84		

Inorganics Quality Control Summary

Analytical Batch	483389	**Client ID**	MB483245		LCS483245		
Prep Batch	483245	**GCAL ID**	1074651		1074652		
Prep Method	SW-846 7471B	**Sample Type**	Method Blank		LCS		
		Prep Date	06/14/2012 19:30		06/14/2012 19:30		
		Analytical Date	06/16/2012 13:27		06/16/2012 13:28		
		Matrix	Solid		Solid		
SW-846 7471B		**Units**	mg/kg	**Spike**	**Result**		**Control**
		Result	**RDL**	**Added**		**% R**	**Limits % R**
7439-97-6	Mercury	0.0046U	0.0046	0.25	0.28	111	80 - 120

Analytical Batch	483389	**Client ID**	ART 1		1074541MS		
Prep Batch	483245	**GCAL ID**	21206141106		1074654		
Prep Method	SW-846 7471B	**Sample Type**	SAMPLE		MS		
		Prep Date	06/14/2012 19:30		06/14/2012 19:30		
		Analytical Date	06/16/2012 13:30		06/16/2012 13:33		
		Matrix	Solid		Solid		
SW-846 7471B		**Units**	mg/kg	**Spike**	**Result**		**Control**
		Result	**RDL**	**Added**		**% R**	**Limits % R**
7439-97-6	Mercury	0.011	0.0046	0.25	0.27	105	75 - 125

Analytical Batch	483389	**Client ID**	ART 1		1074541DUP		
Prep Batch	483245	**GCAL ID**	21206141106		1074653		
Prep Method	SW-846 7471B	**Sample Type**	SAMPLE		DUP		
		Prep Date	06/14/2012 19:30		06/14/2012 19:30		
		Analytical Date	06/16/2012 13:30		06/16/2012 13:31		
		Matrix	Solid		Solid		
SW-846 7471B		**Units**	mg/kg	**Result**		**RPD**	**RPD**
		Result	**RDL**		**RPD**		**Limit**
7439-97-6	Mercury	0.011	0.0046	0.013	17	20	

Inorganics Quality Control Summary

Analytical Batch	483998	**Client ID**	MB483320	LCS483320
Prep Batch	483320	**GCAL ID**	1075006	1075007
Prep Method	SW-846	**Sample Type**	Method Blank	LCS
	3050B	**Prep Date**	06/16/2012 09:30	06/16/2012 09:30
		Analytical Date	06/24/2012 02:31	06/24/2012 02:39
		Matrix	Solid	Solid

SW-846 6010B		**Units**	mg/kg	**Spike**	**Result**		**Control**
		Result	**RDL**	**Added**		**% R**	**Limits % R**
7429-90-5	Aluminum	0.79U	0.79	200	194	97	80 - 120
7440-36-0	Antimony	0.097U	0.097	20.0	19.6	98	80 - 120
7440-38-2	Arsenic	0.14U	0.14	20.0	20.0	100	80 - 120
7440-39-3	Barium	0.036J	0.024	20.0	20.2	101	80 - 120
7440-41-7	Beryllium	0.0038J	0.0020	20.0	19.7	99	80 - 120
7440-43-9	Cadmium	0.0090U	0.0090	20.0	20.0	100	80 - 120
7440-70-2	Calcium	15.4J	4.37	200	207	103	80 - 120
7440-47-3	Chromium	0.018U	0.018	20.0	20.4	102	80 - 120
7440-48-4	Cobalt	0.010U	0.010	20.0	20.5	103	80 - 120
7440-50-8	Copper	0.031U	0.031	20.0	19.9	100	80 - 120
7439-89-6	Iron	2.74J	0.70	200	199	100	80 - 120
7439-92-1	Lead	0.11U	0.11	20.0	20.5	102	80 - 120
7439-95-4	Magnesium	0.93J	0.43	200	198	99	80 - 120
7439-96-5	Manganese	0.090J	0.014	20.0	20.2	101	80 - 120
7440-02-0	Nickel	0.037J	0.021	20.0	21.1	105	80 - 120
7440-09-7	Potassium	2.13J	2.11	400	414	104	80 - 120
7782-49-2	Selenium	0.13U	0.13	20.0	20.0	100	80 - 120
7440-22-4	Silver	0.022U	0.022	20.0	20.1	100	80 - 120
7440-23-5	Sodium	8.47J	3.03	800	819	102	80 - 120
7440-28-0	Thallium	0.088U	0.088	20.0	20.1	101	80 - 120
7440-62-2	Vanadium	0.015U	0.015	20.0	20.0	100	80 - 120
7440-66-6	Zinc	0.49J	0.43	20.0	19.9	99	80 - 120

Inorganics Quality Control Summary

Analytical Batch	483998	**Client ID**	IMP2-VR-B (UNTREATED)	1074532MS
Prep Batch	483320	**GCAL ID**	21206141402	1075009
Prep Method	SW-846 3050B	**Sample Type**	SAMPLE	MS
		Prep Date	06/16/2012 09:30	06/16/2012 09:30
		Analytical Date	06/24/2012 02:46	06/24/2012 03:02
		Matrix	Solid	Solid

SW-846 6010B		**Units**	mg/kg	**Spike**	**Result**		**Control**
		Result	**RDL**	**Added**		**% R**	**Limits % R**
7429-90-5	Aluminum	194	0.79	200	380	93	75 - 125
7440-36-0	Antimony	0.63	0.097	20.0	15.6	75	75 - 125
7440-38-2	Arsenic	0.0	0.14	20.0	18.2	91	75 - 125
7440-39-3	Barium	4.51	0.024	20.0	23.6	95	75 - 125
7440-41-7	Beryllium	0.0093	0.0020	20.0	18.2	91	75 - 125
7440-43-9	Cadmium	0.011	0.0090	20.0	19.4	97	75 - 125
7440-70-2	Calcium	126	4.37	200	295	85	75 - 125
7440-47-3	Chromium	2.85	0.018	20.0	21.7	94	75 - 125
7440-48-4	Cobalt	0.19	0.010	20.0	19.8	98	75 - 125
7440-50-8	Copper	14.3	0.031	20.0	33.8	97	75 - 125
7439-89-6	Iron	596	0.70	200	729	**67***	75 - 125
7439-92-1	Lead	38.9	0.11	20.0	61.6	113	75 - 125
7439-95-4	Magnesium	35.3	0.43	200	215	90	75 - 125
7439-96-5	Manganese	8.19	0.014	20.0	25.5	87	75 - 125
7440-02-0	Nickel	3.07	0.021	20.0	22.6	98	75 - 125
7440-09-7	Potassium	39.0	2.11	400	427	97	75 - 125
7782-49-2	Selenium	8.02	0.13	20.0	28.2	101	75 - 125
7440-22-4	Silver	0.0	0.022	20.0	2.34	**12***	75 - 125
7440-23-5	Sodium	2560	3.03	800	3190	79	75 - 125
7440-28-0	Thallium	1.16	0.088	20.0	20.8	98	75 - 125
7440-62-2	Vanadium	0.65	0.015	20.0	19.6	95	75 - 125
7440-66-6	Zinc	4.77	0.43	20.0	23.0	91	75 - 125

Inorganics Quality Control Summary

Analytical Batch	483998	**Client ID**	IMP2-VR-B (UNTREATED)	1074532DUP
Prep Batch	483320	**GCAL ID**	21206141402	1075008
Prep Method	SW-846	**Sample Type**	SAMPLE	DUP
	3050B	**Prep Date**	06/16/2012 09:30	06/16/2012 09:30
		Analytical Date	06/24/2012 02:46	06/24/2012 02:54
		Matrix	Solid	Solid

SW-846 6010B		**Units**	mg/kg	**Result**		**RPD**
		Result	**RDL**		**RPD**	**Limit**
7429-90-5	Aluminum	194	0.79	169	14	20
7440-36-0	Antimony	0.63	0.097	0.45	**33***	20
7440-38-2	Arsenic	0.0	0.14	0.26	**200***	20
7440-39-3	Barium	4.51	0.024	5.04	11	20
7440-41-7	Beryllium	0.0093	0.0020	0.0091	2	20
7440-43-9	Cadmium	0.011	0.0090	0.0	**200***	20
7440-70-2	Calcium	126	4.37	91.3	**32***	20
7440-47-3	Chromium	2.85	0.018	1.77	**47***	20
7440-48-4	Cobalt	0.19	0.010	0.17	11	20
7440-50-8	Copper	14.3	0.031	13.9	3	20
7439-89-6	Iron	596	0.70	488	20	20
7439-92-1	Lead	38.9	0.11	45.0	15	20
7439-95-4	Magnesium	35.3	0.43	28.8	20	20
7439-96-5	Manganese	8.19	0.014	5.49	**39***	20
7440-02-0	Nickel	3.07	0.021	2.55	19	20
7440-09-7	Potassium	39.0	2.11	41.4	6	20
7782-49-2	Selenium	8.02	0.13	8.46	5	20
7440-22-4	Silver	0.0	0.022	0.0	0	20
7440-23-5	Sodium	2560	3.03	2420	6	20
7440-28-0	Thallium	1.16	0.088	1.13	3	20
7440-62-2	Vanadium	0.65	0.015	0.68	5	20
7440-66-6	Zinc	4.77	0.43	3.49	**31***	20

General Chemistry Quality Control Summary

Analytical Batch	483311	**Client ID**	API-B-6-9-10		1074396DUP		
Prep Batch	N/A	**GCAL ID**	21206140138		1074923		
		Sample Type	SAMPLE		DUP		
		Analytical Date	06/16/2012 11:00		06/16/2012 11:00		
		Matrix	Solid		Solid		
SW-846 9045C pH		**Units**	pH unit		**Result**	**RPD**	**RPD Limit**
		Result	**RDL**				
pH	pH	7.39	1.00		7.43	0.5	1

Analytical Batch	483333	**Client ID**	IMP2-VR-C (UNTREATED)		1074533DUP		
Prep Batch	N/A	**GCAL ID**	21206141403		1075061		
		Sample Type	SAMPLE		DUP		
		Analytical Date	06/16/2012 06:40		06/16/2012 06:40		
		Matrix	Solid		Solid		
SW-846 9045C pH		**Units**	pH unit		**Result**	**RPD**	**RPD Limit**
		Result	**RDL**				
pH	pH	2.03	1.00		2.03	0	1

General Chemistry Quality Control Summary

Analytical Batch	484273	**Client ID**	MB484273			LCS484273			LCSD484273			
Prep Batch	N/A	**GCAL ID**	1080082			1080083			1080084			
		Sample Type	Method Blank			LCS			LCSD			
		Analytical Date	06/27/2012 09:43			06/27/2012 09:52			06/27/2012 10:04			
		Matrix	Solid			Solid			Solid			
SW-846 9060M		**Units**	mg/kg	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
C-012	Total Organic Carbon	50.0U	50.0	10000	9660	97	69 - 128	9610	96	0.5	25

Analytical Batch	484273	**Client ID**	EIS-CCS-01	1074432DUP			
Prep Batch	N/A	**GCAL ID**	21206140151	1080087			
		Sample Type	SAMPLE	DUP			
		Analytical Date	06/27/2012 10:41	06/27/2012 14:39			
		Matrix	Solid	Solid			
SW-846 9060M		**Units**	mg/kg	**Result**		**RPD**	
		Result	**RDL**		**RPD**	**Limit**	
C-012	Total Organic Carbon	2810	50.0	3010	7	25	

GCAL
GULF COAST ANALYTICAL LABORATORIES, INC

7979 GSRI AVE, BATON ROUGE LA 70820-7402
(225) 769-4900 FAX (225) 767-5717

Chain of Custody Record

Lab use only	Client Name	Client #	Group#	Due Date
~~2T~~ OLM 6/14	KEMRON	4794	212061414	6-25-12

Report to:
Client: KEMRON Environmental
Address: 1359A Ellsworth Ind. Blvd
Atlanta, GA 30318
Contact: Tommy Jordan
Phone: 404-601-6927
Fax: tjordan@kemron.com

Bill to:
Client: same
Address:
Contact:
Phone:
Fax:

P.O. Number: SH0416
Project Name/Number: Bridgewater
Sampled By: Mason M Reedy

4.0°C

Matrix	Date	Time (2400)	Comp	Grab	Sample Description	Preservatives	No. Containers	Total VOC + TICs + thiophenes + NAPTH *	Total SVOC + TICs	Total TAL Metals	Total Organic Carbon	Soil pH	Remarks:	Lab ID
s	6/13/2012	15:20		x	IMP2 - VR - A (Untreated)		1	x	x	x		x	Samples will be hot	06/14 01
s	6/13/2012	15:20		x	IMP2 - VR - B (Untreated)		1	x	x	x		x		02
s	6/13/2012	15:20		x	IMP2 - VR - C (Untreated)		1	x	x	x		x		03
s	6/13/2012	15:20		x	IMP2 - VR (Untreated)		1				x			04
s	6/13/2012	15:25		x	IMP2 - HC - A (Untreated)		1	x	x	x		x		05
s	6/13/2012	15:25		x	IMP2 - HC - B (Untreated)		1	x	x	x		x		06
s	6/13/2012	15:25		x	IMP2 - HC - C (Untreated)		1	x	x	x		x		07
s	6/13/2012	15:25		x	IMP2 - HC (Untreated)		1				x			08

Analytical Requests & Methods

Turn Around Time: ___ 24 - 48 hrs ___ 3 days ___ 1 week x standard other ___

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
		~~6/13/12~~ 6/13/12	~~15:00~~ 1334
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
		6/14/12	0930
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

Note:
Report to tjordan@kemron.com
* Perform 1-point Calibration for Thiophene
Report as dry weights

By submitting these samples, you agree to the terms and conditions contained in our most recent schedule of services.

Matrix: W = water, S=Soil, SD=Solid, L=Liquid, SL=Sludge, O=Oil, CT=Charcoal Tube, OVM=Organic Vapor Monitor, XT=XAD Tube, A=Air Bag, SUM=Summa Canister

GCAL
GULF COAST ANALYTICAL LABORATORIES, INC

SAMPLE RECEIVING CHECKLIST

SDG
212061414

PROJECT

Client
4794 - KEMRON

Transport Method
FEDEX

Profile
232522 - Bridgewater Acid Tar

Received By
McCune, Odie

Line Item(s)
1 - Sludge

Receive Date(s)
06/14/12

CHECKLIST

Were all samples received using proper thermal preservation?	☑ Yes	☐ No	☐ NA
When used, were all custody seals intact?	☑ Yes	☐ No	☐ NA
Were all samples received in proper containers?	☑ Yes	☐ No	☐ NA
Were all samples received using proper chemical preservation?	☑ Yes	☐ No	☐ NA
Was preservative added to any container at the lab?	☐ Yes	☑ No	☐ NA
Were all containers received in good condition?	☑ Yes	☐ No	☐ NA
Were all VOA vials received with no head space?	☐ Yes	☐ No	☑ NA
Do all sample labels match the Chain of Custody?	☑ Yes	☐ No	☐ NA
Did the Chain of Custody list the sampling technician?	☑ Yes	☐ No	☐ NA

COOLERS

Airbill	Temp(oC)
7985 0720 2071	4.0

DISCREPANCIES

None

LABORATORY PRESERVATIONS

None

NOTES

APPENDIX D

TRIAL ANALYTICAL REPORTS

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7/6/2012

Mr. Tommy Jordan
Kemron Environmental Services
1359-A Ellsworth Industrial Boulevard

Atlanta GA 30318

Project Name: Bridgewater NJ
Project #: SE 0416-007
Workorder #: 1206600B

Dear Mr. Tommy Jordan

The following report includes the data for the above referenced project for sample(s) received on 6/28/2012 at Air Toxics Ltd.

The data and associated QC analyzed by TO-14 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Ausha Scott

Project Manager

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WORK ORDER #: 1206600B

Work Order Summary

CLIENT:	Mr. Tommy Jordan Kemron Environmental Services 1359-A Ellsworth Industrial Boulevard Atlanta, GA 30318	**BILL TO:**	Accounts Payable Kemron Environmental Services 1359-A Ellsworth Industrial Boulevard Atlanta, GA 30318
PHONE:	404-516-3172	**P.O. #**	SE 0416-007
FAX:	404-636-7162	**PROJECT #**	SE 0416-007 Bridgewater NJ
DATE RECEIVED:	06/28/2012	**CONTACT:**	Ausha Scott
DATE COMPLETED:	07/05/2012		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
02A	To Trial	TO-14		
03A	Lab Blank	TO-14	NA	NA
04A	CCV	TO-14	NA	NA
05A	LCS	TO-14	NA	NA
05AA	LCSD	TO-14	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 07/06/12

Technical Director

Certfication numbers: AZ Licensure AZ0719, CA NELAP - 02110CA, LA NELAP - 02089,
NY NELAP - 11291, TX NELAP - T104704434-11-3, UT NELAP -CA009332011-1, WA NELAP - C935
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,
Accreditation number: E87680, Effective date: 07/01/11 , Expiration date: 06/30/12.
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins | Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
ATL GC/MS Application
Kemron Environmental Services
Workorder# 1206600B

One Vial sample containing sludge was received on June 28, 2012. An aliquot of the headspace was injected into a TO-15 GC/MS unit to measure the VOC vapor concentration.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

Results generated by this method are considered semi-quantitative, screening level data only.

Dilution was performed on sample To Trial due to the presence of high level target species.

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page. Target compound non-detects in the samples that are associated with high bias in QC analyses have not been flagged.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit.

UJ- Non-detected compound associated with low bias in the CCV and/or LCS.

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
ATL GC APPLICATION #44 BY GC/MS

Client Sample ID: To Trial

Lab ID#: 1206600B-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Chloromethane	20000	54000
Carbon Disulfide	5000	85000
Hexane	5000	14000
Cyclohexane	5000	9000
Benzene	5000	2500000
Toluene	5000	34000

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Client Sample ID: To Trial

Lab ID#: 1206600B-02A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14070525**	**Date of Collection:**	**6/27/12 3:35:00 PM**
Dil. Factor:	**1000**	**Date of Analysis:**	**7/5/12 09:40 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Freon 12	5000	Not Detected
Freon 114	5000	Not Detected
Chloromethane	20000	54000
Vinyl Chloride	5000	Not Detected
1,3-Butadiene	5000	Not Detected
Bromomethane	5000	Not Detected
Chloroethane	5000	Not Detected
Freon 11	5000	Not Detected
Ethanol	20000	Not Detected
Freon 113	5000	Not Detected
1,1-Dichloroethene	5000	Not Detected
Acetone	20000	Not Detected
2-Propanol	20000	Not Detected
Carbon Disulfide	5000	85000
3-Chloropropene	20000	Not Detected
Methylene Chloride	5000	Not Detected
Methyl tert-butyl ether	5000	Not Detected
trans-1,2-Dichloroethene	5000	Not Detected
Hexane	5000	14000
1,1-Dichloroethane	5000	Not Detected
2-Butanone (Methyl Ethyl Ketone)	5000	Not Detected
cis-1,2-Dichloroethene	5000	Not Detected
Tetrahydrofuran	5000	Not Detected
Chloroform	5000	Not Detected
1,1,1-Trichloroethane	5000	Not Detected
Cyclohexane	5000	9000
Carbon Tetrachloride	5000	Not Detected
2,2,4-Trimethylpentane	5000	Not Detected
Benzene	5000	2500000
1,2-Dichloroethane	5000	Not Detected
Heptane	5000	Not Detected
Trichloroethene	5000	Not Detected
1,2-Dichloropropane	5000	Not Detected
1,4-Dioxane	20000	Not Detected
Bromodichloromethane	5000	Not Detected
cis-1,3-Dichloropropene	5000	Not Detected
4-Methyl-2-pentanone	5000	Not Detected
Toluene	5000	34000
trans-1,3-Dichloropropene	5000	Not Detected
1,1,2-Trichloroethane	5000	Not Detected
Tetrachloroethene	5000	Not Detected
2-Hexanone	20000	Not Detected

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Client Sample ID: To Trial

Lab ID#: 1206600B-02A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14070525**	**Date of Collection: 6/27/12 3:35:00 PM**	
Dil. Factor:	**1000**	**Date of Analysis: 7/5/12 09:40 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Dibromochloromethane	5000	Not Detected
1,2-Dibromoethane (EDB)	5000	Not Detected
Chlorobenzene	5000	Not Detected
Ethyl Benzene	5000	Not Detected
m,p-Xylene	5000	Not Detected
o-Xylene	5000	Not Detected
Styrene	5000	Not Detected
Bromoform	5000	Not Detected
Cumene	5000	Not Detected
1,1,2,2-Tetrachloroethane	5000	Not Detected
Propylbenzene	5000	Not Detected
4-Ethyltoluene	5000	Not Detected
1,3,5-Trimethylbenzene	5000	Not Detected
1,2,4-Trimethylbenzene	5000	Not Detected
1,3-Dichlorobenzene	5000	Not Detected
1,4-Dichlorobenzene	5000	Not Detected
alpha-Chlorotoluene	5000	Not Detected
1,2-Dichlorobenzene	5000	Not Detected
1,2,4-Trichlorobenzene	20000	Not Detected
Hexachlorobutadiene	20000	Not Detected
Naphthalene	20000	Not Detected

Container Type: Vial

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	110	70-130
4-Bromofluorobenzene	93	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1206600B-03A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14070505**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 7/5/12 09:17 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Freon 12	5.0	Not Detected
Freon 114	5.0	Not Detected
Chloromethane	20	Not Detected
Vinyl Chloride	5.0	Not Detected
1,3-Butadiene	5.0	Not Detected
Bromomethane	5.0	Not Detected
Chloroethane	5.0	Not Detected
Freon 11	5.0	Not Detected
Ethanol	20	Not Detected
Freon 113	5.0	Not Detected
1,1-Dichloroethene	5.0	Not Detected
Acetone	20	Not Detected
2-Propanol	20	Not Detected
Carbon Disulfide	5.0	Not Detected
3-Chloropropene	20	Not Detected
Methylene Chloride	5.0	Not Detected
Methyl tert-butyl ether	5.0	Not Detected
trans-1,2-Dichloroethene	5.0	Not Detected
Hexane	5.0	Not Detected
1,1-Dichloroethane	5.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	5.0	Not Detected
cis-1,2-Dichloroethene	5.0	Not Detected
Tetrahydrofuran	5.0	Not Detected
Chloroform	5.0	Not Detected
1,1,1-Trichloroethane	5.0	Not Detected
Cyclohexane	5.0	Not Detected
Carbon Tetrachloride	5.0	Not Detected
2,2,4-Trimethylpentane	5.0	Not Detected
Benzene	5.0	Not Detected
1,2-Dichloroethane	5.0	Not Detected
Heptane	5.0	Not Detected
Trichloroethene	5.0	Not Detected
1,2-Dichloropropane	5.0	Not Detected
1,4-Dioxane	20	Not Detected
Bromodichloromethane	5.0	Not Detected
cis-1,3-Dichloropropene	5.0	Not Detected
4-Methyl-2-pentanone	5.0	Not Detected
Toluene	5.0	Not Detected
trans-1,3-Dichloropropene	5.0	Not Detected
1,1,2-Trichloroethane	5.0	Not Detected
Tetrachloroethene	5.0	Not Detected
2-Hexanone	20	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1206600B-03A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14070505**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 7/5/12 09:17 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Dibromochloromethane	5.0	Not Detected
1,2-Dibromoethane (EDB)	5.0	Not Detected
Chlorobenzene	5.0	Not Detected
Ethyl Benzene	5.0	Not Detected
m,p-Xylene	5.0	Not Detected
o-Xylene	5.0	Not Detected
Styrene	5.0	Not Detected
Bromoform	5.0	Not Detected
Cumene	5.0	Not Detected
1,1,2,2-Tetrachloroethane	5.0	Not Detected
Propylbenzene	5.0	Not Detected
4-Ethyltoluene	5.0	Not Detected
1,3,5-Trimethylbenzene	5.0	Not Detected
1,2,4-Trimethylbenzene	5.0	Not Detected
1,3-Dichlorobenzene	5.0	Not Detected
1,4-Dichlorobenzene	5.0	Not Detected
alpha-Chlorotoluene	5.0	Not Detected
1,2-Dichlorobenzene	5.0	Not Detected
1,2,4-Trichlorobenzene	20	Not Detected
Hexachlorobutadiene	20	Not Detected
Naphthalene	20	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	103	70-130
1,2-Dichloroethane-d4	114	70-130
4-Bromofluorobenzene	94	70-130

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Client Sample ID: CCV

Lab ID#: 1206600B-04A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14070502**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 7/5/12 07:50 AM**	

Compound	%Recovery
Freon 12	94
Freon 114	97
Chloromethane	111
Vinyl Chloride	102
1,3-Butadiene	107
Bromomethane	105
Chloroethane	103
Freon 11	100
Ethanol	131 Q
Freon 113	94
1,1-Dichloroethene	106
Acetone	105
2-Propanol	118
Carbon Disulfide	85
3-Chloropropene	90
Methylene Chloride	104
Methyl tert-butyl ether	93
trans-1,2-Dichloroethene	94
Hexane	104
1,1-Dichloroethane	97
2-Butanone (Methyl Ethyl Ketone)	96
cis-1,2-Dichloroethene	100
Tetrahydrofuran	121
Chloroform	96
1,1,1-Trichloroethane	95
Cyclohexane	94
Carbon Tetrachloride	96
2,2,4-Trimethylpentane	106
Benzene	98
1,2-Dichloroethane	100
Heptane	98
Trichloroethene	96
1,2-Dichloropropane	99
1,4-Dioxane	92
Bromodichloromethane	98
cis-1,3-Dichloropropene	95
4-Methyl-2-pentanone	100
Toluene	96
trans-1,3-Dichloropropene	90
1,1,2-Trichloroethane	91
Tetrachloroethene	89
2-Hexanone	98

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Client Sample ID: CCV

Lab ID#: 1206600B-04A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14070502**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 7/5/12 07:50 AM**	

Compound	%Recovery
Dibromochloromethane	91
1,2-Dibromoethane (EDB)	90
Chlorobenzene	87
Ethyl Benzene	89
m,p-Xylene	89
o-Xylene	88
Styrene	92
Bromoform	98
Cumene	93
1,1,2,2-Tetrachloroethane	96
Propylbenzene	99
4-Ethyltoluene	90
1,3,5-Trimethylbenzene	107
1,2,4-Trimethylbenzene	92
1,3-Dichlorobenzene	95
1,4-Dichlorobenzene	87
alpha-Chlorotoluene	109
1,2-Dichlorobenzene	88
1,2,4-Trichlorobenzene	99
Hexachlorobutadiene	106
Naphthalene	98

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	104	70-130
1,2-Dichloroethane-d4	107	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: LCS

Lab ID#: 1206600B-05A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14070503**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 7/5/12 08:20 AM**	

Compound	%Recovery
Freon 12	113
Freon 114	111
Chloromethane	133 Q
Vinyl Chloride	121
1,3-Butadiene	126
Bromomethane	119
Chloroethane	121
Freon 11	116
Ethanol	142 Q
Freon 113	109
1,1-Dichloroethene	124
Acetone	118
2-Propanol	136 Q
Carbon Disulfide	123
3-Chloropropene	118
Methylene Chloride	119
Methyl tert-butyl ether	104
trans-1,2-Dichloroethene	119
Hexane	119
1,1-Dichloroethane	111
2-Butanone (Methyl Ethyl Ketone)	111
cis-1,2-Dichloroethene	115
Tetrahydrofuran	126
Chloroform	112
1,1,1-Trichloroethane	110
Cyclohexane	108
Carbon Tetrachloride	111
2,2,4-Trimethylpentane	120
Benzene	110
1,2-Dichloroethane	110
Heptane	106
Trichloroethene	108
1,2-Dichloropropane	113
1,4-Dioxane	101
Bromodichloromethane	110
cis-1,3-Dichloropropene	107
4-Methyl-2-pentanone	108
Toluene	107
trans-1,3-Dichloropropene	102
1,1,2-Trichloroethane	103
Tetrachloroethene	101
2-Hexanone	106

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Client Sample ID: LCS

Lab ID#: 1206600B-05A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14070503**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 7/5/12 08:20 AM**	

Compound	%Recovery
Dibromochloromethane	102
1,2-Dibromoethane (EDB)	101
Chlorobenzene	99
Ethyl Benzene	100
m,p-Xylene	102
o-Xylene	102
Styrene	105
Bromoform	108
Cumene	106
1,1,2,2-Tetrachloroethane	108
Propylbenzene	111
4-Ethyltoluene	94
1,3,5-Trimethylbenzene	116
1,2,4-Trimethylbenzene	99
1,3-Dichlorobenzene	104
1,4-Dichlorobenzene	93
alpha-Chlorotoluene	114
1,2-Dichlorobenzene	96
1,2,4-Trichlorobenzene	92
Hexachlorobutadiene	101
Naphthalene	89

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	105	70-130
1,2-Dichloroethane-d4	108	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: LCSD

Lab ID#: 1206600B-05AA

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14070504**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 7/5/12 08:42 AM**	

Compound	%Recovery
Freon 12	112
Freon 114	111
Chloromethane	134 Q
Vinyl Chloride	118
1,3-Butadiene	122
Bromomethane	120
Chloroethane	119
Freon 11	115
Ethanol	129
Freon 113	108
1,1-Dichloroethene	123
Acetone	116
2-Propanol	135 Q
Carbon Disulfide	122
3-Chloropropene	114
Methylene Chloride	117
Methyl tert-butyl ether	103
trans-1,2-Dichloroethene	117
Hexane	120
1,1-Dichloroethane	112
2-Butanone (Methyl Ethyl Ketone)	110
cis-1,2-Dichloroethene	115
Tetrahydrofuran	124
Chloroform	109
1,1,1-Trichloroethane	109
Cyclohexane	108
Carbon Tetrachloride	111
2,2,4-Trimethylpentane	120
Benzene	109
1,2-Dichloroethane	109
Heptane	106
Trichloroethene	107
1,2-Dichloropropane	111
1,4-Dioxane	101
Bromodichloromethane	110
cis-1,3-Dichloropropene	107
4-Methyl-2-pentanone	105
Toluene	106
trans-1,3-Dichloropropene	101
1,1,2-Trichloroethane	99
Tetrachloroethene	98
2-Hexanone	105

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Client Sample ID: LCSD

Lab ID#: 1206600B-05AA

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14070504**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 7/5/12 08:42 AM**	

Compound	%Recovery
Dibromochloromethane	99
1,2-Dibromoethane (EDB)	99
Chlorobenzene	97
Ethyl Benzene	97
m,p-Xylene	99
o-Xylene	100
Styrene	103
Bromoform	105
Cumene	104
1,1,2,2-Tetrachloroethane	107
Propylbenzene	110
4-Ethyltoluene	94
1,3,5-Trimethylbenzene	114
1,2,4-Trimethylbenzene	96
1,3-Dichlorobenzene	103
1,4-Dichlorobenzene	93
alpha-Chlorotoluene	113
1,2-Dichlorobenzene	94
1,2,4-Trichlorobenzene	92
Hexachlorobutadiene	103
Naphthalene	88

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	105	70-130
1,2-Dichloroethane-d4	109	70-130
4-Bromofluorobenzene	96	70-130

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7/2/2012

Mr. Tommy Jordan
Kemron Environmental Services
1359-A Ellsworth Industrial Boulevard

Atlanta GA 30318

Project Name: Bridgewater, NJ
Project #: SE0416-007
Workorder #: 1206500

Dear Mr. Tommy Jordan

The following report includes the data for the above referenced project for sample(s) received on 6/25/2012 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 (5&20 ppbv) are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Ausha Scott

Project Manager

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WORK ORDER #: 1206500

Work Order Summary

CLIENT:	Mr. Tommy Jordan Kemron Environmental Services 1359-A Ellsworth Industrial Boulevard Atlanta, GA 30318	**BILL TO:**	Accounts Payable Kemron Environmental Services 1359-A Ellsworth Industrial Boulevard Atlanta, GA 30318
PHONE:	404-516-3172	**P.O. #**	
FAX:	404-636-7162	**PROJECT #**	SE0416-007 Bridgewater, NJ
DATE RECEIVED:	06/25/2012	**CONTACT:**	Ausha Scott
DATE COMPLETED:	07/02/2012		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	Trial-Day 1	Modified TO-15 (5&20 ppbv	2.6 "Hg	5 psi
02A	Lab Blank	Modified TO-15 (5&20 ppbv	NA	NA
03A	CCV	Modified TO-15 (5&20 ppbv	NA	NA
04A	LCS	Modified TO-15 (5&20 ppbv	NA	NA
04AA	LCSD	Modified TO-15 (5&20 ppbv	NA	NA

CERTIFIED BY: Heidi Mayo DATE: 07/02/12

Technical Director

Certfication numbers: AZ Licensure AZ0719, CA NELAP - 02110CA, LA NELAP - 02089,
NY NELAP - 11291, TX NELAP - T104704434-11-3, UT NELAP -CA009332011-1, WA NELAP - C935
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,
Accreditation number: E87680, Effective date: 07/01/11 , Expiration date: 06/30/12.
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

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180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
EPA Method TO-15 Soil Gas
Kemron Environmental Services
Workorder# 1206500

One 6 Liter Summa Canister sample was received on June 25, 2012. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode. The method involves concentrating up to 50 mLs of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

Dilution was performed on sample Trial-Day 1 due to the presence of high level target species.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the reporting limit.
UJ- Non-detected compound associated with low bias in the CCV and/or LCS.
N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS

Client Sample ID: Trial-Day 1

Lab ID#: 1206500-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	29000	62000	70000	150000
Carbon Disulfide	7400	64000	23000	200000
Hexane	7400	27000	26000	96000
Cyclohexane	7400	9000	25000	31000
Benzene	7400	5000000	23000	16000000
Toluene	7400	54000	28000	200000

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Client Sample ID: Trial-Day 1

Lab ID#: 1206500-01A

EPA METHOD TO-15 GC/MS

File Name:	**14062614**	**Date of Collection: 6/22/12 9:12:00 AM**	
Dil. Factor:	**1470**	**Date of Analysis: 6/26/12 07:16 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	7400	Not Detected	36000	Not Detected
Freon 114	7400	Not Detected	51000	Not Detected
Chloromethane	29000	Not Detected	61000	Not Detected
Vinyl Chloride	7400	Not Detected	19000	Not Detected
1,3-Butadiene	7400	Not Detected	16000	Not Detected
Bromomethane	7400	Not Detected	28000	Not Detected
Chloroethane	29000	Not Detected	78000	Not Detected
Freon 11	7400	Not Detected	41000	Not Detected
Ethanol	29000	Not Detected	55000	Not Detected
Freon 113	7400	Not Detected	56000	Not Detected
1,1-Dichloroethene	7400	Not Detected	29000	Not Detected
Acetone	29000	62000	70000	150000
2-Propanol	29000	Not Detected	72000	Not Detected
Carbon Disulfide	7400	64000	23000	200000
3-Chloropropene	29000	Not Detected	92000	Not Detected
Methylene Chloride	7400	Not Detected	26000	Not Detected
Methyl tert-butyl ether	7400	Not Detected	26000	Not Detected
trans-1,2-Dichloroethene	7400	Not Detected	29000	Not Detected
Hexane	7400	27000	26000	96000
1,1-Dichloroethane	7400	Not Detected	30000	Not Detected
2-Butanone (Methyl Ethyl Ketone)	29000	Not Detected	87000	Not Detected
cis-1,2-Dichloroethene	7400	Not Detected	29000	Not Detected
Tetrahydrofuran	7400	Not Detected	22000	Not Detected
Chloroform	7400	Not Detected	36000	Not Detected
1,1,1-Trichloroethane	7400	Not Detected	40000	Not Detected
Cyclohexane	7400	9000	25000	31000
Carbon Tetrachloride	7400	Not Detected	46000	Not Detected
2,2,4-Trimethylpentane	7400	Not Detected	34000	Not Detected
Benzene	7400	5000000	23000	16000000
1,2-Dichloroethane	7400	Not Detected	30000	Not Detected
Heptane	7400	Not Detected	30000	Not Detected
Trichloroethene	7400	Not Detected	40000	Not Detected
1,2-Dichloropropane	7400	Not Detected	34000	Not Detected
1,4-Dioxane	29000	Not Detected	100000	Not Detected
Bromodichloromethane	7400	Not Detected	49000	Not Detected
cis-1,3-Dichloropropene	7400	Not Detected	33000	Not Detected
4-Methyl-2-pentanone	7400	Not Detected	30000	Not Detected
Toluene	7400	54000	28000	200000
trans-1,3-Dichloropropene	7400	Not Detected	33000	Not Detected
1,1,2-Trichloroethane	7400	Not Detected	40000	Not Detected
Tetrachloroethene	7400	Not Detected	50000	Not Detected
2-Hexanone	29000	Not Detected	120000	Not Detected

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Client Sample ID: Trial-Day 1

Lab ID#: 1206500-01A

EPA METHOD TO-15 GC/MS

File Name:	**14062614**	**Date of Collection:**	**6/22/12 9:12:00 AM**
Dil. Factor:	**1470**	**Date of Analysis:**	**6/26/12 07:16 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	7400	Not Detected	63000	Not Detected
1,2-Dibromoethane (EDB)	7400	Not Detected	56000	Not Detected
Chlorobenzene	7400	Not Detected	34000	Not Detected
Ethyl Benzene	7400	Not Detected	32000	Not Detected
m,p-Xylene	7400	Not Detected	32000	Not Detected
o-Xylene	7400	Not Detected	32000	Not Detected
Styrene	7400	Not Detected	31000	Not Detected
Bromoform	7400	Not Detected	76000	Not Detected
Cumene	7400	Not Detected	36000	Not Detected
1,1,2,2-Tetrachloroethane	7400	Not Detected	50000	Not Detected
Propylbenzene	7400	Not Detected	36000	Not Detected
4-Ethyltoluene	7400	Not Detected	36000	Not Detected
1,3,5-Trimethylbenzene	7400	Not Detected	36000	Not Detected
1,2,4-Trimethylbenzene	7400	Not Detected	36000	Not Detected
1,3-Dichlorobenzene	7400	Not Detected	44000	Not Detected
1,4-Dichlorobenzene	7400	Not Detected	44000	Not Detected
alpha-Chlorotoluene	7400	Not Detected	38000	Not Detected
1,2-Dichlorobenzene	7400	Not Detected	44000	Not Detected
1,2,4-Trichlorobenzene	29000	Not Detected	220000	Not Detected
Hexachlorobutadiene	29000	Not Detected	310000	Not Detected
Naphthalene	29000	Not Detected	150000	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	121	70-130
Toluene-d8	103	70-130
4-Bromofluorobenzene	92	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1206500-02A

EPA METHOD TO-15 GC/MS

File Name:	**14062606**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/26/12 01:09 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5.0	Not Detected	25	Not Detected
Freon 114	5.0	Not Detected	35	Not Detected
Chloromethane	20	Not Detected	41	Not Detected
Vinyl Chloride	5.0	Not Detected	13	Not Detected
1,3-Butadiene	5.0	Not Detected	11	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	20	Not Detected	53	Not Detected
Freon 11	5.0	Not Detected	28	Not Detected
Ethanol	20	Not Detected	38	Not Detected
Freon 113	5.0	Not Detected	38	Not Detected
1,1-Dichloroethene	5.0	Not Detected	20	Not Detected
Acetone	20	Not Detected	48	Not Detected
2-Propanol	20	Not Detected	49	Not Detected
Carbon Disulfide	5.0	Not Detected	16	Not Detected
3-Chloropropene	20	Not Detected	63	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	5.0	Not Detected	18	Not Detected
trans-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Hexane	5.0	Not Detected	18	Not Detected
1,1-Dichloroethane	5.0	Not Detected	20	Not Detected
2-Butanone (Methyl Ethyl Ketone)	20	Not Detected	59	Not Detected
cis-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Tetrahydrofuran	5.0	Not Detected	15	Not Detected
Chloroform	5.0	Not Detected	24	Not Detected
1,1,1-Trichloroethane	5.0	Not Detected	27	Not Detected
Cyclohexane	5.0	Not Detected	17	Not Detected
Carbon Tetrachloride	5.0	Not Detected	31	Not Detected
2,2,4-Trimethylpentane	5.0	Not Detected	23	Not Detected
Benzene	5.0	Not Detected	16	Not Detected
1,2-Dichloroethane	5.0	Not Detected	20	Not Detected
Heptane	5.0	Not Detected	20	Not Detected
Trichloroethene	5.0	Not Detected	27	Not Detected
1,2-Dichloropropane	5.0	Not Detected	23	Not Detected
1,4-Dioxane	20	Not Detected	72	Not Detected
Bromodichloromethane	5.0	Not Detected	34	Not Detected
cis-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
4-Methyl-2-pentanone	5.0	Not Detected	20	Not Detected
Toluene	5.0	Not Detected	19	Not Detected
trans-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
1,1,2-Trichloroethane	5.0	Not Detected	27	Not Detected
Tetrachloroethene	5.0	Not Detected	34	Not Detected
2-Hexanone	20	Not Detected	82	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1206500-02A

EPA METHOD TO-15 GC/MS

File Name:	**14062606**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/26/12 01:09 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	5.0	Not Detected	42	Not Detected
1,2-Dibromoethane (EDB)	5.0	Not Detected	38	Not Detected
Chlorobenzene	5.0	Not Detected	23	Not Detected
Ethyl Benzene	5.0	Not Detected	22	Not Detected
m,p-Xylene	5.0	Not Detected	22	Not Detected
o-Xylene	5.0	Not Detected	22	Not Detected
Styrene	5.0	Not Detected	21	Not Detected
Bromoform	5.0	Not Detected	52	Not Detected
Cumene	5.0	Not Detected	24	Not Detected
1,1,2,2-Tetrachloroethane	5.0	Not Detected	34	Not Detected
Propylbenzene	5.0	Not Detected	24	Not Detected
4-Ethyltoluene	5.0	Not Detected	24	Not Detected
1,3,5-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,2,4-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,3-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,4-Dichlorobenzene	5.0	Not Detected	30	Not Detected
alpha-Chlorotoluene	5.0	Not Detected	26	Not Detected
1,2-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,2,4-Trichlorobenzene	20	Not Detected	150	Not Detected
Hexachlorobutadiene	20	Not Detected	210	Not Detected
Naphthalene	20	Not Detected	100	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	120	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	93	70-130

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Client Sample ID: CCV

Lab ID#: 1206500-03A

EPA METHOD TO-15 GC/MS

File Name:	**14062602**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/26/12 10:47 AM**	

Compound	%Recovery
Freon 12	101
Freon 114	97
Chloromethane	115
Vinyl Chloride	103
1,3-Butadiene	111
Bromomethane	105
Chloroethane	102
Freon 11	108
Ethanol	118
Freon 113	99
1,1-Dichloroethene	109
Acetone	102
2-Propanol	107
Carbon Disulfide	82
3-Chloropropene	89
Methylene Chloride	105
Methyl tert-butyl ether	91
trans-1,2-Dichloroethene	95
Hexane	99
1,1-Dichloroethane	98
2-Butanone (Methyl Ethyl Ketone)	96
cis-1,2-Dichloroethene	100
Tetrahydrofuran	113
Chloroform	99
1,1,1-Trichloroethane	97
Cyclohexane	94
Carbon Tetrachloride	98
2,2,4-Trimethylpentane	101
Benzene	98
1,2-Dichloroethane	106
Heptane	97
Trichloroethene	96
1,2-Dichloropropane	100
1,4-Dioxane	91
Bromodichloromethane	99
cis-1,3-Dichloropropene	93
4-Methyl-2-pentanone	95
Toluene	96
trans-1,3-Dichloropropene	86
1,1,2-Trichloroethane	90
Tetrachloroethene	88
2-Hexanone	90

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Client Sample ID: CCV
Lab ID#: 1206500-03A
EPA METHOD TO-15 GC/MS

File Name:	**14062602**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/26/12 10:47 AM**	

Compound	%Recovery
Dibromochloromethane	90
1,2-Dibromoethane (EDB)	90
Chlorobenzene	89
Ethyl Benzene	89
m,p-Xylene	88
o-Xylene	90
Styrene	92
Bromoform	93
Cumene	94
1,1,2,2-Tetrachloroethane	96
Propylbenzene	97
4-Ethyltoluene	98
1,3,5-Trimethylbenzene	91
1,2,4-Trimethylbenzene	89
1,3-Dichlorobenzene	95
1,4-Dichlorobenzene	87
alpha-Chlorotoluene	94
1,2-Dichlorobenzene	88
1,2,4-Trichlorobenzene	105
Hexachlorobutadiene	115
Naphthalene	106

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	116	70-130
Toluene-d8	106	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: LCS
Lab ID#: 1206500-04A
EPA METHOD TO-15 GC/MS

File Name:	**14062603**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/26/12 12:01 PM**	

Compound	%Recovery
Freon 12	105
Freon 114	99
Chloromethane	118
Vinyl Chloride	109
1,3-Butadiene	113
Bromomethane	106
Chloroethane	105
Freon 11	109
Ethanol	116
Freon 113	93
1,1-Dichloroethene	111
Acetone	104
2-Propanol	108
Carbon Disulfide	107
3-Chloropropene	100
Methylene Chloride	104
Methyl tert-butyl ether	91
trans-1,2-Dichloroethene	104
Hexane	99
1,1-Dichloroethane	100
2-Butanone (Methyl Ethyl Ketone)	97
cis-1,2-Dichloroethene	103
Tetrahydrofuran	108
Chloroform	103
1,1,1-Trichloroethane	99
Cyclohexane	94
Carbon Tetrachloride	102
2,2,4-Trimethylpentane	101
Benzene	103
1,2-Dichloroethane	109
Heptane	97
Trichloroethene	102
1,2-Dichloropropane	102
1,4-Dioxane	95
Bromodichloromethane	105
cis-1,3-Dichloropropene	96
4-Methyl-2-pentanone	96
Toluene	98
trans-1,3-Dichloropropene	90
1,1,2-Trichloroethane	93
Tetrachloroethene	89
2-Hexanone	89

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Client Sample ID: LCS
Lab ID#: 1206500-04A
EPA METHOD TO-15 GC/MS

File Name:	**14062603**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/26/12 12:01 PM**	

Compound	%Recovery
Dibromochloromethane	94
1,2-Dibromoethane (EDB)	94
Chlorobenzene	92
Ethyl Benzene	91
m,p-Xylene	91
o-Xylene	91
Styrene	93
Bromoform	96
Cumene	97
1,1,2,2-Tetrachloroethane	102
Propylbenzene	102
4-Ethyltoluene	94
1,3,5-Trimethylbenzene	92
1,2,4-Trimethylbenzene	87
1,3-Dichlorobenzene	97
1,4-Dichlorobenzene	87
alpha-Chlorotoluene	93
1,2-Dichlorobenzene	91
1,2,4-Trichlorobenzene	98
Hexachlorobutadiene	103
Naphthalene	77

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	114	70-130
Toluene-d8	107	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: LCSD

Lab ID#: 1206500-04AA

EPA METHOD TO-15 GC/MS

File Name:	**14062604**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/26/12 12:20 PM**	

Compound	%Recovery
Freon 12	106
Freon 114	101
Chloromethane	124
Vinyl Chloride	108
1,3-Butadiene	113
Bromomethane	109
Chloroethane	104
Freon 11	110
Ethanol	121
Freon 113	100
1,1-Dichloroethene	116
Acetone	107
2-Propanol	114
Carbon Disulfide	110
3-Chloropropene	102
Methylene Chloride	109
Methyl tert-butyl ether	93
trans-1,2-Dichloroethene	109
Hexane	105
1,1-Dichloroethane	104
2-Butanone (Methyl Ethyl Ketone)	98
cis-1,2-Dichloroethene	108
Tetrahydrofuran	114
Chloroform	106
1,1,1-Trichloroethane	103
Cyclohexane	99
Carbon Tetrachloride	105
2,2,4-Trimethylpentane	105
Benzene	106
1,2-Dichloroethane	113
Heptane	100
Trichloroethene	106
1,2-Dichloropropane	107
1,4-Dioxane	98
Bromodichloromethane	109
cis-1,3-Dichloropropene	99
4-Methyl-2-pentanone	98
Toluene	102
trans-1,3-Dichloropropene	93
1,1,2-Trichloroethane	96
Tetrachloroethene	93
2-Hexanone	95

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Client Sample ID: LCSD
Lab ID#: 1206500-04AA
EPA METHOD TO-15 GC/MS

File Name:	**14062604**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/26/12 12:20 PM**	

Compound	%Recovery
Dibromochloromethane	97
1,2-Dibromoethane (EDB)	97
Chlorobenzene	95
Ethyl Benzene	93
m,p-Xylene	95
o-Xylene	96
Styrene	97
Bromoform	100
Cumene	100
1,1,2,2-Tetrachloroethane	106
Propylbenzene	105
4-Ethyltoluene	90
1,3,5-Trimethylbenzene	111
1,2,4-Trimethylbenzene	94
1,3-Dichlorobenzene	100
1,4-Dichlorobenzene	91
alpha-Chlorotoluene	101
1,2-Dichlorobenzene	96
1,2,4-Trichlorobenzene	114
Hexachlorobutadiene	116
Naphthalene	88

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	113	70-130
Toluene-d8	107	70-130
4-Bromofluorobenzene	96	70-130

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7/3/2012

Mr. Tommy Jordan
Kemron Environmental Services
1359-A Ellsworth Industrial Boulevard

Atlanta GA 30318

Project Name: Bridgewater NJ
Project #: SE 0416-007
Workorder #: 1206600A

Dear Mr. Tommy Jordan

The following report includes the data for the above referenced project for sample(s) received on 6/28/2012 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 (5&20 ppbv) are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Ausha Scott

Project Manager

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WORK ORDER #: 1206600A

Work Order Summary

CLIENT:	Mr. Tommy Jordan Kemron Environmental Services 1359-A Ellsworth Industrial Boulevard Atlanta, GA 30318	**BILL TO:**	Accounts Payable Kemron Environmental Services 1359-A Ellsworth Industrial Boulevard Atlanta, GA 30318
PHONE:	404-516-3172	**P.O. #**	SE 0416-007
FAX:	404-636-7162	**PROJECT #**	SE 0416-007 Bridgewater NJ
DATE RECEIVED:	06/28/2012	**CONTACT:**	Ausha Scott
DATE COMPLETED:	07/03/2012		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	Trial Day 5	Modified TO-15 (5&20 ppbv	7.0 "Hg	5 psi
02A	Lab Blank	Modified TO-15 (5&20 ppbv	NA	NA
03A	CCV	Modified TO-15 (5&20 ppbv	NA	NA
04A	LCS	Modified TO-15 (5&20 ppbv	NA	NA
04AA	LCSD	Modified TO-15 (5&20 ppbv	NA	NA

CERTIFIED BY: Heidi Mayo DATE: 07/03/12

Technical Director

Certfication numbers: AZ Licensure AZ0719, CA NELAP - 02110CA, LA NELAP - 02089,
NY NELAP - 11291, TX NELAP - T104704434-11-3, UT NELAP -CA009332011-1, WA NELAP - C935
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,
Accreditation number: E87680, Effective date: 07/01/11 , Expiration date: 06/30/12.
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

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180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
EPA Method TO-15 Soil Gas
Kemron Environmental Services
Workorder# 1206600A

One 6 Liter Summa Canister sample was received on June 28, 2012. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode. The method involves concentrating up to 50 mLs of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit.

UJ- Non-detected compound associated with low bias in the CCV and/or LCS.

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS

Client Sample ID: Trial Day 5

Lab ID#: 1206600A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	3500	7400	7200	15000
Acetone	3500	58000	8300	140000
Carbon Disulfide	880	1900	2700	6000
Benzene	880	370000	2800	1200000
Toluene	880	21000	3300	80000

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Client Sample ID: Trial Day 5

Lab ID#: 1206600A-01A

EPA METHOD TO-15 GC/MS

File Name:	**14063018**	**Date of Collection:**	**6/27/12 7:15:00 AM**
Dil. Factor:	**175**	**Date of Analysis:**	**6/30/12 07:41 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	880	Not Detected	4300	Not Detected
Freon 114	880	Not Detected	6100	Not Detected
Chloromethane	3500	7400	7200	15000
Vinyl Chloride	880	Not Detected	2200	Not Detected
1,3-Butadiene	880	Not Detected	1900	Not Detected
Bromomethane	880	Not Detected	3400	Not Detected
Chloroethane	3500	Not Detected	9200	Not Detected
Freon 11	880	Not Detected	4900	Not Detected
Ethanol	3500	Not Detected	6600	Not Detected
Freon 113	880	Not Detected	6700	Not Detected
1,1-Dichloroethene	880	Not Detected	3500	Not Detected
Acetone	3500	58000	8300	140000
2-Propanol	3500	Not Detected	8600	Not Detected
Carbon Disulfide	880	1900	2700	6000
3-Chloropropene	3500	Not Detected	11000	Not Detected
Methylene Chloride	880	Not Detected	3000	Not Detected
Methyl tert-butyl ether	880	Not Detected	3200	Not Detected
trans-1,2-Dichloroethene	880	Not Detected	3500	Not Detected
Hexane	880	Not Detected	3100	Not Detected
1,1-Dichloroethane	880	Not Detected	3500	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3500	Not Detected	10000	Not Detected
cis-1,2-Dichloroethene	880	Not Detected	3500	Not Detected
Tetrahydrofuran	880	Not Detected	2600	Not Detected
Chloroform	880	Not Detected	4300	Not Detected
1,1,1-Trichloroethane	880	Not Detected	4800	Not Detected
Cyclohexane	880	Not Detected	3000	Not Detected
Carbon Tetrachloride	880	Not Detected	5500	Not Detected
2,2,4-Trimethylpentane	880	Not Detected	4100	Not Detected
Benzene	880	370000	2800	1200000
1,2-Dichloroethane	880	Not Detected	3500	Not Detected
Heptane	880	Not Detected	3600	Not Detected
Trichloroethene	880	Not Detected	4700	Not Detected
1,2-Dichloropropane	880	Not Detected	4000	Not Detected
1,4-Dioxane	3500	Not Detected	13000	Not Detected
Bromodichloromethane	880	Not Detected	5900	Not Detected
cis-1,3-Dichloropropene	880	Not Detected	4000	Not Detected
4-Methyl-2-pentanone	880	Not Detected	3600	Not Detected
Toluene	880	21000	3300	80000
trans-1,3-Dichloropropene	880	Not Detected	4000	Not Detected
1,1,2-Trichloroethane	880	Not Detected	4800	Not Detected
Tetrachloroethene	880	Not Detected	5900	Not Detected
2-Hexanone	3500	Not Detected	14000	Not Detected

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Client Sample ID: Trial Day 5

Lab ID#: 1206600A-01A

EPA METHOD TO-15 GC/MS

File Name:	**14063018**	**Date of Collection:**	**6/27/12 7:15:00 AM**
Dil. Factor:	**175**	**Date of Analysis:**	**6/30/12 07:41 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	880	Not Detected	7400	Not Detected
1,2-Dibromoethane (EDB)	880	Not Detected	6700	Not Detected
Chlorobenzene	880	Not Detected	4000	Not Detected
Ethyl Benzene	880	Not Detected	3800	Not Detected
m,p-Xylene	880	Not Detected	3800	Not Detected
o-Xylene	880	Not Detected	3800	Not Detected
Styrene	880	Not Detected	3700	Not Detected
Bromoform	880	Not Detected	9000	Not Detected
Cumene	880	Not Detected	4300	Not Detected
1,1,2,2-Tetrachloroethane	880	Not Detected	6000	Not Detected
Propylbenzene	880	Not Detected	4300	Not Detected
4-Ethyltoluene	880	Not Detected	4300	Not Detected
1,3,5-Trimethylbenzene	880	Not Detected	4300	Not Detected
1,2,4-Trimethylbenzene	880	Not Detected	4300	Not Detected
1,3-Dichlorobenzene	880	Not Detected	5300	Not Detected
1,4-Dichlorobenzene	880	Not Detected	5300	Not Detected
alpha-Chlorotoluene	880	Not Detected	4500	Not Detected
1,2-Dichlorobenzene	880	Not Detected	5300	Not Detected
1,2,4-Trichlorobenzene	3500	Not Detected	26000	Not Detected
Hexachlorobutadiene	3500	Not Detected	37000	Not Detected
Naphthalene	3500	Not Detected	18000	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	125	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	94	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1206600A-02A

EPA METHOD TO-15 GC/MS

File Name:	**14063008**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/30/12 03:22 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5.0	Not Detected	25	Not Detected
Freon 114	5.0	Not Detected	35	Not Detected
Chloromethane	20	Not Detected	41	Not Detected
Vinyl Chloride	5.0	Not Detected	13	Not Detected
1,3-Butadiene	5.0	Not Detected	11	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	20	Not Detected	53	Not Detected
Freon 11	5.0	Not Detected	28	Not Detected
Ethanol	20	Not Detected	38	Not Detected
Freon 113	5.0	Not Detected	38	Not Detected
1,1-Dichloroethene	5.0	Not Detected	20	Not Detected
Acetone	20	Not Detected	48	Not Detected
2-Propanol	20	Not Detected	49	Not Detected
Carbon Disulfide	5.0	Not Detected	16	Not Detected
3-Chloropropene	20	Not Detected	63	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	5.0	Not Detected	18	Not Detected
trans-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Hexane	5.0	Not Detected	18	Not Detected
1,1-Dichloroethane	5.0	Not Detected	20	Not Detected
2-Butanone (Methyl Ethyl Ketone)	20	Not Detected	59	Not Detected
cis-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Tetrahydrofuran	5.0	Not Detected	15	Not Detected
Chloroform	5.0	Not Detected	24	Not Detected
1,1,1-Trichloroethane	5.0	Not Detected	27	Not Detected
Cyclohexane	5.0	Not Detected	17	Not Detected
Carbon Tetrachloride	5.0	Not Detected	31	Not Detected
2,2,4-Trimethylpentane	5.0	Not Detected	23	Not Detected
Benzene	5.0	Not Detected	16	Not Detected
1,2-Dichloroethane	5.0	Not Detected	20	Not Detected
Heptane	5.0	Not Detected	20	Not Detected
Trichloroethene	5.0	Not Detected	27	Not Detected
1,2-Dichloropropane	5.0	Not Detected	23	Not Detected
1,4-Dioxane	20	Not Detected	72	Not Detected
Bromodichloromethane	5.0	Not Detected	34	Not Detected
cis-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
4-Methyl-2-pentanone	5.0	Not Detected	20	Not Detected
Toluene	5.0	Not Detected	19	Not Detected
trans-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
1,1,2-Trichloroethane	5.0	Not Detected	27	Not Detected
Tetrachloroethene	5.0	Not Detected	34	Not Detected
2-Hexanone	20	Not Detected	82	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1206600A-02A

EPA METHOD TO-15 GC/MS

File Name:	**14063008**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/30/12 03:22 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	5.0	Not Detected	42	Not Detected
1,2-Dibromoethane (EDB)	5.0	Not Detected	38	Not Detected
Chlorobenzene	5.0	Not Detected	23	Not Detected
Ethyl Benzene	5.0	Not Detected	22	Not Detected
m,p-Xylene	5.0	Not Detected	22	Not Detected
o-Xylene	5.0	Not Detected	22	Not Detected
Styrene	5.0	Not Detected	21	Not Detected
Bromoform	5.0	Not Detected	52	Not Detected
Cumene	5.0	Not Detected	24	Not Detected
1,1,2,2-Tetrachloroethane	5.0	Not Detected	34	Not Detected
Propylbenzene	5.0	Not Detected	24	Not Detected
4-Ethyltoluene	5.0	Not Detected	24	Not Detected
1,3,5-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,2,4-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,3-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,4-Dichlorobenzene	5.0	Not Detected	30	Not Detected
alpha-Chlorotoluene	5.0	Not Detected	26	Not Detected
1,2-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,2,4-Trichlorobenzene	20	Not Detected	150	Not Detected
Hexachlorobutadiene	20	Not Detected	210	Not Detected
Naphthalene	20	Not Detected	100	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	123	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	90	70-130

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Client Sample ID: CCV

Lab ID#: 1206600A-03A

EPA METHOD TO-15 GC/MS

File Name:	**14063002**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/30/12 11:05 AM**	

Compound	%Recovery
Freon 12	101
Freon 114	94
Chloromethane	113
Vinyl Chloride	106
1,3-Butadiene	110
Bromomethane	99
Chloroethane	98
Freon 11	108
Ethanol	114
Freon 113	92
1,1-Dichloroethene	103
Acetone	99
2-Propanol	99
Carbon Disulfide	86
3-Chloropropene	83
Methylene Chloride	105
Methyl tert-butyl ether	81
trans-1,2-Dichloroethene	90
Hexane	95
1,1-Dichloroethane	97
2-Butanone (Methyl Ethyl Ketone)	91
cis-1,2-Dichloroethene	100
Tetrahydrofuran	112
Chloroform	99
1,1,1-Trichloroethane	95
Cyclohexane	89
Carbon Tetrachloride	101
2,2,4-Trimethylpentane	98
Benzene	100
1,2-Dichloroethane	113
Heptane	96
Trichloroethene	99
1,2-Dichloropropane	102
1,4-Dioxane	89
Bromodichloromethane	106
cis-1,3-Dichloropropene	88
4-Methyl-2-pentanone	86
Toluene	94
trans-1,3-Dichloropropene	85
1,1,2-Trichloroethane	93
Tetrachloroethene	88
2-Hexanone	85

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Client Sample ID: CCV
Lab ID#: 1206600A-03A
EPA METHOD TO-15 GC/MS

File Name:	**14063002**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/30/12 11:05 AM**	

Compound	%Recovery
Dibromochloromethane	96
1,2-Dibromoethane (EDB)	90
Chlorobenzene	89
Ethyl Benzene	89
m,p-Xylene	88
o-Xylene	89
Styrene	93
Bromoform	100
Cumene	96
1,1,2,2-Tetrachloroethane	104
Propylbenzene	102
4-Ethyltoluene	90
1,3,5-Trimethylbenzene	112
1,2,4-Trimethylbenzene	93
1,3-Dichlorobenzene	100
1,4-Dichlorobenzene	91
alpha-Chlorotoluene	92
1,2-Dichlorobenzene	93
1,2,4-Trichlorobenzene	106
Hexachlorobutadiene	115
Naphthalene	99

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	118	70-130
Toluene-d8	106	70-130
4-Bromofluorobenzene	99	70-130

eurofins | Air Toxics

Client Sample ID: LCS
Lab ID#: 1206600A-04A
EPA METHOD TO-15 GC/MS

File Name:	**14063003**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/30/12 12:51 PM**	

Compound	%Recovery
Freon 12	117
Freon 114	106
Chloromethane	128
Vinyl Chloride	120
1,3-Butadiene	125
Bromomethane	114
Chloroethane	111
Freon 11	121
Ethanol	118
Freon 113	103
1,1-Dichloroethene	121
Acetone	107
2-Propanol	110
Carbon Disulfide	120
3-Chloropropene	106
Methylene Chloride	116
Methyl tert-butyl ether	89
trans-1,2-Dichloroethene	111
Hexane	107
1,1-Dichloroethane	108
2-Butanone (Methyl Ethyl Ketone)	99
cis-1,2-Dichloroethene	111
Tetrahydrofuran	116
Chloroform	113
1,1,1-Trichloroethane	109
Cyclohexane	100
Carbon Tetrachloride	114
2,2,4-Trimethylpentane	109
Benzene	110
1,2-Dichloroethane	121
Heptane	104
Trichloroethene	109
1,2-Dichloropropane	112
1,4-Dioxane	94
Bromodichloromethane	117
cis-1,3-Dichloropropene	99
4-Methyl-2-pentanone	92
Toluene	104
trans-1,3-Dichloropropene	93
1,1,2-Trichloroethane	101
Tetrachloroethene	96
2-Hexanone	87

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Client Sample ID: LCS
Lab ID#: 1206600A-04A
EPA METHOD TO-15 GC/MS

File Name:	**14063003**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/30/12 12:51 PM**	

Compound	%Recovery
Dibromochloromethane	102
1,2-Dibromoethane (EDB)	98
Chlorobenzene	100
Ethyl Benzene	100
m,p-Xylene	100
o-Xylene	99
Styrene	104
Bromoform	109
Cumene	106
1,1,2,2-Tetrachloroethane	113
Propylbenzene	113
4-Ethyltoluene	94
1,3,5-Trimethylbenzene	118
1,2,4-Trimethylbenzene	94
1,3-Dichlorobenzene	103
1,4-Dichlorobenzene	92
alpha-Chlorotoluene	90
1,2-Dichlorobenzene	94
1,2,4-Trichlorobenzene	72
Hexachlorobutadiene	84
Naphthalene	54 Q

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	119	70-130
Toluene-d8	105	70-130
4-Bromofluorobenzene	100	70-130

eurofins | Air Toxics

Client Sample ID: LCSD
Lab ID#: 1206600A-04AA
EPA METHOD TO-15 GC/MS

File Name:	**14063004**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/30/12 01:38 PM**	

Compound	%Recovery
Freon 12	115
Freon 114	108
Chloromethane	129
Vinyl Chloride	122
1,3-Butadiene	126
Bromomethane	118
Chloroethane	113
Freon 11	122
Ethanol	121
Freon 113	104
1,1-Dichloroethene	125
Acetone	108
2-Propanol	112
Carbon Disulfide	121
3-Chloropropene	107
Methylene Chloride	116
Methyl tert-butyl ether	91
trans-1,2-Dichloroethene	114
Hexane	109
1,1-Dichloroethane	110
2-Butanone (Methyl Ethyl Ketone)	100
cis-1,2-Dichloroethene	113
Tetrahydrofuran	116
Chloroform	112
1,1,1-Trichloroethane	109
Cyclohexane	104
Carbon Tetrachloride	115
2,2,4-Trimethylpentane	111
Benzene	112
1,2-Dichloroethane	122
Heptane	106
Trichloroethene	111
1,2-Dichloropropane	113
1,4-Dioxane	94
Bromodichloromethane	119
cis-1,3-Dichloropropene	100
4-Methyl-2-pentanone	94
Toluene	104
trans-1,3-Dichloropropene	92
1,1,2-Trichloroethane	98
Tetrachloroethene	94
2-Hexanone	88

eurofins | Air Toxics

Client Sample ID: LCSD
Lab ID#: 1206600A-04AA
EPA METHOD TO-15 GC/MS

File Name:	**14063004**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/30/12 01:38 PM**	

Compound	%Recovery
Dibromochloromethane	103
1,2-Dibromoethane (EDB)	99
Chlorobenzene	99
Ethyl Benzene	97
m,p-Xylene	98
o-Xylene	98
Styrene	103
Bromoform	108
Cumene	105
1,1,2,2-Tetrachloroethane	108
Propylbenzene	108
4-Ethyltoluene	90
1,3,5-Trimethylbenzene	114
1,2,4-Trimethylbenzene	93
1,3-Dichlorobenzene	99
1,4-Dichlorobenzene	89
alpha-Chlorotoluene	89
1,2-Dichlorobenzene	92
1,2,4-Trichlorobenzene	71
Hexachlorobutadiene	79
Naphthalene	54 Q

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	118	70-130
Toluene-d8	105	70-130
4-Bromofluorobenzene	94	70-130

Mr. Tommy Jordan
Kemron Environmental Services, Inc.
1359-A Ellsworth Industrial Blvd.
Atlanta, GA 30318

July 05, 2012

DOH ELAP# 11626 Account# 19982 Login# L268521
AIHA # 100324

Dear Mr. Jordan:

Enclosed are the analytical results for the samples received by our laboratory on June 28, 2012. All test results meet the quality control requirements of AIHA and NELAC unless otherwise stated in this report. All samples on the chain of custody were received in good condition unless otherwise noted.

Results in this report are based on the sampling data provided by the client and refer only to the samples as they were received at the laboratory. Unless otherwise requested, all samples will be discarded 14 days from the date of this report.

Current Scopes of Accreditation can be viewed at www.galsonlabs.com in the accreditations section under the "about Galson" tab.

Please contact Tonya Lancaster at (888) 432-5227, if you would like any additional information regarding this report.

Thank you for using Galson Laboratories.

Sincerely,

Galson Laboratories

Mary G. Unangst
Laboratory Director

Enclosure(s)

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East Syracuse, NY 13057
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FAX: (315) 437-0571
www.galsonlabs.com

LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 22-JUN-12 - 26-JUN-12 Account No.: 19982
Date Received : 28-JUN-12 Login No. : L268521
Date Analyzed : 29-JUN-12
Report ID : 742839

Client ID : AMBIANT **Lab ID : L268521-1** **Air Volume : 1.2 Liter**
Date Sampled : 06/26/12 **Date Analyzed : 06/29/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Acetaldehyde	0.1	1.4	<0.1	1.5	1.2	0.67
Benzaldehyde	0.1	0.3	<0.1	0.3	0.2	0.05
Butyraldehyde	0.1	0.4	<0.1	0.4	0.4	0.1
Crotonaldehyde	0.1	<0.1	<0.1	<0.1	<0.09	<0.03
Formaldehyde	0.1	<0.1	<0.1	<0.1	<0.08	<0.07
Isovaleraldehyde	0.1	<0.1	<0.1	<0.1	<0.08	<0.02
Propionaldehyde	0.1	0.3	<0.1	0.3	0.3	0.1
Valeraldehyde	0.1	0.2	<0.1	0.2	0.2	0.05

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-119

Submitted by: BCF
Approved by : tlh
Date : 05-JUL-12 NYS DOH # : 11626
QC by: Joe Mancuso

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million LOQ-Limit of Quantitation

Field sampling was not performed by Galson. Galson presents results based on sampling data provided by clients.

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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 22-JUN-12 - 26-JUN-12 Account No.: 19982
Date Received : 28-JUN-12 Login No. : L268521
Date Analyzed : 29-JUN-12
Report ID : 742839

Client ID : TRIAL DAY 1 **Lab ID : L268521-2** **Air Volume : 1.2 Liter**
Date Sampled : 06/22/12 **Date Analyzed : 06/29/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Acetaldehyde	0.1	<0.1	<0.1	<0.1	<0.08	<0.05
Benzaldehyde	0.1	<0.1	<0.1	<0.1	<0.08	<0.02
Butyraldehyde	0.1	<0.1	<0.1	<0.1	<0.09	<0.03
Crotonaldehyde	0.1	<0.1	<0.1	<0.1	<0.09	<0.03
Formaldehyde	0.1	<0.1	<0.1	<0.1	<0.08	<0.07
Isovaleraldehyde	0.1	<0.1	<0.1	<0.1	<0.08	<0.02
Propionaldehyde	0.1	<0.1	<0.1	<0.1	<0.08	<0.04
Valeraldehyde	0.1	<0.1	<0.1	<0.1	<0.09	<0.02

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-119

Submitted by: BCF
Approved by : tlh
Date : 05-JUL-12 NYS DOH # : 11626
QC by: Joe Mancuso

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million LOQ-Limit of Quantitation

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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 22-JUN-12 - 26-JUN-12 Account No.: 19982
Date Received : 28-JUN-12 Login No. : L268521
Date Analyzed : 29-JUN-12
Report ID : 742839

Client ID : TRIAL DAY 2 **Lab ID : L268521-3** **Air Volume : 1.2 Liter**
Date Sampled : 06/23/12 **Date Analyzed : 06/29/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Acetaldehyde	0.1	<0.1	0.7	0.7	0.6	0.3
Benzaldehyde	0.1	<0.1	<0.1	<0.1	<0.08	<0.02
Butyraldehyde	0.1	<0.1	<0.1	<0.1	<0.09	<0.03
Crotonaldehyde	0.1	<0.1	<0.1	<0.1	<0.09	<0.03
Formaldehyde	0.1	<0.1	<0.1	<0.1	<0.08	<0.07
Isovaleraldehyde	0.1	<0.1	<0.1	<0.1	<0.08	<0.02
Propionaldehyde	0.1	<0.1	<0.1	<0.1	<0.08	<0.04
Valeraldehyde	0.1	<0.1	<0.1	<0.1	<0.09	<0.02

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-119

Submitted by: BCF
Approved by : tlh
Date : 05-JUL-12 NYS DOH # : 11626
QC by: Joe Mancuso

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million LOQ-Limit of Quantitation

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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 22-JUN-12 - 26-JUN-12 Account No.: 19982
Date Received : 28-JUN-12 Login No. : L268521
Date Analyzed : 30-JUN-12
Report ID : 742806

Client ID : AMBIANT **Lab ID : L268521-4** **Air Volume : 4.52 Liter**
Date Sampled : 06/26/12 **Date Analyzed : 06/30/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Hydrobromic Acid	5	<5	<5	<5	<1	<0.3
Hydrochloric Acid	5	<5	<5	<5	<1	<0.7
Hydrofluoric Acid	5	<5	<5	<5	<1	<1
Nitric Acid	5	<5	<5	<5	<1	<0.4
Phosphoric Acid	5	<5	<5	<5	<1	NA
Sulfuric Acid	5	<5	<5	<5	<1	NA

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-10-03

Submitted by: KLS
Approved by : tlh
Date : 05-JUL-12 NYS DOH # : 11626
QC by: Joe Mancuso

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million LOQ-Limit of Quantitation

Field sampling was not performed by Galson. Galson presents results based on sampling data provided by clients.

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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 22-JUN-12 - 26-JUN-12 Account No.: 19982
Date Received : 28-JUN-12 Login No. : L268521
Date Analyzed : 30-JUN-12
Report ID : 742806

Client ID : TRIAL DAY 1 **Lab ID : L268521-5** **Air Volume : 4.52 Liter**
Date Sampled : 06/22/12 **Date Analyzed : 06/30/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Hydrobromic Acid	5	<5	<5	<5	<1	<0.3
Hydrochloric Acid	5	<5	<5	<5	<1	<0.7
Hydrofluoric Acid	5	<5	<5	<5	<1	<1
Nitric Acid	5	<5	<5	<5	<1	<0.4
Phosphoric Acid	5	<5	<5	<5	<1	NA
Sulfuric Acid	5	7.8	7.7	*15	*3.4	NA

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-10-03

Submitted by: KLS
Approved by : tlh
Date : 05-JUL-12 NYS DOH # : 11626
QC by: Joe Mancuso

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million LOQ-Limit of Quantitation

Field sampling was not performed by Galson. Galson presents results based on sampling data provided by clients.

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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 22-JUN-12 - 26-JUN-12 Account No.: 19982
Date Received : 28-JUN-12 Login No. : L268521
Date Analyzed : 30-JUN-12
Report ID : 742806

Client ID : TRIAL DAY2 **Lab ID : L268521-6** **Air Volume : 4.52 Liter**
Date Sampled : 06/23/12 **Date Analyzed : 06/30/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Hydrobromic Acid	5	<5	<5	<5	<1	<0.3
Hydrochloric Acid	5	<5	<5	<5	<1	<0.7
Hydrofluoric Acid	5	<5	<5	<5	<1	<1
Nitric Acid	5	<5	<5	<5	<1	<0.4
Phosphoric Acid	5	<5	<5	<5	<1	NA
Sulfuric Acid	5	11	11	*21	*4.7	NA

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-10-03

Submitted by: KLS
Approved by : tlh
Date : 05-JUL-12 NYS DOH # : 11626
QC by: Joe Mancuso

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million LOQ-Limit of Quantitation

Field sampling was not performed by Galson. Galson presents results based on sampling data provided by clients.

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LABORATORY FOOTNOTE REPORT

Client Name : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 22-JUN-12 - 26-JUN-12 Account No.: 19982
Date Received: 28-JUN-12 Login No. : L268521
Date Analyzed: 29-JUN-12 - 30-JUN-12

Unless otherwise noted below, all quality control results associated with the samples were within established control limits.

Unrounded results are carried through the calculations that yield the final result and the final result is rounded to the number of significant figures appropriate to the accuracy of the analytical method. Please note that results appearing in the columns preceeding the final result column may have been rounded in order to fit the report format and therefore, if carried through the calculations, may not yield an identical final result to the one reported.

The stated LOQs for each analyte represent the demonstrated LOQ concentrations prior to correction for desorption efficiency (if applicable).

L268521 (Report ID: 742839):
SOPs: LC-SOP-4(11)
ACETALDEHYDE - Total ug corrected for a desorption efficiency of 99%.
BENZALDEHYDE - Total ug corrected for a desorption efficiency of 103%.
BUTYRALDEHYDE - Total ug corrected for a desorption efficiency of 89%.
Crotonaldehyde - Total ug corrected for a desorption efficiency of 95%.
FORMALDEHYDE - Total ug corrected for a desorption efficiency of 99%.
ISOVALERALDEHYDE - Total ug corrected for a desorption efficiency of 99%.
PROPIONALDEHYDE - Total ug corrected for a desorption efficiency of 99%.
VALERALDEHYDE - Total ug corrected for a desorption efficiency of 98%.
Formaldehyde results have been corrected for the average background found on the media:
front section = 0.0502 ug and back section = 0.0196 ug for lot #7776.
Acetaldehyde results have been corrected for the average background found on the media:
front section = 0.0392 ug and back section = 0.0217 ug for lot #7776.

L268521-3 (Report ID: 742839):
Tube may have been reversed during sampling.

Parameter	Method	PEL
Acetaldehyde	mod. NIOSH 2016; HPLC/UV	200 ppm
Benzaldehyde	mod. NIOSH 2016; HPLC/UV	N/A
Butyraldehyde	mod. NIOSH 2016; HPLC/UV	N/A
Crotonaldehyde	mod. NIOSH 2016; HPLC/UV	2 ppm
Formaldehyde	mod. NIOSH 2016; HPLC/UV	0.75 ppm
Isovaleraldehyde	mod. NIOSH 2016; HPLC/UV	N/A
Propionaldehyde	mod. NIOSH 2016; HPLC/UV	N/A
Valeraldehyde	mod. NIOSH 2016; HPLC/UV	N/A

L268521 (Report ID: 742806):
SOPs: ii-n7903(7)
Sulfuric acid results have been corrected for average background found on the media.
Front section only = 1.8581 ug for lot#7174.

L268521-5 (Report ID: 742806):
Result reported as (*) designates possible breakthrough or migration.
Reported results may be biased low.

L268521-6 (Report ID: 742806):
Result reported as (*) designates possible breakthrough or migration.
Reported results may be biased low.

Parameter	Method	PEL
Hydrobromic Acid	mod. NIOSH 7903; IC	3 ppm

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million

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LABORATORY FOOTNOTE REPORT

Client Name : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 22-JUN-12 - 26-JUN-12 Account No.: 19982
Date Received: 28-JUN-12 Login No. : L268521
Date Analyzed: 29-JUN-12 - 30-JUN-12

Unless otherwise noted below, all quality control results associated with the samples were within established control limits.

Unrounded results are carried through the calculations that yield the final result and the final result is rounded to the number of significant figures appropriate to the accuracy of the analytical method. Please note that results appearing in the columns preceeding the final result column may have been rounded in order to fit the report format and therefore, if carried through the calculations, may not yield an identical final result to the one reported.

The stated LOQs for each analyte represent the demonstrated LOQ concentrations prior to correction for desorption efficiency (if applicable).

L268521-6 (Report ID: 742806):

Parameter	Method	PEL
Hydrochloric Acid	mod. NIOSH 7903; IC	5 ppm Ceiling
Hydrofluoric Acid	mod. NIOSH 7903; IC	3 ppm
Nitric Acid	mod. NIOSH 7903; IC	2 ppm
Phosphoric Acid	mod. NIOSH 7903; IC	1 mg/m3
Sulfuric Acid	mod. NIOSH 7903; IC	1 mg/m3

< -Less Than	mg -Milligrams	m3 -Cubic Meters	kg -Kilograms
> -Greater Than	ug -Micrograms	l -Liters	NS -Not Specified
NA -Not Applicable	ND -Not Detected	ppm -Parts per Million	

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☒ New Client?

Report To*: [redacted] / Kemron
1359-A Ellsworth Indl Blvd NW
Atlanta, GA 30318

Invoice To*: Tommy Jordan / Kemron
1359-A Ellsworth Indl Blvd NW
Atlanta, GA 30318

Client Account No.*:

Phone No.*: (404) 636-0928
Cell No.: (404) 516-3172
Email Results To: Tommy Jordan ~~tjordan@kemron.com~~
Email Address: tjordan@kemron.com

Phone No.: (404) 636-0928
Email: tjordan@kemron.com
Purchase Order No.: SE0416-007
Credit Card: ☐ Credit Card on File ☐ Call for Credit Card Info

☐ Samples submitted using the FreePumpLoan™ Program. ☐ Samples submitted using the FreeSamplingBadges™ Program.

Need Results By*:	(surcharge)
☐ 5 Business Days	0%
☑ 4 Business Days	35%
☐ 3 Business Days	50%
☐ 2 Business Days	75%
☐ Next Day by 6pm	100%
☐ Next Day by Noon	150%
☐ Same Day	200%

Site Name: Bridgewater Project: Bridgewater TS Sampled By: Michael ~~Hartley~~ R21

Comments: Result Needed by 07/05/2012
Report "Profiles" for inorganic acids and Aldehydes

List description of industry or process/interferences present in sampling area: NA

State samples were collected in (ex. NY): GA

Please indicate which OEL this data will be used for: ☐ OSHA PEL ☐ ACGIH TLV ☐ Cal OSHA ☐ MSHA ☑ Other (specify): NA

Sample Identification* (Maximum of 20 characters, ID's longer than 20 characters will be abbreviated.)	Date Sampled* (mm/dd/yy)	Collection Medium	Sample Volume, Sample Time, or Sample Area*	Sample Units*: L, ml, min., in2, cm2, ft2	Analysis Requested*	Method Reference^	Hexavalent Chromium Process (ex. welding, plating, painting, etc.)*
Example	01/01/11	2pc UW PVC	960	L	Hexavalent Chromium (Cr6)	mod. OSHA ID-215	Welding
Ambient	6/26/12	Time 1928 / SGT	1.2	L	NIOSH 2016M Aldehydes		
~~Day 1~~ Rm Trial Day 1	6/22/12	1920 / SGT	1.2	L	NIOSH 2016 M Aldehydes		
~~Day 2~~ 06/27/12 Trial Day 2	6/23/12	1920 / SGT	1.2	L	NIOSH 2016M Aldehydes		
Ambient	6/26/12	226-10-03 1728 / SGT	4.63	L	NIOSH 7903A Inorganic Acid Gases		
~~Day 1~~ Rm Trial Day 1	6/22/12	1720 / SGT	4.52	L	NIOSH 7903A Inorganic Acid Gases		
~~Day 2~~ 06/27/12 Trial Day 2	6/23/12	1720 / SGT	4.52	L	NIOSH 7903A Inorgain Acid Gases		

^Galson Laboratories will substitute our routine/preferred method if it does not match the method listed on the COC unless this box is checked: ☐ Use method(s) listed on COC

For metals analysis: if requesting an analyte with the option of a lower LOQ please indicate if the lower LOQ is required (only available for certain analytes see SAG):

For crystalline silica: form(s) of silica needed must be indicated (Quartz, Cristobalite, and/or Tridymite)*:

Chain of Custody	Print Name	Signature	Date/Time
Relinquished by:	RM Hartley	[signature]	06/27/2012
Received by LAB:	M. Krause	M. Krause	6/28/12 1014

Samples received after 3pm will be considered as next day's business.
*Required fields, failure to complete these fields may result in a delay in your samples being processed.

Page 1 of 1

LAB ORIGINAL

Page 10 of 10 Report Reference: Generated 05/01/12 14:27

American Cyanamid Superfund Site
Terra Therm Treatability Study
Page 658 of 1332

LABORATORY REPORT

July 5, 2012

Tommy Jordan
Kemron Environmental Services
1359-A Ellsworth Industrial Blvd
Atlanta, GA 30318

RE: Bridgewater, N.J. / SE 0416-007

Dear Tommy:

Enclosed are the results of the sample submitted to our laboratory on June 28, 2012. For your reference, this analysis has been assigned our service request number P1202614.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is certified by the California Department of Health Services, NELAP Laboratory Certificate No. 02115CA; Arizona Department of Health Services, Certificate No. AZ0694; Florida Department of Health, NELAP Certification E871020; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA200007; The American Industrial Hygiene Association, Laboratory #101661; United States Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP), Certificate No. L11-203; Pennsylvania Registration No. 68-03307; TX Commission of Environmental Quality, NELAP ID T104704413-11-2; Minnesota Department of Health, NELAP Certificate No. 362188; Washington State Department of Ecology, ELAP Lab ID: C946, State of Utah Department of Health, NELAP Certificate No. CA015272011-1; Los Angeles Department of Building and Safety, Approval No: TA00001. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact me for information corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kate Aguilera
Project Manager

Client: Kemron Environmental Services Service Request No: P1202614
Project: Bridgewater, N.J. / SE 0416-007

CASE NARRATIVE

The sample was received intact under chain of custody on June 28, 2012 and was stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the sample at the time of sample receipt.

Sulfur Analysis

The sample was analyzed for twenty sulfur compounds per ASTM D 5504-08 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD). All compounds with the exception of hydrogen sulfide and carbonyl sulfide are quantitated against the initial calibration curve for methyl mercaptan.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of Columbia Analytical Services, Inc. dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to AALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

DETAIL SUMMARY REPORT

Client: Kemron Environmental Services
Service Request: P1202614
Project ID: Bridgewater, N.J. / SE 0416-007

Date Received: 6/28/2012
Time Received: 10:15

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	ASTM D5504-08 - Sulfur Bag
T0 Trial	P1202614-001	Air	6/27/2012	15:31	X

Columbia Analytical Services

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Air - Chain of Custody Record & Analytical Service Request

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day-Standard

CAS Project No. 1202614

Company Name & Address (Reporting Information)	Kemron 1359-A Ellsworth Industrial Blvd NW Atlanta, GA 30318
Project Name	Bridgewater, N.J.
Project Number	SE 0416-007
Project Manager	Tommy Jordan
P.O. # / Billing Information	
Phone	(404) 636-0928
Fax	(404) 636-7162
Email Address for Result Reporting	tjordan@Kemron.com
Sampler (Print & Sign)	Tommy Jordan
CAS Contact:	

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code #- FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	Analysis Method: Reduced Sulfur ASTM 5504		Comments e.g. Actual Preservative or specific instructions
T0 Trial	1	06/27/12	1531					1LTB	X		Results Due 7/5/12

Report Tier Levels - please select

Tier I - Results (Default if not specified) ____
Tier II (Results + QC Summaries) ____
Tier III (Results + QC & Calibration Summaries) ____
Tier IV (Data Validation Package) 10% Surcharge ____

EDD required Yes / No
Type: _____

Project Requirements (MRLs, QAPP)

	Date:	Time:	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	06/27/12	1622	Katie Aguilera	6/28/12	1015
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank Temperature ____ °C

COC AIR REV 3-11

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Sample Acceptance Check Form

Client: Kemron Environmental Services Work order: P1202614
Project: Bridgewater, N.J. / SE 0416-007
Sample(s) received on: 6/28/12 Date opened: 6/28/12 by: SANDERSON

Note: This form is used forall samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by CAS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
9	Was a **trip blank** received?	☐	☐	☒
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☒	☐
	Were signature and date included?	☐	☒	☐
	Were seals intact?	☐	☒	☐
	Were custody seals on outside of sample container?	☒	☐	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1202614-001.01	1 L Zefon Bag					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

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RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **T0 Trial**
Client Project ID: **Bridgewater, N.J. / SE 0416-007**

CAS Project ID: P1202614
CAS Sample ID: P1202614-001

Test Code: ASTM D 5504-08
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Wade Henton
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: 6/27/12
Time Collected: 15:31
Date Received: 6/28/12
Date Analyzed: 6/28/12
Time Analyzed: 11:38
Volume(s) Analyzed: 0.50 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	14	ND	10	
463-58-1	Carbonyl Sulfide	**630**	25	**260**	10	
74-93-1	Methyl Mercaptan	ND	20	ND	10	
75-08-1	Ethyl Mercaptan	ND	25	ND	10	
75-18-3	Dimethyl Sulfide	**2,400**	25	**930**	10	
75-15-0	Carbon Disulfide	**130,000**	16	**41,000**	5.0	
75-33-2	Isopropyl Mercaptan	ND	31	ND	10	
75-66-1	tert-Butyl Mercaptan	ND	37	ND	10	
107-03-9	n-Propyl Mercaptan	ND	31	ND	10	
624-89-5	Ethyl Methyl Sulfide	**330**	31	**110**	10	
110-02-1	Thiophene	**1,500**	34	**440**	10	
513-44-0	Isobutyl Mercaptan	**370**	37	**100**	10	
352-93-2	Diethyl Sulfide	ND	37	ND	10	
109-79-5	n-Butyl Mercaptan	ND	37	ND	10	
624-92-0	Dimethyl Disulfide	ND	19	ND	5.0	
616-44-4	3-Methylthiophene	**160**	40	**41**	10	
110-01-0	Tetrahydrothiophene	ND	36	ND	10	
638-02-8	2,5-Dimethylthiophene	ND	46	ND	10	
872-55-9	2-Ethylthiophene	**67**	46	**15**	10	
110-81-6	Diethyl Disulfide	ND	25	ND	5.0	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **Method Blank**
Client Project ID: **Bridgewater, N.J. / SE 0416-007**

CAS Project ID: P1202614
CAS Sample ID: P120628-MB

Test Code: ASTM D 5504-08
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Wade Henton
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 6/28/12
Time Analyzed: 09:44
Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Kemron Environmental Services**
Client Sample ID: **Lab Control Sample** CAS Project ID: P1202614
Client Project ID: **Bridgewater, N.J. / SE 0416-007** CAS Sample ID: P120628-LCS

Test Code: ASTM D 5504-08 Date Collected: NA
Instrument ID: Agilent 6890A/GC13/SCD Date Received: NA
Analyst: Wade Henton Date Analyzed: 6/28/12
Sampling Media: 1 L Zefon Bag Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount ppbV	Result ppbV	% Recovery	CAS Acceptance Limits	Data Qualifier
7783-06-4	Hydrogen Sulfide	2,380	**2,270**	**95**	51-141	
463-58-1	Carbonyl Sulfide	2,470	**2,100**	**85**	63-147	
74-93-1	Methyl Mercaptan	2,360	**3,310**	**140**	54-156	

LABORATORY REPORT

July 5, 2012

Tommy Jordan
Kemron Environmental Services
1359-A Ellsworth Industrial Blvd
Atlanta, GA 30318

RE: Bridgewater, N.J. / SE0416-007

Dear Tommy:

Enclosed are the results of the sample submitted to our laboratory on June 22, 2012. For your reference, this analysis has been assigned our service request number P1202527.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is certified by the California Department of Health Services, NELAP Laboratory Certificate No. 02115CA; Arizona Department of Health Services, Certificate No. AZ0694; Florida Department of Health, NELAP Certification E871020; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA200007; The American Industrial Hygiene Association, Laboratory #101661; United States Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP), Certificate No. L11-203; Pennsylvania Registration No. 68-03307; TX Commission of Environmental Quality, NELAP ID T104704413-11-2; Minnesota Department of Health, NELAP Certificate No. 362188; Washington State Department of Ecology, ELAP Lab ID: C946, State of Utah Department of Health, NELAP Certificate No. CA015272011-1; Los Angeles Department of Building and Safety, Approval No: TA00001. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact me for information corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kate Aguilera
Project Manager

Client: Kemron Environmental Services Service Request No: P1202527
Project: Bridgewater, N.J. / SE0416-007

CASE NARRATIVE

The sample was received intact under chain of custody on June 22, 2012 and was stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the sample at the time of sample receipt.

Sulfur Analysis

The sample was analyzed for twenty sulfur compounds per ASTM D 5504-08 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD). All compounds with the exception of hydrogen sulfide and carbonyl sulfide are quantitated against the initial calibration curve for methyl mercaptan.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of Columbia Analytical Services, Inc. dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to AALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

DETAIL SUMMARY REPORT

Client: Kemron Environmental Services
Service Request: P1202527
Project ID: Bridgewater, N.J. / SE0416-007

Date Received: 6/22/2012
Time Received: 09:40

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	ASTM D5504-08 - Sulfur Bag
Trial-Day 1	P1202527-001	Air	6/21/2012	00:00	X

Columbia Analytical Services™
2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Air - Chain of Custody Record & Analytical Service Request

Page _____ of _____

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day-Standard

CAS Project No. 1202527

CAS Contact:

Analysis Method

Company Name & Address (Reporting Information)
Kemron
1359-A Ellsworth Industrial Blvd
Atlanta GA 30318

Project Name: Bridgewater, N.J.

Project Number: SE0416-007

Project Manager: Tommy Jordan

P.O. # / Billing Information

Phone: 404-636-0928 Fax: 404-636-7162

Email Address for Result Reporting: tjordan@kemron.com

Sampler (Print & Sign): Mark Clark

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code #- FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	Revised Sulfur ASTM 5504		Comments e.g. Actual Preservative or specific instructions
Trial-Day 1	(1)	6/21						1L TB	X		

Report Tier Levels - please select
Tier I - Results (Default if not specified) _____
Tier II (Results + QC Summaries) _____
Tier III (Results + QC & Calibration Summaries) _____
Tier IV (Data Validation Package) 10% Surcharge _____
EDD required Yes / No
Type: _____

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
	6/21/12	19:53		6/22/12	0940
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank Temperature ____°C

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Sample Acceptance Check Form

Client: Kemron Environmental Services Work order: P1202527
Project: Bridgewater, N.J. / SE0416-007
Sample(s) received on: 6/22/12 Date opened: 6/22/12 by: MZAMORA

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by CAS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
9	Was a **trip blank** received?	☐	☐	☒
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1202527-001.01	1 L Zefon Bag					

Explain any discrepancies: (include lab sample ID numbers):
The time of sample collection was not indicated on the COC.

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **Trial-Day 1**
Client Project ID: **Bridgewater, N.J. / SE0416-007**

CAS Project ID: P1202527
CAS Sample ID: P1202527-001

Test Code: ASTM D 5504-08
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Wade Henton/Lauryn Keeler
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: 6/21/12
Time Collected: NA
Date Received: 6/22/12
Date Analyzed: 6/22/12
Time Analyzed: 17:33
Volume(s) Analyzed: 0.0050 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**2,000,000**	1,400	**1,500,000**	1,000	
463-58-1	Carbonyl Sulfide	**1,700,000**	2,500	**680,000**	1,000	
74-93-1	Methyl Mercaptan	**18,000**	2,000	**9,100**	1,000	
75-08-1	Ethyl Mercaptan	ND	2,500	ND	1,000	
75-18-3	Dimethyl Sulfide	**18,000**	2,500	**6,900**	1,000	
75-15-0	Carbon Disulfide	**1,000,000**	1,600	**330,000**	500	
75-33-2	Isopropyl Mercaptan	ND	3,100	ND	1,000	
75-66-1	tert-Butyl Mercaptan	ND	3,700	ND	1,000	
107-03-9	n-Propyl Mercaptan	ND	3,100	ND	1,000	
624-89-5	Ethyl Methyl Sulfide	ND	3,100	ND	1,000	
110-02-1	Thiophene	ND	3,400	ND	1,000	
513-44-0	Isobutyl Mercaptan	ND	3,700	ND	1,000	
352-93-2	Diethyl Sulfide	ND	3,700	ND	1,000	
109-79-5	n-Butyl Mercaptan	ND	3,700	ND	1,000	
624-92-0	Dimethyl Disulfide	ND	1,900	ND	500	
616-44-4	3-Methylthiophene	ND	4,000	ND	1,000	
110-01-0	Tetrahydrothiophene	ND	3,600	ND	1,000	
638-02-8	2,5-Dimethylthiophene	ND	4,600	ND	1,000	
872-55-9	2-Ethylthiophene	ND	4,600	ND	1,000	
110-81-6	Diethyl Disulfide	ND	2,500	ND	500	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **Method Blank**
Client Project ID: **Bridgewater, N.J. / SE0416-007**

CAS Project ID: P1202527
CAS Sample ID: P120622-MB

Test Code: ASTM D 5504-08
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Wade Henton/Lauryn Keeler
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 6/22/12
Time Analyzed: 15:31
Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Kemron Environmental Services**
Client Sample ID: **Lab Control Sample** CAS Project ID: P1202527
Client Project ID: **Bridgewater, N.J. / SE0416-007** CAS Sample ID: P120622-LCS

Test Code: ASTM D 5504-08 Date Collected: NA
Instrument ID: Agilent 6890A/GC13/SCD Date Received: NA
Analyst: Wade Henton/Lauryn Keeler Date Analyzed: 6/22/12
Sampling Media: 1 L Zefon Bag Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount ppbV	Result ppbV	% Recovery	CAS Acceptance Limits	Data Qualifier
7783-06-4	Hydrogen Sulfide	2,380	**2,610**	**110**	51-141	
463-58-1	Carbonyl Sulfide	2,470	**2,250**	**91**	63-147	
74-93-1	Methyl Mercaptan	2,360	**3,250**	**138**	54-156	

LABORATORY REPORT

July 5, 2012

Tommy Jordan
Kemron Environmental Services
1359-A Ellsworth Industrial Blvd
Atlanta, GA 30318

RE: Bridgewater NJ / SE0416-007

Dear Tommy:

Enclosed are the results of the sample submitted to our laboratory on June 23, 2012. For your reference, this analysis has been assigned our service request number P1202549.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is certified by the California Department of Health Services, NELAP Laboratory Certificate No. 02115CA; Arizona Department of Health Services, Certificate No. AZ0694; Florida Department of Health, NELAP Certification E871020; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA200007; The American Industrial Hygiene Association, Laboratory #101661; United States Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP), Certificate No. L11-203; Pennsylvania Registration No. 68-03307; TX Commission of Environmental Quality, NELAP ID T104704413-11-2; Minnesota Department of Health, NELAP Certificate No. 362188; Washington State Department of Ecology, ELAP Lab ID: C946, State of Utah Department of Health, NELAP Certificate No. CA015272011-1; Los Angeles Department of Building and Safety, Approval No: TA00001. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact me for information corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kate Aguilera
Project Manager

Client: Kemron Environmental Services Service Request No: P1202549
Project: Bridgewater NJ / SE0416-007

CASE NARRATIVE

The sample was received intact under chain of custody on June 23, 2012 and was stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the sample at the time of sample receipt.

Sulfur Analysis

The sample was analyzed for twenty sulfur compounds per ASTM D 5504-08 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD). All compounds with the exception of hydrogen sulfide and carbonyl sulfide are quantitated against the initial calibration curve for methyl mercaptan.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of Columbia Analytical Services, Inc. dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to AALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

DETAIL SUMMARY REPORT

Client: Kemron Environmental Services
Service Request: P1202549
Project ID: Bridgewater NJ / SE0416-007

Date Received: 6/23/2012
Time Received: 11:10

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	ASTM D5504-08 - Sulfur Bag
Trial - Day 2	P1202549-001	Air	6/22/2012	19:52	X

Columbia Analytical Services

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Air - Chain of Custody Record & Analytical Service Request

Page _____ of _____

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day-Standard

CAS Project No. P1202549

CAS Contact:

Company Name & Address (Reporting Information)
Kemron
1359-A Ellsworth Industrial Blvd
Atlanta GA 30318

Project Name: Bridgewater NJ

Project Number: SE0416-007

P.O. # / Billing Information: SAME

Project Manager: Tommy Jordan

Phone: 404-636-0928

Fax: 404-636-7162

Email Address for Result Reporting: tjordan@kemron.com

Sampler (Print & Sign): Tommy Jordan

Analysis Method

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code #- FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	Reduced Sulfur ASTM 5504		Comments e.g. Actual Preservative or specific instructions
Trial - Day 2	1	6/22	1952					1L TB	X		

Report Tier Levels - please select

Tier I - Results (Default if not specified) _____
Tier II (Results + QC Summaries) _____
Tier III (Results + QC & Calibration Summaries) _____
Tier IV (Data Validation Package) 10% Surcharge _____

EDD required Yes / No
Type: _____

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
	6/22	1952		6/23/12	1110
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank Temperature ____°C

Columbia Analytical Services
Now part of the ALS Group
2655 Park Center Drive, Suite A, Simi Valley, CA 93065 | 805.526.7161 | www.caslab.com

Sample Acceptance Check Form

Client: Kemron Environmental Services Work order: P1202549

Project: Bridgewater NJ / SE0416-007

Sample(s) received on: 6/23/12 Date opened: 6/23/12 by: MZAMORA

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by CAS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
9	Was a **trip blank** received?	☐	☐	☒
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1202549-001.01	1 L Zefon Bag					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **Trial - Day 2**
Client Project ID: **Bridgewater NJ / SE0416-007**

CAS Project ID: P1202549
CAS Sample ID: P1202549-001

Test Code: ASTM D 5504-08
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Wade Henton/Lauryn Keeler
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: 6/22/12
Time Collected: 19:52
Date Received: 6/23/12
Date Analyzed: 6/23/12
Time Analyzed: 12:06, 12:23
Volume(s) Analyzed: 0.0050 ml(s)
0.00050 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**41,000,000**	14,000	**30,000,000**	10,000	**D**
463-58-1	Carbonyl Sulfide	**33,000**	2,500	**13,000**	1,000	
74-93-1	Methyl Mercaptan	**470,000**	2,000	**240,000**	1,000	
75-08-1	Ethyl Mercaptan	**48,000**	2,500	**19,000**	1,000	
75-18-3	Dimethyl Sulfide	**21,000**	2,500	**8,100**	1,000	
75-15-0	Carbon Disulfide	**51,000**	1,600	**16,000**	500	
75-33-2	Isopropyl Mercaptan	**16,000**	3,100	**5,200**	1,000	
75-66-1	tert-Butyl Mercaptan	ND	3,700	ND	1,000	
107-03-9	n-Propyl Mercaptan	ND	3,100	ND	1,000	
624-89-5	Ethyl Methyl Sulfide	ND	3,100	ND	1,000	
110-02-1	Thiophene	ND	3,400	ND	1,000	
513-44-0	Isobutyl Mercaptan	ND	3,700	ND	1,000	
352-93-2	Diethyl Sulfide	ND	3,700	ND	1,000	
109-79-5	n-Butyl Mercaptan	ND	3,700	ND	1,000	
624-92-0	Dimethyl Disulfide	ND	1,900	ND	500	
616-44-4	3-Methylthiophene	ND	4,000	ND	1,000	
110-01-0	Tetrahydrothiophene	ND	3,600	ND	1,000	
638-02-8	2,5-Dimethylthiophene	ND	4,600	ND	1,000	
872-55-9	2-Ethylthiophene	ND	4,600	ND	1,000	
110-81-6	Diethyl Disulfide	ND	2,500	ND	500	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **Method Blank**
Client Project ID: **Bridgewater NJ / SE0416-007**

CAS Project ID: P1202549
CAS Sample ID: P120623-MB

Test Code: ASTM D 5504-08
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Wade Henton/Lauryn Keeler
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 6/23/12
Time Analyzed: 11:12
Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Kemron Environmental Services**
Client Sample ID: **Lab Control Sample** CAS Project ID: P1202549
Client Project ID: **Bridgewater NJ / SE0416-007** CAS Sample ID: P120623-LCS

Test Code: ASTM D 5504-08 Date Collected: NA
Instrument ID: Agilent 6890A/GC13/SCD Date Received: NA
Analyst: Wade Henton/Lauryn Keeler Date Analyzed: 6/23/12
Sampling Media: 1 L Zefon Bag Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount ppbV	Result ppbV	% Recovery	CAS Acceptance Limits	Data Qualifier
7783-06-4	Hydrogen Sulfide	2,380	**2,150**	**90**	51-141	
463-58-1	Carbonyl Sulfide	2,470	**1,910**	**77**	63-147	
74-93-1	Methyl Mercaptan	2,360	**2,940**	**125**	54-156	

NELAP CERTIFICATE NUMBER 01955
DOD ELAP CERTIFICATE NUMBER ADE - 1482

ANALYTICAL RESULTS

PERFORMED BY

GULF COAST ANALYTICAL LABORATORIES, INC.
7979 GSRI Avenue
Baton Rouge, LA 70820

Report Date 07/10/2012

GCAL Report 212070337

Deliver To	KEMRON 1359A Ellsworth Industrial Blv Atlanta, GA 30318 404-601-6927
Attn	Tommy Jordan

Project Bridgewater Acid Tar

CASE NARRATIVE

Client: KEMRON **Report:** 212070337

Gulf Coast Analytical Laboratories received and analyzed the sample(s) listed on the sample cross-reference page of this report. Receipt of the sample(s) is documented by the attached chain of custody. This applies only to the sample(s) listed in this report. No sample integrity or quality control exceptions were identified unless noted below.

VOLATILES MASS SPECTROMETRY

In the SW-846 8260B analysis, Thiophene is included in the reportable analyte list. As per client instructions, a one point calibration was performed for this analyte. It was not detected in any samples and is reported as ND. This analyte is not included in GCAL's scope of accreditation.

In the SW-846 8260B analysis, samples 21207033701 (TRIAL DAY 1 CONDENSATE-B) and 21207033702 (TRIAL DAY 1 CONDENSATE-M) had to be diluted due to the presence of non-target background and to bracket the concentration of target analytes within the calibration range of the instrument. The dilutions are reflected in the elevated detection limits.

In the SW-846 8260B analysis, sample 21207033703 (TRIAL DAY 1 CONDENSATE-T) had to be diluted to bracket the concentration of target compounds within the calibration range of the instrument. The dilution is reflected in elevated detection limits.

In the SW-846 8260B analysis for analytical batch 485070, the LCS and/or LCSD recoveries are above the upper control limit for Vinyl acetate. This compound was not detected in the associated samples.

SEMI-VOLATILES MASS SPECTROMETRY

In the SW-846 8270C analysis, sample 21207033702 (TRIAL DAY 1 CONDENSATE-M) had to be diluted to bracket the concentration of target compounds within the calibration range of the instrument. This is reflected in elevated detection limits.

In the SW-846 8270C analysis, sample 21207033703 (TRIAL DAY 1 CONDENSATE-T) and 21207033701 (TRIAL DAY 1 CONDENSATE-B) had to be diluted to eliminate interference from non-target background. This is reflected in elevated detection limits.

In the SW-846 8270C analysis, the recoveries for the surrogates are reported as diluted out for those analyses performed at a 10 or higher dilution.

Laboratory Endorsement

Sample analysis was performed in accordance with approved methodologies provided by the Environmental Protection Agency or other recognized agencies. The samples and their corresponding extracts will be maintained for a period of 30 days unless otherwise arranged. Following this retention period the samples will be disposed in accordance with GCAL's Standard Operating Procedures.

Common Abbreviations Utilized in this Report

ND	Indicates the result was Not Detected at the specified RDL
DO	Indicates the result was Diluted Out
MI	Indicates the result was subject to Matrix Interference
TNTC	Indicates the result was Too Numerous To Count
SUBC	Indicates the analysis was Sub-Contracted
FLD	Indicates the analysis was performed in the Field
PQL	Practical Quantitation Limit
MDL	Method Detection Limit
RDL	Reporting Detection Limit
00:00	Reported as a time equivalent to 12:00 AM

Reporting Flags Utilized in this Report

J	Indicates the result is between the MDL and RDL
U	Indicates the compound was analyzed for but not detected
B	Indicates the analyte was detected in the associated Method Blank

Sample receipt at GCAL is documented through the attached chain of custody. In accordance with NELAC, this report shall be reproduced only in full and with the written permission of GCAL. The results contained within this report relate only to the samples reported. The documented results are presented within this report.

This report pertains only to the samples listed in the Report Sample Summary and should be retained as a permanent record thereof. The results contained within this report are intended for the use of the client. Any unauthorized use of the information contained in this report is prohibited.

I certify that this data package is in compliance with the NELAC standard and terms and conditions of the contract and Statement of Work both technically and for completeness, for other than the conditions in the case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data submitted has been authorized by the Quality Assurance Manager or his/her designee, as verified by the following signature.

Estimated uncertainty of measurement is available upon request. This report is in compliance with the DOD QSM as specified in the contract if applicable.

Robyn Migues
Technical Director
GCAL REPORT 212070337

THIS REPORT CONTAINS _____ PAGES.

Report Sample Summary

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207033701	TRIAL DAY 1 CONDENSATE-B	Water	06/22/2012 09:30	06/23/2012 09:45
21207033702	TRIAL DAY 1 CONDENSATE-M	Water	06/22/2012 09:30	06/23/2012 09:45
21207033703	TRIAL DAY 1 CONDENSATE-T	Solid	06/22/2012 09:30	06/23/2012 09:45

Summary of Compounds Detected

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207033701	**TRIAL DAY 1 CONDENSATE-B**	Water	06/22/2012 09:30	06/23/2012 09:45

Library Search Volatiles

CAS#	Parameter	Result	Retention	Units
554-12-1	Propanoic acid, methyl ester	2680	4.48	ug/L

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
108-88-3	Toluene	92800	1.11	ug/L
100-41-4	Ethylbenzene	2050	1.53	ug/L
106-42-3	p-Xylene	20400	1.58	ug/L
108-38-3	Benzene, 1,3-dimethyl-	5790	1.68	ug/L
98-82-8	Benzene, (1-methylethyl)-	3840	1.83	ug/L
611-14-3	Benzene, 1-ethyl-2-methyl-	4430	2	ug/L
95-63-6	Benzene, 1,2,4-trimethyl-	4990	2.15	ug/L
10544-50-0	Sulfur, mol. (S8)	18400	5.75	ug/L

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
106-46-7	1,4-Dichlorobenzene	1190J	4760	121	ug/L
91-57-6	2-Methylnaphthalene	264J	4760	121	ug/L
86-73-7	Fluorene	313J	4760	137	ug/L
108-95-2	Phenol	1600J	4760	71.4	ug/L
1319-77-3MP	m,p-Cresol	1220J	4760	168	ug/L

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
95-63-6	1,2,4-Trimethylbenzene	1300J	2500	51.0	ug/L
95-50-1	1,2-Dichlorobenzene	6040	2500	58.5	ug/L
108-67-8	1,3,5-Trimethylbenzene	793J	2500	37.5	ug/L
106-46-7	1,4-Dichlorobenzene	549J	2500	55.0	ug/L
78-93-3	2-Butanone	9120	2500	181	ug/L
100-41-4	Ethylbenzene	624J	2500	59.5	ug/L
98-82-8	Isopropylbenzene (Cumene)	992J	2500	61.5	ug/L
91-20-3	Naphthalene	6170	2500	32.5	ug/L
108-88-3	Toluene	64100	2500	63.5	ug/L
1330-20-7	Xylene (total)	8300	7500	192	ug/L
136777-61-2	m,p-Xylene	6200	5000	119	ug/L
95-47-6	o-Xylene	2100J	2500	73.5	ug/L
135-98-8	sec-Butylbenzene	524J	2500	55.5	ug/L

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
67-64-1	Acetone	120000	25000	2000	ug/L
71-43-2	Benzene	454000	25000	495	ug/L

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207033702	**TRIAL DAY 1 CONDENSATE-M**	Water	06/22/2012 09:30	06/23/2012 09:45

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
108-88-3	Toluene	485000	1.13	ug/L
1196-58-3	Benzene, (1-ethylpropyl)-	11800	2.54	ug/L
98-51-1	4-tert-Butyltoluene	42700	2.58	ug/L
2049-95-8	Benzene, (1,1-dimethylpropyl)-	19100	2.65	ug/L
4468-42-2	Benzene, (1-ethylbutyl)-	17400	2.90	ug/L
700-88-9	Benzene, cyclopentyl-	17200	3.12	ug/L
5279-14-1	Benzene, (1-nitropropyl)-	19600	3.25	ug/L
2132-84-5	Benzene, (1-methylhexyl)-	21400	3.36	ug/L
778-22-3	Benzene, 1,1'-(1-methylethylidene)b	76900	4.36	ug/L
26137-53-1	Naphthalene, 1,2,3-trimethyl-4-prop	157000	4.60	ug/L
10544-50-0	Sulfur, mol. (S8)	41000	5.75	ug/L
100-41-4	Ethylbenzene	22900	1.53	ug/L
106-42-3	p-Xylene	184000	1.58	ug/L
95-47-6	Benzene, 1,2-dimethyl-	55500	1.68	ug/L
98-82-8	Benzene, (1-methylethyl)-	47100	1.83	ug/L
108-67-8	Benzene, 1,3,5-trimethyl-	53100	2.04	ug/L
526-73-8	Benzene, 1,2,3-trimethyl-	63900	2.15	ug/L
135-98-8	Benzene, (1-methylpropyl)-	91000	2.22	ug/L
768-49-0	Benzene, (2-methyl-1-propenyl)-	12400	2.47	ug/L

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
106-46-7	1,4-Dichlorobenzene	107000	43500	1110	ug/L
91-57-6	2-Methylnaphthalene	26600J	43500	1110	ug/L
117-81-7	Bis(2-Ethylhexyl)phthalate	16400J	43500	830	ug/L
86-73-7	Fluorene	28800J	43500	1250	ug/L

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
95-63-6	1,2,4-Trimethylbenzene	13100J	50000	1020	ug/L
95-50-1	1,2-Dichlorobenzene	62300	50000	1170	ug/L
108-67-8	1,3,5-Trimethylbenzene	8940J	50000	750	ug/L
106-46-7	1,4-Dichlorobenzene	6110J	50000	1100	ug/L
67-64-1	Acetone	102000	50000	3990	ug/L
100-41-4	Ethylbenzene	7650J	50000	1190	ug/L
98-82-8	Isopropylbenzene (Cumene)	9950J	50000	1230	ug/L
91-20-3	Naphthalene	82500	50000	650	ug/L
108-88-3	Toluene	724000	50000	1270	ug/L
1330-20-7	Xylene (total)	100000J	150000	3840	ug/L
136777-61-2	m,p-Xylene	76100J	100000	2370	ug/L
95-47-6	o-Xylene	24300J	50000	1470	ug/L
135-98-8	sec-Butylbenzene	5090J	50000	1110	ug/L

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207033702	**TRIAL DAY 1 CONDENSATE-M**	Water	06/22/2012 09:30	06/23/2012 09:45

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
71-43-2	Benzene	4090000	500000	9900	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207033703	**TRIAL DAY 1 CONDENSATE-T**	Solid	06/22/2012 09:30	06/23/2012 09:45

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
95-63-6	1,2,4-Trimethylbenzene	1170000J	4970000	358000	ug/Kg
95-50-1	1,2-Dichlorobenzene	4410000J	4970000	274000	ug/Kg
91-20-3	Naphthalene	6460000	4970000	319000	ug/Kg
108-88-3	Toluene	58600000	4970000	154000	ug/Kg
1330-20-7	Xylene (total)	8120000J	9940000	399000	ug/Kg
136777-61-2	m,p-Xylene	6410000	4970000	292000	ug/Kg
95-47-6	o-Xylene	1700000J	4970000	134000	ug/Kg

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
117-81-7	Bis(2-Ethylhexyl)phthalate	904000	16500	980	ug/Kg
86-73-7	Fluorene	334000	16500	645	ug/Kg

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
108-88-3	Toluene	85000000	1.59	ug/Kg
1196-58-3	Benzene, (1-ethylpropyl)-	1020000	2.99	ug/Kg
1075-38-3	Benzene, 1-(1,1-dimethylethyl)-3-me	2070000	3.01	ug/Kg
	Unknown	1370000	3.68	ug/Kg
13540-56-2	Benzene, 1,2-dimethyl-4-(phenylmeth	1330000	4.80	ug/Kg
26137-53-1	Naphthalene, 1,2,3-trimethyl-4-prop	1900000	5.04	ug/Kg
100-41-4	Ethylbenzene	2250000	2	ug/Kg
106-42-3	p-Xylene	19400000	2.04	ug/Kg
108-38-3	Benzene, 1,3-dimethyl-	5420000	2.15	ug/Kg
98-82-8	Benzene, (1-methylethyl)-	4220000	2.28	ug/Kg
611-14-3	Benzene, 1-ethyl-2-methyl-	1630000	2.45	ug/Kg
95-63-6	Benzene, 1,2,4-trimethyl-	2990000	2.48	ug/Kg
108-67-8	Benzene, 1,3,5-trimethyl-	5280000	2.60	ug/Kg
2870-04-4	Benzene, 2-ethyl-1,3-dimethyl-	1240000	2.73	ug/Kg

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
71-43-2	Benzene	270000000	49700000	1510000	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207033701	**TRIAL DAY 1 CONDENSATE-B**	Water	06/22/2012 09:30	06/23/2012 09:45

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			5000	07/07/2012 13:56	CEK	485069

CAS#	Parameter	Result	RDL	MDL	Units
67-64-1	**Acetone**	**120000**	**25000**	**2000**	**ug/L**
71-43-2	**Benzene**	**454000**	**25000**	**495**	**ug/L**

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	250000	241000	ug/L	96	78 - 130
1868-53-7	Dibromofluoromethane	250000	251000	ug/L	100	77 - 127
2037-26-5	Toluene d8	250000	244000	ug/L	98	76 - 134
17060-07-0	1,2-Dichloroethane-d4	250000	258000	ug/L	103	71 - 127

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			500	07/07/2012 15:32	CEK	485069

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	51.5U	2500	51.5	ug/L
71-55-6	1,1,1-Trichloroethane	42.5U	2500	42.5	ug/L
79-34-5	1,1,2,2-Tetrachloroethane	54.0U	2500	54.0	ug/L
79-00-5	1,1,2-Trichloroethane	73.5U	2500	73.5	ug/L
75-34-3	1,1-Dichloroethane	69.0U	2500	69.0	ug/L
75-35-4	1,1-Dichloroethene	104U	2500	104	ug/L
563-58-6	1,1-Dichloropropene	60.5U	2500	60.5	ug/L
96-18-4	1,2,3-Trichloropropane	49.0U	2500	49.0	ug/L
120-82-1	1,2,4-Trichlorobenzene	78.0U	2500	78.0	ug/L
95-63-6	**1,2,4-Trimethylbenzene**	**1300J**	**2500**	**51.0**	**ug/L**
96-12-8	1,2-Dibromo-3-chloropropane	89.0U	2500	89.0	ug/L
106-93-4	1,2-Dibromoethane	50.2U	2500	50.2	ug/L
95-50-1	**1,2-Dichlorobenzene**	**6040**	**2500**	**58.5**	**ug/L**
107-06-2	1,2-Dichloroethane	59.5U	2500	59.5	ug/L
540-59-0	1,2-Dichloroethene(Total)	105U	5000	105	ug/L
78-87-5	1,2-Dichloropropane	75.2U	2500	75.2	ug/L
108-67-8	**1,3,5-Trimethylbenzene**	**793J**	**2500**	**37.5**	**ug/L**
541-73-1	1,3-Dichlorobenzene	67.5U	2500	67.5	ug/L
142-28-9	1,3-Dichloropropane	36.0U	2500	36.0	ug/L
106-46-7	**1,4-Dichlorobenzene**	**549J**	**2500**	**55.0**	**ug/L**
594-20-7	2,2-Dichloropropane	90.5U	2500	90.5	ug/L
78-93-3	**2-Butanone**	**9120**	**2500**	**181**	**ug/L**
95-49-8	2-Chlorotoluene	54.0U	2500	54.0	ug/L
591-78-6	2-Hexanone	46.5U	2500	46.5	ug/L
106-43-4	4-Chlorotoluene	58.5U	2500	58.5	ug/L
99-87-6	4-Isopropyltoluene	41.0U	2500	41.0	ug/L
108-10-1	4-Methyl-2-pentanone	39.7U	2500	39.7	ug/L
108-86-1	Bromobenzene	54.5U	2500	54.5	ug/L
74-97-5	Bromochloromethane	63.5U	2500	63.5	ug/L
75-27-4	Bromodichloromethane	38.0U	2500	38.0	ug/L
75-25-2	Bromoform	75.0U	2500	75.0	ug/L
74-83-9	Bromomethane	214U	2500	214	ug/L
75-15-0	Carbon disulfide	95.0U	2500	95.0	ug/L
56-23-5	Carbon tetrachloride	73.0U	2500	73.0	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207033701	**TRIAL DAY 1 CONDENSATE-B**	Water	06/22/2012 09:30	06/23/2012 09:45

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			500	07/07/2012 15:32	CEK	485069

CAS#	Parameter	Result	RDL	MDL	Units
108-90-7	Chlorobenzene	44.5U	2500	44.5	ug/L
75-00-3	Chloroethane	118U	2500	118	ug/L
67-66-3	Chloroform	54.5U	2500	54.5	ug/L
74-87-3	Chloromethane	29.0U	2500	29.0	ug/L
124-48-1	Dibromochloromethane	38.0U	2500	38.0	ug/L
74-95-3	Dibromomethane	65.5U	2500	65.5	ug/L
75-71-8	Dichlorodifluoromethane	77.0U	2500	77.0	ug/L
100-41-4	**Ethylbenzene**	**624J**	**2500**	**59.5**	**ug/L**
87-68-3	Hexachlorobutadiene	106U	2500	106	ug/L
98-82-8	**Isopropylbenzene (Cumene)**	**992J**	**2500**	**61.5**	**ug/L**
74-88-4	Methyl iodide	42.0U	2500	42.0	ug/L
75-09-2	Methylene chloride	74.5U	2500	74.5	ug/L
91-20-3	**Naphthalene**	**6170**	**2500**	**32.5**	**ug/L**
100-42-5	Styrene	49.0U	2500	49.0	ug/L
127-18-4	Tetrachloroethene	63.0U	2500	63.0	ug/L
110-02-1	Thiophene	ND			ug/L
108-88-3	**Toluene**	**64100**	**2500**	**63.5**	**ug/L**
79-01-6	Trichloroethene	75.5U	2500	75.5	ug/L
75-69-4	Trichlorofluoromethane	65.5U	2500	65.5	ug/L
76-13-1	Trichlorotrifluoroethane	79.0U	2500	79.0	ug/L
108-05-4	Vinyl acetate	38.0U	2500	38.0	ug/L
75-01-4	Vinyl chloride	68.5U	2500	68.5	ug/L
1330-20-7	**Xylene (total)**	**8300**	**7500**	**192**	**ug/L**
156-59-2	cis-1,2-Dichloroethene	67.0U	2500	67.0	ug/L
10061-01-5	cis-1,3-Dichloropropene	46.0U	2500	46.0	ug/L
136777-61-2	**m,p-Xylene**	**6200**	**5000**	**119**	**ug/L**
104-51-8	n-Butylbenzene	76.0U	2500	76.0	ug/L
103-65-1	n-Propylbenzene	51.0U	2500	51.0	ug/L
95-47-6	**o-Xylene**	**2100J**	**2500**	**73.5**	**ug/L**
135-98-8	**sec-Butylbenzene**	**524J**	**2500**	**55.5**	**ug/L**
1634-04-4	tert-Butyl methyl ether (MTBE)	30.2U	2500	30.2	ug/L
98-06-6	tert-Butylbenzene	48.5U	2500	48.5	ug/L
156-60-5	trans-1,2-Dichloroethene	37.5U	2500	37.5	ug/L
10061-02-6	trans-1,3-Dichloropropene	73.0U	2500	73.0	ug/L
110-57-6	trans-1,4-Dichloro-2-butene	156U	2500	156	ug/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	25000	25200	ug/L	101	78 - 130
1868-53-7	Dibromofluoromethane	25000	24900	ug/L	100	77 - 127
2037-26-5	Toluene d8	25000	25100	ug/L	100	76 - 134
17060-07-0	1,2-Dichloroethane-d4	25000	25300	ug/L	101	71 - 127

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207033701	**TRIAL DAY 1 CONDENSATE-B**	Water	06/22/2012 09:30	06/23/2012 09:45

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			500	07/07/2012 15:32	JCK	485088

CAS#	Parameter	Result	Retention	Units
554-12-1	**Propanoic acid, methyl ester**	**2680**	**4.48**	**ug/L**

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
07/05/2012 14:55	484872	SW-846 3510C	10	07/09/2012 10:36	JEW	485111

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	111U	4760	111	ug/L
122-66-7	1,2Diphenylhydrazine/Azobenzen	132U	4760	132	ug/L
106-46-7	**1,4-Dichlorobenzene**	**1190J**	**4760**	**121**	**ug/L**
95-95-4	2,4,5-Trichlorophenol	151U	4760	151	ug/L
88-06-2	2,4,6-Trichlorophenol	131U	4760	131	ug/L
120-83-2	2,4-Dichlorophenol	103U	4760	103	ug/L
105-67-9	2,4-Dimethylphenol	330U	4760	330	ug/L
51-28-5	2,4-Dinitrophenol	1240U	4760	1240	ug/L
121-14-2	2,4-Dinitrotoluene	125U	4760	125	ug/L
606-20-2	2,6-Dinitrotoluene	168U	4760	168	ug/L
91-58-7	2-Chloronaphthalene	105U	4760	105	ug/L
95-57-8	2-Chlorophenol	131U	4760	131	ug/L
91-57-6	**2-Methylnaphthalene**	**264J**	**4760**	**121**	**ug/L**
88-74-4	2-Nitroaniline	94.3U	4760	94.3	ug/L
88-75-5	2-Nitrophenol	170U	4760	170	ug/L
91-94-1	3,3'-Dichlorobenzidine	141U	4760	141	ug/L
99-09-2	3-Nitroaniline	108U	4760	108	ug/L
534-52-1	4,6-Dinitro-2-methylphenol	943U	4760	943	ug/L
101-55-3	4-Bromophenyl phenyl ether	160U	4760	160	ug/L
59-50-7	4-Chloro-3-methylphenol	111U	4760	111	ug/L
106-47-8	4-Chloroaniline	220U	4760	220	ug/L
7005-72-3	4-Chlorophenyl phenyl ether	128U	4760	128	ug/L
100-01-6	4-Nitroaniline	105U	4760	105	ug/L
100-02-7	4-Nitrophenol	871U	4760	871	ug/L
83-32-9	Acenaphthene	128U	4760	128	ug/L
208-96-8	Acenaphthylene	144U	4760	144	ug/L
62-53-3	Aniline	342U	4760	342	ug/L
120-12-7	Anthracene	150U	4760	150	ug/L
56-55-3	Benzo(a)anthracene	150U	4760	150	ug/L
50-32-8	Benzo(a)pyrene	59.5U	4760	59.5	ug/L
205-99-2	Benzo(b)fluoranthene	103U	4760	103	ug/L
191-24-2	Benzo(g,h,i)perylene	102U	4760	102	ug/L
207-08-9	Benzo(k)fluoranthene	112U	4760	112	ug/L
100-51-6	Benzyl alcohol	169U	4760	169	ug/L
111-91-1	Bis(2-Chloroethoxy)methane	138U	4760	138	ug/L
111-44-4	Bis(2-Chloroethyl)ether	137U	4760	137	ug/L
108-60-1	Bis(2-Chloroisopropyl)ether	122U	4760	122	ug/L
117-81-7	Bis(2-Ethylhexyl)phthalate	91.0U	4760	91.0	ug/L
85-68-7	Butyl benzyl phthalate	78.6U	4760	78.6	ug/L
86-74-8	Carbazole	110U	4760	110	ug/L
218-01-9	Chrysene	206U	4760	206	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207033701	**TRIAL DAY 1 CONDENSATE-B**	Water	06/22/2012 09:30	06/23/2012 09:45

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
07/05/2012 14:55	484872	SW-846 3510C	10	07/09/2012 10:36	JEW	485111

CAS#	Parameter	Result	RDL	MDL	Units
84-74-2	Di-n-butyl phthalate	90.0U	4760	90.0	ug/L
117-84-0	Di-n-octyl phthalate	79.5U	4760	79.5	ug/L
53-70-3	Dibenz(a,h)anthracene	103U	4760	103	ug/L
132-64-9	Dibenzofuran	108U	4760	108	ug/L
84-66-2	Diethyl phthalate	144U	4760	144	ug/L
131-11-3	Dimethyl phthalate	121U	4760	121	ug/L
206-44-0	Fluoranthene	127U	4760	127	ug/L
86-73-7	**Fluorene**	**313J**	**4760**	**137**	**ug/L**
118-74-1	Hexachlorobenzene	119U	4760	119	ug/L
87-68-3	Hexachlorobutadiene	91.4U	4760	91.4	ug/L
77-47-4	Hexachlorocyclopentadiene	82.9U	4760	82.9	ug/L
67-72-1	Hexachloroethane	142U	4760	142	ug/L
193-39-5	Indeno(1,2,3-cd)pyrene	74.8U	4760	74.8	ug/L
78-59-1	Isophorone	181U	4760	181	ug/L
98-95-3	Nitrobenzene	157U	4760	157	ug/L
87-86-5	Pentachlorophenol	80.0U	4760	80.0	ug/L
85-01-8	Phenanthrene	145U	4760	145	ug/L
108-95-2	**Phenol**	**1600J**	**4760**	**71.4**	**ug/L**
129-00-0	Pyrene	231U	4760	231	ug/L
110-86-1	Pyridine	1700U	4760	1700	ug/L
1319-77-3MP	**m,p-Cresol**	**1220J**	**4760**	**168**	**ug/L**
621-64-7	n-Nitrosodi-n-propylamine	145U	4760	145	ug/L
62-75-9	n-Nitrosodimethylamine	145U	4760	145	ug/L
86-30-6	n-Nitrosodiphenylamine	173U	4760	173	ug/L
95-48-7	o-Cresol	157U	4760	157	ug/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	2380	Diluted Out	ug/L	**0***	52 - 120
321-60-8	2-Fluorobiphenyl	2380	Diluted Out	ug/L	**0***	16 - 128
1718-51-0	Terphenyl-d14	2380	Diluted Out	ug/L	**0***	43 - 138
4165-62-2	Phenol-d5	4760	Diluted Out	ug/L	**0***	10 - 120
367-12-4	2-Fluorophenol	4760	Diluted Out	ug/L	**0***	10 - 120
118-79-6	2,4,6-Tribromophenol	4760	Diluted Out	ug/L	**0***	52 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10	07/09/2012 10:36	JEW	484982

CAS#	Parameter	Result	Retention	Units
108-88-3	**Toluene**	**92800**	**1.11**	**ug/L**
100-41-4	**Ethylbenzene**	**2050**	**1.53**	**ug/L**
106-42-3	**p-Xylene**	**20400**	**1.58**	**ug/L**
108-38-3	**Benzene, 1,3-dimethyl-**	**5790**	**1.68**	**ug/L**
98-82-8	**Benzene, (1-methylethyl)-**	**3840**	**1.83**	**ug/L**
611-14-3	**Benzene, 1-ethyl-2-methyl-**	**4430**	**2**	**ug/L**
95-63-6	**Benzene, 1,2,4-trimethyl-**	**4990**	**2.15**	**ug/L**
10544-50-0	**Sulfur, mol. (S8)**	**18400**	**5.75**	**ug/L**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207033702	**TRIAL DAY 1 CONDENSATE-M**	Water	06/22/2012 09:30	06/23/2012 09:45

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			100000	07/07/2012 15:11	CEK	485069

CAS#	Parameter	Result	RDL	MDL	Units
71-43-2	**Benzene**	**4090000**	**500000**	**9900**	**ug/L**

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	5000000	4800000	ug/L	96	78 - 130
1868-53-7	Dibromofluoromethane	5000000	5040000	ug/L	101	77 - 127
2037-26-5	Toluene d8	5000000	5010000	ug/L	100	76 - 134
17060-07-0	1,2-Dichloroethane-d4	5000000	5110000	ug/L	102	71 - 127

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10000	07/07/2012 19:35	CEK	485069

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	1030U	50000	1030	ug/L
71-55-6	1,1,1-Trichloroethane	850U	50000	850	ug/L
79-34-5	1,1,2,2-Tetrachloroethane	1080U	50000	1080	ug/L
79-00-5	1,1,2-Trichloroethane	1470U	50000	1470	ug/L
75-34-3	1,1-Dichloroethane	1380U	50000	1380	ug/L
75-35-4	1,1-Dichloroethene	2080U	50000	2080	ug/L
563-58-6	1,1-Dichloropropene	1210U	50000	1210	ug/L
96-18-4	1,2,3-Trichloropropane	980U	50000	980	ug/L
120-82-1	1,2,4-Trichlorobenzene	1560U	50000	1560	ug/L
95-63-6	**1,2,4-Trimethylbenzene**	**13100J**	**50000**	**1020**	**ug/L**
96-12-8	1,2-Dibromo-3-chloropropane	1780U	50000	1780	ug/L
106-93-4	1,2-Dibromoethane	1000U	50000	1000	ug/L
95-50-1	**1,2-Dichlorobenzene**	**62300**	**50000**	**1170**	**ug/L**
107-06-2	1,2-Dichloroethane	1190U	50000	1190	ug/L
540-59-0	1,2-Dichloroethene(Total)	2090U	100000	2090	ug/L
78-87-5	1,2-Dichloropropane	1500U	50000	1500	ug/L
108-67-8	**1,3,5-Trimethylbenzene**	**8940J**	**50000**	**750**	**ug/L**
541-73-1	1,3-Dichlorobenzene	1350U	50000	1350	ug/L
142-28-9	1,3-Dichloropropane	720U	50000	720	ug/L
106-46-7	**1,4-Dichlorobenzene**	**6110J**	**50000**	**1100**	**ug/L**
594-20-7	2,2-Dichloropropane	1810U	50000	1810	ug/L
78-93-3	2-Butanone	3620U	50000	3620	ug/L
95-49-8	2-Chlorotoluene	1080U	50000	1080	ug/L
591-78-6	2-Hexanone	930U	50000	930	ug/L
106-43-4	4-Chlorotoluene	1170U	50000	1170	ug/L
99-87-6	4-Isopropyltoluene	820U	50000	820	ug/L
108-10-1	4-Methyl-2-pentanone	794U	50000	794	ug/L
67-64-1	**Acetone**	**102000**	**50000**	**3990**	**ug/L**
108-86-1	Bromobenzene	1090U	50000	1090	ug/L
74-97-5	Bromochloromethane	1270U	50000	1270	ug/L
75-27-4	Bromodichloromethane	760U	50000	760	ug/L
75-25-2	Bromoform	1500U	50000	1500	ug/L
74-83-9	Bromomethane	4270U	50000	4270	ug/L
75-15-0	Carbon disulfide	1900U	50000	1900	ug/L
56-23-5	Carbon tetrachloride	1460U	50000	1460	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207033702	**TRIAL DAY 1 CONDENSATE-M**	Water	06/22/2012 09:30	06/23/2012 09:45

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10000	07/07/2012 19:35	CEK	485069

CAS#	Parameter	Result	RDL	MDL	Units
108-90-7	Chlorobenzene	890U	50000	890	ug/L
75-00-3	Chloroethane	2350U	50000	2350	ug/L
67-66-3	Chloroform	1090U	50000	1090	ug/L
74-87-3	Chloromethane	580U	50000	580	ug/L
124-48-1	Dibromochloromethane	760U	50000	760	ug/L
74-95-3	Dibromomethane	1310U	50000	1310	ug/L
75-71-8	Dichlorodifluoromethane	1540U	50000	1540	ug/L
100-41-4	**Ethylbenzene**	**7650J**	**50000**	**1190**	**ug/L**
87-68-3	Hexachlorobutadiene	2110U	50000	2110	ug/L
98-82-8	**Isopropylbenzene (Cumene)**	**9950J**	**50000**	**1230**	**ug/L**
74-88-4	Methyl iodide	840U	50000	840	ug/L
75-09-2	Methylene chloride	1490U	50000	1490	ug/L
91-20-3	**Naphthalene**	**82500**	**50000**	**650**	**ug/L**
100-42-5	Styrene	980U	50000	980	ug/L
127-18-4	Tetrachloroethene	1260U	50000	1260	ug/L
110-02-1	Thiophene	ND			ug/L
108-88-3	**Toluene**	**724000**	**50000**	**1270**	**ug/L**
79-01-6	Trichloroethene	1510U	50000	1510	ug/L
75-69-4	Trichlorofluoromethane	1310U	50000	1310	ug/L
76-13-1	Trichlorotrifluoroethane	1580U	50000	1580	ug/L
108-05-4	Vinyl acetate	760U	50000	760	ug/L
75-01-4	Vinyl chloride	1370U	50000	1370	ug/L
1330-20-7	**Xylene (total)**	**100000J**	**150000**	**3840**	**ug/L**
156-59-2	cis-1,2-Dichloroethene	1340U	50000	1340	ug/L
10061-01-5	cis-1,3-Dichloropropene	920U	50000	920	ug/L
136777-61-2	**m,p-Xylene**	**76100J**	**100000**	**2370**	**ug/L**
104-51-8	n-Butylbenzene	1520U	50000	1520	ug/L
103-65-1	n-Propylbenzene	1020U	50000	1020	ug/L
95-47-6	**o-Xylene**	**24300J**	**50000**	**1470**	**ug/L**
135-98-8	**sec-Butylbenzene**	**5090J**	**50000**	**1110**	**ug/L**
1634-04-4	tert-Butyl methyl ether (MTBE)	604U	50000	604	ug/L
98-06-6	tert-Butylbenzene	970U	50000	970	ug/L
156-60-5	trans-1,2-Dichloroethene	750U	50000	750	ug/L
10061-02-6	trans-1,3-Dichloropropene	1460U	50000	1460	ug/L
110-57-6	trans-1,4-Dichloro-2-butene	3120U	50000	3120	ug/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	500000	477000	ug/L	95	78 - 130
1868-53-7	Dibromofluoromethane	500000	501000	ug/L	100	77 - 127
2037-26-5	Toluene d8	500000	505000	ug/L	101	76 - 134
17060-07-0	1,2-Dichloroethane-d4	500000	508000	ug/L	102	71 - 127

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207033702	**TRIAL DAY 1 CONDENSATE-M**	Water	06/22/2012 09:30	06/23/2012 09:45

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10000	07/07/2012 19:35	JCK	485088

CAS#	Parameter	Result	Retention	Units
	No tics detected	ND		ug/L

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
07/05/2012 14:55	484872	SW-846 3510C	100	07/09/2012 10:50	JEW	485111

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	1020U	43500	1020	ug/L
122-66-7	1,2Diphenylhydrazine/Azobenzen	1210U	43500	1210	ug/L
106-46-7	**1,4-Dichlorobenzene**	**107000**	**43500**	**1110**	**ug/L**
95-95-4	2,4,5-Trichlorophenol	1380U	43500	1380	ug/L
88-06-2	2,4,6-Trichlorophenol	1200U	43500	1200	ug/L
120-83-2	2,4-Dichlorophenol	943U	43500	943	ug/L
105-67-9	2,4-Dimethylphenol	3020U	43500	3020	ug/L
51-28-5	2,4-Dinitrophenol	11300U	43500	11300	ug/L
121-14-2	2,4-Dinitrotoluene	1140U	43500	1140	ug/L
606-20-2	2,6-Dinitrotoluene	1530U	43500	1530	ug/L
91-58-7	2-Chloronaphthalene	961U	43500	961	ug/L
95-57-8	2-Chlorophenol	1200U	43500	1200	ug/L
91-57-6	**2-Methylnaphthalene**	**26600J**	**43500**	**1110**	**ug/L**
88-74-4	2-Nitroaniline	861U	43500	861	ug/L
88-75-5	2-Nitrophenol	1550U	43500	1550	ug/L
91-94-1	3,3'-Dichlorobenzidine	1290U	43500	1290	ug/L
99-09-2	3-Nitroaniline	983U	43500	983	ug/L
534-52-1	4,6-Dinitro-2-methylphenol	8610U	43500	8610	ug/L
101-55-3	4-Bromophenyl phenyl ether	1470U	43500	1470	ug/L
59-50-7	4-Chloro-3-methylphenol	1020U	43500	1020	ug/L
106-47-8	4-Chloroaniline	2010U	43500	2010	ug/L
7005-72-3	4-Chlorophenyl phenyl ether	1170U	43500	1170	ug/L
100-01-6	4-Nitroaniline	961U	43500	961	ug/L
100-02-7	4-Nitrophenol	7960U	43500	7960	ug/L
83-32-9	Acenaphthene	1170U	43500	1170	ug/L
208-96-8	Acenaphthylene	1320U	43500	1320	ug/L
62-53-3	Aniline	3120U	43500	3120	ug/L
120-12-7	Anthracene	1370U	43500	1370	ug/L
56-55-3	Benzo(a)anthracene	1370U	43500	1370	ug/L
50-32-8	Benzo(a)pyrene	543U	43500	543	ug/L
205-99-2	Benzo(b)fluoranthene	943U	43500	943	ug/L
191-24-2	Benzo(g,h,i)perylene	935U	43500	935	ug/L
207-08-9	Benzo(k)fluoranthene	1030U	43500	1030	ug/L
100-51-6	Benzyl alcohol	1540U	43500	1540	ug/L
111-91-1	Bis(2-Chloroethoxy)methane	1260U	43500	1260	ug/L
111-44-4	Bis(2-Chloroethyl)ether	1250U	43500	1250	ug/L
108-60-1	Bis(2-Chloroisopropyl)ether	1120U	43500	1120	ug/L
117-81-7	**Bis(2-Ethylhexyl)phthalate**	**16400J**	**43500**	**830**	**ug/L**
85-68-7	Butyl benzyl phthalate	717U	43500	717	ug/L
86-74-8	Carbazole	1010U	43500	1010	ug/L
218-01-9	Chrysene	1880U	43500	1880	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207033702	**TRIAL DAY 1 CONDENSATE-M**	Water	06/22/2012 09:30	06/23/2012 09:45

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
07/05/2012 14:55	484872	SW-846 3510C	100	07/09/2012 10:50	JEW	485111

CAS#	Parameter	Result	RDL	MDL	Units
84-74-2	Di-n-butyl phthalate	822U	43500	822	ug/L
117-84-0	Di-n-octyl phthalate	726U	43500	726	ug/L
53-70-3	Dibenz(a,h)anthracene	943U	43500	943	ug/L
132-64-9	Dibenzofuran	987U	43500	987	ug/L
84-66-2	Diethyl phthalate	1320U	43500	1320	ug/L
131-11-3	Dimethyl phthalate	1110U	43500	1110	ug/L
206-44-0	Fluoranthene	1160U	43500	1160	ug/L
86-73-7	**Fluorene**	**28800J**	**43500**	**1250**	**ug/L**
118-74-1	Hexachlorobenzene	1080U	43500	1080	ug/L
87-68-3	Hexachlorobutadiene	835U	43500	835	ug/L
77-47-4	Hexachlorocyclopentadiene	757U	43500	757	ug/L
67-72-1	Hexachloroethane	1300U	43500	1300	ug/L
193-39-5	Indeno(1,2,3-cd)pyrene	683U	43500	683	ug/L
78-59-1	Isophorone	1650U	43500	1650	ug/L
98-95-3	Nitrobenzene	1430U	43500	1430	ug/L
87-86-5	Pentachlorophenol	730U	43500	730	ug/L
85-01-8	Phenanthrene	1320U	43500	1320	ug/L
108-95-2	Phenol	652U	43500	652	ug/L
129-00-0	Pyrene	2110U	43500	2110	ug/L
110-86-1	Pyridine	15600U	43500	15600	ug/L
1319-77-3MP	m,p-Cresol	1530U	43500	1530	ug/L
621-64-7	n-Nitrosodi-n-propylamine	1320U	43500	1320	ug/L
62-75-9	n-Nitrosodimethylamine	1320U	43500	1320	ug/L
86-30-6	n-Nitrosodiphenylamine	1580U	43500	1580	ug/L
95-48-7	o-Cresol	1430U	43500	1430	ug/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	2170	Diluted Out	ug/L	**0***	52 - 120
321-60-8	2-Fluorobiphenyl	2170	Diluted Out	ug/L	**0***	16 - 128
1718-51-0	Terphenyl-d14	2170	Diluted Out	ug/L	**0***	43 - 138
4165-62-2	Phenol-d5	4350	Diluted Out	ug/L	**0***	10 - 120
367-12-4	2-Fluorophenol	4350	Diluted Out	ug/L	**0***	10 - 120
118-79-6	2,4,6-Tribromophenol	4350	Diluted Out	ug/L	**0***	52 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			100	07/09/2012 10:50	JEW	484982

CAS#	Parameter	Result	Retention	Units
108-88-3	**Toluene**	**485000**	**1.13**	**ug/L**
1196-58-3	**Benzene, (1-ethylpropyl)-**	**11800**	**2.54**	**ug/L**
98-51-1	**4-tert-Butyltoluene**	**42700**	**2.58**	**ug/L**
2049-95-8	**Benzene, (1,1-dimethylpropyl)-**	**19100**	**2.65**	**ug/L**
4468-42-2	**Benzene, (1-ethylbutyl)-**	**17400**	**2.90**	**ug/L**
700-88-9	**Benzene, cyclopentyl-**	**17200**	**3.12**	**ug/L**
5279-14-1	**Benzene, (1-nitropropyl)-**	**19600**	**3.25**	**ug/L**
2132-84-5	**Benzene, (1-methylhexyl)-**	**21400**	**3.36**	**ug/L**
778-22-3	**Benzene, 1,1'-(1-methylethylidene)b**	**76900**	**4.36**	**ug/L**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207033702	**TRIAL DAY 1 CONDENSATE-M**	Water	06/22/2012 09:30	06/23/2012 09:45

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			100	07/09/2012 10:50	JEW	484982

CAS#	Parameter	Result	Retention	Units
26137-53-1	Naphthalene, 1,2,3-trimethyl-4-prop	157000	4.60	ug/L
10544-50-0	Sulfur, mol. (S8)	41000	5.75	ug/L
100-41-4	Ethylbenzene	22900	1.53	ug/L
106-42-3	p-Xylene	184000	1.58	ug/L
95-47-6	Benzene, 1,2-dimethyl-	55500	1.68	ug/L
98-82-8	Benzene, (1-methylethyl)-	47100	1.83	ug/L
108-67-8	Benzene, 1,3,5-trimethyl-	53100	2.04	ug/L
526-73-8	Benzene, 1,2,3-trimethyl-	63900	2.15	ug/L
135-98-8	Benzene, (1-methylpropyl)-	91000	2.22	ug/L
768-49-0	Benzene, (2-methyl-1-propenyl)-	12400	2.47	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207033703	**TRIAL DAY 1 CONDENSATE-T**	Solid	06/22/2012 09:30	06/23/2012 09:45

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10000000	07/07/2012 14:51	CEK	485070

CAS#	Parameter	Result	RDL	MDL	Units
71-43-2	**Benzene**	**270000000**	**49700000**	**1510000**	**ug/Kg**

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	497000000	478000000	ug/Kg	96	62 - 127
1868-53-7	Dibromofluoromethane	497000000	508000000	ug/Kg	102	65 - 130
2037-26-5	Toluene d8	497000000	497000000	ug/Kg	100	71 - 132
17060-07-0	1,2-Dichloroethane-d4	497000000	531000000	ug/Kg	107	62 - 125

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1000000	07/07/2012 19:55	CEK	485070

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	134000U	4970000	134000	ug/Kg
71-55-6	1,1,1-Trichloroethane	236000U	4970000	236000	ug/Kg
79-34-5	1,1,2,2-Tetrachloroethane	113000U	4970000	113000	ug/Kg
79-00-5	1,1,2-Trichloroethane	133000U	4970000	133000	ug/Kg
75-34-3	1,1-Dichloroethane	148000U	4970000	148000	ug/Kg
75-35-4	1,1-Dichloroethene	231000U	4970000	231000	ug/Kg
563-58-6	1,1-Dichloropropene	243000U	4970000	243000	ug/Kg
96-18-4	1,2,3-Trichloropropane	114000U	4970000	114000	ug/Kg
120-82-1	1,2,4-Trichlorobenzene	353000U	4970000	353000	ug/Kg
95-63-6	**1,2,4-Trimethylbenzene**	**1170000J**	**4970000**	**358000**	**ug/Kg**
96-12-8	1,2-Dibromo-3-chloropropane	399000U	4970000	399000	ug/Kg
106-93-4	1,2-Dibromoethane	143000U	4970000	143000	ug/Kg
95-50-1	**1,2-Dichlorobenzene**	**4410000J**	**4970000**	**274000**	**ug/Kg**
107-06-2	1,2-Dichloroethane	197000U	4970000	197000	ug/Kg
540-59-0	1,2-Dichloroethene(Total)	233000U	9940000	233000	ug/Kg
78-87-5	1,2-Dichloropropane	153000U	4970000	153000	ug/Kg
108-67-8	1,3,5-Trimethylbenzene	374000U	4970000	374000	ug/Kg
541-73-1	1,3-Dichlorobenzene	258000U	4970000	258000	ug/Kg
142-28-9	1,3-Dichloropropane	157000U	4970000	157000	ug/Kg
106-46-7	1,4-Dichlorobenzene	230000U	4970000	230000	ug/Kg
594-20-7	2,2-Dichloropropane	248000U	4970000	248000	ug/Kg
78-93-3	2-Butanone	515000U	4970000	515000	ug/Kg
95-49-8	2-Chlorotoluene	218000U	4970000	218000	ug/Kg
591-78-6	2-Hexanone	430000U	4970000	430000	ug/Kg
106-43-4	4-Chlorotoluene	234000U	4970000	234000	ug/Kg
99-87-6	4-Isopropyltoluene	209000U	4970000	209000	ug/Kg
108-10-1	4-Methyl-2-pentanone	131000U	4970000	131000	ug/Kg
67-64-1	Acetone	1020000U	24900000	1020000	ug/Kg
108-86-1	Bromobenzene	155000U	4970000	155000	ug/Kg
74-97-5	Bromochloromethane	134000U	4970000	134000	ug/Kg
75-27-4	Bromodichloromethane	161000U	4970000	161000	ug/Kg
75-25-2	Bromoform	158000U	4970000	158000	ug/Kg
74-83-9	Bromomethane	301000U	4970000	301000	ug/Kg
75-15-0	Carbon disulfide	323000U	4970000	323000	ug/Kg
56-23-5	Carbon tetrachloride	201000U	4970000	201000	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207033703	**TRIAL DAY 1 CONDENSATE-T**	Solid	06/22/2012 09:30	06/23/2012 09:45

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1000000	07/07/2012 19:55	CEK	485070

CAS#	Parameter	Result	RDL	MDL	Units
108-90-7	Chlorobenzene	148000U	4970000	148000	ug/Kg
75-00-3	Chloroethane	329000U	4970000	329000	ug/Kg
67-66-3	Chloroform	214000U	4970000	214000	ug/Kg
74-87-3	Chloromethane	236000U	4970000	236000	ug/Kg
124-48-1	Dibromochloromethane	217000U	4970000	217000	ug/Kg
74-95-3	Dibromomethane	230000U	4970000	230000	ug/Kg
75-71-8	Dichlorodifluoromethane	223000U	4970000	223000	ug/Kg
100-41-4	Ethylbenzene	182000U	4970000	182000	ug/Kg
87-68-3	Hexachlorobutadiene	213000U	4970000	213000	ug/Kg
98-82-8	Isopropylbenzene (Cumene)	184000U	4970000	184000	ug/Kg
74-88-4	Methyl iodide	1220000U	4970000	1220000	ug/Kg
75-09-2	Methylene chloride	439000U	9940000	439000	ug/Kg
91-20-3	**Naphthalene**	**6460000**	**4970000**	**319000**	**ug/Kg**
100-42-5	Styrene	153000U	4970000	153000	ug/Kg
127-18-4	Tetrachloroethene	294000U	4970000	294000	ug/Kg
110-02-1	Thiophene	ND			ug/Kg
108-88-3	**Toluene**	**58600000**	**4970000**	**154000**	**ug/Kg**
79-01-6	Trichloroethene	212000U	4970000	212000	ug/Kg
75-69-4	Trichlorofluoromethane	259000U	4970000	259000	ug/Kg
76-13-1	Trichlorotrifluoroethane	199000U	4970000	199000	ug/Kg
108-05-4	Vinyl acetate	140000U	4970000	140000	ug/Kg
75-01-4	Vinyl chloride	270000U	4970000	270000	ug/Kg
1330-20-7	**Xylene (total)**	**8120000J**	**9940000**	**399000**	**ug/Kg**
156-59-2	cis-1,2-Dichloroethene	147000U	4970000	147000	ug/Kg
10061-01-5	cis-1,3-Dichloropropene	184000U	4970000	184000	ug/Kg
136777-61-2	**m,p-Xylene**	**6410000**	**4970000**	**292000**	**ug/Kg**
104-51-8	n-Butylbenzene	232000U	4970000	232000	ug/Kg
103-65-1	n-Propylbenzene	735000U	4970000	735000	ug/Kg
95-47-6	**o-Xylene**	**1700000J**	**4970000**	**134000**	**ug/Kg**
135-98-8	sec-Butylbenzene	196000U	4970000	196000	ug/Kg
1634-04-4	tert-Butyl methyl ether (MTBE)	121000U	4970000	121000	ug/Kg
98-06-6	tert-Butylbenzene	254000U	4970000	254000	ug/Kg
156-60-5	trans-1,2-Dichloroethene	130000U	4970000	130000	ug/Kg
10061-02-6	trans-1,3-Dichloropropene	169000U	4970000	169000	ug/Kg
110-57-6	trans-1,4-Dichloro-2-butene	515000U	4970000	515000	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	49700000	43400000	ug/Kg	87	62 - 127
1868-53-7	Dibromofluoromethane	49700000	50200000	ug/Kg	101	65 - 130
2037-26-5	Toluene d8	49700000	49000000	ug/Kg	99	71 - 132
17060-07-0	1,2-Dichloroethane-d4	49700000	51200000	ug/Kg	103	62 - 125

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207033703	**TRIAL DAY 1 CONDENSATE-T**	Solid	06/22/2012 09:30	06/23/2012 09:45

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1000000	07/07/2012 19:55	JCK	485089

CAS#	Parameter	Result	Retention	Units
	No tics detected	ND		ug/Kg

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/26/2012 12:45	484151	3550C	50	06/28/2012 14:19	KCB	484405

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	565U	16500	565	ug/Kg
122-66-7	1,2Diphenylhydrazine/Azobenzen	585U	16500	585	ug/Kg
95-95-4	2,4,5-Trichlorophenol	1120U	16500	1120	ug/Kg
88-06-2	2,4,6-Trichlorophenol	3940U	16500	3940	ug/Kg
120-83-2	2,4-Dichlorophenol	1770U	16500	1770	ug/Kg
105-67-9	2,4-Dimethylphenol	11700U	16500	11700	ug/Kg
51-28-5	2,4-Dinitrophenol	7600U	16500	7600	ug/Kg
121-14-2	2,4-Dinitrotoluene	1000U	16500	1000	ug/Kg
606-20-2	2,6-Dinitrotoluene	1330U	16500	1330	ug/Kg
91-58-7	2-Chloronaphthalene	530U	16500	530	ug/Kg
95-57-8	2-Chlorophenol	580U	16500	580	ug/Kg
91-57-6	2-Methylnaphthalene	448U	16500	448	ug/Kg
88-74-4	2-Nitroaniline	1200U	82500	1200	ug/Kg
88-75-5	2-Nitrophenol	1230U	16500	1230	ug/Kg
91-94-1	3,3'-Dichlorobenzidine	15300U	33000	15300	ug/Kg
99-09-2	3-Nitroaniline	1100U	82500	1100	ug/Kg
534-52-1	4,6-Dinitro-2-methylphenol	7500U	82500	7500	ug/Kg
101-55-3	4-Bromophenyl phenyl ether	925U	16500	925	ug/Kg
59-50-7	4-Chloro-3-methylphenol	1580U	16500	1580	ug/Kg
106-47-8	4-Chloroaniline	1110U	16500	1110	ug/Kg
7005-72-3	4-Chlorophenyl phenyl ether	935U	16500	935	ug/Kg
100-01-6	4-Nitroaniline	8150U	82500	8150	ug/Kg
100-02-7	4-Nitrophenol	4660U	82500	4660	ug/Kg
83-32-9	Acenaphthene	590U	16500	590	ug/Kg
208-96-8	Acenaphthylene	655U	16500	655	ug/Kg
62-53-3	Aniline	1540U	16500	1540	ug/Kg
120-12-7	Anthracene	570U	16500	570	ug/Kg
56-55-3	Benzo(a)anthracene	1290U	16500	1290	ug/Kg
50-32-8	Benzo(a)pyrene	615U	16500	615	ug/Kg
205-99-2	Benzo(b)fluoranthene	1520U	16500	1520	ug/Kg
191-24-2	Benzo(g,h,i)perylene	525U	16500	525	ug/Kg
207-08-9	Benzo(k)fluoranthene	670U	16500	670	ug/Kg
100-51-6	Benzyl alcohol	2260U	16500	2260	ug/Kg
111-91-1	Bis(2-Chloroethoxy)methane	1290U	16500	1290	ug/Kg
111-44-4	Bis(2-Chloroethyl)ether	1220U	16500	1220	ug/Kg
108-60-1	Bis(2-Chloroisopropyl)ether	1030U	16500	1030	ug/Kg
117-81-7	**Bis(2-Ethylhexyl)phthalate**	**904000**	**16500**	**980**	**ug/Kg**
85-68-7	Butyl benzyl phthalate	297U	16500	297	ug/Kg
86-74-8	Carbazole	1000U	16500	1000	ug/Kg
218-01-9	Chrysene	725U	16500	725	ug/Kg
84-74-2	Di-n-butyl phthalate	655U	16500	655	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207033703	**TRIAL DAY 1 CONDENSATE-T**	Solid	06/22/2012 09:30	06/23/2012 09:45

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
06/26/2012 12:45	484151	3550C	50	06/28/2012 14:19	KCB	484405

CAS#	Parameter	Result	RDL	MDL	Units
117-84-0	Di-n-octyl phthalate	222U	16500	222	ug/Kg
53-70-3	Dibenz(a,h)anthracene	575U	16500	575	ug/Kg
132-64-9	Dibenzofuran	535U	16500	535	ug/Kg
84-66-2	Diethyl phthalate	1020U	16500	1020	ug/Kg
131-11-3	Dimethyl phthalate	705U	16500	705	ug/Kg
206-44-0	Fluoranthene	326U	16500	326	ug/Kg
86-73-7	**Fluorene**	**334000**	**16500**	**645**	**ug/Kg**
118-74-1	Hexachlorobenzene	955U	16500	955	ug/Kg
87-68-3	Hexachlorobutadiene	1000U	16500	1000	ug/Kg
77-47-4	Hexachlorocyclopentadiene	6000U	16500	6000	ug/Kg
67-72-1	Hexachloroethane	795U	16500	795	ug/Kg
193-39-5	Indeno(1,2,3-cd)pyrene	1550U	16500	1550	ug/Kg
78-59-1	Isophorone	580U	16500	580	ug/Kg
98-95-3	Nitrobenzene	920U	16500	920	ug/Kg
87-86-5	Pentachlorophenol	6300U	82500	6300	ug/Kg
85-01-8	Phenanthrene	530U	16500	530	ug/Kg
108-95-2	Phenol	990U	16500	990	ug/Kg
129-00-0	Pyrene	765U	16500	765	ug/Kg
110-86-1	Pyridine	6000U	16500	6000	ug/Kg
1319-77-3MP	m,p-Cresol	2330U	16500	2330	ug/Kg
621-64-7	n-Nitrosodi-n-propylamine	755U	16500	755	ug/Kg
62-75-9	n-Nitrosodimethylamine	2270U	16500	2270	ug/Kg
86-30-6	n-Nitrosodiphenylamine	525U	16500	525	ug/Kg
95-48-7	o-Cresol	585U	16500	585	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	3330	Diluted Out	ug/Kg	**0***	46 - 123
321-60-8	2-Fluorobiphenyl	3330	Diluted Out	ug/Kg	**0***	47 - 127
1718-51-0	Terphenyl-d14	3330	Diluted Out	ug/Kg	**0***	38 - 167
4165-62-2	Phenol-d5	6670	Diluted Out	ug/Kg	**0***	43 - 123
367-12-4	2-Fluorophenol	6670	Diluted Out	ug/Kg	**0***	51 - 119
118-79-6	2,4,6-Tribromophenol	6670	Diluted Out	ug/Kg	**0***	44 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			50	06/28/2012 14:19	KCB	485116

CAS#	Parameter	Result	Retention	Units
108-88-3	**Toluene**	**85000000**	**1.59**	**ug/Kg**
1196-58-3	**Benzene, (1-ethylpropyl)-**	**1020000**	**2.99**	**ug/Kg**
1075-38-3	**Benzene, 1-(1,1-dimethylethyl)-3-me**	**2070000**	**3.01**	**ug/Kg**
	Unknown	**1370000**	**3.68**	**ug/Kg**
13540-56-2	**Benzene, 1,2-dimethyl-4-(phenylmeth**	**1330000**	**4.80**	**ug/Kg**
26137-53-1	**Naphthalene, 1,2,3-trimethyl-4-prop**	**1900000**	**5.04**	**ug/Kg**
100-41-4	**Ethylbenzene**	**2250000**	**2**	**ug/Kg**
106-42-3	**p-Xylene**	**19400000**	**2.04**	**ug/Kg**
108-38-3	**Benzene, 1,3-dimethyl-**	**5420000**	**2.15**	**ug/Kg**
98-82-8	**Benzene, (1-methylethyl)-**	**4220000**	**2.28**	**ug/Kg**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207033703	**TRIAL DAY 1 CONDENSATE-T**	Solid	06/22/2012 09:30	06/23/2012 09:45

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			50	06/28/2012 14:19	KCB	485116

CAS#	Parameter	Result	Retention	Units
611-14-3	**Benzene, 1-ethyl-2-methyl-**	**1630000**	**2.45**	**ug/Kg**
95-63-6	**Benzene, 1,2,4-trimethyl-**	**2990000**	**2.48**	**ug/Kg**
108-67-8	**Benzene, 1,3,5-trimethyl-**	**5280000**	**2.60**	**ug/Kg**
2870-04-4	**Benzene, 2-ethyl-1,3-dimethyl-**	**1240000**	**2.73**	**ug/Kg**

RESULTS REPORTED ON A WET WEIGHT BASIS

GC/MS Volatiles Quality Control Summary

Analytical Batch 485069		**Client ID**	MB485069			LCS485069				LCSD485069		
Prep Batch N/A		**GCAL ID**	1084033			1084034				1084035		
		Sample Type	Method Blank			LCS				LCSD		
		Analytical Date	07/07/2012 13:14			07/07/2012 11:33				07/07/2012 11:53		
		Matrix	Water			Water				Water		
SW-846 8260B			**Units**	ug/L	**Spike**	**Result**		**Control**		**Result**			**RPD**
			Result	**RDL**	**Added**		**% R**	**Limits % R**			**% R**	**RPD**	**Limit**
67-64-1	Acetone		0.399U	0.399	50.0	45.2	90	44 - 156		44.2	88	2	30
74-97-5	Bromochloromethane		0.127U	0.127	50.0	57.7	115	76 - 130		52.2	104	10	30
75-27-4	Bromodichloromethane		0.076U	0.076	50.0	60.4	121	74 - 125		57.4	115	5	30
75-25-2	Bromoform		0.150U	0.150	50.0	43.7	87	64 - 122		46.9	94	7	30
74-83-9	Bromomethane		0.427U	0.427	50.0	47.8	96	47 - 138		45.3	91	5	30
75-15-0	Carbon disulfide		0.190U	0.190	50.0	55.1	110	69 - 136		49.8	100	10	30
56-23-5	Carbon tetrachloride		0.146U	0.146	50.0	55.9	112	76 - 128		53.2	106	5	30
75-00-3	Chloroethane		0.235U	0.235	50.0	53.9	108	62 - 141		49.4	99	9	30
136777-61-2	m,p-Xylene		0.237U	0.237	100	106	106	74 - 126		105	105	0.9	30
67-66-3	Chloroform		0.109U	0.109	50.0	56.4	113	75 - 122		52.6	105	7	30
74-87-3	Chloromethane		0.058U	0.058	50.0	57.2	114	59 - 132		57.6	115	0.7	30
124-48-1	Dibromochloromethane		0.076U	0.076	50.0	46.8	94	71 - 123		49.2	98	5	30
74-95-3	Dibromomethane		0.131U	0.131	50.0	51.0	102	72 - 129		50.4	101	1	30
75-71-8	Dichlorodifluoromethane		0.154U	0.154	50.0	54.8	110	58 - 140		53.1	106	3	30
75-34-3	1,1-Dichloroethane		0.138U	0.138	50.0	59.1	118	74 - 127		52.9	106	11	30
107-06-2	1,2-Dichloroethane		0.119U	0.119	50.0	55.4	111	71 - 129		52.7	105	5	30
156-59-2	cis-1,2-Dichloroethene		0.134U	0.134	50.0	58.8	118	73 - 130		56.6	113	4	30
156-60-5	trans-1,2-Dichloroethene		0.075U	0.075	50.0	57.0	114	69 - 132		52.9	106	7	30
75-09-2	Methylene chloride		0.149U	0.149	50.0	52.5	105	68 - 132		50.0	100	5	30
78-87-5	1,2-Dichloropropane		0.150U	0.150	50.0	58.8	118	72 - 128		56.9	114	3	30
10061-01-5	cis-1,3-Dichloropropene		0.092U	0.092	50.0	51.1	102	71 - 132		49.9	100	2	30
10061-02-6	trans-1,3-Dichloropropene		0.146U	0.146	50.0	52.7	105	71 - 131		50.9	102	3	30
100-41-4	Ethylbenzene		0.119U	0.119	50.0	52.7	105	74 - 126		52.0	104	1	30
591-78-6	2-Hexanone		0.093U	0.093	50.0	40.8	82	50 - 135		45.0	90	10	30
98-82-8	Isopropylbenzene (Cumene)		0.123U	0.123	50.0	56.3	113	71 - 125		55.6	111	1	30
78-93-3	2-Butanone		0.362U	0.362	50.0	42.6	85	58 - 137		45.2	90	6	30
74-88-4	Methyl iodide		0.084U	0.084	50.0	50.1	100	57 - 141		48.2	96	4	30
108-10-1	4-Methyl-2-pentanone		0.079U	0.079	50.0	43.7	87	57 - 132		46.5	93	6	30
103-65-1	n-Propylbenzene		0.102U	0.102	50.0	59.1	118	75 - 129		58.6	117	0.8	30
100-42-5	Styrene		0.098U	0.098	50.0	49.5	99	71 - 127		50.1	100	1	30
127-18-4	Tetrachloroethene		0.126U	0.126	50.0	49.3	99	68 - 128		49.0	98	0.6	30
630-20-6	1,1,1,2-Tetrachloroethane		0.103U	0.103	50.0	50.3	101	75 - 124		50.2	100	0.2	30
79-34-5	1,1,2,2-Tetrachloroethane		0.108U	0.108	50.0	45.4	91	70 - 122		54.4	109	18	30

GC/MS Volatiles Quality Control Summary

Analytical Batch 485069		**Client ID**	MB485069			LCS485069				LCSD485069		
Prep Batch N/A		**GCAL ID**	1084033			1084034				1084035		
		Sample Type	Method Blank			LCS				LCSD		
		Analytical Date	07/07/2012 13:14			07/07/2012 11:33				07/07/2012 11:53		
		Matrix	Water			Water				Water		
SW-846 8260B		**Units**	ug/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
120-82-1	1,2,4-Trichlorobenzene	0.156U	0.156	50.0	43.5	87	61 - 135	46.2	92	6	30
71-55-6	1,1,1-Trichloroethane	0.085U	0.085	50.0	58.8	118	76 - 126	55.0	110	7	30
79-00-5	1,1,2-Trichloroethane	0.147U	0.147	50.0	48.9	98	72 - 121	50.8	102	4	30
75-69-4	Trichlorofluoromethane	0.131U	0.131	50.0	55.0	110	72 - 136	51.4	103	7	30
96-18-4	1,2,3-Trichloropropane	0.098U	0.098	50.0	50.1	100	70 - 120	54.5	109	8	30
95-63-6	1,2,4-Trimethylbenzene	0.102U	0.102	50.0	56.9	114	74 - 125	60.3	121	6	30
108-67-8	1,3,5-Trimethylbenzene	0.075U	0.075	50.0	56.7	113	71 - 132	59.4	119	5	30
75-01-4	Vinyl chloride	0.137U	0.137	50.0	55.9	112	68 - 132	53.2	106	5	30
95-47-6	o-Xylene	0.147U	0.147	50.0	55.6	111	73 - 130	54.5	109	2	30
96-12-8	1,2-Dibromo-3-chloropropane	0.178U	0.178	50.0	41.5	83	57 - 121	46.6	93	12	30
106-93-4	1,2-Dibromoethane	0.100U	0.100	50.0	46.0	92	70 - 124	46.3	93	0.7	30
108-05-4	Vinyl acetate	0.076U	0.076	50.0	72.4	145	54 - 147	67.9	136	6	30
1634-04-4	tert-Butyl methyl ether (MTBE)	0.060U	0.060	50.0	49.5	99	71 - 125	47.3	95	5	30
540-59-0	1,2-Dichloroethene(Total)	0.209U	0.209	100	116	116	74 - 128	110	110	5	30
99-87-6	4-Isopropyltoluene	0.082U	0.082	50.0	51.8	104	71 - 129	52.7	105	2	30
1330-20-7	Xylene (total)	0.384U	0.384	150	162	108	74 - 127	160	107	1	30
110-57-6	trans-1,4-Dichloro-2-butene	0.312U	0.312	50.0	45.9	92	56 - 132	52.3	105	13	30
594-20-7	2,2-Dichloropropane	0.181U	0.181	50.0	61.0	122	77 - 124	57.0	114	7	30
76-13-1	Trichlorotrifluoroethane	0.158U	0.158	50.0	54.5	109	72 - 136	50.0	100	9	30
563-58-6	1,1-Dichloropropene	0.121U	0.121	50.0	53.2	106	72 - 131	51.0	102	4	30
142-28-9	1,3-Dichloropropane	0.072U	0.072	50.0	47.8	96	74 - 122	49.8	100	4	30
108-86-1	Bromobenzene	0.109U	0.109	50.0	55.7	111	71 - 120	60.0	120	7	30
95-49-8	2-Chlorotoluene	0.108U	0.108	50.0	54.8	110	72 - 127	57.8	116	5	30
106-43-4	4-Chlorotoluene	0.117U	0.117	50.0	54.7	109	75 - 126	59.3	119	8	30
98-06-6	tert-Butylbenzene	0.097U	0.097	50.0	58.9	118	72 - 126	58.6	117	0.5	30
135-98-8	sec-Butylbenzene	0.111U	0.111	50.0	59.2	118	70 - 136	59.5	119	0.5	30
541-73-1	1,3-Dichlorobenzene	0.135U	0.135	50.0	50.1	100	74 - 126	56.3	113	12	30
106-46-7	1,4-Dichlorobenzene	0.110U	0.110	50.0	51.3	103	72 - 122	51.7	103	0.8	30
104-51-8	n-Butylbenzene	0.152U	0.152	50.0	54.7	109	69 - 134	52.5	105	4	30
95-50-1	1,2-Dichlorobenzene	0.117U	0.117	50.0	50.2	100	71 - 126	54.7	109	9	30
87-68-3	Hexachlorobutadiene	0.211U	0.211	50.0	58.1	116	61 - 144	50.8	102	13	30
91-20-3	Naphthalene	0.065U	0.065	50.0	37.1	74	57 - 138	40.2	80	8	35
75-35-4	1,1-Dichloroethene	0.208U	0.208	50.0	52.8	106	69 - 129	50.3	101	5	20

GC/MS Volatiles Quality Control Summary

Analytical Batch	485069	**Client ID**	MB485069			LCS485069			LCSD485069			
Prep Batch	N/A	**GCAL ID**	1084033			1084034			1084035			
		Sample Type	Method Blank			LCS			LCSD			
		Analytical Date	07/07/2012 13:14			07/07/2012 11:33			07/07/2012 11:53			
		Matrix	Water			Water			Water			
SW-846 8260B		**Units**	ug/L	**Spike**	**Result**		**Control**	**Result**			**RPD**	
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**	
71-43-2	Benzene	0.099U	0.099	50.0	57.7	115	70 - 129	55.6	111	4	20	
79-01-6	Trichloroethene	0.151U	0.151	50.0	55.4	111	76 - 129	51.4	103	7	20	
108-88-3	Toluene	0.127U	0.127	50.0	53.1	106	72 - 120	52.2	104	2	20	
108-90-7	Chlorobenzene	0.089U	0.089	50.0	52.5	105	74 - 123	53.2	106	1	20	
Surrogate												
460-00-4	4-Bromofluorobenzene	47.7	95	50	49	98	78 - 130	48.1	96			
1868-53-7	Dibromofluoromethane	50.8	102	50	53	106	77 - 127	49.9	100			
2037-26-5	Toluene d8	50.6	101	50	47.3	95	76 - 134	48.9	98			
17060-07-0	1,2-Dichloroethane-d4	52	104	50	50.9	102	71 - 127	49.5	99			

Analytical Batch	485070	**Client ID**	MB485070			LCS485070			LCSD485070			
Prep Batch	N/A	**GCAL ID**	1084036			1084037			1084038			
		Sample Type	Method Blank			LCS			LCSD			
		Analytical Date	07/07/2012 13:34			07/07/2012 11:33			07/07/2012 11:53			
		Matrix	Solid			Solid			Solid			
SW-846 8260B		**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**			**RPD**	
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**	
67-64-1	Acetone	51.5U	51.5	2500	2260	90	38 - 152	2210	88	2	30	
74-97-5	Bromochloromethane	6.75U	6.75	2500	2890	116	73 - 127	2610	104	10	30	
75-27-4	Bromodichloromethane	8.10U	8.10	2500	3020	121	74 - 126	2870	115	5	30	
75-25-2	Bromoform	7.95U	7.95	2500	2180	87	67 - 122	2350	94	8	30	
74-83-9	Bromomethane	15.2U	15.2	2500	2390	96	48 - 139	2260	90	6	30	
75-15-0	Carbon disulfide	16.3U	16.3	2500	2750	110	68 - 133	2490	100	10	30	
56-23-5	Carbon tetrachloride	10.1U	10.1	2500	2800	112	71 - 133	2660	106	5	30	
75-00-3	Chloroethane	16.6U	16.6	2500	2700	108	57 - 144	2470	99	9	30	
136777-61-2	m,p-Xylene	14.7U	14.7	5000	5310	106	72 - 128	5270	105	0.8	30	
67-66-3	Chloroform	10.8U	10.8	2500	2820	113	74 - 124	2630	105	7	30	
74-87-3	Chloromethane	11.9U	11.9	2500	2860	114	61 - 130	2880	115	0.7	30	
124-48-1	Dibromochloromethane	10.9U	10.9	2500	2340	94	74 - 122	2460	98	5	30	
74-95-3	Dibromomethane	11.6U	11.6	2500	2550	102	72 - 125	2520	101	1	30	
75-71-8	Dichlorodifluoromethane	11.2U	11.2	2500	2740	110	59 - 138	2660	106	3	30	
75-34-3	1,1-Dichloroethane	7.45U	7.45	2500	2960	118	71 - 126	2650	106	11	30	

GC/MS Volatiles Quality Control Summary

Analytical Batch 485070		**Client ID**	MB485070			LCS485070				LCSD485070		
Prep Batch N/A		**GCAL ID**	1084036			1084037				1084038		
		Sample Type	Method Blank			LCS				LCSD		
		Analytical Date	07/07/2012 13:34			07/07/2012 11:33				07/07/2012 11:53		
		Matrix	Solid			Solid				Solid		
SW-846 8260B		**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
107-06-2	1,2-Dichloroethane	9.90U	9.90	2500	2770	111	68 - 126	2630	105	5	30
156-59-2	cis-1,2-Dichloroethene	7.40U	7.40	2500	2940	118	72 - 130	2830	113	4	30
156-60-5	trans-1,2-Dichloroethene	6.55U	6.55	2500	2850	114	67 - 134	2650	106	7	30
75-09-2	Methylene chloride	22.1U	22.1	2500	2620	105	66 - 130	2500	100	5	30
78-87-5	1,2-Dichloropropane	7.70U	7.70	2500	2940	118	72 - 129	2840	114	3	30
10061-01-5	cis-1,3-Dichloropropene	9.25U	9.25	2500	2560	102	72 - 129	2500	100	2	30
10061-02-6	trans-1,3-Dichloropropene	8.50U	8.50	2500	2630	105	72 - 126	2540	102	3	30
100-41-4	Ethylbenzene	9.15U	9.15	2500	2640	106	74 - 130	2600	104	2	30
591-78-6	2-Hexanone	21.7U	21.7	2500	2040	82	47 - 137	2250	90	10	30
98-82-8	Isopropylbenzene (Cumene)	9.25U	9.25	2500	2820	113	74 - 125	2780	111	1	30
78-93-3	2-Butanone	25.9U	25.9	2500	2130	85	47 - 142	2260	90	6	30
74-88-4	Methyl iodide	61.5U	61.5	2500	2500	100	54 - 140	2410	96	4	30
108-10-1	4-Methyl-2-pentanone	6.60U	6.60	2500	2180	87	52 - 136	2330	93	7	30
103-65-1	n-Propylbenzene	37.0U	37.0	2500	2960	118	73 - 137	2930	117	1	30
100-42-5	Styrene	7.70U	7.70	2500	2480	99	72 - 128	2500	100	0.8	30
127-18-4	Tetrachloroethene	14.8U	14.8	2500	2470	99	70 - 127	2450	98	0.8	30
630-20-6	1,1,1,2-Tetrachloroethane	6.75U	6.75	2500	2510	100	77 - 122	2510	100	0	30
79-34-5	1,1,2,2-Tetrachloroethane	5.70U	5.70	2500	2270	91	66 - 129	2720	109	18	30
120-82-1	1,2,4-Trichlorobenzene	17.8U	17.8	2500	2170	87	64 - 135	2310	92	6	30
71-55-6	1,1,1-Trichloroethane	11.9U	11.9	2500	2940	118	70 - 130	2750	110	7	30
79-00-5	1,1,2-Trichloroethane	6.70U	6.70	2500	2450	98	74 - 120	2540	102	4	30
75-69-4	Trichlorofluoromethane	13.1U	13.1	2500	2750	110	64 - 141	2570	103	7	30
96-18-4	1,2,3-Trichloropropane	5.75U	5.75	2500	2510	100	63 - 132	2730	109	8	30
95-63-6	1,2,4-Trimethylbenzene	18.0U	18.0	2500	2840	114	75 - 130	3020	121	6	30
108-67-8	1,3,5-Trimethylbenzene	18.8U	18.8	2500	2830	113	74 - 136	2970	119	5	30
75-01-4	Vinyl chloride	13.6U	13.6	2500	2800	112	67 - 131	2660	106	5	30
95-47-6	o-Xylene	6.75U	6.75	2500	2780	111	69 - 133	2730	109	2	30
96-12-8	1,2-Dibromo-3-chloropropane	20.1U	20.1	2500	2080	83	60 - 123	2330	93	11	30
106-93-4	1,2-Dibromoethane	7.20U	7.20	2500	2300	92	74 - 122	2320	93	0.9	30
108-05-4	Vinyl acetate	7.05U	7.05	2500	3620	**145***	53 - 140	3400	136	6	30
1634-04-4	tert-Butyl methyl ether (MTBE)	6.10U	6.10	2500	2480	99	69 - 126	2360	94	5	30
540-59-0	1,2-Dichloroethene(Total)	11.7U	11.7	5000	5790	116	72 - 129	5480	110	6	30
99-87-6	4-Isopropyltoluene	10.5U	10.5	2500	2590	104	71 - 136	2640	106	2	30

GCAL Report 212070337

GC/MS Volatiles Quality Control Summary

Analytical Batch	485070	**Client ID**	MB485070			LCS485070				LCSD485070		
Prep Batch	N/A	**GCAL ID**	1084036			1084037				1084038		
		Sample Type	Method Blank			LCS				LCSD		
		Analytical Date	07/07/2012 13:34			07/07/2012 11:33				07/07/2012 11:53		
		Matrix	Solid			Solid				Solid		
SW-846 8260B		**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**			**RPD**	
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**	
1330-20-7	Xylene (total)	20.1U	20.1	7500	8090	108	71 - 129	8000	107	1	30	
110-57-6	trans-1,4-Dichloro-2-butene	25.9U	25.9	2500	2300	92	44 - 146	2610	104	13	30	
594-20-7	2,2-Dichloropropane	12.5U	12.5	2500	3050	122	74 - 129	2850	114	7	30	
76-13-1	Trichlorotrifluoroethane	10.0U	10.0	2500	2720	109	66 - 139	2500	100	8	30	
563-58-6	1,1-Dichloropropene	12.2U	12.2	2500	2660	106	70 - 138	2550	102	4	30	
142-28-9	1,3-Dichloropropane	7.90U	7.90	2500	2390	96	77 - 121	2490	100	4	30	
108-86-1	Bromobenzene	7.80U	7.80	2500	2790	112	73 - 124	3000	120	7	30	
95-49-8	2-Chlorotoluene	11.0U	11.0	2500	2740	110	75 - 132	2890	116	5	30	
106-43-4	4-Chlorotoluene	11.8U	11.8	2500	2730	109	74 - 133	2970	119	8	30	
98-06-6	tert-Butylbenzene	12.8U	12.8	2500	2950	118	72 - 136	2930	117	0.7	30	
135-98-8	sec-Butylbenzene	9.85U	9.85	2500	2960	118	72 - 141	2980	119	0.7	30	
541-73-1	1,3-Dichlorobenzene	13.0U	13.0	2500	2500	100	77 - 127	2820	113	12	30	
106-46-7	1,4-Dichlorobenzene	11.6U	11.6	2500	2570	103	74 - 123	2580	103	0.4	30	
104-51-8	n-Butylbenzene	11.7U	11.7	2500	2740	110	68 - 144	2630	105	4	30	
95-50-1	1,2-Dichlorobenzene	13.8U	13.8	2500	2510	100	76 - 125	2740	110	9	30	
87-68-3	Hexachlorobutadiene	10.7U	10.7	2500	2910	116	71 - 140	2540	102	14	30	
91-20-3	Naphthalene	16.1U	16.1	2500	1850	74	54 - 132	2010	80	8	30	
75-35-4	1,1-Dichloroethene	11.6U	11.6	2500	2640	106	68 - 129	2520	101	5	30	
71-43-2	Benzene	7.60U	7.60	2500	2880	115	73 - 128	2780	111	4	30	
79-01-6	Trichloroethene	10.7U	10.7	2500	2770	111	78 - 127	2570	103	7	30	
108-88-3	Toluene	7.75U	7.75	2500	2660	106	74 - 121	2610	104	2	30	
108-90-7	Chlorobenzene	7.45U	7.45	2500	2620	105	75 - 121	2660	106	2	30	
Surrogate												
460-00-4	4-Bromofluorobenzene	2300	92	2500	2450	98	62 - 127	2410	96			
1868-53-7	Dibromofluoromethane	2540	102	2500	2650	106	65 - 130	2500	100			
2037-26-5	Toluene d8	2500	100	2500	2360	94	71 - 132	2440	98			
17060-07-0	1,2-Dichloroethane-d4	2540	102	2500	2540	102	62 - 125	2470	99			

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	484405	**Client ID**	MB484151			LCS484151			LCSD484151			
Prep Batch	484151	**GCAL ID**	1079536			1079537			1079538			
Prep Method	3550C	**Sample Type**	Method Blank			LCS			LCSD			
		Prep Date	06/26/2012 12:45			06/26/2012 12:45			06/26/2012 12:45			
		Analytical Date	06/28/2012 13:28			06/28/2012 13:45			06/28/2012 14:02			
		Matrix	Solid			Solid			Solid			
SW-846 8270C		**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
208-96-8	Acenaphthylene	1970U	1970								
120-12-7	Anthracene	1710U	1710								
56-55-3	Benzo(a)anthracene	3870U	3870								
205-99-2	Benzo(b)fluoranthene	4560U	4560								
207-08-9	Benzo(k)fluoranthene	2010U	2010								
191-24-2	Benzo(g,h,i)perylene	1580U	1580								
50-32-8	Benzo(a)pyrene	1850U	1850								
85-68-7	Butyl benzyl phthalate	890U	890								
111-91-1	Bis(2-Chloroethoxy)methane	3870U	3870								
111-44-4	Bis(2-Chloroethyl)ether	3650U	3650								
108-60-1	Bis(2-Chloroisopropyl)ether	3090U	3090								
117-81-7	Bis(2-Ethylhexyl)phthalate	2940U	2940								
101-55-3	4-Bromophenyl phenyl ether	2780U	2780								
86-74-8	Carbazole	3000U	3000								
7005-72-3	4-Chlorophenyl phenyl ether	2810U	2810								
218-01-9	Chrysene	2180U	2180								
53-70-3	Dibenz(a,h)anthracene	1730U	1730								
132-64-9	Dibenzofuran	1610U	1610								
91-94-1	3,3'-Dichlorobenzidine	45900U	45900								
120-83-2	2,4-Dichlorophenol	5310U	5310								
84-66-2	Diethyl phthalate	3050U	3050								
105-67-9	2,4-Dimethylphenol	35000U	35000								
131-11-3	Dimethyl phthalate	2120U	2120								
117-84-0	Di-n-octyl phthalate	666U	666								
51-28-5	2,4-Dinitrophenol	22800U	22800								
606-20-2	2,6-Dinitrotoluene	3990U	3990								
206-44-0	Fluoranthene	978U	978								
86-73-7	Fluorene	1940U	1940								
118-74-1	Hexachlorobenzene	2870U	2870								
87-68-3	Hexachlorobutadiene	3000U	3000								
77-47-4	Hexachlorocyclopentadiene	18000U	18000								
67-72-1	Hexachloroethane	2390U	2390								

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	484405	**Client ID**	MB484151			LCS484151			LCSD484151			
Prep Batch	484151	**GCAL ID**	1079536			1079537			1079538			
Prep Method	3550C	**Sample Type**	Method Blank			LCS			LCSD			
		Prep Date	06/26/2012 12:45			06/26/2012 12:45			06/26/2012 12:45			
		Analytical Date	06/28/2012 13:28			06/28/2012 13:45			06/28/2012 14:02			
		Matrix	Solid			Solid			Solid			
SW-846 8270C		**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
78-59-1	Isophorone	1740U	1740								
193-39-5	Indeno(1,2,3-cd)pyrene	4640U	4640								
91-57-6	2-Methylnaphthalene	1340U	1340								
95-48-7	o-Cresol	1760U	1760								
98-95-3	Nitrobenzene	2760U	2760								
88-75-5	2-Nitrophenol	3680U	3680								
62-75-9	n-Nitrosodimethylamine	6800U	6800								
86-30-6	n-Nitrosodiphenylamine	1580U	1580								
85-01-8	Phenanthrene	1590U	1590								
95-95-4	2,4,5-Trichlorophenol	3350U	3350								
88-06-2	2,4,6-Trichlorophenol	11800U	11800								
100-51-6	Benzyl alcohol	6770U	6770								
62-53-3	Aniline	4620U	4620								
110-86-1	Pyridine	18000U	18000								
99-09-2	3-Nitroaniline	3300U	3300								
100-01-6	4-Nitroaniline	24500U	24500								
84-74-2	Di-n-butyl phthalate	1970U	1970								
122-66-7	1,2Diphenylhydrazine/Azobenzen	1760U	1760								
88-74-4	2-Nitroaniline	3600U	3600								
91-58-7	2-Chloronaphthalene	1590U	1590								
106-47-8	4-Chloroaniline	3330U	3330								
1319-77-3MP	m,p-Cresol	6990U	6990								
534-52-1	4,6-Dinitro-2-methylphenol	22500U	22500								
108-95-2	Phenol	2970U	2970	100000	79100	79	42 - 120	86200	86	9	40
95-57-8	2-Chlorophenol	1740U	1740	100000	76700	77	48 - 120	87000	87	13	40
106-46-7	1,4-Dichlorobenzene	1560U	1560	100000	71800	72	42 - 120	81000	81	12	40
621-64-7	n-Nitrosodi-n-propylamine	2270U	2270	100000	75800	76	46 - 120	85000	85	11	40
120-82-1	1,2,4-Trichlorobenzene	1700U	1700	100000	67500	68	46 - 120	74100	74	9	40
59-50-7	4-Chloro-3-methylphenol	4730U	4730	100000	76100	76	46 - 120	88800	89	15	40
83-32-9	Acenaphthene	1770U	1770	100000	70700	71	50 - 120	80500	81	13	40
100-02-7	4-Nitrophenol	14000U	14000	100000	64300	64	32 - 120	80600	81	22	40
121-14-2	2,4-Dinitrotoluene	3000U	3000	100000	59200	59	45 - 120	72500	73	20	40

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	484405	**Client ID**	MB484151	LCS484151	LCSD484151
Prep Batch	484151	**GCAL ID**	1079536	1079537	1079538
Prep Method	3550C	**Sample Type**	Method Blank	LCS	LCSD
		Prep Date	06/26/2012 12:45	06/26/2012 12:45	06/26/2012 12:45
		Analytical Date	06/28/2012 13:28	06/28/2012 13:45	06/28/2012 14:02
		Matrix	Solid	Solid	Solid

SW-846 8270C		**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
87-86-5	Pentachlorophenol	18900U	18900	100000	90900	91	30 - 124	107000	107	16	40
129-00-0	Pyrene	2300U	2300	100000	90000	90	38 - 136	87200	87	3	40
Surrogate											
4165-60-0	Nitrobenzene-d5	78700	79	100000	79900	80	46 - 123	85700	86		
321-60-8	2-Fluorobiphenyl	76500	77	100000	74900	75	47 - 127	81600	82		
1718-51-0	Terphenyl-d14	69200	69	100000	77200	77	38 - 167	78300	78		
4165-62-2	Phenol-d5	173000	87	200000	168000	84	43 - 123	186000	93		
367-12-4	2-Fluorophenol	170000	85	200000	167000	84	51 - 119	184000	92		
118-79-6	2,4,6-Tribromophenol	135000	68	200000	138000	69	44 - 121	166000	83		

Analytical Batch	484967	**Client ID**	MB484872	LCS484872	LCSD484872
Prep Batch	484872	**GCAL ID**	1083234	1083235	1083236
Prep Method	SW-846	**Sample Type**	Method Blank	LCS	LCSD
	3510C	**Prep Date**	07/05/2012 14:55	07/05/2012 14:55	07/05/2012 14:55
		Analytical Date	07/06/2012 10:19	07/06/2012 10:33	07/06/2012 10:47
		Matrix	Water	Water	Water

SW-846 8270C		**Units**	ug/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
208-96-8	Acenaphthylene	0.303U	0.303								
120-12-7	Anthracene	0.316U	0.316								
56-55-3	Benzo(a)anthracene	0.316U	0.316								
205-99-2	Benzo(b)fluoranthene	0.217U	0.217								
207-08-9	Benzo(k)fluoranthene	0.236U	0.236								
191-24-2	Benzo(g,h,i)perylene	0.215U	0.215								
50-32-8	Benzo(a)pyrene	0.125U	0.125								
85-68-7	Butyl benzyl phthalate	0.165U	0.165								
111-91-1	Bis(2-Chloroethoxy)methane	0.290U	0.290								
111-44-4	Bis(2-Chloroethyl)ether	0.288U	0.288								
108-60-1	Bis(2-Chloroisopropyl)ether	0.257U	0.257								
117-81-7	Bis(2-Ethylhexyl)phthalate	0.191U	0.191								
101-55-3	4-Bromophenyl phenyl ether	0.337U	0.337								

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	484967	**Client ID**	MB484872	LCS484872	LCSD484872
Prep Batch	484872	**GCAL ID**	1083234	1083235	1083236
Prep Method	SW-846	**Sample Type**	Method Blank	LCS	LCSD
	3510C	**Prep Date**	07/05/2012 14:55	07/05/2012 14:55	07/05/2012 14:55
		Analytical Date	07/06/2012 10:19	07/06/2012 10:33	07/06/2012 10:47
		Matrix	Water	Water	Water

SW-846 8270C		**Units**	ug/L	**Spike**	**Result**	**% R**	**Control**	**Result**	**% R**	**RPD**	**RPD**
		Result	**RDL**	**Added**			**Limits % R**				**Limit**
86-74-8	Carbazole	0.232U	0.232								
7005-72-3	4-Chlorophenyl phenyl ether	0.268U	0.268								
218-01-9	Chrysene	0.433U	0.433								
53-70-3	Dibenz(a,h)anthracene	0.217U	0.217								
132-64-9	Dibenzofuran	0.227U	0.227								
91-94-1	3,3'-Dichlorobenzidine	0.297U	0.297								
120-83-2	2,4-Dichlorophenol	0.217U	0.217								
84-66-2	Diethyl phthalate	0.303U	0.303								
105-67-9	2,4-Dimethylphenol	0.694U	0.694								
131-11-3	Dimethyl phthalate	0.255U	0.255								
117-84-0	Di-n-octyl phthalate	0.167U	0.167								
51-28-5	2,4-Dinitrophenol	2.60U	2.60								
606-20-2	2,6-Dinitrotoluene	0.352U	0.352								
206-44-0	Fluoranthene	0.267U	0.267								
86-73-7	Fluorene	0.288U	0.288								
118-74-1	Hexachlorobenzene	0.249U	0.249								
87-68-3	Hexachlorobutadiene	0.192U	0.192								
77-47-4	Hexachlorocyclopentadiene	0.174U	0.174								
67-72-1	Hexachloroethane	0.299U	0.299								
78-59-1	Isophorone	0.380U	0.380								
193-39-5	Indeno(1,2,3-cd)pyrene	0.157U	0.157								
91-57-6	2-Methylnaphthalene	0.255U	0.255								
95-48-7	o-Cresol	0.329U	0.329								
98-95-3	Nitrobenzene	0.329U	0.329								
88-75-5	2-Nitrophenol	0.357U	0.357								
62-75-9	n-Nitrosodimethylamine	0.304U	0.304								
86-30-6	n-Nitrosodiphenylamine	0.364U	0.364								
85-01-8	Phenanthrene	0.304U	0.304								
95-95-4	2,4,5-Trichlorophenol	0.317U	0.317								
88-06-2	2,4,6-Trichlorophenol	0.275U	0.275								
100-51-6	Benzyl alcohol	0.355U	0.355								
62-53-3	Aniline	0.718U	0.718								

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	484967	**Client ID**	MB484872	LCS484872	LCSD484872
Prep Batch	484872	**GCAL ID**	1083234	1083235	1083236
Prep Method	SW-846	**Sample Type**	Method Blank	LCS	LCSD
	3510C	**Prep Date**	07/05/2012 14:55	07/05/2012 14:55	07/05/2012 14:55
		Analytical Date	07/06/2012 10:19	07/06/2012 10:33	07/06/2012 10:47
		Matrix	Water	Water	Water

SW-846 8270C		**Units**	ug/L	**Spike**	**Result**	**% R**	**Control**	**Result**	**% R**	**RPD**	**RPD**
		Result	**RDL**	**Added**			**Limits % R**				**Limit**
110-86-1	Pyridine	3.58U	3.58								
99-09-2	3-Nitroaniline	0.226U	0.226								
100-01-6	4-Nitroaniline	0.221U	0.221								
84-74-2	Di-n-butyl phthalate	0.189U	0.189								
122-66-7	1,2Diphenylhydrazine/Azobenzen	0.278U	0.278								
88-74-4	2-Nitroaniline	0.198U	0.198								
91-58-7	2-Chloronaphthalene	0.221U	0.221								
106-47-8	4-Chloroaniline	0.463U	0.463								
1319-77-3MP	m,p-Cresol	0.352U	0.352								
534-52-1	4,6-Dinitro-2-methylphenol	1.98U	1.98								
108-95-2	Phenol	0.150U	0.150	100	28.2	28	16 - 120	34.5	35	20	30
95-57-8	2-Chlorophenol	0.276U	0.276	100	65.8	66	42 - 120	75.2	75	13	30
106-46-7	1,4-Dichlorobenzene	0.255U	0.255	100	74.5	75	22 - 120	81.5	82	9	30
621-64-7	n-Nitrosodi-n-propylamine	0.304U	0.304	100	80.7	81	47 - 120	81.4	81	0.9	30
120-82-1	1,2,4-Trichlorobenzene	0.234U	0.234	100	76.2	76	30 - 120	85.1	85	11	30
59-50-7	4-Chloro-3-methylphenol	0.234U	0.234	100	69.7	70	44 - 120	72.1	72	3	30
83-32-9	Acenaphthene	0.268U	0.268	100	80.4	80	52 - 120	90.9	91	12	30
100-02-7	4-Nitrophenol	1.83U	1.83	100	33.4	33	10 - 120	40.9	41	20	30
121-14-2	2,4-Dinitrotoluene	0.263U	0.263	100	82.2	82	37 - 138	83.9	84	2	30
87-86-5	Pentachlorophenol	0.168U	0.168	100	107	107	25 - 158	116	116	8	30
129-00-0	Pyrene	0.486U	0.486	100	73.6	74	54 - 120	73.6	74	0	30
Surrogate											
4165-60-0	Nitrobenzene-d5	42.8	86	50	43.6	87	52 - 120	46.3	93		
321-60-8	2-Fluorobiphenyl	41.7	83	50	42.7	85	16 - 128	46.9	94		
1718-51-0	Terphenyl-d14	37.8	76	50	32	64	43 - 138	33.1	66		
4165-62-2	Phenol-d5	34.4	34	100	26.3	26	10 - 120	31.5	32		
367-12-4	2-Fluorophenol	47.6	48	100	41.8	42	10 - 120	47.6	48		
118-79-6	2,4,6-Tribromophenol	99.3	99	100	94.4	94	20 - 120	88.4	88		

GCAL

GULF COAST ANALYTICAL LABORATORIES, INC
7979 GSRI Avenue, Baton Rouge, Louisiana 70820-7402
Phone 225.769.4900 • Fax 225.767.5717

CHAIN OF CUSTODY RECORD

212070337 7/9/12

Lab use only	Client Name	Client #	Workorder #	Due Date
	Kemron	4794	~~212062559~~	~~7/3/12~~

Report to:
Client: Kemron
Address: 1359-A Ellsworth Ind Blvd
Atlanta GA 30318
Contact: Tommy Jordan
Phone: 404-636-0928
Fax: 404-636-7162

Bill to:
Client: SAME
Address:
Contact:
Phone:
Fax:

P.O. Number
Project Name/Number: Bridgewater NJ/SE 0416-007
Sampled By: Tommy A Jordan

Matrix[1]	Date	Time (2400)	Comp	Grab	Sample Description	Preservatives	No Containers	Analytical Requests & Method: 8260+TICS + Naphthalene + 1,4-Dichlorobenzene	Analytical Requests & Method: 8270 + TICS	Lab ID	Remarks:
L	6/22	0930		X	TRIAL-DAY1-CONDENSATE-B	N/A	1x40ml	X	X	1	HOT!!!!
SL	6/22	0930		X	TRIAL-DAY1-Condensate-M	↓	1	X	X	2	HOT!!!!
O	6/22	0930		X	TRIAL-DAY1 Condensate-T	↓	1	X	X	3	HOT!!!!

Lab use only:
Custody Seal used ☑ yes ☐ no
intact ☑ yes ☐ no
Temperature °C 26.4

Turn Around Time: ☐ 24-48 hrs. ☐ 3 days ☐ 1 week ☒ Standard ☒ Other ~~Standard expected to 3 day possible~~

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
	Fedex	6/22/12	1752
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Fedex 7985 4540 0833	Udu McCune	6-23-12	9:45
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

Note: A RUSH analysis may be requested during the week of 6/25/12

By submitting these samples, you agree to the terms and conditions contained in our most recent schedule of services.

Matrix[1]: W = water, S = soil, SD = solid, L = liquid, SL = sludge, o = oil, CT = charcoal tube, A = air bag

We cannot accept verbal changes. Please fax written changes to (225)767-5717

WHITE: CLIENT FINAL REPORT — CANARY: LABORATORY — PINK: CLIENT

GCAL-06 11/98

GCAL
GULF COAST ANALYTICAL LABORATORIES, INC

SAMPLE RECEIVING CHECKLIST

SDG
212070337

PROJECT	
Client 4794 - KEMRON	**Transport Method** FEDEX
Profile 232522 - Bridgewater Acid Tar	**Received By** Saucier, Charlotte
Line Item(s) 1 - Sludge	**Receive Date(s)** 06/23/12

CHECKLIST			
Were all samples received using proper thermal preservation?	☑ Yes	☐ No	☐ NA
When used, were all custody seals intact?	☑ Yes	☐ No	☐ NA
Were all samples received in proper containers?	☑ Yes	☐ No	☐ NA
Were all samples received using proper chemical preservation?	☑ Yes	☐ No	☐ NA
Was preservative added to any container at the lab?	☐ Yes	☑ No	☐ NA
Were all containers received in good condition?	☑ Yes	☐ No	☐ NA
Were all VOA vials received with no head space?	☐ Yes	☐ No	☑ NA
Do all sample labels match the Chain of Custody?	☑ Yes	☐ No	☐ NA
Did the Chain of Custody list the sampling technician?	☑ Yes	☐ No	☐ NA

COOLERS

Airbill	Temp(oC)
7985 4540 0833	26.4

DISCREPANCIES

None

LABORATORY PRESERVATIONS

None

NOTES

212070337

Revision 1.1

APPENDIX E

THERMAL TEMPERATURE MONITORING SHEETS

KEMRON ENVIRONMENTAL SERVICES

THERMAL DESORPTION DATA

PROJECT:	Bridgewater	TESTING DATE:	7/12/2012
PROJECT No:	SH0416	TESTED BY:	MC
MATERIAL TYPE:	HC-90C	TRACKING CODE:	

SET-UP, MONITORING, and TESTING INFORMATION

SAMPLE No.		HC-90C A	HC-90C B	
WEIGHT OF PAN (tare weight)		5471.00	5470.50	g
WEIGHT OF UNTREATED SOIL + TARE		6468.00	6471.00	g
WEIGHT OF UNTREATED SOIL		997.00	1000.50	g
WEIGHT OF TREATED SOIL + TARE		6229.50	6240.50	g
WEIGHT OF TREATED SOIL		758.50	770.00	g
WEIGHT LOSS		238.50	230.50	g
LENGTH OF TREATMENT		24	24	Days

VISUAL OBSERVATIONS - BEFORE TREATMENT

Two separate box reactors were utilized to produce enough treated material for analytical testing. The two reactors are represented as "A" and "B". The off-gas lines from the two reactors were merged into a single master off-gas line prior to reaching the condenser. Separate air inlet lines were connected to both reactors at a flow rate of 10ml/min. Temperature monitoring activities were performed only on reactor "A". Off-gas monitoring and sampling activities were performed at the master off-gas line.

Time 0 - Aldehyde Sampling began 7/12/2012 @ 08:25 - Stopped 7/12/2012 @ 10:25
Flow rate 10 ml/min

Time 0 - Acid gas sampling began 7/11/2012 @ 17:00 - Stopped 7/11/2012 @ 22:30
Flow rate 10 ml/min

Time 0 - H2S = 19.8 Time 0 - SO2 = 32

Reactor "A" Average Initial Reactor Head Space = 1.885 inches

Reactor "B" Average Initial Reactor Head Space = 1.895 inches

System passed leak test @ 5.0 psi for 10 minutes

VISUAL OBSERVATIONS - DURING TREATMENT

VISUAL OBSERVATIONS - AFTER TREATMENT

Treated samle had a tarry odor. Surface of treated material uneven and friable interior of sample is hard. Interior of reactor shows significant rusting.

Reactor "A" Average Final reactor head space = 2.233 inches

Sample shrinkage = 0.348 inches = 18.46%

Reactor "B" Average Final reactor head space = 2.196 inches

Sample shrinkage = 0.301 inches = 15.96%

KEMRON
ENVIRONMENTAL SERVICES

THERMAL DESORPTION DATA

PROJECT:	Bridgewater	TESTING DATE:	7/12/2012
PROJECT No:	SH0416	TESTED BY:	MC
MATERIAL TYPE:	HC-90C	TRACKING CODE:	

KEMRON
ENVIRONMENTAL SERVICES

THERMAL DESORPTION DATA

PROJECT:	Bridgewater	TESTING DATE:	7/12/2012
PROJECT No:	SH0416	TESTED BY:	MC
MATERIAL TYPE:	HC-90C	TRACKING CODE:	0

	Day	Time			Temps Soil	Temps Oven	Comments
1	7/12/2012	12		36	25.1	25.0	Testing Started Oven set to 30C
2	7/12/2012	12		50	28.4	38.2	Off-gas monitoring performed
3	7/12/2012	13		5	31.3	39.4	Oven set to 50C
4	7/12/2012	13		58	49.1	55.6	Off-gas monitoring performed
5	7/12/2012	14		15	54.5	56.2	Oven set to 70C
6	7/12/2012	15		9	71.4	69.4	Off-gas monitoring performed
7	7/12/2012	15		20	73.8	68.6	Oven set to 90C
8	7/12/2012	15		43	80.0	76.1	Steady condensate drip
9	7/12/2012	16		29	88.8	84.1	
10	7/12/2012	16		39	90.0	85.1	Off-gas monitoring performed
11	7/12/2012	18		38	91.1	78.7	
12	7/13/2012	9		0	91.3	79.9	
13	7/13/2012	11		31	94.0	83.3	Condensate removed and stored
14	7/13/2012	12		22	92.6	83.1	Off-gas monitoring performed
15	7/13/2012	13		35	92.6	82.9	
16	7/13/2012	14		22	90.9	80.0	
17	7/13/2012	15		25	92.9	84.9	Oven temperature reduced 89.8C
18	7/14/2012	9		44	86.6	78.4	Off-gas monitoring performed Condensate clear with oily sheen
19	7/14/2012	13		0	91.8	81.5	
20	7/16/2012	9		17	90.1	79.8	Condensate clear with oily sheen Off-gas monitoring performed
21	7/16/2012	14		23	89.4	79.5	
22	7/16/2012	17		8	89.4	80.0	Started Summa VOC sample collection
23	7/17/2012	17		8	91.0	81.8	Stopped Summa VOC sample collection
24	7/17/2012	10		25	87.8	79.6	Off-gas monitoring performed

KEMRON
ENVIRONMENTAL SERVICES

THERMAL DESORPTION DATA

PROJECT:	Bridgewater	TESTING DATE:	7/12/2012
PROJECT No:	SH0416	TESTED BY:	MC
MATERIAL TYPE:	HC-90C	TRACKING CODE:	0

	Day	Time			Temps		Comments
					Soil	Oven	
25	7/17/2012	10		37	88.3	78.5	Started aldehyde sampling 10 ml/min
26	7/17/2012	12		47			Stopped aldehyde sampling
27	7/17/2012	12		57			Started reduced sulfur collection
28	7/17/2012	13		41			stopped reduced sulfur colletion
29	7/17/2012	13		46			started inorganic acid sample collection
30	7/17/2012	18		46			stopped inorganic acid sample collection
31	7/17/2012	19		53	88.4	79.6	
32	7/18/2012	9		3	88.2	79.5	Condensate clear with oily sheen
33	7/18/2012	16		45	94.3	84.7	Off-gas monitoring performed
34	7/18/2012	17		30	90.0	82.0	
35	7/19/2012	8		25	91.9	81.0	
36	7/19/2012	13		53	89.0	79.3	condenste clear with oily areas and black particulates
37	7/19/2012	14		13			Off-gas monitoring performed
38	7/20/2012	8		37	91.1	82.3	
39	7/20/2012	13		7	90.9	82.2	Condensate clear with oily sheen Off-gas monitoring performed
40	7/20/2012	16		45	90.7	82.5	
41	7/23/2012	8		5	91.3	82.9	
42	7/23/2012	9		10	91.4	92.8	condensate more oily and clear Off-gas monitoring performed
43	7/23/2012	11		47	90.2	81.5	
44	7/23/2012	14		15	89.3	80.7	
45	7/23/2012	17		9	88.9	80.4	
46	7/24/2012	8		20	89.1	79.6	
47	7/24/2012	9		10	89.1	80.0	condensate clear, off-gas monitoring performed
48	7/24/2012	12		5	89.0	79.8	

KEMRON
ENVIRONMENTAL SERVICES

THERMAL DESORPTION DATA

PROJECT:	Bridgewater	TESTING DATE:	7/12/2012
PROJECT No:	SH0416	TESTED BY:	MC
MATERIAL TYPE:	HC-90C	TRACKING CODE:	0

	Day	Time			Temps		Comments
					Soil	Oven	
49	7/24/2012	15		20	89.2	80.3	
50	7/25/2012	8		31	88.9	79.6	
51	7/25/2012	9		52	89.6	80.8	condensate clear, off-gas monitoring performed
52	7/25/2012	13		55	89.6	81.0	
53	7/25/2012	15		42	88.4	80.5	
54	7/26/2012	8		45	89.4	81.0	
55	7/26/2012	9		55	89.3	81.0	condensate clear, off-gas monitoring performed
56	7/26/2012	17		21	86.5	78.1	
57	7/27/2012	8		5	90.8	81.8	
58	7/27/2012	9		5	91.3	82.3	No condensate collected, off-gas monitoring performed
59	7/27/2012	16		13	89.9	80.1	
60	7/30/2012	16		42	90.9	81.8	Off-gas monitoring performed
61	7/31/2012	10		13	91.4	81.9	Condensate clear w/ slight yellow tint Off-gas monitoring performed
62	7/31/2012	17		35	91.4	82.0	
63	8/1/2012	9		35	92.8	84.1	No condensate collected, off-gas monitoring performed
64	8/1/2012	16		55	91.8	83.8	
65	8/2/2012	8		36	91.7	83.9	Thin layer of condensate collecte Off-gas monitoring performed
66	8/2/2012	14		35	91.4	84.2	
67	8/2/2012	16		35	91.3	84.0	
68	8/3/2012	8		35	90.9	83.3	clear condensate very thin layer Off-gas monitoring performed
69	8/5/2012	13		4	81.9	83.3	Started Summa VOC sample collection
70	8/6/2012	8		0	92.1	83.3	Stopped Summa VOC sample collection Off-gas monitoring performed

KEMRON
ENVIRONMENTAL SERVICES

THERMAL DESORPTION DATA

PROJECT:	Bridgewater	TESTING DATE:	7/12/2012
PROJECT No:	SH0416	TESTED BY:	MC
MATERIAL TYPE:	HC-90C	TRACKING CODE:	0

	Day	Time			Temps		Comments
					Soil	Oven	
71	8/6/2012	9		50			Started aldehyde sampling 10 ml/min
72	8/6/2012	11		30			Stopped aldehyde sampling
73	8/6/2012	11		40			Started reduced sulfur testing
74	8/6/2012	12		15			Stopped reduced sulfur collection
75	8/6/2012	12		20			started inorganic acid sample collection
76	8/6/2012	17		10			stopped inorganic acid sample collection
77	8/6/2012	17		20	91.7	83.4	Started Summa VOC sample collection
78	8/7/2012	9		22	92.2	83.9	Stopped Summa VOC sample collection
79	8/7/2012	15		20	31.6	28.3	Turned oven off
80	8/7/2012	16		2	30.6	28.3	Started Time Final Summa VOC sample collection
81	8/8/2012	11		15	26.0	26.4	Stopped Time Final Summa VOC sample collection
82	8/8/2012	12		52	26.8	28.0	Started Time Final aldehyde sampling
83	8/8/2012	14		52			Stopped Time final aldehyde sampling
84	8/8/2012	14		55			Started Time Final reduced sulfur sampling
85	8/8/2012	15		25			Stopped Time Final reduced sulfur sampling
86	8/8/2012	16		30			Started inorganic acid sample collection 30 ml/min
87	8/8/2012	18		20			Stopped inorganic acid sample collection 30 ml/min
88							
89							
90							
91							
92							
93							
94							
95							
96							

KEMRON
ENVIRONMENTAL SERVICES

THERMAL DESORPTION DATA

PROJECT:	Bridgewater	TESTING DATE:	7/12/2012
PROJECT No:	SH0416	TESTED BY:	MC
MATERIAL TYPE:	HC-90C	TRACKING CODE:	0

	Day	Time	Temps		Comments
			Soil	Oven	
97					
98					
99					
100					
101					
102					
103					
104					
105					
106					
107					
108					
109					
110					

KEMRON ENVIRONMENTAL SERVICES

THERMAL DESORPTION DATA

PROJECT: Bridgewater
PROJECT No: SH0416
MATERIAL TYPE: HC-90C

TESTING DATE: 7/12/2012
TESTED BY: MC
TRACKING CODE: 0

	Day	Time	Temps		Comments
			Soil	Oven	

KEMRON ENVIRONMENTAL SERVICES

THERMAL DESORPTION DATA

PROJECT:	Bridgewater	TESTING DATE:	7/12/2012
PROJECT No:	SH0416	TESTED BY:	MC
MATERIAL TYPE:	HC-90C	TRACKING CODE:	0

	Day	Time			Temps		Comments
					Soil	Oven	

KEMRON
ENVIRONMENTAL SERVICES

THERMAL DESORPTION DATA

PROJECT:	Bridgewater	TESTING DATE:	7/12/2012
PROJECT No:	SH0416	TESTED BY:	MC
MATERIAL TYPE:	HC-90C	TRACKING CODE:	0

	Day	Time	Temps		Comments
			Soil	Oven	

KEMRON
ENVIRONMENTAL SERVICES

THERMAL DESORPTION DATA

PROJECT:	Bridgewater	TESTING DATE:	7/12/2012
PROJECT No:	SH0416	TESTED BY:	MC
MATERIAL TYPE:	HC-90C	TRACKING CODE:	0

	Day	Time	Temps		Comments
			Soil	Oven	
83		14			Turned off datalogger

KEMRON ENVIRONMENTAL SERVICES

THERMAL DESORPTION DATA

PROJECT:	Bridgewater	TESTING DATE:	7/11/2012
PROJECT No:	SH0416	TESTED BY:	MC
MATERIAL TYPE:	HC-100C	TRACKING CODE:	

SET-UP, MONITORING, and TESTING INFORMATION		
SAMPLE No.	HC-100C	
WEIGHT OF PAN (tare weight)	7754.50	g
WEIGHT OF UNTREATED SOIL + TARE	9268.50	g
WEIGHT OF UNTREATED SOIL	1514.00	g
WEIGHT OF TREATED SOIL + TARE	8890.00	g
WEIGHT OF TREATED SOIL	1135.50	g
WEIGHT LOSS	378.50	g
LENGTH OF TREATMENT	14	Days

VISUAL OBSERVATIONS - BEFORE TREATMENT

Time 0 air sampling performed on the 90C treatment materials only.
Average Initial Reactor Head Space = 1.795 inches
System passed leak test @ 5.1 psi for 15 minutes

VISUAL OBSERVATIONS - DURING TREATMENT

VISUAL OBSERVATIONS - AFTER TREATMENT

Treated samle had a tarry odor. Hard uneven surface of treated material is hard. Interior of reactor shows significant rusting.

Average Final reactor head space = 2.625 inches
Sample shrinkage = 0.830 inches = 46.24%

KEMRON
ENVIRONMENTAL SERVICES

THERMAL DESORPTION DATA

PROJECT:	Bridgewater	TESTING DATE:	7/11/2012
PROJECT No:	SH0416	TESTED BY:	MC
MATERIAL TYPE:	HC-100C	TRACKING CODE:	0

	Day	Time			Temps Soil	Temps Oven	Comments
1	7/11/2012	16	:	28	16.7	26.2	Testing Started Oven set to 30C
2	7/11/2012	17	:	30	18.6	30.8	Off-gas monitoring performed
3	7/11/2012	19	:	35	49.1	50.5	Oven set to 50C
4	7/11/2012	21	:	52	49.3	50.7	Off-gas monitoring performed
5	7/12/2012	8	:	30	49.2	50.7	Oven set to 70C
6	7/12/2012	9	:	45	66.0	69.2	
7	7/12/2012	10	:	7	68.4	72.1	Off-gas monitoring performed
8	7/12/2012	11	:	3	71.1	72.9	Oven set to 90C
9	7/12/2012	12	:	45	88.4	90.1	Off-gas monitoring performed
10	7/12/2012	13	:	29	88.8	97.2	oven set to 100 C
11	7/12/2012	15	:	22	96.8	100.3	
12	7/12/2012	17	:	26	96.7	100.0	100 ml of condensate produced
13	7/12/2012	19	:	42	96.8	100.0	Condensate removed and stored
14	7/13/2012	8	:	30			Thermocouple damaged
15	7/13/2012	8	:	50	81.3	75.7	Thermocouple replaced
16	7/13/2012	11	:	12	95.5	103.6	Off-gas monitoring performed
17	7/13/2012	11	:	30	95.7	102.0	
18	7/13/2012	12	:	18	97.0	102.2	
19	7/13/2012	14	:	23	97.1	100.5	
20	7/13/2012	15	:	25	98.6	102.5	
21	7/14/2012	9	:	41	97.3	102.5	Condensate flask broken- condensate lost- flask replaced Off-gas monitoring performed
22	7/14/2012	13	:	5	98.9	102.6	
23	7/15/2012	8	:	37	99.8	102.7	Thick white oily condensate collected
24	7/16/2012	16	:	27	98.1	102.6	
25	7/16/2012	17	:	4	99.9	102.9	Started summa VOC sampling

KEMRON
ENVIRONMENTAL SERVICES

THERMAL DESORPTION DATA

PROJECT:	Bridgewater	TESTING DATE:	7/11/2012
PROJECT No:	SH0416	TESTED BY:	MC
MATERIAL TYPE:	HC-100C	TRACKING CODE:	0

	Day	Time			Temps Soil	Temps Oven	Comments
26	7/17/2012	5		1	99.7	102.8	
27	7/17/2012	11		36	99.7	102.8	Stopped summa VOC sampling Off-gas monitoring performed
28	7/17/2012	12		18			started aldehyde sampling
29	7/17/2012	13		58			stopped aldehyde sampling
30	7/17/2012	14		9			started reduced sulfur sampling
31	7/17/2012	14		39			stopped reduced sulfur sampling
32	7/17/2012	14		55			started inorganic acid sampling
33	7/17/2012	17		55	99.7	102.6	stopped inorganic acid sampling
34	7/18/2012	9		5	99.4	102.5	Condensate cloudy yellow with black particulates Off-gas monitoring performed
35	7/18/2012	14		46	99.6	102.5	
36	7/18/2012	17		30	100.0	106.0	Reduced oven temperature 1C
37	7/19/2012	8		26	99.3	105.1	
38	7/19/2012	13		35	99.3	105.8	increased oven temperture 1C
39	7/19/2012	16		45	100.3	105.9	oily condensate with black particulates Off-gas monitoring performed
40	7/20/2012	8		35	100.0	106.0	
41	7/20/2012	14		44	99.9	105.8	condensate clear and oily with black particulates Off-gas monitoring performed
42	7/23/2012	16		47	100.1	105.9	
43	7/23/2012	8		4	100.3	106.1	
44	7/23/2012	10		27	100.2	105.9	condensate yellow with black particulates Noticeable oily layer present Off-gas monitoring performed
45	7/23/2012	11		50	100.2	106.2	

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ENVIRONMENTAL SERVICES

THERMAL DESORPTION DATA

PROJECT:	Bridgewater	TESTING DATE:	7/11/2012
PROJECT No:	SH0416	TESTED BY:	MC
MATERIAL TYPE:	HC-100C	TRACKING CODE:	0

	Day	Time			Temps Soil	Temps Oven	Comments
46	7/24/2012	14		17	100.1	106.3	
47	7/24/2012	17		9	100.6	106.3	
48	7/24/2012	8		20	100.3	106.4	
49	7/24/2012	10		30	100.3	106.3	Condensate relatively clear with yellow particulates Off-gas monitoring performed
50	7/25/2012	12		7	100.0	106.1	
51	7/25/2012	15		20	100.2	106.2	
52	7/25/2012	8		30	100.3	105.9	
53	7/25/2012	11		45	99.6	104.4	Off-gas monitoring performed
54	7/26/2012	13		55	99.5	104.4	Condensate relatively clear with yellow particulates
55	7/26/2012	15		41	99.8	104.4	
56	7/26/2012	8		40	100.5	100.2	
57	7/26/2012	11		35	100.3	100.2	Off-gas monitoring performed clear condensate with yellow and tarry particulates
58	7/26/2012	17		23	100.3	104.5	
59	7/27/2012	8		6	100.0	104.7	Condensate relatively clear with yellow particulates Off-gas monitoring performed
60	7/27/2012	11		25	100.0	104.8	started reduced sulfur sampling
61	7/27/2012	13		5	100.0	104.7	stopped reduced sulfur sampling
62	7/27/2012	13		10	100.0	104.7	started aldehyde sampling 10ml/min
63	7/27/2012	14		50	100.4	102.1	stopped aldehyde sampling
64	7/27/2012	16		20	100.4	102.1	started summa VOC sampling
65	7/28/2012	9		20	100.0	101.9	Stopped summa VOC sampling
66	7/28/2012	9		28			Started inorganic acid sampling
67	7/28/2012	14		28	100.3	102.6	stopped inorganic acid sampling - turned oven off
68	7/30/2012	11		25	29.5	31.6	Off-gas monitoring performed

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ENVIRONMENTAL SERVICES

THERMAL DESORPTION DATA

PROJECT:	Bridgewater	TESTING DATE:	7/11/2012
PROJECT No:	SH0416	TESTED BY:	MC
MATERIAL TYPE:	HC-100C	TRACKING CODE:	0

	Day	Time			Temps		Comments
					Soil	Oven	
69	7/30/2012	11		45	29.5	31.7	started inorganic acid sampling
70	7/30/2012	16		45	30.3	31.3	stopped inorganic acid sampling
71	7/30/2012	16		55	30.3	31.3	started reduced sulfur sampling 20ml/min
72	7/30/2012	17		38	30.4	31.4	stopped reduced sulfur sampling
73	8/6/2012	9		0	31.4	33.5	started aldehyde sampling
74	8/6/2012	10		40	31.4	32.8	stopped aldehyde sampling
75	8/6/2012	11		5	31.1	32.8	turned off dataloggers

KEMRON
ENVIRONMENTAL SERVICES

THERMAL DESORPTION DATA

PROJECT:	Bridgewater	TESTING DATE:	7/12/2012
PROJECT No:	SH0416	TESTED BY:	MC
MATERIAL TYPE:	VR-90C	TRACKING CODE:	8255

SET-UP, MONITORING, and TESTING INFORMATION

SAMPLE No.	VR-90C	
WEIGHT OF PAN (tare weight)	23.5	g
WEIGHT OF UNTREATED SOIL + TARE	2580	g
WEIGHT OF UNTREATED SOIL	2556.50	g
WEIGHT OF TREATED SOIL + TARE	1611.1	g
WEIGHT OF TREATED SOIL	1587.60	g
WEIGHT LOSS	968.90	g
LENGTH OF TREATMENT	23	Days

VISUAL OBSERVATIONS - BEFORE TREATMENT

Reactor too large to weigh - prepared aluminum foil liner for weighing untreated sample
Tare= Aluminum Liner
Time 0 - Aldehyde Sampling began 7/11/2012 @ 20:23 - Stopped 7/11/2012 @ 22:25
Flow rate 10 ml/min
Time 0 - Acid gas sampling began 7/12/2012 @ 08:30 - Stopped 7/12/2012 @ 14:00
Flow rate 10 ml/min
Time 0 - H2S = 2.0 Time 0 - SO2 = 0
Average Initial Reactor Head Space = 7.783 inches
System passed leak test @ 5.1 psi for 10 minutes

VISUAL OBSERVATIONS - DURING TREATMENT

VISUAL OBSERVATIONS - AFTER TREATMENT

Treated samle had a tarry odor, visible air bubbles on the surface of the treated material.
Sample had a shiny sheen.

Average Final reactor head space = 7.991 inches
Sample shrinkage = 0.208 inches = 2.67%

Expansion of VR material during heating
Average head space between top of stain on reactor sides and top of reactor = 5.2 inches
Expansion during heating = 31.9%

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ENVIRONMENTAL SERVICES

THERMAL DESORPTION DATA

PROJECT:	Bridgewater	TESTING DATE:	7/12/2012
PROJECT No:	SH0416	TESTED BY:	MC
MATERIAL TYPE:	VR-90C	TRACKING CODE:	8255

	Day	Time			Temps		Comments
					Soil	Oven	
1	7/12/2012	17	:	15	25.5	29.3	Testing Started
2	7/12/2012	18	:	28	29.6	29.6	Off-gas monitoring performed
3	7/13/2012	9	:	10	35.7	35.8	Oven set to 50C
4	7/13/2012	11	:	15	50.0	52.7	Off-gas monitoring performed
5	7/13/2012	11	:	21	50.3	52.4	Oven set to 70C
6	7/13/2012	11	:	58	57.5	78.4	Condensate observed
7	7/13/2012	13	:	12	70.6	84.8	Condensate removed and stored
8	7/13/2012	13	:	15	71.1	84.8	Off-gas monitoring performed
9	7/13/2012	13	:	27	71.7	85.1	Oven set to 93C
10	7/13/2012	14	:	22	79.8	96.5	
11	7/13/2012	16	:	10	89.6	92.7	Clogged off-gas line repaired
12	7/13/2012	16	:	29	87.1	92.8	Off-gas monitoring performed
13	7/14/2012	9	:	46	92.8	94.1	Oven temp reduced to 89C Milky residue observed in bottom of flask - 2 distinct layers
14	7/14/2012	10	:	5			Condensate removed and stored
15	7/16/2012	12	:	59	91.8	92.7	Condensate removed and stored Oily clear liquid with black particles Off-gas monitoring performed
16	7/16/2012	16	:	25	91.4	92.8	
17	7/17/2012	5	:	5	91.2	92.0	Started summa cannister collection
18	7/17/2012	5	:	12	92.0	93.6	
19	7/17/2012	10	:	40			Stopped summa cannister collection
20	7/17/2012	10	:	58			Condensate removed and stored
21	7/17/2012	11	:	35	91.7	92.6	Off-gas monitoring performed Began aldehyde sample collection

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ENVIRONMENTAL SERVICES

THERMAL DESORPTION DATA

PROJECT:	Bridgewater	TESTING DATE:	7/12/2012
PROJECT No:	SH0416	TESTED BY:	MC
MATERIAL TYPE:	VR-90C	TRACKING CODE:	8255

	Day	Time			Temps Soil	Temps Oven	Comments
22	7/17/2012	13	:	9			Stopped aldehyde sample collection
23	7/17/2012	13	:	11			Started reduced sulfur sample collection
24	7/17/2012	13	:	41			Stopped reduced sulfur sample collection
25	7/17/2012	13	:	48			Started inorganic acid sample collection
26	7/17/2012	18	:	48			Stopped inorganic acid sample collection
27	7/17/2012	19	:	50	91.8	93.2	
28	7/18/2012	9	:	5	91.5	93.5	Off-gas monitoring performed Condensate cloudy liquid
29	7/18/2012	14	:	47	91.1	92.6	
30	7/18/2012	17	:	30	91.5	93.0	
31	7/19/2012	8	:	24	91.8	93.2	
32	7/19/2012	9	:	2	91.0	93.0	Condensate removed
33	7/19/2012	12	:	58	91.7	92.6	Off-gas monitoring performed
34	7/20/2012	8	:	37	91.7	92.6	Condensate removed Cloudy-oily with black particles
35	7/20/2012	12	:	55	91.5	92.9	Off-gas monitoring performed
36	7/20/2012	15	:	40	91.3	92.9	Condensate pH = 3.0
37	7/20/2012	16	:	45	91.3	92.9	
38	7/23/2012	8	:	5	91.5	92.9	Condensate - cloudy-oily Off-gas monitoring performed
39	7/23/2012	11	:	47	91.2	92.6	
40	7/23/2012	14	:	16	91.0	91.8	
41	7/23/2012	17	:	12	91.3	92.7	
42	7/24/2012	8	:	19	91.7	93.2	Condensate removed - cloudy-oily Off-gas monitoring performed
43	7/24/2012	12	:	5	91.7	93.3	

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ENVIRONMENTAL SERVICES

THERMAL DESORPTION DATA

PROJECT:	Bridgewater	TESTING DATE:	7/12/2012
PROJECT No:	SH0416	TESTED BY:	MC
MATERIAL TYPE:	VR-90C	TRACKING CODE:	8255

	Day	Time			Temps Soil	Temps Oven	Comments
44	7/24/2012	15	:	20	91.3	92.5	
45	7/25/2012	8	:	32	91.4	92.3	Condensate removed - slightly cloudy-oily Off-gas monitoring performed
46	7/25/2012	13	:	55	90.9	92.3	
47	7/25/2012	15	:	45	90.9	91.7	
48	7/26/2012	8	:	43	91.4	92.8	Condensate removed - slightly cloudy-oily Off-gas monitoring performed
49	7/26/2012	17	:	20	90.7	91.6	
50	7/27/2012	8	:	3	92.0	93.1	Condensate removed - cloudy-oily Off-gas monitoring performed
51	7/27/2012	16	:	12	91.9	93.0	
52	7/30/2012	9	:	47			Off-gas monitoring performed
53	7/30/2012	16	:	43	90.9	92.5	
54	7/31/2012	9	:	15	91.6	92.8	Condensate removed - white cloudy-oily Off-gas monitoring performed
55	7/31/2012	10	:	5	91.6	92.9	Off-gas monitoring performed
56	7/31/2012	17	:	35	91.6	93.4	
57	8/1/2012	8	:	58	91.6	93.4	Condensate has 2 layers. Top layer thick oil bottom layer white cloudy liquid Off-gas monitoring performed
58	8/1/2012	16	:	56	91.6	93.5	
59	8/2/2012	9	:	20	90.7	92.4	Condensate cloudy with 2 layers. Top layer oily, bottom layer cloudy liquid Off-gas monitoring performed
60	8/2/2012	14	:	32	91.2	93.6	
61	8/2/2012	16	:	35	91.4	92.5	Oily white bubbles being deposited inside

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ENVIRONMENTAL SERVICES

THERMAL DESORPTION DATA

PROJECT:	Bridgewater	TESTING DATE:	7/12/2012
PROJECT No:	SH0416	TESTED BY:	MC
MATERIAL TYPE:	VR-90C	TRACKING CODE:	8255

	Day	Time			Temps Soil	Temps Oven	Comments
							condenser coil.
62	8/3/2012	9	:	10	92.0	93.1	Condensate is cloudy white liquid with thin oily layer on surface Off-gas monitoring performed
63	8/5/2012	13	:	0	92.3	92.9	
64	8/5/2012	17	:	10	92.0	93.1	Started summa VOC off-gas collection
65	8/6/2012	8	:	30	91.9	93.5	Stopped summa VOC off-gas collection
66	8/6/2012	9	:	47			Condensate clear liquid
67	8/6/2012	11	:	35			Started reduced sulfur sample collection
68	8/6/2012	12	:	10			Stopped reduced sulfur sample collection
69	8/6/2012	12	:	11	92.2	93.1	Started inorganic acid sample collection
70	8/6/2012	17	:	11			Stopped inorganic acid sample collection
71	8/6/2012	17	:	15	92.2	93.3	**Turned oven off**
72	8/7/2012	8	:	55	28.3	27.4	Ambient temperature reached
73	8/7/2012	9	:	12			
74	8/7/2012	11	:	11			
75	8/7/2012	12	:	20			Started Time Final inorganic acid collection @ 20ml/min
76	8/7/2012	15	:	0	25.4	26.2	Stopped Time Final inorganic acid sample collection
77	8/7/2012	16	:	0			Started Time Final summa VOC off-gas collection
78	8/8/2012	9	:	41	25.3	25.2	Stopped Time Final summa VOC off-gas collection
79	8/8/2012	10	:	11			Started Time Final aldehyde sample collection 10 ml/min
80	8/8/2012	13		10	25.2	25.5	Stopped Time Final aldehyde sample collection
81		13		25	25.2	25.6	Started Time Final reduced sulfur sample collection 10ml/min
82		14		20			Stopped Time Final reduced sulfur sample collection
83		18		15			Turned off datalogger

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ENVIRONMENTAL SERVICES

THERMAL DESORPTION DATA

PROJECT:	Bridgewater	TESTING DATE:	7/11/2012
PROJECT No:	SH0416	TESTED BY:	MC
MATERIAL TYPE:	VR-100C	TRACKING CODE:	

SET-UP, MONITORING, and TESTING INFORMATION

SAMPLE No.	VR-100C	
WEIGHT OF PAN (tare weight)	20.5	g
WEIGHT OF UNTREATED SOIL + TARE	2538	g
WEIGHT OF UNTREATED SOIL	2517.50	g
WEIGHT OF TREATED SOIL + TARE	1805.5	g
WEIGHT OF TREATED SOIL	1785.00	g
WEIGHT LOSS	732.50	g
LENGTH OF TREATMENT	13	Days

VISUAL OBSERVATIONS - BEFORE TREATMENT

Reactor too large to weigh - prepared aluminum foil liner for weighing untreated sample
Tare= Aluminum Liner

Average Initial Reactor Head Space = 8.233 inches

Failed initial leak test. Reactor leak at swagelok fitting. Reactor repaired 7/10/12
System passed leak test 7/11/12 @ 4.9 psi for 10 minutes

VISUAL OBSERVATIONS - DURING TREATMENT

VISUAL OBSERVATIONS - AFTER TREATMENT

Treated samPle had a tarry odor, black color with white flakes around perimeter of sample.
Noticeable discoloration (tarry residue) on sides of reactor indicating approximately
3 inches of swell during heating.
Average Final reactor head space = 8.701 inches
Sample shrinkage = 0.468 inches = 5.68%

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ENVIRONMENTAL SERVICES

PROJECT:	Bridgewater	TESTING DATE:	7/11/2012
PROJECT No:	SH0416	TESTED BY:	MC
MATERIAL TYPE:	VR-100C	TRACKING CODE:	0

	Day	Time			Temps Soil	Temps Oven	Comments
1	7/11/2012	16		28	29.6	25.9	Testing Started
2	7/11/2012	17		0	33.7	29.1	Off-gas monitoring performed
3	7/11/2012	19		58	45.1	50.6	Oven set to 50C
4	7/11/2012	20		25	46.8	50.7	Off-gas monitoring performed
5	7/11/2012	21		51	49.1	50.7	Oven maintained at 50C overnight
6	7/12/2012	8		30	50.0	50.6	Oven set to 70C
7	7/12/2012	9		42	60.9	69.7	
8	7/12/2012	10		45	65.1	72.7	Off-gas monitoring performed
9	7/12/2012	11		3	65.9	72.9	Oven set to 90C
10	7/12/2012	13		6	84.7	90.0	Off-gas monitoring performed
11	7/12/2012	13		23	85.9	92.2	Oven set to 100C
12	7/12/2012	15		22	91.9	100.3	
13	7/12/2012	17		25	93.2	99.8	Condensate has two phases clear and yellow
14	7/12/2012	18		42	94.7	100.1	
15	7/13/2012	8		30	96.8	100.1	
16	7/13/2012	10		22	97.1	100.1	Removed condensate
17	7/13/2012	11		8	93.3	101.3	Off-gas monitoring performed
18	7/13/2012	12		17	94.9	102.3	
19	7/13/2012	14		22	95.7	100.5	
20	7/13/2012	15		24	97.1	102.5	
21	7/14/2012	9		42	97.4	102.6	Condenste milky white with thin oily layer Off-gas monitoring performed
22	7/16/2012	8		37	98.7	102.6	2 layered condensate oily and cloudy
23	7/16/2012	16		23	97.8	102.7	Off-gas monitoring performed
24	7/16/2012	17		4	98.9	102.9	Started Summa VOC sampling
25	7/17/2012	5		6	98.3	102.7	

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ENVIRONMENTAL SERVICES

PROJECT:	Bridgewater	TESTING DATE:	7/11/2012
PROJECT No:	SH0416	TESTED BY:	MC
MATERIAL TYPE:	VR-100C	TRACKING CODE:	0

	Day	Time			Temps		Comments
					Soil	Oven	
26	7/17/2012	11		36	98.3	102.8	stopped Summa VOC sampling Off-gas monitoring performed
27	7/17/2012	12		18			started aldehyde sampling
28	7/17/2012	13		58			stoped aldehyde sampling
29	7/17/2012	14		9			started reduced sulfur sampling
30	7/17/2012	14		39			stopped reduced sulfur sampling
31	7/17/2012	14		55			Started inorganic acid sampling
32	7/17/2012	17		55	98.4	102.6	stopped inorganic acid sampling
33	7/18/2012	9		4	98.2	102.5	Oily condensate with Thick cloudy "donut" ring at bottom Off-gas monitoring performed
34	7/18/2012	14		46	98.0	102.5	
35	7/18/2012	17		30	98.3	106.0	Oven temp reduced 1C
36	7/19/2012	8		26	98.5	105.1	
37	7/19/2012	13		35	98.3	105.8	Oven temp increased 1C
38	7/19/2012	15		43	98.8	105.8	Thick oily/cloudy condensate. Top lay is cloudy, bottom layer is yellow. Off-gas monitoring performed
39	7/20/2012	8		37	99.0	106.0	
40	7/20/2012	13		50	98.4	105.8	milky white residue forming in condenser. Condensate milky with thin oil layer on top
41	7/20/2012	16		45	98.9	105.9	
42	7/23/2012	8		5	99.6	106.0	
43	7/23/2012	9		42	98.9	106.0	Condensate cloudy / oily 2 phases Off-gas monitoring performed
44	7/23/2012	14		17	99.5	106.3	
45	7/23/2012	17		9	100.0	106.3	
46	7/24/2012	8		20	99.9	106.4	

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ENVIRONMENTAL SERVICES

PROJECT:	Bridgewater	TESTING DATE:	7/11/2012
PROJECT No:	SH0416	TESTED BY:	MC
MATERIAL TYPE:	VR-100C	TRACKING CODE:	0

	Day	Time			Temps Soil	Temps Oven	Comments
47	7/24/2012	9		50	98.7	106.4	Condensate cloudy with yellow particulates Off-gas monitoring performed
48	7/24/2012	12		9	99.1	106.2	
49	7/24/2012	15		20	99.2	106.1	
50	7/25/2012	8		30	99.5	105.9	
51	7/25/2012	10		45	98.7	104.2	yellow condensate in bottom with cloudy yellow top layer Off-gas monitoring performed
52	7/25/2012	13		55	98.7	104.4	
53	7/25/2012	15		42	98.6	104.4	
54	7/26/2012	8		40	99.6	100.3	
55	7/26/2012	10		52	99.7	98.5	Started tedlar bag sample collection
56	7/26/2012	14		30	99.8	100.4	Started reduced sulfur sample collection 20 ml/min
57	7/26/2012	15		20	99.1	104.7	Stopped reduced sulfur sample collection
58	7/26/2012	17		8	99.0	104.5	Started Summa VOC sampling
59	7/27/2012	8		5	99.1	104.6	
60	7/27/2012	8		21	99.4	104.7	stopped Summa VOC sampling
61	7/27/2012	8		24	98.7	104.7	Started inorganic acid sampling
62	7/27/2012	13		24	99.0	104.9	stopped inorganic acid sampling
63	7/27/2012	13		45	99.1	101.4	started aldehyde sampling
64	7/27/2012	15		25	99.5	102.1	stopped aldehyde sampling
65	8/6/2012	16		15	99.6	102.1	Turned off oven
66	8/6/2012	11		5	29.8	31.6	Off-gas monitoring performed
67	8/6/2012	11		45	29.2	31.7	Started inorganic acid sampling 35ml/min
68	8/6/2012	16		45	29.8	31.3	stopped inorganic acid sampling Off-gas monitoring performed
69	8/6/2012	16		45	30.0	31.3	started reduced sulfur sampling 20 ml/min

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ENVIRONMENTAL SERVICES

PROJECT:	Bridgewater	TESTING DATE:	7/11/2012
PROJECT No:	SH0416	TESTED BY:	MC
MATERIAL TYPE:	VR-100C	TRACKING CODE:	0

	Day	Time			Temps		Comments
					Soil	Oven	
70	8/6/2012	17		38	30.2	31.4	stopped reduced sulfur sampling
71	8/6/2012	8		58	31.2	33.5	started aldehyde sampling 15 ml/min
72	8/7/2012	10		40	31.4	32.8	stopped aldehyde sampling
73	8/7/2012	11		5	31.4	32.8	stopped datalogger

APPENDIX F

CONDENSATE ANALYTICAL REPORTS

NELAP CERTIFICATE NUMBER 01955
DOD ELAP CERTIFICATE NUMBER ADE - 1482

ANALYTICAL RESULTS

PERFORMED BY

GULF COAST ANALYTICAL LABORATORIES, INC.
7979 GSRI Avenue
Baton Rouge, LA 70820

Report Date 08/07/2012

GCAL Report 212073024

Deliver To	KEMRON 1359A Ellsworth Industrial Blv Atlanta, GA 30318 404-601-6927
Attn	Tommy Jordan

Project Bridgewater NJ SH-0416-007

CASE NARRATIVE

Client: KEMRON **Report:** 212073024

Gulf Coast Analytical Laboratories received and analyzed the sample(s) listed on the sample cross-reference page of this report. Receipt of the sample(s) is documented by the attached chain of custody. This applies only to the sample(s) listed in this report. No sample integrity or quality control exceptions were identified unless noted below.

VOLATILES MASS SPECTROMETRY

In the SW-846 8260B analysis, Thiophene is included in the reportable analyte list. As per client instructions, a one point calibration was performed for this analyte. It was not detected in any samples and is reported as ND. This analyte is not included in GCALs scope of accreditation.

In the SW-846 8260B analysis, samples 21207302405 (VR 90 RECON CONDENSATE (H2O)), 21207302406 (HC 100 RECON CONDENSATE (H2O)), 21207302407 (VR 100 RECON CONDENSATE (H2O)), 21207302408 (HC 90 RECON CONDENSATE (H2O)), 21207302402 (HC100 RECONSTITUTED CONDENSATE), 21207302403 (VR100 RECONSTITUTED CONDENSATE), 21207302401 (VR 90 RECONSTITUTED CONDENSATE) and 21207302404 (HC 90 RECONSTITUTED CONDENSATE) had to be diluted to bracket the concentration of target compounds within the calibration range of the instrument. The dilution is reflected in elevated detection limits.

SEMI-VOLATILES MASS SPECTROMETRY

In the SW-846 8270C analysis, samples 21207302405 (VR 90 RECON CONDENSATE (H2O)), 21207302406 (HC 100 RECON CONDENSATE (H2O)), 21207302407 (VR 100 RECON CONDENSATE (H2O)) and 21207302408 (HC 90 RECON CONDENSATE (H2O)) were concentrated from an initial volume of 100mLs rather than 1 L in the extraction process due to the sample matrix. This is reflected in elevated detection limits.

In the SW-846 8270C analysis, samples 21207302405 (VR 90 RECON CONDENSATE (H2O)), 21207302406 (HC 100 RECON CONDENSATE (H2O)), 21207302407 (VR 100 RECON CONDENSATE (H2O)) and 21207302408 (HC 90 RECON CONDENSATE (H2O)) had to be diluted to bracket the concentration of target compounds within the calibration range of the instrument. This is reflected in elevated detection limits.

In the SW-846 8270C analysis, samples 21207302401 (VR 90 RECONSTITUTED CONDENSATE), 21207302402 (HC100 RECONSTITUTED CONDENSATE), 21207302403 (VR100 RECONSTITUTED CONDENSATE) and 21207302404 (HC 90 RECONSTITUTED CONDENSATE) had to be diluted to eliminate interference from non-target background. This is reflected in elevated detection limits.

In the SW-846 8270C analysis, the recoveries for the surrogates are reported as diluted out for those analyses performed at a 10 or higher dilution.

Laboratory Endorsement

Sample analysis was performed in accordance with approved methodologies provided by the Environmental Protection Agency or other recognized agencies. The samples and their corresponding extracts will be maintained for a period of 30 days unless otherwise arranged. Following this retention period the samples will be disposed in accordance with GCAL's Standard Operating Procedures.

Common Abbreviations Utilized in this Report

ND	Indicates the result was Not Detected at the specified RDL
DO	Indicates the result was Diluted Out
MI	Indicates the result was subject to Matrix Interference
TNTC	Indicates the result was Too Numerous To Count
SUBC	Indicates the analysis was Sub-Contracted
FLD	Indicates the analysis was performed in the Field
PQL	Practical Quantitation Limit
MDL	Method Detection Limit
RDL	Reporting Detection Limit
00:00	Reported as a time equivalent to 12:00 AM

Reporting Flags Utilized in this Report

J	Indicates the result is between the MDL and RDL
U	Indicates the compound was analyzed for but not detected
B	Indicates the analyte was detected in the associated Method Blank

Sample receipt at GCAL is documented through the attached chain of custody. In accordance with NELAC, this report shall be reproduced only in full and with the written permission of GCAL. The results contained within this report relate only to the samples reported. The documented results are presented within this report.

This report pertains only to the samples listed in the Report Sample Summary and should be retained as a permanent record thereof. The results contained within this report are intended for the use of the client. Any unauthorized use of the information contained in this report is prohibited.

I certify that this data package is in compliance with the NELAC standard and terms and conditions of the contract and Statement of Work both technically and for completeness, for other than the conditions in the case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data submitted has been authorized by the Quality Assurance Manager or his/her designee, as verified by the following signature.

Estimated uncertainty of measurement is available upon request. This report is in compliance with the DOD QSM as specified in the contract if applicable.

Robyn Migues
Technical Director
GCAL REPORT 212073024

THIS REPORT CONTAINS _____ PAGES.

Report Sample Summary

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302401	VR 90 RECONSTITUTED CONDENSATE	Solid	07/27/2012 14:56	07/28/2012 09:30
21207302402	HC100 RECONSTITUTED CONDENSATE	Solid	07/27/2012 14:55	07/28/2012 09:30
21207302403	VR100 RECONSTITUTED CONDENSATE	Solid	07/27/2012 14:54	07/28/2012 09:30
21207302404	HC 90 RECONSTITUTED CONDENSATE	Solid	07/27/2012 14:57	07/28/2012 09:30
21207302405	VR 90 RECON CONDENSATE (H2O)	Water	07/27/2012 14:56	07/28/2012 09:30
21207302406	HC 100 RECON CONDENSATE (H2O)	Water	07/27/2012 14:55	07/28/2012 09:30
21207302407	VR 100 RECON CONDENSATE (H2O)	Water	07/27/2012 14:54	07/28/2012 09:30
21207302408	HC 90 RECON CONDENSATE (H2O)	Water	07/27/2012 14:57	07/28/2012 09:30

Summary of Compounds Detected

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302401	**VR 90 RECONSTITUTED CONDENSATE**	Solid	07/27/2012 14:56	07/28/2012 09:30

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
95-50-1	1,2-Dichlorobenzene	1500000J	2480000	137000	ug/Kg
71-43-2	Benzene	38400000	2480000	75400	ug/Kg
98-82-8	Isopropylbenzene (Cumene)	1130000J	2480000	91800	ug/Kg
91-20-3	Naphthalene	6950000	2480000	159000	ug/Kg
108-88-3	Toluene	10500000	2480000	76900	ug/Kg
1330-20-7	Xylene (total)	3640000J	4960000	199000	ug/Kg
136777-61-2	m,p-Xylene	2410000J	2480000	146000	ug/Kg
95-47-6	o-Xylene	1230000J	2480000	67000	ug/Kg

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
91-57-6	2-Methylnaphthalene	234000J	495000	15700	ug/Kg
117-81-7	Bis(2-Ethylhexyl)phthalate	2900000	495000	24700	ug/Kg
86-73-7	Fluorene	70600J	495000	15900	ug/Kg

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
108-88-3	Toluene	24000000	1.08	ug/Kg
135-98-8	Benzene, (1-methylpropyl)-	1790000	2.17	ug/Kg
934-80-5	Benzene, 4-ethyl-1,2-dimethyl-	214000	2.38	ug/Kg
768-49-0	Benzene, (2-methyl-1-propenyl)-	457000	2.43	ug/Kg
1196-58-3	Benzene, (1-ethylpropyl)-	571000	2.50	ug/Kg
98-51-1	4-tert-Butyltoluene	1900000	2.53	ug/Kg
2049-95-8	Benzene, (1,1-dimethylpropyl)-	816000	2.60	ug/Kg
4468-42-2	Benzene, (1-ethylbutyl)-	645000	2.85	ug/Kg
2132-84-5	Benzene, (1-methylhexyl)-	1280000	3.31	ug/Kg
	Unknown	483000	3.47	ug/Kg
98-51-1	4-tert-Butyltoluene	805000	3.54	ug/Kg
111-65-9	Octane	324000	1.20	ug/Kg
99-87-6	Benzene, 1-methyl-4-(1-methylethyl)	538000	3.65	ug/Kg
3073-66-3	Cyclohexane, 1,1,3-trimethyl-	252000	1.39	ug/Kg
100-41-4	Ethylbenzene	1070000	1.49	ug/Kg
106-42-3	p-Xylene	8810000	1.53	ug/Kg
95-47-6	Benzene, 1,2-dimethyl-	2760000	1.64	ug/Kg
98-82-8	Benzene, (1-methylethyl)-	2210000	1.78	ug/Kg
108-67-8	Benzene, 1,3,5-trimethyl-	1540000	1.99	ug/Kg
526-73-8	Benzene, 1,2,3-trimethyl-	2850000	2.11	ug/Kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302402	**HC100 RECONSTITUTED CONDENSATE**	Solid	07/27/2012 14:55	07/28/2012 09:30

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
91-57-6	2-Methylnaphthalene	220000J	495000	15700	ug/Kg
117-81-7	Bis(2-Ethylhexyl)phthalate	38100J	495000	24700	ug/Kg
86-73-7	Fluorene	139000J	495000	15900	ug/Kg

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
108-88-3	Toluene	44000000	1.08	ug/Kg
95-63-6	Benzene, 1,2,4-trimethyl-	2230000	2.11	ug/Kg
1196-58-3	Benzene, (1-ethylpropyl)-	418000	2.50	ug/Kg
98-51-1	4-tert-Butyltoluene	1690000	2.53	ug/Kg
99-87-6	Benzene, 1-methyl-4-(1-methylethyl)	241000	2.60	ug/Kg
2132-84-5	Benzene, (1-methylhexyl)-	252000	3.31	ug/Kg
	Unknown	400000	3.47	ug/Kg
	Unknown	708000	3.54	ug/Kg
111-65-9	Octane	421000	1.20	ug/Kg
3073-66-3	Cyclohexane, 1,1,3-trimethyl-	412000	1.39	ug/Kg
100-41-4	Ethylbenzene	1860000	1.49	ug/Kg
108-38-3	Benzene, 1,3-dimethyl-	14300000	1.53	ug/Kg
106-42-3	p-Xylene	4050000	1.64	ug/Kg
98-82-8	Benzene, (1-methylethyl)-	3980000	1.78	ug/Kg
611-14-3	Benzene, 1-ethyl-2-methyl-	716000	1.96	ug/Kg
108-67-8	Benzene, 1,3,5-trimethyl-	1440000	1.99	ug/Kg

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
71-43-2	Benzene	12700000	988000	30000	ug/Kg
108-88-3	Toluene	3650000	988000	30600	ug/Kg
1330-20-7	Xylene (total)	747000J	1980000	79200	ug/Kg
136777-61-2	m,p-Xylene	747000J	988000	58100	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302403	**VR100 RECONSTITUTED CONDENSATE**	Solid	07/27/2012 14:54	07/28/2012 09:30

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
91-57-6	2-Methylnaphthalene	720000	495000	15700	ug/Kg
117-81-7	Bis(2-Ethylhexyl)phthalate	153000J	495000	24700	ug/Kg
86-73-7	Fluorene	453000J	495000	15900	ug/Kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302403	**VR100 RECONSTITUTED CONDENSATE**	Solid	07/27/2012 14:54	07/28/2012 09:30

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
95-50-1	1,2-Dichlorobenzene	223000J	940000	51900	ug/Kg
71-43-2	Benzene	9840000	940000	28600	ug/Kg
108-88-3	Toluene	2530000	940000	29100	ug/Kg
1330-20-7	Xylene (total)	703000J	1880000	75400	ug/Kg
136777-61-2	m,p-Xylene	703000J	940000	55300	ug/Kg

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
108-88-3	Toluene	22000000	1.08	ug/Kg
934-80-5	Benzene, 4-ethyl-1,2-dimethyl-	231000	2.38	ug/Kg
2049-95-8	Benzene, (1,1-dimethylpropyl)-	222000	2.60	ug/Kg
700-88-9	Benzene, cyclopentyl-	214000	3.07	ug/Kg
827-52-1	Benzene, cyclohexyl-	238000	3.43	ug/Kg
50704-01-3	Benzene, (1,3-dimethyl-2-butenyl)-	846000	3.47	ug/Kg
4815-57-0	Benzene, 1,4-dipropyl-	1400000	3.54	ug/Kg
934-80-5	Benzene, 4-ethyl-1,2-dimethyl-	1020000	3.65	ug/Kg
4575-46-6	Benzene, 1-cyclohexyl-3-methyl-	242000	3.76	ug/Kg
13540-56-2	Benzene, 1,2-dimethyl-4-(phenylmeth	231000	4.26	ug/Kg
4309-66-4	Stilbene, 4-amino- (E)-	1660000	4.55	ug/Kg
100-41-4	Ethylbenzene	1030000	1.49	ug/Kg
10544-50-0	Sulfur, mol. (S8)	809000	5.70	ug/Kg
108-38-3	Benzene, 1,3-dimethyl-	8440000	1.53	ug/Kg
95-47-6	Benzene, 1,2-dimethyl-	2670000	1.64	ug/Kg
98-82-8	Benzene, (1-methylethyl)-	2150000	1.78	ug/Kg
620-14-4	Benzene, 1-ethyl-3-methyl-	775000	1.96	ug/Kg
108-67-8	Benzene, 1,3,5-trimethyl-	1570000	1.99	ug/Kg
526-73-8	Benzene, 1,2,3-trimethyl-	2920000	2.10	ug/Kg
135-98-8	Benzene, (1-methylpropyl)-	1820000	2.17	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302404	**HC 90 RECONSTITUTED CONDENSATE**	Solid	07/27/2012 14:57	07/28/2012 09:30

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
71-43-2	Benzene	20200000	978000	29700	ug/Kg
108-88-3	Toluene	2990000	978000	30300	ug/Kg

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
91-57-6	2-Methylnaphthalene	80300J	495000	15700	ug/Kg
117-81-7	Bis(2-Ethylhexyl)phthalate	30000J	495000	24700	ug/Kg
86-73-7	Fluorene	40400J	495000	15900	ug/Kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302404	**HC 90 RECONSTITUTED CONDENSATE**	Solid	07/27/2012 14:57	07/28/2012 09:30

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
1640-89-7	Cyclopentane, ethyl-	204000	0.9550	ug/Kg
611-14-3	Benzene, 1-ethyl-2-methyl-	794000	1.96	ug/Kg
108-67-8	Benzene, 1,3,5-trimethyl-	1520000	1.99	ug/Kg
95-36-3	1,2,4-Trimethylbenzene	2440000	2.11	ug/Kg
99-87-6	Benzene, 1-methyl-4-(1-methylethyl)	2000000	2.17	ug/Kg
1196-58-3	Benzene, (1-ethylpropyl)-	399000	2.50	ug/Kg
98-51-1	4-tert-Butyltoluene	1560000	2.53	ug/Kg
2049-95-8	Benzene, (1,1-dimethylpropyl)-	216000	2.60	ug/Kg
4468-42-2	Benzene, (1-ethylbutyl)-	192000	2.85	ug/Kg
2132-84-5	Benzene, (1-methylhexyl)-	171000	3.31	ug/Kg
1075-38-3	Benzene, 1-(1,1-dimethylethyl)-3-me	281000	3.54	ug/Kg
108-88-3	Toluene	83400000	1.08	ug/Kg
27577-96-4	Ethanol, 2-xylyl-	203000	3.65	ug/Kg
	Unknown	315000	1.13	ug/Kg
111-65-9	Octane	679000	1.20	ug/Kg
3073-66-3	Cyclohexane, 1,1,3-trimethyl-	614000	1.39	ug/Kg
100-41-4	Ethylbenzene	2390000	1.49	ug/Kg
108-38-3	Benzene, 1,3-dimethyl-	19100000	1.53	ug/Kg
106-42-3	p-Xylene	5040000	1.64	ug/Kg
98-82-8	Benzene, (1-methylethyl)-	4630000	1.78	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302405	**VR 90 RECON CONDENSATE (H2O)**	Water	07/27/2012 14:56	07/28/2012 09:30

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
78-93-3	2-Butanone	19000J	100000	7240	ug/L
67-64-1	Acetone	164000	100000	7980	ug/L
71-43-2	Benzene	1310000	100000	1980	ug/L
91-20-3	Naphthalene	10200J	100000	1300	ug/L
108-88-3	Toluene	124000	100000	2540	ug/L
1330-20-7	Xylene (total)	9390J	300000	7680	ug/L
136777-61-2	m,p-Xylene	9390J	200000	4740	ug/L

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
1003-38-9	Furan, tetrahydro-2,5-dimethyl-	692	0.9710	ug/L
	Unknown	587	1.92	ug/L
611-14-3	Benzene, 1-ethyl-2-methyl-	225	1.96	ug/L
108-67-8	Benzene, 1,3,5-trimethyl-	842	1.99	ug/L
95-36-3	1,2,4-Trimethylbenzene	1220	2.11	ug/L
	Unknown	299	2.24	ug/L
872-50-4	2-Pyrrolidinone, 1-methyl-	582	2.32	ug/L
	Unknown	349	2.38	ug/L
	Unknown	487	2.59	ug/L

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302405	**VR 90 RECON CONDENSATE (H2O)**	Water	07/27/2012 14:56	07/28/2012 09:30

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
95-87-4	Phenol, 2,5-dimethyl-	296	2.75	ug/L
10225-39-5	1,3-Butanedione, 2-butyl-1-phenyl-	2230	2.90	ug/L
108-88-3	Toluene	16600	1.09	ug/L
13540-56-2	Benzene, 1,2-dimethyl-4-(phenylmeth	42.2	4.31	ug/L
120-92-3	Cyclopentanone	3600	1.17	ug/L
	Unknown	433	1.32	ug/L
1120-72-5	Cyclopentanone, 2-methyl-	956	1.40	ug/L
100-41-4	Ethylbenzene	692	1.49	ug/L
108-38-3	Benzene, 1,3-dimethyl-	4510	1.53	ug/L
95-47-6	Benzene, 1,2-dimethyl-	3670	1.64	ug/L
98-82-8	Benzene, (1-methylethyl)-	819	1.78	ug/L

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
106-46-7	1,4-Dichlorobenzene	414	100	2.55	ug/L
91-57-6	2-Methylnaphthalene	43.4J	100	2.55	ug/L
83-32-9	Acenaphthene	3.53J	100	2.68	ug/L
117-81-7	Bis(2-Ethylhexyl)phthalate	749	100	1.91	ug/L
84-74-2	Di-n-butyl phthalate	5.08J	100	1.89	ug/L
86-73-7	Fluorene	9.62J	100	2.88	ug/L
110-86-1	Pyridine	620	100	35.8	ug/L

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
62-53-3	Aniline	2880	400	28.7	ug/L
108-95-2	Phenol	3950	400	6.00	ug/L
1319-77-3MP	m,p-Cresol	2920	400	14.1	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302406	**HC 100 RECON CONDENSATE (H2O)**	Water	07/27/2012 14:55	07/28/2012 09:30

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
565-61-7	2-Pentanone, 3-methyl-	1070	1.02	ug/L
108-38-3	Benzene, 1,3-dimethyl-	7070	1.54	ug/L
95-47-6	Benzene, 1,2-dimethyl-	2460	1.64	ug/L
1120-73-6	2-Cyclopenten-1-one, 2-methyl-	392	1.69	ug/L
98-82-8	Benzene, (1-methylethyl)-	1610	1.78	ug/L
108-29-2	2(3H)-Furanone, dihydro-5-methyl-	676	1.92	ug/L
526-73-8	Benzene, 1,2,3-trimethyl-	1190	1.99	ug/L
135-98-8	Benzene, (1-methylpropyl)-	497	2.17	ug/L
60-12-8	Phenylethyl Alcohol	319	2.62	ug/L

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302406	**HC 100 RECON CONDENSATE (H2O)**	Water	07/27/2012 14:55	07/28/2012 09:30

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
106-48-9	Parachlorophenol	269	2.97	ug/L
108-88-3	Toluene	27400	1.10	ug/L
700-88-9	Benzene, cyclopentyl-	279	3.07	ug/L
589-38-8	3-Hexanone	1480	1.14	ug/L
120-92-3	Cyclopentanone	3130	1.18	ug/L
	Unknown	1020	1.23	ug/L
	Unknown	830	1.32	ug/L
	Unknown	289	1.36	ug/L
1120-72-5	Cyclopentanone, 2-methyl-	393	1.40	ug/L
100-41-4	Ethylbenzene	1060	1.49	ug/L

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
106-46-7	1,4-Dichlorobenzene	259	100	2.55	ug/L
91-57-6	2-Methylnaphthalene	50.4J	100	2.55	ug/L
83-32-9	Acenaphthene	3.59J	100	2.68	ug/L
62-53-3	Aniline	143	100	7.18	ug/L
117-81-7	Bis(2-Ethylhexyl)phthalate	35.3J	100	1.91	ug/L
86-73-7	Fluorene	20.9J	100	2.88	ug/L
78-59-1	Isophorone	27.4J	100	3.80	ug/L
95-48-7	o-Cresol	370	100	3.29	ug/L

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
108-95-2	Phenol	3180	200	3.00	ug/L
1319-77-3MP	m,p-Cresol	2290	200	7.04	ug/L

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
67-64-1	Acetone	141000	100000	7980	ug/L
71-43-2	Benzene	1230000	100000	1980	ug/L
108-88-3	Toluene	180000	100000	2540	ug/L
1330-20-7	Xylene (total)	11500J	300000	7680	ug/L
136777-61-2	m,p-Xylene	11500J	200000	4740	ug/L

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302407	**VR 100 RECON CONDENSATE (H2O)**	Water	07/27/2012 14:54	07/28/2012 09:30

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
106-46-7	1,4-Dichlorobenzene	219	100	2.55	ug/L
91-57-6	2-Methylnaphthalene	45.7J	100	2.55	ug/L
117-81-7	Bis(2-Ethylhexyl)phthalate	7.95J	100	1.91	ug/L
86-73-7	Fluorene	23.7J	100	2.88	ug/L
110-86-1	Pyridine	447	100	35.8	ug/L
95-48-7	o-Cresol	569	100	3.29	ug/L

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
62-53-3	Aniline	2660	400	28.7	ug/L
108-95-2	Phenol	3960	400	6.00	ug/L
1319-77-3MP	m,p-Cresol	4530	400	14.1	ug/L

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
108-88-3	Toluene	12400	1.09	ug/L
106-42-3	p-Xylene	1670	1.64	ug/L
1120-73-6	2-Cyclopenten-1-one, 2-methyl-	497	1.69	ug/L
98-82-8	Benzene, (1-methylethyl)-	322	1.78	ug/L
583-60-8	Cyclohexanone, 2-methyl-	452	1.90	ug/L
108-67-8	Benzene, 1,3,5-trimethyl-	552	1.99	ug/L
	Unknown	131	2.24	ug/L
95-48-7	Phenol, 2-methyl-	281	2.37	ug/L
10544-50-0	Sulfur, mol. (S8)	1260	5.71	ug/L
	Unknown	1020	1.12	ug/L
26549-24-6	2-Hexanol, (R)-	1850	1.21	ug/L
	Unknown	114	1.28	ug/L
	Unknown	280	1.32	ug/L
	Unknown	102	1.37	ug/L
1120-72-5	Cyclopentanone, 2-methyl-	536	1.40	ug/L
100-41-4	Ethylbenzene	322	1.49	ug/L
108-38-3	Benzene, 1,3-dimethyl-	2190	1.53	ug/L

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
67-64-1	Acetone	124000	100000	7980	ug/L
71-43-2	Benzene	1090000	100000	1980	ug/L
108-88-3	Toluene	135000	100000	2540	ug/L
1330-20-7	Xylene (total)	10400J	300000	7680	ug/L
136777-61-2	m,p-Xylene	10400J	200000	4740	ug/L

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302408	**HC 90 RECON CONDENSATE (H2O)**	Water	07/27/2012 14:57	07/28/2012 09:30

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
106-46-7	1,4-Dichlorobenzene	229	100	2.55	ug/L
91-57-6	2-Methylnaphthalene	55.5J	100	2.55	ug/L
117-81-7	Bis(2-Ethylhexyl)phthalate	10.2J	100	1.91	ug/L
86-73-7	Fluorene	25.9J	100	2.88	ug/L
78-59-1	Isophorone	73.1J	100	3.80	ug/L
95-48-7	o-Cresol	593	100	3.29	ug/L

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
108-95-2	Phenol	5490	500	7.50	ug/L
1319-77-3MP	m,p-Cresol	4840	500	17.6	ug/L

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
565-61-7	2-Pentanone, 3-methyl-	974	1.02	ug/L
100-41-4	Ethylbenzene	748	1.49	ug/L
110-12-3	2-Hexanone, 5-methyl-	731	1.61	ug/L
106-42-3	p-Xylene	2270	1.64	ug/L
1120-73-6	2-Cyclopenten-1-one, 2-methyl-	367	1.69	ug/L
98-82-8	Benzene, (1-methylethyl)-	1200	1.78	ug/L
108-29-2	2(3H)-Furanone, dihydro-5-methyl-	833	1.92	ug/L
95-36-3	1,2,4-Trimethylbenzene	1090	1.99	ug/L
108-67-8	Benzene, 1,3,5-trimethyl-	859	2.10	ug/L
12427-38-2	Maneb	642	5.71	ug/L
108-88-3	Toluene	19800	1.09	ug/L
	Unknown	1270	1.12	ug/L
120-92-3	Cyclopentanone	2610	1.17	ug/L
	Unknown	847	1.23	ug/L
	Unknown	442	1.32	ug/L
98-01-1	2-Furancarboxaldehyde	270	1.36	ug/L
1120-72-5	Cyclopentanone, 2-methyl-	533	1.40	ug/L
1757-42-2	Cyclopentanone, 3-methyl-	334	1.44	ug/L

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
67-64-1	Acetone	224000	100000	7980	ug/L
71-43-2	Benzene	1470000	100000	1980	ug/L
108-88-3	Toluene	136000	100000	2540	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302401	**VR 90 RECONSTITUTED CONDENSATE**	Solid	07/27/2012 14:56	07/28/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			500000	08/05/2012 20:24	CEK	487041

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	67000U	2480000	67000	ug/Kg
71-55-6	1,1,1-Trichloroethane	118000U	2480000	118000	ug/Kg
79-34-5	1,1,2,2-Tetrachloroethane	56500U	2480000	56500	ug/Kg
79-00-5	1,1,2-Trichloroethane	66500U	2480000	66500	ug/Kg
75-34-3	1,1-Dichloroethane	73900U	2480000	73900	ug/Kg
75-35-4	1,1-Dichloroethene	115000U	2480000	115000	ug/Kg
563-58-6	1,1-Dichloropropene	121000U	2480000	121000	ug/Kg
96-18-4	1,2,3-Trichloropropane	57000U	2480000	57000	ug/Kg
120-82-1	1,2,4-Trichlorobenzene	176000U	2480000	176000	ug/Kg
95-63-6	1,2,4-Trimethylbenzene	179000U	2480000	179000	ug/Kg
96-12-8	1,2-Dibromo-3-chloropropane	199000U	2480000	199000	ug/Kg
106-93-4	1,2-Dibromoethane	71400U	2480000	71400	ug/Kg
95-50-1	**1,2-Dichlorobenzene**	**1500000J**	**2480000**	**137000**	**ug/Kg**
107-06-2	1,2-Dichloroethane	98200U	2480000	98200	ug/Kg
540-59-0	1,2-Dichloroethene(Total)	116000U	4960000	116000	ug/Kg
78-87-5	1,2-Dichloropropane	76400U	2480000	76400	ug/Kg
108-67-8	1,3,5-Trimethylbenzene	187000U	2480000	187000	ug/Kg
541-73-1	1,3-Dichlorobenzene	129000U	2480000	129000	ug/Kg
142-28-9	1,3-Dichloropropane	78400U	2480000	78400	ug/Kg
106-46-7	1,4-Dichlorobenzene	115000U	2480000	115000	ug/Kg
594-20-7	2,2-Dichloropropane	124000U	2480000	124000	ug/Kg
78-93-3	2-Butanone	257000U	2480000	257000	ug/Kg
95-49-8	2-Chlorotoluene	109000U	2480000	109000	ug/Kg
591-78-6	2-Hexanone	215000U	2480000	215000	ug/Kg
106-43-4	4-Chlorotoluene	117000U	2480000	117000	ug/Kg
99-87-6	4-Isopropyltoluene	104000U	2480000	104000	ug/Kg
108-10-1	4-Methyl-2-pentanone	65500U	2480000	65500	ug/Kg
67-64-1	Acetone	511000U	12400000	511000	ug/Kg
71-43-2	**Benzene**	**38400000**	**2480000**	**75400**	**ug/Kg**
108-86-1	Bromobenzene	77400U	2480000	77400	ug/Kg
74-97-5	Bromochloromethane	67000U	2480000	67000	ug/Kg
75-27-4	Bromodichloromethane	80400U	2480000	80400	ug/Kg
75-25-2	Bromoform	78900U	2480000	78900	ug/Kg
74-83-9	Bromomethane	150000U	2480000	150000	ug/Kg
75-15-0	Carbon disulfide	161000U	2480000	161000	ug/Kg
56-23-5	Carbon tetrachloride	100000U	2480000	100000	ug/Kg
108-90-7	Chlorobenzene	73900U	2480000	73900	ug/Kg
75-00-3	Chloroethane	164000U	2480000	164000	ug/Kg
67-66-3	Chloroform	107000U	2480000	107000	ug/Kg
74-87-3	Chloromethane	118000U	2480000	118000	ug/Kg
124-48-1	Dibromochloromethane	108000U	2480000	108000	ug/Kg
74-95-3	Dibromomethane	115000U	2480000	115000	ug/Kg
75-71-8	Dichlorodifluoromethane	111000U	2480000	111000	ug/Kg
100-41-4	Ethylbenzene	90800U	2480000	90800	ug/Kg
87-68-3	Hexachlorobutadiene	106000U	2480000	106000	ug/Kg
98-82-8	**Isopropylbenzene (Cumene)**	**1130000J**	**2480000**	**91800**	**ug/Kg**
74-88-4	Methyl iodide	610000U	2480000	610000	ug/Kg
75-09-2	Methylene chloride	219000U	4960000	219000	ug/Kg
91-20-3	**Naphthalene**	**6950000**	**2480000**	**159000**	**ug/Kg**
100-42-5	Styrene	76400U	2480000	76400	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302401	**VR 90 RECONSTITUTED CONDENSATE**	Solid	07/27/2012 14:56	07/28/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			500000	08/05/2012 20:24	CEK	487041

CAS#	Parameter	Result	RDL	MDL	Units
127-18-4	Tetrachloroethene	147000U	2480000	147000	ug/Kg
110-02-1	Thiophene	ND			ug/Kg
108-88-3	**Toluene**	**10500000**	**2480000**	**76900**	**ug/Kg**
79-01-6	Trichloroethene	106000U	2480000	106000	ug/Kg
75-69-4	Trichlorofluoromethane	129000U	2480000	129000	ug/Kg
76-13-1	Trichlorotrifluoroethane	99200U	2480000	99200	ug/Kg
108-05-4	Vinyl acetate	69900U	2480000	69900	ug/Kg
75-01-4	Vinyl chloride	135000U	2480000	135000	ug/Kg
1330-20-7	**Xylene (total)**	**3640000J**	**4960000**	**199000**	**ug/Kg**
156-59-2	cis-1,2-Dichloroethene	73400U	2480000	73400	ug/Kg
10061-01-5	cis-1,3-Dichloropropene	91800U	2480000	91800	ug/Kg
136777-61-2	**m,p-Xylene**	**2410000J**	**2480000**	**146000**	**ug/Kg**
104-51-8	n-Butylbenzene	116000U	2480000	116000	ug/Kg
103-65-1	n-Propylbenzene	367000U	2480000	367000	ug/Kg
95-47-6	**o-Xylene**	**1230000J**	**2480000**	**67000**	**ug/Kg**
135-98-8	sec-Butylbenzene	97700U	2480000	97700	ug/Kg
1634-04-4	tert-Butyl methyl ether (MTBE)	60500U	2480000	60500	ug/Kg
98-06-6	tert-Butylbenzene	127000U	2480000	127000	ug/Kg
156-60-5	trans-1,2-Dichloroethene	65000U	2480000	65000	ug/Kg
10061-02-6	trans-1,3-Dichloropropene	84300U	2480000	84300	ug/Kg
110-57-6	trans-1,4-Dichloro-2-butene	257000U	2480000	257000	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	24800000	24700000	ug/Kg	100	62 - 127
1868-53-7	Dibromofluoromethane	24800000	24300000	ug/Kg	98	65 - 130
2037-26-5	Toluene d8	24800000	26600000	ug/Kg	107	71 - 132
17060-07-0	1,2-Dichloroethane-d4	24800000	24400000	ug/Kg	98	62 - 125

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			500000	08/05/2012 20:24	CEK	487111

CAS#	Parameter	Result	Retention	Units
	No tics detected	ND		ug/Kg

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/02/2012 13:00	486788	3550C	10	08/04/2012 13:48	KCB	487030

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	18600U	495000	18600	ug/Kg
122-66-7	1,2Diphenylhydrazine/Azobenzen	11200U	495000	11200	ug/Kg
95-95-4	2,4,5-Trichlorophenol	25000U	495000	25000	ug/Kg
88-06-2	2,4,6-Trichlorophenol	201000U	495000	201000	ug/Kg
120-83-2	2,4-Dichlorophenol	40900U	495000	40900	ug/Kg
105-67-9	2,4-Dimethylphenol	227000U	495000	227000	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302401	**VR 90 RECONSTITUTED CONDENSATE**	Solid	07/27/2012 14:56	07/28/2012 09:30

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/02/2012 13:00	486788	3550C	10	08/04/2012 13:48	KCB	487030

CAS#	Parameter	Result	RDL	MDL	Units
51-28-5	2,4-Dinitrophenol	211000U	495000	211000	ug/Kg
121-14-2	2,4-Dinitrotoluene	56700U	495000	56700	ug/Kg
606-20-2	2,6-Dinitrotoluene	48900U	495000	48900	ug/Kg
91-58-7	2-Chloronaphthalene	6340U	495000	6340	ug/Kg
95-57-8	2-Chlorophenol	20300U	495000	20300	ug/Kg
91-57-6	**2-Methylnaphthalene**	**234000J**	**495000**	**15700**	**ug/Kg**
88-74-4	2-Nitroaniline	27200U	2480000	27200	ug/Kg
88-75-5	2-Nitrophenol	33700U	495000	33700	ug/Kg
91-94-1	3,3'-Dichlorobenzidine	168000U	990000	168000	ug/Kg
99-09-2	3-Nitroaniline	35600U	2480000	35600	ug/Kg
534-52-1	4,6-Dinitro-2-methylphenol	222000U	2480000	222000	ug/Kg
101-55-3	4-Bromophenyl phenyl ether	37200U	495000	37200	ug/Kg
59-50-7	4-Chloro-3-methylphenol	52800U	495000	52800	ug/Kg
106-47-8	4-Chloroaniline	41700U	495000	41700	ug/Kg
7005-72-3	4-Chlorophenyl phenyl ether	40100U	495000	40100	ug/Kg
100-01-6	4-Nitroaniline	329000U	2480000	329000	ug/Kg
100-02-7	4-Nitrophenol	320000U	2480000	320000	ug/Kg
83-32-9	Acenaphthene	13000U	495000	13000	ug/Kg
208-96-8	Acenaphthylene	15100U	495000	15100	ug/Kg
62-53-3	Aniline	41800U	495000	41800	ug/Kg
120-12-7	Anthracene	12400U	495000	12400	ug/Kg
56-55-3	Benzo(a)anthracene	43800U	495000	43800	ug/Kg
50-32-8	Benzo(a)pyrene	13300U	495000	13300	ug/Kg
205-99-2	Benzo(b)fluoranthene	76000U	495000	76000	ug/Kg
191-24-2	Benzo(g,h,i)perylene	16800U	495000	16800	ug/Kg
207-08-9	Benzo(k)fluoranthene	11400U	495000	11400	ug/Kg
100-51-6	Benzyl alcohol	54900U	495000	54900	ug/Kg
111-91-1	Bis(2-Chloroethoxy)methane	28000U	495000	28000	ug/Kg
111-44-4	Bis(2-Chloroethyl)ether	41900U	495000	41900	ug/Kg
108-60-1	Bis(2-Chloroisopropyl)ether	39000U	495000	39000	ug/Kg
117-81-7	**Bis(2-Ethylhexyl)phthalate**	**2900000**	**495000**	**24700**	**ug/Kg**
85-68-7	Butyl benzyl phthalate	13300U	495000	13300	ug/Kg
86-74-8	Carbazole	34200U	495000	34200	ug/Kg
218-01-9	Chrysene	13800U	495000	13800	ug/Kg
84-74-2	Di-n-butyl phthalate	15700U	495000	15700	ug/Kg
117-84-0	Di-n-octyl phthalate	16300U	495000	16300	ug/Kg
53-70-3	Dibenz(a,h)anthracene	14500U	495000	14500	ug/Kg
132-64-9	Dibenzofuran	7700U	495000	7700	ug/Kg
84-66-2	Diethyl phthalate	20100U	495000	20100	ug/Kg
131-11-3	Dimethyl phthalate	8350U	495000	8350	ug/Kg
206-44-0	Fluoranthene	9670U	495000	9670	ug/Kg
86-73-7	**Fluorene**	**70600J**	**495000**	**15900**	**ug/Kg**
118-74-1	Hexachlorobenzene	61700U	495000	61700	ug/Kg
87-68-3	Hexachlorobutadiene	29600U	495000	29600	ug/Kg
77-47-4	Hexachlorocyclopentadiene	246000U	495000	246000	ug/Kg
67-72-1	Hexachloroethane	18100U	495000	18100	ug/Kg
193-39-5	Indeno(1,2,3-cd)pyrene	30500U	495000	30500	ug/Kg
78-59-1	Isophorone	21200U	495000	21200	ug/Kg
98-95-3	Nitrobenzene	17800U	495000	17800	ug/Kg
87-86-5	Pentachlorophenol	279000U	2480000	279000	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302401	**VR 90 RECONSTITUTED CONDENSATE**	Solid	07/27/2012 14:56	07/28/2012 09:30

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/02/2012 13:00	486788	3550C	10	08/04/2012 13:48	KCB	487030

CAS#	Parameter	Result	RDL	MDL	Units
85-01-8	Phenanthrene	13100U	495000	13100	ug/Kg
108-95-2	Phenol	49900U	495000	49900	ug/Kg
129-00-0	Pyrene	11400U	495000	11400	ug/Kg
110-86-1	Pyridine	243000U	495000	243000	ug/Kg
1319-77-3MP	m,p-Cresol	58300U	495000	58300	ug/Kg
621-64-7	n-Nitrosodi-n-propylamine	18300U	495000	18300	ug/Kg
62-75-9	n-Nitrosodimethylamine	91400U	495000	91400	ug/Kg
86-30-6	n-Nitrosodiphenylamine	11400U	495000	11400	ug/Kg
95-48-7	o-Cresol	17900U	495000	17900	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	100000	Diluted Out	ug/Kg	**0***	46 - 123
321-60-8	2-Fluorobiphenyl	100000	Diluted Out	ug/Kg	**0***	47 - 127
1718-51-0	Terphenyl-d14	100000	Diluted Out	ug/Kg	**0***	38 - 167
4165-62-2	Phenol-d5	200000	Diluted Out	ug/Kg	**0***	43 - 123
367-12-4	2-Fluorophenol	200000	Diluted Out	ug/Kg	**0***	51 - 119
118-79-6	2,4,6-Tribromophenol	200000	Diluted Out	ug/Kg	**0***	44 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10	08/04/2012 13:48	KCB	487017

CAS#	Parameter	Result	Retention	Units
108-88-3	**Toluene**	**24000000**	**1.08**	**ug/Kg**
135-98-8	**Benzene, (1-methylpropyl)-**	**1790000**	**2.17**	**ug/Kg**
934-80-5	**Benzene, 4-ethyl-1,2-dimethyl-**	**214000**	**2.38**	**ug/Kg**
768-49-0	**Benzene, (2-methyl-1-propenyl)-**	**457000**	**2.43**	**ug/Kg**
1196-58-3	**Benzene, (1-ethylpropyl)-**	**571000**	**2.50**	**ug/Kg**
98-51-1	**4-tert-Butyltoluene**	**1900000**	**2.53**	**ug/Kg**
2049-95-8	**Benzene, (1,1-dimethylpropyl)-**	**816000**	**2.60**	**ug/Kg**
4468-42-2	**Benzene, (1-ethylbutyl)-**	**645000**	**2.85**	**ug/Kg**
2132-84-5	**Benzene, (1-methylhexyl)-**	**1280000**	**3.31**	**ug/Kg**
	Unknown	**483000**	**3.47**	**ug/Kg**
98-51-1	**4-tert-Butyltoluene**	**805000**	**3.54**	**ug/Kg**
111-65-9	**Octane**	**324000**	**1.20**	**ug/Kg**
99-87-6	**Benzene, 1-methyl-4-(1-methylethyl)**	**538000**	**3.65**	**ug/Kg**
3073-66-3	**Cyclohexane, 1,1,3-trimethyl-**	**252000**	**1.39**	**ug/Kg**
100-41-4	**Ethylbenzene**	**1070000**	**1.49**	**ug/Kg**
106-42-3	**p-Xylene**	**8810000**	**1.53**	**ug/Kg**
95-47-6	**Benzene, 1,2-dimethyl-**	**2760000**	**1.64**	**ug/Kg**
98-82-8	**Benzene, (1-methylethyl)-**	**2210000**	**1.78**	**ug/Kg**
108-67-8	**Benzene, 1,3,5-trimethyl-**	**1540000**	**1.99**	**ug/Kg**
526-73-8	**Benzene, 1,2,3-trimethyl-**	**2850000**	**2.11**	**ug/Kg**

RESULTS REPORTED ON A WET WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302402	**HC100 RECONSTITUTED CONDENSATE**	Solid	07/27/2012 14:55	07/28/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			200000	08/05/2012 15:38	CEK	487041

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	26700U	988000	26700	ug/Kg
71-55-6	1,1,1-Trichloroethane	46800U	988000	46800	ug/Kg
79-34-5	1,1,2,2-Tetrachloroethane	22500U	988000	22500	ug/Kg
79-00-5	1,1,2-Trichloroethane	26500U	988000	26500	ug/Kg
75-34-3	1,1-Dichloroethane	29400U	988000	29400	ug/Kg
75-35-4	1,1-Dichloroethene	45800U	988000	45800	ug/Kg
563-58-6	1,1-Dichloropropene	48200U	988000	48200	ug/Kg
96-18-4	1,2,3-Trichloropropane	22700U	988000	22700	ug/Kg
120-82-1	1,2,4-Trichlorobenzene	70200U	988000	70200	ug/Kg
95-63-6	1,2,4-Trimethylbenzene	71100U	988000	71100	ug/Kg
96-12-8	1,2-Dibromo-3-chloropropane	79200U	988000	79200	ug/Kg
106-93-4	1,2-Dibromoethane	28500U	988000	28500	ug/Kg
95-50-1	1,2-Dichlorobenzene	54500U	988000	54500	ug/Kg
107-06-2	1,2-Dichloroethane	39100U	988000	39100	ug/Kg
540-59-0	1,2-Dichloroethene(Total)	46200U	1980000	46200	ug/Kg
78-87-5	1,2-Dichloropropane	30400U	988000	30400	ug/Kg
108-67-8	1,3,5-Trimethylbenzene	74300U	988000	74300	ug/Kg
541-73-1	1,3-Dichlorobenzene	51400U	988000	51400	ug/Kg
142-28-9	1,3-Dichloropropane	31200U	988000	31200	ug/Kg
106-46-7	1,4-Dichlorobenzene	45700U	988000	45700	ug/Kg
594-20-7	2,2-Dichloropropane	49200U	988000	49200	ug/Kg
78-93-3	2-Butanone	102000U	988000	102000	ug/Kg
95-49-8	2-Chlorotoluene	43300U	988000	43300	ug/Kg
591-78-6	2-Hexanone	85600U	988000	85600	ug/Kg
106-43-4	4-Chlorotoluene	46400U	988000	46400	ug/Kg
99-87-6	4-Isopropyltoluene	41500U	988000	41500	ug/Kg
108-10-1	4-Methyl-2-pentanone	26100U	988000	26100	ug/Kg
67-64-1	Acetone	204000U	4940000	204000	ug/Kg
71-43-2	**Benzene**	**12700000**	**988000**	**30000**	**ug/Kg**
108-86-1	Bromobenzene	30800U	988000	30800	ug/Kg
74-97-5	Bromochloromethane	26700U	988000	26700	ug/Kg
75-27-4	Bromodichloromethane	32000U	988000	32000	ug/Kg
75-25-2	Bromoform	31400U	988000	31400	ug/Kg
74-83-9	Bromomethane	59900U	988000	59900	ug/Kg
75-15-0	Carbon disulfide	64200U	988000	64200	ug/Kg
56-23-5	Carbon tetrachloride	39900U	988000	39900	ug/Kg
108-90-7	Chlorobenzene	29400U	988000	29400	ug/Kg
75-00-3	Chloroethane	65400U	988000	65400	ug/Kg
67-66-3	Chloroform	42500U	988000	42500	ug/Kg
74-87-3	Chloromethane	46800U	988000	46800	ug/Kg
124-48-1	Dibromochloromethane	43100U	988000	43100	ug/Kg
74-95-3	Dibromomethane	45700U	988000	45700	ug/Kg
75-71-8	Dichlorodifluoromethane	44300U	988000	44300	ug/Kg
100-41-4	Ethylbenzene	36200U	988000	36200	ug/Kg
87-68-3	Hexachlorobutadiene	42300U	988000	42300	ug/Kg
98-82-8	Isopropylbenzene (Cumene)	36600U	988000	36600	ug/Kg
74-88-4	Methyl iodide	243000U	988000	243000	ug/Kg
75-09-2	Methylene chloride	87400U	1980000	87400	ug/Kg
91-20-3	Naphthalene	63400U	988000	63400	ug/Kg
100-42-5	Styrene	30400U	988000	30400	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302402	**HC100 RECONSTITUTED CONDENSATE**	Solid	07/27/2012 14:55	07/28/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			200000	08/05/2012 15:38	CEK	487041

CAS#	Parameter	Result	RDL	MDL	Units
127-18-4	Tetrachloroethene	58500U	988000	58500	ug/Kg
110-02-1	Thiophene	ND			ug/Kg
108-88-3	**Toluene**	**3650000**	**988000**	**30600**	**ug/Kg**
79-01-6	Trichloroethene	42100U	988000	42100	ug/Kg
75-69-4	Trichlorofluoromethane	51600U	988000	51600	ug/Kg
76-13-1	Trichlorotrifluoroethane	39500U	988000	39500	ug/Kg
108-05-4	Vinyl acetate	27900U	988000	27900	ug/Kg
75-01-4	Vinyl chloride	53800U	988000	53800	ug/Kg
1330-20-7	**Xylene (total)**	**747000J**	**1980000**	**79200**	**ug/Kg**
156-59-2	cis-1,2-Dichloroethene	29200U	988000	29200	ug/Kg
10061-01-5	cis-1,3-Dichloropropene	36600U	988000	36600	ug/Kg
136777-61-2	**m,p-Xylene**	**747000J**	**988000**	**58100**	**ug/Kg**
104-51-8	n-Butylbenzene	46000U	988000	46000	ug/Kg
103-65-1	n-Propylbenzene	146000U	988000	146000	ug/Kg
95-47-6	o-Xylene	26700U	988000	26700	ug/Kg
135-98-8	sec-Butylbenzene	38900U	988000	38900	ug/Kg
1634-04-4	tert-Butyl methyl ether (MTBE)	24100U	988000	24100	ug/Kg
98-06-6	tert-Butylbenzene	50600U	988000	50600	ug/Kg
156-60-5	trans-1,2-Dichloroethene	25900U	988000	25900	ug/Kg
10061-02-6	trans-1,3-Dichloropropene	33600U	988000	33600	ug/Kg
110-57-6	trans-1,4-Dichloro-2-butene	102000U	988000	102000	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	9880000	9900000	ug/Kg	100	62 - 127
1868-53-7	Dibromofluoromethane	9880000	9850000	ug/Kg	100	65 - 130
2037-26-5	Toluene d8	9880000	10400000	ug/Kg	105	71 - 132
17060-07-0	1,2-Dichloroethane-d4	9880000	9970000	ug/Kg	101	62 - 125

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			200000	08/05/2012 15:38	CEK	487111

CAS#	Parameter	Result	Retention	Units
	No tics detected	ND		ug/Kg

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/02/2012 13:00	486788	3550C	10	08/04/2012 14:03	KCB	487030

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	18600U	495000	18600	ug/Kg
122-66-7	1,2Diphenylhydrazine/Azobenzen	11200U	495000	11200	ug/Kg
95-95-4	2,4,5-Trichlorophenol	25000U	495000	25000	ug/Kg
88-06-2	2,4,6-Trichlorophenol	201000U	495000	201000	ug/Kg
120-83-2	2,4-Dichlorophenol	40900U	495000	40900	ug/Kg
105-67-9	2,4-Dimethylphenol	227000U	495000	227000	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302402	**HC100 RECONSTITUTED CONDENSATE**	Solid	07/27/2012 14:55	07/28/2012 09:30

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/02/2012 13:00	486788	3550C	10	08/04/2012 14:03	KCB	487030

CAS#	Parameter	Result	RDL	MDL	Units
51-28-5	2,4-Dinitrophenol	211000U	495000	211000	ug/Kg
121-14-2	2,4-Dinitrotoluene	56700U	495000	56700	ug/Kg
606-20-2	2,6-Dinitrotoluene	48900U	495000	48900	ug/Kg
91-58-7	2-Chloronaphthalene	6340U	495000	6340	ug/Kg
95-57-8	2-Chlorophenol	20300U	495000	20300	ug/Kg
91-57-6	**2-Methylnaphthalene**	**220000J**	**495000**	**15700**	**ug/Kg**
88-74-4	2-Nitroaniline	27200U	2480000	27200	ug/Kg
88-75-5	2-Nitrophenol	33700U	495000	33700	ug/Kg
91-94-1	3,3'-Dichlorobenzidine	168000U	990000	168000	ug/Kg
99-09-2	3-Nitroaniline	35600U	2480000	35600	ug/Kg
534-52-1	4,6-Dinitro-2-methylphenol	222000U	2480000	222000	ug/Kg
101-55-3	4-Bromophenyl phenyl ether	37200U	495000	37200	ug/Kg
59-50-7	4-Chloro-3-methylphenol	52800U	495000	52800	ug/Kg
106-47-8	4-Chloroaniline	41700U	495000	41700	ug/Kg
7005-72-3	4-Chlorophenyl phenyl ether	40100U	495000	40100	ug/Kg
100-01-6	4-Nitroaniline	329000U	2480000	329000	ug/Kg
100-02-7	4-Nitrophenol	320000U	2480000	320000	ug/Kg
83-32-9	Acenaphthene	13000U	495000	13000	ug/Kg
208-96-8	Acenaphthylene	15100U	495000	15100	ug/Kg
62-53-3	Aniline	41800U	495000	41800	ug/Kg
120-12-7	Anthracene	12400U	495000	12400	ug/Kg
56-55-3	Benzo(a)anthracene	43800U	495000	43800	ug/Kg
50-32-8	Benzo(a)pyrene	13300U	495000	13300	ug/Kg
205-99-2	Benzo(b)fluoranthene	76000U	495000	76000	ug/Kg
191-24-2	Benzo(g,h,i)perylene	16800U	495000	16800	ug/Kg
207-08-9	Benzo(k)fluoranthene	11400U	495000	11400	ug/Kg
100-51-6	Benzyl alcohol	54900U	495000	54900	ug/Kg
111-91-1	Bis(2-Chloroethoxy)methane	28000U	495000	28000	ug/Kg
111-44-4	Bis(2-Chloroethyl)ether	41900U	495000	41900	ug/Kg
108-60-1	Bis(2-Chloroisopropyl)ether	39000U	495000	39000	ug/Kg
117-81-7	**Bis(2-Ethylhexyl)phthalate**	**38100J**	**495000**	**24700**	**ug/Kg**
85-68-7	Butyl benzyl phthalate	13300U	495000	13300	ug/Kg
86-74-8	Carbazole	34200U	495000	34200	ug/Kg
218-01-9	Chrysene	13800U	495000	13800	ug/Kg
84-74-2	Di-n-butyl phthalate	15700U	495000	15700	ug/Kg
117-84-0	Di-n-octyl phthalate	16300U	495000	16300	ug/Kg
53-70-3	Dibenz(a,h)anthracene	14500U	495000	14500	ug/Kg
132-64-9	Dibenzofuran	7700U	495000	7700	ug/Kg
84-66-2	Diethyl phthalate	20100U	495000	20100	ug/Kg
131-11-3	Dimethyl phthalate	8350U	495000	8350	ug/Kg
206-44-0	Fluoranthene	9670U	495000	9670	ug/Kg
86-73-7	**Fluorene**	**139000J**	**495000**	**15900**	**ug/Kg**
118-74-1	Hexachlorobenzene	61700U	495000	61700	ug/Kg
87-68-3	Hexachlorobutadiene	29600U	495000	29600	ug/Kg
77-47-4	Hexachlorocyclopentadiene	246000U	495000	246000	ug/Kg
67-72-1	Hexachloroethane	18100U	495000	18100	ug/Kg
193-39-5	Indeno(1,2,3-cd)pyrene	30500U	495000	30500	ug/Kg
78-59-1	Isophorone	21200U	495000	21200	ug/Kg
98-95-3	Nitrobenzene	17800U	495000	17800	ug/Kg
87-86-5	Pentachlorophenol	279000U	2480000	279000	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302402	**HC100 RECONSTITUTED CONDENSATE**	Solid	07/27/2012 14:55	07/28/2012 09:30

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/02/2012 13:00	486788	3550C	10	08/04/2012 14:03	KCB	487030

CAS#	Parameter	Result	RDL	MDL	Units
85-01-8	Phenanthrene	13100U	495000	13100	ug/Kg
108-95-2	Phenol	49900U	495000	49900	ug/Kg
129-00-0	Pyrene	11400U	495000	11400	ug/Kg
110-86-1	Pyridine	243000U	495000	243000	ug/Kg
1319-77-3MP	m,p-Cresol	58300U	495000	58300	ug/Kg
621-64-7	n-Nitrosodi-n-propylamine	18300U	495000	18300	ug/Kg
62-75-9	n-Nitrosodimethylamine	91400U	495000	91400	ug/Kg
86-30-6	n-Nitrosodiphenylamine	11400U	495000	11400	ug/Kg
95-48-7	o-Cresol	17900U	495000	17900	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	100000	Diluted Out	ug/Kg	**0***	46 - 123
321-60-8	2-Fluorobiphenyl	100000	Diluted Out	ug/Kg	**0***	47 - 127
1718-51-0	Terphenyl-d14	100000	Diluted Out	ug/Kg	**0***	38 - 167
4165-62-2	Phenol-d5	200000	Diluted Out	ug/Kg	**0***	43 - 123
367-12-4	2-Fluorophenol	200000	Diluted Out	ug/Kg	**0***	51 - 119
118-79-6	2,4,6-Tribromophenol	200000	Diluted Out	ug/Kg	**0***	44 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10	08/04/2012 14:03	KCB	487017

CAS#	Parameter	Result	Retention	Units
108-88-3	**Toluene**	**44000000**	**1.08**	**ug/Kg**
95-63-6	**Benzene, 1,2,4-trimethyl-**	**2230000**	**2.11**	**ug/Kg**
1196-58-3	**Benzene, (1-ethylpropyl)-**	**418000**	**2.50**	**ug/Kg**
98-51-1	**4-tert-Butyltoluene**	**1690000**	**2.53**	**ug/Kg**
99-87-6	**Benzene, 1-methyl-4-(1-methylethyl)**	**241000**	**2.60**	**ug/Kg**
2132-84-5	**Benzene, (1-methylhexyl)-**	**252000**	**3.31**	**ug/Kg**
	Unknown	**400000**	**3.47**	**ug/Kg**
	Unknown	**708000**	**3.54**	**ug/Kg**
111-65-9	**Octane**	**421000**	**1.20**	**ug/Kg**
3073-66-3	**Cyclohexane, 1,1,3-trimethyl-**	**412000**	**1.39**	**ug/Kg**
100-41-4	**Ethylbenzene**	**1860000**	**1.49**	**ug/Kg**
108-38-3	**Benzene, 1,3-dimethyl-**	**14300000**	**1.53**	**ug/Kg**
106-42-3	**p-Xylene**	**4050000**	**1.64**	**ug/Kg**
98-82-8	**Benzene, (1-methylethyl)-**	**3980000**	**1.78**	**ug/Kg**
611-14-3	**Benzene, 1-ethyl-2-methyl-**	**716000**	**1.96**	**ug/Kg**
108-67-8	**Benzene, 1,3,5-trimethyl-**	**1440000**	**1.99**	**ug/Kg**

RESULTS REPORTED ON A WET WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302403	**VR100 RECONSTITUTED CONDENSATE**	Solid	07/27/2012 14:54	07/28/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			200000	08/05/2012 15:59	CEK	487041

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	25400U	940000	25400	ug/Kg
71-55-6	1,1,1-Trichloroethane	44500U	940000	44500	ug/Kg
79-34-5	1,1,2,2-Tetrachloroethane	21400U	940000	21400	ug/Kg
79-00-5	1,1,2-Trichloroethane	25200U	940000	25200	ug/Kg
75-34-3	1,1-Dichloroethane	28000U	940000	28000	ug/Kg
75-35-4	1,1-Dichloroethene	43600U	940000	43600	ug/Kg
563-58-6	1,1-Dichloropropene	45900U	940000	45900	ug/Kg
96-18-4	1,2,3-Trichloropropane	21600U	940000	21600	ug/Kg
120-82-1	1,2,4-Trichlorobenzene	66700U	940000	66700	ug/Kg
95-63-6	1,2,4-Trimethylbenzene	67700U	940000	67700	ug/Kg
96-12-8	1,2-Dibromo-3-chloropropane	75400U	940000	75400	ug/Kg
106-93-4	1,2-Dibromoethane	27100U	940000	27100	ug/Kg
95-50-1	**1,2-Dichlorobenzene**	**223000J**	**940000**	**51900**	**ug/Kg**
107-06-2	1,2-Dichloroethane	37200U	940000	37200	ug/Kg
540-59-0	1,2-Dichloroethene(Total)	44000U	1880000	44000	ug/Kg
78-87-5	1,2-Dichloropropane	28900U	940000	28900	ug/Kg
108-67-8	1,3,5-Trimethylbenzene	70700U	940000	70700	ug/Kg
541-73-1	1,3-Dichlorobenzene	48900U	940000	48900	ug/Kg
142-28-9	1,3-Dichloropropane	29700U	940000	29700	ug/Kg
106-46-7	1,4-Dichlorobenzene	43400U	940000	43400	ug/Kg
594-20-7	2,2-Dichloropropane	46800U	940000	46800	ug/Kg
78-93-3	2-Butanone	97400U	940000	97400	ug/Kg
95-49-8	2-Chlorotoluene	41200U	940000	41200	ug/Kg
591-78-6	2-Hexanone	81400U	940000	81400	ug/Kg
106-43-4	4-Chlorotoluene	44200U	940000	44200	ug/Kg
99-87-6	4-Isopropyltoluene	39500U	940000	39500	ug/Kg
108-10-1	4-Methyl-2-pentanone	24800U	940000	24800	ug/Kg
67-64-1	Acetone	194000U	4700000	194000	ug/Kg
71-43-2	**Benzene**	**9840000**	**940000**	**28600**	**ug/Kg**
108-86-1	Bromobenzene	29300U	940000	29300	ug/Kg
74-97-5	Bromochloromethane	25400U	940000	25400	ug/Kg
75-27-4	Bromodichloromethane	30500U	940000	30500	ug/Kg
75-25-2	Bromoform	29900U	940000	29900	ug/Kg
74-83-9	Bromomethane	57000U	940000	57000	ug/Kg
75-15-0	Carbon disulfide	61100U	940000	61100	ug/Kg
56-23-5	Carbon tetrachloride	38000U	940000	38000	ug/Kg
108-90-7	Chlorobenzene	28000U	940000	28000	ug/Kg
75-00-3	Chloroethane	62200U	940000	62200	ug/Kg
67-66-3	Chloroform	40400U	940000	40400	ug/Kg
74-87-3	Chloromethane	44500U	940000	44500	ug/Kg
124-48-1	Dibromochloromethane	41000U	940000	41000	ug/Kg
74-95-3	Dibromomethane	43400U	940000	43400	ug/Kg
75-71-8	Dichlorodifluoromethane	42100U	940000	42100	ug/Kg
100-41-4	Ethylbenzene	34400U	940000	34400	ug/Kg
87-68-3	Hexachlorobutadiene	40200U	940000	40200	ug/Kg
98-82-8	Isopropylbenzene (Cumene)	34800U	940000	34800	ug/Kg
74-88-4	Methyl iodide	231000U	940000	231000	ug/Kg
75-09-2	Methylene chloride	83100U	1880000	83100	ug/Kg
91-20-3	Naphthalene	60300U	940000	60300	ug/Kg
100-42-5	Styrene	28900U	940000	28900	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302403	**VR100 RECONSTITUTED CONDENSATE**	Solid	07/27/2012 14:54	07/28/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			200000	08/05/2012 15:59	CEK	487041

CAS#	Parameter	Result	RDL	MDL	Units
127-18-4	Tetrachloroethene	55600U	940000	55600	ug/Kg
110-02-1	Thiophene	ND			ug/Kg
108-88-3	**Toluene**	**2530000**	**940000**	**29100**	**ug/Kg**
79-01-6	Trichloroethene	40000U	940000	40000	ug/Kg
75-69-4	Trichlorofluoromethane	49100U	940000	49100	ug/Kg
76-13-1	Trichlorotrifluoroethane	37600U	940000	37600	ug/Kg
108-05-4	Vinyl acetate	26500U	940000	26500	ug/Kg
75-01-4	Vinyl chloride	51100U	940000	51100	ug/Kg
1330-20-7	**Xylene (total)**	**703000J**	**1880000**	**75400**	**ug/Kg**
156-59-2	cis-1,2-Dichloroethene	27800U	940000	27800	ug/Kg
10061-01-5	cis-1,3-Dichloropropene	34800U	940000	34800	ug/Kg
136777-61-2	**m,p-Xylene**	**703000J**	**940000**	**55300**	**ug/Kg**
104-51-8	n-Butylbenzene	43800U	940000	43800	ug/Kg
103-65-1	n-Propylbenzene	139000U	940000	139000	ug/Kg
95-47-6	o-Xylene	25400U	940000	25400	ug/Kg
135-98-8	sec-Butylbenzene	37000U	940000	37000	ug/Kg
1634-04-4	tert-Butyl methyl ether (MTBE)	22900U	940000	22900	ug/Kg
98-06-6	tert-Butylbenzene	48100U	940000	48100	ug/Kg
156-60-5	trans-1,2-Dichloroethene	24600U	940000	24600	ug/Kg
10061-02-6	trans-1,3-Dichloropropene	32000U	940000	32000	ug/Kg
110-57-6	trans-1,4-Dichloro-2-butene	97400U	940000	97400	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	9400000	9310000	ug/Kg	99	62 - 127
1868-53-7	Dibromofluoromethane	9400000	9140000	ug/Kg	97	65 - 130
2037-26-5	Toluene d8	9400000	9910000	ug/Kg	105	71 - 132
17060-07-0	1,2-Dichloroethane-d4	9400000	9370000	ug/Kg	100	62 - 125

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			200000	08/05/2012 15:59	CEK	487111

CAS#	Parameter	Result	Retention	Units
	No tics detected	ND		ug/Kg

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/02/2012 13:00	486788	3550C	10	08/04/2012 14:17	KCB	487030

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	18600U	495000	18600	ug/Kg
122-66-7	1,2Diphenylhydrazine/Azobenzen	11200U	495000	11200	ug/Kg
95-95-4	2,4,5-Trichlorophenol	25000U	495000	25000	ug/Kg
88-06-2	2,4,6-Trichlorophenol	201000U	495000	201000	ug/Kg
120-83-2	2,4-Dichlorophenol	40900U	495000	40900	ug/Kg
105-67-9	2,4-Dimethylphenol	227000U	495000	227000	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302403	**VR100 RECONSTITUTED CONDENSATE**	Solid	07/27/2012 14:54	07/28/2012 09:30

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/02/2012 13:00	486788	3550C	10	08/04/2012 14:17	KCB	487030

CAS#	Parameter	Result	RDL	MDL	Units
51-28-5	2,4-Dinitrophenol	211000U	495000	211000	ug/Kg
121-14-2	2,4-Dinitrotoluene	56700U	495000	56700	ug/Kg
606-20-2	2,6-Dinitrotoluene	48900U	495000	48900	ug/Kg
91-58-7	2-Chloronaphthalene	6340U	495000	6340	ug/Kg
95-57-8	2-Chlorophenol	20300U	495000	20300	ug/Kg
91-57-6	**2-Methylnaphthalene**	**720000**	**495000**	**15700**	**ug/Kg**
88-74-4	2-Nitroaniline	27200U	2480000	27200	ug/Kg
88-75-5	2-Nitrophenol	33700U	495000	33700	ug/Kg
91-94-1	3,3'-Dichlorobenzidine	168000U	990000	168000	ug/Kg
99-09-2	3-Nitroaniline	35600U	2480000	35600	ug/Kg
534-52-1	4,6-Dinitro-2-methylphenol	222000U	2480000	222000	ug/Kg
101-55-3	4-Bromophenyl phenyl ether	37200U	495000	37200	ug/Kg
59-50-7	4-Chloro-3-methylphenol	52800U	495000	52800	ug/Kg
106-47-8	4-Chloroaniline	41700U	495000	41700	ug/Kg
7005-72-3	4-Chlorophenyl phenyl ether	40100U	495000	40100	ug/Kg
100-01-6	4-Nitroaniline	329000U	2480000	329000	ug/Kg
100-02-7	4-Nitrophenol	320000U	2480000	320000	ug/Kg
83-32-9	Acenaphthene	13000U	495000	13000	ug/Kg
208-96-8	Acenaphthylene	15100U	495000	15100	ug/Kg
62-53-3	Aniline	41800U	495000	41800	ug/Kg
120-12-7	Anthracene	12400U	495000	12400	ug/Kg
56-55-3	Benzo(a)anthracene	43800U	495000	43800	ug/Kg
50-32-8	Benzo(a)pyrene	13300U	495000	13300	ug/Kg
205-99-2	Benzo(b)fluoranthene	76000U	495000	76000	ug/Kg
191-24-2	Benzo(g,h,i)perylene	16800U	495000	16800	ug/Kg
207-08-9	Benzo(k)fluoranthene	11400U	495000	11400	ug/Kg
100-51-6	Benzyl alcohol	54900U	495000	54900	ug/Kg
111-91-1	Bis(2-Chloroethoxy)methane	28000U	495000	28000	ug/Kg
111-44-4	Bis(2-Chloroethyl)ether	41900U	495000	41900	ug/Kg
108-60-1	Bis(2-Chloroisopropyl)ether	39000U	495000	39000	ug/Kg
117-81-7	**Bis(2-Ethylhexyl)phthalate**	**153000J**	**495000**	**24700**	**ug/Kg**
85-68-7	Butyl benzyl phthalate	13300U	495000	13300	ug/Kg
86-74-8	Carbazole	34200U	495000	34200	ug/Kg
218-01-9	Chrysene	13800U	495000	13800	ug/Kg
84-74-2	Di-n-butyl phthalate	15700U	495000	15700	ug/Kg
117-84-0	Di-n-octyl phthalate	16300U	495000	16300	ug/Kg
53-70-3	Dibenz(a,h)anthracene	14500U	495000	14500	ug/Kg
132-64-9	Dibenzofuran	7700U	495000	7700	ug/Kg
84-66-2	Diethyl phthalate	20100U	495000	20100	ug/Kg
131-11-3	Dimethyl phthalate	8350U	495000	8350	ug/Kg
206-44-0	Fluoranthene	9670U	495000	9670	ug/Kg
86-73-7	**Fluorene**	**453000J**	**495000**	**15900**	**ug/Kg**
118-74-1	Hexachlorobenzene	61700U	495000	61700	ug/Kg
87-68-3	Hexachlorobutadiene	29600U	495000	29600	ug/Kg
77-47-4	Hexachlorocyclopentadiene	246000U	495000	246000	ug/Kg
67-72-1	Hexachloroethane	18100U	495000	18100	ug/Kg
193-39-5	Indeno(1,2,3-cd)pyrene	30500U	495000	30500	ug/Kg
78-59-1	Isophorone	21200U	495000	21200	ug/Kg
98-95-3	Nitrobenzene	17800U	495000	17800	ug/Kg
87-86-5	Pentachlorophenol	279000U	2480000	279000	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302403	**VR100 RECONSTITUTED CONDENSATE**	Solid	07/27/2012 14:54	07/28/2012 09:30

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/02/2012 13:00	486788	3550C	10	08/04/2012 14:17	KCB	487030

CAS#	Parameter	Result	RDL	MDL	Units
85-01-8	Phenanthrene	13100U	495000	13100	ug/Kg
108-95-2	Phenol	49900U	495000	49900	ug/Kg
129-00-0	Pyrene	11400U	495000	11400	ug/Kg
110-86-1	Pyridine	243000U	495000	243000	ug/Kg
1319-77-3MP	m,p-Cresol	58300U	495000	58300	ug/Kg
621-64-7	n-Nitrosodi-n-propylamine	18300U	495000	18300	ug/Kg
62-75-9	n-Nitrosodimethylamine	91400U	495000	91400	ug/Kg
86-30-6	n-Nitrosodiphenylamine	11400U	495000	11400	ug/Kg
95-48-7	o-Cresol	17900U	495000	17900	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	100000	Diluted Out	ug/Kg	**0***	46 - 123
321-60-8	2-Fluorobiphenyl	100000	Diluted Out	ug/Kg	**0***	47 - 127
1718-51-0	Terphenyl-d14	100000	Diluted Out	ug/Kg	**0***	38 - 167
4165-62-2	Phenol-d5	200000	Diluted Out	ug/Kg	**0***	43 - 123
367-12-4	2-Fluorophenol	200000	Diluted Out	ug/Kg	**0***	51 - 119
118-79-6	2,4,6-Tribromophenol	200000	Diluted Out	ug/Kg	**0***	44 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10	08/04/2012 14:17	KCB	487017

CAS#	Parameter	Result	Retention	Units
108-88-3	**Toluene**	**22000000**	**1.08**	**ug/Kg**
934-80-5	**Benzene, 4-ethyl-1,2-dimethyl-**	**231000**	**2.38**	**ug/Kg**
2049-95-8	**Benzene, (1,1-dimethylpropyl)-**	**222000**	**2.60**	**ug/Kg**
700-88-9	**Benzene, cyclopentyl-**	**214000**	**3.07**	**ug/Kg**
827-52-1	**Benzene, cyclohexyl-**	**238000**	**3.43**	**ug/Kg**
50704-01-3	**Benzene, (1,3-dimethyl-2-butenyl)-**	**846000**	**3.47**	**ug/Kg**
4815-57-0	**Benzene, 1,4-dipropyl-**	**1400000**	**3.54**	**ug/Kg**
934-80-5	**Benzene, 4-ethyl-1,2-dimethyl-**	**1020000**	**3.65**	**ug/Kg**
4575-46-6	**Benzene, 1-cyclohexyl-3-methyl-**	**242000**	**3.76**	**ug/Kg**
13540-56-2	**Benzene, 1,2-dimethyl-4-(phenylmeth**	**231000**	**4.26**	**ug/Kg**
4309-66-4	**Stilbene, 4-amino- (E)-**	**1660000**	**4.55**	**ug/Kg**
100-41-4	**Ethylbenzene**	**1030000**	**1.49**	**ug/Kg**
10544-50-0	**Sulfur, mol. (S8)**	**809000**	**5.70**	**ug/Kg**
108-38-3	**Benzene, 1,3-dimethyl-**	**8440000**	**1.53**	**ug/Kg**
95-47-6	**Benzene, 1,2-dimethyl-**	**2670000**	**1.64**	**ug/Kg**
98-82-8	**Benzene, (1-methylethyl)-**	**2150000**	**1.78**	**ug/Kg**
620-14-4	**Benzene, 1-ethyl-3-methyl-**	**775000**	**1.96**	**ug/Kg**
108-67-8	**Benzene, 1,3,5-trimethyl-**	**1570000**	**1.99**	**ug/Kg**
526-73-8	**Benzene, 1,2,3-trimethyl-**	**2920000**	**2.10**	**ug/Kg**
135-98-8	**Benzene, (1-methylpropyl)-**	**1820000**	**2.17**	**ug/Kg**

RESULTS REPORTED ON A WET WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302404	**HC 90 RECONSTITUTED CONDENSATE**	Solid	07/27/2012 14:57	07/28/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			200000	08/05/2012 20:43	CEK	487041

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	26400U	978000	26400	ug/Kg
71-55-6	1,1,1-Trichloroethane	46400U	978000	46400	ug/Kg
79-34-5	1,1,2,2-Tetrachloroethane	22300U	978000	22300	ug/Kg
79-00-5	1,1,2-Trichloroethane	26200U	978000	26200	ug/Kg
75-34-3	1,1-Dichloroethane	29200U	978000	29200	ug/Kg
75-35-4	1,1-Dichloroethene	45400U	978000	45400	ug/Kg
563-58-6	1,1-Dichloropropene	47700U	978000	47700	ug/Kg
96-18-4	1,2,3-Trichloropropane	22500U	978000	22500	ug/Kg
120-82-1	1,2,4-Trichlorobenzene	69500U	978000	69500	ug/Kg
95-63-6	1,2,4-Trimethylbenzene	70500U	978000	70500	ug/Kg
96-12-8	1,2-Dibromo-3-chloropropane	78500U	978000	78500	ug/Kg
106-93-4	1,2-Dibromoethane	28200U	978000	28200	ug/Kg
95-50-1	1,2-Dichlorobenzene	54000U	978000	54000	ug/Kg
107-06-2	1,2-Dichloroethane	38700U	978000	38700	ug/Kg
540-59-0	1,2-Dichloroethene(Total)	45800U	1960000	45800	ug/Kg
78-87-5	1,2-Dichloropropane	30100U	978000	30100	ug/Kg
108-67-8	1,3,5-Trimethylbenzene	73600U	978000	73600	ug/Kg
541-73-1	1,3-Dichlorobenzene	50900U	978000	50900	ug/Kg
142-28-9	1,3-Dichloropropane	30900U	978000	30900	ug/Kg
106-46-7	1,4-Dichlorobenzene	45200U	978000	45200	ug/Kg
594-20-7	2,2-Dichloropropane	48700U	978000	48700	ug/Kg
78-93-3	2-Butanone	101000U	978000	101000	ug/Kg
95-49-8	2-Chlorotoluene	42900U	978000	42900	ug/Kg
591-78-6	2-Hexanone	84700U	978000	84700	ug/Kg
106-43-4	4-Chlorotoluene	46000U	978000	46000	ug/Kg
99-87-6	4-Isopropyltoluene	41100U	978000	41100	ug/Kg
108-10-1	4-Methyl-2-pentanone	25800U	978000	25800	ug/Kg
67-64-1	Acetone	202000U	4890000	202000	ug/Kg
71-43-2	**Benzene**	**20200000**	**978000**	**29700**	**ug/Kg**
108-86-1	Bromobenzene	30500U	978000	30500	ug/Kg
74-97-5	Bromochloromethane	26400U	978000	26400	ug/Kg
75-27-4	Bromodichloromethane	31700U	978000	31700	ug/Kg
75-25-2	Bromoform	31100U	978000	31100	ug/Kg
74-83-9	Bromomethane	59300U	978000	59300	ug/Kg
75-15-0	Carbon disulfide	63600U	978000	63600	ug/Kg
56-23-5	Carbon tetrachloride	39500U	978000	39500	ug/Kg
108-90-7	Chlorobenzene	29200U	978000	29200	ug/Kg
75-00-3	Chloroethane	64800U	978000	64800	ug/Kg
67-66-3	Chloroform	42100U	978000	42100	ug/Kg
74-87-3	Chloromethane	46400U	978000	46400	ug/Kg
124-48-1	Dibromochloromethane	42700U	978000	42700	ug/Kg
74-95-3	Dibromomethane	45200U	978000	45200	ug/Kg
75-71-8	Dichlorodifluoromethane	43800U	978000	43800	ug/Kg
100-41-4	Ethylbenzene	35800U	978000	35800	ug/Kg
87-68-3	Hexachlorobutadiene	41900U	978000	41900	ug/Kg
98-82-8	Isopropylbenzene (Cumene)	36200U	978000	36200	ug/Kg
74-88-4	Methyl iodide	241000U	978000	241000	ug/Kg
75-09-2	Methylene chloride	86500U	1960000	86500	ug/Kg
91-20-3	Naphthalene	62800U	978000	62800	ug/Kg
100-42-5	Styrene	30100U	978000	30100	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302404	**HC 90 RECONSTITUTED CONDENSATE**	Solid	07/27/2012 14:57	07/28/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			200000	08/05/2012 20:43	CEK	487041

CAS#	Parameter	Result	RDL	MDL	Units
127-18-4	Tetrachloroethene	57900U	978000	57900	ug/Kg
110-02-1	Thiophene	ND			ug/Kg
108-88-3	**Toluene**	**2990000**	**978000**	**30300**	**ug/Kg**
79-01-6	Trichloroethene	41700U	978000	41700	ug/Kg
75-69-4	Trichlorofluoromethane	51100U	978000	51100	ug/Kg
76-13-1	Trichlorotrifluoroethane	39100U	978000	39100	ug/Kg
108-05-4	Vinyl acetate	27600U	978000	27600	ug/Kg
75-01-4	Vinyl chloride	53200U	978000	53200	ug/Kg
1330-20-7	Xylene (total)	78500U	1960000	78500	ug/Kg
156-59-2	cis-1,2-Dichloroethene	29000U	978000	29000	ug/Kg
10061-01-5	cis-1,3-Dichloropropene	36200U	978000	36200	ug/Kg
136777-61-2	m,p-Xylene	57500U	978000	57500	ug/Kg
104-51-8	n-Butylbenzene	45600U	978000	45600	ug/Kg
103-65-1	n-Propylbenzene	145000U	978000	145000	ug/Kg
95-47-6	o-Xylene	26400U	978000	26400	ug/Kg
135-98-8	sec-Butylbenzene	38600U	978000	38600	ug/Kg
1634-04-4	tert-Butyl methyl ether (MTBE)	23900U	978000	23900	ug/Kg
98-06-6	tert-Butylbenzene	50100U	978000	50100	ug/Kg
156-60-5	trans-1,2-Dichloroethene	25600U	978000	25600	ug/Kg
10061-02-6	trans-1,3-Dichloropropene	33300U	978000	33300	ug/Kg
110-57-6	trans-1,4-Dichloro-2-butene	101000U	978000	101000	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	9780000	9640000	ug/Kg	99	62 - 127
1868-53-7	Dibromofluoromethane	9780000	9460000	ug/Kg	97	65 - 130
2037-26-5	Toluene d8	9780000	10500000	ug/Kg	107	71 - 132
17060-07-0	1,2-Dichloroethane-d4	9780000	9860000	ug/Kg	101	62 - 125

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			200000	08/05/2012 20:43	CEK	487111

CAS#	Parameter	Result	Retention	Units
	No tics detected	ND		ug/Kg

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/02/2012 13:00	486788	3550C	10	08/04/2012 14:31	KCB	487030

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	18600U	495000	18600	ug/Kg
122-66-7	1,2Diphenylhydrazine/Azobenzen	11200U	495000	11200	ug/Kg
95-95-4	2,4,5-Trichlorophenol	25000U	495000	25000	ug/Kg
88-06-2	2,4,6-Trichlorophenol	201000U	495000	201000	ug/Kg
120-83-2	2,4-Dichlorophenol	40900U	495000	40900	ug/Kg
105-67-9	2,4-Dimethylphenol	227000U	495000	227000	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302404	**HC 90 RECONSTITUTED CONDENSATE**	Solid	07/27/2012 14:57	07/28/2012 09:30

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/02/2012 13:00	486788	3550C	10	08/04/2012 14:31	KCB	487030

CAS#	Parameter	Result	RDL	MDL	Units
51-28-5	2,4-Dinitrophenol	211000U	495000	211000	ug/Kg
121-14-2	2,4-Dinitrotoluene	56700U	495000	56700	ug/Kg
606-20-2	2,6-Dinitrotoluene	48900U	495000	48900	ug/Kg
91-58-7	2-Chloronaphthalene	6340U	495000	6340	ug/Kg
95-57-8	2-Chlorophenol	20300U	495000	20300	ug/Kg
91-57-6	**2-Methylnaphthalene**	**80300J**	**495000**	**15700**	**ug/Kg**
88-74-4	2-Nitroaniline	27200U	2480000	27200	ug/Kg
88-75-5	2-Nitrophenol	33700U	495000	33700	ug/Kg
91-94-1	3,3'-Dichlorobenzidine	168000U	990000	168000	ug/Kg
99-09-2	3-Nitroaniline	35600U	2480000	35600	ug/Kg
534-52-1	4,6-Dinitro-2-methylphenol	222000U	2480000	222000	ug/Kg
101-55-3	4-Bromophenyl phenyl ether	37200U	495000	37200	ug/Kg
59-50-7	4-Chloro-3-methylphenol	52800U	495000	52800	ug/Kg
106-47-8	4-Chloroaniline	41700U	495000	41700	ug/Kg
7005-72-3	4-Chlorophenyl phenyl ether	40100U	495000	40100	ug/Kg
100-01-6	4-Nitroaniline	329000U	2480000	329000	ug/Kg
100-02-7	4-Nitrophenol	320000U	2480000	320000	ug/Kg
83-32-9	Acenaphthene	13000U	495000	13000	ug/Kg
208-96-8	Acenaphthylene	15100U	495000	15100	ug/Kg
62-53-3	Aniline	41800U	495000	41800	ug/Kg
120-12-7	Anthracene	12400U	495000	12400	ug/Kg
56-55-3	Benzo(a)anthracene	43800U	495000	43800	ug/Kg
50-32-8	Benzo(a)pyrene	13300U	495000	13300	ug/Kg
205-99-2	Benzo(b)fluoranthene	76000U	495000	76000	ug/Kg
191-24-2	Benzo(g,h,i)perylene	16800U	495000	16800	ug/Kg
207-08-9	Benzo(k)fluoranthene	11400U	495000	11400	ug/Kg
100-51-6	Benzyl alcohol	54900U	495000	54900	ug/Kg
111-91-1	Bis(2-Chloroethoxy)methane	28000U	495000	28000	ug/Kg
111-44-4	Bis(2-Chloroethyl)ether	41900U	495000	41900	ug/Kg
108-60-1	Bis(2-Chloroisopropyl)ether	39000U	495000	39000	ug/Kg
117-81-7	**Bis(2-Ethylhexyl)phthalate**	**30000J**	**495000**	**24700**	**ug/Kg**
85-68-7	Butyl benzyl phthalate	13300U	495000	13300	ug/Kg
86-74-8	Carbazole	34200U	495000	34200	ug/Kg
218-01-9	Chrysene	13800U	495000	13800	ug/Kg
84-74-2	Di-n-butyl phthalate	15700U	495000	15700	ug/Kg
117-84-0	Di-n-octyl phthalate	16300U	495000	16300	ug/Kg
53-70-3	Dibenz(a,h)anthracene	14500U	495000	14500	ug/Kg
132-64-9	Dibenzofuran	7700U	495000	7700	ug/Kg
84-66-2	Diethyl phthalate	20100U	495000	20100	ug/Kg
131-11-3	Dimethyl phthalate	8350U	495000	8350	ug/Kg
206-44-0	Fluoranthene	9670U	495000	9670	ug/Kg
86-73-7	**Fluorene**	**40400J**	**495000**	**15900**	**ug/Kg**
118-74-1	Hexachlorobenzene	61700U	495000	61700	ug/Kg
87-68-3	Hexachlorobutadiene	29600U	495000	29600	ug/Kg
77-47-4	Hexachlorocyclopentadiene	246000U	495000	246000	ug/Kg
67-72-1	Hexachloroethane	18100U	495000	18100	ug/Kg
193-39-5	Indeno(1,2,3-cd)pyrene	30500U	495000	30500	ug/Kg
78-59-1	Isophorone	21200U	495000	21200	ug/Kg
98-95-3	Nitrobenzene	17800U	495000	17800	ug/Kg
87-86-5	Pentachlorophenol	279000U	2480000	279000	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302404	**HC 90 RECONSTITUTED CONDENSATE**	Solid	07/27/2012 14:57	07/28/2012 09:30

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/02/2012 13:00	486788	3550C	10	08/04/2012 14:31	KCB	487030

CAS#	Parameter	Result	RDL	MDL	Units
85-01-8	Phenanthrene	13100U	495000	13100	ug/Kg
108-95-2	Phenol	49900U	495000	49900	ug/Kg
129-00-0	Pyrene	11400U	495000	11400	ug/Kg
110-86-1	Pyridine	243000U	495000	243000	ug/Kg
1319-77-3MP	m,p-Cresol	58300U	495000	58300	ug/Kg
621-64-7	n-Nitrosodi-n-propylamine	18300U	495000	18300	ug/Kg
62-75-9	n-Nitrosodimethylamine	91400U	495000	91400	ug/Kg
86-30-6	n-Nitrosodiphenylamine	11400U	495000	11400	ug/Kg
95-48-7	o-Cresol	17900U	495000	17900	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	100000	Diluted Out	ug/Kg	**0***	46 - 123
321-60-8	2-Fluorobiphenyl	100000	Diluted Out	ug/Kg	**0***	47 - 127
1718-51-0	Terphenyl-d14	100000	Diluted Out	ug/Kg	**0***	38 - 167
4165-62-2	Phenol-d5	200000	Diluted Out	ug/Kg	**0***	43 - 123
367-12-4	2-Fluorophenol	200000	Diluted Out	ug/Kg	**0***	51 - 119
118-79-6	2,4,6-Tribromophenol	200000	Diluted Out	ug/Kg	**0***	44 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10	08/04/2012 14:31	KCB	487017

CAS#	Parameter	Result	Retention	Units
1640-89-7	**Cyclopentane, ethyl-**	**204000**	**0.9550**	**ug/Kg**
611-14-3	**Benzene, 1-ethyl-2-methyl-**	**794000**	**1.96**	**ug/Kg**
108-67-8	**Benzene, 1,3,5-trimethyl-**	**1520000**	**1.99**	**ug/Kg**
95-36-3	**1,2,4-Trimethylbenzene**	**2440000**	**2.11**	**ug/Kg**
99-87-6	**Benzene, 1-methyl-4-(1-methylethyl)**	**2000000**	**2.17**	**ug/Kg**
1196-58-3	**Benzene, (1-ethylpropyl)-**	**399000**	**2.50**	**ug/Kg**
98-51-1	**4-tert-Butyltoluene**	**1560000**	**2.53**	**ug/Kg**
2049-95-8	**Benzene, (1,1-dimethylpropyl)-**	**216000**	**2.60**	**ug/Kg**
4468-42-2	**Benzene, (1-ethylbutyl)-**	**192000**	**2.85**	**ug/Kg**
2132-84-5	**Benzene, (1-methylhexyl)-**	**171000**	**3.31**	**ug/Kg**
1075-38-3	**Benzene, 1-(1,1-dimethylethyl)-3-me**	**281000**	**3.54**	**ug/Kg**
108-88-3	**Toluene**	**83400000**	**1.08**	**ug/Kg**
27577-96-4	**Ethanol, 2-xylyl-**	**203000**	**3.65**	**ug/Kg**
	Unknown	**315000**	**1.13**	**ug/Kg**
111-65-9	**Octane**	**679000**	**1.20**	**ug/Kg**
3073-66-3	**Cyclohexane, 1,1,3-trimethyl-**	**614000**	**1.39**	**ug/Kg**
100-41-4	**Ethylbenzene**	**2390000**	**1.49**	**ug/Kg**
108-38-3	**Benzene, 1,3-dimethyl-**	**19100000**	**1.53**	**ug/Kg**
106-42-3	**p-Xylene**	**5040000**	**1.64**	**ug/Kg**
98-82-8	**Benzene, (1-methylethyl)-**	**4630000**	**1.78**	**ug/Kg**

RESULTS REPORTED ON A WET WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302405	**VR 90 RECON CONDENSATE (H2O)**	Water	07/27/2012 14:56	07/28/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20000	08/01/2012 16:05	EDS	486823

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	2060U	100000	2060	ug/L
71-55-6	1,1,1-Trichloroethane	1700U	100000	1700	ug/L
79-34-5	1,1,2,2-Tetrachloroethane	2160U	100000	2160	ug/L
79-00-5	1,1,2-Trichloroethane	2940U	100000	2940	ug/L
75-34-3	1,1-Dichloroethane	2760U	100000	2760	ug/L
75-35-4	1,1-Dichloroethene	4160U	100000	4160	ug/L
563-58-6	1,1-Dichloropropene	2420U	100000	2420	ug/L
96-18-4	1,2,3-Trichloropropane	1960U	100000	1960	ug/L
120-82-1	1,2,4-Trichlorobenzene	3120U	100000	3120	ug/L
95-63-6	1,2,4-Trimethylbenzene	2040U	100000	2040	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	3560U	100000	3560	ug/L
106-93-4	1,2-Dibromoethane	2010U	100000	2010	ug/L
95-50-1	1,2-Dichlorobenzene	2340U	100000	2340	ug/L
107-06-2	1,2-Dichloroethane	2380U	100000	2380	ug/L
540-59-0	1,2-Dichloroethene(Total)	4180U	200000	4180	ug/L
78-87-5	1,2-Dichloropropane	3010U	100000	3010	ug/L
108-67-8	1,3,5-Trimethylbenzene	1500U	100000	1500	ug/L
541-73-1	1,3-Dichlorobenzene	2700U	100000	2700	ug/L
142-28-9	1,3-Dichloropropane	1440U	100000	1440	ug/L
106-46-7	1,4-Dichlorobenzene	2200U	100000	2200	ug/L
594-20-7	2,2-Dichloropropane	3620U	100000	3620	ug/L
78-93-3	**2-Butanone**	**19000J**	**100000**	**7240**	**ug/L**
95-49-8	2-Chlorotoluene	2160U	100000	2160	ug/L
591-78-6	2-Hexanone	1860U	100000	1860	ug/L
106-43-4	4-Chlorotoluene	2340U	100000	2340	ug/L
99-87-6	4-Isopropyltoluene	1640U	100000	1640	ug/L
108-10-1	4-Methyl-2-pentanone	1590U	100000	1590	ug/L
67-64-1	**Acetone**	**164000**	**100000**	**7980**	**ug/L**
71-43-2	**Benzene**	**1310000**	**100000**	**1980**	**ug/L**
108-86-1	Bromobenzene	2180U	100000	2180	ug/L
74-97-5	Bromochloromethane	2540U	100000	2540	ug/L
75-27-4	Bromodichloromethane	1520U	100000	1520	ug/L
75-25-2	Bromoform	3000U	100000	3000	ug/L
74-83-9	Bromomethane	8540U	100000	8540	ug/L
75-15-0	Carbon disulfide	3800U	100000	3800	ug/L
56-23-5	Carbon tetrachloride	2920U	100000	2920	ug/L
108-90-7	Chlorobenzene	1780U	100000	1780	ug/L
75-00-3	Chloroethane	4700U	100000	4700	ug/L
67-66-3	Chloroform	2180U	100000	2180	ug/L
74-87-3	Chloromethane	1160U	100000	1160	ug/L
124-48-1	Dibromochloromethane	1520U	100000	1520	ug/L
74-95-3	Dibromomethane	2620U	100000	2620	ug/L
75-71-8	Dichlorodifluoromethane	3080U	100000	3080	ug/L
100-41-4	Ethylbenzene	2380U	100000	2380	ug/L
87-68-3	Hexachlorobutadiene	4220U	100000	4220	ug/L
98-82-8	Isopropylbenzene (Cumene)	2460U	100000	2460	ug/L
74-88-4	Methyl iodide	1680U	100000	1680	ug/L
75-09-2	Methylene chloride	2980U	100000	2980	ug/L
91-20-3	**Naphthalene**	**10200J**	**100000**	**1300**	**ug/L**
100-42-5	Styrene	1960U	100000	1960	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302405	**VR 90 RECON CONDENSATE (H2O)**	Water	07/27/2012 14:56	07/28/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20000	08/01/2012 16:05	EDS	486823

CAS#	Parameter	Result	RDL	MDL	Units
127-18-4	Tetrachloroethene	2520U	100000	2520	ug/L
110-02-1	Thiophene	ND			ug/L
108-88-3	**Toluene**	**124000**	**100000**	**2540**	**ug/L**
79-01-6	Trichloroethene	3020U	100000	3020	ug/L
75-69-4	Trichlorofluoromethane	2620U	100000	2620	ug/L
76-13-1	Trichlorotrifluoroethane	3160U	100000	3160	ug/L
108-05-4	Vinyl acetate	1520U	100000	1520	ug/L
75-01-4	Vinyl chloride	2740U	100000	2740	ug/L
1330-20-7	**Xylene (total)**	**9390J**	**300000**	**7680**	**ug/L**
156-59-2	cis-1,2-Dichloroethene	2680U	100000	2680	ug/L
10061-01-5	cis-1,3-Dichloropropene	1840U	100000	1840	ug/L
136777-61-2	**m,p-Xylene**	**9390J**	**200000**	**4740**	**ug/L**
104-51-8	n-Butylbenzene	3040U	100000	3040	ug/L
103-65-1	n-Propylbenzene	2040U	100000	2040	ug/L
95-47-6	o-Xylene	2940U	100000	2940	ug/L
135-98-8	sec-Butylbenzene	2220U	100000	2220	ug/L
1634-04-4	tert-Butyl methyl ether (MTBE)	1210U	100000	1210	ug/L
98-06-6	tert-Butylbenzene	1940U	100000	1940	ug/L
156-60-5	trans-1,2-Dichloroethene	1500U	100000	1500	ug/L
10061-02-6	trans-1,3-Dichloropropene	2920U	100000	2920	ug/L
110-57-6	trans-1,4-Dichloro-2-butene	6240U	100000	6240	ug/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	1000000	1020000	ug/L	102	78 - 130
1868-53-7	Dibromofluoromethane	1000000	970000	ug/L	97	77 - 127
2037-26-5	Toluene d8	1000000	1030000	ug/L	103	76 - 134
17060-07-0	1,2-Dichloroethane-d4	1000000	983000	ug/L	98	71 - 127

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20000	08/01/2012 16:05	EDS	487066

CAS#	Parameter	Result	Retention	Units
	No tics detected	ND		ug/L

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/02/2012 11:30	486845	SW-846 3510C	4	08/03/2012 17:47	KCB	486994

CAS#	Parameter	Result	RDL	MDL	Units
62-53-3	**Aniline**	**2880**	**400**	**28.7**	**ug/L**
108-95-2	**Phenol**	**3950**	**400**	**6.00**	**ug/L**
1319-77-3MP	**m,p-Cresol**	**2920**	**400**	**14.1**	**ug/L**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302405	**VR 90 RECON CONDENSATE (H2O)**	Water	07/27/2012 14:56	07/28/2012 09:30

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/02/2012 11:30	486845	SW-846 3510C	1	08/04/2012 14:45	KCB	487030

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	2.34U	100	2.34	ug/L
122-66-7	1,2Diphenylhydrazine/Azobenzen	2.78U	100	2.78	ug/L
106-46-7	**1,4-Dichlorobenzene**	**414**	**100**	**2.55**	**ug/L**
95-95-4	2,4,5-Trichlorophenol	3.17U	100	3.17	ug/L
88-06-2	2,4,6-Trichlorophenol	2.75U	100	2.75	ug/L
120-83-2	2,4-Dichlorophenol	2.17U	100	2.17	ug/L
105-67-9	2,4-Dimethylphenol	6.94U	100	6.94	ug/L
51-28-5	2,4-Dinitrophenol	26.0U	100	26.0	ug/L
121-14-2	2,4-Dinitrotoluene	2.63U	100	2.63	ug/L
606-20-2	2,6-Dinitrotoluene	3.52U	100	3.52	ug/L
91-58-7	2-Chloronaphthalene	2.21U	100	2.21	ug/L
95-57-8	2-Chlorophenol	2.76U	100	2.76	ug/L
91-57-6	**2-Methylnaphthalene**	**43.4J**	**100**	**2.55**	**ug/L**
88-74-4	2-Nitroaniline	1.98U	100	1.98	ug/L
88-75-5	2-Nitrophenol	3.57U	100	3.57	ug/L
91-94-1	3,3'-Dichlorobenzidine	2.97U	100	2.97	ug/L
99-09-2	3-Nitroaniline	2.26U	100	2.26	ug/L
534-52-1	4,6-Dinitro-2-methylphenol	19.8U	100	19.8	ug/L
101-55-3	4-Bromophenyl phenyl ether	3.37U	100	3.37	ug/L
59-50-7	4-Chloro-3-methylphenol	2.34U	100	2.34	ug/L
106-47-8	4-Chloroaniline	4.63U	100	4.63	ug/L
7005-72-3	4-Chlorophenyl phenyl ether	2.68U	100	2.68	ug/L
100-01-6	4-Nitroaniline	2.21U	100	2.21	ug/L
100-02-7	4-Nitrophenol	18.3U	100	18.3	ug/L
83-32-9	**Acenaphthene**	**3.53J**	**100**	**2.68**	**ug/L**
208-96-8	Acenaphthylene	3.03U	100	3.03	ug/L
120-12-7	Anthracene	3.16U	100	3.16	ug/L
56-55-3	Benzo(a)anthracene	3.16U	100	3.16	ug/L
50-32-8	Benzo(a)pyrene	1.25U	100	1.25	ug/L
205-99-2	Benzo(b)fluoranthene	2.17U	100	2.17	ug/L
191-24-2	Benzo(g,h,i)perylene	2.15U	100	2.15	ug/L
207-08-9	Benzo(k)fluoranthene	2.36U	100	2.36	ug/L
100-51-6	Benzyl alcohol	3.55U	100	3.55	ug/L
111-91-1	Bis(2-Chloroethoxy)methane	2.90U	100	2.90	ug/L
111-44-4	Bis(2-Chloroethyl)ether	2.88U	100	2.88	ug/L
108-60-1	Bis(2-Chloroisopropyl)ether	2.57U	100	2.57	ug/L
117-81-7	**Bis(2-Ethylhexyl)phthalate**	**749**	**100**	**1.91**	**ug/L**
85-68-7	Butyl benzyl phthalate	1.65U	100	1.65	ug/L
86-74-8	Carbazole	2.32U	100	2.32	ug/L
218-01-9	Chrysene	4.33U	100	4.33	ug/L
84-74-2	**Di-n-butyl phthalate**	**5.08J**	**100**	**1.89**	**ug/L**
117-84-0	Di-n-octyl phthalate	1.67U	100	1.67	ug/L
53-70-3	Dibenz(a,h)anthracene	2.17U	100	2.17	ug/L
132-64-9	Dibenzofuran	2.27U	100	2.27	ug/L
84-66-2	Diethyl phthalate	3.03U	100	3.03	ug/L
131-11-3	Dimethyl phthalate	2.55U	100	2.55	ug/L
206-44-0	Fluoranthene	2.67U	100	2.67	ug/L
86-73-7	**Fluorene**	**9.62J**	**100**	**2.88**	**ug/L**
118-74-1	Hexachlorobenzene	2.49U	100	2.49	ug/L
87-68-3	Hexachlorobutadiene	1.92U	100	1.92	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302405	**VR 90 RECON CONDENSATE (H2O)**	Water	07/27/2012 14:56	07/28/2012 09:30

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/02/2012 11:30	486845	SW-846 3510C	1	08/04/2012 14:45	KCB	487030

CAS#	Parameter	Result	RDL	MDL	Units
77-47-4	Hexachlorocyclopentadiene	1.74U	100	1.74	ug/L
67-72-1	Hexachloroethane	2.99U	100	2.99	ug/L
193-39-5	Indeno(1,2,3-cd)pyrene	1.57U	100	1.57	ug/L
78-59-1	Isophorone	3.80U	100	3.80	ug/L
98-95-3	Nitrobenzene	3.29U	100	3.29	ug/L
87-86-5	Pentachlorophenol	1.68U	100	1.68	ug/L
85-01-8	Phenanthrene	3.04U	100	3.04	ug/L
129-00-0	Pyrene	4.86U	100	4.86	ug/L
110-86-1	**Pyridine**	**620**	**100**	**35.8**	**ug/L**
621-64-7	n-Nitrosodi-n-propylamine	3.04U	100	3.04	ug/L
62-75-9	n-Nitrosodimethylamine	3.04U	100	3.04	ug/L
86-30-6	n-Nitrosodiphenylamine	3.64U	100	3.64	ug/L
95-48-7	o-Cresol	3.29U	100	3.29	ug/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	500	Diluted Out	ug/L	**0***	52 - 120
321-60-8	2-Fluorobiphenyl	500	Diluted Out	ug/L	**0***	16 - 128
1718-51-0	Terphenyl-d14	500	Diluted Out	ug/L	**0***	43 - 138
4165-62-2	Phenol-d5	1000	Diluted Out	ug/L	**0***	10 - 120
367-12-4	2-Fluorophenol	1000	Diluted Out	ug/L	**0***	10 - 120
118-79-6	2,4,6-Tribromophenol	1000	Diluted Out	ug/L	**0***	52 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	08/04/2012 14:45	KCB	487018

CAS#	Parameter	Result	Retention	Units
1003-38-9	**Furan, tetrahydro-2,5-dimethyl-**	**692**	**0.9710**	**ug/L**
	Unknown	**587**	**1.92**	**ug/L**
611-14-3	**Benzene, 1-ethyl-2-methyl-**	**225**	**1.96**	**ug/L**
108-67-8	**Benzene, 1,3,5-trimethyl-**	**842**	**1.99**	**ug/L**
95-36-3	**1,2,4-Trimethylbenzene**	**1220**	**2.11**	**ug/L**
	Unknown	**299**	**2.24**	**ug/L**
872-50-4	**2-Pyrrolidinone, 1-methyl-**	**582**	**2.32**	**ug/L**
	Unknown	**349**	**2.38**	**ug/L**
	Unknown	**487**	**2.59**	**ug/L**
95-87-4	**Phenol, 2,5-dimethyl-**	**296**	**2.75**	**ug/L**
10225-39-5	**1,3-Butanedione, 2-butyl-1-phenyl-**	**2230**	**2.90**	**ug/L**
108-88-3	**Toluene**	**16600**	**1.09**	**ug/L**
13540-56-2	**Benzene, 1,2-dimethyl-4-(phenylmeth**	**42.2**	**4.31**	**ug/L**
120-92-3	**Cyclopentanone**	**3600**	**1.17**	**ug/L**
	Unknown	**433**	**1.32**	**ug/L**
1120-72-5	**Cyclopentanone, 2-methyl-**	**956**	**1.40**	**ug/L**
100-41-4	**Ethylbenzene**	**692**	**1.49**	**ug/L**
108-38-3	**Benzene, 1,3-dimethyl-**	**4510**	**1.53**	**ug/L**
95-47-6	**Benzene, 1,2-dimethyl-**	**3670**	**1.64**	**ug/L**
98-82-8	**Benzene, (1-methylethyl)-**	**819**	**1.78**	**ug/L**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302406	**HC 100 RECON CONDENSATE (H2O)**	Water	07/27/2012 14:55	07/28/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20000	08/01/2012 16:25	EDS	486823

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	2060U	100000	2060	ug/L
71-55-6	1,1,1-Trichloroethane	1700U	100000	1700	ug/L
79-34-5	1,1,2,2-Tetrachloroethane	2160U	100000	2160	ug/L
79-00-5	1,1,2-Trichloroethane	2940U	100000	2940	ug/L
75-34-3	1,1-Dichloroethane	2760U	100000	2760	ug/L
75-35-4	1,1-Dichloroethene	4160U	100000	4160	ug/L
563-58-6	1,1-Dichloropropene	2420U	100000	2420	ug/L
96-18-4	1,2,3-Trichloropropane	1960U	100000	1960	ug/L
120-82-1	1,2,4-Trichlorobenzene	3120U	100000	3120	ug/L
95-63-6	1,2,4-Trimethylbenzene	2040U	100000	2040	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	3560U	100000	3560	ug/L
106-93-4	1,2-Dibromoethane	2010U	100000	2010	ug/L
95-50-1	1,2-Dichlorobenzene	2340U	100000	2340	ug/L
107-06-2	1,2-Dichloroethane	2380U	100000	2380	ug/L
540-59-0	1,2-Dichloroethene(Total)	4180U	200000	4180	ug/L
78-87-5	1,2-Dichloropropane	3010U	100000	3010	ug/L
108-67-8	1,3,5-Trimethylbenzene	1500U	100000	1500	ug/L
541-73-1	1,3-Dichlorobenzene	2700U	100000	2700	ug/L
142-28-9	1,3-Dichloropropane	1440U	100000	1440	ug/L
106-46-7	1,4-Dichlorobenzene	2200U	100000	2200	ug/L
594-20-7	2,2-Dichloropropane	3620U	100000	3620	ug/L
78-93-3	2-Butanone	7240U	100000	7240	ug/L
95-49-8	2-Chlorotoluene	2160U	100000	2160	ug/L
591-78-6	2-Hexanone	1860U	100000	1860	ug/L
106-43-4	4-Chlorotoluene	2340U	100000	2340	ug/L
99-87-6	4-Isopropyltoluene	1640U	100000	1640	ug/L
108-10-1	4-Methyl-2-pentanone	1590U	100000	1590	ug/L
67-64-1	**Acetone**	**141000**	**100000**	**7980**	**ug/L**
71-43-2	**Benzene**	**1230000**	**100000**	**1980**	**ug/L**
108-86-1	Bromobenzene	2180U	100000	2180	ug/L
74-97-5	Bromochloromethane	2540U	100000	2540	ug/L
75-27-4	Bromodichloromethane	1520U	100000	1520	ug/L
75-25-2	Bromoform	3000U	100000	3000	ug/L
74-83-9	Bromomethane	8540U	100000	8540	ug/L
75-15-0	Carbon disulfide	3800U	100000	3800	ug/L
56-23-5	Carbon tetrachloride	2920U	100000	2920	ug/L
108-90-7	Chlorobenzene	1780U	100000	1780	ug/L
75-00-3	Chloroethane	4700U	100000	4700	ug/L
67-66-3	Chloroform	2180U	100000	2180	ug/L
74-87-3	Chloromethane	1160U	100000	1160	ug/L
124-48-1	Dibromochloromethane	1520U	100000	1520	ug/L
74-95-3	Dibromomethane	2620U	100000	2620	ug/L
75-71-8	Dichlorodifluoromethane	3080U	100000	3080	ug/L
100-41-4	Ethylbenzene	2380U	100000	2380	ug/L
87-68-3	Hexachlorobutadiene	4220U	100000	4220	ug/L
98-82-8	Isopropylbenzene (Cumene)	2460U	100000	2460	ug/L
74-88-4	Methyl iodide	1680U	100000	1680	ug/L
75-09-2	Methylene chloride	2980U	100000	2980	ug/L
91-20-3	Naphthalene	1300U	100000	1300	ug/L
100-42-5	Styrene	1960U	100000	1960	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302406	**HC 100 RECON CONDENSATE (H2O)**	Water	07/27/2012 14:55	07/28/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20000	08/01/2012 16:25	EDS	486823

CAS#	Parameter	Result	RDL	MDL	Units
127-18-4	Tetrachloroethene	2520U	100000	2520	ug/L
110-02-1	Thiophene	ND			ug/L
108-88-3	**Toluene**	**180000**	**100000**	**2540**	**ug/L**
79-01-6	Trichloroethene	3020U	100000	3020	ug/L
75-69-4	Trichlorofluoromethane	2620U	100000	2620	ug/L
76-13-1	Trichlorotrifluoroethane	3160U	100000	3160	ug/L
108-05-4	Vinyl acetate	1520U	100000	1520	ug/L
75-01-4	Vinyl chloride	2740U	100000	2740	ug/L
1330-20-7	**Xylene (total)**	**11500J**	**300000**	**7680**	**ug/L**
156-59-2	cis-1,2-Dichloroethene	2680U	100000	2680	ug/L
10061-01-5	cis-1,3-Dichloropropene	1840U	100000	1840	ug/L
136777-61-2	**m,p-Xylene**	**11500J**	**200000**	**4740**	**ug/L**
104-51-8	n-Butylbenzene	3040U	100000	3040	ug/L
103-65-1	n-Propylbenzene	2040U	100000	2040	ug/L
95-47-6	o-Xylene	2940U	100000	2940	ug/L
135-98-8	sec-Butylbenzene	2220U	100000	2220	ug/L
1634-04-4	tert-Butyl methyl ether (MTBE)	1210U	100000	1210	ug/L
98-06-6	tert-Butylbenzene	1940U	100000	1940	ug/L
156-60-5	trans-1,2-Dichloroethene	1500U	100000	1500	ug/L
10061-02-6	trans-1,3-Dichloropropene	2920U	100000	2920	ug/L
110-57-6	trans-1,4-Dichloro-2-butene	6240U	100000	6240	ug/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	1000000	982000	ug/L	98	78 - 130
1868-53-7	Dibromofluoromethane	1000000	984000	ug/L	98	77 - 127
2037-26-5	Toluene d8	1000000	1020000	ug/L	102	76 - 134
17060-07-0	1,2-Dichloroethane-d4	1000000	1010000	ug/L	101	71 - 127

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20000	08/01/2012 16:25	EDS	487066

CAS#	Parameter	Result	Retention	Units
	No tics detected	ND		ug/L

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/02/2012 11:30	486845	SW-846 3510C	2	08/03/2012 18:01	KCB	486994

CAS#	Parameter	Result	RDL	MDL	Units
108-95-2	**Phenol**	**3180**	**200**	**3.00**	**ug/L**
1319-77-3MP	**m,p-Cresol**	**2290**	**200**	**7.04**	**ug/L**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302406	**HC 100 RECON CONDENSATE (H2O)**	Water	07/27/2012 14:55	07/28/2012 09:30

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/02/2012 11:30	486845	SW-846 3510C	1	08/04/2012 14:59	KCB	487030

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	2.34U	100	2.34	ug/L
122-66-7	1,2Diphenylhydrazine/Azobenzen	2.78U	100	2.78	ug/L
106-46-7	**1,4-Dichlorobenzene**	**259**	**100**	**2.55**	**ug/L**
95-95-4	2,4,5-Trichlorophenol	3.17U	100	3.17	ug/L
88-06-2	2,4,6-Trichlorophenol	2.75U	100	2.75	ug/L
120-83-2	2,4-Dichlorophenol	2.17U	100	2.17	ug/L
105-67-9	2,4-Dimethylphenol	6.94U	100	6.94	ug/L
51-28-5	2,4-Dinitrophenol	26.0U	100	26.0	ug/L
121-14-2	2,4-Dinitrotoluene	2.63U	100	2.63	ug/L
606-20-2	2,6-Dinitrotoluene	3.52U	100	3.52	ug/L
91-58-7	2-Chloronaphthalene	2.21U	100	2.21	ug/L
95-57-8	2-Chlorophenol	2.76U	100	2.76	ug/L
91-57-6	**2-Methylnaphthalene**	**50.4J**	**100**	**2.55**	**ug/L**
88-74-4	2-Nitroaniline	1.98U	100	1.98	ug/L
88-75-5	2-Nitrophenol	3.57U	100	3.57	ug/L
91-94-1	3,3'-Dichlorobenzidine	2.97U	100	2.97	ug/L
99-09-2	3-Nitroaniline	2.26U	100	2.26	ug/L
534-52-1	4,6-Dinitro-2-methylphenol	19.8U	100	19.8	ug/L
101-55-3	4-Bromophenyl phenyl ether	3.37U	100	3.37	ug/L
59-50-7	4-Chloro-3-methylphenol	2.34U	100	2.34	ug/L
106-47-8	4-Chloroaniline	4.63U	100	4.63	ug/L
7005-72-3	4-Chlorophenyl phenyl ether	2.68U	100	2.68	ug/L
100-01-6	4-Nitroaniline	2.21U	100	2.21	ug/L
100-02-7	4-Nitrophenol	18.3U	100	18.3	ug/L
83-32-9	**Acenaphthene**	**3.59J**	**100**	**2.68**	**ug/L**
208-96-8	Acenaphthylene	3.03U	100	3.03	ug/L
62-53-3	**Aniline**	**143**	**100**	**7.18**	**ug/L**
120-12-7	Anthracene	3.16U	100	3.16	ug/L
56-55-3	Benzo(a)anthracene	3.16U	100	3.16	ug/L
50-32-8	Benzo(a)pyrene	1.25U	100	1.25	ug/L
205-99-2	Benzo(b)fluoranthene	2.17U	100	2.17	ug/L
191-24-2	Benzo(g,h,i)perylene	2.15U	100	2.15	ug/L
207-08-9	Benzo(k)fluoranthene	2.36U	100	2.36	ug/L
100-51-6	Benzyl alcohol	3.55U	100	3.55	ug/L
111-91-1	Bis(2-Chloroethoxy)methane	2.90U	100	2.90	ug/L
111-44-4	Bis(2-Chloroethyl)ether	2.88U	100	2.88	ug/L
108-60-1	Bis(2-Chloroisopropyl)ether	2.57U	100	2.57	ug/L
117-81-7	**Bis(2-Ethylhexyl)phthalate**	**35.3J**	**100**	**1.91**	**ug/L**
85-68-7	Butyl benzyl phthalate	1.65U	100	1.65	ug/L
86-74-8	Carbazole	2.32U	100	2.32	ug/L
218-01-9	Chrysene	4.33U	100	4.33	ug/L
84-74-2	Di-n-butyl phthalate	1.89U	100	1.89	ug/L
117-84-0	Di-n-octyl phthalate	1.67U	100	1.67	ug/L
53-70-3	Dibenz(a,h)anthracene	2.17U	100	2.17	ug/L
132-64-9	Dibenzofuran	2.27U	100	2.27	ug/L
84-66-2	Diethyl phthalate	3.03U	100	3.03	ug/L
131-11-3	Dimethyl phthalate	2.55U	100	2.55	ug/L
206-44-0	Fluoranthene	2.67U	100	2.67	ug/L
86-73-7	**Fluorene**	**20.9J**	**100**	**2.88**	**ug/L**
118-74-1	Hexachlorobenzene	2.49U	100	2.49	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302406	**HC 100 RECON CONDENSATE (H2O)**	Water	07/27/2012 14:55	07/28/2012 09:30

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/02/2012 11:30	486845	SW-846 3510C	1	08/04/2012 14:59	KCB	487030

CAS#	Parameter	Result	RDL	MDL	Units
87-68-3	Hexachlorobutadiene	1.92U	100	1.92	ug/L
77-47-4	Hexachlorocyclopentadiene	1.74U	100	1.74	ug/L
67-72-1	Hexachloroethane	2.99U	100	2.99	ug/L
193-39-5	Indeno(1,2,3-cd)pyrene	1.57U	100	1.57	ug/L
78-59-1	**Isophorone**	**27.4J**	**100**	**3.80**	**ug/L**
98-95-3	Nitrobenzene	3.29U	100	3.29	ug/L
87-86-5	Pentachlorophenol	1.68U	100	1.68	ug/L
85-01-8	Phenanthrene	3.04U	100	3.04	ug/L
129-00-0	Pyrene	4.86U	100	4.86	ug/L
110-86-1	Pyridine	35.8U	100	35.8	ug/L
621-64-7	n-Nitrosodi-n-propylamine	3.04U	100	3.04	ug/L
62-75-9	n-Nitrosodimethylamine	3.04U	100	3.04	ug/L
86-30-6	n-Nitrosodiphenylamine	3.64U	100	3.64	ug/L
95-48-7	**o-Cresol**	**370**	**100**	**3.29**	**ug/L**

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	500	Diluted Out	ug/L	**0***	52 - 120
321-60-8	2-Fluorobiphenyl	500	Diluted Out	ug/L	**0***	16 - 128
1718-51-0	Terphenyl-d14	500	Diluted Out	ug/L	**0***	43 - 138
4165-62-2	Phenol-d5	1000	Diluted Out	ug/L	**0***	10 - 120
367-12-4	2-Fluorophenol	1000	Diluted Out	ug/L	**0***	10 - 120
118-79-6	2,4,6-Tribromophenol	1000	Diluted Out	ug/L	**0***	52 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	08/04/2012 14:59	KCB	487018

CAS#	Parameter	Result	Retention	Units
565-61-7	**2-Pentanone, 3-methyl-**	**1070**	**1.02**	**ug/L**
108-38-3	**Benzene, 1,3-dimethyl-**	**7070**	**1.54**	**ug/L**
95-47-6	**Benzene, 1,2-dimethyl-**	**2460**	**1.64**	**ug/L**
1120-73-6	**2-Cyclopenten-1-one, 2-methyl-**	**392**	**1.69**	**ug/L**
98-82-8	**Benzene, (1-methylethyl)-**	**1610**	**1.78**	**ug/L**
108-29-2	**2(3H)-Furanone, dihydro-5-methyl-**	**676**	**1.92**	**ug/L**
526-73-8	**Benzene, 1,2,3-trimethyl-**	**1190**	**1.99**	**ug/L**
135-98-8	**Benzene, (1-methylpropyl)-**	**497**	**2.17**	**ug/L**
60-12-8	**Phenylethyl Alcohol**	**319**	**2.62**	**ug/L**
106-48-9	**Parachlorophenol**	**269**	**2.97**	**ug/L**
108-88-3	**Toluene**	**27400**	**1.10**	**ug/L**
700-88-9	**Benzene, cyclopentyl-**	**279**	**3.07**	**ug/L**
589-38-8	**3-Hexanone**	**1480**	**1.14**	**ug/L**
120-92-3	**Cyclopentanone**	**3130**	**1.18**	**ug/L**
	Unknown	**1020**	**1.23**	**ug/L**
	Unknown	**830**	**1.32**	**ug/L**
	Unknown	**289**	**1.36**	**ug/L**
1120-72-5	**Cyclopentanone, 2-methyl-**	**393**	**1.40**	**ug/L**
100-41-4	**Ethylbenzene**	**1060**	**1.49**	**ug/L**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302407	**VR 100 RECON CONDENSATE (H2O)**	Water	07/27/2012 14:54	07/28/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20000	08/01/2012 16:46	EDS	486823

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	2060U	100000	2060	ug/L
71-55-6	1,1,1-Trichloroethane	1700U	100000	1700	ug/L
79-34-5	1,1,2,2-Tetrachloroethane	2160U	100000	2160	ug/L
79-00-5	1,1,2-Trichloroethane	2940U	100000	2940	ug/L
75-34-3	1,1-Dichloroethane	2760U	100000	2760	ug/L
75-35-4	1,1-Dichloroethene	4160U	100000	4160	ug/L
563-58-6	1,1-Dichloropropene	2420U	100000	2420	ug/L
96-18-4	1,2,3-Trichloropropane	1960U	100000	1960	ug/L
120-82-1	1,2,4-Trichlorobenzene	3120U	100000	3120	ug/L
95-63-6	1,2,4-Trimethylbenzene	2040U	100000	2040	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	3560U	100000	3560	ug/L
106-93-4	1,2-Dibromoethane	2010U	100000	2010	ug/L
95-50-1	1,2-Dichlorobenzene	2340U	100000	2340	ug/L
107-06-2	1,2-Dichloroethane	2380U	100000	2380	ug/L
540-59-0	1,2-Dichloroethene(Total)	4180U	200000	4180	ug/L
78-87-5	1,2-Dichloropropane	3010U	100000	3010	ug/L
108-67-8	1,3,5-Trimethylbenzene	1500U	100000	1500	ug/L
541-73-1	1,3-Dichlorobenzene	2700U	100000	2700	ug/L
142-28-9	1,3-Dichloropropane	1440U	100000	1440	ug/L
106-46-7	1,4-Dichlorobenzene	2200U	100000	2200	ug/L
594-20-7	2,2-Dichloropropane	3620U	100000	3620	ug/L
78-93-3	2-Butanone	7240U	100000	7240	ug/L
95-49-8	2-Chlorotoluene	2160U	100000	2160	ug/L
591-78-6	2-Hexanone	1860U	100000	1860	ug/L
106-43-4	4-Chlorotoluene	2340U	100000	2340	ug/L
99-87-6	4-Isopropyltoluene	1640U	100000	1640	ug/L
108-10-1	4-Methyl-2-pentanone	1590U	100000	1590	ug/L
67-64-1	**Acetone**	**124000**	**100000**	**7980**	**ug/L**
71-43-2	**Benzene**	**1090000**	**100000**	**1980**	**ug/L**
108-86-1	Bromobenzene	2180U	100000	2180	ug/L
74-97-5	Bromochloromethane	2540U	100000	2540	ug/L
75-27-4	Bromodichloromethane	1520U	100000	1520	ug/L
75-25-2	Bromoform	3000U	100000	3000	ug/L
74-83-9	Bromomethane	8540U	100000	8540	ug/L
75-15-0	Carbon disulfide	3800U	100000	3800	ug/L
56-23-5	Carbon tetrachloride	2920U	100000	2920	ug/L
108-90-7	Chlorobenzene	1780U	100000	1780	ug/L
75-00-3	Chloroethane	4700U	100000	4700	ug/L
67-66-3	Chloroform	2180U	100000	2180	ug/L
74-87-3	Chloromethane	1160U	100000	1160	ug/L
124-48-1	Dibromochloromethane	1520U	100000	1520	ug/L
74-95-3	Dibromomethane	2620U	100000	2620	ug/L
75-71-8	Dichlorodifluoromethane	3080U	100000	3080	ug/L
100-41-4	Ethylbenzene	2380U	100000	2380	ug/L
87-68-3	Hexachlorobutadiene	4220U	100000	4220	ug/L
98-82-8	Isopropylbenzene (Cumene)	2460U	100000	2460	ug/L
74-88-4	Methyl iodide	1680U	100000	1680	ug/L
75-09-2	Methylene chloride	2980U	100000	2980	ug/L
91-20-3	Naphthalene	1300U	100000	1300	ug/L
100-42-5	Styrene	1960U	100000	1960	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302407	**VR 100 RECON CONDENSATE (H2O)**	Water	07/27/2012 14:54	07/28/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20000	08/01/2012 16:46	EDS	486823

CAS#	Parameter	Result	RDL	MDL	Units
127-18-4	Tetrachloroethene	2520U	100000	2520	ug/L
110-02-1	Thiophene	ND			ug/L
108-88-3	**Toluene**	**135000**	**100000**	**2540**	**ug/L**
79-01-6	Trichloroethene	3020U	100000	3020	ug/L
75-69-4	Trichlorofluoromethane	2620U	100000	2620	ug/L
76-13-1	Trichlorotrifluoroethane	3160U	100000	3160	ug/L
108-05-4	Vinyl acetate	1520U	100000	1520	ug/L
75-01-4	Vinyl chloride	2740U	100000	2740	ug/L
1330-20-7	**Xylene (total)**	**10400J**	**300000**	**7680**	**ug/L**
156-59-2	cis-1,2-Dichloroethene	2680U	100000	2680	ug/L
10061-01-5	cis-1,3-Dichloropropene	1840U	100000	1840	ug/L
136777-61-2	**m,p-Xylene**	**10400J**	**200000**	**4740**	**ug/L**
104-51-8	n-Butylbenzene	3040U	100000	3040	ug/L
103-65-1	n-Propylbenzene	2040U	100000	2040	ug/L
95-47-6	o-Xylene	2940U	100000	2940	ug/L
135-98-8	sec-Butylbenzene	2220U	100000	2220	ug/L
1634-04-4	tert-Butyl methyl ether (MTBE)	1210U	100000	1210	ug/L
98-06-6	tert-Butylbenzene	1940U	100000	1940	ug/L
156-60-5	trans-1,2-Dichloroethene	1500U	100000	1500	ug/L
10061-02-6	trans-1,3-Dichloropropene	2920U	100000	2920	ug/L
110-57-6	trans-1,4-Dichloro-2-butene	6240U	100000	6240	ug/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	1000000	975000	ug/L	98	78 - 130
1868-53-7	Dibromofluoromethane	1000000	963000	ug/L	96	77 - 127
2037-26-5	Toluene d8	1000000	1010000	ug/L	101	76 - 134
17060-07-0	1,2-Dichloroethane-d4	1000000	1000000	ug/L	100	71 - 127

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20000	08/01/2012 16:46	EDS	487066

CAS#	Parameter	Result	Retention	Units
	No tics detected	ND		ug/L

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/02/2012 11:30	486845	SW-846 3510C	4	08/03/2012 18:15	KCB	486994

CAS#	Parameter	Result	RDL	MDL	Units
62-53-3	**Aniline**	**2660**	**400**	**28.7**	**ug/L**
108-95-2	**Phenol**	**3960**	**400**	**6.00**	**ug/L**
1319-77-3MP	**m,p-Cresol**	**4530**	**400**	**14.1**	**ug/L**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302407	**VR 100 RECON CONDENSATE (H2O)**	Water	07/27/2012 14:54	07/28/2012 09:30

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/02/2012 11:30	486845	SW-846 3510C	1	08/04/2012 15:13	KCB	487030

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	2.34U	100	2.34	ug/L
122-66-7	1,2Diphenylhydrazine/Azobenzen	2.78U	100	2.78	ug/L
106-46-7	**1,4-Dichlorobenzene**	**219**	**100**	**2.55**	**ug/L**
95-95-4	2,4,5-Trichlorophenol	3.17U	100	3.17	ug/L
88-06-2	2,4,6-Trichlorophenol	2.75U	100	2.75	ug/L
120-83-2	2,4-Dichlorophenol	2.17U	100	2.17	ug/L
105-67-9	2,4-Dimethylphenol	6.94U	100	6.94	ug/L
51-28-5	2,4-Dinitrophenol	26.0U	100	26.0	ug/L
121-14-2	2,4-Dinitrotoluene	2.63U	100	2.63	ug/L
606-20-2	2,6-Dinitrotoluene	3.52U	100	3.52	ug/L
91-58-7	2-Chloronaphthalene	2.21U	100	2.21	ug/L
95-57-8	2-Chlorophenol	2.76U	100	2.76	ug/L
91-57-6	**2-Methylnaphthalene**	**45.7J**	**100**	**2.55**	**ug/L**
88-74-4	2-Nitroaniline	1.98U	100	1.98	ug/L
88-75-5	2-Nitrophenol	3.57U	100	3.57	ug/L
91-94-1	3,3'-Dichlorobenzidine	2.97U	100	2.97	ug/L
99-09-2	3-Nitroaniline	2.26U	100	2.26	ug/L
534-52-1	4,6-Dinitro-2-methylphenol	19.8U	100	19.8	ug/L
101-55-3	4-Bromophenyl phenyl ether	3.37U	100	3.37	ug/L
59-50-7	4-Chloro-3-methylphenol	2.34U	100	2.34	ug/L
106-47-8	4-Chloroaniline	4.63U	100	4.63	ug/L
7005-72-3	4-Chlorophenyl phenyl ether	2.68U	100	2.68	ug/L
100-01-6	4-Nitroaniline	2.21U	100	2.21	ug/L
100-02-7	4-Nitrophenol	18.3U	100	18.3	ug/L
83-32-9	Acenaphthene	2.68U	100	2.68	ug/L
208-96-8	Acenaphthylene	3.03U	100	3.03	ug/L
120-12-7	Anthracene	3.16U	100	3.16	ug/L
56-55-3	Benzo(a)anthracene	3.16U	100	3.16	ug/L
50-32-8	Benzo(a)pyrene	1.25U	100	1.25	ug/L
205-99-2	Benzo(b)fluoranthene	2.17U	100	2.17	ug/L
191-24-2	Benzo(g,h,i)perylene	2.15U	100	2.15	ug/L
207-08-9	Benzo(k)fluoranthene	2.36U	100	2.36	ug/L
100-51-6	Benzyl alcohol	3.55U	100	3.55	ug/L
111-91-1	Bis(2-Chloroethoxy)methane	2.90U	100	2.90	ug/L
111-44-4	Bis(2-Chloroethyl)ether	2.88U	100	2.88	ug/L
108-60-1	Bis(2-Chloroisopropyl)ether	2.57U	100	2.57	ug/L
117-81-7	**Bis(2-Ethylhexyl)phthalate**	**7.95J**	**100**	**1.91**	**ug/L**
85-68-7	Butyl benzyl phthalate	1.65U	100	1.65	ug/L
86-74-8	Carbazole	2.32U	100	2.32	ug/L
218-01-9	Chrysene	4.33U	100	4.33	ug/L
84-74-2	Di-n-butyl phthalate	1.89U	100	1.89	ug/L
117-84-0	Di-n-octyl phthalate	1.67U	100	1.67	ug/L
53-70-3	Dibenz(a,h)anthracene	2.17U	100	2.17	ug/L
132-64-9	Dibenzofuran	2.27U	100	2.27	ug/L
84-66-2	Diethyl phthalate	3.03U	100	3.03	ug/L
131-11-3	Dimethyl phthalate	2.55U	100	2.55	ug/L
206-44-0	Fluoranthene	2.67U	100	2.67	ug/L
86-73-7	**Fluorene**	**23.7J**	**100**	**2.88**	**ug/L**
118-74-1	Hexachlorobenzene	2.49U	100	2.49	ug/L
87-68-3	Hexachlorobutadiene	1.92U	100	1.92	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302407	**VR 100 RECON CONDENSATE (H2O)**	Water	07/27/2012 14:54	07/28/2012 09:30

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/02/2012 11:30	486845	SW-846 3510C	1	08/04/2012 15:13	KCB	487030

CAS#	Parameter	Result	RDL	MDL	Units
77-47-4	Hexachlorocyclopentadiene	1.74U	100	1.74	ug/L
67-72-1	Hexachloroethane	2.99U	100	2.99	ug/L
193-39-5	Indeno(1,2,3-cd)pyrene	1.57U	100	1.57	ug/L
78-59-1	Isophorone	3.80U	100	3.80	ug/L
98-95-3	Nitrobenzene	3.29U	100	3.29	ug/L
87-86-5	Pentachlorophenol	1.68U	100	1.68	ug/L
85-01-8	Phenanthrene	3.04U	100	3.04	ug/L
129-00-0	Pyrene	4.86U	100	4.86	ug/L
110-86-1	**Pyridine**	**447**	**100**	**35.8**	**ug/L**
621-64-7	n-Nitrosodi-n-propylamine	3.04U	100	3.04	ug/L
62-75-9	n-Nitrosodimethylamine	3.04U	100	3.04	ug/L
86-30-6	n-Nitrosodiphenylamine	3.64U	100	3.64	ug/L
95-48-7	**o-Cresol**	**569**	**100**	**3.29**	**ug/L**

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	500	Diluted Out	ug/L	**0***	52 - 120
321-60-8	2-Fluorobiphenyl	500	Diluted Out	ug/L	**0***	16 - 128
1718-51-0	Terphenyl-d14	500	Diluted Out	ug/L	**0***	43 - 138
4165-62-2	Phenol-d5	1000	Diluted Out	ug/L	**0***	10 - 120
367-12-4	2-Fluorophenol	1000	Diluted Out	ug/L	**0***	10 - 120
118-79-6	2,4,6-Tribromophenol	1000	Diluted Out	ug/L	**0***	52 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	08/04/2012 15:13	KCB	487018

CAS#	Parameter	Result	Retention	Units
108-88-3	**Toluene**	**12400**	**1.09**	**ug/L**
106-42-3	**p-Xylene**	**1670**	**1.64**	**ug/L**
1120-73-6	**2-Cyclopenten-1-one, 2-methyl-**	**497**	**1.69**	**ug/L**
98-82-8	**Benzene, (1-methylethyl)-**	**322**	**1.78**	**ug/L**
583-60-8	**Cyclohexanone, 2-methyl-**	**452**	**1.90**	**ug/L**
108-67-8	**Benzene, 1,3,5-trimethyl-**	**552**	**1.99**	**ug/L**
	Unknown	**131**	**2.24**	**ug/L**
95-48-7	**Phenol, 2-methyl-**	**281**	**2.37**	**ug/L**
10544-50-0	**Sulfur, mol. (S8)**	**1260**	**5.71**	**ug/L**
	Unknown	**1020**	**1.12**	**ug/L**
26549-24-6	**2-Hexanol, (R)-**	**1850**	**1.21**	**ug/L**
	Unknown	**114**	**1.28**	**ug/L**
	Unknown	**280**	**1.32**	**ug/L**
	Unknown	**102**	**1.37**	**ug/L**
1120-72-5	**Cyclopentanone, 2-methyl-**	**536**	**1.40**	**ug/L**
100-41-4	**Ethylbenzene**	**322**	**1.49**	**ug/L**
108-38-3	**Benzene, 1,3-dimethyl-**	**2190**	**1.53**	**ug/L**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302408	**HC 90 RECON CONDENSATE (H2O)**	Water	07/27/2012 14:57	07/28/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20000	08/01/2012 17:06	EDS	486823

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	2060U	100000	2060	ug/L
71-55-6	1,1,1-Trichloroethane	1700U	100000	1700	ug/L
79-34-5	1,1,2,2-Tetrachloroethane	2160U	100000	2160	ug/L
79-00-5	1,1,2-Trichloroethane	2940U	100000	2940	ug/L
75-34-3	1,1-Dichloroethane	2760U	100000	2760	ug/L
75-35-4	1,1-Dichloroethene	4160U	100000	4160	ug/L
563-58-6	1,1-Dichloropropene	2420U	100000	2420	ug/L
96-18-4	1,2,3-Trichloropropane	1960U	100000	1960	ug/L
120-82-1	1,2,4-Trichlorobenzene	3120U	100000	3120	ug/L
95-63-6	1,2,4-Trimethylbenzene	2040U	100000	2040	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	3560U	100000	3560	ug/L
106-93-4	1,2-Dibromoethane	2010U	100000	2010	ug/L
95-50-1	1,2-Dichlorobenzene	2340U	100000	2340	ug/L
107-06-2	1,2-Dichloroethane	2380U	100000	2380	ug/L
540-59-0	1,2-Dichloroethene(Total)	4180U	200000	4180	ug/L
78-87-5	1,2-Dichloropropane	3010U	100000	3010	ug/L
108-67-8	1,3,5-Trimethylbenzene	1500U	100000	1500	ug/L
541-73-1	1,3-Dichlorobenzene	2700U	100000	2700	ug/L
142-28-9	1,3-Dichloropropane	1440U	100000	1440	ug/L
106-46-7	1,4-Dichlorobenzene	2200U	100000	2200	ug/L
594-20-7	2,2-Dichloropropane	3620U	100000	3620	ug/L
78-93-3	2-Butanone	7240U	100000	7240	ug/L
95-49-8	2-Chlorotoluene	2160U	100000	2160	ug/L
591-78-6	2-Hexanone	1860U	100000	1860	ug/L
106-43-4	4-Chlorotoluene	2340U	100000	2340	ug/L
99-87-6	4-Isopropyltoluene	1640U	100000	1640	ug/L
108-10-1	4-Methyl-2-pentanone	1590U	100000	1590	ug/L
67-64-1	**Acetone**	**224000**	**100000**	**7980**	**ug/L**
71-43-2	**Benzene**	**1470000**	**100000**	**1980**	**ug/L**
108-86-1	Bromobenzene	2180U	100000	2180	ug/L
74-97-5	Bromochloromethane	2540U	100000	2540	ug/L
75-27-4	Bromodichloromethane	1520U	100000	1520	ug/L
75-25-2	Bromoform	3000U	100000	3000	ug/L
74-83-9	Bromomethane	8540U	100000	8540	ug/L
75-15-0	Carbon disulfide	3800U	100000	3800	ug/L
56-23-5	Carbon tetrachloride	2920U	100000	2920	ug/L
108-90-7	Chlorobenzene	1780U	100000	1780	ug/L
75-00-3	Chloroethane	4700U	100000	4700	ug/L
67-66-3	Chloroform	2180U	100000	2180	ug/L
74-87-3	Chloromethane	1160U	100000	1160	ug/L
124-48-1	Dibromochloromethane	1520U	100000	1520	ug/L
74-95-3	Dibromomethane	2620U	100000	2620	ug/L
75-71-8	Dichlorodifluoromethane	3080U	100000	3080	ug/L
100-41-4	Ethylbenzene	2380U	100000	2380	ug/L
87-68-3	Hexachlorobutadiene	4220U	100000	4220	ug/L
98-82-8	Isopropylbenzene (Cumene)	2460U	100000	2460	ug/L
74-88-4	Methyl iodide	1680U	100000	1680	ug/L
75-09-2	Methylene chloride	2980U	100000	2980	ug/L
91-20-3	Naphthalene	1300U	100000	1300	ug/L
100-42-5	Styrene	1960U	100000	1960	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302408	**HC 90 RECON CONDENSATE (H2O)**	Water	07/27/2012 14:57	07/28/2012 09:30

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20000	08/01/2012 17:06	EDS	486823

CAS#	Parameter	Result	RDL	MDL	Units
127-18-4	Tetrachloroethene	2520U	100000	2520	ug/L
110-02-1	Thiophene	ND			ug/L
108-88-3	**Toluene**	**136000**	**100000**	**2540**	**ug/L**
79-01-6	Trichloroethene	3020U	100000	3020	ug/L
75-69-4	Trichlorofluoromethane	2620U	100000	2620	ug/L
76-13-1	Trichlorotrifluoroethane	3160U	100000	3160	ug/L
108-05-4	Vinyl acetate	1520U	100000	1520	ug/L
75-01-4	Vinyl chloride	2740U	100000	2740	ug/L
1330-20-7	Xylene (total)	7680U	300000	7680	ug/L
156-59-2	cis-1,2-Dichloroethene	2680U	100000	2680	ug/L
10061-01-5	cis-1,3-Dichloropropene	1840U	100000	1840	ug/L
136777-61-2	m,p-Xylene	4740U	200000	4740	ug/L
104-51-8	n-Butylbenzene	3040U	100000	3040	ug/L
103-65-1	n-Propylbenzene	2040U	100000	2040	ug/L
95-47-6	o-Xylene	2940U	100000	2940	ug/L
135-98-8	sec-Butylbenzene	2220U	100000	2220	ug/L
1634-04-4	tert-Butyl methyl ether (MTBE)	1210U	100000	1210	ug/L
98-06-6	tert-Butylbenzene	1940U	100000	1940	ug/L
156-60-5	trans-1,2-Dichloroethene	1500U	100000	1500	ug/L
10061-02-6	trans-1,3-Dichloropropene	2920U	100000	2920	ug/L
110-57-6	trans-1,4-Dichloro-2-butene	6240U	100000	6240	ug/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	1000000	978000	ug/L	98	78 - 130
1868-53-7	Dibromofluoromethane	1000000	966000	ug/L	97	77 - 127
2037-26-5	Toluene d8	1000000	1030000	ug/L	103	76 - 134
17060-07-0	1,2-Dichloroethane-d4	1000000	991000	ug/L	99	71 - 127

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20000	08/01/2012 17:06	EDS	487066

CAS#	Parameter	Result	Retention	Units
	No tics detected	ND		ug/L

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/02/2012 11:30	486845	SW-846 3510C	5	08/03/2012 18:30	KCB	486994

CAS#	Parameter	Result	RDL	MDL	Units
108-95-2	**Phenol**	**5490**	**500**	**7.50**	**ug/L**
1319-77-3MP	**m,p-Cresol**	**4840**	**500**	**17.6**	**ug/L**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302408	**HC 90 RECON CONDENSATE (H2O)**	Water	07/27/2012 14:57	07/28/2012 09:30

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/02/2012 11:30	486845	SW-846 3510C	1	08/04/2012 15:27	KCB	487030

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	2.34U	100	2.34	ug/L
122-66-7	1,2Diphenylhydrazine/Azobenzen	2.78U	100	2.78	ug/L
106-46-7	**1,4-Dichlorobenzene**	**229**	**100**	**2.55**	**ug/L**
95-95-4	2,4,5-Trichlorophenol	3.17U	100	3.17	ug/L
88-06-2	2,4,6-Trichlorophenol	2.75U	100	2.75	ug/L
120-83-2	2,4-Dichlorophenol	2.17U	100	2.17	ug/L
105-67-9	2,4-Dimethylphenol	6.94U	100	6.94	ug/L
51-28-5	2,4-Dinitrophenol	26.0U	100	26.0	ug/L
121-14-2	2,4-Dinitrotoluene	2.63U	100	2.63	ug/L
606-20-2	2,6-Dinitrotoluene	3.52U	100	3.52	ug/L
91-58-7	2-Chloronaphthalene	2.21U	100	2.21	ug/L
95-57-8	2-Chlorophenol	2.76U	100	2.76	ug/L
91-57-6	**2-Methylnaphthalene**	**55.5J**	**100**	**2.55**	**ug/L**
88-74-4	2-Nitroaniline	1.98U	100	1.98	ug/L
88-75-5	2-Nitrophenol	3.57U	100	3.57	ug/L
91-94-1	3,3'-Dichlorobenzidine	2.97U	100	2.97	ug/L
99-09-2	3-Nitroaniline	2.26U	100	2.26	ug/L
534-52-1	4,6-Dinitro-2-methylphenol	19.8U	100	19.8	ug/L
101-55-3	4-Bromophenyl phenyl ether	3.37U	100	3.37	ug/L
59-50-7	4-Chloro-3-methylphenol	2.34U	100	2.34	ug/L
106-47-8	4-Chloroaniline	4.63U	100	4.63	ug/L
7005-72-3	4-Chlorophenyl phenyl ether	2.68U	100	2.68	ug/L
100-01-6	4-Nitroaniline	2.21U	100	2.21	ug/L
100-02-7	4-Nitrophenol	18.3U	100	18.3	ug/L
83-32-9	Acenaphthene	2.68U	100	2.68	ug/L
208-96-8	Acenaphthylene	3.03U	100	3.03	ug/L
62-53-3	Aniline	7.18U	100	7.18	ug/L
120-12-7	Anthracene	3.16U	100	3.16	ug/L
56-55-3	Benzo(a)anthracene	3.16U	100	3.16	ug/L
50-32-8	Benzo(a)pyrene	1.25U	100	1.25	ug/L
205-99-2	Benzo(b)fluoranthene	2.17U	100	2.17	ug/L
191-24-2	Benzo(g,h,i)perylene	2.15U	100	2.15	ug/L
207-08-9	Benzo(k)fluoranthene	2.36U	100	2.36	ug/L
100-51-6	Benzyl alcohol	3.55U	100	3.55	ug/L
111-91-1	Bis(2-Chloroethoxy)methane	2.90U	100	2.90	ug/L
111-44-4	Bis(2-Chloroethyl)ether	2.88U	100	2.88	ug/L
108-60-1	Bis(2-Chloroisopropyl)ether	2.57U	100	2.57	ug/L
117-81-7	**Bis(2-Ethylhexyl)phthalate**	**10.2J**	**100**	**1.91**	**ug/L**
85-68-7	Butyl benzyl phthalate	1.65U	100	1.65	ug/L
86-74-8	Carbazole	2.32U	100	2.32	ug/L
218-01-9	Chrysene	4.33U	100	4.33	ug/L
84-74-2	Di-n-butyl phthalate	1.89U	100	1.89	ug/L
117-84-0	Di-n-octyl phthalate	1.67U	100	1.67	ug/L
53-70-3	Dibenz(a,h)anthracene	2.17U	100	2.17	ug/L
132-64-9	Dibenzofuran	2.27U	100	2.27	ug/L
84-66-2	Diethyl phthalate	3.03U	100	3.03	ug/L
131-11-3	Dimethyl phthalate	2.55U	100	2.55	ug/L
206-44-0	Fluoranthene	2.67U	100	2.67	ug/L
86-73-7	**Fluorene**	**25.9J**	**100**	**2.88**	**ug/L**
118-74-1	Hexachlorobenzene	2.49U	100	2.49	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21207302408	**HC 90 RECON CONDENSATE (H2O)**	Water	07/27/2012 14:57	07/28/2012 09:30

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/02/2012 11:30	486845	SW-846 3510C	1	08/04/2012 15:27	KCB	487030

CAS#	Parameter	Result	RDL	MDL	Units
87-68-3	Hexachlorobutadiene	1.92U	100	1.92	ug/L
77-47-4	Hexachlorocyclopentadiene	1.74U	100	1.74	ug/L
67-72-1	Hexachloroethane	2.99U	100	2.99	ug/L
193-39-5	Indeno(1,2,3-cd)pyrene	1.57U	100	1.57	ug/L
78-59-1	**Isophorone**	**73.1J**	**100**	**3.80**	**ug/L**
98-95-3	Nitrobenzene	3.29U	100	3.29	ug/L
87-86-5	Pentachlorophenol	1.68U	100	1.68	ug/L
85-01-8	Phenanthrene	3.04U	100	3.04	ug/L
129-00-0	Pyrene	4.86U	100	4.86	ug/L
110-86-1	Pyridine	35.8U	100	35.8	ug/L
621-64-7	n-Nitrosodi-n-propylamine	3.04U	100	3.04	ug/L
62-75-9	n-Nitrosodimethylamine	3.04U	100	3.04	ug/L
86-30-6	n-Nitrosodiphenylamine	3.64U	100	3.64	ug/L
95-48-7	**o-Cresol**	**593**	**100**	**3.29**	**ug/L**

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	500	Diluted Out	ug/L	**0***	52 - 120
321-60-8	2-Fluorobiphenyl	500	Diluted Out	ug/L	**0***	16 - 128
1718-51-0	Terphenyl-d14	500	Diluted Out	ug/L	**0***	43 - 138
4165-62-2	Phenol-d5	1000	Diluted Out	ug/L	**0***	10 - 120
367-12-4	2-Fluorophenol	1000	Diluted Out	ug/L	**0***	10 - 120
118-79-6	2,4,6-Tribromophenol	1000	Diluted Out	ug/L	**0***	52 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	08/04/2012 15:27	KCB	487018

CAS#	Parameter	Result	Retention	Units
565-61-7	**2-Pentanone, 3-methyl-**	**974**	**1.02**	**ug/L**
100-41-4	**Ethylbenzene**	**748**	**1.49**	**ug/L**
110-12-3	**2-Hexanone, 5-methyl-**	**731**	**1.61**	**ug/L**
106-42-3	**p-Xylene**	**2270**	**1.64**	**ug/L**
1120-73-6	**2-Cyclopenten-1-one, 2-methyl-**	**367**	**1.69**	**ug/L**
98-82-8	**Benzene, (1-methylethyl)-**	**1200**	**1.78**	**ug/L**
108-29-2	**2(3H)-Furanone, dihydro-5-methyl-**	**833**	**1.92**	**ug/L**
95-36-3	**1,2,4-Trimethylbenzene**	**1090**	**1.99**	**ug/L**
108-67-8	**Benzene, 1,3,5-trimethyl-**	**859**	**2.10**	**ug/L**
12427-38-2	**Maneb**	**642**	**5.71**	**ug/L**
108-88-3	**Toluene**	**19800**	**1.09**	**ug/L**
	Unknown	**1270**	**1.12**	**ug/L**
120-92-3	**Cyclopentanone**	**2610**	**1.17**	**ug/L**
	Unknown	**847**	**1.23**	**ug/L**
	Unknown	**442**	**1.32**	**ug/L**
98-01-1	**2-Furancarboxaldehyde**	**270**	**1.36**	**ug/L**
1120-72-5	**Cyclopentanone, 2-methyl-**	**533**	**1.40**	**ug/L**
1757-42-2	**Cyclopentanone, 3-methyl-**	**334**	**1.44**	**ug/L**

GC/MS Volatiles Quality Control Summary

Analytical Batch 486823	**Client ID**	MB486823	LCS486823	LCSD486823
Prep Batch N/A	**GCAL ID**	1092189	1092190	1092191
	Sample Type	Method Blank	LCS	LCSD
	Analytical Date	08/01/2012 15:45	08/01/2012 13:43	08/01/2012 14:17
	Matrix	Water	Water	Water

SW-846 8260B		**Units**	ug/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
67-64-1	Acetone	0.399U	0.399	50.0	41.1	82	44 - 156	45.3	91	10	30
74-97-5	Bromochloromethane	0.127U	0.127	50.0	54.3	109	76 - 130	52.3	105	4	30
75-27-4	Bromodichloromethane	0.076U	0.076	50.0	55.4	111	74 - 125	54.0	108	3	30
75-25-2	Bromoform	0.150U	0.150	50.0	53.7	107	64 - 122	56.3	113	5	30
74-83-9	Bromomethane	0.427U	0.427	50.0	39.2	78	47 - 138	40.7	81	4	30
75-15-0	Carbon disulfide	0.190U	0.190	50.0	49.8	100	69 - 136	50.7	101	2	30
56-23-5	Carbon tetrachloride	0.146U	0.146	50.0	55.8	112	76 - 128	54.9	110	2	30
75-00-3	Chloroethane	0.235U	0.235	50.0	50.4	101	62 - 141	49.9	100	1	30
136777-61-2	m,p-Xylene	0.237U	0.237	100	109	109	74 - 126	109	109	0	30
67-66-3	Chloroform	0.109U	0.109	50.0	54.4	109	75 - 122	52.7	105	3	30
74-87-3	Chloromethane	0.058U	0.058	50.0	46.8	94	59 - 132	44.5	89	5	30
124-48-1	Dibromochloromethane	0.076U	0.076	50.0	54.5	109	71 - 123	53.5	107	2	30
74-95-3	Dibromomethane	0.131U	0.131	50.0	52.1	104	72 - 129	52.4	105	0.6	30
75-71-8	Dichlorodifluoromethane	0.154U	0.154	50.0	46.4	93	58 - 140	45.6	91	2	30
75-34-3	1,1-Dichloroethane	0.138U	0.138	50.0	52.7	105	74 - 127	51.9	104	2	30
107-06-2	1,2-Dichloroethane	0.119U	0.119	50.0	52.1	104	71 - 129	51.5	103	1	30
156-59-2	cis-1,2-Dichloroethene	0.134U	0.134	50.0	52.3	105	73 - 130	51.4	103	2	30
156-60-5	trans-1,2-Dichloroethene	0.075U	0.075	50.0	53.2	106	69 - 132	52.7	105	0.9	30
75-09-2	Methylene chloride	0.149U	0.149	50.0	49.8	100	68 - 132	48.5	97	3	30
78-87-5	1,2-Dichloropropane	0.150U	0.150	50.0	54.7	109	72 - 128	53.3	107	3	30
10061-01-5	cis-1,3-Dichloropropene	0.092U	0.092	50.0	56.2	112	71 - 132	55.1	110	2	30
10061-02-6	trans-1,3-Dichloropropene	0.146U	0.146	50.0	55.3	111	71 - 131	55.6	111	0.5	30
100-41-4	Ethylbenzene	0.119U	0.119	50.0	55.9	112	74 - 126	55.9	112	0	30
591-78-6	2-Hexanone	0.093U	0.093	50.0	49.1	98	50 - 135	51.4	103	5	30
98-82-8	Isopropylbenzene (Cumene)	0.123U	0.123	50.0	57.5	115	71 - 125	58.4	117	2	30
78-93-3	2-Butanone	0.362U	0.362	50.0	47.9	96	58 - 137	51.8	104	8	30
74-88-4	Methyl iodide	0.084U	0.084	50.0	42.8	86	57 - 141	46.4	93	8	30
108-10-1	4-Methyl-2-pentanone	0.079U	0.079	50.0	51.4	103	57 - 132	53.7	107	4	30
103-65-1	n-Propylbenzene	0.102U	0.102	50.0	57.8	116	75 - 129	57.9	116	0.2	30
100-42-5	Styrene	0.098U	0.098	50.0	58.0	116	71 - 127	57.4	115	1	30
127-18-4	Tetrachloroethene	0.126U	0.126	50.0	55.2	110	68 - 128	54.3	109	2	30
630-20-6	1,1,1,2-Tetrachloroethane	0.103U	0.103	50.0	56.2	112	75 - 124	55.6	111	1	30
79-34-5	1,1,2,2-Tetrachloroethane	0.108U	0.108	50.0	53.6	107	70 - 122	52.0	104	3	30

GC/MS Volatiles Quality Control Summary

Analytical Batch 486823	**Client ID**	MB486823			LCS486823			LCSD486823			
Prep Batch N/A	**GCAL ID**	1092189			1092190			1092191			
	Sample Type	Method Blank			LCS			LCSD			
	Analytical Date	08/01/2012 15:45			08/01/2012 13:43			08/01/2012 14:17			
	Matrix	Water			Water			Water			
SW-846 8260B		**Units**	ug/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
120-82-1	1,2,4-Trichlorobenzene	0.156U	0.156	50.0	52.7	105	61 - 135	55.3	111	5	30
71-55-6	1,1,1-Trichloroethane	0.085U	0.085	50.0	54.8	110	76 - 126	53.5	107	2	30
79-00-5	1,1,2-Trichloroethane	0.147U	0.147	50.0	52.6	105	72 - 121	52.1	104	1	30
75-69-4	Trichlorofluoromethane	0.131U	0.131	50.0	54.7	109	72 - 136	51.4	103	6	30
96-18-4	1,2,3-Trichloropropane	0.098U	0.098	50.0	52.5	105	70 - 120	52.9	106	0.8	30
95-63-6	1,2,4-Trimethylbenzene	0.102U	0.102	50.0	57.6	115	74 - 125	57.6	115	0	30
108-67-8	1,3,5-Trimethylbenzene	0.075U	0.075	50.0	58.5	117	71 - 132	58.1	116	0.7	30
75-01-4	Vinyl chloride	0.137U	0.137	50.0	51.0	102	68 - 132	50.5	101	1	30
95-47-6	o-Xylene	0.147U	0.147	50.0	55.5	111	73 - 130	55.2	110	0.5	30
96-12-8	1,2-Dibromo-3-chloropropane	0.178U	0.178	50.0	51.6	103	57 - 121	55.3	111	7	30
106-93-4	1,2-Dibromoethane	0.100U	0.100	50.0	53.1	106	70 - 124	54.1	108	2	30
108-05-4	Vinyl acetate	0.076U	0.076	50.0	52.9	106	54 - 147	49.0	98	8	30
1634-04-4	tert-Butyl methyl ether (MTBE)	0.060U	0.060	50.0	51.3	103	71 - 125	52.3	105	2	30
540-59-0	1,2-Dichloroethene(Total)	0.209U	0.209	100	105	105	74 - 128	104	104	1	30
99-87-6	4-Isopropyltoluene	0.082U	0.082	50.0	59.5	119	71 - 129	60.6	121	2	30
1330-20-7	Xylene (total)	0.384U	0.384	150	165	110	74 - 127	164	109	0.6	30
110-57-6	trans-1,4-Dichloro-2-butene	0.312U	0.312	50.0	52.9	106	56 - 132	53.5	107	1	30
594-20-7	2,2-Dichloropropane	0.181U	0.181	50.0	60.0	120	77 - 124	57.2	114	5	30
76-13-1	Trichlorotrifluoroethane	0.158U	0.158	50.0	54.1	108	72 - 136	54.2	108	0.2	30
563-58-6	1,1-Dichloropropene	0.121U	0.121	50.0	55.5	111	72 - 131	54.3	109	2	30
142-28-9	1,3-Dichloropropane	0.072U	0.072	50.0	52.4	105	74 - 122	51.7	103	1	30
108-86-1	Bromobenzene	0.109U	0.109	50.0	53.6	107	71 - 120	53.1	106	0.9	30
95-49-8	2-Chlorotoluene	0.108U	0.108	50.0	53.1	106	72 - 127	53.6	107	0.9	30
106-43-4	4-Chlorotoluene	0.117U	0.117	50.0	56.4	113	75 - 126	56.1	112	0.5	30
98-06-6	tert-Butylbenzene	0.097U	0.097	50.0	59.1	118	72 - 126	59.9	120	1	30
135-98-8	sec-Butylbenzene	0.111U	0.111	50.0	59.4	119	70 - 136	60.3	121	2	30
541-73-1	1,3-Dichlorobenzene	0.135U	0.135	50.0	55.6	111	74 - 126	55.5	111	0.2	30
106-46-7	1,4-Dichlorobenzene	0.110U	0.110	50.0	54.2	108	72 - 122	54.4	109	0.4	30
104-51-8	n-Butylbenzene	0.152U	0.152	50.0	58.8	118	69 - 134	60.5	121	3	30
95-50-1	1,2-Dichlorobenzene	0.117U	0.117	50.0	53.1	106	71 - 126	54.3	109	2	30
87-68-3	Hexachlorobutadiene	0.211U	0.211	50.0	52.6	105	61 - 144	54.7	109	4	30
91-20-3	Naphthalene	0.065U	0.065	50.0	52.1	104	57 - 138	55.9	112	7	35
75-35-4	1,1-Dichloroethene	0.208U	0.208	50.0	53.5	107	69 - 129	52.1	104	3	20

GC/MS Volatiles Quality Control Summary

Analytical Batch	486823	**Client ID**	MB486823			LCS486823			LCSD486823			
Prep Batch	N/A	**GCAL ID**	1092189			1092190			1092191			
		Sample Type	Method Blank			LCS			LCSD			
		Analytical Date	08/01/2012 15:45			08/01/2012 13:43			08/01/2012 14:17			
		Matrix	Water			Water			Water			
SW-846 8260B		**Units**	ug/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
71-43-2	Benzene	0.099U	0.099	50.0	53.1	106	70 - 129	52.0	104	2	20
79-01-6	Trichloroethene	0.151U	0.151	50.0	56.4	113	76 - 129	54.9	110	3	20
108-88-3	Toluene	0.127U	0.127	50.0	53.2	106	72 - 120	52.1	104	2	20
108-90-7	Chlorobenzene	0.089U	0.089	50.0	52.1	104	74 - 123	51.8	104	0.6	20
110-02-1	Thiophene	0.00									
Surrogate											
460-00-4	4-Bromofluorobenzene	49.2	98	50	49.4	99	78 - 130	49.8	100		
1868-53-7	Dibromofluoromethane	48.6	97	50	48.8	98	77 - 127	51.5	103		
2037-26-5	Toluene d8	51	102	50	49.2	98	76 - 134	49.9	100		
17060-07-0	1,2-Dichloroethane-d4	50.3	101	50	50.1	100	71 - 127	50.7	101		

Analytical Batch	487041	**Client ID**	MB487041			LCS487041			LCSD487041			
Prep Batch	N/A	**GCAL ID**	1093281			1093282			1093283			
		Sample Type	Method Blank			LCS			LCSD			
		Analytical Date	08/05/2012 13:31			08/05/2012 11:50			08/05/2012 12:10			
		Matrix	Solid			Solid			Solid			
SW-846 8260B		**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
67-64-1	Acetone	51.5U	51.5	2500	1690	68	38 - 152	1880	75	11	30
74-97-5	Bromochloromethane	6.75U	6.75	2500	2590	104	73 - 127	2540	102	2	30
75-27-4	Bromodichloromethane	8.10U	8.10	2500	2820	113	74 - 126	2720	109	4	30
75-25-2	Bromoform	7.95U	7.95	2500	2470	99	67 - 122	2540	102	3	30
74-83-9	Bromomethane	15.2U	15.2	2500	2360	94	48 - 139	2310	92	2	30
75-15-0	Carbon disulfide	16.3U	16.3	2500	2780	111	68 - 133	2640	106	5	30
56-23-5	Carbon tetrachloride	10.1U	10.1	2500	2780	111	71 - 133	2700	108	3	30
75-00-3	Chloroethane	16.6U	16.6	2500	2650	106	57 - 144	2600	104	2	30
136777-61-2	m,p-Xylene	14.7U	14.7	5000	5190	104	72 - 128	4950	99	5	30
67-66-3	Chloroform	10.8U	10.8	2500	2750	110	74 - 124	2650	106	4	30
74-87-3	Chloromethane	11.9U	11.9	2500	2760	110	61 - 130	2690	108	3	30
124-48-1	Dibromochloromethane	10.9U	10.9	2500	2750	110	74 - 122	2690	108	2	30
74-95-3	Dibromomethane	11.6U	11.6	2500	2720	109	72 - 125	2580	103	5	30
75-71-8	Dichlorodifluoromethane	11.2U	11.2	2500	2640	106	59 - 138	2720	109	3	30

GC/MS Volatiles Quality Control Summary

Analytical Batch 487041	**Client ID**	MB487041	LCS487041	LCSD487041
Prep Batch N/A	**GCAL ID**	1093281	1093282	1093283
	Sample Type	Method Blank	LCS	LCSD
	Analytical Date	08/05/2012 13:31	08/05/2012 11:50	08/05/2012 12:10
	Matrix	Solid	Solid	Solid

SW-846 8260B		**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
75-34-3	1,1-Dichloroethane	7.45U	7.45	2500	2670	107	71 - 126	2580	103	3	30
107-06-2	1,2-Dichloroethane	9.90U	9.90	2500	2700	108	68 - 126	2670	107	1	30
156-59-2	cis-1,2-Dichloroethene	7.40U	7.40	2500	2680	107	72 - 130	2610	104	3	30
156-60-5	trans-1,2-Dichloroethene	6.55U	6.55	2500	2660	106	67 - 134	2570	103	3	30
75-09-2	Methylene chloride	22.1U	22.1	2500	2400	96	66 - 130	2330	93	3	30
78-87-5	1,2-Dichloropropane	7.70U	7.70	2500	2740	110	72 - 129	2640	106	4	30
10061-01-5	cis-1,3-Dichloropropene	9.25U	9.25	2500	2480	99	72 - 129	2410	96	3	30
10061-02-6	trans-1,3-Dichloropropene	8.50U	8.50	2500	2410	96	72 - 126	2370	95	2	30
100-41-4	Ethylbenzene	9.15U	9.15	2500	2840	114	74 - 130	2770	111	2	30
591-78-6	2-Hexanone	21.7U	21.7	2500	2050	82	47 - 137	2300	92	11	30
98-82-8	Isopropylbenzene (Cumene)	9.25U	9.25	2500	2640	106	74 - 125	2440	98	8	30
78-93-3	2-Butanone	25.9U	25.9	2500	2130	85	47 - 142	2300	92	8	30
74-88-4	Methyl iodide	61.5U	61.5	2500	2520	101	54 - 140	2440	98	3	30
108-10-1	4-Methyl-2-pentanone	6.60U	6.60	2500	2370	95	52 - 136	2610	104	10	30
103-65-1	n-Propylbenzene	37.0U	37.0	2500	2880	115	73 - 137	2760	110	4	30
100-42-5	Styrene	7.70U	7.70	2500	2510	100	72 - 128	2440	98	3	30
127-18-4	Tetrachloroethene	14.8U	14.8	2500	2900	116	70 - 127	2770	111	5	30
630-20-6	1,1,1,2-Tetrachloroethane	6.75U	6.75	2500	2690	108	77 - 122	2570	103	5	30
79-34-5	1,1,2,2-Tetrachloroethane	5.70U	5.70	2500	2480	99	66 - 129	2720	109	9	30
120-82-1	1,2,4-Trichlorobenzene	17.8U	17.8	2500	2260	90	64 - 135	2330	93	3	30
71-55-6	1,1,1-Trichloroethane	11.9U	11.9	2500	2820	113	70 - 130	2760	110	2	30
79-00-5	1,1,2-Trichloroethane	6.70U	6.70	2500	2540	102	74 - 120	2560	102	0.8	30
75-69-4	Trichlorofluoromethane	13.1U	13.1	2500	2700	108	64 - 141	2640	106	2	30
96-18-4	1,2,3-Trichloropropane	5.75U	5.75	2500	2280	91	63 - 132	2540	102	11	30
95-63-6	1,2,4-Trimethylbenzene	18.0U	18.0	2500	2570	103	75 - 130	2450	98	5	30
108-67-8	1,3,5-Trimethylbenzene	18.8U	18.8	2500	2610	104	74 - 136	2490	100	5	30
75-01-4	Vinyl chloride	13.6U	13.6	2500	2690	108	67 - 131	2740	110	2	30
95-47-6	o-Xylene	6.75U	6.75	2500	2590	104	69 - 133	2460	98	5	30
96-12-8	1,2-Dibromo-3-chloropropane	20.1U	20.1	2500	2120	85	60 - 123	2530	101	18	30
106-93-4	1,2-Dibromoethane	7.20U	7.20	2500	2620	105	74 - 122	2640	106	0.8	30
108-05-4	Vinyl acetate	7.05U	7.05	2500	2340	94	53 - 140	2330	93	0.4	30
1634-04-4	tert-Butyl methyl ether (MTBE)	6.10U	6.10	2500	2470	99	69 - 126	2540	102	3	30
540-59-0	1,2-Dichloroethene(Total)	11.7U	11.7	5000	5340	107	72 - 129	5180	104	3	30

GC/MS Volatiles Quality Control Summary

Analytical Batch	487041	**Client ID**	MB487041			LCS487041				LCSD487041		
Prep Batch	N/A	**GCAL ID**	1093281			1093282				1093283		
		Sample Type	Method Blank			LCS				LCSD		
		Analytical Date	08/05/2012 13:31			08/05/2012 11:50				08/05/2012 12:10		
		Matrix	Solid			Solid				Solid		
SW-846 8260B		**Units**	ug/Kg	**Spike**	**Result**		**Control**		**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**			**% R**	**RPD**	**Limit**
99-87-6	4-Isopropyltoluene	10.5U	10.5	2500	2660	106	71 - 136		2440	98	9	30
1330-20-7	Xylene (total)	20.1U	20.1	7500	7790	104	71 - 129		7410	99	5	30
110-57-6	trans-1,4-Dichloro-2-butene	25.9U	25.9	2500	2100	84	44 - 146		2330	93	10	30
594-20-7	2,2-Dichloropropane	12.5U	12.5	2500	2820	113	74 - 129		2740	110	3	30
76-13-1	Trichlorotrifluoroethane	10.0U	10.0	2500	2790	112	66 - 139		2660	106	5	30
563-58-6	1,1-Dichloropropene	12.2U	12.2	2500	2800	112	70 - 138		2710	108	3	30
142-28-9	1,3-Dichloropropane	7.90U	7.90	2500	2550	102	77 - 121		2550	102	0	30
108-86-1	Bromobenzene	7.80U	7.80	2500	2630	105	73 - 124		2640	106	0.4	30
95-49-8	2-Chlorotoluene	11.0U	11.0	2500	2790	112	75 - 132		2720	109	3	30
106-43-4	4-Chlorotoluene	11.8U	11.8	2500	2890	116	74 - 133		2850	114	1	30
98-06-6	tert-Butylbenzene	12.8U	12.8	2500	2630	105	72 - 136		2480	99	6	30
135-98-8	sec-Butylbenzene	9.85U	9.85	2500	2690	108	72 - 141		2490	100	8	30
541-73-1	1,3-Dichlorobenzene	13.0U	13.0	2500	2740	110	77 - 127		2650	106	3	30
106-46-7	1,4-Dichlorobenzene	11.6U	11.6	2500	2580	103	74 - 123		2550	102	1	30
104-51-8	n-Butylbenzene	11.7U	11.7	2500	2660	106	68 - 144		2430	97	9	30
95-50-1	1,2-Dichlorobenzene	13.8U	13.8	2500	2610	104	76 - 125		2620	105	0.4	30
87-68-3	Hexachlorobutadiene	10.7U	10.7	2500	3250	130	71 - 140		2830	113	14	30
91-20-3	Naphthalene	16.1U	16.1	2500	1880	75	54 - 132		2200	88	16	30
75-35-4	1,1-Dichloroethene	11.6U	11.6	2500	2720	109	68 - 129		2630	105	3	30
71-43-2	Benzene	7.60U	7.60	2500	2750	110	73 - 128		2630	105	4	30
79-01-6	Trichloroethene	10.7U	10.7	2500	2770	111	78 - 127		2640	106	5	30
108-88-3	Toluene	7.75U	7.75	2500	2650	106	74 - 121		2530	101	5	30
108-90-7	Chlorobenzene	7.45U	7.45	2500	2690	108	75 - 121		2560	102	5	30
110-02-1	Thiophene	0.00										
Surrogate												
460-00-4	4-Bromofluorobenzene	2480	99	2500	2600	104	62 - 127		2570	103		
1868-53-7	Dibromofluoromethane	2480	99	2500	2500	100	65 - 130		2520	101		
2037-26-5	Toluene d8	2580	103	2500	2470	99	71 - 132		2510	100		
17060-07-0	1,2-Dichloroethane-d4	2490	100	2500	2470	99	62 - 125		2420	97		

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	486994	**Client ID**	MB486788			LCS486788			LCSD486788			
Prep Batch	486788	**GCAL ID**	1092035			1092036			1092037			
Prep Method	3550C	**Sample Type**	Method Blank			LCS			LCSD			
		Prep Date	08/02/2012 13:00			08/02/2012 13:00			08/02/2012 13:00			
		Analytical Date	08/03/2012 13:00			08/03/2012 13:14			08/03/2012 13:28			
		Matrix	Solid			Solid			Solid			
SW-846 8270C		**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
208-96-8	Acenaphthylene	1510U	1510								
120-12-7	Anthracene	1240U	1240								
56-55-3	Benzo(a)anthracene	4380U	4380								
205-99-2	Benzo(b)fluoranthene	7600U	7600								
207-08-9	Benzo(k)fluoranthene	1140U	1140								
191-24-2	Benzo(g,h,i)perylene	1680U	1680								
50-32-8	Benzo(a)pyrene	1330U	1330								
85-68-7	Butyl benzyl phthalate	1330U	1330								
111-91-1	Bis(2-Chloroethoxy)methane	2800U	2800								
111-44-4	Bis(2-Chloroethyl)ether	4190U	4190								
108-60-1	Bis(2-Chloroisopropyl)ether	3900U	3900								
117-81-7	Bis(2-Ethylhexyl)phthalate	2470U	2470								
101-55-3	4-Bromophenyl phenyl ether	3720U	3720								
86-74-8	Carbazole	3420U	3420								
7005-72-3	4-Chlorophenyl phenyl ether	4010U	4010								
218-01-9	Chrysene	1380U	1380								
53-70-3	Dibenz(a,h)anthracene	1450U	1450								
132-64-9	Dibenzofuran	770U	770								
91-94-1	3,3'-Dichlorobenzidine	16800U	16800								
120-83-2	2,4-Dichlorophenol	4090U	4090								
84-66-2	Diethyl phthalate	2010U	2010								
105-67-9	2,4-Dimethylphenol	22700U	22700								
131-11-3	Dimethyl phthalate	835U	835								
117-84-0	Di-n-octyl phthalate	1630U	1630								
51-28-5	2,4-Dinitrophenol	21100U	21100								
606-20-2	2,6-Dinitrotoluene	4890U	4890								
206-44-0	Fluoranthene	967U	967								
86-73-7	Fluorene	1590U	1590								
118-74-1	Hexachlorobenzene	6170U	6170								
87-68-3	Hexachlorobutadiene	2960U	2960								
77-47-4	Hexachlorocyclopentadiene	24600U	24600								
67-72-1	Hexachloroethane	1810U	1810								

GCAL Report 212073024

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	486994	**Client ID**	MB486788	LCS486788	LCSD486788
Prep Batch	486788	**GCAL ID**	1092035	1092036	1092037
Prep Method	3550C	**Sample Type**	Method Blank	LCS	LCSD
		Prep Date	08/02/2012 13:00	08/02/2012 13:00	08/02/2012 13:00
		Analytical Date	08/03/2012 13:00	08/03/2012 13:14	08/03/2012 13:28
		Matrix	Solid	Solid	Solid

SW-846 8270C		**Units**	ug/Kg	**Spike**	**Result**	**% R**	**Control**	**Result**	**% R**	**RPD**	**RPD**
		Result	**RDL**	**Added**			**Limits % R**				**Limit**
78-59-1	Isophorone	2120U	2120								
193-39-5	Indeno(1,2,3-cd)pyrene	3050U	3050								
91-57-6	2-Methylnaphthalene	1570U	1570								
95-48-7	o-Cresol	1790U	1790								
98-95-3	Nitrobenzene	1780U	1780								
88-75-5	2-Nitrophenol	3370U	3370								
62-75-9	n-Nitrosodimethylamine	9140U	9140								
86-30-6	n-Nitrosodiphenylamine	1140U	1140								
85-01-8	Phenanthrene	1310U	1310								
95-95-4	2,4,5-Trichlorophenol	2500U	2500								
88-06-2	2,4,6-Trichlorophenol	20100U	20100								
100-51-6	Benzyl alcohol	5490U	5490								
62-53-3	Aniline	4180U	4180								
110-86-1	Pyridine	24300U	24300								
99-09-2	3-Nitroaniline	3560U	3560								
100-01-6	4-Nitroaniline	32900U	32900								
84-74-2	Di-n-butyl phthalate	1570U	1570								
122-66-7	1,2Diphenylhydrazine/Azobenzen	1120U	1120								
88-74-4	2-Nitroaniline	2720U	2720								
91-58-7	2-Chloronaphthalene	634U	634								
106-47-8	4-Chloroaniline	4170U	4170								
1319-77-3MP	m,p-Cresol	5830U	5830								
534-52-1	4,6-Dinitro-2-methylphenol	22200U	22200								
108-95-2	Phenol	4990U	4990	100000	73700	74	42 - 120	78500	79	6	40
95-57-8	2-Chlorophenol	2030U	2030	100000	81800	82	48 - 120	88600	89	8	40
106-46-7	1,4-Dichlorobenzene	934U	934	100000	78800	79	42 - 120	86300	86	9	40
621-64-7	n-Nitrosodi-n-propylamine	1830U	1830	100000	71700	72	46 - 120	77600	78	8	40
120-82-1	1,2,4-Trichlorobenzene	1860U	1860	100000	77200	77	46 - 120	81600	82	6	40
59-50-7	4-Chloro-3-methylphenol	5280U	5280	100000	88700	89	46 - 120	94300	94	6	40
83-32-9	Acenaphthene	1300U	1300	100000	75100	75	50 - 120	78300	78	4	40
100-02-7	4-Nitrophenol	32000U	32000	100000	49300	49	32 - 120	53000	53	7	40
121-14-2	2,4-Dinitrotoluene	5670U	5670	100000	61700	62	45 - 120	66300	66	7	40

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	486994	**Client ID**	MB486788	LCS486788	LCSD486788
Prep Batch	486788	**GCAL ID**	1092035	1092036	1092037
Prep Method	3550C	**Sample Type**	Method Blank	LCS	LCSD
		Prep Date	08/02/2012 13:00	08/02/2012 13:00	08/02/2012 13:00
		Analytical Date	08/03/2012 13:00	08/03/2012 13:14	08/03/2012 13:28
		Matrix	Solid	Solid	Solid

SW-846 8270C		**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
87-86-5	Pentachlorophenol	27900U	27900	100000	67600	68	30 - 124	73200	73	8	40
129-00-0	Pyrene	1140U	1140	100000	102000	102	38 - 136	103000	103	1	40
Surrogate											
4165-60-0	Nitrobenzene-d5	83400	83	100000	69600	70	46 - 123	77900	78		
321-60-8	2-Fluorobiphenyl	96300	96	100000	81300	81	47 - 127	84500	85		
1718-51-0	Terphenyl-d14	105000	105	100000	105000	105	38 - 167	111000	111		
4165-62-2	Phenol-d5	192000	96	200000	162000	81	43 - 123	175000	88		
367-12-4	2-Fluorophenol	185000	93	200000	155000	78	51 - 119	171000	86		
118-79-6	2,4,6-Tribromophenol	180000	90	200000	160000	80	44 - 121	162000	81		

Analytical Batch	486994	**Client ID**	MB486845	LCS486845	LCSD486845
Prep Batch	486845	**GCAL ID**	1092332	1092333	1092334
Prep Method	SW-846	**Sample Type**	Method Blank	LCS	LCSD
	3510C	**Prep Date**	08/02/2012 11:30	08/02/2012 11:30	08/02/2012 11:30
		Analytical Date	08/03/2012 11:20	08/03/2012 11:34	08/03/2012 11:48
		Matrix	Water	Water	Water

SW-846 8270C		**Units**	ug/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
208-96-8	Acenaphthylene	0.303U	0.303								
120-12-7	Anthracene	0.316U	0.316								
56-55-3	Benzo(a)anthracene	0.316U	0.316								
205-99-2	Benzo(b)fluoranthene	0.217U	0.217								
207-08-9	Benzo(k)fluoranthene	0.236U	0.236								
191-24-2	Benzo(g,h,i)perylene	0.215U	0.215								
50-32-8	Benzo(a)pyrene	0.125U	0.125								
85-68-7	Butyl benzyl phthalate	0.165U	0.165								
111-91-1	Bis(2-Chloroethoxy)methane	0.290U	0.290								
111-44-4	Bis(2-Chloroethyl)ether	0.288U	0.288								
108-60-1	Bis(2-Chloroisopropyl)ether	0.257U	0.257								
117-81-7	Bis(2-Ethylhexyl)phthalate	0.191U	0.191								
101-55-3	4-Bromophenyl phenyl ether	0.337U	0.337								

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	486994	**Client ID**	MB486845	LCS486845	LCSD486845
Prep Batch	486845	**GCAL ID**	1092332	1092333	1092334
Prep Method	SW-846	**Sample Type**	Method Blank	LCS	LCSD
	3510C	**Prep Date**	08/02/2012 11:30	08/02/2012 11:30	08/02/2012 11:30
		Analytical Date	08/03/2012 11:20	08/03/2012 11:34	08/03/2012 11:48
		Matrix	Water	Water	Water

SW-846 8270C		**Units**	ug/L	**Spike**	**Result**	**% R**	**Control**	**Result**	**% R**	**RPD**	**RPD**
		Result	**RDL**	**Added**			**Limits % R**				**Limit**
86-74-8	Carbazole	0.232U	0.232								
7005-72-3	4-Chlorophenyl phenyl ether	0.268U	0.268								
218-01-9	Chrysene	0.433U	0.433								
53-70-3	Dibenz(a,h)anthracene	0.217U	0.217								
132-64-9	Dibenzofuran	0.227U	0.227								
91-94-1	3,3'-Dichlorobenzidine	0.297U	0.297								
120-83-2	2,4-Dichlorophenol	0.217U	0.217								
84-66-2	Diethyl phthalate	0.303U	0.303								
105-67-9	2,4-Dimethylphenol	0.694U	0.694								
131-11-3	Dimethyl phthalate	0.255U	0.255								
117-84-0	Di-n-octyl phthalate	0.167U	0.167								
51-28-5	2,4-Dinitrophenol	2.60U	2.60								
606-20-2	2,6-Dinitrotoluene	0.352U	0.352								
206-44-0	Fluoranthene	0.267U	0.267								
86-73-7	Fluorene	0.288U	0.288								
118-74-1	Hexachlorobenzene	0.249U	0.249								
87-68-3	Hexachlorobutadiene	0.192U	0.192								
77-47-4	Hexachlorocyclopentadiene	0.174U	0.174								
67-72-1	Hexachloroethane	0.299U	0.299								
78-59-1	Isophorone	0.380U	0.380								
193-39-5	Indeno(1,2,3-cd)pyrene	0.157U	0.157								
91-57-6	2-Methylnaphthalene	0.255U	0.255								
95-48-7	o-Cresol	0.329U	0.329								
98-95-3	Nitrobenzene	0.329U	0.329								
88-75-5	2-Nitrophenol	0.357U	0.357								
62-75-9	n-Nitrosodimethylamine	0.304U	0.304								
86-30-6	n-Nitrosodiphenylamine	0.364U	0.364								
85-01-8	Phenanthrene	0.304U	0.304								
95-95-4	2,4,5-Trichlorophenol	0.317U	0.317								
88-06-2	2,4,6-Trichlorophenol	0.275U	0.275								
100-51-6	Benzyl alcohol	0.355U	0.355								
62-53-3	Aniline	0.718U	0.718								

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	486994	**Client ID**	MB486845	LCS486845	LCSD486845
Prep Batch	486845	**GCAL ID**	1092332	1092333	1092334
Prep Method	SW-846	**Sample Type**	Method Blank	LCS	LCSD
	3510C	**Prep Date**	08/02/2012 11:30	08/02/2012 11:30	08/02/2012 11:30
		Analytical Date	08/03/2012 11:20	08/03/2012 11:34	08/03/2012 11:48
		Matrix	Water	Water	Water

SW-846 8270C		**Units**	ug/L	**Spike**	**Result**	**% R**	**Control**	**Result**	**% R**	**RPD**	**RPD**
		Result	**RDL**	**Added**			**Limits % R**				**Limit**
110-86-1	Pyridine	3.58U	3.58								
99-09-2	3-Nitroaniline	0.226U	0.226								
100-01-6	4-Nitroaniline	0.221U	0.221								
84-74-2	Di-n-butyl phthalate	0.189U	0.189								
122-66-7	1,2Diphenylhydrazine/Azobenzen	0.278U	0.278								
88-74-4	2-Nitroaniline	0.198U	0.198								
91-58-7	2-Chloronaphthalene	0.221U	0.221								
106-47-8	4-Chloroaniline	0.463U	0.463								
1319-77-3MP	m,p-Cresol	0.352U	0.352								
534-52-1	4,6-Dinitro-2-methylphenol	1.98U	1.98								
108-95-2	Phenol	0.150U	0.150	100	44.1	44	16 - 120	55.5	56	23	30
95-57-8	2-Chlorophenol	0.276U	0.276	100	76.0	76	42 - 120	101	101	28	30
106-46-7	1,4-Dichlorobenzene	0.255U	0.255	100	71.2	71	22 - 120	93.6	94	27	30
621-64-7	n-Nitrosodi-n-propylamine	0.304U	0.304	100	74.5	75	47 - 120	96.7	97	26	30
120-82-1	1,2,4-Trichlorobenzene	0.234U	0.234	100	71.9	72	30 - 120	96.0	96	29	30
59-50-7	4-Chloro-3-methylphenol	0.234U	0.234	100	70.8	71	44 - 120	92.2	92	26	30
83-32-9	Acenaphthene	0.268U	0.268	100	72.5	73	52 - 120	90.7	91	22	30
100-02-7	4-Nitrophenol	1.83U	1.83	100	35.6	36	10 - 120	45.7	46	25	30
121-14-2	2,4-Dinitrotoluene	0.263U	0.263	100	70.3	70	37 - 138	93.2	93	28	30
87-86-5	Pentachlorophenol	0.168U	0.168	100	83.5	84	25 - 158	107	107	25	30
129-00-0	Pyrene	0.486U	0.486	100	79.6	80	54 - 120	96.5	97	19	30
Surrogate											
4165-60-0	Nitrobenzene-d5	38.7	77	50	35.1	70	52 - 120	44.7	89		
321-60-8	2-Fluorobiphenyl	38.1	76	50	37.3	75	16 - 128	44.5	89		
1718-51-0	Terphenyl-d14	49.7	99	50	43.7	87	43 - 138	49.8	100		
4165-62-2	Phenol-d5	39.5	40	100	39.4	39	10 - 120	47.7	48		
367-12-4	2-Fluorophenol	55.1	55	100	55	55	10 - 120	67.4	67		
118-79-6	2,4,6-Tribromophenol	87.5	88	100	75	75	20 - 120	94.2	94		

GCAL

GULF COAST ANALYTICAL LABORATORIES, INC

7979 GSRI AVE, BATON ROUGE LA 70820-7402
(225) 769-4900 FAX (225) 767-5717

Chain of Custody Record

Lab use only			
KEMRON	4794	212073024	8/08/12
Client Name	Client #	Group#	Due Date

Report to:
Client: Kemron
Address: 1359-A Ellsworth Ind Blvd ATL, GA 30318
Contact: Tommy Jordan
Phone: 404-630-0928
Fax: 404-630-7162

Bill to:
Client: same
Address:
Contact:
Phone:
Fax:

P.O. Number

Project Name/Number: Bridgewater NJ/~~SF~~ SH-0416-007

Sampled By:

Analytical Requests & Methods

Matrix	Date	Time (2400)	Comp	Grab	Sample Description	Preservatives	No. Containers	8260 + TICS + Naphthalene + thiophene	8270 + TICS	Remarks:	Lab ID
											7/30
OL	7-27-12	1456		X	VR90 Reconstituted Condensate	NA	1	X	X	HOT!!	1,5
OL	7-27-12	1455		X	HC100 Reconstituted Condensate	NA	1	X	X	HOT!!	2,6
OL	7-27-12	1454		X	VR100 Reconstituted Condensate	NA	1	X	X	HOT!!	3,7
OL	7-27-12	1457		X	HC90 Reconstituted Condensate	NA	1	X	X	HOT!!	4,8

23.3°C

Turn Around Time: ___ 24 - 48 hrs ___ 3 days ___ 1 week X standard other ___

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
		7/27/12	15:07
Relinquished by: (Signature) 8758 - 2001 - 0250	Received by: (Signature)	Date: 7/28/12	Time: 0930
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

Note:
please use 1 point calibration for Thiophene and Naphthalene

By submitting these samples, you agree to the terms and conditions contained in our most recent schedule of services.

Matrix: W = water, S=Soil, SD=Solid, L=Liquid, SL=Sludge, O=Oil, CT=Charcoal Tube, OVM=Organic Vapor Monitor, XT=XAD Tube, A=Air Bag, SUM=Summa Canister

GCAL
GULF COAST ANALYTICAL LABORATORIES, INC

SAMPLE RECEIVING CHECKLIST

SDG
212073024

PROJECT	
Client 4794 - KEMRON	**Transport Method** FEDEX
Profile 232522 - Bridgewater Acid Tar	**Received By** Pfeifer, Ben J.
Line Item(s) 1 - Sludge	**Receive Date(s)** 07/30/12

CHECKLIST			
Were all samples received using proper thermal preservation?	☑ Yes	☐ No	☐ NA
When used, were all custody seals intact?	☑ Yes	☐ No	☐ NA
Were all samples received in proper containers?	☑ Yes	☐ No	☐ NA
Were all samples received using proper chemical preservation?	☑ Yes	☐ No	☐ NA
Was preservative added to any container at the lab?	☐ Yes	☑ No	☐ NA
Were all containers received in good condition?	☑ Yes	☐ No	☐ NA
Were all VOA vials received with no head space?	☐ Yes	☐ No	☑ NA
Do all sample labels match the Chain of Custody?	☑ Yes	☐ No	☐ NA
Did the Chain of Custody list the sampling technician?	☐ Yes	☑ No	☐ NA

COOLERS

Airbill	Temp(oC)
8758 2001 0250	23.3

DISCREPANCIES

None

LABORATORY PRESERVATIONS

None

NOTES

212073024

Revision 1.1

APPENDIX G

OFF GAS ANALYTICAL REPORTS

LABORATORY REPORT

August 24, 2012

Tommy Jordan
Kemron Environmental Services
1359-A Ellsworth Industrial Blvd
Atlanta, GA 30318

RE: Bridgewater / SH0416-005

Dear Tommy:

Enclosed are the results of the samples submitted to our laboratory on August 11, 2012. For your reference, these analyses have been assigned our service request number P1203274.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is certified by the California Department of Health Services, NELAP Laboratory Certificate No. 02115CA; Arizona Department of Health Services, Certificate No. AZ0694; Florida Department of Health, NELAP Certification E871020; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA200007; The American Industrial Hygiene Association, Laboratory #101661; United States Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP), Certificate No. L11-203; Pennsylvania Registration No. 68-03307; TX Commission of Environmental Quality, NELAP ID T104704413-12-3; Minnesota Department of Health, NELAP Certificate No. 362188; Washington State Department of Ecology, ELAP Lab ID: C946, State of Utah Department of Health, NELAP Certificate No. CA01527Z012-Z; Los Angeles Department of Building and Safety, Approval No: TA00001. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact me for information corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kate Aguilera
Project Manager

Client: Kemron Environmental Services Service Request No: P1203274
Project: Bridgewater / SH0416-005

CASE NARRATIVE

The samples were received intact under chain of custody on August 11, 2012 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Sulfur Analysis

The samples were analyzed for twenty sulfur compounds per ASTM D 5504-08 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD). All compounds with the exception of hydrogen sulfide and carbonyl sulfide are quantitated against the initial calibration curve for methyl mercaptan.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of Columbia Analytical Services, Inc. dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to AALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

DETAIL SUMMARY REPORT

Client: Kemron Environmental Services
Service Request: P1203274
Project ID: Bridgewater / SH0416-005

Date Received: 8/11/2012
Time Received: 09:05

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	ASTM D5504-08 - Sulfur Bag
VR 90C Day 1	P1203274-001	Air	8/10/2012	15:05	X
HC 90C Day 1	P1203274-002	Air	8/10/2012	14:02	X

Columbia Analytical Services

CHAIN OF CUSTODY

SR#: P1203274

1317 South 13th Ave, Kelso, WA 98626 | 360.577.7222 | 800.695.7222 | 360.636.1068 (fax)

PAGE 1 OF 1 COC #

PROJECT NAME: Bridgewater
PROJECT NUMBER: SH0416-005
PROJECT MANAGER: Tommy Jordan
COMPANY/ADDRESS: Kemron
1359 Ellsworth Industrial Blvd
CITY/STATE/ZIP: Atlanta GA
E-MAIL ADDRESS: tjordan@kemron.com
PHONE #: 404-601-6908 FAX #:
SAMPLER'S SIGNATURE:

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625 ☐ 8270 ☐ 8270LL ☐	Volatile Organics 624 ☐ 8260 ☐ 8021 ☐ BTEX ☐	Hydrocarbons (*see below) Gas ☐ Diesel ☐ Oil ☐	☐ Fuel Fingerprint (FIQ) ☐ NW-HCID Screen	Oil & Grease/TRPH 1664 HEM ☐ 1664 SGT ☐	PCB's Aroclors ☐ Congeners ☐	Pesticides/Herbicides 608 ☐ 8081A ☐ 8141A ☐ 8151A ☐	Chlorophenolics - 8151M Tri ☐ Tetra ☐ PCP ☐	PAHS 8310 ☐ SIM ☐	Metals, Total or Dissolved (See list below)	Cyanide ☐	Hex-Chrom ☐	pH, Cond, Cl, SO_4, P, F, NO_2, NO_3, BOD, TSS, TDS (circle)	NH_3-N, COD, Total-P, TKN, TOC, DOC (circle) NO_2+NO_3	TOX 9020 ☐ AOX 1650 ☐ 506 ☐	Reduced Sulfur SSOH			REMARKS
VR 90C Day1	8/10/12	1505	D	A.V	1																X			
HC 90C Day1	8/10/12	1402	D	A.V	1																X			

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required
___ II. Report Dup., MS, MSD as required
___ III. Data Validation Report (includes all raw data)
___ IV. CLP Deliverable Report
___ V. EDD

INVOICE INFORMATION

P.O. #
Bill To:

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.
___ 5 Day
X Standard (10-15 working days)
___ Provide FAX Results
8/27/12 Requested Report Date

Circle which metals are to be analyzed:

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER:_____ (CIRCLE ONE)

SPECIAL INSTRUCTIONS/COMMENTS:

☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature	Fed Ex	Fedex	
Date/Time: 1545	Date/Time	Date/Time	Date/Time: 8/10/12 0905
Printed Name: Tommy Jordan	Printed Name	Printed Name	Printed Name
Firm: Kemron	Firm	Firm	Firm: ALS

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Sample Acceptance Check Form

Client: Kemron Environmental Services Work order: P1203274

Project: Bridgewater / SH0416-005

Sample(s) received on: 8/11/12 Date opened: 8/11/12 by: MZAMORA

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by CAS**?	☐	☒	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
9	Was a **trip blank** received?	☐	☒	☐
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1203274-001.01	1 L Zefon Bag					
P1203274-002.01	1 L Zefon Bag					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **VR 90C Day 1**
Client Project ID: **Bridgewater / SH0416-005**

CAS Project ID: P1203274
CAS Sample ID: P1203274-001

Test Code: ASTM D 5504-08
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Wade Henton
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: 8/10/12
Time Collected: 15:05
Date Received: 8/11/12
Date Analyzed: 8/11/12
Time Analyzed: 11:44, 11:59
Volume(s) Analyzed: 0.10 ml(s)
0.0050 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**1,400,000**	1,400	**1,000,000**	1,000	**D**
463-58-1	Carbonyl Sulfide	**2,900**	2,500	**1,200**	1,000	**D**
74-93-1	Methyl Mercaptan	**28,000**	98	**14,000**	50	
75-08-1	Ethyl Mercaptan	**2,700**	130	**1,100**	50	
75-18-3	Dimethyl Sulfide	**26,000**	130	**10,000**	50	
75-15-0	Carbon Disulfide	**1,100,000**	1,600	**350,000**	500	**D**
75-33-2	Isopropyl Mercaptan	**1,200**	160	**370**	50	
75-66-1	tert-Butyl Mercaptan	ND	180	ND	50	
107-03-9	n-Propyl Mercaptan	ND	160	ND	50	
624-89-5	Ethyl Methyl Sulfide	**1,800**	160	**560**	50	
110-02-1	Thiophene	**3,900**	170	**1,100**	50	
513-44-0	Isobutyl Mercaptan	ND	180	ND	50	
352-93-2	Diethyl Sulfide	ND	180	ND	50	
109-79-5	n-Butyl Mercaptan	ND	180	ND	50	
624-92-0	Dimethyl Disulfide	**220**	96	**58**	25	
616-44-4	3-Methylthiophene	ND	200	ND	50	
110-01-0	Tetrahydrothiophene	ND	180	ND	50	
638-02-8	2,5-Dimethylthiophene	ND	230	ND	50	
872-55-9	2-Ethylthiophene	ND	230	ND	50	
110-81-6	Diethyl Disulfide	ND	120	ND	25	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

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RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **HC 90C Day 1**
Client Project ID: **Bridgewater / SH0416-005**

CAS Project ID: P1203274
CAS Sample ID: P1203274-002

Test Code: ASTM D 5504-08
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Wade Henton
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: 8/10/12
Time Collected: 14:02
Date Received: 8/11/12
Date Analyzed: 8/11/12
Time Analyzed: 12:15, 12:54
Volume(s) Analyzed: 0.10 ml(s)
0.0010 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**32,000,000**	7,000	**23,000,000**	5,000	**D**
463-58-1	Carbonyl Sulfide	**26,000**	120	**11,000**	50	
74-93-1	Methyl Mercaptan	**700,000**	9,800	**360,000**	5,000	**D**
75-08-1	Ethyl Mercaptan	**55,000**	130	**21,000**	50	
75-18-3	Dimethyl Sulfide	**84,000**	130	**33,000**	50	
75-15-0	Carbon Disulfide	**620,000**	78	**200,000**	25	
75-33-2	Isopropyl Mercaptan	**8,800**	160	**2,800**	50	
75-66-1	tert-Butyl Mercaptan	**3,700**	180	**1,000**	50	
107-03-9	n-Propyl Mercaptan	**1,100**	160	**340**	50	
624-89-5	Ethyl Methyl Sulfide	**5,500**	160	**1,800**	50	
110-02-1	Thiophene	**19,000**	170	**5,500**	50	
513-44-0	Isobutyl Mercaptan	**3,000**	180	**800**	50	
352-93-2	Diethyl Sulfide	ND	180	ND	50	
109-79-5	n-Butyl Mercaptan	ND	180	ND	50	
624-92-0	Dimethyl Disulfide	**2,500**	96	**650**	25	
616-44-4	3-Methylthiophene	**790**	200	**200**	50	
110-01-0	Tetrahydrothiophene	ND	180	ND	50	
638-02-8	2,5-Dimethylthiophene	ND	230	ND	50	
872-55-9	2-Ethylthiophene	**780**	230	**170**	50	
110-81-6	Diethyl Disulfide	ND	120	ND	25	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **Method Blank**
Client Project ID: **Bridgewater / SH0416-005**

CAS Project ID: P1203274
CAS Sample ID: P120811-MB

Test Code: ASTM D 5504-08
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Wade Henton
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 8/11/12
Time Analyzed: 11:30
Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Kemron Environmental Services**
Client Sample ID: **Lab Control Sample** CAS Project ID: P1203274
Client Project ID: **Bridgewater / SH0416-005** CAS Sample ID: P120811-LCS

Test Code: ASTM D 5504-08 Date Collected: NA
Instrument ID: Agilent 6890A/GC13/SCD Date Received: NA
Analyst: Wade Henton Date Analyzed: 8/11/12
Sampling Media: 1 L Zefon Bag Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount ppbV	Result ppbV	% Recovery	CAS Acceptance Limits	Data Qualifier
7783-06-4	Hydrogen Sulfide	2,380	**2,570**	**108**	51-141	
463-58-1	Carbonyl Sulfide	2,470	**2,100**	**85**	63-147	
74-93-1	Methyl Mercaptan	2,360	**3,140**	**133**	54-156	

LABORATORY REPORT

July 30, 2012

Tommy Jordan
Kemron Environmental Services
1359-A Ellsworth Industrial Blvd
Atlanta, GA 30318

RE: Bridgewater / SH041602-005

Dear Tommy:

Enclosed are the results of the samples submitted to our laboratory on July 18, 2012. For your reference, these analyses have been assigned our service request number P1202894.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

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If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

For Kate Aguilera
Project Manager

Client: Kemron Environmental Services Service Request No: P1202894
Project: Bridgewater / SH041602-005

CASE NARRATIVE

The samples were received intact under chain of custody on July 18, 2012 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Sulfur Analysis

The samples were analyzed for twenty sulfur compounds per ASTM D 5504-08 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD). All compounds with the exception of hydrogen sulfide and carbonyl sulfide are quantitated against the initial calibration curve for methyl mercaptan.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of Columbia Analytical Services, Inc. dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to AALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

DETAIL SUMMARY REPORT

Client: Kemron Environmental Services
Service Request: P1202894
Project ID: Bridgewater / SH041602-005

Date Received: 7/18/2012
Time Received: 07:55

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	ASTM D5504-08 - Sulfur Bag
VR 90 Day 3	P1202894-001	Air	7/17/2012	13:41	X
HC 90 Day 3	P1202894-002	Air	7/17/2012	13:41	X
VR 100 Day 3	P1202894-003	Air	7/17/2012	14:39	X
HC 100 Day 3	P1202894-004	Air	7/17/2012	14:39	X

Columbia Analytical Services™
2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Air - Chain of Custody Record & Analytical Service Request

Page 1 of 1

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day-Standard

CAS Project No. P1202844

CAS Contact: Kate Aguilera

Company Name & Address (Reporting Information)	Kemron Environmental Services 1359 A Ellsworth Industrial Blvd Atlanta GA 30318
Project Name	Bridgewater
Project Number	5H0416 @ 2-005
Project Manager	Tommy Jordan
P.O. # / Billing Information	
Phone	404-601-6908
Fax	
Email Address for Result Reporting	tjordan@kemron.com
Sampler (Print & Sign)	Tommy Jordan

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code #- FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	Analysis Method: Reduced Sulfur ASTM 5504		Comments e.g. Actual Preservative or specific instructions
VR 90 Day 3	1	7/17/12	1341					1LTB	X		
HC 90 Day 3	2	"	1341					1LTB	X		
VR 100 Day 3	3	"	1439					1LTB	X		
HC 100 Day 3	4	"	1439					1LTB	X		

Report Tier Levels - please select
Tier I - Results (Default if not specified) _____
Tier II (Results + QC Summaries) _____
Tier III (Results + QC & Calibration Summaries) _____
Tier IV (Data Validation Package) 10% Surcharge _____
EDD required (Yes) / No
Type: STD

Project Requirements (MRLs, QAPP)

	Date	Time		Date	Time
Relinquished by: (Signature)	7/17/12	1515	Received by: (Signature)	7/18/12	0755
Relinquished by: (Signature)			Received by: (Signature)		

Cooler / Blank Temperature ____ °C

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Sample Acceptance Check Form

Client: Kemron Environmental Services Work order: P1202894

Project: Bridgewater / SH041602-005

Sample(s) received on: 7/18/12 Date opened: 7/18/12 by: MZAMORA

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by CAS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
9	Was a **trip blank** received?	☐	☒	☐
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1202894-001.01	1 L Zefon Bag					
P1202894-002.01	1 L Zefon Bag					
P1202894-003.01	1 L Zefon Bag					
P1202894-004.01	1 L Zefon Bag					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **VR 90 Day 3**
Client Project ID: **Bridgewater / SH041602-005**

CAS Project ID: P1202894
CAS Sample ID: P1202894-001

Test Code: ASTM D 5504-08
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Wade Henton
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: 7/17/12
Time Collected: 13:41
Date Received: 7/18/12
Date Analyzed: 7/18/12
Time Analyzed: 11:16
Volume(s) Analyzed: 0.0050 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**2,700,000**	1,400	**1,900,000**	1,000	
463-58-1	Carbonyl Sulfide	**7,200**	2,500	**2,900**	1,000	
74-93-1	Methyl Mercaptan	**41,000**	2,000	**21,000**	1,000	
75-08-1	Ethyl Mercaptan	**7,800**	2,500	**3,100**	1,000	
75-18-3	Dimethyl Sulfide	**10,000**	2,500	**4,000**	1,000	
75-15-0	Carbon Disulfide	**100,000**	1,600	**33,000**	500	
75-33-2	Isopropyl Mercaptan	ND	3,100	ND	1,000	
75-66-1	tert-Butyl Mercaptan	ND	3,700	ND	1,000	
107-03-9	n-Propyl Mercaptan	ND	3,100	ND	1,000	
624-89-5	Ethyl Methyl Sulfide	ND	3,100	ND	1,000	
110-02-1	Thiophene	**6,000**	3,400	**1,700**	1,000	
513-44-0	Isobutyl Mercaptan	ND	3,700	ND	1,000	
352-93-2	Diethyl Sulfide	ND	3,700	ND	1,000	
109-79-5	n-Butyl Mercaptan	ND	3,700	ND	1,000	
624-92-0	Dimethyl Disulfide	ND	1,900	ND	500	
616-44-4	3-Methylthiophene	ND	4,000	ND	1,000	
110-01-0	Tetrahydrothiophene	ND	3,600	ND	1,000	
638-02-8	2,5-Dimethylthiophene	ND	4,600	ND	1,000	
872-55-9	2-Ethylthiophene	ND	4,600	ND	1,000	
110-81-6	Diethyl Disulfide	ND	2,500	ND	500	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **HC 90 Day 3**
Client Project ID: **Bridgewater / SH041602-005**

CAS Project ID: P1202894
CAS Sample ID: P1202894-002

Test Code: ASTM D 5504-08
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Wade Henton
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: 7/17/12
Time Collected: 13:41
Date Received: 7/18/12
Date Analyzed: 7/18/12
Time Analyzed: 09:57
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**420,000**		70	**300,000**		50	
463-58-1	Carbonyl Sulfide	**12,000**		120	**4,800**		50	
74-93-1	Methyl Mercaptan	**7,300**		98	**3,700**		50	
75-08-1	Ethyl Mercaptan	**980**		130	**390**		50	
75-18-3	Dimethyl Sulfide	**20,000**		130	**7,800**		50	
75-15-0	Carbon Disulfide	**25,000**		78	**8,100**		25	
75-33-2	Isopropyl Mercaptan	**620**		160	**200**		50	
75-66-1	tert-Butyl Mercaptan	**2,400**		180	**650**		50	
107-03-9	n-Propyl Mercaptan		ND	160		ND	50	
624-89-5	Ethyl Methyl Sulfide	**3,000**		160	**970**		50	
110-02-1	Thiophene	**43,000**		170	**12,000**		50	
513-44-0	Isobutyl Mercaptan		ND	180		ND	50	
352-93-2	Diethyl Sulfide		ND	180		ND	50	
109-79-5	n-Butyl Mercaptan		ND	180		ND	50	
624-92-0	Dimethyl Disulfide	**6,900**		96	**1,800**		25	
616-44-4	3-Methylthiophene	**6,000**		200	**1,500**		50	
110-01-0	Tetrahydrothiophene	**1,000**		180	**280**		50	
638-02-8	2,5-Dimethylthiophene		ND	230		ND	50	
872-55-9	2-Ethylthiophene	**10,000**		230	**2,200**		50	
110-81-6	Diethyl Disulfide		ND	120		ND	25	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **VR 100 Day 3**
Client Project ID: **Bridgewater / SH041602-005**

CAS Project ID: P1202894
CAS Sample ID: P1202894-003

Test Code: ASTM D 5504-08
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Wade Henton
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: 7/17/12
Time Collected: 14:39
Date Received: 7/18/12
Date Analyzed: 7/18/12
Time Analyzed: 10:51
Volume(s) Analyzed: 0.0040 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**6,100,000**	1,700	**4,400,000**	1,300	
463-58-1	Carbonyl Sulfide	**31,000**	3,100	**13,000**	1,300	
74-93-1	Methyl Mercaptan	**47,000**	2,500	**24,000**	1,300	
75-08-1	Ethyl Mercaptan	**10,000**	3,200	**4,000**	1,300	
75-18-3	Dimethyl Sulfide	**19,000**	3,200	**7,300**	1,300	
75-15-0	Carbon Disulfide	**54,000**	1,900	**17,000**	630	
75-33-2	Isopropyl Mercaptan	**11,000**	3,900	**3,600**	1,300	
75-66-1	tert-Butyl Mercaptan	ND	4,600	ND	1,300	
107-03-9	n-Propyl Mercaptan	ND	3,900	ND	1,300	
624-89-5	Ethyl Methyl Sulfide	ND	3,900	ND	1,300	
110-02-1	Thiophene	**14,000**	4,300	**4,000**	1,300	
513-44-0	Isobutyl Mercaptan	ND	4,600	ND	1,300	
352-93-2	Diethyl Sulfide	ND	4,600	ND	1,300	
109-79-5	n-Butyl Mercaptan	ND	4,600	ND	1,300	
624-92-0	Dimethyl Disulfide	ND	2,400	ND	630	
616-44-4	3-Methylthiophene	ND	5,000	ND	1,300	
110-01-0	Tetrahydrothiophene	ND	4,500	ND	1,300	
638-02-8	2,5-Dimethylthiophene	ND	5,700	ND	1,300	
872-55-9	2-Ethylthiophene	ND	5,700	ND	1,300	
110-81-6	Diethyl Disulfide	ND	3,100	ND	630	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **HC 100 Day 3**
Client Project ID: **Bridgewater / SH041602-005**

CAS Project ID: P1202894
CAS Sample ID: P1202894-004

Test Code: ASTM D 5504-08
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Wade Henton
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: 7/17/12
Time Collected: 14:39
Date Received: 7/18/12
Date Analyzed: 7/18/12
Time Analyzed: 10:30
Volume(s) Analyzed: 0.0040 ml(s)

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**4,500,000**		1,700	**3,200,000**		1,300	
463-58-1	Carbonyl Sulfide	**6,000**		3,100	**2,500**		1,300	
74-93-1	Methyl Mercaptan	**20,000**		2,500	**10,000**		1,300	
75-08-1	Ethyl Mercaptan	**3,300**		3,200	**1,300**		1,300	
75-18-3	Dimethyl Sulfide	**31,000**		3,200	**12,000**		1,300	
75-15-0	Carbon Disulfide	**15,000**		1,900	**4,900**		630	
75-33-2	Isopropyl Mercaptan		ND	3,900		ND	1,300	
75-66-1	tert-Butyl Mercaptan		ND	4,600		ND	1,300	
107-03-9	n-Propyl Mercaptan		ND	3,900		ND	1,300	
624-89-5	Ethyl Methyl Sulfide		ND	3,900		ND	1,300	
110-02-1	Thiophene	**32,000**		4,300	**9,400**		1,300	
513-44-0	Isobutyl Mercaptan		ND	4,600		ND	1,300	
352-93-2	Diethyl Sulfide		ND	4,600		ND	1,300	
109-79-5	n-Butyl Mercaptan		ND	4,600		ND	1,300	
624-92-0	Dimethyl Disulfide	**5,500**		2,400	**1,400**		630	
616-44-4	3-Methylthiophene		ND	5,000		ND	1,300	
110-01-0	Tetrahydrothiophene		ND	4,500		ND	1,300	
638-02-8	2,5-Dimethylthiophene		ND	5,700		ND	1,300	
872-55-9	2-Ethylthiophene	**5,900**		5,700	**1,300**		1,300	
110-81-6	Diethyl Disulfide		ND	3,100		ND	630	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **Method Blank**
Client Project ID: **Bridgewater / SH041602-005**

CAS Project ID: P1202894
CAS Sample ID: P120718-MB

Test Code: ASTM D 5504-08
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Wade Henton
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 7/18/12
Time Analyzed: 08:20
Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Kemron Environmental Services**
Client Sample ID: **Lab Control Sample** CAS Project ID: P1202894
Client Project ID: **Bridgewater / SH041602-005** CAS Sample ID: P120718-LCS

Test Code: ASTM D 5504-08 Date Collected: NA
Instrument ID: Agilent 6890A/GC13/SCD Date Received: NA
Analyst: Wade Henton Date Analyzed: 7/18/12
Sampling Media: 1 L Zefon Bag Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount ppbV	Result ppbV	% Recovery	CAS Acceptance Limits	Data Qualifier
7783-06-4	Hydrogen Sulfide	2,380	**2,940**	**124**	51-141	
463-58-1	Carbonyl Sulfide	2,470	**2,350**	**95**	63-147	
74-93-1	Methyl Mercaptan	2,360	**3,250**	**138**	54-156	

LABORATORY REPORT

August 10, 2012

Tommy Jordan
Kemron Environmental Services
1359-A Ellsworth Industrial Blvd
Atlanta, GA 30318

RE: Bridgewater / SH041602-005

Dear Tommy:

Enclosed are the results of the sample submitted to our laboratory on July 28, 2012. For your reference, this analysis has been assigned our service request number P1203066.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is certified by the California Department of Health Services, NELAP Laboratory Certificate No. 02115CA; Arizona Department of Health Services, Certificate No. AZ0694; Florida Department of Health, NELAP Certification E871020; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA200007; The American Industrial Hygiene Association, Laboratory #101661; United States Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP), Certificate No. L11-203; Pennsylvania Registration No. 68-03307; TX Commission of Environmental Quality, NELAP ID T104704413-12-3; Minnesota Department of Health, NELAP Certificate No. 362188; Washington State Department of Ecology, ELAP Lab ID: C946, State of Utah Department of Health, NELAP Certificate No. CA01527Z012-Z; Los Angeles Department of Building and Safety, Approval No: TA00001. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact me for information corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kate Aguilera
Project Manager

Client: Kemron Environmental Services Service Request No: P1203066
Project: Bridgewater / SH041602-005

CASE NARRATIVE

The sample was received intact under chain of custody on July 28, 2012 and was stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the sample at the time of sample receipt.

Sulfur Analysis

The sample was analyzed for twenty sulfur compounds per ASTM D 5504-08 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD). All compounds with the exception of hydrogen sulfide and carbonyl sulfide are quantitated against the initial calibration curve for methyl mercaptan.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of Columbia Analytical Services, Inc. dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to AALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

DETAIL SUMMARY REPORT

Client: Kemron Environmental Services
Service Request: P1203066
Project ID: Bridgewater / SH041602-005

Date Received: 7/28/2012
Time Received: 08:50

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	ASTM D5504-08 - Sulfur Bag
HC100 (Day 14)	P1203066-001	Air	7/27/2012	15:03	X

Columbia Analytical Services
2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Air - Chain of Custody Record & Analytical Service Request

Page 1 of 1

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day-Standard

CAS Project No. P1203066

CAS Contact: Kate Aguilera

Company Name & Address (Reporting Information): Kemron Environmental Services, 1359-A Ellsworth Industrial Blvd, Atlanta, GA 30318

Project Name: Bridgewater

Project Number: SH041602-005

Project Manager: Tommy Jordan

P.O. # / Billing Information: SH041602-005

Phone: 404-636-0928

Fax:

Email Address for Result Reporting: TJordan@Kemron.com

Sampler (Print & Sign): Mason M Reedy [signature]

Analysis Method/Analytes

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Sample Type (Air/Tube/ Solid)	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller (Bar code - FC #)	Sample Volume	Reduced Sulfur ASTM 5504			Comments e.g. Actual Preservative or specific instructions
HC 100 (Day 14)	1	7/27/12	1503				1LTB	X			

Report Tier Levels - please select
Tier I - (Results/Default if not specified) _____
Tier II (Results + QC) _____
Tier III (Data Validation Package) 10% Surcharge _____
Tier V (client specified) _____

EDD required Yes / No
Type: Std
EDD Units: _____

Project Requirements (MRLs, QAPP)

Reliquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
[signature]	7/27/12	1503	[signature]	7/28/12	0850
Reliquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Reliquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank Temperature _____ °C

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Sample Acceptance Check Form

Client: Kemron Environmental Services Work order: P1203066
Project: Bridgewater / SH041602-005
Sample(s) received on: 7/28/12 Date opened: 7/28/12 by: MZAMORA

Note: This form is used forall samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by CAS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
9	Was a **trip blank** received?	☐	☒	☐
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1203066-001.01	1 L Zefon Bag					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **HC100 (Day 14)**
Client Project ID: **Bridgewater / SH041602-005**

CAS Project ID: P1203066
CAS Sample ID: P1203066-001

Test Code: ASTM D 5504-08
Instrument ID: Agilent 7890A/GC22/SCD
Analyst: Wade Henton
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: 7/27/12
Time Collected: 15:03
Date Received: 7/28/12
Date Analyzed: 7/28/12
Time Analyzed: 10:16
Volume(s) Analyzed: 0.010 ml(s)

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**350,000**		700	**250,000**		500	
463-58-1	Carbonyl Sulfide	**10,000**		1,200	**4,200**		500	
74-93-1	Methyl Mercaptan	**2,900**		980	**1,500**		500	
75-08-1	Ethyl Mercaptan		ND	1,300		ND	500	
75-18-3	Dimethyl Sulfide	**24,000**		1,300	**9,400**		500	
75-15-0	Carbon Disulfide	**16,000**		780	**5,100**		250	
75-33-2	Isopropyl Mercaptan		ND	1,600		ND	500	
75-66-1	tert-Butyl Mercaptan		ND	1,800		ND	500	
107-03-9	n-Propyl Mercaptan		ND	1,600		ND	500	
624-89-5	Ethyl Methyl Sulfide	**2,500**		1,600	**810**		500	
110-02-1	Thiophene	**30,000**		1,700	**8,700**		500	
513-44-0	Isobutyl Mercaptan		ND	1,800		ND	500	
352-93-2	Diethyl Sulfide		ND	1,800		ND	500	
109-79-5	n-Butyl Mercaptan		ND	1,800		ND	500	
624-92-0	Dimethyl Disulfide	**4,500**		960	**1,200**		250	
616-44-4	3-Methylthiophene	**3,200**		2,000	**800**		500	
110-01-0	Tetrahydrothiophene		ND	1,800		ND	500	
638-02-8	2,5-Dimethylthiophene		ND	2,300		ND	500	
872-55-9	2-Ethylthiophene	**6,200**		2,300	**1,400**		500	
110-81-6	Diethyl Disulfide		ND	1,200		ND	250	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **Method Blank**
Client Project ID: **Bridgewater / SH041602-005**

CAS Project ID: P1203066
CAS Sample ID: P120728-MB

Test Code: ASTM D 5504-08
Instrument ID: Agilent 7890A/GC22/SCD
Analyst: Wade Henton
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 7/28/12
Time Analyzed: 08:10
Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Kemron Environmental Services**
Client Sample ID: **Lab Control Sample** CAS Project ID: P1203066
Client Project ID: **Bridgewater / SH041602-005** CAS Sample ID: P120728-LCS

Test Code: ASTM D 5504-08 Date Collected: NA
Instrument ID: Agilent 7890A/GC22/SCD Date Received: NA
Analyst: Wade Henton Date Analyzed: 7/28/12
Sampling Media: 1 L Zefon Bag Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount ppbV	Result ppbV	% Recovery	CAS Acceptance Limits	Data Qualifier
7783-06-4	Hydrogen Sulfide	2,380	**2,630**	**111**	51-141	
463-58-1	Carbonyl Sulfide	2,470	**2,280**	**92**	63-147	
74-93-1	Methyl Mercaptan	2,360	**3,280**	**139**	54-156	

LABORATORY REPORT

August 14, 2012

Tommy Jordan
Kemron Environmental Services
1359-A Ellsworth Industrial Blvd
Atlanta, GA 30318

RE: Bridgewater / SH041602-005

Dear Tommy:

Enclosed are the results of the sample submitted to our laboratory on August 1, 2012. For your reference, this analysis has been assigned our service request number P1203114.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is certified by the California Department of Health Services, NELAP Laboratory Certificate No. 02115CA; Arizona Department of Health Services, Certificate No. AZ0694; Florida Department of Health, NELAP Certification E871020; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA200007; The American Industrial Hygiene Association, Laboratory #101661; United States Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP), Certificate No. L11-203; Pennsylvania Registration No. 68-03307; TX Commission of Environmental Quality, NELAP ID T104704413-12-3; Minnesota Department of Health, NELAP Certificate No. 362188; Washington State Department of Ecology, ELAP Lab ID: C946, State of Utah Department of Health, NELAP Certificate No. CA01527Z012-Z; Los Angeles Department of Building and Safety, Approval No: TA00001. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact me for information corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kate Aguilera
Project Manager

Client: Kemron Environmental Services Service Request No: P1203114
Project: Bridgewater / SH041602-005

CASE NARRATIVE

The sample was received intact under chain of custody on August 1, 2012 and was stored in accordance with the analytical method requirements. The samples were received past the recommended holding time. The analysis was performed as soon as possible after receipt by the laboratory. The data is flagged to indicate the holding time exceedance. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the sample at the time of sample receipt.

Sulfur Analysis

The samples were analyzed for twenty sulfur compounds per ASTM D 5504-08 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD). All compounds with the exception of hydrogen sulfide and carbonyl sulfide are quantitated against the initial calibration curve for methyl mercaptan.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of Columbia Analytical Services, Inc. dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to AALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

DETAIL SUMMARY REPORT

Client: Kemron Environmental Services
Service Request: P1203114
Project ID: Bridgewater / SH041602-005

Date Received: 8/1/2012
Time Received: 07:15

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	ASTM D5504-08 - Sulfur Bag
VR100 Ambient TF	P1203114-001	Air	7/30/2012	17:38	X
HC100 Ambient TF	P1203114-002	Air	7/30/2012	17:38	X

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Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Air - Chain of Custody Record & Analytical Service Request

Page 1 of 1

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) (10 Day-Standard)

CAS Project No. PV20 3114

CAS Contact: Kate Aguilera

Company Name & Address (Reporting Information)
Kemron Environmental Services
1359-A Elkworth Industrial Blvd
Atlanta, GA 30318

Project Name: Bridgewater

Project Number: SH041602-005

Project Manager: Tommy Jordan

P.O. # / Billing Information: SH041602-005

Phone: 404-601-6908

Fax:

Email Address for Result Reporting: TJordan@kemron.com

Sampler (Print & Sign): Ashley Clayborn

Analysis Method/Analytes

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Sample Type (Air/Tube/ Solid)	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller (Bar code - FC #)	Sample Volume	Reduced Suite TO-15 SIM 5504			Comments e.g. Actual Preservative or specific instructions
VR100 Ambient TF	1	7-30-12	17:38				1L-TB	✓			
HC100 Ambient TF	2	7-30-12	17:38				1L-TB	✓			

Report Tier Levels - please select
Tier I - (Results/Default if not specified) ____
Tier II (Results + QC) ____
Tier III (Data Validation Package) 10% Surcharge ____
Tier V (client specified) ____

EDD required (Yes) No
Type: SIS EDD Units: ____

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
	7/30/12	17:40		8/1/12	0715
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

CS 012

Cooler / Blank Temperature ____ °C

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Sample Acceptance Check Form

Client: Kemron Environmental Services Work order: P1203114
Project: Bridgewater / SH041602-005
Sample(s) received on: 8/1/12 Date opened: 8/1/12 by: MZAMORA

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by CAS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☐	☒	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
9	Was a **trip blank** received?	☐	☒	☐
10	Were **custody seals** on outside of cooler/Box?	☒	☐	☐
	Location of seal(s)? Side of box, covering opening. Sealing Lid?	☒	☐	☐
	Were signature and date included?	☒	☐	☐
	Were seals intact?	☒	☐	☐
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1203114-001.01	1 L Zefon Bag					
P1203114-002.01	1 L Zefon Bag					

Explain any discrepancies: (include lab sample ID numbers):
the samples were received past the holding time.

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

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RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **VR100 Ambient TF**
Client Project ID: **Bridgewater / SH041602-005**

CAS Project ID: P1203114
CAS Sample ID: P1203114-001

Test Code: ASTM D 5504-08
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Wade Henton
Sampling Media: 1 L Zefon Bag
Test Notes: **H3**

Date Collected: 7/30/12
Time Collected: 17:38
Date Received: 8/1/12
Date Analyzed: 8/1/12
Time Analyzed: 09:48
Volume(s) Analyzed: 0.050 ml(s)

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**470,000**		140	**340,000**		100	
463-58-1	Carbonyl Sulfide	**11,000**		250	**4,600**		100	
74-93-1	Methyl Mercaptan	**320**		200	**160**		100	
75-08-1	Ethyl Mercaptan		ND	250		ND	100	
75-18-3	Dimethyl Sulfide	**23,000**		250	**8,900**		100	
75-15-0	Carbon Disulfide	**6,200**		160	**2,000**		50	
75-33-2	Isopropyl Mercaptan		ND	310		ND	100	
75-66-1	tert-Butyl Mercaptan		ND	370		ND	100	
107-03-9	n-Propyl Mercaptan		ND	310		ND	100	
624-89-5	Ethyl Methyl Sulfide	**2,300**		310	**720**		100	
110-02-1	Thiophene	**23,000**		340	**6,600**		100	
513-44-0	Isobutyl Mercaptan		ND	370		ND	100	
352-93-2	Diethyl Sulfide		ND	370		ND	100	
109-79-5	n-Butyl Mercaptan		ND	370		ND	100	
624-92-0	Dimethyl Disulfide	**2,700**		190	**710**		50	
616-44-4	3-Methylthiophene	**3,500**		400	**870**		100	
110-01-0	Tetrahydrothiophene		ND	360		ND	100	
638-02-8	2,5-Dimethylthiophene		ND	460		ND	100	
872-55-9	2-Ethylthiophene	**7,600**		460	**1,700**		100	
110-81-6	Diethyl Disulfide		ND	250		ND	50	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
H3 = Sample was received and analyzed past holding time.

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RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **HC100 Ambient TF**
Client Project ID: **Bridgewater / SH041602-005**

CAS Project ID: P1203114
CAS Sample ID: P1203114-002

Test Code: ASTM D 5504-08
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Wade Henton
Sampling Media: 1 L Zefon Bag
Test Notes: **H3**

Date Collected: 7/30/12
Time Collected: 17:38
Date Received: 8/1/12
Date Analyzed: 8/1/12
Time Analyzed: 10:10
Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**22,000**		7.0	**16,000**		5.0	
463-58-1	Carbonyl Sulfide	**16,000**		12	**6,400**		5.0	
74-93-1	Methyl Mercaptan	**230**		9.8	**120**		5.0	
75-08-1	Ethyl Mercaptan	**74**		13	**29**		5.0	
75-18-3	Dimethyl Sulfide	**1,400**		13	**560**		5.0	
75-15-0	Carbon Disulfide	**7,800**		7.8	**2,500**		2.5	
75-33-2	Isopropyl Mercaptan	**99**		16	**32**		5.0	
75-66-1	tert-Butyl Mercaptan	**240**		18	**65**		5.0	
107-03-9	n-Propyl Mercaptan		ND	16		ND	5.0	
624-89-5	Ethyl Methyl Sulfide	**340**		16	**110**		5.0	
110-02-1	Thiophene	**5,900**		17	**1,700**		5.0	
513-44-0	Isobutyl Mercaptan		ND	18		ND	5.0	
352-93-2	Diethyl Sulfide	**39**		18	**11**		5.0	
109-79-5	n-Butyl Mercaptan	**48**		18	**13**		5.0	
624-92-0	Dimethyl Disulfide	**460**		9.6	**120**		2.5	
616-44-4	3-Methylthiophene	**1,800**		20	**450**		5.0	
110-01-0	Tetrahydrothiophene	**360**		18	**99**		5.0	
638-02-8	2,5-Dimethylthiophene		ND	23		ND	5.0	
872-55-9	2-Ethylthiophene	**1,000**		23	**230**		5.0	
110-81-6	Diethyl Disulfide		ND	12		ND	2.5	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
H3 = Sample was received and analyzed past holding time.

RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **Method Blank**
Client Project ID: **Bridgewater / SH041602-005**

CAS Project ID: P1203114
CAS Sample ID: P120801-MB

Test Code: ASTM D 5504-08
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Wade Henton
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 8/01/12
Time Analyzed: 08:14
Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Kemron Environmental Services**
Client Sample ID: **Lab Control Sample** CAS Project ID: P1203114
Client Project ID: **Bridgewater / SH041602-005** CAS Sample ID: P120801-LCS

Test Code: ASTM D 5504-08 Date Collected: NA
Instrument ID: Agilent 6890A/GC13/SCD Date Received: NA
Analyst: Wade Henton Date Analyzed: 8/01/12
Sampling Media: 1 L Zefon Bag Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount ppbV	Result ppbV	% Recovery	CAS Acceptance Limits	Data Qualifier
7783-06-4	Hydrogen Sulfide	2,380	**2,270**	**95**	51-141	
463-58-1	Carbonyl Sulfide	2,470	**1,960**	**79**	63-147	
74-93-1	Methyl Mercaptan	2,360	**2,830**	**120**	54-156	

LABORATORY REPORT

August 22, 2012

Tommy Jordan
Kemron Environmental Services
1359-A Ellsworth Industrial Blvd
Atlanta, GA 30318

RE: Bridgewater / SH0416-005

Dear Tommy:

Enclosed are the results of the samples submitted to our laboratory on August 9, 2012. For your reference, these analyses have been assigned our service request number P1203226.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is certified by the California Department of Health Services, NELAP Laboratory Certificate No. 02115CA; Arizona Department of Health Services, Certificate No. AZ0694; Florida Department of Health, NELAP Certification E871020; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA200007; The American Industrial Hygiene Association, Laboratory #101661; United States Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP), Certificate No. L11-203; Pennsylvania Registration No. 68-03307; TX Commission of Environmental Quality, NELAP ID T104704413-12-3; Minnesota Department of Health, NELAP Certificate No. 362188; Washington State Department of Ecology, ELAP Lab ID: C946, State of Utah Department of Health, NELAP Certificate No. CA01527Z012-Z; Los Angeles Department of Building and Safety, Approval No: TA00001. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact me for information corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kate Aguilera
Project Manager

Client: Kemron Environmental Services Service Request No: P1203226
Project: Bridgewater / SH0416-005

CASE NARRATIVE

The samples were received intact under chain of custody on August 9, 2012 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Sulfur Analysis

The samples were analyzed for twenty sulfur compounds per ASTM D 5504-08 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD). All compounds with the exception of hydrogen sulfide and carbonyl sulfide are quantitated against the initial calibration curve for methyl mercaptan.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of Columbia Analytical Services, Inc. dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to AALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

DETAIL SUMMARY REPORT

Client: Kemron Environmental Services
Service Request: P1203226
Project ID: Bridgewater / SH0416-005

Date Received: 8/9/2012
Time Received: 07:50

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	ASTM D5504-08 - Sulfur Bag
HC 90 C TF	P1203226-001	Air	8/8/2012	15:25	X
VR 90 C TF	P1203226-002	Air	8/8/2012	14:20	X
VR 100 C Day 1	P1203226-003	Air	8/8/2012	15:38	X
HC 100 C Day 1	P1203226-004	Air	8/8/2012	15:59	X

Columbia Analytical Services™

CHAIN OF CUSTODY

SR#: _____

1317 South 13th Ave, Kelso, WA 98626 | 360.577.7222 | 800.695.7222 | 360.636.1068 (fax)

PAGE 1 OF 1 COC # _____

PROJECT NAME: Bridgewater
PROJECT NUMBER: SH0416-005
PROJECT MANAGER: Tommy Jordan
COMPANY/ADDRESS: 1359 E Illsworth Ind Blvd
CITY/STATE/ZIP: Atlanta GA 30318
E-MAIL ADDRESS: tjordan@kemron.com
PHONE # | FAX #
SAMPLER'S SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625 ☐ 8270 ☐ 8270LL ☐	Volatile Organics 624 ☐ 8260 ☐ 8021 ☐ BTEX ☐	Hydrocarbons (*see below) Gas ☐ Diesel ☐ Oil ☐	☐ Fuel Fingerprint (FIQ) ☐ NW-HCID	Oil & Grease/TRPH 1664 HEM ☐ 1664 SGT ☐	PCB's Aroclors ☐ Congeners ☐	Pesticides/Herbicides 608 ☐ 8081A ☐ 8141A ☐ 8151A ☐	Chlorophenolics - 8151M Tri ☐ Tetra ☐ PCP ☐	PAHS 8310 ☐ SIM ☐	Metals, Total or Dissolved (See list below)	Cyanide ☐	Hex-Chrom ☐	pH, Cond., Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS (circle)	NH_3-N, COD, Total-P, TKN, TOC, DOC (circle) NO_2+NO_3	TOX 9020 ☐ AOX 1650 ☐ 506 ☐	Reduced Sulfur ASTM 5504			REMARKS
HC 90 C HC Trip	8/8/12	1525	1		1															X				
VR 90 C Trip	8/8/12	1420	2		1															X				
VR 100C Day 1	1	1538	3		1															X				
HC 100C Day 1	1	1559	4		1															X				

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required
___ II. Report Dup., MS, MSD as required
___ III. Data Validation Report (includes all raw data)
___ IV. CLP Deliverable Report
___ V. EDD

INVOICE INFORMATION

P.O. # _____
Bill To: SAME

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.
___ 5 Day
X Standard (10-15 working days)
___ Provide FAX Results

Requested Report Date

Circle which metals are to be analyzed:

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER: _____ (CIRCLE ONE)

SPECIAL INSTRUCTIONS/COMMENTS:

☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: Fed Ex	Signature:	Signature: [signature]
Date/Time: 8/8/12 1559	Date/Time:	Date/Time:	Date/Time: 8/9/12 0750
Printed Name:	Printed Name:	Printed Name:	Printed Name: Reese Martin
Firm:	Firm:	Firm:	Firm:

BCOC #1 03/10

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Sample Acceptance Check Form

Client: Kemron Environmental Services Work order: P1203226
Project: Bridgewater / SH0416-005
Sample(s) received on: 8/9/12 Date opened: 8/9/12 by: RMARTENIES

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by CAS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
9	Was a **trip blank** received?	☐	☒	☐
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1203226-001.01	1 L Zefon Bag					
P1203226-002.01	1 L Zefon Bag					
P1203226-003.01	1 L Zefon Bag					
P1203226-004.01	1 L Zefon Bag					

Explain any discrepancies: (include lab sample ID numbers):
"HC 90 C HC TF" was logged in as "HC 90 C TF"

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

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RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **HC 90 C TF**
Client Project ID: **Bridgewater / SH0416-005**

CAS Project ID: P1203226
CAS Sample ID: P1203226-001

Test Code: ASTM D 5504-08
Instrument ID: Agilent 7890A/GC22/SCD
Analyst: Wade Henton
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: 8/8/12
Time Collected: 15:25
Date Received: 8/9/12
Date Analyzed: 8/9/12
Time Analyzed: 09:26
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**28,000**	70	**20,000**	50	
463-58-1	Carbonyl Sulfide	**310**	120	**130**	50	
74-93-1	Methyl Mercaptan	**150**	98	**78**	50	
75-08-1	Ethyl Mercaptan	ND	130	ND	50	
75-18-3	Dimethyl Sulfide	**2,400**	130	**950**	50	
75-15-0	Carbon Disulfide	**1,300**	78	**410**	25	
75-33-2	Isopropyl Mercaptan	ND	160	ND	50	
75-66-1	tert-Butyl Mercaptan	ND	180	ND	50	
107-03-9	n-Propyl Mercaptan	ND	160	ND	50	
624-89-5	Ethyl Methyl Sulfide	**350**	160	**110**	50	
110-02-1	Thiophene	**3,900**	170	**1,100**	50	
513-44-0	Isobutyl Mercaptan	ND	180	ND	50	
352-93-2	Diethyl Sulfide	ND	180	ND	50	
109-79-5	n-Butyl Mercaptan	ND	180	ND	50	
624-92-0	Dimethyl Disulfide	**600**	96	**150**	25	
616-44-4	3-Methylthiophene	**830**	200	**210**	50	
110-01-0	Tetrahydrothiophene	ND	180	ND	50	
638-02-8	2,5-Dimethylthiophene	ND	230	ND	50	
872-55-9	2-Ethylthiophene	**1,800**	230	**390**	50	
110-81-6	Diethyl Disulfide	ND	120	ND	25	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **VR 90 C TF**
Client Project ID: **Bridgewater / SH0416-005**

CAS Project ID: P1203226
CAS Sample ID: P1203226-002

Test Code: ASTM D 5504-08
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Wade Henton
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: 8/8/12
Time Collected: 14:20
Date Received: 8/9/12
Date Analyzed: 8/9/12
Time Analyzed: 09:45
Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**2,900**		7.0	**2,100**		5.0	
463-58-1	Carbonyl Sulfide	**3,100**		12	**1,300**		5.0	
74-93-1	Methyl Mercaptan	**100**		9.8	**52**		5.0	
75-08-1	Ethyl Mercaptan	**47**		13	**18**		5.0	
75-18-3	Dimethyl Sulfide	**510**		13	**200**		5.0	
75-15-0	Carbon Disulfide	**3,300**		7.8	**1,100**		2.5	
75-33-2	Isopropyl Mercaptan	**60**		16	**19**		5.0	
75-66-1	tert-Butyl Mercaptan	**150**		18	**40**		5.0	
107-03-9	n-Propyl Mercaptan		ND	16		ND	5.0	
624-89-5	Ethyl Methyl Sulfide	**120**		16	**38**		5.0	
110-02-1	Thiophene	**360**		17	**110**		5.0	
513-44-0	Isobutyl Mercaptan	**50**		18	**14**		5.0	
352-93-2	Diethyl Sulfide		ND	18		ND	5.0	
109-79-5	n-Butyl Mercaptan		ND	18		ND	5.0	
624-92-0	Dimethyl Disulfide	**160**		9.6	**43**		2.5	
616-44-4	3-Methylthiophene	**100**		20	**25**		5.0	
110-01-0	Tetrahydrothiophene	**31**		18	**8.6**		5.0	
638-02-8	2,5-Dimethylthiophene		ND	23		ND	5.0	
872-55-9	2-Ethylthiophene		ND	23		ND	5.0	
110-81-6	Diethyl Disulfide		ND	12		ND	2.5	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **VR 100 C Day 1**
Client Project ID: **Bridgewater / SH0416-005**

CAS Project ID: P1203226
CAS Sample ID: P1203226-003

Test Code: ASTM D 5504-08
Instrument ID: Agilent 7890A/GC22/SCD
Analyst: Wade Henton
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: 8/8/12
Time Collected: 15:38
Date Received: 8/9/12
Date Analyzed: 8/9/12
Time Analyzed: 10:13
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**120,000**		70	**85,000**		50	
463-58-1	Carbonyl Sulfide	**1,100**		120	**460**		50	
74-93-1	Methyl Mercaptan	**17,000**		98	**8,600**		50	
75-08-1	Ethyl Mercaptan	**4,200**		130	**1,700**		50	
75-18-3	Dimethyl Sulfide	**3,900**		130	**1,500**		50	
75-15-0	Carbon Disulfide	**48,000**		78	**16,000**		25	
75-33-2	Isopropyl Mercaptan	**3,100**		160	**980**		50	
75-66-1	tert-Butyl Mercaptan	**840**		180	**230**		50	
107-03-9	n-Propyl Mercaptan	**330**		160	**110**		50	
624-89-5	Ethyl Methyl Sulfide	**1,300**		160	**420**		50	
110-02-1	Thiophene	**9,500**		170	**2,800**		50	
513-44-0	Isobutyl Mercaptan	**1,500**		180	**400**		50	
352-93-2	Diethyl Sulfide	**260**		180	**70**		50	
109-79-5	n-Butyl Mercaptan		ND	180		ND	50	
624-92-0	Dimethyl Disulfide	**1,000**		96	**260**		25	
616-44-4	3-Methylthiophene	**2,400**		200	**590**		50	
110-01-0	Tetrahydrothiophene	**400**		180	**110**		50	
638-02-8	2,5-Dimethylthiophene		ND	230		ND	50	
872-55-9	2-Ethylthiophene	**660**		230	**140**		50	
110-81-6	Diethyl Disulfide		ND	120		ND	25	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **HC 100 C Day 1**
Client Project ID: **Bridgewater / SH0416-005**

CAS Project ID: P1203226
CAS Sample ID: P1203226-004

Test Code: ASTM D 5504-08
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Wade Henton
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: 8/8/12
Time Collected: 15:59
Date Received: 8/9/12
Date Analyzed: 8/9/12
Time Analyzed: 10:24
Volume(s) Analyzed: 0.010 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**1,200,000**	700	**850,000**	500	
463-58-1	Carbonyl Sulfide	**12,000**	1,200	**4,800**	500	
74-93-1	Methyl Mercaptan	**91,000**	980	**46,000**	500	
75-08-1	Ethyl Mercaptan	**22,000**	1,300	**8,700**	500	
75-18-3	Dimethyl Sulfide	**63,000**	1,300	**25,000**	500	
75-15-0	Carbon Disulfide	**110,000**	780	**37,000**	250	
75-33-2	Isopropyl Mercaptan	**5,900**	1,600	**1,900**	500	
75-66-1	tert-Butyl Mercaptan	**11,000**	1,800	**2,900**	500	
107-03-9	n-Propyl Mercaptan	**3,100**	1,600	**990**	500	
624-89-5	Ethyl Methyl Sulfide	**9,400**	1,600	**3,000**	500	
110-02-1	Thiophene	**56,000**	1,700	**16,000**	500	
513-44-0	Isobutyl Mercaptan	ND	1,800	ND	500	
352-93-2	Diethyl Sulfide	ND	1,800	ND	500	
109-79-5	n-Butyl Mercaptan	ND	1,800	ND	500	
624-92-0	Dimethyl Disulfide	**2,800**	960	**730**	250	
616-44-4	3-Methylthiophene	ND	2,000	ND	500	
110-01-0	Tetrahydrothiophene	ND	1,800	ND	500	
638-02-8	2,5-Dimethylthiophene	ND	2,300	ND	500	
872-55-9	2-Ethylthiophene	ND	2,300	ND	500	
110-81-6	Diethyl Disulfide	ND	1,200	ND	250	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **Method Blank**
Client Project ID: **Bridgewater / SH0416-005**

CAS Project ID: P1203226
CAS Sample ID: P120809-MB

Test Code: ASTM D 5504-08
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Wade Henton
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 8/09/12
Time Analyzed: 08:11
Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **Method Blank**
Client Project ID: **Bridgewater / SH0416-005**

CAS Project ID: P1203226
CAS Sample ID: P120809-MB

Test Code: ASTM D 5504-08
Instrument ID: Agilent 7890A/GC22/SCD
Analyst: Wade Henton
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 8/09/12
Time Analyzed: 08:11
Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Kemron Environmental Services**
Client Sample ID: **Lab Control Sample** CAS Project ID: P1203226
Client Project ID: **Bridgewater / SH0416-005** CAS Sample ID: P120809-LCS

Test Code: ASTM D 5504-08 Date Collected: NA
Instrument ID: Agilent 6890A/GC13/SCD Date Received: NA
Analyst: Wade Henton Date Analyzed: 8/09/12
Sampling Media: 1 L Zefon Bag Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount ppbV	Result ppbV	% Recovery	CAS Acceptance Limits	Data Qualifier
7783-06-4	Hydrogen Sulfide	2,380	**2,250**	**95**	51-141	
463-58-1	Carbonyl Sulfide	2,470	**1,860**	**75**	63-147	
74-93-1	Methyl Mercaptan	2,360	**2,670**	**113**	54-156	

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Kemron Environmental Services**
Client Sample ID: **Lab Control Sample** CAS Project ID: P1203226
Client Project ID: **Bridgewater / SH0416-005** CAS Sample ID: P120809-LCS

Test Code: ASTM D 5504-08 Date Collected: NA
Instrument ID: Agilent 7890A/GC22/SCD Date Received: NA
Analyst: Wade Henton Date Analyzed: 8/09/12
Sampling Media: 1 L Zefon Bag Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount ppbV	Result ppbV	% Recovery	CAS Acceptance Limits	Data Qualifier
7783-06-4	Hydrogen Sulfide	2,380	**2,110**	**89**	51-141	
463-58-1	Carbonyl Sulfide	2,470	**1,780**	**72**	63-147	
74-93-1	Methyl Mercaptan	2,360	**2,570**	**109**	54-156	

LABORATORY REPORT

August 9, 2012

Tommy Jordan
Kemron Environmental Services
1359-A Ellsworth Industrial Blvd
Atlanta, GA 30318

RE: Bridgewater / SH041602-005

Dear Tommy:

Enclosed are the results of the sample submitted to our laboratory on July 27, 2012. For your reference, this analysis has been assigned our service request number P1203044.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is certified by the California Department of Health Services, NELAP Laboratory Certificate No. 02115CA; Arizona Department of Health Services, Certificate No. AZ0694; Florida Department of Health, NELAP Certification E871020; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA200007; The American Industrial Hygiene Association, Laboratory #101661; United States Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP), Certificate No. L11-203; Pennsylvania Registration No. 68-03307; TX Commission of Environmental Quality, NELAP ID T104704413-12-3; Minnesota Department of Health, NELAP Certificate No. 362188; Washington State Department of Ecology, ELAP Lab ID: C946, State of Utah Department of Health, NELAP Certificate No. CA01527Z012-Z; Los Angeles Department of Building and Safety, Approval No: TA00001. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact me for information corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kate Aguilera
Project Manager

Client: Kemron Environmental Services Service Request No: P1203044
Project: Bridgewater / SH041602-005

CASE NARRATIVE

The sample was received intact under chain of custody on July 27, 2012 and was stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the sample at the time of sample receipt.

Sulfur Analysis

The sample was analyzed for twenty sulfur compounds per ASTM D 5504-08 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD). All compounds with the exception of hydrogen sulfide and carbonyl sulfide are quantitated against the initial calibration curve for methyl mercaptan.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of Columbia Analytical Services, Inc. dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to AALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

DETAIL SUMMARY REPORT

Client: Kemron Environmental Services
Service Request: P1203044
Project ID: Bridgewater / SH041602-005

Date Received: 7/27/2012
Time Received: 07:50

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	ASTM D5504-08 - Sulfur Bag
VR 100C (Day 13)	P1203044-001	Air	7/26/2012	15:20	X

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Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Air - Chain of Custody Record & Analytical Service Request

Page _____ of _____

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day-Standard

CAS Project No. 1203044

CAS Contact: Kate Agudera

Company Name & Address (Reporting Information)
Kemron Environmental Services
1359-A Ellsworth Industrial Blvd
Atlanta, GA 30318

Project Name: Bridgewater

Project Number: SH041602-005

Project Manager: Tommy Jordan

P.O. # / Billing Information: SH041602-005

Phone: 404-636-0928

Fax:

Email Address for Result Reporting: TJordan@kemron.com

Sampler (Print & Sign): Mason Reedy Mason Reedy

Analysis Method/Analytes

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Sample Type (Air/Tube/ Solid)	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller (Bar code - FC #)	Sample Volume	Reduced Sulfur ASTM 5504			Comments e.g. Actual Preservative or specific instructions
VR 100C (day 13)	1	7/26/12	1520				1LTB	X			

Report Tier Levels - please select
Tier I - (Results/Default if not specified) _____
Tier II (Results + QC) _____
Tier III (Data Validation Package) 10% Surcharge _____
Tier V (client specified) _____

EDD required (Yes) / No
Type: STD EDD Units: _____

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Mason Reedy	7/26/12	1536			
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
				7/27/12	0750
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank Temperature _____ °C

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Sample Acceptance Check Form

Client: Kemron Environmental Services Work order: P1203044

Project: Bridgewater / SH041602-005

Sample(s) received on: 7/27/12 Date opened: 7/27/12 by: MZAMORA

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by CAS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
9	Was a **trip blank** received?	☐	☒	☐
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1203044-001.01	1 L Zefon Bag					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

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RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **VR 100C (Day 13)**
Client Project ID: **Bridgewater / SH041602-005**

CAS Project ID: P1203044
CAS Sample ID: P1203044-001

Test Code: ASTM D 5504-08
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Wade Henton
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: 7/26/12
Time Collected: 15:20
Date Received: 7/27/12
Date Analyzed: 7/27/12
Time Analyzed: 08:55
Volume(s) Analyzed: 0.010 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**3,600,000**	700	**2,600,000**	500	
463-58-1	Carbonyl Sulfide	**95,000**	1,200	**39,000**	500	
74-93-1	Methyl Mercaptan	**11,000**	980	**5,800**	500	
75-08-1	Ethyl Mercaptan	**2,700**	1,300	**1,100**	500	
75-18-3	Dimethyl Sulfide	**4,000**	1,300	**1,600**	500	
75-15-0	Carbon Disulfide	**18,000**	780	**5,800**	250	
75-33-2	Isopropyl Mercaptan	ND	1,600	ND	500	
75-66-1	tert-Butyl Mercaptan	ND	1,800	ND	500	
107-03-9	n-Propyl Mercaptan	ND	1,600	ND	500	
624-89-5	Ethyl Methyl Sulfide	ND	1,600	ND	500	
110-02-1	Thiophene	**6,800**	1,700	**2,000**	500	
513-44-0	Isobutyl Mercaptan	ND	1,800	ND	500	
352-93-2	Diethyl Sulfide	ND	1,800	ND	500	
109-79-5	n-Butyl Mercaptan	ND	1,800	ND	500	
624-92-0	Dimethyl Disulfide	ND	960	ND	250	
616-44-4	3-Methylthiophene	ND	2,000	ND	500	
110-01-0	Tetrahydrothiophene	ND	1,800	ND	500	
638-02-8	2,5-Dimethylthiophene	ND	2,300	ND	500	
872-55-9	2-Ethylthiophene	ND	2,300	ND	500	
110-81-6	Diethyl Disulfide	ND	1,200	ND	250	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **Method Blank**
Client Project ID: **Bridgewater / SH041602-005**

CAS Project ID: P1203044
CAS Sample ID: P120727-MB

Test Code: ASTM D 5504-08
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Wade Henton
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 7/27/12
Time Analyzed: 07:53
Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Kemron Environmental Services**
Client Sample ID: **Lab Control Sample** CAS Project ID: P1203044
Client Project ID: **Bridgewater / SH041602-005** CAS Sample ID: P120727-LCS

Test Code: ASTM D 5504-08 Date Collected: NA
Instrument ID: Agilent 6890A/GC13/SCD Date Received: NA
Analyst: Wade Henton Date Analyzed: 7/27/12
Sampling Media: 1 L Zefon Bag Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount ppbV	Result ppbV	% Recovery	CAS Acceptance Limits	Data Qualifier
7783-06-4	Hydrogen Sulfide	2,380	**2,360**	**99**	51-141	
463-58-1	Carbonyl Sulfide	2,470	**1,980**	**80**	63-147	
74-93-1	Methyl Mercaptan	2,360	**2,920**	**124**	54-156	

LABORATORY REPORT

July 26, 2012

Tommy Jordan
Kemron Environmental Services
1359-A Ellsworth Industrial Blvd
Atlanta, GA 30318

RE: Bridgewater / SH041602-005

Dear Tommy:

Enclosed are the results of the samples submitted to our laboratory on July 13, 2012. For your reference, these analyses have been assigned our service request number P1202828.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

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If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

For Kate Aguilera
Project Manager

Client: Kemron Environmental Services Service Request No: P1202828
Project: Bridgewater / SH041602-005

CASE NARRATIVE

The samples were received intact under chain of custody on July 13, 2012 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Sulfur Analysis

The samples were analyzed for twenty sulfur compounds per ASTM D 5504-08 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD). All compounds with the exception of hydrogen sulfide and carbonyl sulfide are quantitated against the initial calibration curve for methyl mercaptan.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of Columbia Analytical Services, Inc. dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to AALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

DETAIL SUMMARY REPORT

Client: Kemron Environmental Services
Service Request: P1202828
Project ID: Bridgewater / SH041602-005

Date Received: 7/13/2012
Time Received: 07:25

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	ASTM D5504-08 - Sulfur Bag
VR-To	P1202828-001	Air	7/12/2012	14:00	X
HC-To	P1202828-002	Air	7/12/2012	14:00	X

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Page 1 of 1

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) (10 Day-Standard)

CAS Project No. P1202825

Company Name & Address (Reporting Information)
KEMRON Environmental Services
1359-A Ellsworth Ind. Blvd
Atlanta GA 30318

Project Name: Bridgewater
Project Number: SH041602-005
P.O. # / Billing Information: SH041602-005

CAS Contact: Kat Aguilera

Project Manager: Tommy Jordan
Phone: 404-636-0928
Fax:
Email Address for Result Reporting: TJordan@kemron.com
Sampler (Print & Sign): Mark Clark

Analysis Method

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code #- FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	Reduced Sulfur ASTM 5504		Comments e.g. Actual Preservative or specific instructions
VR-To	1	7/12/12	1400					1LTB	X		
HC-To	2	7/12/12	1400					1LTB	X		

Report Tier Levels - please select
Tier I - Results (Default if not specified) ____
Tier II (Results + QC Summaries) ____
Tier III (Results + QC & Calibration Summaries) ____
Tier IV (Data Validation Package) 10% Surcharge ____

EDD required (Yes) / No
Type: ~~Excel~~ Std

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
				7/13/12	0725
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank Temperature ____°C

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Sample Acceptance Check Form

Client: Kemron Environmental Services Work order: P1202828
Project: Bridgewater / SH041602-005
Sample(s) received on: 7/13/12 Date opened: 7/13/12 by: MZAMORA

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by CAS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☐	☒	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
9	Was a **trip blank** received?	☐	☒	☐
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1202828-001.01	1 L Zefon Bag					
P1202828-002.01	1 L Zefon Bag					

Explain any discrepancies: (include lab sample ID numbers):
No signature relinquishing sample(s) on Chain of Custody

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

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RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **VR-To**
Client Project ID: **Bridgewater / SH041602-005**

CAS Project ID: P1202828
CAS Sample ID: P1202828-001

Test Code: ASTM D 5504-08
Instrument ID: HP5890 II/GC5/SCD
Analyst: Lauryn Keeler
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: 7/12/12
Time Collected: 14:00
Date Received: 7/13/12
Date Analyzed: 7/13/12
Time Analyzed: 10:01
Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**640**	14	**460**	10	
463-58-1	Carbonyl Sulfide	**200**	25	**82**	10	
74-93-1	Methyl Mercaptan	ND	20	ND	10	
75-08-1	Ethyl Mercaptan	ND	25	ND	10	
75-18-3	Dimethyl Sulfide	**680**	25	**270**	10	
75-15-0	Carbon Disulfide	**48,000**	16	**16,000**	5.0	
75-33-2	Isopropyl Mercaptan	ND	31	ND	10	
75-66-1	tert-Butyl Mercaptan	ND	37	ND	10	
107-03-9	n-Propyl Mercaptan	ND	31	ND	10	
624-89-5	Ethyl Methyl Sulfide	**170**	31	**55**	10	
110-02-1	Thiophene	**66**	34	**19**	10	
513-44-0	Isobutyl Mercaptan	ND	37	ND	10	
352-93-2	Diethyl Sulfide	ND	37	ND	10	
109-79-5	n-Butyl Mercaptan	ND	37	ND	10	
624-92-0	Dimethyl Disulfide	**39**	19	**10**	5.0	
616-44-4	3-Methylthiophene	ND	40	ND	10	
110-01-0	Tetrahydrothiophene	ND	36	ND	10	
638-02-8	2,5-Dimethylthiophene	ND	46	ND	10	
872-55-9	2-Ethylthiophene	ND	46	ND	10	
110-81-6	Diethyl Disulfide	ND	25	ND	5.0	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **HC-To**
Client Project ID: **Bridgewater / SH041602-005**

CAS Project ID: P1202828
CAS Sample ID: P1202828-002

Test Code: ASTM D 5504-08
Instrument ID: HP5890 II/GC5/SCD
Analyst: Lauryn Keeler
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: 7/12/12
Time Collected: 14:00
Date Received: 7/13/12
Date Analyzed: 7/13/12
Time Analyzed: 11:24
Volume(s) Analyzed: 0.050 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**64,000**	280	**46,000**	200	
463-58-1	Carbonyl Sulfide	**1,500**	490	**600**	200	
74-93-1	Methyl Mercaptan	**540**	390	**280**	200	
75-08-1	Ethyl Mercaptan	ND	510	ND	200	
75-18-3	Dimethyl Sulfide	**13,000**	510	**5,300**	200	
75-15-0	Carbon Disulfide	**770,000**	310	**250,000**	100	
75-33-2	Isopropyl Mercaptan	ND	620	ND	200	
75-66-1	tert-Butyl Mercaptan	ND	740	ND	200	
107-03-9	n-Propyl Mercaptan	ND	620	ND	200	
624-89-5	Ethyl Methyl Sulfide	**2,600**	620	**830**	200	
110-02-1	Thiophene	**2,800**	690	**820**	200	
513-44-0	Isobutyl Mercaptan	ND	740	ND	200	
352-93-2	Diethyl Sulfide	ND	740	ND	200	
109-79-5	n-Butyl Mercaptan	ND	740	ND	200	
624-92-0	Dimethyl Disulfide	ND	390	ND	100	
616-44-4	3-Methylthiophene	ND	800	ND	200	
110-01-0	Tetrahydrothiophene	ND	720	ND	200	
638-02-8	2,5-Dimethylthiophene	ND	920	ND	200	
872-55-9	2-Ethylthiophene	ND	920	ND	200	
110-81-6	Diethyl Disulfide	ND	500	ND	100	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **Method Blank**
Client Project ID: **Bridgewater / SH041602-005**

CAS Project ID: P1202828
CAS Sample ID: P120713-MB

Test Code: ASTM D 5504-08
Instrument ID: HP5890 II/GC5/SCD
Analyst: Lauryn Keeler
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 7/13/12
Time Analyzed: 07:26
Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	14	ND	10	
463-58-1	Carbonyl Sulfide	ND	25	ND	10	
74-93-1	Methyl Mercaptan	ND	20	ND	10	
75-08-1	Ethyl Mercaptan	ND	25	ND	10	
75-18-3	Dimethyl Sulfide	ND	25	ND	10	
75-15-0	Carbon Disulfide	ND	16	ND	5.0	
75-33-2	Isopropyl Mercaptan	ND	31	ND	10	
75-66-1	tert-Butyl Mercaptan	ND	37	ND	10	
107-03-9	n-Propyl Mercaptan	ND	31	ND	10	
624-89-5	Ethyl Methyl Sulfide	ND	31	ND	10	
110-02-1	Thiophene	ND	34	ND	10	
513-44-0	Isobutyl Mercaptan	ND	37	ND	10	
352-93-2	Diethyl Sulfide	ND	37	ND	10	
109-79-5	n-Butyl Mercaptan	ND	37	ND	10	
624-92-0	Dimethyl Disulfide	ND	19	ND	5.0	
616-44-4	3-Methylthiophene	ND	40	ND	10	
110-01-0	Tetrahydrothiophene	ND	36	ND	10	
638-02-8	2,5-Dimethylthiophene	ND	46	ND	10	
872-55-9	2-Ethylthiophene	ND	46	ND	10	
110-81-6	Diethyl Disulfide	ND	25	ND	5.0	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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LABORATORY CONTROL SAMPLE SUMMARY

Client: **Kemron Environmental Services**
Client Sample ID: **Lab Control Sample** CAS Project ID: P1202828
Client Project ID: **Bridgewater / SH041602-005** CAS Sample ID: P120713-LCS

Test Code: ASTM D 5504-08 Date Collected: NA
Instrument ID: HP5890 II/GC5/SCD Date Received: NA
Analyst: Lauryn Keeler Date Analyzed: 7/13/12
Sampling Media: 1 L Zefon Bag Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount ppbV	Result ppbV	% Recovery	CAS Acceptance Limits	Data Qualifier
7783-06-4	Hydrogen Sulfide	2,380	**2,160**	**91**	51-141	
463-58-1	Carbonyl Sulfide	2,470	**2,090**	**85**	63-147	
74-93-1	Methyl Mercaptan	2,360	**3,530**	**150**	54-156	

LABORATORY REPORT

August 20, 2012

Tommy Jordan
Kemron Environmental Services
1359-A Ellsworth Industrial Blvd
Atlanta, GA 30318

RE: Bridgewater / SH0416-005

Dear Tommy:

Enclosed are the results of the samples submitted to our laboratory on August 7, 2012. For your reference, these analyses have been assigned our service request number P1203188.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is certified by the California Department of Health Services, NELAP Laboratory Certificate No. 02115CA; Arizona Department of Health Services, Certificate No. AZ0694; Florida Department of Health, NELAP Certification E871020; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA200007; The American Industrial Hygiene Association, Laboratory #101661; United States Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP), Certificate No. L11-203; Pennsylvania Registration No. 68-03307; TX Commission of Environmental Quality, NELAP ID T104704413-12-3; Minnesota Department of Health, NELAP Certificate No. 362188; Washington State Department of Ecology, ELAP Lab ID: C946, State of Utah Department of Health, NELAP Certificate No. CA01527Z012-Z; Los Angeles Department of Building and Safety, Approval No: TA00001. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact me for information corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kate Aguilera
Project Manager

Client: Kemron Environmental Services Service Request No: P1203188
Project: Bridgewater / SH0416-005

CASE NARRATIVE

The samples were received intact under chain of custody on August 7, 2012 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Sulfur Analysis

The samples were analyzed for twenty sulfur compounds per ASTM D 5504-08 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD). All compounds with the exception of hydrogen sulfide and carbonyl sulfide are quantitated against the initial calibration curve for methyl mercaptan.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of Columbia Analytical Services, Inc. dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to AALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

DETAIL SUMMARY REPORT

Client: Kemron Environmental Services
Service Request: P1203188
Project ID: Bridgewater / SH0416-005

Date Received: 8/7/2012
Time Received: 08:40

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	ASTM D5504-08 - Sulfur Bag
VR 90 Day 23	P1203188-001	Air	8/6/2012	12:10	X
HC 90 Day 24	P1203188-002	Air	8/6/2012	12:15	X

Columbia Analytical Services

CHAIN OF CUSTODY

SR#: R1203188

1317 South 13th Ave, Kelso, WA 98626 | 360.577.7222 | 800.695.7222 | 360.636.1068 (fax)

PAGE 1 OF 1 COC #

PROJECT NAME: Bridgewater
PROJECT NUMBER: SH0416-005
PROJECT MANAGER: Tommy Jordan
COMPANY/ADDRESS: 1359 Ellsworth Industrial Blvd
CITY/STATE/ZIP: Atlanta GA 30040
E-MAIL ADDRESS: tjordan@kemron.com
PHONE #: FAX #:
SAMPLERS SIGNATURE:

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625☐ 8270☐ 8270LL☐	Volatile Organics 624☐ 8260☐	Hydrocarbons (*see below) Gas☐	BTEX☐ Diesel☐ Oil☐	Fuel Fingerprint (FIQ) NW-HCID Screen	Oil & Grease/TRPH 1664 HEM☐	1664 SGT☐	PCB's Aroclors☐ Congeners☐	Pesticides/Herbicides 608☐ 8081A☐	8141A☐ 8151A☐	Chlorophenolics - 8151M Tri☐ Tetra☐ PCP☐	PAHS 8310☐ SIM☐	Metals, Total or Dissolved (See list below)	Cyanide☐	Hex-Chrom☐	pH, Cond., Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS (circle)	NH_3-N, COD, Total-P, TKN, TOC, DOC (circle) NO_2+NO_3	TOX 9020☐	AOX 1650☐ 506☐	Reduced Sulfur ASTM 5504				REMARKS
VR 90 Day 23	8/6/12	1210	1		1																		X					
HC 90 Day 24	8/6/12	1215	2		1																		X					

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required
___ II. Report Dup., MS, MSD as required
___ III. Data Validation Report (includes all raw data)
___ IV. CLP Deliverable Report
___ V. EDD

INVOICE INFORMATION

P.O. #
Bill To: SAME

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.
___ 5 Day
X Standard (10-15 working days)
___ Provide FAX Results
8/21/12 Requested Report Date

Circle which metals are to be analyzed:

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER:_____ (CIRCLE ONE)

SPECIAL INSTRUCTIONS/COMMENTS:

☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: 8/6/12 1310	Signature: Fed Ex	Signature:	Signature: 8/7/12 0840
Date/Time	Date/Time	Date/Time	Date/Time
Printed Name: Tommy Jordan	Printed Name:	Printed Name:	Printed Name: Rose Montanez
Firm	Firm	Firm	Firm

BCOC #1 03/10

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Sample Acceptance Check Form

Client: Kemron Environmental Services Work order: P1203188

Project: Bridgewater / SH0416-005

Sample(s) received on: 8/7/12 Date opened: 8/7/12 by: RMARTENIES

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by CAS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
9	Was a **trip blank** received?	☐	☒	☐
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1203188-001.01	1 L Zefon Bag					
P1203188-002.01	1 L Zefon Bag					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **VR 90 Day 23**
Client Project ID: **Bridgewater / SH0416-005**

CAS Project ID: P1203188
CAS Sample ID: P1203188-001

Test Code: ASTM D 5504-08
Instrument ID: Agilent 7890A/GC22/SCD
Analyst: Wade Henton
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: 8/6/12
Time Collected: 12:10
Date Received: 8/7/12
Date Analyzed: 8/7/12
Time Analyzed: 11:50, 11:20
Volume(s) Analyzed: 0.050 ml(s)
0.0050 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**1,500,000**	1,400	**1,100,000**	1,000	**D**
463-58-1	Carbonyl Sulfide	**13,000**	250	**5,200**	100	
74-93-1	Methyl Mercaptan	**16,000**	200	**8,400**	100	
75-08-1	Ethyl Mercaptan	**2,700**	250	**1,000**	100	
75-18-3	Dimethyl Sulfide	**2,500**	250	**960**	100	
75-15-0	Carbon Disulfide	**22,000**	160	**7,000**	50	
75-33-2	Isopropyl Mercaptan	**1,200**	310	**390**	100	
75-66-1	tert-Butyl Mercaptan	**1,100**	370	**300**	100	
107-03-9	n-Propyl Mercaptan	ND	310	ND	100	
624-89-5	Ethyl Methyl Sulfide	**520**	310	**170**	100	
110-02-1	Thiophene	**2,200**	340	**650**	100	
513-44-0	Isobutyl Mercaptan	ND	370	ND	100	
352-93-2	Diethyl Sulfide	ND	370	ND	100	
109-79-5	n-Butyl Mercaptan	ND	370	ND	100	
624-92-0	Dimethyl Disulfide	**700**	190	**180**	50	
616-44-4	3-Methylthiophene	ND	400	ND	100	
110-01-0	Tetrahydrothiophene	ND	360	ND	100	
638-02-8	2,5-Dimethylthiophene	ND	460	ND	100	
872-55-9	2-Ethylthiophene	ND	460	ND	100	
110-81-6	Diethyl Disulfide	ND	250	ND	50	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

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RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **HC 90 Day 24**
Client Project ID: **Bridgewater / SH0416-005**

CAS Project ID: P1203188
CAS Sample ID: P1203188-002

Test Code: ASTM D 5504-08
Instrument ID: Agilent 7890A/GC22/SCD
Analyst: Wade Henton
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: 8/6/12
Time Collected: 12:15
Date Received: 8/7/12
Date Analyzed: 8/7/12
Time Analyzed: 12:07
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**110,000**		70	**76,000**		50	
463-58-1	Carbonyl Sulfide	**7,300**		120	**3,000**		50	
74-93-1	Methyl Mercaptan	**980**		98	**500**		50	
75-08-1	Ethyl Mercaptan	**140**		130	**56**		50	
75-18-3	Dimethyl Sulfide	**9,000**		130	**3,500**		50	
75-15-0	Carbon Disulfide	**12,000**		78	**3,900**		25	
75-33-2	Isopropyl Mercaptan		ND	160		ND	50	
75-66-1	tert-Butyl Mercaptan	**220**		180	**59**		50	
107-03-9	n-Propyl Mercaptan		ND	160		ND	50	
624-89-5	Ethyl Methyl Sulfide	**980**		160	**310**		50	
110-02-1	Thiophene	**8,300**		170	**2,400**		50	
513-44-0	Isobutyl Mercaptan		ND	180		ND	50	
352-93-2	Diethyl Sulfide		ND	180		ND	50	
109-79-5	n-Butyl Mercaptan		ND	180		ND	50	
624-92-0	Dimethyl Disulfide	**1,400**		96	**350**		25	
616-44-4	3-Methylthiophene	**680**		200	**170**		50	
110-01-0	Tetrahydrothiophene		ND	180		ND	50	
638-02-8	2,5-Dimethylthiophene		ND	230		ND	50	
872-55-9	2-Ethylthiophene	**590**		230	**130**		50	
110-81-6	Diethyl Disulfide		ND	120		ND	25	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Kemron Environmental Services**
Client Sample ID: **Method Blank**
Client Project ID: **Bridgewater / SH0416-005**

CAS Project ID: P1203188
CAS Sample ID: P120807-MB

Test Code: ASTM D 5504-08
Instrument ID: Agilent 7890A/GC22/SCD
Analyst: Wade Henton
Sampling Media: 1 L Zefon Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 8/07/12
Time Analyzed: 11:00
Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Kemron Environmental Services**
Client Sample ID: **Lab Control Sample** CAS Project ID: P1203188
Client Project ID: **Bridgewater / SH0416-005** CAS Sample ID: P120807-LCS

Test Code: ASTM D 5504-08 Date Collected: NA
Instrument ID: Agilent 7890A/GC22/SCD Date Received: NA
Analyst: Wade Henton Date Analyzed: 8/07/12
Sampling Media: 1 L Zefon Bag Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount ppbV	Result ppbV	% Recovery	CAS Acceptance Limits	Data Qualifier
7783-06-4	Hydrogen Sulfide	2,380	**2,030**	**85**	51-141	
463-58-1	Carbonyl Sulfide	2,470	**1,700**	**69**	63-147	
74-93-1	Methyl Mercaptan	2,360	**2,660**	**113**	54-156	

Mr. Tommy Jordan
Kemron Environmental Services, Inc.
1359-A Ellsworth Industrial Blvd.
Atlanta, GA 30318

August 08, 2012

DOH ELAP# 11626 Account# 19982 Login# L270760
AIHA # 100324

Dear Mr. Jordan:

Enclosed are the analytical results for the samples received by our laboratory on August 01, 2012. All test results meet the quality control requirements of AIHA and NELAC unless otherwise stated in this report. All samples on the chain of custody were received in good condition unless otherwise noted.

Results in this report are based on the sampling data provided by the client and refer only to the samples as they were received at the laboratory. Unless otherwise requested, all samples will be discarded 14 days from the date of this report.

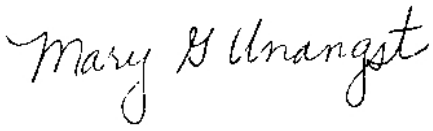
Current Scopes of Accreditation can be viewed at www.galsonlabs.com in the accreditations section under the "about Galson" tab.

Please contact Tonya Lancaster at (888) 432-5227, if you would like any additional information regarding this report.

Thank you for using Galson Laboratories.

Sincerely,

Galson Laboratories



Mary G. Unangst
Laboratory Director

Enclosure(s)

GALSON LABORATORIES

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.galsonlabs.com

LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 11-JUL-12 - 31-JUL-12 Account No.: 19982
Date Received : 01-AUG-12 Login No. : L270760
Date Analyzed : 02-AUG-12 - 08-AUG-12
Report ID : 747403

Client ID : HC TO **Lab ID : L270760-1** **Air Volume : 1.2 Liter**
Date Sampled : 07/11/12 **Date Analyzed : 08/08/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Acetaldehyde	0.1	0.4	<0.1	0.4	0.3	0.2
Benzaldehyde	0.1	<0.1	<0.1	<0.1	<0.08	<0.02
Butyraldehyde	0.1	<0.1	<0.1	<0.1	<0.09	<0.03
Crotonaldehyde	0.1	<0.1	<0.1	<0.1	<0.09	<0.03
Formaldehyde	0.1	<0.1	<0.1	<0.1	<0.08	<0.07
Isovaleraldehyde	0.1	8.3	<0.1	8.4	7.0	2.0
Propionaldehyde	0.1	<0.1	<0.1	<0.1	<0.08	<0.04
Valeraldehyde	0.1	<0.1	<0.1	<0.1	<0.09	<0.02

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-119

Submitted by: BCF
Approved by : tlh
Date : 08-AUG-12 NYS DOH # : 11626
QC by: Tony D'Amico

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million LOQ-Limit of Quantitation

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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 11-JUL-12 - 31-JUL-12 Account No.: 19982
Date Received : 01-AUG-12 Login No. : L270760
Date Analyzed : 02-AUG-12 - 08-AUG-12
Report ID : 747403

Client ID : VR TO **Lab ID : L270760-2** **Air Volume : 1.2 Liter**
Date Sampled : 07/11/12 **Date Analyzed : 08/08/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Acetaldehyde	0.1	1.3	<0.1	1.3	1.1	0.60
Benzaldehyde	0.1	<0.1	<0.1	<0.1	<0.08	<0.02
Butyraldehyde	0.1	0.2	<0.1	0.3	0.2	0.07
Crotonaldehyde	0.1	<0.1	<0.1	<0.1	<0.09	<0.03
Formaldehyde	0.1	<0.1	<0.1	<0.1	<0.08	<0.07
Isovaleraldehyde	0.1	11	<0.1	11	9.6	2.7
Propionaldehyde	0.1	0.3	<0.1	0.3	0.3	0.1
Valeraldehyde	0.1	<0.1	<0.1	<0.1	<0.09	<0.02

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-119

Submitted by: BCF
Approved by : tlh
Date : 08-AUG-12 NYS DOH # : 11626
QC by: Tony D'Amico

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> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million LOQ-Limit of Quantitation

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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 11-JUL-12 - 31-JUL-12 Account No.: 19982
Date Received : 01-AUG-12 Login No. : L270760
Date Analyzed : 02-AUG-12 - 08-AUG-12
Report ID : 747403

Client ID : HC 100 TF **Lab ID : L270760-3** **Air Volume : 1.5 Liter**
Date Sampled : 07/31/12 **Date Analyzed : 08/08/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Acetaldehyde	0.1	1.1	<0.1	1.1	0.72	0.40
Benzaldehyde	0.1	0.6	<0.1	0.6	0.4	0.09
Butyraldehyde	0.1	0.2	<0.1	0.2	0.1	0.05
Crotonaldehyde	0.1	<0.1	<0.1	<0.1	<0.07	<0.02
Formaldehyde	0.1	<0.1	<0.1	<0.1	<0.07	<0.05
Isovaleraldehyde	0.1	4.9	<0.1	4.9	3.3	0.94
Propionaldehyde	0.1	0.3	<0.1	0.3	0.2	0.09
Valeraldehyde	0.1	<0.1	<0.1	<0.1	<0.07	<0.02

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-119

Submitted by: BCF
Approved by : tlh
Date : 08-AUG-12 NYS DOH # : 11626
QC by: Tony D'Amico

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 11-JUL-12 - 31-JUL-12 Account No.: 19982
Date Received : 01-AUG-12 Login No. : L270760
Date Analyzed : 02-AUG-12 - 08-AUG-12
Report ID : 747403

Client ID : VR 100 TF **Lab ID : L270760-4** **Air Volume : 1.5 Liter**
Date Sampled : 07/31/12 **Date Analyzed : 08/08/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Acetaldehyde	0.1	9.2	<0.1	9.3	6.2	3.4
Benzaldehyde	0.1	0.2	<0.1	0.2	0.1	0.03
Butyraldehyde	0.1	1.1	<0.1	1.2	0.82	0.28
Crotonaldehyde	0.1	<0.1	<0.1	<0.1	<0.07	<0.02
Formaldehyde	0.1	<0.1	<0.1	<0.1	<0.07	<0.05
Isovaleraldehyde	0.1	8.7	<0.1	8.8	5.9	1.7
Propionaldehyde	0.1	2.7	<0.1	2.7	1.8	0.77
Valeraldehyde	0.1	<0.1	<0.1	<0.1	<0.07	<0.02

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-119

Submitted by: BCF
Approved by : tlh
Date : 08-AUG-12 NYS DOH # : 11626
QC by: Tony D'Amico

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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 11-JUL-12 - 31-JUL-12 Account No.: 19982
Date Received : 01-AUG-12 Login No. : L270760
Date Analyzed : 02-AUG-12 - 08-AUG-12
Report ID : 747403

Client ID : VR 90 DAY 3 **Lab ID : L270760-5** **Air Volume : 0.94 Liter**
Date Sampled : 07/16/12 **Date Analyzed : 08/08/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Acetaldehyde	0.1	9.9	0.42	10	11	6.1
Benzaldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.02
Butyraldehyde	0.1	2.1	<0.1	2.3	2.5	0.84
Crotonaldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.04
Formaldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.09
Isovaleraldehyde	0.1	15	0.57	15	16	4.7
Propionaldehyde	0.1	2.9	<0.1	2.9	3.1	1.3
Valeraldehyde	0.1	0.1	<0.1	0.1	0.1	0.04

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-119

Submitted by: BCF
Approved by : tlh
Date : 08-AUG-12 NYS DOH # : 11626
QC by: Tony D'Amico

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> -Greater Than ug -Micrograms l -Liters NS -Not Specified
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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 11-JUL-12 - 31-JUL-12 Account No.: 19982
Date Received : 01-AUG-12 Login No. : L270760
Date Analyzed : 02-AUG-12 - 08-AUG-12
Report ID : 747403

Client ID : VR 100 DAY 3 **Lab ID : L270760-6** **Air Volume : 1.0 Liter**
Date Sampled : 07/16/12 **Date Analyzed : 08/08/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Acetaldehyde	0.1	1.4	<0.1	1.4	1.4	0.78
Benzaldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.02
Butyraldehyde	0.1	1.3	<0.1	1.4	1.4	0.48
Crotonaldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.04
Formaldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.08
Isovaleraldehyde	0.1	10	0.22	11	11	3.0
Propionaldehyde	0.1	0.5	<0.1	0.5	0.5	0.2
Valeraldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.03

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-119

Submitted by: BCF
Approved by : tlh
Date : 08-AUG-12 NYS DOH # : 11626
QC by: Tony D'Amico

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 11-JUL-12 - 31-JUL-12 Account No.: 19982
Date Received : 01-AUG-12 Login No. : L270760
Date Analyzed : 02-AUG-12 - 08-AUG-12
Report ID : 747403

Client ID : HC 90 DAY 3 **Lab ID : L270760-7** **Air Volume : 1.3 Liter**
Date Sampled : 07/16/12 **Date Analyzed : 08/08/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Acetaldehyde	0.1	1.2	<0.1	1.2	0.92	0.51
Benzaldehyde	0.1	0.4	0.2	*0.6	*0.5	*0.1
Butyraldehyde	0.1	0.8	<0.1	0.9	0.7	0.2
Crotonaldehyde	0.1	<0.1	<0.1	<0.1	<0.08	<0.03
Formaldehyde	0.1	<0.1	<0.1	<0.1	<0.08	<0.06
Isovaleraldehyde	0.1	20	2.0	*22	*17	*4.9
Propionaldehyde	0.1	0.4	<0.1	0.4	0.3	0.1
Valeraldehyde	0.1	<0.1	<0.1	<0.1	<0.08	<0.02

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-119

Submitted by: BCF
Approved by : tlh
Date : 08-AUG-12 NYS DOH # : 11626
QC by: Tony D'Amico

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 11-JUL-12 - 31-JUL-12 Account No.: 19982
Date Received : 01-AUG-12 Login No. : L270760
Date Analyzed : 02-AUG-12 - 08-AUG-12
Report ID : 747403

Client ID : HC 100 DAY 3 **Lab ID : L270760-8** **Air Volume : 1.0 Liter**
Date Sampled : 07/16/12 **Date Analyzed : 08/08/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Acetaldehyde	0.1	0.1	<0.1	0.1	0.1	0.06
Benzaldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.02
Butyraldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.04
Crotonaldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.04
Formaldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.08
Isovaleraldehyde	0.1	4.1	<0.1	4.2	4.2	1.2
Propionaldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.04
Valeraldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.03

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-119

Submitted by: BCF
Approved by : tlh
Date : 08-AUG-12 NYS DOH # : 11626
QC by: Tony D'Amico

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million LOQ-Limit of Quantitation

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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 11-JUL-12 - 31-JUL-12 Account No.: 19982
Date Received : 01-AUG-12 Login No. : L270760
Date Analyzed : 02-AUG-12 - 08-AUG-12
Report ID : 747403

Client ID : VR 100 DAY 13 **Lab ID : L270760-9** **Air Volume : 1.0 Liter**
Date Sampled : 07/26/12 **Date Analyzed : 08/08/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Acetaldehyde	0.1	4.0	<0.1	4.1	4.1	2.3
Benzaldehyde	0.1	0.2	<0.1	0.1	0.1	0.03
Butyraldehyde	0.1	2.8	<0.1	3.1	3.1	1.0
Crotonaldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.04
Formaldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.08
Isovaleraldehyde	0.1	13	<0.1	13	13	3.6
Propionaldehyde	0.1	1.9	<0.1	1.9	1.9	0.80
Valeraldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.03

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-119

Submitted by: BCF
Approved by : tlh
Date : 08-AUG-12 NYS DOH # : 11626
QC by: Tony D'Amico

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 11-JUL-12 - 31-JUL-12 Account No.: 19982
Date Received : 01-AUG-12 Login No. : L270760
Date Analyzed : 02-AUG-12 - 08-AUG-12
Report ID : 747403

Client ID : HC 100 DAY 14 **Lab ID : L270760-10** **Air Volume : 1.0 Liter**
Date Sampled : 07/27/12 **Date Analyzed : 08/08/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Acetaldehyde	0.1	1.9	<0.1	1.9	1.9	1.1
Benzaldehyde	0.1	0.8	<0.1	0.8	0.8	0.2
Butyraldehyde	0.1	0.8	<0.1	0.9	0.9	0.3
Crotonaldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.04
Formaldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.08
Isovaleraldehyde	0.1	18	<0.1	18	18	5.2
Propionaldehyde	0.1	0.6	<0.1	0.6	0.6	0.3
Valeraldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.03

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-119

Submitted by: BCF
Approved by : tlh
Date : 08-AUG-12 NYS DOH # : 11626
QC by: Tony D'Amico

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 11-JUL-12 - 31-JUL-12 Account No.: 19982
Date Received : 01-AUG-12 Login No. : L270760
Date Analyzed : 02-AUG-12 - 03-AUG-12
Report ID : 746859

Client ID : HC TO **Lab ID : L270760-11** **Air Volume : 3.3 Liter**
Date Sampled : 07/11/12 **Date Analyzed : 08/02/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Hydrobromic Acid	5	<5	<5	<5	<2	<0.5
Hydrochloric Acid	5	<5	<5	<5	<2	<1
Hydrofluoric Acid	5	<5	<5	<5	<2	<2
Nitric Acid	5	<5	<5	<5	<2	<0.6
Phosphoric Acid	5	<5	<5	<5	<2	NA
Sulfuric Acid	5	21	<5	21	6.4	NA

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-10-03

Submitted by: KLS
Approved by : tlh
Date : 07-AUG-12 NYS DOH # : 11626
QC by: Tony D'Amico

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 11-JUL-12 - 31-JUL-12 Account No.: 19982
Date Received : 01-AUG-12 Login No. : L270760
Date Analyzed : 02-AUG-12 - 03-AUG-12
Report ID : 746859

Client ID : VR TO **Lab ID : L270760-12** **Air Volume : 3.3 Liter**
Date Sampled : 07/11/12 **Date Analyzed : 08/02/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Hydrobromic Acid	5	<5	<5	<5	<2	<0.5
Hydrochloric Acid	5	<5	<5	<5	<2	<1
Hydrofluoric Acid	5	<5	<5	<5	<2	<2
Nitric Acid	5	<5	<5	<5	<2	<0.6
Phosphoric Acid	5	<5	<5	<5	<2	NA
Sulfuric Acid	5	<5	<5	<5	<2	NA

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-10-03

Submitted by: KLS
Approved by : tlh
Date : 07-AUG-12 NYS DOH # : 11626
QC by: Tony D'Amico

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
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NA -Not Applicable ND -Not Detected ppm -Parts per Million LOQ-Limit of Quantitation

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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 11-JUL-12 - 31-JUL-12 Account No.: 19982
Date Received : 01-AUG-12 Login No. : L270760
Date Analyzed : 02-AUG-12 - 03-AUG-12
Report ID : 746859

Client ID : HC 100 TF **Lab ID : L270760-13** **Air Volume : 6.0 Liter**
Date Sampled : 07/31/12 **Date Analyzed : 08/02/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Hydrobromic Acid	5	<5	<5	<5	<0.8	<0.3
Hydrochloric Acid	5	<5	<5	<5	<0.8	<0.6
Hydrofluoric Acid	5	<5	<5	<5	<0.8	<1
Nitric Acid	5	<5	<5	<5	<0.8	<0.3
Phosphoric Acid	5	<5	<5	<5	<0.8	NA
Sulfuric Acid	5	<5	<5	<5	<0.8	NA

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-10-03

Submitted by: KLS
Approved by : tlh
Date : 07-AUG-12 NYS DOH # : 11626
QC by: Tony D'Amico

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million LOQ-Limit of Quantitation

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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 11-JUL-12 - 31-JUL-12 Account No.: 19982
Date Received : 01-AUG-12 Login No. : L270760
Date Analyzed : 02-AUG-12 - 03-AUG-12
Report ID : 746859

Client ID : VR 100 TF **Lab ID : L270760-14** **Air Volume : 10.5 Liter**
Date Sampled : 07/30/12 **Date Analyzed : 08/02/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Hydrobromic Acid	5	<5	<5	<5	<0.5	<0.1
Hydrochloric Acid	5	<5	<5	<5	<0.5	<0.3
Hydrofluoric Acid	5	<5	<5	<5	<0.5	<0.6
Nitric Acid	5	<5	<5	<5	<0.5	<0.2
Phosphoric Acid	5	<5	<5	<5	<0.5	NA
Sulfuric Acid	5	<5	<5	<5	<0.5	NA

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-10-03

Submitted by: KLS
Approved by : tlh
Date : 07-AUG-12 NYS DOH # : 11626
QC by: Tony D'Amico

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million LOQ-Limit of Quantitation

Field sampling was not performed by Galson. Galson presents results based on sampling data provided by clients.

GALSON LABORATORIES

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FAX: (315) 437-0571
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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 11-JUL-12 - 31-JUL-12 Account No.: 19982
Date Received : 01-AUG-12 Login No. : L270760
Date Analyzed : 02-AUG-12 - 03-AUG-12
Report ID : 746859

Client ID : VR 90 DAY 3 **Lab ID : L270760-15** **Air Volume : 3.0 Liter**
Date Sampled : 07/16/12 **Date Analyzed : 08/02/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Hydrobromic Acid	5	<5	<5	<5	<2	<0.5
Hydrochloric Acid	5	<5	<5	<5	<2	<1
Hydrofluoric Acid	5	<5	<5	<5	<2	<2
Nitric Acid	5	<5	<5	<5	<2	<0.6
Phosphoric Acid	5	<5	<5	<5	<2	NA
Sulfuric Acid	5	<5	<5	<5	<2	NA

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-10-03

Submitted by: KLS
Approved by : tlh
Date : 07-AUG-12 NYS DOH # : 11626
QC by: Tony D'Amico

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million LOQ-Limit of Quantitation

Field sampling was not performed by Galson. Galson presents results based on sampling data provided by clients.

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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 11-JUL-12 - 31-JUL-12 Account No.: 19982
Date Received : 01-AUG-12 Login No. : L270760
Date Analyzed : 02-AUG-12 - 03-AUG-12
Report ID : 746859

Client ID : VR 100 DAY 3 **Lab ID : L270760-16** **Air Volume : 1.8 Liter**
Date Sampled : 07/16/12 **Date Analyzed : 08/03/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Hydrobromic Acid	5	<5	<5	<5	<3	<0.8
Hydrochloric Acid	5	<5	<5	<5	<3	<2
Hydrofluoric Acid	5	<5	<5	<5	<3	<3
Nitric Acid	5	<5	<5	<5	<3	<1
Phosphoric Acid	5	<5	<5	<5	<5	NA
Sulfuric Acid	5	11	6.8	*18	*9.9	NA

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-10-03

Submitted by: KLS
Approved by : tlh
Date : 07-AUG-12 NYS DOH # : 11626
QC by: Tony D'Amico

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million LOQ-Limit of Quantitation

Field sampling was not performed by Galson. Galson presents results based on sampling data provided by clients.

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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 11-JUL-12 - 31-JUL-12 Account No.: 19982
Date Received : 01-AUG-12 Login No. : L270760
Date Analyzed : 02-AUG-12 - 03-AUG-12
Report ID : 746859

Client ID : HC 90 DAY 3 **Lab ID : L270760-17** **Air Volume : 3.0 Liter**
Date Sampled : 07/16/12 **Date Analyzed : 08/03/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Hydrobromic Acid	5	<5	<5	<5	<2	<0.5
Hydrochloric Acid	5	<5	<5	<5	<2	<1
Hydrofluoric Acid	5	<5	<5	<5	<2	<2
Nitric Acid	5	<5	<5	<5	<2	<0.6
Phosphoric Acid	5	<5	<5	<5	<2	NA
Sulfuric Acid	5	<5	<5	<5	<2	NA

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-10-03

Submitted by: KLS
Approved by : tlh
Date : 07-AUG-12 NYS DOH # : 11626
QC by: Tony D'Amico

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million LOQ-Limit of Quantitation

Field sampling was not performed by Galson. Galson presents results based on sampling data provided by clients.

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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 11-JUL-12 - 31-JUL-12 Account No.: 19982
Date Received : 01-AUG-12 Login No. : L270760
Date Analyzed : 02-AUG-12 - 03-AUG-12
Report ID : 746859

Client ID : HC 100 DAY 3 **Lab ID : L270760-18** **Air Volume : 1.8 Liter**
Date Sampled : 07/16/12 **Date Analyzed : 08/03/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Hydrobromic Acid	5	<5	<5	<5	<3	<0.8
Hydrochloric Acid	5	<5	<5	<5	<3	<2
Hydrofluoric Acid	5	<5	<5	<5	<3	<3
Nitric Acid	5	<5	<5	<5	<3	<1
Phosphoric Acid	5	<5	<5	<5	<3	NA
Sulfuric Acid	5	16	11	*27	*15	NA

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-10-03

Submitted by: KLS
Approved by : tlh
Date : 07-AUG-12 NYS DOH # : 11626
QC by: Tony D'Amico

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million LOQ-Limit of Quantitation

Field sampling was not performed by Galson. Galson presents results based on sampling data provided by clients.

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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 11-JUL-12 - 31-JUL-12 Account No.: 19982
Date Received : 01-AUG-12 Login No. : L270760
Date Analyzed : 02-AUG-12 - 03-AUG-12
Report ID : 746859

Client ID : VR 100 DAY 13 **Lab ID : L270760-19** **Air Volume : 3.0 Liter**
Date Sampled : 07/26/12 **Date Analyzed : 08/03/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Hydrobromic Acid	5	<5	<5	<5	<2	<0.5
Hydrochloric Acid	5	7	<5	7	2	2
Hydrofluoric Acid	5	<5	<5	<5	<2	<2
Nitric Acid	5	<5	<5	<5	<2	<0.6
Phosphoric Acid	5	<5	<5	<5	<2	NA
Sulfuric Acid	5	390	110	*510	*170	NA

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-10-03

Submitted by: KLS
Approved by : tlh
Date : 07-AUG-12 NYS DOH # : 11626
QC by: Tony D'Amico

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million LOQ-Limit of Quantitation

Field sampling was not performed by Galson. Galson presents results based on sampling data provided by clients.

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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 11-JUL-12 - 31-JUL-12 Account No.: 19982
Date Received : 01-AUG-12 Login No. : L270760
Date Analyzed : 02-AUG-12 - 03-AUG-12
Report ID : 746859

Client ID : HC 100 DAY 14 **Lab ID : L270760-20** **Air Volume : 3.0 Liter**
Date Sampled : 07/27/12 **Date Analyzed : 08/03/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Hydrobromic Acid	5	<5	<5	<5	<2	<0.5
Hydrochloric Acid	5	<5	<5	<5	<2	<1
Hydrofluoric Acid	5	<5	<5	<5	<2	<2
Nitric Acid	5	<5	<5	<5	<2	<0.6
Phosphoric Acid	5	<5	<5	<5	<2	NA
Sulfuric Acid	5	84	8.8	*93	*31	NA

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-10-03

Submitted by: KLS
Approved by : tlh
Date : 07-AUG-12 NYS DOH # : 11626
QC by: Tony D'Amico

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million LOQ-Limit of Quantitation

Field sampling was not performed by Galson. Galson presents results based on sampling data provided by clients.

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LABORATORY FOOTNOTE REPORT

Client Name : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 11-JUL-12 - 31-JUL-12 Account No.: 19982
Date Received: 01-AUG-12 Login No. : L270760
Date Analyzed: 02-AUG-12 - 08-AUG-12

Unless otherwise noted below, all quality control results associated with the samples were within established control limits.

Unrounded results are carried through the calculations that yield the final result and the final result is rounded to the number of significant figures appropriate to the accuracy of the analytical method. Please note that results appearing in the columns preceeding the final result column may have been rounded in order to fit the report format and therefore, if carried through the calculations, may not yield an identical final result to the one reported.

The stated LOQs for each analyte represent the demonstrated LOQ concentrations prior to correction for desorption efficiency (if applicable).

L270760 (Report ID: 747403):
SOPs: LC-SOP-4(11)
ACETALDEHYDE - Total ug corrected for a desorption efficiency of 99%.
BENZALDEHYDE - Total ug corrected for a desorption efficiency of 103%.
BUTYRALDEHYDE - Total ug corrected for a desorption efficiency of 89%.
Crotonaldehyde - Total ug corrected for a desorption efficiency of 95%.
FORMALDEHYDE - Total ug corrected for a desorption efficiency of 99%.
ISOVALERALDEHYDE - Total ug corrected for a desorption efficiency of 99%.
PROPIONALDEHYDE - Total ug corrected for a desorption efficiency of 99%.
VALERALDEHYDE - Total ug corrected for a desorption efficiency of 98%.
Formaldehyde results have been corrected for the average background found on the media:
front section = 0.0460 ug and back section = 0.0573 ug for lot #7808.
Acetaldehyde results have been corrected for the average background found on the media:
front section = 0.0134 ug and back section = 0.0397 ug for lot #7808.

*L270760-7 (Report ID: 747403):
Result reported as (*) designates possible breakthrough or migration.
Reported results may be biased low.

Parameter	Method	PEL
Acetaldehyde	mod. NIOSH 2016; HPLC/UV	200 ppm
Benzaldehyde	mod. NIOSH 2016; HPLC/UV	N/A
Butyraldehyde	mod. NIOSH 2016; HPLC/UV	N/A
Crotonaldehyde	mod. NIOSH 2016; HPLC/UV	2 ppm
Formaldehyde	mod. NIOSH 2016; HPLC/UV	0.75 ppm
Isovaleraldehyde	mod. NIOSH 2016; HPLC/UV	N/A
Propionaldehyde	mod. NIOSH 2016; HPLC/UV	N/A
Valeraldehyde	mod. NIOSH 2016; HPLC/UV	N/A

L270760 (Report ID: 746859):
SOPs: ii-n7903(8)
Sulfuric Acid results have been corrected for average background found on the media:
front section only = 1.9306 ug for lot #7596.
The blank spike recovery for Hydrofluoric Acid was outside the control limits of 76.5-107% at 75.5% recovery. The blank spike and duplicate recoveries for Nitric Acid were outside the control limits of 99.2-118% at 97.7% and 96.3%, respectively.
Where possible, control limits are statistically generated in-house.
In the absence of statistical limits, guidance default limits of 75-125% are used.
Reported results for Hydrofluoric Acid and Nitric Acid may be biased low.

*L270760-16 (Report ID: 746859:
Result reported as (*) designates possible breakthrough or migration.

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million

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LABORATORY FOOTNOTE REPORT

Client Name : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater TS

Date Sampled : 11-JUL-12 - 31-JUL-12 Account No.: 19982
Date Received: 01-AUG-12 Login No. : L270760
Date Analyzed: 02-AUG-12 - 08-AUG-12

Unless otherwise noted below, all quality control results associated with the samples were within established control limits.

Unrounded results are carried through the calculations that yield the final result and the final result is rounded to the number of significant figures appropriate to the accuracy of the analytical method. Please note that results appearing in the columns preceeding the final result column may have been rounded in order to fit the report format and therefore, if carried through the calculations, may not yield an identical final result to the one reported.

The stated LOQs for each analyte represent the demonstrated LOQ concentrations prior to correction for desorption efficiency (if applicable).

*L270760-16 (Report ID: 746859:
Reported results may be biased low.

*L270760-18 (Report ID: 746859:
Result reported as (*) designates possible breakthrough or migration.
Reported results may be biased low.

*L270760-19 (Report ID: 746859:
Result reported as (*) designates possible breakthrough or migration.
Reported results may be biased low.

*L270760-20 (Report ID: 746859:
Result reported as (*) designates possible breakthrough or migration.
Reported results may be biased low.

Parameter	Method	PEL
Hydrobromic Acid	mod. NIOSH 7903; IC	3 ppm
Hydrochloric Acid	mod. NIOSH 7903; IC	5 ppm Ceiling
Hydrofluoric Acid	mod. NIOSH 7903; IC	3 ppm
Nitric Acid	mod. NIOSH 7903; IC	2 ppm
Phosphoric Acid	mod. NIOSH 7903; IC	1 mg/m3
Sulfuric Acid	mod. NIOSH 7903; IC	1 mg/m3

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million

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East Syracuse, NY 13057-9672
Tel: 315-432-5227
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Fax: 315-437-0571
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☐ New Client?

Client Account No.* :

Report To* : Kemron Environmental Services
1359-A Ellsworth Ind Blvd NW
ATL, GA 30318

Phone No.* : (404) 636-0928
Cell No. : (404) 576-3172
Email Results To : Tommy Jordan
Email Address : tjordan@kemron.com

Invoice To* : Tommy Jordan/Kemron
1359A Ellsworth
Ind Blvd
ATL, GA 30318

Phone No. : (404) 636-0928
Email : tjordan@kemron.com
Purchase Order No. : SE 0416-007
Credit Card : ☐ Credit Card on File ☐ Call for Credit Card Info

☐ Samples submitted using the FreePumpLoan™ Program. ☐ Samples submitted using the FreeSamplingBadges™ Program.

Need Results By*:	(surcharge)
☒ 5 Business Days	0%
☐ 4 Business Days	35%
☐ 3 Business Days	50%
☐ 2 Business Days	75%
☐ Next Day by 6pm	100%
☐ Next Day by Noon	150%
☐ Same Day	200%

Site Name : Bridgewater Project : Bridgewater TS Sampled By : Ashley Clayborn

Comments:
Report "profiles" for inorganic acids and aldehydes (23)

List description of industry or process/interferences present in sampling area:

State samples were collected in (ex. NY):

Please indicate which OEL this data will be used for:
☐ OSHA PEL ☐ ACGIH TLV ☐ Cal OSHA
☐ MSHA ☒ Other (specify): [illegible]

Sample Identification* (Maximum of 20 characters, ID's longer than 20 characters will be abbreviated.)	Date Sampled* (mm/dd/yy)	Collection Medium	Sample Volume, Sample Time, or Sample Area*	Sample Units*: L, ml, min., in2, cm2, ft2	Analysis Requested*	Method Reference^	Hexavalent Chromium Process (ex. welding, plating, painting, etc.)*
Example	01/01/11	2pc UW PVC	960	L	Hexavalent Chromium (Cr6)	mod. OSHA ID-215	Welding
HC To	07/11/12	Tube	~~3.3~~ 1.2	L	2016M Aldehydes		226-119 ALL
HC To	07/11/12	Tube	3.3	L	7903M Inorganic acid		226-10-03
VR To	07/11/12	Tube	1.2	L	2016M Aldehydes		(MN)
VR To	07/11/12	Tube	3.3	L	7903M Inorganic acids		
HC 100 TF	07/30/12	Tube	~~1.8~~ 1.5	L	2016M Aldehydes		
HC 100 TF	07/30/12	Tube	6.0	L	7903M Inorganic acids		
VR 100 TF	07/31/12	Tube	1.5	L	2016M Aldehydes		
VR 100 TF	07/30/12	Tube	10.5	L	7903M Inorganic acids		
VR 90 Bay 3	07/16/12	Tube	0.94	L	2016M Aldehydes		
VR 90 Bay 3	07/16/12	Tube	3.0	L	7903M Inorganic acids		

^Galson Laboratories will substitute our routine/preferred method if it does not match the method listed on the COC unless this box is checked: ☐ Use method(s) listed on COC

For metals analysis: if requesting an analyte with the option of a lower LOQ please indicate if the lower LOQ is required (only available for certain analytes see SAG):

For crystalline silica: form(s) of silica needed must be indicated (Quartz, Cristobalite, and/or Tridymite)*:

Chain of Custody	Print Name	Signature	Date/Time
Relinquished by :	Ashley Clayborn	[signature]	07/31/12 / 16:35
Received by LAB :	M. Fenno	[signature]	8/1/12 1226

Samples received after 3pm will be considered as next day's business.
*Required fields, failure to complete these fields may result in a delay in your samples being processed.

Page 1 of 2

LAB ORIGINAL

Page 24 of 25 Report Reference: I Generated 08 AUG 12 16:34
American Cyanamid Superfund Site
Terra Therm Treatability Study
Page 900 of 1332

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☐ New Client?

Report To*: Kemron Environmental Services - 1359 A Ellsworth Ind Blvd. NW ATL, GA 30318

Client Account No.*:

Invoice To*: Tammy Jordan/Kemron 1359A Ellsworth Ind Blvd. NW ATL, GA 30318

Phone No.*: (404) 636-0928
Cell No.: 404-576-3172
Email Results To: Tammy Jordan
Email Address: tjordan@kemron.com

Phone No.: (404) 636-0928
Email: tjordan@kemron.com
Purchase Order No.: SE 0416-007
Credit Card: ☐ Credit Card on File ☐ Call for Credit Card Info

☐ Samples submitted using the FreePumpLoan™ Program.
☐ Samples submitted using the FreeSamplingBadges™ Program.

Need Results By*:	(surcharge)
☒ 5 Business Days	0%
☐ 4 Business Days	35%
☐ 3 Business Days	50%
☐ 2 Business Days	75%
☐ Next Day by 6pm	100%
☐ Next Day by Noon	150%
☐ Same Day	200%

Site Name: Bridgewater | Project: Bridgewater IS | Sampled By: Ashley Clayborn

Comments:
Report "profiles" for inorganic acids and aldehydes (23)

List description of industry or process/interferences present in sampling area:

State samples were collected in (ex. NY):

Please indicate which OEL this data will be used for:
☐ OSHA PEL ☐ ACGIH TLV ☐ Cal OSHA
☐ MSHA ☐ Other (specify):

Sample Identification* (Maximum of 20 characters, ID's longer than 20 characters will be abbreviated.)	Date Sampled* (mm/dd/yy)	Collection Medium	Sample Volume, Sample Time, or Sample Area*	Sample Units*: L, ml, min., in2, cm2, ft2	Analysis Requested*	Method Reference^	Hexavalent Chromium Process (ex. welding, plating, painting, etc.)*
Example	01/01/11	2pc UW PVC	960	L	Hexavalent Chromium (Cr6)	mod. OSHA ID-215	Welding
VR 100 Day 3	07/16/12	Tube	1.0	L	2016M-Aldehydes		
VR 100 Day 3	07/16/12	Tube	1.8	L	7903A-Inorganic Acids		
HC 90 Day 3	07/16/12	Tube	1.3	L	2016M-Aldehydes		
HC 90 Day 3	07/16/12	Tube	3.0	L	7903M-Inorganic Acids		
HC 100 Day 3	07/16/12	Tube	1.0	L	2016M-Aldehydes		
HC 100 Day 3	07/16/12	Tube	1.8	L	7903M-Inorganic Acids		
VR 100 Day 13	07/26/12	Tube	1.0	L	2016M-Aldehydes		
VR 100 Day 13	07/26/12	Tube	3.0	L	7903M-Inorganic Acids		
HC 100 Day 14	07/27/12	Tube	1.0	L	2016M-Aldehydes		
HC 100 Day 14	07/27/12	Tube	3.0	L	7903M-Inorganic Acids		

^Galson Laboratories will substitute our routine/preferred method if it does not match the method listed on the COC unless this box is checked: ☐ Use method(s) listed on COC

For metals analysis: if requesting an analyte with the option of a lower LOQ please indicate if the lower LOQ is required (only available for certain analytes see SAG):

For crystalline silica: form(s) of silica needed must be indicated (Quartz, Cristobalite, and/or Tridymite)*:

Chain of Custody	Print Name	Signature	Date/Time
Relinquished by:	Ashley Clayborn		07/31/12 10:35
Received by LAB:	M. Ferro	Matt Adams	8/1/12 1226

Samples received after 3pm will be considered as next day's business.
*Required fields, failure to complete these fields may result in a delay in your samples being processed.

Page 2 of 2

LAB ORIGINAL

American Cyanamid Superfund Site
Interim Treatability Study
Page 901 of 1332

Mr. Tommy Jordan
Kemron Environmental Services, Inc.
1359-A Ellsworth Industrial Blvd.
Atlanta, GA 30318

August 21, 2012

DOH ELAP# 11626 Account# 19982 Login# L271693
AIHA # 100324

Dear Mr. Jordan:

Enclosed are the analytical results for the samples received by our laboratory on August 14, 2012. All test results meet the quality control requirements of AIHA and NELAC unless otherwise stated in this report. All samples on the chain of custody were received in good condition unless otherwise noted.

Results in this report are based on the sampling data provided by the client and refer only to the samples as they were received at the laboratory. Unless otherwise requested, all samples will be discarded 14 days from the date of this report.

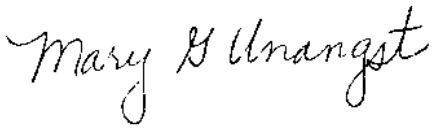
Current Scopes of Accreditation can be viewed at www.galsonlabs.com in the accreditations section under the "about Galson" tab.

Please contact Tonya Lancaster at (888) 432-5227, if you would like any additional information regarding this report.

Thank you for using Galson Laboratories.

Sincerely,

Galson Laboratories



Mary G. Unangst
Laboratory Director

Enclosure(s)

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East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater Thermal Study

Date Sampled : 06-AUG-12 - 10-AUG-12 Account No.: 19982
Date Received : 14-AUG-12 Login No. : L271693
Date Analyzed : 15-AUG-12 - 16-AUG-12
Report ID : 748412

Client ID : VR 100 DAY 1 **Lab ID : L271693-1** **Air Volume : 1.2 Liter**
Date Sampled : 08/08/12 **Date Analyzed : 08/15/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Acetaldehyde	0.1	2.7	<0.1	2.7	2.3	1.3
Benzaldehyde	0.1	0.1	<0.1	0.1	0.09	0.02
Butyraldehyde	0.1	1.2	<0.1	1.4	1.2	0.39
Crotonaldehyde	0.1	<0.1	<0.1	<0.1	<0.09	<0.03
Formaldehyde	0.1	0.4	0.1	*0.5	*0.4	*0.3
Isovaleraldehyde	0.1	7.8	<0.1	7.9	6.6	1.9
Propionaldehyde	0.1	0.9	<0.1	0.9	0.7	0.3
Valeraldehyde	0.1	<0.1	<0.1	<0.1	<0.09	<0.02

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-119

Submitted by: tns
Approved by : tlh
Date : 21-AUG-12 NYS DOH # : 11626
QC by: Tom Burgess

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million LOQ-Limit of Quantitation

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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater Thermal Study

Date Sampled : 06-AUG-12 - 10-AUG-12 Account No.: 19982
Date Received : 14-AUG-12 Login No. : L271693
Date Analyzed : 15-AUG-12 - 16-AUG-12
Report ID : 748412

Client ID : HC 100 DAY 1 **Lab ID : L271693-2** **Air Volume : 3.3 Liter**
Date Sampled : 08/08/12 **Date Analyzed : 08/15/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Acetaldehyde	0.1	7.6	<0.1	7.7	2.3	1.3
Benzaldehyde	0.1	0.1	<0.1	0.1	0.04	0.01
Butyraldehyde	0.1	2.4	<0.1	2.7	0.82	0.28
Crotonaldehyde	0.1	<0.1	<0.1	<0.1	<0.03	<0.01
Formaldehyde	0.1	<0.1	<0.1	<0.1	<0.03	<0.02
Isovaleraldehyde	0.1	4.2	<0.1	4.2	1.3	0.37
Propionaldehyde	0.1	2.5	<0.1	2.5	0.77	0.32
Valeraldehyde	0.1	0.3	<0.1	0.3	0.1	0.03

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-119

Submitted by: tns
Approved by : tlh
Date : 21-AUG-12 NYS DOH # : 11626
QC by: Tom Burgess

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million LOQ-Limit of Quantitation

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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater Thermal Study

Date Sampled : 06-AUG-12 - 10-AUG-12 Account No.: 19982
Date Received : 14-AUG-12 Login No. : L271693
Date Analyzed : 15-AUG-12 - 16-AUG-12
Report ID : 748412

Client ID : VR 90 DAY 1 **Lab ID : L271693-3** **Air Volume : 0.85 Liter**
Date Sampled : 08/10/12 **Date Analyzed : 08/15/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Acetaldehyde	0.1	0.5	<0.1	0.5	0.6	0.3
Benzaldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.03
Butyraldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.04
Crotonaldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.04
Formaldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isovaleraldehyde	0.1	1.1	<0.1	1.1	1.3	0.37
Propionaldehyde	0.1	0.1	<0.1	0.1	0.1	0.05
Valeraldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.03

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-119

Submitted by: tns
Approved by : tlh
Date : 21-AUG-12 NYS DOH # : 11626
QC by: Tom Burgess

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million LOQ-Limit of Quantitation

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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater Thermal Study

Date Sampled : 06-AUG-12 - 10-AUG-12 Account No.: 19982
Date Received : 14-AUG-12 Login No. : L271693
Date Analyzed : 15-AUG-12 - 16-AUG-12
Report ID : 748412

Client ID : VR 90 DAY 23 **Lab ID : L271693-4** **Air Volume : 1.0 Liter**
Date Sampled : 08/06/12 **Date Analyzed : 08/15/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Acetaldehyde	0.1	1.1	<0.1	1.1	1.1	0.63
Benzaldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.02
Butyraldehyde	0.1	0.7	<0.1	0.7	0.7	0.2
Crotonaldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.04
Formaldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.08
Isovaleraldehyde	0.1	4.2	<0.1	4.3	4.3	1.2
Propionaldehyde	0.1	0.6	<0.1	0.6	0.6	0.3
Valeraldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.03

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-119

Submitted by: tns
Approved by : tlh
Date : 21-AUG-12 NYS DOH # : 11626
QC by: Tom Burgess

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million LOQ-Limit of Quantitation

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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater Thermal Study

Date Sampled : 06-AUG-12 - 10-AUG-12 Account No.: 19982
Date Received : 14-AUG-12 Login No. : L271693
Date Analyzed : 15-AUG-12 - 16-AUG-12
Report ID : 748412

Client ID : VR 90 TF **Lab ID : L271693-5** **Air Volume : 1.79 Liter**
Date Sampled : 08/08/12 **Date Analyzed : 08/15/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Acetaldehyde	0.1	17	<0.1	18	9.9	5.5
Benzaldehyde	0.1	<0.1	<0.1	<0.1	<0.05	<0.01
Butyraldehyde	0.1	1.1	<0.1	1.3	0.72	0.24
Crotonaldehyde	0.1	<0.1	<0.1	<0.1	<0.06	<0.02
Formaldehyde	0.1	<0.1	<0.1	<0.1	<0.06	<0.05
Isovaleraldehyde	0.1	2.3	<0.1	2.4	1.3	0.37
Propionaldehyde	0.1	4.1	<0.1	4.1	2.3	0.96
Valeraldehyde	0.1	<0.1	<0.1	<0.1	<0.06	<0.02

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-119

Submitted by: tns
Approved by : tlh
Date : 21-AUG-12 NYS DOH # : 11626
QC by: Tom Burgess

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater Thermal Study

Date Sampled : 06-AUG-12 - 10-AUG-12 Account No.: 19982
Date Received : 14-AUG-12 Login No. : L271693
Date Analyzed : 15-AUG-12 - 16-AUG-12
Report ID : 748412

Client ID : HC 90 DAY 1 **Lab ID : L271693-6** **Air Volume : 1.0 Liter**
Date Sampled : 08/10/12 **Date Analyzed : 08/15/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Acetaldehyde	0.1	12	4.3	*16	*16	*9.1
Benzaldehyde	0.1	1	<0.1	1	1	0.2
Butyraldehyde	0.1	2.3	0.98	*3.7	*3.7	*1.3
Crotonaldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.04
Formaldehyde	0.1	<0.1	0.1	*0.1	*0.1	*0.1
Isovaleraldehyde	0.1	7.6	1.3	*9.0	*9.0	*2.6
Propionaldehyde	0.1	3.0	1.2	*4.3	*4.3	*1.8
Valeraldehyde	0.1	0.1	<0.1	0.1	0.1	0.04

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-119

Submitted by: tns
Approved by : tlh
Date : 21-AUG-12 NYS DOH # : 11626
QC by: Tom Burgess

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater Thermal Study

Date Sampled : 06-AUG-12 - 10-AUG-12 Account No.: 19982
Date Received : 14-AUG-12 Login No. : L271693
Date Analyzed : 15-AUG-12 - 16-AUG-12
Report ID : 748412

Client ID : HC 90 DAY 24 **Lab ID : L271693-7** **Air Volume : 1.0 Liter**
Date Sampled : 08/06/12 **Date Analyzed : 08/15/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Acetaldehyde	0.1	0.2	<0.1	0.2	0.2	0.1
Benzaldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.02
Butyraldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.04
Crotonaldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.04
Formaldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.08
Isovaleraldehyde	0.1	0.4	<0.1	0.4	0.4	0.1
Propionaldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.04
Valeraldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.03

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-119

Submitted by: tns
Approved by : tlh
Date : 21-AUG-12 NYS DOH # : 11626
QC by: Tom Burgess

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million LOQ-Limit of Quantitation

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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater Thermal Study

Date Sampled : 06-AUG-12 - 10-AUG-12 Account No.: 19982
Date Received : 14-AUG-12 Login No. : L271693
Date Analyzed : 15-AUG-12 - 16-AUG-12
Report ID : 748412

Client ID : HC 90 DAY TF **Lab ID : L271693-8** **Air Volume : 1.2 Liter**
Date Sampled : 08/08/12 **Date Analyzed : 08/15/12**

Parameter	LOQ ug	Front ug	Back ug	Total ug	Conc mg/m3	ppm
Acetaldehyde	0.1	1.3	<0.1	1.3	1.1	0.60
Benzaldehyde	0.1	0.2	<0.1	0.2	0.2	0.05
Butyraldehyde	0.1	0.2	<0.1	0.3	0.2	0.07
Crotonaldehyde	0.1	<0.1	<0.1	<0.1	<0.09	<0.03
Formaldehyde	0.1	<0.1	<0.1	<0.1	<0.08	<0.07
Isovaleraldehyde	0.1	1.6	0.10	1.7	1.4	0.41
Propionaldehyde	0.1	0.4	<0.1	0.5	0.4	0.2
Valeraldehyde	0.1	<0.1	<0.1	<0.1	<0.09	<0.02

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media : 226-119

Submitted by: tns
Approved by : tlh
Date : 21-AUG-12 NYS DOH # : 11626
QC by: Tom Burgess

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million LOQ-Limit of Quantitation

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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater Thermal Study

Date Sampled : 06-AUG-12 - 11-AUG-12 Account No.: 19982
Date Received : 14-AUG-12 Login No. : L271693
Date Analyzed : 15-AUG-12 - 16-AUG-12
Report ID : 748445

Sulfuric Acid

	Sample ID	Lab ID	Air Vol liter	Front ug	Back ug	Total ug	Conc mg/m3
	VR 100 DAY 1	L271693-9	3.2	8	<5	8	2
	HC 100 DAY 1	L271693-10	1.2	6	<5	6	5
	VR 90 DAY 1	L271693-11	3.7	8	<5	8	2
*	VR 90 DAY 23	L271693-12	3	110	17	*130	*43
%	VR 90 TF	L271693-13	3.2	<5	<5	<5	<2
	HC 90 DAY 1	L271693-14	3.75	<5	<5	<5	<1
#*	HC 90 DAY 24	L271693-15	5.8	210	97	*300	*52
!	HC 90 DAY TF	L271693-16	3.3	<5	6	6	2

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Level of quantitation: 5 ug
Analytical Method : mod. NIOSH 7903; IC
OSHA PEL (TWA) : 1 mg/m3
Collection Media : 226-10-03

Submitted by: tmk
Approved by : dnf/tlh
Date : 21-AUG-12 NYS DOH # : 11626
QC by: Tom Burgess

< -Less Than
> -Greater Than
NA -Not Applicable
mg -Milligrams
ug -Micrograms
ND -Not Detected
m3 -Cubic Meters
l -Liters
ppm -Parts per Million
kg -Kilograms
NS -Not Specified

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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater Thermal Study

Date Sampled : 06-AUG-12 - 11-AUG-12 Account No.: 19982
Date Received : 14-AUG-12 Login No. : L271693
Date Analyzed : 15-AUG-12
Report ID : 748446

Phosphoric Acid

	Sample ID	Lab ID	Air Vol liter	Front ug	Back ug	Total ug	Conc mg/m3
%	VR 100 DAY 1	L271693-9	3.2	<5	<5	<5	<2
%	HC 100 DAY 1	L271693-10	1.2	<5	<5	<5	<4
	VR 90 DAY 1	L271693-11	3.7	<5	<5	<5	<1
%	VR 90 DAY 23	L271693-12	3	<5	<5	<5	<2
%	VR 90 TF	L271693-13	3.2	<5	<5	<5	<2
	HC 90 DAY 1	L271693-14	3.75	<5	<5	<5	<1
#	HC 90 DAY 24	L271693-15	5.8	<5	<5	<5	<0.9
%	HC 90 DAY TF	L271693-16	3.3	<5	<5	<5	<2

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Level of quantitation: 5 ug
Analytical Method : mod. NIOSH 7903; IC
OSHA PEL (TWA) : 1 mg/m3
Collection Media : 226-10-03

Submitted by: tmk
Approved by : dnf/tlh
Date : 21-AUG-12 NYS DOH # : 11626
QC by: Tom Burgess

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million

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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater Thermal Study

Date Sampled : 06-AUG-12 - 11-AUG-12 Account No.: 19982
Date Received : 14-AUG-12 Login No. : L271693
Date Analyzed : 15-AUG-12
Report ID : 748447

Hydrobromic Acid

	Sample ID	Lab ID	Air Vol liter	Front ug	Back ug	Total ug	Conc mg/m3	ppm
	VR 100 DAY 1	L271693-9	3.2	<5	<5	<5	<2	<0.5
	HC 100 DAY 1	L271693-10	1.2	<5	<5	<5	<4	<1
	VR 90 DAY 1	L271693-11	3.7	<5	<5	<5	<1	<0.4
	VR 90 DAY 23	L271693-12	3	<5	<5	<5	<2	<0.5
	VR 90 TF	L271693-13	3.2	<5	<5	<5	<2	<0.5
	HC 90 DAY 1	L271693-14	3.75	<5	<5	<5	<1	<0.4
#	HC 90 DAY 24	L271693-15	5.8	<5	<5	<5	<0.9	<0.3
	HC 90 DAY TF	L271693-16	3.3	<5	<5	<5	<2	<0.5

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Level of quantitation: 5 ug
Analytical Method : mod. NIOSH 7903; IC
OSHA PEL (TWA) : 3 ppm
Collection Media : 226-10-03

Submitted by: tmk
Approved by : dnf/tlh
Date : 21-AUG-12 NYS DOH # : 11626
QC by: Tom Burgess

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million

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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater Thermal Study

Date Sampled : 06-AUG-12 - 11-AUG-12 Account No.: 19982
Date Received : 14-AUG-12 Login No. : L271693
Date Analyzed : 15-AUG-12
Report ID : 748448

Hydrochloric Acid

	Sample ID	Lab ID	Air Vol liter	Front ug	Back ug	Total ug	Conc mg/m3	ppm
	VR 100 DAY 1	L271693-9	3.2	<5	<5	<5	<2	<1
	HC 100 DAY 1	L271693-10	1.2	<5	<5	<5	<4	<3
	VR 90 DAY 1	L271693-11	3.7	<5	<5	<5	<1	<0.9
	VR 90 DAY 23	L271693-12	3	<5	<5	<5	<2	<1
	VR 90 TF	L271693-13	3.2	<5	<5	<5	<2	<1
	HC 90 DAY 1	L271693-14	3.75	6	<5	6	2	1
#	HC 90 DAY 24	L271693-15	5.8	<5	<5	<5	<0.9	<0.6
	HC 90 DAY TF	L271693-16	3.3	<5	<5	<5	<2	<1

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Level of quantitation: 5 ug
Analytical Method : mod. NIOSH 7903; IC
OSHA PEL (TWA) : 5 ppm Ceiling
Collection Media : 226-10-03

Submitted by: tmk
Approved by : dnf/tlh
Date : 21-AUG-12 NYS DOH # : 11626
QC by: Tom Burgess

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million

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LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater Thermal Study

Date Sampled : 06-AUG-12 - 11-AUG-12 Account No.: 19982
Date Received : 14-AUG-12 Login No. : L271693
Date Analyzed : 15-AUG-12
Report ID : 748450

Hydrofluoric Acid

	Sample ID	Lab ID	Air Vol liter	Front ug	Back ug	Total ug	Conc mg/m3	ppm
	VR 100 DAY 1	L271693-9	3.2	<5	<5	<5	<2	<2
%	HC 100 DAY 1	L271693-10	1.2	<5	<5	<5	<4	<5
	VR 90 DAY 1	L271693-11	3.7	<5	<5	<5	<1	<2
	VR 90 DAY 23	L271693-12	3	<5	<5	<5	<2	<2
	VR 90 TF	L271693-13	3.2	<5	<5	<5	<2	<2
	HC 90 DAY 1	L271693-14	3.75	<5	<5	<5	<1	<2
#	HC 90 DAY 24	L271693-15	5.8	<5	<5	<5	<0.9	<1
	HC 90 DAY TF	L271693-16	3.3	<5	<5	<5	<2	<2

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Level of quantitation: 5 ug
Analytical Method : mod. NIOSH 7903; IC
OSHA PEL (TWA) : 3 ppm
Collection Media : 226-10-03

Submitted by: tmk
Approved by : dnf/tlh
Date : 21-AUG-12 NYS DOH # : 11626
QC by: Tom Burgess

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million

GALSON LABORATORIES

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.galsonlabs.com

LABORATORY ANALYSIS REPORT

Client : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater Thermal Study

Date Sampled : 06-AUG-12 - 11-AUG-12 Account No.: 19982
Date Received : 14-AUG-12 Login No. : L271693
Date Analyzed : 15-AUG-12
Report ID : 748451

Nitric Acid

	Sample ID	Lab ID	Air Vol liter	Front ug	Back ug	Total ug	Conc mg/m3	ppm
	VR 100 DAY 1	L271693-9	3.2	<5	<5	<5	<2	<0.6
	HC 100 DAY 1	L271693-10	1.2	<5	<5	<5	<4	<2
	VR 90 DAY 1	L271693-11	3.7	<5	<5	<5	<1	<0.5
	VR 90 DAY 23	L271693-12	3	<5	<5	<5	<2	<0.6
	VR 90 TF	L271693-13	3.2	<5	<5	<5	<2	<0.6
	HC 90 DAY 1	L271693-14	3.75	<5	<5	<5	<1	<0.5
#	HC 90 DAY 24	L271693-15	5.8	<5	<5	<5	<0.9	<0.3
	HC 90 DAY TF	L271693-16	3.3	<5	<5	<5	<2	<0.6

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Level of quantitation: 5 ug
Analytical Method : mod. NIOSH 7903; IC
OSHA PEL (TWA) : 2 ppm
Collection Media : 226-10-03

Submitted by: tmk
Approved by : dnf/tlh
Date : 21-AUG-12 NYS DOH # : 11626
QC by: Tom Burgess

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million

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LABORATORY FOOTNOTE REPORT

Client Name : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater Thermal Study

Date Sampled : 06-AUG-12 - 11-AUG-12 Account No.: 19982
Date Received: 14-AUG-12 Login No. : L271693
Date Analyzed: 15-AUG-12 - 16-AUG-12

Unless otherwise noted below, all quality control results associated with the samples were within established control limits.

Unrounded results are carried through the calculations that yield the final result and the final result is rounded to the number of significant figures appropriate to the accuracy of the analytical method. Please note that results appearing in the columns preceeding the final result column may have been rounded in order to fit the report format and therefore, if carried through the calculations, may not yield an identical final result to the one reported.

The stated LOQs for each analyte represent the demonstrated LOQ concentrations prior to correction for desorption efficiency (if applicable).

^ L271693 (Report ID: 748412):
SOPs: LC-SOP-4(11)
ACETALDEHYDE - Total ug corrected for a desorption efficiency of 99%.
BENZALDEHYDE - Total ug corrected for a desorption efficiency of 103%.
BUTYRALDEHYDE - Total ug corrected for a desorption efficiency of 89%.
Crotonaldehyde - Total ug corrected for a desorption efficiency of 95%.
FORMALDEHYDE - Total ug corrected for a desorption efficiency of 99%.
ISOVALERALDEHYDE - Total ug corrected for a desorption efficiency of 99%.
PROPIONALDEHYDE - Total ug corrected for a desorption efficiency of 99%.
VALERALDEHYDE - Total ug corrected for a desorption efficiency of 98%.
Formaldehyde results have been corrected for the average background found on the media:
front section = 0.0460 ug and back section = 0.0134 ug for lot #7808 for all samples except 3.
Acetaldehyde results have been corrected for the average background found on the media:
front section = 0.0573 ug and back section = 0.0397 ug for lot #7808 for all samples except 3.
Formaldehyde results have been corrected for the average background found on the media:
front section = 0.0502 ug and back section = 0.0196 ug for lot #7776 for sample 3.
Acetaldehyde results have been corrected for the average background found on the media:
front section = 0.0392 ug and back section = 0.0217 ug for lot #7776 for sample 3.
The percent recovery for the blank spike for the following compounds were outside of house established control limits:
Benzaldehyde at 89.4%; control limits 91.9-105%
Crotonaldehyde at 76.5%; control limits 84.7-121%
The percent recovery for the blank spike dupilcate for the following compounds were outside of house established control limits:
Benzaldehyde at 88.3%; control limits 91.9-105%
Crotonaldehyde at 76.8%; control limits 84.7-121%
Isovaleraldehyde at 93%; control limits 93.3-110%
Where possible, control limits are statistically generated in-house.
In the absence of statistical limits, guidance default limits of 75-125% are used.
Reported results may be biased low.

*^L271693-1 (Report ID: 748412):
Result reported as (*) designates possible breakthrough or migration.
Reported results may be biased low.

&*^L271693-6 (Report ID: 748412):
Result reported as (*) designates possible breakthrough or migration.
Reported results may be biased low.
The 2,4-DNPH peak for this sample was not a minimum of 2.7 times larger than the Formaldehyde-DNPH peak (as required by NIOSH method 2016) thus indicating that breakthrough from the sampler may have occurred. The reported results may be biased low.

< -Less Than	mg -Milligrams	m3 -Cubic Meters	kg -Kilograms
> -Greater Than	ug -Micrograms	l -Liters	NS -Not Specified
NA -Not Applicable	ND -Not Detected	ppm -Parts per Million	

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LABORATORY FOOTNOTE REPORT

Client Name : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater Thermal Study

Date Sampled : 06-AUG-12 - 11-AUG-12 Account No.: 19982
Date Received: 14-AUG-12 Login No. : L271693
Date Analyzed: 15-AUG-12 - 16-AUG-12

Unless otherwise noted below, all quality control results associated with the samples were within established control limits.

Unrounded results are carried through the calculations that yield the final result and the final result is rounded to the number of significant figures appropriate to the accuracy of the analytical method. Please note that results appearing in the columns preceeding the final result column may have been rounded in order to fit the report format and therefore, if carried through the calculations, may not yield an identical final result to the one reported.

The stated LOQs for each analyte represent the demonstrated LOQ concentrations prior to correction for desorption efficiency (if applicable).

L271693-6 (Report ID: 748412):

Parameter	Method	PEL
Acetaldehyde	mod. NIOSH 2016; HPLC/UV	200 ppm
Benzaldehyde	mod. NIOSH 2016; HPLC/UV	N/A
Butyraldehyde	mod. NIOSH 2016; HPLC/UV	N/A
Crotonaldehyde	mod. NIOSH 2016; HPLC/UV	2 ppm
Formaldehyde	mod. NIOSH 2016; HPLC/UV	0.75 ppm
Isovaleraldehyde	mod. NIOSH 2016; HPLC/UV	N/A
Propionaldehyde	mod. NIOSH 2016; HPLC/UV	N/A
Valeraldehyde	mod. NIOSH 2016; HPLC/UV	N/A

L271693 (Report ID: 748445):
SOPs: ii-n7903(8)
Results have been corrected for average background found on the media.
For samples 9 - 13, and 15-16 : Front section only = 1.9306 ug for lot#7596.
For sample 14 : Front section only = 1.8581 ug for lot#7174.

\# L271693 (Report ID: 748445):
Received sample tube uncapped. Unknown effect on sample result.

! L271693 (Report ID: 748445):
Tube may have been reversed during sampling.

* L271693 (Report ID: 748445):
Result reported as (*) designates possible breakthrough or migration.
Reported results may be biased low.

% L271693 (Report ID: 748445):
The suggested minimum air volume necessary for this method is 5L.

L271693 (Report ID: 748446):
SOPs: ii-n7903(8)

\# L271693 (Report ID: 748446):
Received sample tube uncapped. Unknown effect on sample result.

% L271693 (Report ID: 748446):
The suggested minimum air volume necessary for this method is 5L.

L271693 (Report ID: 748447):
SOPs: ii-n7903(8)

\# L271693 (Report ID: 748447):
Received sample tube uncapped. Unknown effect on sample result.

< -Less Than mg -Milligrams m3 -Cubic Meters kg -Kilograms
> -Greater Than ug -Micrograms l -Liters NS -Not Specified
NA -Not Applicable ND -Not Detected ppm -Parts per Million

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LABORATORY FOOTNOTE REPORT

Client Name : Kemron Environmental Services, Inc.
Site : Bridgewater
Project No. : Bridgewater Thermal Study

Date Sampled : 06-AUG-12 - 11-AUG-12 Account No.: 19982
Date Received: 14-AUG-12 Login No. : L271693
Date Analyzed: 15-AUG-12 - 16-AUG-12

Unless otherwise noted below, all quality control results associated with the samples were within established control limits.

Unrounded results are carried through the calculations that yield the final result and the final result is rounded to the number of significant figures appropriate to the accuracy of the analytical method. Please note that results appearing in the columns preceeding the final result column may have been rounded in order to fit the report format and therefore, if carried through the calculations, may not yield an identical final result to the one reported.

The stated LOQs for each analyte represent the demonstrated LOQ concentrations prior to correction for desorption efficiency (if applicable).

L271693 (Report ID: 748448):
SOPs: ii-n7903(8)

\# L271693 (Report ID: 748448):
Received sample tube uncapped. Unknown effect on sample result.

L271693 (Report ID: 748450):
SOPs: ii-n7903(8)

\# L271693 (Report ID: 748450):
Received sample tube uncapped. Unknown effect on sample result.

% L271693 (Report ID: 748450):
The suggested minimum air volume necessary for this method is 5L.

L271693 (Report ID: 748451):
SOPs: ii-n7903(8)

\# L271693 (Report ID: 748451):
Received sample tube uncapped. Unknown effect on sample result.

< -Less Than	mg -Milligrams	m3 -Cubic Meters	kg -Kilograms
> -Greater Than	ug -Micrograms	l -Liters	NS -Not Specified
NA -Not Applicable	ND -Not Detected	ppm -Parts per Million	

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888-432-LABS (5227)
Fax: (315) 437-0571
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☐ New Client?

Client Account No.*: _____

Report To*: KEMRON Environmental Services
1359-A Ellsworth Industrial Blvd
Atlanta, GA 30318

Phone No.*: (404) 636-0928
Cell No.: (404) 576-3172
Email Results to: Tommy Jordan
Email address: tjordan@kemron.com

Invoice To*: Tommy Jordan
KEMRON Environmental Services
1359-A Ellsworth Industrial Blvd
Atlanta, GA 30318

Phone No.: (404) 636-0928
Email: tjordan@kemron.com
P.O. No.: SE 0416-007
Credit Card: ☐ Card on File ☐ Call for Credit Card Info.

89

☐ Samples submitted using the FreePumpLoan™ Program ☑ Samples submitted using the FreeSamplingBadges™ Program

Need Results By:	(surcharge)
☑ 5 Business Days	0%
☐ 4 Business Days	35%
☐ 3 Business Days	50%
☐ 2 Business Days	75%
☐ Next Day by 6pm	100%
☐ Next Day by Noon	150%
☐ Same Day	200%

Site Name: Bridgewater Project: Bridgewater Thermal Study Sampled by: Mason M Reedy

Comments: Report "profiles" for Aldephydes and Inorganic Acid

List description of industry or Process/interferences present in sampling area:

State samples were collected in (e.g., NY)

Please indicate which OEL this data will be used for:
☐ OSHA PEL ☐ ACGIH TLV ☐ Cal OSHA
☐ MSHA ☑ Other (specify):

Sample Identification* (Maxmium of 20 Characters)		Date Sampled	Collection Medium	Sample Volume Sample Time Sample Area*	Sample Units*: L,ml,min,in2,cm2,ft2	Analysis Requested*	Method Reference^	Hexavalent Chromium Process (e.g., welding plating, painting, etc.)*
VR 100	Day 1	08/08/12	TUBE 226-119 226-10-03 (S1)	1.2	L	2016M Aldephydes		
VR 100	Day 1	08/08/12	TUBE 226-10-03	3.2	L	7903M Inorganic Acid		
HC 100	Day 1	08/08/12	TUBE 226-10-03	3.3	L	2016M Aldephydes		
HC 100	Day 1	08/08/12	TUBE 226-119	1.2	L	7903M Inorganic Acid		
VR 90	Day 1	08/10/12	TUBE 226-10-03	0.85	L	2016M Aldephydes		
VR 90	Day 1	08/11/12	TUBE 226-119	3.7	L	7903M Inorganic Acid		
VR 90	Day 23	08/06/12	TUBE 226-10-03	1.0	L	2016M Aldephydes		
VR 90	Day 23	08/06/12	TUBE 226-119	3.0	L	7903M Inorganic Acid		
VR 90	Tf	08/08/12	TUBE 226-10-03	1.79	L	2016M Aldephydes		
VR 90	Tf	08/07/12	TUBE 226-119	3.2	L	7903M Inorganic Acid		
* Rear uncapped (S1)								

^Galson Laboratories will subsititute our routine/preferred method if it does not match the method listed on the COC unless this box is checked: ☐ Use method(s) listed on COC

For metals analysis: if requesting an analyte with the option of a lower LOQ, please indicate if the lower LOQ is required (only available for certain analytes - see SAG):

For crystalline silica: form(s) of silica needed must be indicated (Quartz, Cristobalite, and/or Tridymite)*:

Chain of Custody	Print Name	Signature	Date/Time
Relinquished by:	Mason M Reedy	Mason M Reedy	1220, 8/13/2012
Received by LAB:	M-Kraus	M-Kraus	8/14/12 1144

Samples received after 3pm will be considered as next day's business
* Required fields, failure to complete these fields may result in a delay in your samples being processed.

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Fax: (315) 437-0571
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☐ New Client?

Client Account No.*: _____

Report To*: KEMRON Environmental Services
1359-A Ellsworth Industrial Blvd
Atlanta, GA 30318

Phone No.*: (404) 636-0928
Cell No.: (404) 576-3172
Email Results to: Tommy Jordan
Email address: tjordan@kemron.com

Invoice To*: Tommy Jordan
KEMRON Environmental Services
1359-A Ellsworth Industrial Blvd
Atlanta, GA 30318

Phone No.: (404) 636-0928
Email: tjordan@kemron.com
P.O. No.: SE 0416-007
Credit Card: ☐ Card on File ☐ Call for Credit Card Info.

29

☐ Samples submitted using the FreePumpLoan™ Program ☑ Samples submitted using the FreeSamplingBadges™ Program

Need Results By:	(surcharge)
☑ 5 Business Days	0%
☐ 4 Business Days	35%
☐ 3 Business Days	50%
☐ 2 Business Days	75%
☐ Next Day by 6pm	100%
☐ Next Day by Noon	150%
☐ Same Day	200%

Site Name: Bridgewater Project: Bridgewater Thermal Study Sampled by: Mason M Reedy

Comments: Report "profiles" for Aldephydes and Inorganic Acid

List description of industry or Process/interferences present in sampling area:

State samples were collected in (e.g., NY)

Please indicate which OEL this data will be used for:
☐ OSHA PEL ☐ ACGIH TLV ☐ Cal OSHA
☐ MSHA ☑ Other (specify):

Sample Identification* (Maxmium of 20 Characters)	Date Sampled	Collection Medium	Sample Volume Sample Time Sample Area*	Sample Units*: L, ml,min,in2,cm2,ft2	Analysis Requested*	Method Reference^	Hexavalent Chromium Process (e.g., welding plating, painting, etc.)*
HC 90 Day 1	08/10/12	TUBE 226-119*	1.0	L	2016M Aldephydes		
HC 90 Day 1	08/11/12	TUBE 226-10-03	3.75	L	7903M Inorganic Acid		
HC 90 Day 24	08/06/12	TUBE 226-10-03	1.0	L	2016M Aldephydes		
HC 90 Day 24	08/06/02	TUBE 226-119*	5.8	L	7903M Inorganic Acid		
HC 90 Day Tf	08/08/12	TUBE 226-10-03	1.2	L	2016M Aldephydes		
HC 90 Day Tf	08/08/12	TUBE 226-119*	3.3	L	7903M Inorganic Acid		

* Record uncapped. SK

^Galson Laboratories will subsititute our routine/preferred method if it does not match the method listed on the COC unless this box is checked: ☐ Use method(s) listed on COC

For metals analysis: if requesting an analyte with the option of a lower LOQ, please indicate if the lower LOQ is required (only available for certain analytes - see SAG):

For crystalline silica: form(s) of silica needed must be indicated (Quartz, Cristobalite, and/or Tridymite)*:

Chain of Custody	Print Name	Signature	Date/Time
Relinquished by:	Mason M Reedy	Mason M Reedy	1220 8/13/2012
Received by LAB:	M. Krawiec	M. Krawiec	8/14/12 1144

Samples received after 3pm will be considered as next day's business
* Required fields, failure to complete these fields may result in a delay in your samples being processed.

Page 20 of 20 Report Reference:1 Generated:21-AUG-12 16:27
American Cyanamid Superfund Site
TerraTherm Treatability Study
Page 921 of 1332

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8/2/2012

Mr. Tommy Jordan
Kemron Environmental Services
1359-A Ellsworth Industrial Boulevard

Atlanta GA 30318

Project Name: Bridgewater, NJ
Project #: SE0416-007
Workorder #: 1207389

Dear Mr. Tommy Jordan

The following report includes the data for the above referenced project for sample(s) received on 7/20/2012 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 (5&20 ppbv) are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Ausha Scott

Project Manager

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WORK ORDER #: 1207389

Work Order Summary

CLIENT:	Mr. Tommy Jordan Kemron Environmental Services 1359-A Ellsworth Industrial Boulevard Atlanta, GA 30318	**BILL TO:**	Accounts Payable Kemron Environmental Services 1359-A Ellsworth Industrial Boulevard Atlanta, GA 30318
PHONE:	404-516-3172	**P.O. #**	
FAX:	404-636-7162	**PROJECT #**	SE0416-007 Bridgewater, NJ
DATE RECEIVED:	07/20/2012	**CONTACT:**	Ausha Scott
DATE COMPLETED:	08/02/2012		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	HC90C-Day3	Modified TO-15 (5&20 ppbv	0.4 psi	5 psi
02A	VR100C-Day3	Modified TO-15 (5&20 ppbv	2.6 "Hg	5 psi
03A	HC100C-Day3	Modified TO-15 (5&20 ppbv	3.0 "Hg	5 psi
04A	VR90C-Day3	Modified TO-15 (5&20 ppbv	2.0 "Hg	5 psi
05A	Lab Blank	Modified TO-15 (5&20 ppbv	NA	NA
06A	CCV	Modified TO-15 (5&20 ppbv	NA	NA
07A	LCS	Modified TO-15 (5&20 ppbv	NA	NA
07AA	LCSD	Modified TO-15 (5&20 ppbv	NA	NA

CERTIFIED BY: Heidi Mayo DATE: 08/02/12

Technical Director

Certfication numbers: AZ Licensure AZ0719, CA NELAP - 02110CA, LA NELAP - 02089,
NY NELAP - 11291, TX NELAP - T104704434-11-3, UT NELAP -CA009332011-1, WA NELAP - C935
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,
Accreditation number: E87680, Effective date: 07/01/11 , Expiration date: 06/30/12.
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins | Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
EPA Method TO-15 Soil Gas
Kemron Environmental Services
Workorder# 1207389

Four 6 Liter Summa Canister samples were received on July 20, 2012. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode. The method involves concentrating up to 50 mLs of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

Despite the use of a flow controller for sample collection, the final canister vacuum for sample HC90C-Day3 was measured at pressure in the field. This pressure reading was confirmed by the laboratory upon sample receipt.

Analytical Notes

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page.

Dilution was performed on samples HC90C-Day3, VR100C-Day3, HC100C-Day3 and VR90C-Day3 due to the presence of high level target species.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the reporting limit.
UJ- Non-detected compound associated with low bias in the CCV and/or LCS.
N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified

b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS

Client Sample ID: HC90C-Day3

Lab ID#: 1207389-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	43000	64000	90000	130000
Acetone	43000	110000	100000	260000
Benzene	11000	7300000	35000	23000000
Toluene	11000	4600000	41000	18000000
Ethyl Benzene	11000	78000	47000	340000
m,p-Xylene	11000	620000	47000	2700000
o-Xylene	11000	78000	47000	340000
Cumene	11000	40000	53000	200000

Client Sample ID: VR100C-Day3

Lab ID#: 1207389-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	98000	140000	230000	340000
Benzene	24000	9800000	78000	31000000
Toluene	24000	3900000	92000	15000000
Ethyl Benzene	24000	31000	110000	140000
m,p-Xylene	24000	240000	110000	1000000
o-Xylene	24000	43000	110000	190000

Client Sample ID: HC100C-Day3

Lab ID#: 1207389-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	50000	100000	100000	220000
Acetone	50000	72000	120000	170000
Benzene	12000	6000000	40000	19000000
Toluene	12000	2500000	47000	9400000
Ethyl Benzene	12000	34000	54000	150000
m,p-Xylene	12000	330000	54000	1400000
o-Xylene	12000	69000	54000	300000
Cumene	12000	50000	61000	250000

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS

Client Sample ID: VR90C-Day3

Lab ID#: 1207389-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Carbon Disulfide	90000	98000	280000	300000
Benzene	90000	64000000	290000	200000000
Toluene	90000	4600000	340000	17000000

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Client Sample ID: HC90C-Day3

Lab ID#: 1207389-01A

EPA METHOD TO-15 GC/MS

File Name:	**14072431**	**Date of Collection: 7/16/12 5:08:00 PM**	
Dil. Factor:	**2170**	**Date of Analysis: 7/25/12 06:51 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	11000	Not Detected	54000	Not Detected
Freon 114	11000	Not Detected	76000	Not Detected
Chloromethane	43000	64000	90000	130000
Vinyl Chloride	11000	Not Detected	28000	Not Detected
1,3-Butadiene	11000	Not Detected	24000	Not Detected
Bromomethane	11000	Not Detected	42000	Not Detected
Chloroethane	43000	Not Detected	110000	Not Detected
Freon 11	11000	Not Detected	61000	Not Detected
Ethanol	43000	Not Detected	82000	Not Detected
Freon 113	11000	Not Detected	83000	Not Detected
1,1-Dichloroethene	11000	Not Detected	43000	Not Detected
Acetone	43000	110000	100000	260000
2-Propanol	43000	Not Detected	110000	Not Detected
Carbon Disulfide	11000	Not Detected	34000	Not Detected
3-Chloropropene	43000	Not Detected	140000	Not Detected
Methylene Chloride	11000	Not Detected	38000	Not Detected
Methyl tert-butyl ether	11000	Not Detected	39000	Not Detected
trans-1,2-Dichloroethene	11000	Not Detected	43000	Not Detected
Hexane	11000	Not Detected	38000	Not Detected
1,1-Dichloroethane	11000	Not Detected	44000	Not Detected
2-Butanone (Methyl Ethyl Ketone)	43000	Not Detected	130000	Not Detected
cis-1,2-Dichloroethene	11000	Not Detected	43000	Not Detected
Tetrahydrofuran	11000	Not Detected	32000	Not Detected
Chloroform	11000	Not Detected	53000	Not Detected
1,1,1-Trichloroethane	11000	Not Detected	59000	Not Detected
Cyclohexane	11000	Not Detected	37000	Not Detected
Carbon Tetrachloride	11000	Not Detected	68000	Not Detected
2,2,4-Trimethylpentane	11000	Not Detected	51000	Not Detected
Benzene	11000	7300000	35000	23000000
1,2-Dichloroethane	11000	Not Detected	44000	Not Detected
Heptane	11000	Not Detected	44000	Not Detected
Trichloroethene	11000	Not Detected	58000	Not Detected
1,2-Dichloropropane	11000	Not Detected	50000	Not Detected
1,4-Dioxane	43000	Not Detected	160000	Not Detected
Bromodichloromethane	11000	Not Detected	73000	Not Detected
cis-1,3-Dichloropropene	11000	Not Detected	49000	Not Detected
4-Methyl-2-pentanone	11000	Not Detected	44000	Not Detected
Toluene	11000	4600000	41000	18000000
trans-1,3-Dichloropropene	11000	Not Detected	49000	Not Detected
1,1,2-Trichloroethane	11000	Not Detected	59000	Not Detected
Tetrachloroethene	11000	Not Detected	74000	Not Detected
2-Hexanone	43000	Not Detected	180000	Not Detected

eurofins | Air Toxics

Client Sample ID: HC90C-Day3

Lab ID#: 1207389-01A

EPA METHOD TO-15 GC/MS

File Name:	**14072431**	**Date of Collection: 7/16/12 5:08:00 PM**	
Dil. Factor:	**2170**	**Date of Analysis: 7/25/12 06:51 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	11000	Not Detected	92000	Not Detected
1,2-Dibromoethane (EDB)	11000	Not Detected	83000	Not Detected
Chlorobenzene	11000	Not Detected	50000	Not Detected
Ethyl Benzene	11000	78000	47000	340000
m,p-Xylene	11000	620000	47000	2700000
o-Xylene	11000	78000	47000	340000
Styrene	11000	Not Detected	46000	Not Detected
Bromoform	11000	Not Detected	110000	Not Detected
Cumene	11000	40000	53000	200000
1,1,2,2-Tetrachloroethane	11000	Not Detected	74000	Not Detected
Propylbenzene	11000	Not Detected	53000	Not Detected
4-Ethyltoluene	11000	Not Detected	53000	Not Detected
1,3,5-Trimethylbenzene	11000	Not Detected	53000	Not Detected
1,2,4-Trimethylbenzene	11000	Not Detected	53000	Not Detected
1,3-Dichlorobenzene	11000	Not Detected	65000	Not Detected
1,4-Dichlorobenzene	11000	Not Detected	65000	Not Detected
alpha-Chlorotoluene	11000	Not Detected	56000	Not Detected
1,2-Dichlorobenzene	11000	Not Detected	65000	Not Detected
1,2,4-Trichlorobenzene	43000	Not Detected	320000	Not Detected
Hexachlorobutadiene	43000	Not Detected	460000	Not Detected
Naphthalene	43000	Not Detected	230000	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	112	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	92	70-130

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Client Sample ID: VR100C-Day3

Lab ID#: 1207389-02A

EPA METHOD TO-15 GC/MS

File Name:	**14072433**	**Date of Collection: 7/16/12 5:04:00 PM**	
Dil. Factor:	**4900**	**Date of Analysis: 7/25/12 07:36 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	24000	Not Detected	120000	Not Detected
Freon 114	24000	Not Detected	170000	Not Detected
Chloromethane	98000	Not Detected	200000	Not Detected
Vinyl Chloride	24000	Not Detected	63000	Not Detected
1,3-Butadiene	24000	Not Detected	54000	Not Detected
Bromomethane	24000	Not Detected	95000	Not Detected
Chloroethane	98000	Not Detected	260000	Not Detected
Freon 11	24000	Not Detected	140000	Not Detected
Ethanol	98000	Not Detected	180000	Not Detected
Freon 113	24000	Not Detected	190000	Not Detected
1,1-Dichloroethene	24000	Not Detected	97000	Not Detected
Acetone	98000	140000	230000	340000
2-Propanol	98000	Not Detected	240000	Not Detected
Carbon Disulfide	24000	Not Detected	76000	Not Detected
3-Chloropropene	98000	Not Detected	310000	Not Detected
Methylene Chloride	24000	Not Detected	85000	Not Detected
Methyl tert-butyl ether	24000	Not Detected	88000	Not Detected
trans-1,2-Dichloroethene	24000	Not Detected	97000	Not Detected
Hexane	24000	Not Detected	86000	Not Detected
1,1-Dichloroethane	24000	Not Detected	99000	Not Detected
2-Butanone (Methyl Ethyl Ketone)	98000	Not Detected	290000	Not Detected
cis-1,2-Dichloroethene	24000	Not Detected	97000	Not Detected
Tetrahydrofuran	24000	Not Detected	72000	Not Detected
Chloroform	24000	Not Detected	120000	Not Detected
1,1,1-Trichloroethane	24000	Not Detected	130000	Not Detected
Cyclohexane	24000	Not Detected	84000	Not Detected
Carbon Tetrachloride	24000	Not Detected	150000	Not Detected
2,2,4-Trimethylpentane	24000	Not Detected	110000	Not Detected
Benzene	24000	9800000	78000	31000000
1,2-Dichloroethane	24000	Not Detected	99000	Not Detected
Heptane	24000	Not Detected	100000	Not Detected
Trichloroethene	24000	Not Detected	130000	Not Detected
1,2-Dichloropropane	24000	Not Detected	110000	Not Detected
1,4-Dioxane	98000	Not Detected	350000	Not Detected
Bromodichloromethane	24000	Not Detected	160000	Not Detected
cis-1,3-Dichloropropene	24000	Not Detected	110000	Not Detected
4-Methyl-2-pentanone	24000	Not Detected	100000	Not Detected
Toluene	24000	3900000	92000	15000000
trans-1,3-Dichloropropene	24000	Not Detected	110000	Not Detected
1,1,2-Trichloroethane	24000	Not Detected	130000	Not Detected
Tetrachloroethene	24000	Not Detected	170000	Not Detected
2-Hexanone	98000	Not Detected	400000	Not Detected

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Client Sample ID: VR100C-Day3

Lab ID#: 1207389-02A

EPA METHOD TO-15 GC/MS

File Name:	**14072433**	**Date of Collection: 7/16/12 5:04:00 PM**	
Dil. Factor:	**4900**	**Date of Analysis: 7/25/12 07:36 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	24000	Not Detected	210000	Not Detected
1,2-Dibromoethane (EDB)	24000	Not Detected	190000	Not Detected
Chlorobenzene	24000	Not Detected	110000	Not Detected
Ethyl Benzene	24000	31000	110000	140000
m,p-Xylene	24000	240000	110000	1000000
o-Xylene	24000	43000	110000	190000
Styrene	24000	Not Detected	100000	Not Detected
Bromoform	24000	Not Detected	250000	Not Detected
Cumene	24000	Not Detected	120000	Not Detected
1,1,2,2-Tetrachloroethane	24000	Not Detected	170000	Not Detected
Propylbenzene	24000	Not Detected	120000	Not Detected
4-Ethyltoluene	24000	Not Detected	120000	Not Detected
1,3,5-Trimethylbenzene	24000	Not Detected	120000	Not Detected
1,2,4-Trimethylbenzene	24000	Not Detected	120000	Not Detected
1,3-Dichlorobenzene	24000	Not Detected	150000	Not Detected
1,4-Dichlorobenzene	24000	Not Detected	150000	Not Detected
alpha-Chlorotoluene	24000	Not Detected	130000	Not Detected
1,2-Dichlorobenzene	24000	Not Detected	150000	Not Detected
1,2,4-Trichlorobenzene	98000	Not Detected	730000	Not Detected
Hexachlorobutadiene	98000	Not Detected	1000000	Not Detected
Naphthalene	98000	Not Detected	510000	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	111	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	94	70-130

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Client Sample ID: HC100C-Day3

Lab ID#: 1207389-03A

EPA METHOD TO-15 GC/MS

File Name:	**14072434**	**Date of Collection: 7/16/12 5:04:00 PM**	
Dil. Factor:	**2480**	**Date of Analysis: 7/25/12 07:56 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	12000	Not Detected	61000	Not Detected
Freon 114	12000	Not Detected	87000	Not Detected
Chloromethane	50000	100000	100000	220000
Vinyl Chloride	12000	Not Detected	32000	Not Detected
1,3-Butadiene	12000	Not Detected	27000	Not Detected
Bromomethane	12000	Not Detected	48000	Not Detected
Chloroethane	50000	Not Detected	130000	Not Detected
Freon 11	12000	Not Detected	70000	Not Detected
Ethanol	50000	Not Detected	93000	Not Detected
Freon 113	12000	Not Detected	95000	Not Detected
1,1-Dichloroethene	12000	Not Detected	49000	Not Detected
Acetone	50000	72000	120000	170000
2-Propanol	50000	Not Detected	120000	Not Detected
Carbon Disulfide	12000	Not Detected	39000	Not Detected
3-Chloropropene	50000	Not Detected	160000	Not Detected
Methylene Chloride	12000	Not Detected	43000	Not Detected
Methyl tert-butyl ether	12000	Not Detected	45000	Not Detected
trans-1,2-Dichloroethene	12000	Not Detected	49000	Not Detected
Hexane	12000	Not Detected	44000	Not Detected
1,1-Dichloroethane	12000	Not Detected	50000	Not Detected
2-Butanone (Methyl Ethyl Ketone)	50000	Not Detected	150000	Not Detected
cis-1,2-Dichloroethene	12000	Not Detected	49000	Not Detected
Tetrahydrofuran	12000	Not Detected	36000	Not Detected
Chloroform	12000	Not Detected	60000	Not Detected
1,1,1-Trichloroethane	12000	Not Detected	68000	Not Detected
Cyclohexane	12000	Not Detected	43000	Not Detected
Carbon Tetrachloride	12000	Not Detected	78000	Not Detected
2,2,4-Trimethylpentane	12000	Not Detected	58000	Not Detected
Benzene	12000	6000000	40000	19000000
1,2-Dichloroethane	12000	Not Detected	50000	Not Detected
Heptane	12000	Not Detected	51000	Not Detected
Trichloroethene	12000	Not Detected	67000	Not Detected
1,2-Dichloropropane	12000	Not Detected	57000	Not Detected
1,4-Dioxane	50000	Not Detected	180000	Not Detected
Bromodichloromethane	12000	Not Detected	83000	Not Detected
cis-1,3-Dichloropropene	12000	Not Detected	56000	Not Detected
4-Methyl-2-pentanone	12000	Not Detected	51000	Not Detected
Toluene	12000	2500000	47000	9400000
trans-1,3-Dichloropropene	12000	Not Detected	56000	Not Detected
1,1,2-Trichloroethane	12000	Not Detected	68000	Not Detected
Tetrachloroethene	12000	Not Detected	84000	Not Detected
2-Hexanone	50000	Not Detected	200000	Not Detected

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Client Sample ID: HC100C-Day3

Lab ID#: 1207389-03A

EPA METHOD TO-15 GC/MS

File Name:	**14072434**	**Date of Collection: 7/16/12 5:04:00 PM**	
Dil. Factor:	**2480**	**Date of Analysis: 7/25/12 07:56 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	12000	Not Detected	100000	Not Detected
1,2-Dibromoethane (EDB)	12000	Not Detected	95000	Not Detected
Chlorobenzene	12000	Not Detected	57000	Not Detected
Ethyl Benzene	12000	34000	54000	150000
m,p-Xylene	12000	330000	54000	1400000
o-Xylene	12000	69000	54000	300000
Styrene	12000	Not Detected	53000	Not Detected
Bromoform	12000	Not Detected	130000	Not Detected
Cumene	12000	50000	61000	250000
1,1,2,2-Tetrachloroethane	12000	Not Detected	85000	Not Detected
Propylbenzene	12000	Not Detected	61000	Not Detected
4-Ethyltoluene	12000	Not Detected	61000	Not Detected
1,3,5-Trimethylbenzene	12000	Not Detected	61000	Not Detected
1,2,4-Trimethylbenzene	12000	Not Detected	61000	Not Detected
1,3-Dichlorobenzene	12000	Not Detected	74000	Not Detected
1,4-Dichlorobenzene	12000	Not Detected	74000	Not Detected
alpha-Chlorotoluene	12000	Not Detected	64000	Not Detected
1,2-Dichlorobenzene	12000	Not Detected	74000	Not Detected
1,2,4-Trichlorobenzene	50000	Not Detected	370000	Not Detected
Hexachlorobutadiene	50000	Not Detected	530000	Not Detected
Naphthalene	50000	Not Detected	260000	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	110	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: VR90C-Day3

Lab ID#: 1207389-04A

EPA METHOD TO-15 GC/MS

File Name:	**14072436**	**Date of Collection: 7/16/12 5:05:00 PM**	
Dil. Factor:	**18000**	**Date of Analysis: 7/25/12 08:54 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	90000	Not Detected	440000	Not Detected
Freon 114	90000	Not Detected	630000	Not Detected
Chloromethane	360000	Not Detected	740000	Not Detected
Vinyl Chloride	90000	Not Detected	230000	Not Detected
1,3-Butadiene	90000	Not Detected	200000	Not Detected
Bromomethane	90000	Not Detected	350000	Not Detected
Chloroethane	360000	Not Detected	950000	Not Detected
Freon 11	90000	Not Detected	500000	Not Detected
Ethanol	360000	Not Detected	680000	Not Detected
Freon 113	90000	Not Detected	690000	Not Detected
1,1-Dichloroethene	90000	Not Detected	360000	Not Detected
Acetone	360000	Not Detected	860000	Not Detected
2-Propanol	360000	Not Detected	880000	Not Detected
Carbon Disulfide	90000	98000	280000	300000
3-Chloropropene	360000	Not Detected	1100000	Not Detected
Methylene Chloride	90000	Not Detected	310000	Not Detected
Methyl tert-butyl ether	90000	Not Detected	320000	Not Detected
trans-1,2-Dichloroethene	90000	Not Detected	360000	Not Detected
Hexane	90000	Not Detected	320000	Not Detected
1,1-Dichloroethane	90000	Not Detected	360000	Not Detected
2-Butanone (Methyl Ethyl Ketone)	360000	Not Detected	1100000	Not Detected
cis-1,2-Dichloroethene	90000	Not Detected	360000	Not Detected
Tetrahydrofuran	90000	Not Detected	260000	Not Detected
Chloroform	90000	Not Detected	440000	Not Detected
1,1,1-Trichloroethane	90000	Not Detected	490000	Not Detected
Cyclohexane	90000	Not Detected	310000	Not Detected
Carbon Tetrachloride	90000	Not Detected	570000	Not Detected
2,2,4-Trimethylpentane	90000	Not Detected	420000	Not Detected
Benzene	90000	64000000	290000	200000000
1,2-Dichloroethane	90000	Not Detected	360000	Not Detected
Heptane	90000	Not Detected	370000	Not Detected
Trichloroethene	90000	Not Detected	480000	Not Detected
1,2-Dichloropropane	90000	Not Detected	420000	Not Detected
1,4-Dioxane	360000	Not Detected	1300000	Not Detected
Bromodichloromethane	90000	Not Detected	600000	Not Detected
cis-1,3-Dichloropropene	90000	Not Detected	410000	Not Detected
4-Methyl-2-pentanone	90000	Not Detected	370000	Not Detected
Toluene	90000	4600000	340000	17000000
trans-1,3-Dichloropropene	90000	Not Detected	410000	Not Detected
1,1,2-Trichloroethane	90000	Not Detected	490000	Not Detected
Tetrachloroethene	90000	Not Detected	610000	Not Detected
2-Hexanone	360000	Not Detected	1500000	Not Detected

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Client Sample ID: VR90C-Day3

Lab ID#: 1207389-04A

EPA METHOD TO-15 GC/MS

File Name:	**14072436**	**Date of Collection: 7/16/12 5:05:00 PM**	
Dil. Factor:	**18000**	**Date of Analysis: 7/25/12 08:54 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	90000	Not Detected	770000	Not Detected
1,2-Dibromoethane (EDB)	90000	Not Detected	690000	Not Detected
Chlorobenzene	90000	Not Detected	410000	Not Detected
Ethyl Benzene	90000	Not Detected	390000	Not Detected
m,p-Xylene	90000	Not Detected	390000	Not Detected
o-Xylene	90000	Not Detected	390000	Not Detected
Styrene	90000	Not Detected	380000	Not Detected
Bromoform	90000	Not Detected	930000	Not Detected
Cumene	90000	Not Detected	440000	Not Detected
1,1,2,2-Tetrachloroethane	90000	Not Detected	620000	Not Detected
Propylbenzene	90000	Not Detected	440000	Not Detected
4-Ethyltoluene	90000	Not Detected	440000	Not Detected
1,3,5-Trimethylbenzene	90000	Not Detected	440000	Not Detected
1,2,4-Trimethylbenzene	90000	Not Detected	440000	Not Detected
1,3-Dichlorobenzene	90000	Not Detected	540000	Not Detected
1,4-Dichlorobenzene	90000	Not Detected	540000	Not Detected
alpha-Chlorotoluene	90000	Not Detected	460000	Not Detected
1,2-Dichlorobenzene	90000	Not Detected	540000	Not Detected
1,2,4-Trichlorobenzene	360000	Not Detected	2700000	Not Detected
Hexachlorobutadiene	360000	Not Detected	3800000	Not Detected
Naphthalene	360000	Not Detected	1900000	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	110	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1207389-05A

EPA METHOD TO-15 GC/MS

File Name:	**14072406**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 7/24/12 10:50 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5.0	Not Detected	25	Not Detected
Freon 114	5.0	Not Detected	35	Not Detected
Chloromethane	20	Not Detected	41	Not Detected
Vinyl Chloride	5.0	Not Detected	13	Not Detected
1,3-Butadiene	5.0	Not Detected	11	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	20	Not Detected	53	Not Detected
Freon 11	5.0	Not Detected	28	Not Detected
Ethanol	20	Not Detected	38	Not Detected
Freon 113	5.0	Not Detected	38	Not Detected
1,1-Dichloroethene	5.0	Not Detected	20	Not Detected
Acetone	20	Not Detected	48	Not Detected
2-Propanol	20	Not Detected	49	Not Detected
Carbon Disulfide	5.0	Not Detected	16	Not Detected
3-Chloropropene	20	Not Detected	63	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	5.0	Not Detected	18	Not Detected
trans-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Hexane	5.0	Not Detected	18	Not Detected
1,1-Dichloroethane	5.0	Not Detected	20	Not Detected
2-Butanone (Methyl Ethyl Ketone)	20	Not Detected	59	Not Detected
cis-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Tetrahydrofuran	5.0	Not Detected	15	Not Detected
Chloroform	5.0	Not Detected	24	Not Detected
1,1,1-Trichloroethane	5.0	Not Detected	27	Not Detected
Cyclohexane	5.0	Not Detected	17	Not Detected
Carbon Tetrachloride	5.0	Not Detected	31	Not Detected
2,2,4-Trimethylpentane	5.0	Not Detected	23	Not Detected
Benzene	5.0	Not Detected	16	Not Detected
1,2-Dichloroethane	5.0	Not Detected	20	Not Detected
Heptane	5.0	Not Detected	20	Not Detected
Trichloroethene	5.0	Not Detected	27	Not Detected
1,2-Dichloropropane	5.0	Not Detected	23	Not Detected
1,4-Dioxane	20	Not Detected	72	Not Detected
Bromodichloromethane	5.0	Not Detected	34	Not Detected
cis-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
4-Methyl-2-pentanone	5.0	Not Detected	20	Not Detected
Toluene	5.0	Not Detected	19	Not Detected
trans-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
1,1,2-Trichloroethane	5.0	Not Detected	27	Not Detected
Tetrachloroethene	5.0	Not Detected	34	Not Detected
2-Hexanone	20	Not Detected	82	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1207389-05A

EPA METHOD TO-15 GC/MS

File Name:	**14072406**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 7/24/12 10:50 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	5.0	Not Detected	42	Not Detected
1,2-Dibromoethane (EDB)	5.0	Not Detected	38	Not Detected
Chlorobenzene	5.0	Not Detected	23	Not Detected
Ethyl Benzene	5.0	Not Detected	22	Not Detected
m,p-Xylene	5.0	Not Detected	22	Not Detected
o-Xylene	5.0	Not Detected	22	Not Detected
Styrene	5.0	Not Detected	21	Not Detected
Bromoform	5.0	Not Detected	52	Not Detected
Cumene	5.0	Not Detected	24	Not Detected
1,1,2,2-Tetrachloroethane	5.0	Not Detected	34	Not Detected
Propylbenzene	5.0	Not Detected	24	Not Detected
4-Ethyltoluene	5.0	Not Detected	24	Not Detected
1,3,5-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,2,4-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,3-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,4-Dichlorobenzene	5.0	Not Detected	30	Not Detected
alpha-Chlorotoluene	5.0	Not Detected	26	Not Detected
1,2-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,2,4-Trichlorobenzene	20	Not Detected	150	Not Detected
Hexachlorobutadiene	20	Not Detected	210	Not Detected
Naphthalene	20	Not Detected	100	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	110	70-130
Toluene-d8	103	70-130
4-Bromofluorobenzene	94	70-130

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Client Sample ID: CCV

Lab ID#: 1207389-06A

EPA METHOD TO-15 GC/MS

File Name:	**14072402**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 7/24/12 09:20 AM**	

Compound	%Recovery
Freon 12	104
Freon 114	101
Chloromethane	125
Vinyl Chloride	102
1,3-Butadiene	107
Bromomethane	104
Chloroethane	109
Freon 11	105
Ethanol	128
Freon 113	100
1,1-Dichloroethene	103
Acetone	118
2-Propanol	112
Carbon Disulfide	83
3-Chloropropene	85
Methylene Chloride	108
Methyl tert-butyl ether	93
trans-1,2-Dichloroethene	95
Hexane	106
1,1-Dichloroethane	99
2-Butanone (Methyl Ethyl Ketone)	94
cis-1,2-Dichloroethene	102
Tetrahydrofuran	113
Chloroform	97
1,1,1-Trichloroethane	96
Cyclohexane	94
Carbon Tetrachloride	99
2,2,4-Trimethylpentane	107
Benzene	99
1,2-Dichloroethane	103
Heptane	97
Trichloroethene	98
1,2-Dichloropropane	101
1,4-Dioxane	91
Bromodichloromethane	96
cis-1,3-Dichloropropene	93
4-Methyl-2-pentanone	92
Toluene	96
trans-1,3-Dichloropropene	91
1,1,2-Trichloroethane	92
Tetrachloroethene	93
2-Hexanone	89

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Client Sample ID: CCV

Lab ID#: 1207389-06A

EPA METHOD TO-15 GC/MS

File Name:	**14072402**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 7/24/12 09:20 AM**	

Compound	%Recovery
Dibromochloromethane	91
1,2-Dibromoethane (EDB)	92
Chlorobenzene	90
Ethyl Benzene	90
m,p-Xylene	90
o-Xylene	91
Styrene	88
Bromoform	97
Cumene	94
1,1,2,2-Tetrachloroethane	98
Propylbenzene	101
4-Ethyltoluene	91
1,3,5-Trimethylbenzene	107
1,2,4-Trimethylbenzene	94
1,3-Dichlorobenzene	100
1,4-Dichlorobenzene	91
alpha-Chlorotoluene	112
1,2-Dichlorobenzene	93
1,2,4-Trichlorobenzene	123
Hexachlorobutadiene	124
Naphthalene	98

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	110	70-130
Toluene-d8	105	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: LCS
Lab ID#: 1207389-07A
EPA METHOD TO-15 GC/MS

File Name:	**14072404**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 7/24/12 10:01 AM**	

Compound	%Recovery
Freon 12	109
Freon 114	107
Chloromethane	128
Vinyl Chloride	109
1,3-Butadiene	113
Bromomethane	112
Chloroethane	113
Freon 11	108
Ethanol	117
Freon 113	103
1,1-Dichloroethene	115
Acetone	114
2-Propanol	126
Carbon Disulfide	115
3-Chloropropene	104
Methylene Chloride	113
Methyl tert-butyl ether	96
trans-1,2-Dichloroethene	111
Hexane	112
1,1-Dichloroethane	104
2-Butanone (Methyl Ethyl Ketone)	98
cis-1,2-Dichloroethene	107
Tetrahydrofuran	115
Chloroform	101
1,1,1-Trichloroethane	102
Cyclohexane	98
Carbon Tetrachloride	104
2,2,4-Trimethylpentane	111
Benzene	104
1,2-Dichloroethane	104
Heptane	100
Trichloroethene	103
1,2-Dichloropropane	106
1,4-Dioxane	95
Bromodichloromethane	103
cis-1,3-Dichloropropene	99
4-Methyl-2-pentanone	98
Toluene	100
trans-1,3-Dichloropropene	94
1,1,2-Trichloroethane	96
Tetrachloroethene	95
2-Hexanone	98

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Client Sample ID: LCS
Lab ID#: 1207389-07A
EPA METHOD TO-15 GC/MS

File Name:	**14072404**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 7/24/12 10:01 AM**	

Compound	%Recovery
Dibromochloromethane	95
1,2-Dibromoethane (EDB)	95
Chlorobenzene	95
Ethyl Benzene	94
m,p-Xylene	93
o-Xylene	94
Styrene	96
Bromoform	100
Cumene	100
1,1,2,2-Tetrachloroethane	102
Propylbenzene	106
4-Ethyltoluene	92
1,3,5-Trimethylbenzene	111
1,2,4-Trimethylbenzene	96
1,3-Dichlorobenzene	103
1,4-Dichlorobenzene	92
alpha-Chlorotoluene	117
1,2-Dichlorobenzene	96
1,2,4-Trichlorobenzene	135 Q
Hexachlorobutadiene	127
Naphthalene	120

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	109	70-130
Toluene-d8	106	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: LCSD
Lab ID#: 1207389-07AA
EPA METHOD TO-15 GC/MS

File Name:	**14072405**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 7/24/12 10:22 AM**	

Compound	%Recovery
Freon 12	107
Freon 114	106
Chloromethane	128
Vinyl Chloride	110
1,3-Butadiene	111
Bromomethane	111
Chloroethane	111
Freon 11	105
Ethanol	118
Freon 113	101
1,1-Dichloroethene	114
Acetone	110
2-Propanol	124
Carbon Disulfide	115
3-Chloropropene	101
Methylene Chloride	112
Methyl tert-butyl ether	96
trans-1,2-Dichloroethene	110
Hexane	110
1,1-Dichloroethane	102
2-Butanone (Methyl Ethyl Ketone)	99
cis-1,2-Dichloroethene	106
Tetrahydrofuran	114
Chloroform	100
1,1,1-Trichloroethane	101
Cyclohexane	98
Carbon Tetrachloride	102
2,2,4-Trimethylpentane	111
Benzene	102
1,2-Dichloroethane	101
Heptane	98
Trichloroethene	100
1,2-Dichloropropane	105
1,4-Dioxane	94
Bromodichloromethane	101
cis-1,3-Dichloropropene	99
4-Methyl-2-pentanone	96
Toluene	98
trans-1,3-Dichloropropene	94
1,1,2-Trichloroethane	92
Tetrachloroethene	92
2-Hexanone	96

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Client Sample ID: LCSD
Lab ID#: 1207389-07AA
EPA METHOD TO-15 GC/MS

File Name:	**14072405**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 7/24/12 10:22 AM**	

Compound	%Recovery
Dibromochloromethane	94
1,2-Dibromoethane (EDB)	93
Chlorobenzene	92
Ethyl Benzene	90
m,p-Xylene	93
o-Xylene	93
Styrene	94
Bromoform	100
Cumene	97
1,1,2,2-Tetrachloroethane	100
Propylbenzene	104
4-Ethyltoluene	90
1,3,5-Trimethylbenzene	110
1,2,4-Trimethylbenzene	95
1,3-Dichlorobenzene	103
1,4-Dichlorobenzene	91
alpha-Chlorotoluene	116
1,2-Dichlorobenzene	96
1,2,4-Trichlorobenzene	134 Q
Hexachlorobutadiene	135 Q
Naphthalene	127

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	108	70-130
Toluene-d8	105	70-130
4-Bromofluorobenzene	95	70-130

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8/17/2012

Mr. Tommy Jordan
Kemron Environmental Services
1359-A Ellsworth Industrial Boulevard

Atlanta GA 30318

Project Name: Bridgewater, NJ
Project #: SE 0416-007
Workorder #: 1208005

Dear Mr. Tommy Jordan

The following report includes the data for the above referenced project for sample(s) received on 8/1/2012 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 (5&20 ppbv) are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Ausha Scott

Project Manager

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WORK ORDER #: 1208005

Work Order Summary

CLIENT:	Mr. Tommy Jordan Kemron Environmental Services 1359-A Ellsworth Industrial Boulevard Atlanta, GA 30318	**BILL TO:**	Accounts Payable Kemron Environmental Services 1359-A Ellsworth Industrial Boulevard Atlanta, GA 30318
PHONE:	404-516-3172	**P.O. #**	
FAX:	404-636-7162	**PROJECT #**	SE 0416-007 Bridgewater, NJ
DATE RECEIVED:	08/01/2012	**CONTACT:**	Ausha Scott
DATE COMPLETED:	08/17/2012		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	HC 100 Day 14	Modified TO-15 (5&20 ppbv	4.0 "Hg	5 psi
02A	VR 100 Day 13	Modified TO-15 (5&20 ppbv	5.0 "Hg	5 psi
03A	Lab Blank	Modified TO-15 (5&20 ppbv	NA	NA
03B	Lab Blank	Modified TO-15 (5&20 ppbv	NA	NA
04A	CCV	Modified TO-15 (5&20 ppbv	NA	NA
04B	CCV	Modified TO-15 (5&20 ppbv	NA	NA
05A	LCS	Modified TO-15 (5&20 ppbv	NA	NA
05AA	LCSD	Modified TO-15 (5&20 ppbv	NA	NA
05B	LCS	Modified TO-15 (5&20 ppbv	NA	NA
05BB	LCSD	Modified TO-15 (5&20 ppbv	NA	NA

CERTIFIED BY: Heidi Mayo DATE: 08/17/12

Technical Director

Certfication numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NY NELAP - 11291,
TX NELAP - T104704434-12-5, UT NELAP CA009332012-3, WA NELAP - C935
Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2011, Expiration date: 10/17/2012.
Eurofins Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
EPA Method TO-15 Soil Gas
Kemron Environmental Services
Workorder# 1208005

Two 6 Liter Summa Canister samples were received on August 01, 2012. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode. The method involves concentrating up to 50 mLs of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page. Target compound non-detects in the samples that are associated with high bias in QC analyses have not been flagged.

Dilution was performed on samples HC 100 Day 14 and VR 100 Day 13 due to the presence of high level target species.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the reporting limit.
UJ- Non-detected compound associated with low bias in the CCV and/or LCS.
N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS

Client Sample ID: HC 100 Day 14

Lab ID#: 1208005-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	10000	30000	21000	63000
Acetone	10000	64000	24000	150000
Carbon Disulfide	2600	5300	8000	16000
Methylene Chloride	2600	3800	9000	13000
Benzene	2600	1200000	8200	3900000
Toluene	2600	810000	9700	3000000
Ethyl Benzene	2600	16000	11000	68000
m,p-Xylene	2600	200000	11000	870000
o-Xylene	2600	38000	11000	160000
Cumene	2600	28000	13000	140000
4-Ethyltoluene	2600	3300	13000	16000
1,3,5-Trimethylbenzene	2600	6800	13000	34000
1,2,4-Trimethylbenzene	2600	7100	13000	35000
1,2-Dichlorobenzene	2600	14000	16000	87000

Client Sample ID: VR 100 Day 13

Lab ID#: 1208005-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	3200	29000	6600	59000
Acetone	3200	81000	7600	190000
Carbon Disulfide	800	7300	2500	23000
2-Butanone (Methyl Ethyl Ketone)	3200	6800	9500	20000
Benzene	800	400000	2600	1300000
Toluene	800	510000	3000	1900000
Chlorobenzene	800	1200	3700	5700
Ethyl Benzene	800	14000	3500	63000
m,p-Xylene	800	130000	3500	580000
o-Xylene	800	39000	3500	170000
Cumene	800	27000	4000	130000
4-Ethyltoluene	800	3900	4000	19000
1,3,5-Trimethylbenzene	800	9200	4000	45000
1,2,4-Trimethylbenzene	800	8900	4000	44000

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS

Client Sample ID: VR 100 Day 13

Lab ID#: 1208005-02A

1,4-Dichlorobenzene	800	1100	4800	6800
1,2-Dichlorobenzene	800	12000	4800	69000

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Client Sample ID: HC 100 Day 14

Lab ID#: 1208005-01A

EPA METHOD TO-15 GC/MS

File Name:	**14080309**	**Date of Collection:**	**7/27/12 4:20:00 PM**
Dil. Factor:	**517**	**Date of Analysis:**	**8/3/12 04:02 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	2600	Not Detected	13000	Not Detected
Freon 114	2600	Not Detected	18000	Not Detected
Chloromethane	10000	30000	21000	63000
Vinyl Chloride	2600	Not Detected	6600	Not Detected
1,3-Butadiene	2600	Not Detected	5700	Not Detected
Bromomethane	2600	Not Detected	10000	Not Detected
Chloroethane	10000	Not Detected	27000	Not Detected
Freon 11	2600	Not Detected	14000	Not Detected
Ethanol	10000	Not Detected	19000	Not Detected
Freon 113	2600	Not Detected	20000	Not Detected
1,1-Dichloroethene	2600	Not Detected	10000	Not Detected
Acetone	10000	64000	24000	150000
2-Propanol	10000	Not Detected	25000	Not Detected
Carbon Disulfide	2600	5300	8000	16000
3-Chloropropene	10000	Not Detected	32000	Not Detected
Methylene Chloride	2600	3800	9000	13000
Methyl tert-butyl ether	2600	Not Detected	9300	Not Detected
trans-1,2-Dichloroethene	2600	Not Detected	10000	Not Detected
Hexane	2600	Not Detected	9100	Not Detected
1,1-Dichloroethane	2600	Not Detected	10000	Not Detected
2-Butanone (Methyl Ethyl Ketone)	10000	Not Detected	30000	Not Detected
cis-1,2-Dichloroethene	2600	Not Detected	10000	Not Detected
Tetrahydrofuran	2600	Not Detected	7600	Not Detected
Chloroform	2600	Not Detected	13000	Not Detected
1,1,1-Trichloroethane	2600	Not Detected	14000	Not Detected
Cyclohexane	2600	Not Detected	8900	Not Detected
Carbon Tetrachloride	2600	Not Detected	16000	Not Detected
2,2,4-Trimethylpentane	2600	Not Detected	12000	Not Detected
Benzene	2600	1200000	8200	3900000
1,2-Dichloroethane	2600	Not Detected	10000	Not Detected
Heptane	2600	Not Detected	10000	Not Detected
Trichloroethene	2600	Not Detected	14000	Not Detected
1,2-Dichloropropane	2600	Not Detected	12000	Not Detected
1,4-Dioxane	10000	Not Detected	37000	Not Detected
Bromodichloromethane	2600	Not Detected	17000	Not Detected
cis-1,3-Dichloropropene	2600	Not Detected	12000	Not Detected
4-Methyl-2-pentanone	2600	Not Detected	10000	Not Detected
Toluene	2600	810000	9700	3000000
trans-1,3-Dichloropropene	2600	Not Detected	12000	Not Detected
1,1,2-Trichloroethane	2600	Not Detected	14000	Not Detected
Tetrachloroethene	2600	Not Detected	18000	Not Detected
2-Hexanone	10000	Not Detected	42000	Not Detected

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Client Sample ID: HC 100 Day 14

Lab ID#: 1208005-01A

EPA METHOD TO-15 GC/MS

File Name:	**14080309**	**Date of Collection:**	**7/27/12 4:20:00 PM**
Dil. Factor:	**517**	**Date of Analysis:**	**8/3/12 04:02 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	2600	Not Detected	22000	Not Detected
1,2-Dibromoethane (EDB)	2600	Not Detected	20000	Not Detected
Chlorobenzene	2600	Not Detected	12000	Not Detected
Ethyl Benzene	2600	16000	11000	68000
m,p-Xylene	2600	200000	11000	870000
o-Xylene	2600	38000	11000	160000
Styrene	2600	Not Detected	11000	Not Detected
Bromoform	2600	Not Detected	27000	Not Detected
Cumene	2600	28000	13000	140000
1,1,2,2-Tetrachloroethane	2600	Not Detected	18000	Not Detected
Propylbenzene	2600	Not Detected	13000	Not Detected
4-Ethyltoluene	2600	3300	13000	16000
1,3,5-Trimethylbenzene	2600	6800	13000	34000
1,2,4-Trimethylbenzene	2600	7100	13000	35000
1,3-Dichlorobenzene	2600	Not Detected	16000	Not Detected
1,4-Dichlorobenzene	2600	Not Detected	16000	Not Detected
alpha-Chlorotoluene	2600	Not Detected	13000	Not Detected
1,2-Dichlorobenzene	2600	14000	16000	87000
1,2,4-Trichlorobenzene	10000	Not Detected	77000	Not Detected
Hexachlorobutadiene	10000	Not Detected	110000	Not Detected
Naphthalene	10000	Not Detected	54000	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	116	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: VR 100 Day 13

Lab ID#: 1208005-02A

EPA METHOD TO-15 GC/MS

File Name:	**14080228**	**Date of Collection:**	**7/26/12 5:08:00 PM**
Dil. Factor:	**161**	**Date of Analysis:**	**8/3/12 08:05 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	800	Not Detected	4000	Not Detected
Freon 114	800	Not Detected	5600	Not Detected
Chloromethane	3200	29000	6600	59000
Vinyl Chloride	800	Not Detected	2000	Not Detected
1,3-Butadiene	800	Not Detected	1800	Not Detected
Bromomethane	800	Not Detected	3100	Not Detected
Chloroethane	3200	Not Detected	8500	Not Detected
Freon 11	800	Not Detected	4500	Not Detected
Ethanol	3200	Not Detected	6100	Not Detected
Freon 113	800	Not Detected	6200	Not Detected
1,1-Dichloroethene	800	Not Detected	3200	Not Detected
Acetone	3200	81000	7600	190000
2-Propanol	3200	Not Detected	7900	Not Detected
Carbon Disulfide	800	7300	2500	23000
3-Chloropropene	3200	Not Detected	10000	Not Detected
Methylene Chloride	800	Not Detected	2800	Not Detected
Methyl tert-butyl ether	800	Not Detected	2900	Not Detected
trans-1,2-Dichloroethene	800	Not Detected	3200	Not Detected
Hexane	800	Not Detected	2800	Not Detected
1,1-Dichloroethane	800	Not Detected	3200	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3200	6800	9500	20000
cis-1,2-Dichloroethene	800	Not Detected	3200	Not Detected
Tetrahydrofuran	800	Not Detected	2400	Not Detected
Chloroform	800	Not Detected	3900	Not Detected
1,1,1-Trichloroethane	800	Not Detected	4400	Not Detected
Cyclohexane	800	Not Detected	2800	Not Detected
Carbon Tetrachloride	800	Not Detected	5100	Not Detected
2,2,4-Trimethylpentane	800	Not Detected	3800	Not Detected
Benzene	800	400000	2600	1300000
1,2-Dichloroethane	800	Not Detected	3200	Not Detected
Heptane	800	Not Detected	3300	Not Detected
Trichloroethene	800	Not Detected	4300	Not Detected
1,2-Dichloropropane	800	Not Detected	3700	Not Detected
1,4-Dioxane	3200	Not Detected	12000	Not Detected
Bromodichloromethane	800	Not Detected	5400	Not Detected
cis-1,3-Dichloropropene	800	Not Detected	3600	Not Detected
4-Methyl-2-pentanone	800	Not Detected	3300	Not Detected
Toluene	800	510000	3000	1900000
trans-1,3-Dichloropropene	800	Not Detected	3600	Not Detected
1,1,2-Trichloroethane	800	Not Detected	4400	Not Detected
Tetrachloroethene	800	Not Detected	5500	Not Detected
2-Hexanone	3200	Not Detected	13000	Not Detected

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Client Sample ID: VR 100 Day 13

Lab ID#: 1208005-02A

EPA METHOD TO-15 GC/MS

File Name:	**14080228**	**Date of Collection:**	**7/26/12 5:08:00 PM**
Dil. Factor:	**161**	**Date of Analysis:**	**8/3/12 08:05 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	800	Not Detected	6800	Not Detected
1,2-Dibromoethane (EDB)	800	Not Detected	6200	Not Detected
Chlorobenzene	800	1200	3700	5700
Ethyl Benzene	800	14000	3500	63000
m,p-Xylene	800	130000	3500	580000
o-Xylene	800	39000	3500	170000
Styrene	800	Not Detected	3400	Not Detected
Bromoform	800	Not Detected	8300	Not Detected
Cumene	800	27000	4000	130000
1,1,2,2-Tetrachloroethane	800	Not Detected	5500	Not Detected
Propylbenzene	800	Not Detected	4000	Not Detected
4-Ethyltoluene	800	3900	4000	19000
1,3,5-Trimethylbenzene	800	9200	4000	45000
1,2,4-Trimethylbenzene	800	8900	4000	44000
1,3-Dichlorobenzene	800	Not Detected	4800	Not Detected
1,4-Dichlorobenzene	800	1100	4800	6800
alpha-Chlorotoluene	800	Not Detected	4200	Not Detected
1,2-Dichlorobenzene	800	12000	4800	69000
1,2,4-Trichlorobenzene	3200	Not Detected	24000	Not Detected
Hexachlorobutadiene	3200	Not Detected	34000	Not Detected
Naphthalene	3200	Not Detected	17000	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	109	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	97	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1208005-03A

EPA METHOD TO-15 GC/MS

File Name:	**14080207**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/2/12 12:17 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5.0	Not Detected	25	Not Detected
Freon 114	5.0	Not Detected	35	Not Detected
Chloromethane	20	Not Detected	41	Not Detected
Vinyl Chloride	5.0	Not Detected	13	Not Detected
1,3-Butadiene	5.0	Not Detected	11	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	20	Not Detected	53	Not Detected
Freon 11	5.0	Not Detected	28	Not Detected
Ethanol	20	Not Detected	38	Not Detected
Freon 113	5.0	Not Detected	38	Not Detected
1,1-Dichloroethene	5.0	Not Detected	20	Not Detected
Acetone	20	Not Detected	48	Not Detected
2-Propanol	20	Not Detected	49	Not Detected
Carbon Disulfide	5.0	Not Detected	16	Not Detected
3-Chloropropene	20	Not Detected	63	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	5.0	Not Detected	18	Not Detected
trans-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Hexane	5.0	Not Detected	18	Not Detected
1,1-Dichloroethane	5.0	Not Detected	20	Not Detected
2-Butanone (Methyl Ethyl Ketone)	20	Not Detected	59	Not Detected
cis-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Tetrahydrofuran	5.0	Not Detected	15	Not Detected
Chloroform	5.0	Not Detected	24	Not Detected
1,1,1-Trichloroethane	5.0	Not Detected	27	Not Detected
Cyclohexane	5.0	Not Detected	17	Not Detected
Carbon Tetrachloride	5.0	Not Detected	31	Not Detected
2,2,4-Trimethylpentane	5.0	Not Detected	23	Not Detected
Benzene	5.0	Not Detected	16	Not Detected
1,2-Dichloroethane	5.0	Not Detected	20	Not Detected
Heptane	5.0	Not Detected	20	Not Detected
Trichloroethene	5.0	Not Detected	27	Not Detected
1,2-Dichloropropane	5.0	Not Detected	23	Not Detected
1,4-Dioxane	20	Not Detected	72	Not Detected
Bromodichloromethane	5.0	Not Detected	34	Not Detected
cis-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
4-Methyl-2-pentanone	5.0	Not Detected	20	Not Detected
Toluene	5.0	Not Detected	19	Not Detected
trans-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
1,1,2-Trichloroethane	5.0	Not Detected	27	Not Detected
Tetrachloroethene	5.0	Not Detected	34	Not Detected
2-Hexanone	20	Not Detected	82	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1208005-03A

EPA METHOD TO-15 GC/MS

File Name:	**14080207**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/2/12 12:17 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	5.0	Not Detected	42	Not Detected
1,2-Dibromoethane (EDB)	5.0	Not Detected	38	Not Detected
Chlorobenzene	5.0	Not Detected	23	Not Detected
Ethyl Benzene	5.0	Not Detected	22	Not Detected
m,p-Xylene	5.0	Not Detected	22	Not Detected
o-Xylene	5.0	Not Detected	22	Not Detected
Styrene	5.0	Not Detected	21	Not Detected
Bromoform	5.0	Not Detected	52	Not Detected
Cumene	5.0	Not Detected	24	Not Detected
1,1,2,2-Tetrachloroethane	5.0	Not Detected	34	Not Detected
Propylbenzene	5.0	Not Detected	24	Not Detected
4-Ethyltoluene	5.0	Not Detected	24	Not Detected
1,3,5-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,2,4-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,3-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,4-Dichlorobenzene	5.0	Not Detected	30	Not Detected
alpha-Chlorotoluene	5.0	Not Detected	26	Not Detected
1,2-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,2,4-Trichlorobenzene	20	Not Detected	150	Not Detected
Hexachlorobutadiene	20	Not Detected	210	Not Detected
Naphthalene	20	Not Detected	100	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	113	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	94	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1208005-03B

EPA METHOD TO-15 GC/MS

File Name:	**14080306**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/3/12 12:01 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5.0	Not Detected	25	Not Detected
Freon 114	5.0	Not Detected	35	Not Detected
Chloromethane	20	Not Detected	41	Not Detected
Vinyl Chloride	5.0	Not Detected	13	Not Detected
1,3-Butadiene	5.0	Not Detected	11	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	20	Not Detected	53	Not Detected
Freon 11	5.0	Not Detected	28	Not Detected
Ethanol	20	Not Detected	38	Not Detected
Freon 113	5.0	Not Detected	38	Not Detected
1,1-Dichloroethene	5.0	Not Detected	20	Not Detected
Acetone	20	Not Detected	48	Not Detected
2-Propanol	20	Not Detected	49	Not Detected
Carbon Disulfide	5.0	Not Detected	16	Not Detected
3-Chloropropene	20	Not Detected	63	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	5.0	Not Detected	18	Not Detected
trans-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Hexane	5.0	Not Detected	18	Not Detected
1,1-Dichloroethane	5.0	Not Detected	20	Not Detected
2-Butanone (Methyl Ethyl Ketone)	20	Not Detected	59	Not Detected
cis-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Tetrahydrofuran	5.0	Not Detected	15	Not Detected
Chloroform	5.0	Not Detected	24	Not Detected
1,1,1-Trichloroethane	5.0	Not Detected	27	Not Detected
Cyclohexane	5.0	Not Detected	17	Not Detected
Carbon Tetrachloride	5.0	Not Detected	31	Not Detected
2,2,4-Trimethylpentane	5.0	Not Detected	23	Not Detected
Benzene	5.0	Not Detected	16	Not Detected
1,2-Dichloroethane	5.0	Not Detected	20	Not Detected
Heptane	5.0	Not Detected	20	Not Detected
Trichloroethene	5.0	Not Detected	27	Not Detected
1,2-Dichloropropane	5.0	Not Detected	23	Not Detected
1,4-Dioxane	20	Not Detected	72	Not Detected
Bromodichloromethane	5.0	Not Detected	34	Not Detected
cis-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
4-Methyl-2-pentanone	5.0	Not Detected	20	Not Detected
Toluene	5.0	Not Detected	19	Not Detected
trans-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
1,1,2-Trichloroethane	5.0	Not Detected	27	Not Detected
Tetrachloroethene	5.0	Not Detected	34	Not Detected
2-Hexanone	20	Not Detected	82	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1208005-03B

EPA METHOD TO-15 GC/MS

File Name:	**14080306**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/3/12 12:01 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	5.0	Not Detected	42	Not Detected
1,2-Dibromoethane (EDB)	5.0	Not Detected	38	Not Detected
Chlorobenzene	5.0	Not Detected	23	Not Detected
Ethyl Benzene	5.0	Not Detected	22	Not Detected
m,p-Xylene	5.0	Not Detected	22	Not Detected
o-Xylene	5.0	Not Detected	22	Not Detected
Styrene	5.0	Not Detected	21	Not Detected
Bromoform	5.0	Not Detected	52	Not Detected
Cumene	5.0	Not Detected	24	Not Detected
1,1,2,2-Tetrachloroethane	5.0	Not Detected	34	Not Detected
Propylbenzene	5.0	Not Detected	24	Not Detected
4-Ethyltoluene	5.0	Not Detected	24	Not Detected
1,3,5-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,2,4-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,3-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,4-Dichlorobenzene	5.0	Not Detected	30	Not Detected
alpha-Chlorotoluene	5.0	Not Detected	26	Not Detected
1,2-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,2,4-Trichlorobenzene	20	Not Detected	150	Not Detected
Hexachlorobutadiene	20	Not Detected	210	Not Detected
Naphthalene	20	Not Detected	100	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	113	70-130
Toluene-d8	103	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: CCV

Lab ID#: 1208005-04A

EPA METHOD TO-15 GC/MS

File Name:	**14080202**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/2/12 09:52 AM**	

Compound	%Recovery
Freon 12	110
Freon 114	106
Chloromethane	122
Vinyl Chloride	103
1,3-Butadiene	108
Bromomethane	112
Chloroethane	109
Freon 11	112
Ethanol	136 Q
Freon 113	101
1,1-Dichloroethene	109
Acetone	111
2-Propanol	121
Carbon Disulfide	90
3-Chloropropene	88
Methylene Chloride	113
Methyl tert-butyl ether	96
trans-1,2-Dichloroethene	99
Hexane	109
1,1-Dichloroethane	103
2-Butanone (Methyl Ethyl Ketone)	99
cis-1,2-Dichloroethene	106
Tetrahydrofuran	117
Chloroform	103
1,1,1-Trichloroethane	101
Cyclohexane	97
Carbon Tetrachloride	105
2,2,4-Trimethylpentane	111
Benzene	103
1,2-Dichloroethane	109
Heptane	101
Trichloroethene	101
1,2-Dichloropropane	105
1,4-Dioxane	98
Bromodichloromethane	102
cis-1,3-Dichloropropene	95
4-Methyl-2-pentanone	96
Toluene	100
trans-1,3-Dichloropropene	94
1,1,2-Trichloroethane	100
Tetrachloroethene	98
2-Hexanone	98

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Client Sample ID: CCV
Lab ID#: 1208005-04A
EPA METHOD TO-15 GC/MS

File Name:	**14080202**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/2/12 09:52 AM**	

Compound	%Recovery
Dibromochloromethane	98
1,2-Dibromoethane (EDB)	96
Chlorobenzene	96
Ethyl Benzene	94
m,p-Xylene	95
o-Xylene	94
Styrene	96
Bromoform	106
Cumene	100
1,1,2,2-Tetrachloroethane	106
Propylbenzene	109
4-Ethyltoluene	99
1,3,5-Trimethylbenzene	118
1,2,4-Trimethylbenzene	102
1,3-Dichlorobenzene	107
1,4-Dichlorobenzene	99
alpha-Chlorotoluene	117
1,2-Dichlorobenzene	99
1,2,4-Trichlorobenzene	123
Hexachlorobutadiene	134 Q
Naphthalene	112

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	112	70-130
Toluene-d8	105	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: CCV

Lab ID#: 1208005-04B

EPA METHOD TO-15 GC/MS

File Name:	**14080302**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/3/12 09:51 AM**	

Compound	%Recovery
Freon 12	109
Freon 114	107
Chloromethane	120
Vinyl Chloride	104
1,3-Butadiene	109
Bromomethane	102
Chloroethane	109
Freon 11	109
Ethanol	134 Q
Freon 113	100
1,1-Dichloroethene	109
Acetone	112
2-Propanol	119
Carbon Disulfide	92
3-Chloropropene	90
Methylene Chloride	114
Methyl tert-butyl ether	94
trans-1,2-Dichloroethene	98
Hexane	109
1,1-Dichloroethane	104
2-Butanone (Methyl Ethyl Ketone)	97
cis-1,2-Dichloroethene	105
Tetrahydrofuran	118
Chloroform	101
1,1,1-Trichloroethane	100
Cyclohexane	95
Carbon Tetrachloride	103
2,2,4-Trimethylpentane	110
Benzene	104
1,2-Dichloroethane	107
Heptane	100
Trichloroethene	102
1,2-Dichloropropane	106
1,4-Dioxane	99
Bromodichloromethane	103
cis-1,3-Dichloropropene	94
4-Methyl-2-pentanone	95
Toluene	100
trans-1,3-Dichloropropene	91
1,1,2-Trichloroethane	95
Tetrachloroethene	98
2-Hexanone	96

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Client Sample ID: CCV
Lab ID#: 1208005-04B
EPA METHOD TO-15 GC/MS

File Name:	**14080302**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/3/12 09:51 AM**	

Compound	%Recovery
Dibromochloromethane	99
1,2-Dibromoethane (EDB)	94
Chlorobenzene	93
Ethyl Benzene	92
m,p-Xylene	91
o-Xylene	92
Styrene	92
Bromoform	103
Cumene	97
1,1,2,2-Tetrachloroethane	104
Propylbenzene	104
4-Ethyltoluene	93
1,3,5-Trimethylbenzene	110
1,2,4-Trimethylbenzene	99
1,3-Dichlorobenzene	100
1,4-Dichlorobenzene	91
alpha-Chlorotoluene	112
1,2-Dichlorobenzene	93
1,2,4-Trichlorobenzene	102
Hexachlorobutadiene	116
Naphthalene	95

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	108	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: LCS
Lab ID#: 1208005-05A
EPA METHOD TO-15 GC/MS

File Name:	**14080203**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/2/12 10:16 AM**	

Compound	%Recovery
Freon 12	106
Freon 114	105
Chloromethane	124
Vinyl Chloride	108
1,3-Butadiene	108
Bromomethane	108
Chloroethane	106
Freon 11	109
Ethanol	109
Freon 113	102
1,1-Dichloroethene	112
Acetone	107
2-Propanol	112
Carbon Disulfide	113
3-Chloropropene	100
Methylene Chloride	110
Methyl tert-butyl ether	92
trans-1,2-Dichloroethene	107
Hexane	106
1,1-Dichloroethane	101
2-Butanone (Methyl Ethyl Ketone)	94
cis-1,2-Dichloroethene	103
Tetrahydrofuran	110
Chloroform	101
1,1,1-Trichloroethane	100
Cyclohexane	95
Carbon Tetrachloride	104
2,2,4-Trimethylpentane	107
Benzene	101
1,2-Dichloroethane	106
Heptane	97
Trichloroethene	99
1,2-Dichloropropane	103
1,4-Dioxane	91
Bromodichloromethane	102
cis-1,3-Dichloropropene	93
4-Methyl-2-pentanone	91
Toluene	96
trans-1,3-Dichloropropene	91
1,1,2-Trichloroethane	95
Tetrachloroethene	94
2-Hexanone	90

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Client Sample ID: LCS
Lab ID#: 1208005-05A
EPA METHOD TO-15 GC/MS

File Name:	**14080203**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/2/12 10:16 AM**	

Compound	%Recovery
Dibromochloromethane	94
1,2-Dibromoethane (EDB)	93
Chlorobenzene	91
Ethyl Benzene	90
m,p-Xylene	92
o-Xylene	91
Styrene	92
Bromoform	100
Cumene	96
1,1,2,2-Tetrachloroethane	99
Propylbenzene	103
4-Ethyltoluene	89
1,3,5-Trimethylbenzene	111
1,2,4-Trimethylbenzene	94
1,3-Dichlorobenzene	101
1,4-Dichlorobenzene	91
alpha-Chlorotoluene	105
1,2-Dichlorobenzene	93
1,2,4-Trichlorobenzene	109
Hexachlorobutadiene	122
Naphthalene	94

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	110	70-130
Toluene-d8	105	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: LCSD

Lab ID#: 1208005-05AA

EPA METHOD TO-15 GC/MS

File Name:	**14080204**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/2/12 10:49 AM**	

Compound	%Recovery
Freon 12	103
Freon 114	100
Chloromethane	117
Vinyl Chloride	106
1,3-Butadiene	108
Bromomethane	104
Chloroethane	102
Freon 11	104
Ethanol	121
Freon 113	97
1,1-Dichloroethene	110
Acetone	103
2-Propanol	110
Carbon Disulfide	110
3-Chloropropene	96
Methylene Chloride	105
Methyl tert-butyl ether	88
trans-1,2-Dichloroethene	104
Hexane	102
1,1-Dichloroethane	97
2-Butanone (Methyl Ethyl Ketone)	90
cis-1,2-Dichloroethene	99
Tetrahydrofuran	107
Chloroform	97
1,1,1-Trichloroethane	96
Cyclohexane	92
Carbon Tetrachloride	101
2,2,4-Trimethylpentane	102
Benzene	98
1,2-Dichloroethane	102
Heptane	92
Trichloroethene	96
1,2-Dichloropropane	102
1,4-Dioxane	87
Bromodichloromethane	99
cis-1,3-Dichloropropene	90
4-Methyl-2-pentanone	89
Toluene	94
trans-1,3-Dichloropropene	86
1,1,2-Trichloroethane	90
Tetrachloroethene	89
2-Hexanone	87

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Client Sample ID: LCSD
Lab ID#: 1208005-05AA
EPA METHOD TO-15 GC/MS

File Name:	**14080204**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/2/12 10:49 AM**	

Compound	%Recovery
Dibromochloromethane	91
1,2-Dibromoethane (EDB)	90
Chlorobenzene	89
Ethyl Benzene	88
m,p-Xylene	88
o-Xylene	88
Styrene	89
Bromoform	98
Cumene	93
1,1,2,2-Tetrachloroethane	99
Propylbenzene	100
4-Ethyltoluene	86
1,3,5-Trimethylbenzene	108
1,2,4-Trimethylbenzene	92
1,3-Dichlorobenzene	99
1,4-Dichlorobenzene	89
alpha-Chlorotoluene	104
1,2-Dichlorobenzene	93
1,2,4-Trichlorobenzene	111
Hexachlorobutadiene	123
Naphthalene	100

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	109	70-130
Toluene-d8	106	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: LCS
Lab ID#: 1208005-05B
EPA METHOD TO-15 GC/MS

File Name:	**14080303**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/3/12 10:42 AM**	

Compound	%Recovery
Freon 12	105
Freon 114	102
Chloromethane	118
Vinyl Chloride	106
1,3-Butadiene	105
Bromomethane	109
Chloroethane	106
Freon 11	108
Ethanol	121
Freon 113	102
1,1-Dichloroethene	111
Acetone	104
2-Propanol	111
Carbon Disulfide	114
3-Chloropropene	99
Methylene Chloride	108
Methyl tert-butyl ether	89
trans-1,2-Dichloroethene	105
Hexane	102
1,1-Dichloroethane	99
2-Butanone (Methyl Ethyl Ketone)	91
cis-1,2-Dichloroethene	100
Tetrahydrofuran	106
Chloroform	99
1,1,1-Trichloroethane	97
Cyclohexane	91
Carbon Tetrachloride	102
2,2,4-Trimethylpentane	102
Benzene	99
1,2-Dichloroethane	103
Heptane	93
Trichloroethene	98
1,2-Dichloropropane	101
1,4-Dioxane	87
Bromodichloromethane	100
cis-1,3-Dichloropropene	91
4-Methyl-2-pentanone	87
Toluene	94
trans-1,3-Dichloropropene	88
1,1,2-Trichloroethane	91
Tetrachloroethene	91
2-Hexanone	87

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Client Sample ID: LCS
Lab ID#: 1208005-05B
EPA METHOD TO-15 GC/MS

File Name:	**14080303**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/3/12 10:42 AM**	

Compound	%Recovery
Dibromochloromethane	94
1,2-Dibromoethane (EDB)	90
Chlorobenzene	90
Ethyl Benzene	88
m,p-Xylene	89
o-Xylene	90
Styrene	89
Bromoform	98
Cumene	95
1,1,2,2-Tetrachloroethane	101
Propylbenzene	101
4-Ethyltoluene	88
1,3,5-Trimethylbenzene	108
1,2,4-Trimethylbenzene	92
1,3-Dichlorobenzene	99
1,4-Dichlorobenzene	91
alpha-Chlorotoluene	106
1,2-Dichlorobenzene	92
1,2,4-Trichlorobenzene	115
Hexachlorobutadiene	120
Naphthalene	101

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	111	70-130
Toluene-d8	105	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: LCSD

Lab ID#: 1208005-05BB

EPA METHOD TO-15 GC/MS

File Name:	**14080304**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/3/12 11:00 AM**	

Compound	%Recovery
Freon 12	102
Freon 114	99
Chloromethane	115
Vinyl Chloride	104
1,3-Butadiene	103
Bromomethane	105
Chloroethane	103
Freon 11	103
Ethanol	117
Freon 113	98
1,1-Dichloroethene	109
Acetone	101
2-Propanol	110
Carbon Disulfide	110
3-Chloropropene	93
Methylene Chloride	104
Methyl tert-butyl ether	88
trans-1,2-Dichloroethene	105
Hexane	100
1,1-Dichloroethane	98
2-Butanone (Methyl Ethyl Ketone)	91
cis-1,2-Dichloroethene	98
Tetrahydrofuran	106
Chloroform	98
1,1,1-Trichloroethane	97
Cyclohexane	91
Carbon Tetrachloride	101
2,2,4-Trimethylpentane	102
Benzene	98
1,2-Dichloroethane	102
Heptane	93
Trichloroethene	96
1,2-Dichloropropane	100
1,4-Dioxane	86
Bromodichloromethane	100
cis-1,3-Dichloropropene	89
4-Methyl-2-pentanone	91
Toluene	94
trans-1,3-Dichloropropene	86
1,1,2-Trichloroethane	90
Tetrachloroethene	90
2-Hexanone	87

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Client Sample ID: LCSD

Lab ID#: 1208005-05BB

EPA METHOD TO-15 GC/MS

File Name:	**14080304**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/3/12 11:00 AM**	

Compound	%Recovery
Dibromochloromethane	91
1,2-Dibromoethane (EDB)	90
Chlorobenzene	89
Ethyl Benzene	86
m,p-Xylene	88
o-Xylene	87
Styrene	88
Bromoform	97
Cumene	92
1,1,2,2-Tetrachloroethane	95
Propylbenzene	100
4-Ethyltoluene	86
1,3,5-Trimethylbenzene	107
1,2,4-Trimethylbenzene	92
1,3-Dichlorobenzene	96
1,4-Dichlorobenzene	87
alpha-Chlorotoluene	101
1,2-Dichlorobenzene	88
1,2,4-Trichlorobenzene	105
Hexachlorobutadiene	108
Naphthalene	90

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	111	70-130
Toluene-d8	105	70-130
4-Bromofluorobenzene	98	70-130

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8/22/2012

Mr. Tommy Jordan
Kemron Environmental Services
1359-A Ellsworth Industrial Boulevard

Atlanta GA 30318

Project Name: Bridgewater
Project #: SH0416
Workorder #: 1208199

Dear Mr. Tommy Jordan

The following report includes the data for the above referenced project for sample(s) received on 8/9/2012 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 (5&20 ppbv) are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Ausha Scott

Project Manager

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WORK ORDER #: 1208199

Work Order Summary

CLIENT:	Mr. Tommy Jordan Kemron Environmental Services 1359-A Ellsworth Industrial Boulevard Atlanta, GA 30318	**BILL TO:**	Accounts Payable Kemron Environmental Services 1359-A Ellsworth Industrial Boulevard Atlanta, GA 30318
PHONE:	404-516-3172	**P.O. #**	
FAX:	404-636-7162	**PROJECT #**	SH0416 Bridgewater
DATE RECEIVED:	08/09/2012	**CONTACT:**	Ausha Scott
DATE COMPLETED:	08/22/2012		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	VR 90C Day 23	Modified TO-15 (5&20 ppbv	0.5 "Hg	5 psi
02A	HC 90C Day 24	Modified TO-15 (5&20 ppbv	4.5 "Hg	5 psi
03A	Lab Blank	Modified TO-15 (5&20 ppbv	NA	NA
04A	CCV	Modified TO-15 (5&20 ppbv	NA	NA
05A	LCS	Modified TO-15 (5&20 ppbv	NA	NA
05AA	LCSD	Modified TO-15 (5&20 ppbv	NA	NA

CERTIFIED BY: Heidi Mayo DATE: 08/22/12

Technical Director

Certfication numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NY NELAP - 11291,
TX NELAP - T104704434-12-5, UT NELAP CA009332012-3, WA NELAP - C935
Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2011, Expiration date: 10/17/2012.
Eurofins Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
EPA Method TO-15 Soil Gas
Kemron Environmental Services
Workorder# 1208199

Two 6 Liter Summa Canister samples were received on August 09, 2012. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode. The method involves concentrating up to 50 mLs of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

Dilution was performed on samples VR 90C Day 23 and HC 90C Day 24 due to the presence of high level target species.

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit.

UJ- Non-detected compound associated with low bias in the CCV and/or LCS.

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS

Client Sample ID: VR 90C Day 23

Lab ID#: 1208199-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	2700	28000	6500	66000
Carbon Disulfide	680	3000	2100	9200
Benzene	680	420000	2200	1400000
Toluene	680	71000	2600	270000
m,p-Xylene	680	900	3000	3900

Client Sample ID: HC 90C Day 24

Lab ID#: 1208199-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	1600	9400	3300	19000
Acetone	1600	27000	3800	65000
Carbon Disulfide	400	5300	1200	16000
2-Butanone (Methyl Ethyl Ketone)	1600	2700	4600	8100
Benzene	400	310000	1300	1000000
Toluene	400	150000	1500	570000
Ethyl Benzene	400	1700	1700	7300
m,p-Xylene	400	19000	1700	82000
o-Xylene	400	3100	1700	14000
Cumene	400	2200	1900	11000

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Client Sample ID: VR 90C Day 23

Lab ID#: 1208199-01A

EPA METHOD TO-15 GC/MS

File Name:	**14081026**	**Date of Collection:**	**8/6/12 8:30:00 AM**
Dil. Factor:	**136**	**Date of Analysis:**	**8/11/12 01:41 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	680	Not Detected	3400	Not Detected
Freon 114	680	Not Detected	4800	Not Detected
Chloromethane	2700	Not Detected	5600	Not Detected
Vinyl Chloride	680	Not Detected	1700	Not Detected
1,3-Butadiene	680	Not Detected	1500	Not Detected
Bromomethane	680	Not Detected	2600	Not Detected
Chloroethane	2700	Not Detected	7200	Not Detected
Freon 11	680	Not Detected	3800	Not Detected
Ethanol	2700	Not Detected	5100	Not Detected
Freon 113	680	Not Detected	5200	Not Detected
1,1-Dichloroethene	680	Not Detected	2700	Not Detected
Acetone	2700	28000	6500	66000
2-Propanol	2700	Not Detected	6700	Not Detected
Carbon Disulfide	680	3000	2100	9200
3-Chloropropene	2700	Not Detected	8500	Not Detected
Methylene Chloride	680	Not Detected	2400	Not Detected
Methyl tert-butyl ether	680	Not Detected	2400	Not Detected
trans-1,2-Dichloroethene	680	Not Detected	2700	Not Detected
Hexane	680	Not Detected	2400	Not Detected
1,1-Dichloroethane	680	Not Detected	2800	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2700	Not Detected	8000	Not Detected
cis-1,2-Dichloroethene	680	Not Detected	2700	Not Detected
Tetrahydrofuran	680	Not Detected	2000	Not Detected
Chloroform	680	Not Detected	3300	Not Detected
1,1,1-Trichloroethane	680	Not Detected	3700	Not Detected
Cyclohexane	680	Not Detected	2300	Not Detected
Carbon Tetrachloride	680	Not Detected	4300	Not Detected
2,2,4-Trimethylpentane	680	Not Detected	3200	Not Detected
Benzene	680	420000	2200	1400000
1,2-Dichloroethane	680	Not Detected	2800	Not Detected
Heptane	680	Not Detected	2800	Not Detected
Trichloroethene	680	Not Detected	3600	Not Detected
1,2-Dichloropropane	680	Not Detected	3100	Not Detected
1,4-Dioxane	2700	Not Detected	9800	Not Detected
Bromodichloromethane	680	Not Detected	4600	Not Detected
cis-1,3-Dichloropropene	680	Not Detected	3100	Not Detected
4-Methyl-2-pentanone	680	Not Detected	2800	Not Detected
Toluene	680	71000	2600	270000
trans-1,3-Dichloropropene	680	Not Detected	3100	Not Detected
1,1,2-Trichloroethane	680	Not Detected	3700	Not Detected
Tetrachloroethene	680	Not Detected	4600	Not Detected
2-Hexanone	2700	Not Detected	11000	Not Detected

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Client Sample ID: VR 90C Day 23

Lab ID#: 1208199-01A

EPA METHOD TO-15 GC/MS

File Name:	**14081026**	**Date of Collection:**	**8/6/12 8:30:00 AM**
Dil. Factor:	**136**	**Date of Analysis:**	**8/11/12 01:41 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	680	Not Detected	5800	Not Detected
1,2-Dibromoethane (EDB)	680	Not Detected	5200	Not Detected
Chlorobenzene	680	Not Detected	3100	Not Detected
Ethyl Benzene	680	Not Detected	3000	Not Detected
m,p-Xylene	680	900	3000	3900
o-Xylene	680	Not Detected	3000	Not Detected
Styrene	680	Not Detected	2900	Not Detected
Bromoform	680	Not Detected	7000	Not Detected
Cumene	680	Not Detected	3300	Not Detected
1,1,2,2-Tetrachloroethane	680	Not Detected	4700	Not Detected
Propylbenzene	680	Not Detected	3300	Not Detected
4-Ethyltoluene	680	Not Detected	3300	Not Detected
1,3,5-Trimethylbenzene	680	Not Detected	3300	Not Detected
1,2,4-Trimethylbenzene	680	Not Detected	3300	Not Detected
1,3-Dichlorobenzene	680	Not Detected	4100	Not Detected
1,4-Dichlorobenzene	680	Not Detected	4100	Not Detected
alpha-Chlorotoluene	680	Not Detected	3500	Not Detected
1,2-Dichlorobenzene	680	Not Detected	4100	Not Detected
1,2,4-Trichlorobenzene	2700	Not Detected	20000	Not Detected
Hexachlorobutadiene	2700	Not Detected	29000	Not Detected
Naphthalene	2700	Not Detected	14000	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	119	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	92	70-130

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Client Sample ID: HC 90C Day 24

Lab ID#: 1208199-02A

EPA METHOD TO-15 GC/MS

File Name:	**14081028**	**Date of Collection:**	**8/7/12 9:22:00 AM**
Dil. Factor:	**79.0**	**Date of Analysis:**	**8/11/12 02:48 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	400	Not Detected	2000	Not Detected
Freon 114	400	Not Detected	2800	Not Detected
Chloromethane	1600	9400	3300	19000
Vinyl Chloride	400	Not Detected	1000	Not Detected
1,3-Butadiene	400	Not Detected	870	Not Detected
Bromomethane	400	Not Detected	1500	Not Detected
Chloroethane	1600	Not Detected	4200	Not Detected
Freon 11	400	Not Detected	2200	Not Detected
Ethanol	1600	Not Detected	3000	Not Detected
Freon 113	400	Not Detected	3000	Not Detected
1,1-Dichloroethene	400	Not Detected	1600	Not Detected
Acetone	1600	27000	3800	65000
2-Propanol	1600	Not Detected	3900	Not Detected
Carbon Disulfide	400	5300	1200	16000
3-Chloropropene	1600	Not Detected	4900	Not Detected
Methylene Chloride	400	Not Detected	1400	Not Detected
Methyl tert-butyl ether	400	Not Detected	1400	Not Detected
trans-1,2-Dichloroethene	400	Not Detected	1600	Not Detected
Hexane	400	Not Detected	1400	Not Detected
1,1-Dichloroethane	400	Not Detected	1600	Not Detected
2-Butanone (Methyl Ethyl Ketone)	1600	2700	4600	8100
cis-1,2-Dichloroethene	400	Not Detected	1600	Not Detected
Tetrahydrofuran	400	Not Detected	1200	Not Detected
Chloroform	400	Not Detected	1900	Not Detected
1,1,1-Trichloroethane	400	Not Detected	2200	Not Detected
Cyclohexane	400	Not Detected	1400	Not Detected
Carbon Tetrachloride	400	Not Detected	2500	Not Detected
2,2,4-Trimethylpentane	400	Not Detected	1800	Not Detected
Benzene	400	310000	1300	1000000
1,2-Dichloroethane	400	Not Detected	1600	Not Detected
Heptane	400	Not Detected	1600	Not Detected
Trichloroethene	400	Not Detected	2100	Not Detected
1,2-Dichloropropane	400	Not Detected	1800	Not Detected
1,4-Dioxane	1600	Not Detected	5700	Not Detected
Bromodichloromethane	400	Not Detected	2600	Not Detected
cis-1,3-Dichloropropene	400	Not Detected	1800	Not Detected
4-Methyl-2-pentanone	400	Not Detected	1600	Not Detected
Toluene	400	150000	1500	570000
trans-1,3-Dichloropropene	400	Not Detected	1800	Not Detected
1,1,2-Trichloroethane	400	Not Detected	2200	Not Detected
Tetrachloroethene	400	Not Detected	2700	Not Detected
2-Hexanone	1600	Not Detected	6500	Not Detected

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Client Sample ID: HC 90C Day 24

Lab ID#: 1208199-02A

EPA METHOD TO-15 GC/MS

File Name:	**14081028**	**Date of Collection:**	**8/7/12 9:22:00 AM**
Dil. Factor:	**79.0**	**Date of Analysis:**	**8/11/12 02:48 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	400	Not Detected	3400	Not Detected
1,2-Dibromoethane (EDB)	400	Not Detected	3000	Not Detected
Chlorobenzene	400	Not Detected	1800	Not Detected
Ethyl Benzene	400	1700	1700	7300
m,p-Xylene	400	19000	1700	82000
o-Xylene	400	3100	1700	14000
Styrene	400	Not Detected	1700	Not Detected
Bromoform	400	Not Detected	4100	Not Detected
Cumene	400	2200	1900	11000
1,1,2,2-Tetrachloroethane	400	Not Detected	2700	Not Detected
Propylbenzene	400	Not Detected	1900	Not Detected
4-Ethyltoluene	400	Not Detected	1900	Not Detected
1,3,5-Trimethylbenzene	400	Not Detected	1900	Not Detected
1,2,4-Trimethylbenzene	400	Not Detected	1900	Not Detected
1,3-Dichlorobenzene	400	Not Detected	2400	Not Detected
1,4-Dichlorobenzene	400	Not Detected	2400	Not Detected
alpha-Chlorotoluene	400	Not Detected	2000	Not Detected
1,2-Dichlorobenzene	400	Not Detected	2400	Not Detected
1,2,4-Trichlorobenzene	1600	Not Detected	12000	Not Detected
Hexachlorobutadiene	1600	Not Detected	17000	Not Detected
Naphthalene	1600	Not Detected	8300	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	116	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	97	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1208199-03A

EPA METHOD TO-15 GC/MS

File Name:	**14081006**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/10/12 05:53 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5.0	Not Detected	25	Not Detected
Freon 114	5.0	Not Detected	35	Not Detected
Chloromethane	20	Not Detected	41	Not Detected
Vinyl Chloride	5.0	Not Detected	13	Not Detected
1,3-Butadiene	5.0	Not Detected	11	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	20	Not Detected	53	Not Detected
Freon 11	5.0	Not Detected	28	Not Detected
Ethanol	20	Not Detected	38	Not Detected
Freon 113	5.0	Not Detected	38	Not Detected
1,1-Dichloroethene	5.0	Not Detected	20	Not Detected
Acetone	20	Not Detected	48	Not Detected
2-Propanol	20	Not Detected	49	Not Detected
Carbon Disulfide	5.0	Not Detected	16	Not Detected
3-Chloropropene	20	Not Detected	63	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	5.0	Not Detected	18	Not Detected
trans-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Hexane	5.0	Not Detected	18	Not Detected
1,1-Dichloroethane	5.0	Not Detected	20	Not Detected
2-Butanone (Methyl Ethyl Ketone)	20	Not Detected	59	Not Detected
cis-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Tetrahydrofuran	5.0	Not Detected	15	Not Detected
Chloroform	5.0	Not Detected	24	Not Detected
1,1,1-Trichloroethane	5.0	Not Detected	27	Not Detected
Cyclohexane	5.0	Not Detected	17	Not Detected
Carbon Tetrachloride	5.0	Not Detected	31	Not Detected
2,2,4-Trimethylpentane	5.0	Not Detected	23	Not Detected
Benzene	5.0	Not Detected	16	Not Detected
1,2-Dichloroethane	5.0	Not Detected	20	Not Detected
Heptane	5.0	Not Detected	20	Not Detected
Trichloroethene	5.0	Not Detected	27	Not Detected
1,2-Dichloropropane	5.0	Not Detected	23	Not Detected
1,4-Dioxane	20	Not Detected	72	Not Detected
Bromodichloromethane	5.0	Not Detected	34	Not Detected
cis-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
4-Methyl-2-pentanone	5.0	Not Detected	20	Not Detected
Toluene	5.0	Not Detected	19	Not Detected
trans-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
1,1,2-Trichloroethane	5.0	Not Detected	27	Not Detected
Tetrachloroethene	5.0	Not Detected	34	Not Detected
2-Hexanone	20	Not Detected	82	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1208199-03A

EPA METHOD TO-15 GC/MS

File Name:	**14081006**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/10/12 05:53 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	5.0	Not Detected	42	Not Detected
1,2-Dibromoethane (EDB)	5.0	Not Detected	38	Not Detected
Chlorobenzene	5.0	Not Detected	23	Not Detected
Ethyl Benzene	5.0	Not Detected	22	Not Detected
m,p-Xylene	5.0	Not Detected	22	Not Detected
o-Xylene	5.0	Not Detected	22	Not Detected
Styrene	5.0	Not Detected	21	Not Detected
Bromoform	5.0	Not Detected	52	Not Detected
Cumene	5.0	Not Detected	24	Not Detected
1,1,2,2-Tetrachloroethane	5.0	Not Detected	34	Not Detected
Propylbenzene	5.0	Not Detected	24	Not Detected
4-Ethyltoluene	5.0	Not Detected	24	Not Detected
1,3,5-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,2,4-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,3-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,4-Dichlorobenzene	5.0	Not Detected	30	Not Detected
alpha-Chlorotoluene	5.0	Not Detected	26	Not Detected
1,2-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,2,4-Trichlorobenzene	20	Not Detected	150	Not Detected
Hexachlorobutadiene	20	Not Detected	210	Not Detected
Naphthalene	20	Not Detected	100	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	115	70-130
Toluene-d8	105	70-130
4-Bromofluorobenzene	92	70-130

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Client Sample ID: CCV

Lab ID#: 1208199-04A

EPA METHOD TO-15 GC/MS

File Name:	**14081003**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/10/12 04:45 PM**	

Compound	%Recovery
Freon 12	106
Freon 114	104
Chloromethane	118
Vinyl Chloride	102
1,3-Butadiene	106
Bromomethane	110
Chloroethane	105
Freon 11	110
Ethanol	124
Freon 113	98
1,1-Dichloroethene	107
Acetone	105
2-Propanol	105
Carbon Disulfide	89
3-Chloropropene	82
Methylene Chloride	112
Methyl tert-butyl ether	86
trans-1,2-Dichloroethene	96
Hexane	100
1,1-Dichloroethane	102
2-Butanone (Methyl Ethyl Ketone)	92
cis-1,2-Dichloroethene	101
Tetrahydrofuran	109
Chloroform	100
1,1,1-Trichloroethane	97
Cyclohexane	91
Carbon Tetrachloride	103
2,2,4-Trimethylpentane	101
Benzene	104
1,2-Dichloroethane	110
Heptane	95
Trichloroethene	102
1,2-Dichloropropane	104
1,4-Dioxane	93
Bromodichloromethane	104
cis-1,3-Dichloropropene	87
4-Methyl-2-pentanone	88
Toluene	98
trans-1,3-Dichloropropene	86
1,1,2-Trichloroethane	96
Tetrachloroethene	95
2-Hexanone	88

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Client Sample ID: CCV

Lab ID#: 1208199-04A

EPA METHOD TO-15 GC/MS

File Name:	**14081003**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/10/12 04:45 PM**	

Compound	%Recovery
Dibromochloromethane	100
1,2-Dibromoethane (EDB)	93
Chlorobenzene	93
Ethyl Benzene	91
m,p-Xylene	90
o-Xylene	90
Styrene	91
Bromoform	104
Cumene	97
1,1,2,2-Tetrachloroethane	106
Propylbenzene	106
4-Ethyltoluene	95
1,3,5-Trimethylbenzene	118
1,2,4-Trimethylbenzene	98
1,3-Dichlorobenzene	106
1,4-Dichlorobenzene	95
alpha-Chlorotoluene	109
1,2-Dichlorobenzene	98
1,2,4-Trichlorobenzene	111
Hexachlorobutadiene	127
Naphthalene	103

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	114	70-130
Toluene-d8	107	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: LCS
Lab ID#: 1208199-05A
EPA METHOD TO-15 GC/MS

File Name:	**14081004**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/10/12 05:08 PM**	

Compound	%Recovery
Freon 12	120
Freon 114	114
Chloromethane	132 Q
Vinyl Chloride	119
1,3-Butadiene	120
Bromomethane	119
Chloroethane	117
Freon 11	122
Ethanol	118
Freon 113	108
1,1-Dichloroethene	121
Acetone	115
2-Propanol	119
Carbon Disulfide	126
3-Chloropropene	107
Methylene Chloride	123
Methyl tert-butyl ether	94
trans-1,2-Dichloroethene	118
Hexane	110
1,1-Dichloroethane	111
2-Butanone (Methyl Ethyl Ketone)	101
cis-1,2-Dichloroethene	112
Tetrahydrofuran	119
Chloroform	113
1,1,1-Trichloroethane	109
Cyclohexane	103
Carbon Tetrachloride	114
2,2,4-Trimethylpentane	112
Benzene	114
1,2-Dichloroethane	120
Heptane	105
Trichloroethene	112
1,2-Dichloropropane	115
1,4-Dioxane	99
Bromodichloromethane	116
cis-1,3-Dichloropropene	97
4-Methyl-2-pentanone	98
Toluene	109
trans-1,3-Dichloropropene	94
1,1,2-Trichloroethane	105
Tetrachloroethene	101
2-Hexanone	91

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Client Sample ID: LCS

Lab ID#: 1208199-05A

EPA METHOD TO-15 GC/MS

File Name:	**14081004**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/10/12 05:08 PM**	

Compound	%Recovery
Dibromochloromethane	105
1,2-Dibromoethane (EDB)	103
Chlorobenzene	102
Ethyl Benzene	98
m,p-Xylene	100
o-Xylene	99
Styrene	99
Bromoform	110
Cumene	105
1,1,2,2-Tetrachloroethane	115
Propylbenzene	115
4-Ethyltoluene	97
1,3,5-Trimethylbenzene	119
1,2,4-Trimethylbenzene	100
1,3-Dichlorobenzene	113
1,4-Dichlorobenzene	101
alpha-Chlorotoluene	110
1,2-Dichlorobenzene	105
1,2,4-Trichlorobenzene	112
Hexachlorobutadiene	127
Naphthalene	79

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	113	70-130
Toluene-d8	107	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: LCSD

Lab ID#: 1208199-05AA

EPA METHOD TO-15 GC/MS

File Name:	**14081005**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/10/12 05:31 PM**	

Compound	%Recovery
Freon 12	118
Freon 114	112
Chloromethane	133 Q
Vinyl Chloride	116
1,3-Butadiene	121
Bromomethane	119
Chloroethane	116
Freon 11	119
Ethanol	118
Freon 113	107
1,1-Dichloroethene	118
Acetone	116
2-Propanol	120
Carbon Disulfide	126
3-Chloropropene	108
Methylene Chloride	121
Methyl tert-butyl ether	94
trans-1,2-Dichloroethene	117
Hexane	112
1,1-Dichloroethane	112
2-Butanone (Methyl Ethyl Ketone)	102
cis-1,2-Dichloroethene	109
Tetrahydrofuran	117
Chloroform	112
1,1,1-Trichloroethane	109
Cyclohexane	100
Carbon Tetrachloride	113
2,2,4-Trimethylpentane	112
Benzene	115
1,2-Dichloroethane	120
Heptane	104
Trichloroethene	110
1,2-Dichloropropane	116
1,4-Dioxane	98
Bromodichloromethane	115
cis-1,3-Dichloropropene	97
4-Methyl-2-pentanone	98
Toluene	107
trans-1,3-Dichloropropene	94
1,1,2-Trichloroethane	105
Tetrachloroethene	104
2-Hexanone	92

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Client Sample ID: LCSD

Lab ID#: 1208199-05AA

EPA METHOD TO-15 GC/MS

File Name:	**14081005**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/10/12 05:31 PM**	

Compound	%Recovery
Dibromochloromethane	105
1,2-Dibromoethane (EDB)	103
Chlorobenzene	102
Ethyl Benzene	100
m,p-Xylene	101
o-Xylene	99
Styrene	99
Bromoform	111
Cumene	105
1,1,2,2-Tetrachloroethane	116
Propylbenzene	114
4-Ethyltoluene	98
1,3,5-Trimethylbenzene	122
1,2,4-Trimethylbenzene	100
1,3-Dichlorobenzene	110
1,4-Dichlorobenzene	98
alpha-Chlorotoluene	108
1,2-Dichlorobenzene	102
1,2,4-Trichlorobenzene	96
Hexachlorobutadiene	112
Naphthalene	74

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	112	70-130
Toluene-d8	107	70-130
4-Bromofluorobenzene	98	70-130

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8/29/2012

Mr. Tommy Jordan
Kemron Environmental Services
1359-A Ellsworth Industrial Boulevard

Atlanta GA 30318

Project Name: Bridgewater
Project #: SH0416
Workorder #: 1208305

Dear Mr. Tommy Jordan

The following report includes the data for the above referenced project for sample(s) received on 8/14/2012 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 (5&20 ppbv) are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Ausha Scott

Project Manager

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WORK ORDER #: 1208305

Work Order Summary

CLIENT:	Mr. Tommy Jordan Kemron Environmental Services 1359-A Ellsworth Industrial Boulevard Atlanta, GA 30318	**BILL TO:**	Accounts Payable Kemron Environmental Services 1359-A Ellsworth Industrial Boulevard Atlanta, GA 30318
PHONE:	404-516-3172	**P.O. #**	
FAX:	404-636-7162	**PROJECT #**	SH0416 Bridgewater
DATE RECEIVED:	08/14/2012	**CONTACT:**	Ausha Scott
DATE COMPLETED:	08/29/2012		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	HC 90C Day 1	Modified TO-15 (5&20 ppbv	3.5 "Hg	5 psi
02A	VR 90C Day 1	Modified TO-15 (5&20 ppbv	3.0 "Hg	5 psi
03A	HC 100C Day 1	Modified TO-15 (5&20 ppbv	2.5 "Hg	5 psi
04A	VR 100C Day 1	Modified TO-15 (5&20 ppbv	3.5 "Hg	5 psi
05A	Lab Blank	Modified TO-15 (5&20 ppbv	NA	NA
06A	CCV	Modified TO-15 (5&20 ppbv	NA	NA
07A	LCS	Modified TO-15 (5&20 ppbv	NA	NA
07AA	LCSD	Modified TO-15 (5&20 ppbv	NA	NA

CERTIFIED BY: Heidi Mayo DATE: 08/29/12

Technical Director

Certfication numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NY NELAP - 11291,
TX NELAP - T104704434-12-5, UT NELAP CA009332012-3, WA NELAP - C935
Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2011, Expiration date: 10/17/2012.
Eurofins Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
EPA Method TO-15 Soil Gas
Kemron Environmental Services
Workorder# 1208305

Four 6 Liter Summa Canister samples were received on August 14, 2012. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode. The method involves concentrating up to 50 mLs of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page. Target compound non-detects in the samples that are associated with high bias in QC analyses have not been flagged.

Dilutions were performed on samples HC 90C Day 1, VR 90C Day 1, HC 100C Day 1 and VR 100C Day 1 due to the presence of high level target species.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the reporting limit.
UJ- Non-detected compound associated with low bias in the CCV and/or LCS.
N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS

Client Sample ID: HC 90C Day 1

Lab ID#: 1208305-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	220000	290000	450000	610000
Acetone	220000	520000	520000	1200000
Benzene	54000	34000000	170000	110000000
Toluene	54000	4400000	200000	17000000
m,p-Xylene	54000	98000	240000	430000

Client Sample ID: VR 90C Day 1

Lab ID#: 1208305-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Carbon Disulfide	25000	200000	77000	610000
Hexane	25000	85000	88000	300000
Benzene	25000	11000000	79000	34000000
Toluene	25000	90000	94000	340000

Client Sample ID: HC 100C Day 1

Lab ID#: 1208305-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	260000	510000	540000	1000000
Acetone	260000	300000	620000	720000
Carbon Disulfide	65000	230000	200000	720000
Hexane	65000	140000	230000	480000
Benzene	65000	26000000	210000	84000000
Toluene	65000	840000	240000	3200000

Client Sample ID: VR 100C Day 1

Lab ID#: 1208305-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	38000	43000	78000	89000
Carbon Disulfide	9500	51000	30000	160000

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS

Client Sample ID: VR 100C Day 1

Lab ID#: 1208305-04A

Hexane	9500	14000	33000	50000
Benzene	9500	3900000	30000	12000000
Toluene	9500	260000	36000	990000
m,p-Xylene	9500	10000	41000	44000

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Client Sample ID: HC 90C Day 1

Lab ID#: 1208305-01A

EPA METHOD TO-15 GC/MS

File Name:	**14082609**	**Date of Collection:**	**8/11/12 7:55:00 AM**
Dil. Factor:	**10900**	**Date of Analysis:**	**8/26/12 11:40 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	54000	Not Detected	270000	Not Detected
Freon 114	54000	Not Detected	380000	Not Detected
Chloromethane	220000	290000	450000	610000
Vinyl Chloride	54000	Not Detected	140000	Not Detected
1,3-Butadiene	54000	Not Detected	120000	Not Detected
Bromomethane	54000	Not Detected	210000	Not Detected
Chloroethane	220000	Not Detected	580000	Not Detected
Freon 11	54000	Not Detected	310000	Not Detected
Ethanol	220000	Not Detected	410000	Not Detected
Freon 113	54000	Not Detected	420000	Not Detected
1,1-Dichloroethene	54000	Not Detected	220000	Not Detected
Acetone	220000	520000	520000	1200000
2-Propanol	220000	Not Detected	540000	Not Detected
Carbon Disulfide	54000	Not Detected	170000	Not Detected
3-Chloropropene	220000	Not Detected	680000	Not Detected
Methylene Chloride	54000	Not Detected	190000	Not Detected
Methyl tert-butyl ether	54000	Not Detected	200000	Not Detected
trans-1,2-Dichloroethene	54000	Not Detected	220000	Not Detected
Hexane	54000	Not Detected	190000	Not Detected
1,1-Dichloroethane	54000	Not Detected	220000	Not Detected
2-Butanone (Methyl Ethyl Ketone)	220000	Not Detected	640000	Not Detected
cis-1,2-Dichloroethene	54000	Not Detected	220000	Not Detected
Tetrahydrofuran	54000	Not Detected	160000	Not Detected
Chloroform	54000	Not Detected	270000	Not Detected
1,1,1-Trichloroethane	54000	Not Detected	300000	Not Detected
Cyclohexane	54000	Not Detected	190000	Not Detected
Carbon Tetrachloride	54000	Not Detected	340000	Not Detected
2,2,4-Trimethylpentane	54000	Not Detected	250000	Not Detected
Benzene	54000	34000000	170000	110000000
1,2-Dichloroethane	54000	Not Detected	220000	Not Detected
Heptane	54000	Not Detected	220000	Not Detected
Trichloroethene	54000	Not Detected	290000	Not Detected
1,2-Dichloropropane	54000	Not Detected	250000	Not Detected
1,4-Dioxane	220000	Not Detected	780000	Not Detected
Bromodichloromethane	54000	Not Detected	360000	Not Detected
cis-1,3-Dichloropropene	54000	Not Detected	250000	Not Detected
4-Methyl-2-pentanone	54000	Not Detected	220000	Not Detected
Toluene	54000	4400000	200000	17000000
trans-1,3-Dichloropropene	54000	Not Detected	250000	Not Detected
1,1,2-Trichloroethane	54000	Not Detected	300000	Not Detected
Tetrachloroethene	54000	Not Detected	370000	Not Detected
2-Hexanone	220000	Not Detected	890000	Not Detected

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Client Sample ID: HC 90C Day 1

Lab ID#: 1208305-01A

EPA METHOD TO-15 GC/MS

File Name:	**14082609**	**Date of Collection:**	**8/11/12 7:55:00 AM**
Dil. Factor:	**10900**	**Date of Analysis:**	**8/26/12 11:40 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	54000	Not Detected	460000	Not Detected
1,2-Dibromoethane (EDB)	54000	Not Detected	420000	Not Detected
Chlorobenzene	54000	Not Detected	250000	Not Detected
Ethyl Benzene	54000	Not Detected	240000	Not Detected
m,p-Xylene	54000	98000	240000	430000
o-Xylene	54000	Not Detected	240000	Not Detected
Styrene	54000	Not Detected	230000	Not Detected
Bromoform	54000	Not Detected	560000	Not Detected
Cumene	54000	Not Detected	270000	Not Detected
1,1,2,2-Tetrachloroethane	54000	Not Detected	370000	Not Detected
Propylbenzene	54000	Not Detected	270000	Not Detected
4-Ethyltoluene	54000	Not Detected	270000	Not Detected
1,3,5-Trimethylbenzene	54000	Not Detected	270000	Not Detected
1,2,4-Trimethylbenzene	54000	Not Detected	270000	Not Detected
1,3-Dichlorobenzene	54000	Not Detected	330000	Not Detected
1,4-Dichlorobenzene	54000	Not Detected	330000	Not Detected
alpha-Chlorotoluene	54000	Not Detected	280000	Not Detected
1,2-Dichlorobenzene	54000	Not Detected	330000	Not Detected
1,2,4-Trichlorobenzene	220000	Not Detected	1600000	Not Detected
Hexachlorobutadiene	220000	Not Detected	2300000	Not Detected
Naphthalene	220000	Not Detected	1100000	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	105	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: VR 90C Day 1

Lab ID#: 1208305-02A

EPA METHOD TO-15 GC/MS

File Name:	**14082619**	**Date of Collection:**	**8/11/12 7:55:00 AM**
Dil. Factor:	**4970**	**Date of Analysis:**	**8/26/12 06:26 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	25000	Not Detected	120000	Not Detected
Freon 114	25000	Not Detected	170000	Not Detected
Chloromethane	99000	Not Detected	200000	Not Detected
Vinyl Chloride	25000	Not Detected	64000	Not Detected
1,3-Butadiene	25000	Not Detected	55000	Not Detected
Bromomethane	25000	Not Detected	96000	Not Detected
Chloroethane	99000	Not Detected	260000	Not Detected
Freon 11	25000	Not Detected	140000	Not Detected
Ethanol	99000	Not Detected	190000	Not Detected
Freon 113	25000	Not Detected	190000	Not Detected
1,1-Dichloroethene	25000	Not Detected	98000	Not Detected
Acetone	99000	Not Detected	240000	Not Detected
2-Propanol	99000	Not Detected	240000	Not Detected
Carbon Disulfide	25000	200000	77000	610000
3-Chloropropene	99000	Not Detected	310000	Not Detected
Methylene Chloride	25000	Not Detected	86000	Not Detected
Methyl tert-butyl ether	25000	Not Detected	90000	Not Detected
trans-1,2-Dichloroethene	25000	Not Detected	98000	Not Detected
Hexane	25000	85000	88000	300000
1,1-Dichloroethane	25000	Not Detected	100000	Not Detected
2-Butanone (Methyl Ethyl Ketone)	99000	Not Detected	290000	Not Detected
cis-1,2-Dichloroethene	25000	Not Detected	98000	Not Detected
Tetrahydrofuran	25000	Not Detected	73000	Not Detected
Chloroform	25000	Not Detected	120000	Not Detected
1,1,1-Trichloroethane	25000	Not Detected	140000	Not Detected
Cyclohexane	25000	Not Detected	86000	Not Detected
Carbon Tetrachloride	25000	Not Detected	160000	Not Detected
2,2,4-Trimethylpentane	25000	Not Detected	120000	Not Detected
Benzene	25000	11000000	79000	34000000
1,2-Dichloroethane	25000	Not Detected	100000	Not Detected
Heptane	25000	Not Detected	100000	Not Detected
Trichloroethene	25000	Not Detected	130000	Not Detected
1,2-Dichloropropane	25000	Not Detected	110000	Not Detected
1,4-Dioxane	99000	Not Detected	360000	Not Detected
Bromodichloromethane	25000	Not Detected	170000	Not Detected
cis-1,3-Dichloropropene	25000	Not Detected	110000	Not Detected
4-Methyl-2-pentanone	25000	Not Detected	100000	Not Detected
Toluene	25000	90000	94000	340000
trans-1,3-Dichloropropene	25000	Not Detected	110000	Not Detected
1,1,2-Trichloroethane	25000	Not Detected	140000	Not Detected
Tetrachloroethene	25000	Not Detected	170000	Not Detected
2-Hexanone	99000	Not Detected	410000	Not Detected

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Client Sample ID: VR 90C Day 1

Lab ID#: 1208305-02A

EPA METHOD TO-15 GC/MS

File Name:	**14082619**	**Date of Collection:**	**8/11/12 7:55:00 AM**
Dil. Factor:	**4970**	**Date of Analysis:**	**8/26/12 06:26 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	25000	Not Detected	210000	Not Detected
1,2-Dibromoethane (EDB)	25000	Not Detected	190000	Not Detected
Chlorobenzene	25000	Not Detected	110000	Not Detected
Ethyl Benzene	25000	Not Detected	110000	Not Detected
m,p-Xylene	25000	Not Detected	110000	Not Detected
o-Xylene	25000	Not Detected	110000	Not Detected
Styrene	25000	Not Detected	100000	Not Detected
Bromoform	25000	Not Detected	260000	Not Detected
Cumene	25000	Not Detected	120000	Not Detected
1,1,2,2-Tetrachloroethane	25000	Not Detected	170000	Not Detected
Propylbenzene	25000	Not Detected	120000	Not Detected
4-Ethyltoluene	25000	Not Detected	120000	Not Detected
1,3,5-Trimethylbenzene	25000	Not Detected	120000	Not Detected
1,2,4-Trimethylbenzene	25000	Not Detected	120000	Not Detected
1,3-Dichlorobenzene	25000	Not Detected	150000	Not Detected
1,4-Dichlorobenzene	25000	Not Detected	150000	Not Detected
alpha-Chlorotoluene	25000	Not Detected	130000	Not Detected
1,2-Dichlorobenzene	25000	Not Detected	150000	Not Detected
1,2,4-Trichlorobenzene	99000	Not Detected	740000	Not Detected
Hexachlorobutadiene	99000	Not Detected	1100000	Not Detected
Naphthalene	99000	Not Detected	520000	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	106	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: HC 100C Day 1

Lab ID#: 1208305-03A

EPA METHOD TO-15 GC/MS

File Name:	**14082613**	**Date of Collection:**	**8/13/12 3:00:00 PM**
Dil. Factor:	**13000**	**Date of Analysis:**	**8/26/12 01:45 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	65000	Not Detected	320000	Not Detected
Freon 114	65000	Not Detected	450000	Not Detected
Chloromethane	260000	510000	540000	1000000
Vinyl Chloride	65000	Not Detected	170000	Not Detected
1,3-Butadiene	65000	Not Detected	140000	Not Detected
Bromomethane	65000	Not Detected	250000	Not Detected
Chloroethane	260000	Not Detected	690000	Not Detected
Freon 11	65000	Not Detected	360000	Not Detected
Ethanol	260000	Not Detected	490000	Not Detected
Freon 113	65000	Not Detected	500000	Not Detected
1,1-Dichloroethene	65000	Not Detected	260000	Not Detected
Acetone	260000	300000	620000	720000
2-Propanol	260000	Not Detected	640000	Not Detected
Carbon Disulfide	65000	230000	200000	720000
3-Chloropropene	260000	Not Detected	810000	Not Detected
Methylene Chloride	65000	Not Detected	220000	Not Detected
Methyl tert-butyl ether	65000	Not Detected	230000	Not Detected
trans-1,2-Dichloroethene	65000	Not Detected	260000	Not Detected
Hexane	65000	140000	230000	480000
1,1-Dichloroethane	65000	Not Detected	260000	Not Detected
2-Butanone (Methyl Ethyl Ketone)	260000	Not Detected	770000	Not Detected
cis-1,2-Dichloroethene	65000	Not Detected	260000	Not Detected
Tetrahydrofuran	65000	Not Detected	190000	Not Detected
Chloroform	65000	Not Detected	320000	Not Detected
1,1,1-Trichloroethane	65000	Not Detected	350000	Not Detected
Cyclohexane	65000	Not Detected	220000	Not Detected
Carbon Tetrachloride	65000	Not Detected	410000	Not Detected
2,2,4-Trimethylpentane	65000	Not Detected	300000	Not Detected
Benzene	65000	26000000	210000	84000000
1,2-Dichloroethane	65000	Not Detected	260000	Not Detected
Heptane	65000	Not Detected	270000	Not Detected
Trichloroethene	65000	Not Detected	350000	Not Detected
1,2-Dichloropropane	65000	Not Detected	300000	Not Detected
1,4-Dioxane	260000	Not Detected	940000	Not Detected
Bromodichloromethane	65000	Not Detected	440000	Not Detected
cis-1,3-Dichloropropene	65000	Not Detected	300000	Not Detected
4-Methyl-2-pentanone	65000	Not Detected	270000	Not Detected
Toluene	65000	840000	240000	3200000
trans-1,3-Dichloropropene	65000	Not Detected	300000	Not Detected
1,1,2-Trichloroethane	65000	Not Detected	350000	Not Detected
Tetrachloroethene	65000	Not Detected	440000	Not Detected
2-Hexanone	260000	Not Detected	1100000	Not Detected

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Client Sample ID: HC 100C Day 1

Lab ID#: 1208305-03A

EPA METHOD TO-15 GC/MS

File Name:	**14082613**	**Date of Collection:**	**8/13/12 3:00:00 PM**
Dil. Factor:	**13000**	**Date of Analysis:**	**8/26/12 01:45 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	65000	Not Detected	550000	Not Detected
1,2-Dibromoethane (EDB)	65000	Not Detected	500000	Not Detected
Chlorobenzene	65000	Not Detected	300000	Not Detected
Ethyl Benzene	65000	Not Detected	280000	Not Detected
m,p-Xylene	65000	Not Detected	280000	Not Detected
o-Xylene	65000	Not Detected	280000	Not Detected
Styrene	65000	Not Detected	280000	Not Detected
Bromoform	65000	Not Detected	670000	Not Detected
Cumene	65000	Not Detected	320000	Not Detected
1,1,2,2-Tetrachloroethane	65000	Not Detected	450000	Not Detected
Propylbenzene	65000	Not Detected	320000	Not Detected
4-Ethyltoluene	65000	Not Detected	320000	Not Detected
1,3,5-Trimethylbenzene	65000	Not Detected	320000	Not Detected
1,2,4-Trimethylbenzene	65000	Not Detected	320000	Not Detected
1,3-Dichlorobenzene	65000	Not Detected	390000	Not Detected
1,4-Dichlorobenzene	65000	Not Detected	390000	Not Detected
alpha-Chlorotoluene	65000	Not Detected	340000	Not Detected
1,2-Dichlorobenzene	65000	Not Detected	390000	Not Detected
1,2,4-Trichlorobenzene	260000	Not Detected	1900000	Not Detected
Hexachlorobutadiene	260000	Not Detected	2800000	Not Detected
Naphthalene	260000	Not Detected	1400000	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	109	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: VR 100C Day 1

Lab ID#: 1208305-04A

EPA METHOD TO-15 GC/MS

File Name:	**14082622**	**Date of Collection: 8/13/12 3:00:00 PM**	
Dil. Factor:	**1900**	**Date of Analysis: 8/26/12 09:24 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	9500	Not Detected	47000	Not Detected
Freon 114	9500	Not Detected	66000	Not Detected
Chloromethane	38000	43000	78000	89000
Vinyl Chloride	9500	Not Detected	24000	Not Detected
1,3-Butadiene	9500	Not Detected	21000	Not Detected
Bromomethane	9500	Not Detected	37000	Not Detected
Chloroethane	38000	Not Detected	100000	Not Detected
Freon 11	9500	Not Detected	53000	Not Detected
Ethanol	38000	Not Detected	72000	Not Detected
Freon 113	9500	Not Detected	73000	Not Detected
1,1-Dichloroethene	9500	Not Detected	38000	Not Detected
Acetone	38000	Not Detected	90000	Not Detected
2-Propanol	38000	Not Detected	93000	Not Detected
Carbon Disulfide	9500	51000	30000	160000
3-Chloropropene	38000	Not Detected	120000	Not Detected
Methylene Chloride	9500	Not Detected	33000	Not Detected
Methyl tert-butyl ether	9500	Not Detected	34000	Not Detected
trans-1,2-Dichloroethene	9500	Not Detected	38000	Not Detected
Hexane	9500	14000	33000	50000
1,1-Dichloroethane	9500	Not Detected	38000	Not Detected
2-Butanone (Methyl Ethyl Ketone)	38000	Not Detected	110000	Not Detected
cis-1,2-Dichloroethene	9500	Not Detected	38000	Not Detected
Tetrahydrofuran	9500	Not Detected	28000	Not Detected
Chloroform	9500	Not Detected	46000	Not Detected
1,1,1-Trichloroethane	9500	Not Detected	52000	Not Detected
Cyclohexane	9500	Not Detected	33000	Not Detected
Carbon Tetrachloride	9500	Not Detected	60000	Not Detected
2,2,4-Trimethylpentane	9500	Not Detected	44000	Not Detected
Benzene	9500	3900000	30000	12000000
1,2-Dichloroethane	9500	Not Detected	38000	Not Detected
Heptane	9500	Not Detected	39000	Not Detected
Trichloroethene	9500	Not Detected	51000	Not Detected
1,2-Dichloropropane	9500	Not Detected	44000	Not Detected
1,4-Dioxane	38000	Not Detected	140000	Not Detected
Bromodichloromethane	9500	Not Detected	64000	Not Detected
cis-1,3-Dichloropropene	9500	Not Detected	43000	Not Detected
4-Methyl-2-pentanone	9500	Not Detected	39000	Not Detected
Toluene	9500	260000	36000	990000
trans-1,3-Dichloropropene	9500	Not Detected	43000	Not Detected
1,1,2-Trichloroethane	9500	Not Detected	52000	Not Detected
Tetrachloroethene	9500	Not Detected	64000	Not Detected
2-Hexanone	38000	Not Detected	160000	Not Detected

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Client Sample ID: VR 100C Day 1

Lab ID#: 1208305-04A

EPA METHOD TO-15 GC/MS

File Name:	**14082622**	**Date of Collection:**	**8/13/12 3:00:00 PM**
Dil. Factor:	**1900**	**Date of Analysis:**	**8/26/12 09:24 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	9500	Not Detected	81000	Not Detected
1,2-Dibromoethane (EDB)	9500	Not Detected	73000	Not Detected
Chlorobenzene	9500	Not Detected	44000	Not Detected
Ethyl Benzene	9500	Not Detected	41000	Not Detected
m,p-Xylene	9500	10000	41000	44000
o-Xylene	9500	Not Detected	41000	Not Detected
Styrene	9500	Not Detected	40000	Not Detected
Bromoform	9500	Not Detected	98000	Not Detected
Cumene	9500	Not Detected	47000	Not Detected
1,1,2,2-Tetrachloroethane	9500	Not Detected	65000	Not Detected
Propylbenzene	9500	Not Detected	47000	Not Detected
4-Ethyltoluene	9500	Not Detected	47000	Not Detected
1,3,5-Trimethylbenzene	9500	Not Detected	47000	Not Detected
1,2,4-Trimethylbenzene	9500	Not Detected	47000	Not Detected
1,3-Dichlorobenzene	9500	Not Detected	57000	Not Detected
1,4-Dichlorobenzene	9500	Not Detected	57000	Not Detected
alpha-Chlorotoluene	9500	Not Detected	49000	Not Detected
1,2-Dichlorobenzene	9500	Not Detected	57000	Not Detected
1,2,4-Trichlorobenzene	38000	Not Detected	280000	Not Detected
Hexachlorobutadiene	38000	Not Detected	400000	Not Detected
Naphthalene	38000	Not Detected	200000	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	107	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1208305-05A

EPA METHOD TO-15 GC/MS

File Name:	**14082607**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/26/12 10:00 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5.0	Not Detected	25	Not Detected
Freon 114	5.0	Not Detected	35	Not Detected
Chloromethane	20	Not Detected	41	Not Detected
Vinyl Chloride	5.0	Not Detected	13	Not Detected
1,3-Butadiene	5.0	Not Detected	11	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	20	Not Detected	53	Not Detected
Freon 11	5.0	Not Detected	28	Not Detected
Ethanol	20	Not Detected	38	Not Detected
Freon 113	5.0	Not Detected	38	Not Detected
1,1-Dichloroethene	5.0	Not Detected	20	Not Detected
Acetone	20	Not Detected	48	Not Detected
2-Propanol	20	Not Detected	49	Not Detected
Carbon Disulfide	5.0	Not Detected	16	Not Detected
3-Chloropropene	20	Not Detected	63	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	5.0	Not Detected	18	Not Detected
trans-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Hexane	5.0	Not Detected	18	Not Detected
1,1-Dichloroethane	5.0	Not Detected	20	Not Detected
2-Butanone (Methyl Ethyl Ketone)	20	Not Detected	59	Not Detected
cis-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Tetrahydrofuran	5.0	Not Detected	15	Not Detected
Chloroform	5.0	Not Detected	24	Not Detected
1,1,1-Trichloroethane	5.0	Not Detected	27	Not Detected
Cyclohexane	5.0	Not Detected	17	Not Detected
Carbon Tetrachloride	5.0	Not Detected	31	Not Detected
2,2,4-Trimethylpentane	5.0	Not Detected	23	Not Detected
Benzene	5.0	Not Detected	16	Not Detected
1,2-Dichloroethane	5.0	Not Detected	20	Not Detected
Heptane	5.0	Not Detected	20	Not Detected
Trichloroethene	5.0	Not Detected	27	Not Detected
1,2-Dichloropropane	5.0	Not Detected	23	Not Detected
1,4-Dioxane	20	Not Detected	72	Not Detected
Bromodichloromethane	5.0	Not Detected	34	Not Detected
cis-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
4-Methyl-2-pentanone	5.0	Not Detected	20	Not Detected
Toluene	5.0	Not Detected	19	Not Detected
trans-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
1,1,2-Trichloroethane	5.0	Not Detected	27	Not Detected
Tetrachloroethene	5.0	Not Detected	34	Not Detected
2-Hexanone	20	Not Detected	82	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1208305-05A

EPA METHOD TO-15 GC/MS

File Name:	**14082607**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/26/12 10:00 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	5.0	Not Detected	42	Not Detected
1,2-Dibromoethane (EDB)	5.0	Not Detected	38	Not Detected
Chlorobenzene	5.0	Not Detected	23	Not Detected
Ethyl Benzene	5.0	Not Detected	22	Not Detected
m,p-Xylene	5.0	Not Detected	22	Not Detected
o-Xylene	5.0	Not Detected	22	Not Detected
Styrene	5.0	Not Detected	21	Not Detected
Bromoform	5.0	Not Detected	52	Not Detected
Cumene	5.0	Not Detected	24	Not Detected
1,1,2,2-Tetrachloroethane	5.0	Not Detected	34	Not Detected
Propylbenzene	5.0	Not Detected	24	Not Detected
4-Ethyltoluene	5.0	Not Detected	24	Not Detected
1,3,5-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,2,4-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,3-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,4-Dichlorobenzene	5.0	Not Detected	30	Not Detected
alpha-Chlorotoluene	5.0	Not Detected	26	Not Detected
1,2-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,2,4-Trichlorobenzene	20	Not Detected	150	Not Detected
Hexachlorobutadiene	20	Not Detected	210	Not Detected
Naphthalene	20	Not Detected	100	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	106	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: CCV

Lab ID#: 1208305-06A

EPA METHOD TO-15 GC/MS

File Name:	**14082602**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/26/12 06:59 AM**	

Compound	%Recovery
Freon 12	95
Freon 114	105
Chloromethane	122
Vinyl Chloride	100
1,3-Butadiene	106
Bromomethane	105
Chloroethane	104
Freon 11	100
Ethanol	121
Freon 113	97
1,1-Dichloroethene	104
Acetone	106
2-Propanol	119
Carbon Disulfide	84
3-Chloropropene	82
Methylene Chloride	110
Methyl tert-butyl ether	86
trans-1,2-Dichloroethene	88
Hexane	104
1,1-Dichloroethane	96
2-Butanone (Methyl Ethyl Ketone)	89
cis-1,2-Dichloroethene	97
Tetrahydrofuran	133 Q
Chloroform	93
1,1,1-Trichloroethane	91
Cyclohexane	88
Carbon Tetrachloride	94
2,2,4-Trimethylpentane	105
Benzene	94
1,2-Dichloroethane	96
Heptane	90
Trichloroethene	94
1,2-Dichloropropane	97
1,4-Dioxane	88
Bromodichloromethane	92
cis-1,3-Dichloropropene	83
4-Methyl-2-pentanone	87
Toluene	92
trans-1,3-Dichloropropene	80
1,1,2-Trichloroethane	88
Tetrachloroethene	91
2-Hexanone	85

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Client Sample ID: CCV
Lab ID#: 1208305-06A
EPA METHOD TO-15 GC/MS

File Name:	**14082602**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/26/12 06:59 AM**	

Compound	%Recovery
Dibromochloromethane	83
1,2-Dibromoethane (EDB)	85
Chlorobenzene	85
Ethyl Benzene	81
m,p-Xylene	83
o-Xylene	82
Styrene	82
Bromoform	92
Cumene	86
1,1,2,2-Tetrachloroethane	92
Propylbenzene	94
4-Ethyltoluene	87
1,3,5-Trimethylbenzene	102
1,2,4-Trimethylbenzene	88
1,3-Dichlorobenzene	94
1,4-Dichlorobenzene	85
alpha-Chlorotoluene	93
1,2-Dichlorobenzene	86
1,2,4-Trichlorobenzene	93
Hexachlorobutadiene	101
Naphthalene	100

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	109	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: LCS
Lab ID#: 1208305-07A
EPA METHOD TO-15 GC/MS

File Name:	**14082603**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/26/12 07:27 AM**	

Compound	%Recovery
Freon 12	106
Freon 114	107
Chloromethane	124
Vinyl Chloride	91
1,3-Butadiene	95
Bromomethane	86
Chloroethane	107
Freon 11	103
Ethanol	137 Q
Freon 113	100
1,1-Dichloroethene	112
Acetone	112
2-Propanol	127
Carbon Disulfide	111
3-Chloropropene	100
Methylene Chloride	114
Methyl tert-butyl ether	93
trans-1,2-Dichloroethene	107
Hexane	110
1,1-Dichloroethane	101
2-Butanone (Methyl Ethyl Ketone)	95
cis-1,2-Dichloroethene	103
Tetrahydrofuran	117
Chloroform	99
1,1,1-Trichloroethane	97
Cyclohexane	95
Carbon Tetrachloride	99
2,2,4-Trimethylpentane	108
Benzene	98
1,2-Dichloroethane	100
Heptane	92
Trichloroethene	97
1,2-Dichloropropane	105
1,4-Dioxane	88
Bromodichloromethane	98
cis-1,3-Dichloropropene	91
4-Methyl-2-pentanone	92
Toluene	94
trans-1,3-Dichloropropene	89
1,1,2-Trichloroethane	92
Tetrachloroethene	95
2-Hexanone	95

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Client Sample ID: LCS

Lab ID#: 1208305-07A

EPA METHOD TO-15 GC/MS

File Name:	**14082603**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/26/12 07:27 AM**	

Compound	%Recovery
Dibromochloromethane	93
1,2-Dibromoethane (EDB)	91
Chlorobenzene	89
Ethyl Benzene	86
m,p-Xylene	89
o-Xylene	89
Styrene	90
Bromoform	102
Cumene	93
1,1,2,2-Tetrachloroethane	99
Propylbenzene	101
4-Ethyltoluene	88
1,3,5-Trimethylbenzene	106
1,2,4-Trimethylbenzene	94
1,3-Dichlorobenzene	99
1,4-Dichlorobenzene	88
alpha-Chlorotoluene	112
1,2-Dichlorobenzene	93
1,2,4-Trichlorobenzene	121
Hexachlorobutadiene	122
Naphthalene	107

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	107	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: LCSD

Lab ID#: 1208305-07AA

EPA METHOD TO-15 GC/MS

File Name:	**14082604**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/26/12 07:48 AM**	

Compound	%Recovery
Freon 12	110
Freon 114	110
Chloromethane	124
Vinyl Chloride	98
1,3-Butadiene	106
Bromomethane	88
Chloroethane	111
Freon 11	106
Ethanol	142 Q
Freon 113	104
1,1-Dichloroethene	121
Acetone	115
2-Propanol	132 Q
Carbon Disulfide	118
3-Chloropropene	104
Methylene Chloride	118
Methyl tert-butyl ether	97
trans-1,2-Dichloroethene	112
Hexane	113
1,1-Dichloroethane	105
2-Butanone (Methyl Ethyl Ketone)	100
cis-1,2-Dichloroethene	107
Tetrahydrofuran	120
Chloroform	102
1,1,1-Trichloroethane	100
Cyclohexane	97
Carbon Tetrachloride	103
2,2,4-Trimethylpentane	113
Benzene	104
1,2-Dichloroethane	106
Heptane	99
Trichloroethene	102
1,2-Dichloropropane	110
1,4-Dioxane	96
Bromodichloromethane	104
cis-1,3-Dichloropropene	97
4-Methyl-2-pentanone	98
Toluene	99
trans-1,3-Dichloropropene	93
1,1,2-Trichloroethane	98
Tetrachloroethene	100
2-Hexanone	102

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Client Sample ID: LCSD
Lab ID#: 1208305-07AA
EPA METHOD TO-15 GC/MS

File Name:	**14082604**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/26/12 07:48 AM**	

Compound	%Recovery
Dibromochloromethane	98
1,2-Dibromoethane (EDB)	97
Chlorobenzene	93
Ethyl Benzene	92
m,p-Xylene	93
o-Xylene	92
Styrene	96
Bromoform	108
Cumene	97
1,1,2,2-Tetrachloroethane	105
Propylbenzene	106
4-Ethyltoluene	92
1,3,5-Trimethylbenzene	111
1,2,4-Trimethylbenzene	99
1,3-Dichlorobenzene	107
1,4-Dichlorobenzene	96
alpha-Chlorotoluene	120
1,2-Dichlorobenzene	99
1,2,4-Trichlorobenzene	148 Q
Hexachlorobutadiene	140 Q
Naphthalene	131 Q

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	105	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	100	70-130

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8/30/2012

Mr. Tommy Jordan
Kemron Environmental Services
1359-A Ellsworth Industrial Boulevard

Atlanta GA 30318

Project Name: Bridgewater
Project #: SH041602-005
Workorder #: 1208594

Dear Mr. Tommy Jordan

The following report includes the data for the above referenced project for sample(s) received on 8/28/2012 at Air Toxics Ltd.

The data and associated QC analyzed by ATL GC/MS Application #44 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Ausha Scott

Project Manager

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WORK ORDER #: 1208594

Work Order Summary

CLIENT:	Mr. Tommy Jordan Kemron Environmental Services 1359-A Ellsworth Industrial Boulevard Atlanta, GA 30318	**BILL TO:**	Accounts Payable Kemron Environmental Services 1359-A Ellsworth Industrial Boulevard Atlanta, GA 30318
PHONE:	404-516-3172	**P.O. #**	SH041602-005
FAX:	404-636-7162	**PROJECT #**	SH041602-005 Bridgewater
DATE RECEIVED:	08/28/2012	**CONTACT:**	Ausha Scott
DATE COMPLETED:	08/30/2012		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	VR 100 To	ATL GC/MS Application #4		
02A	HC 100 To	ATL GC/MS Application #4		
03A	Lab Blank	ATL GC/MS Application #4	NA	NA
04A	CCV	ATL GC/MS Application #4	NA	NA
05A	LCS	ATL GC/MS Application #4	NA	NA
05AA	LCSD	ATL GC/MS Application #4	NA	NA

CERTIFIED BY: Heidi Mayo DATE: 08/30/12

Technical Director

Certfication numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NY NELAP - 11291,
TX NELAP - T104704434-12-5, UT NELAP CA009332012-3, WA NELAP - C935
Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2011, Expiration date: 10/17/2012.
Eurofins Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
ATL GC Application
Kemron Environmental Services
Workorder# 1208594

Two VOA Vial-40 mL samples were received on August 28, 2012. The laboratory performed analysis of via GC application .. using GC/FID. The method involves direct injection of the air sample into the GC via a syringe.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page. Target compound non-detects in the samples that are associated with high bias in QC analyses have not been flagged.

Dilution was performed on samples VR 100 To and HC 100 To due to the presence of high level target species.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicate as follows:
B - Compound present in laboratory blank greater than reporting limit.
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the detection limit.
M - Reported value may be biased due to apparent matrix interferences.
N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
ATL GC APPLICATION #44 BY GC/MS

Client Sample ID: VR 100 To

Lab ID#: 1208594-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Carbon Disulfide	100000	100000	310000	330000
Benzene	100000	35000000	320000	110000000
Toluene	100000	3600000	380000	14000000
m,p-Xylene	100000	230000	430000	1000000

Client Sample ID: HC 100 To

Lab ID#: 1208594-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Carbon Disulfide	100000	180000	310000	550000
Hexane	100000	110000	350000	390000
Benzene	100000	58000000	320000	180000000
Toluene	100000	5900000	380000	22000000
m,p-Xylene	100000	310000	430000	1400000

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Client Sample ID: VR 100 To

Lab ID#: 1208594-01A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14083023**	**Date of Collection:**	**8/27/12 2:25:00 PM**
Dil. Factor:	**20000**	**Date of Analysis:**	**8/30/12 03:24 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	100000	Not Detected	490000	Not Detected
Freon 114	100000	Not Detected	700000	Not Detected
Chloromethane	400000	Not Detected	830000	Not Detected
Vinyl Chloride	100000	Not Detected	260000	Not Detected
1,3-Butadiene	100000	Not Detected	220000	Not Detected
Bromomethane	100000	Not Detected	390000	Not Detected
Chloroethane	100000	Not Detected	260000	Not Detected
Freon 11	100000	Not Detected	560000	Not Detected
Ethanol	400000	Not Detected	750000	Not Detected
Freon 113	100000	Not Detected	770000	Not Detected
1,1-Dichloroethene	100000	Not Detected	400000	Not Detected
Acetone	400000	Not Detected	950000	Not Detected
2-Propanol	400000	Not Detected	980000	Not Detected
Carbon Disulfide	100000	100000	310000	330000
3-Chloropropene	400000	Not Detected	1200000	Not Detected
Methylene Chloride	100000	Not Detected	350000	Not Detected
Methyl tert-butyl ether	100000	Not Detected	360000	Not Detected
trans-1,2-Dichloroethene	100000	Not Detected	400000	Not Detected
Hexane	100000	Not Detected	350000	Not Detected
1,1-Dichloroethane	100000	Not Detected	400000	Not Detected
2-Butanone (Methyl Ethyl Ketone)	100000	Not Detected	290000	Not Detected
cis-1,2-Dichloroethene	100000	Not Detected	400000	Not Detected
Tetrahydrofuran	100000	Not Detected	290000	Not Detected
Chloroform	100000	Not Detected	490000	Not Detected
1,1,1-Trichloroethane	100000	Not Detected	540000	Not Detected
Cyclohexane	100000	Not Detected	340000	Not Detected
Carbon Tetrachloride	100000	Not Detected	630000	Not Detected
2,2,4-Trimethylpentane	100000	Not Detected	470000	Not Detected
Benzene	100000	35000000	320000	110000000
1,2-Dichloroethane	100000	Not Detected	400000	Not Detected
Heptane	100000	Not Detected	410000	Not Detected
Trichloroethene	100000	Not Detected	540000	Not Detected
1,2-Dichloropropane	100000	Not Detected	460000	Not Detected
1,4-Dioxane	400000	Not Detected	1400000	Not Detected
Bromodichloromethane	100000	Not Detected	670000	Not Detected
cis-1,3-Dichloropropene	100000	Not Detected	450000	Not Detected
4-Methyl-2-pentanone	100000	Not Detected	410000	Not Detected
Toluene	100000	3600000	380000	14000000
trans-1,3-Dichloropropene	100000	Not Detected	450000	Not Detected
1,1,2-Trichloroethane	100000	Not Detected	540000	Not Detected
Tetrachloroethene	100000	Not Detected	680000	Not Detected
2-Hexanone	400000	Not Detected	1600000	Not Detected

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Client Sample ID: VR 100 To

Lab ID#: 1208594-01A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14083023**	**Date of Collection:**	**8/27/12 2:25:00 PM**
Dil. Factor:	**20000**	**Date of Analysis:**	**8/30/12 03:24 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	100000	Not Detected	850000	Not Detected
1,2-Dibromoethane (EDB)	100000	Not Detected	770000	Not Detected
Chlorobenzene	100000	Not Detected	460000	Not Detected
Ethyl Benzene	100000	Not Detected	430000	Not Detected
m,p-Xylene	100000	230000	430000	1000000
o-Xylene	100000	Not Detected	430000	Not Detected
Styrene	100000	Not Detected	420000	Not Detected
Bromoform	100000	Not Detected	1000000	Not Detected
Cumene	100000	Not Detected	490000	Not Detected
1,1,2,2-Tetrachloroethane	100000	Not Detected	690000	Not Detected
Propylbenzene	100000	Not Detected	490000	Not Detected
4-Ethyltoluene	100000	Not Detected	490000	Not Detected
1,3,5-Trimethylbenzene	100000	Not Detected	490000	Not Detected
1,2,4-Trimethylbenzene	100000	Not Detected	490000	Not Detected
1,3-Dichlorobenzene	100000	Not Detected	600000	Not Detected
1,4-Dichlorobenzene	100000	Not Detected	600000	Not Detected
alpha-Chlorotoluene	100000	Not Detected	520000	Not Detected
1,2-Dichlorobenzene	100000	Not Detected	600000	Not Detected
1,2,4-Trichlorobenzene	400000	Not Detected	3000000	Not Detected
Hexachlorobutadiene	400000	Not Detected	4300000	Not Detected
Naphthalene	400000	Not Detected	2100000	Not Detected

Container Type: VOA Vial-40 mL

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	110	70-130
4-Bromofluorobenzene	97	70-130

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Client Sample ID: HC 100 To

Lab ID#: 1208594-02A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14083022**	**Date of Collection:**	**8/27/12 2:30:00 PM**
Dil. Factor:	**20000**	**Date of Analysis:**	**8/30/12 02:55 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	100000	Not Detected	490000	Not Detected
Freon 114	100000	Not Detected	700000	Not Detected
Chloromethane	400000	Not Detected	830000	Not Detected
Vinyl Chloride	100000	Not Detected	260000	Not Detected
1,3-Butadiene	100000	Not Detected	220000	Not Detected
Bromomethane	100000	Not Detected	390000	Not Detected
Chloroethane	100000	Not Detected	260000	Not Detected
Freon 11	100000	Not Detected	560000	Not Detected
Ethanol	400000	Not Detected	750000	Not Detected
Freon 113	100000	Not Detected	770000	Not Detected
1,1-Dichloroethene	100000	Not Detected	400000	Not Detected
Acetone	400000	Not Detected	950000	Not Detected
2-Propanol	400000	Not Detected	980000	Not Detected
Carbon Disulfide	100000	180000	310000	550000
3-Chloropropene	400000	Not Detected	1200000	Not Detected
Methylene Chloride	100000	Not Detected	350000	Not Detected
Methyl tert-butyl ether	100000	Not Detected	360000	Not Detected
trans-1,2-Dichloroethene	100000	Not Detected	400000	Not Detected
Hexane	100000	110000	350000	390000
1,1-Dichloroethane	100000	Not Detected	400000	Not Detected
2-Butanone (Methyl Ethyl Ketone)	100000	Not Detected	290000	Not Detected
cis-1,2-Dichloroethene	100000	Not Detected	400000	Not Detected
Tetrahydrofuran	100000	Not Detected	290000	Not Detected
Chloroform	100000	Not Detected	490000	Not Detected
1,1,1-Trichloroethane	100000	Not Detected	540000	Not Detected
Cyclohexane	100000	Not Detected	340000	Not Detected
Carbon Tetrachloride	100000	Not Detected	630000	Not Detected
2,2,4-Trimethylpentane	100000	Not Detected	470000	Not Detected
Benzene	100000	58000000	320000	180000000
1,2-Dichloroethane	100000	Not Detected	400000	Not Detected
Heptane	100000	Not Detected	410000	Not Detected
Trichloroethene	100000	Not Detected	540000	Not Detected
1,2-Dichloropropane	100000	Not Detected	460000	Not Detected
1,4-Dioxane	400000	Not Detected	1400000	Not Detected
Bromodichloromethane	100000	Not Detected	670000	Not Detected
cis-1,3-Dichloropropene	100000	Not Detected	450000	Not Detected
4-Methyl-2-pentanone	100000	Not Detected	410000	Not Detected
Toluene	100000	5900000	380000	22000000
trans-1,3-Dichloropropene	100000	Not Detected	450000	Not Detected
1,1,2-Trichloroethane	100000	Not Detected	540000	Not Detected
Tetrachloroethene	100000	Not Detected	680000	Not Detected
2-Hexanone	400000	Not Detected	1600000	Not Detected

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Client Sample ID: HC 100 To

Lab ID#: 1208594-02A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14083022**	**Date of Collection:**	**8/27/12 2:30:00 PM**
Dil. Factor:	**20000**	**Date of Analysis:**	**8/30/12 02:55 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	100000	Not Detected	850000	Not Detected
1,2-Dibromoethane (EDB)	100000	Not Detected	770000	Not Detected
Chlorobenzene	100000	Not Detected	460000	Not Detected
Ethyl Benzene	100000	Not Detected	430000	Not Detected
m,p-Xylene	100000	310000	430000	1400000
o-Xylene	100000	Not Detected	430000	Not Detected
Styrene	100000	Not Detected	420000	Not Detected
Bromoform	100000	Not Detected	1000000	Not Detected
Cumene	100000	Not Detected	490000	Not Detected
1,1,2,2-Tetrachloroethane	100000	Not Detected	690000	Not Detected
Propylbenzene	100000	Not Detected	490000	Not Detected
4-Ethyltoluene	100000	Not Detected	490000	Not Detected
1,3,5-Trimethylbenzene	100000	Not Detected	490000	Not Detected
1,2,4-Trimethylbenzene	100000	Not Detected	490000	Not Detected
1,3-Dichlorobenzene	100000	Not Detected	600000	Not Detected
1,4-Dichlorobenzene	100000	Not Detected	600000	Not Detected
alpha-Chlorotoluene	100000	Not Detected	520000	Not Detected
1,2-Dichlorobenzene	100000	Not Detected	600000	Not Detected
1,2,4-Trichlorobenzene	400000	Not Detected	3000000	Not Detected
Hexachlorobutadiene	400000	Not Detected	4300000	Not Detected
Naphthalene	400000	Not Detected	2100000	Not Detected

Container Type: VOA Vial-40 mL

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	111	70-130
4-Bromofluorobenzene	97	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1208594-03A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14083006**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/30/12 07:50 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5.0	Not Detected	25	Not Detected
Freon 114	5.0	Not Detected	35	Not Detected
Chloromethane	20	Not Detected	41	Not Detected
Vinyl Chloride	5.0	Not Detected	13	Not Detected
1,3-Butadiene	5.0	Not Detected	11	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	5.0	Not Detected	13	Not Detected
Freon 11	5.0	Not Detected	28	Not Detected
Ethanol	20	Not Detected	38	Not Detected
Freon 113	5.0	Not Detected	38	Not Detected
1,1-Dichloroethene	5.0	Not Detected	20	Not Detected
Acetone	20	Not Detected	48	Not Detected
2-Propanol	20	Not Detected	49	Not Detected
Carbon Disulfide	5.0	Not Detected	16	Not Detected
3-Chloropropene	20	Not Detected	63	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	5.0	Not Detected	18	Not Detected
trans-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Hexane	5.0	Not Detected	18	Not Detected
1,1-Dichloroethane	5.0	Not Detected	20	Not Detected
2-Butanone (Methyl Ethyl Ketone)	5.0	Not Detected	15	Not Detected
cis-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Tetrahydrofuran	5.0	Not Detected	15	Not Detected
Chloroform	5.0	Not Detected	24	Not Detected
1,1,1-Trichloroethane	5.0	Not Detected	27	Not Detected
Cyclohexane	5.0	Not Detected	17	Not Detected
Carbon Tetrachloride	5.0	Not Detected	31	Not Detected
2,2,4-Trimethylpentane	5.0	Not Detected	23	Not Detected
Benzene	5.0	Not Detected	16	Not Detected
1,2-Dichloroethane	5.0	Not Detected	20	Not Detected
Heptane	5.0	Not Detected	20	Not Detected
Trichloroethene	5.0	Not Detected	27	Not Detected
1,2-Dichloropropane	5.0	Not Detected	23	Not Detected
1,4-Dioxane	20	Not Detected	72	Not Detected
Bromodichloromethane	5.0	Not Detected	34	Not Detected
cis-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
4-Methyl-2-pentanone	5.0	Not Detected	20	Not Detected
Toluene	5.0	Not Detected	19	Not Detected
trans-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
1,1,2-Trichloroethane	5.0	Not Detected	27	Not Detected
Tetrachloroethene	5.0	Not Detected	34	Not Detected
2-Hexanone	20	Not Detected	82	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1208594-03A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14083006**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/30/12 07:50 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	5.0	Not Detected	42	Not Detected
1,2-Dibromoethane (EDB)	5.0	Not Detected	38	Not Detected
Chlorobenzene	5.0	Not Detected	23	Not Detected
Ethyl Benzene	5.0	Not Detected	22	Not Detected
m,p-Xylene	5.0	Not Detected	22	Not Detected
o-Xylene	5.0	Not Detected	22	Not Detected
Styrene	5.0	Not Detected	21	Not Detected
Bromoform	5.0	Not Detected	52	Not Detected
Cumene	5.0	Not Detected	24	Not Detected
1,1,2,2-Tetrachloroethane	5.0	Not Detected	34	Not Detected
Propylbenzene	5.0	Not Detected	24	Not Detected
4-Ethyltoluene	5.0	Not Detected	24	Not Detected
1,3,5-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,2,4-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,3-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,4-Dichlorobenzene	5.0	Not Detected	30	Not Detected
alpha-Chlorotoluene	5.0	Not Detected	26	Not Detected
1,2-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,2,4-Trichlorobenzene	20	Not Detected	150	Not Detected
Hexachlorobutadiene	20	Not Detected	210	Not Detected
Naphthalene	20	Not Detected	100	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	109	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: CCV

Lab ID#: 1208594-04A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14083003**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/30/12 06:17 AM**	

Compound	%Recovery
Freon 12	108
Freon 114	111
Chloromethane	123
Vinyl Chloride	96
1,3-Butadiene	103
Bromomethane	109
Chloroethane	115
Freon 11	108
Ethanol	146 Q
Freon 113	104
1,1-Dichloroethene	112
Acetone	114
2-Propanol	124
Carbon Disulfide	94
3-Chloropropene	91
Methylene Chloride	120
Methyl tert-butyl ether	90
trans-1,2-Dichloroethene	97
Hexane	110
1,1-Dichloroethane	104
2-Butanone (Methyl Ethyl Ketone)	91
cis-1,2-Dichloroethene	105
Tetrahydrofuran	122
Chloroform	98
1,1,1-Trichloroethane	98
Cyclohexane	93
Carbon Tetrachloride	103
2,2,4-Trimethylpentane	110
Benzene	103
1,2-Dichloroethane	109
Heptane	98
Trichloroethene	105
1,2-Dichloropropane	108
1,4-Dioxane	94
Bromodichloromethane	104
cis-1,3-Dichloropropene	91
4-Methyl-2-pentanone	95
Toluene	100
trans-1,3-Dichloropropene	89
1,1,2-Trichloroethane	98
Tetrachloroethene	103
2-Hexanone	97

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Client Sample ID: CCV

Lab ID#: 1208594-04A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14083003**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/30/12 06:17 AM**	

Compound	%Recovery
Dibromochloromethane	102
1,2-Dibromoethane (EDB)	95
Chlorobenzene	93
Ethyl Benzene	91
m,p-Xylene	91
o-Xylene	92
Styrene	96
Bromoform	112
Cumene	96
1,1,2,2-Tetrachloroethane	98
Propylbenzene	103
4-Ethyltoluene	94
1,3,5-Trimethylbenzene	111
1,2,4-Trimethylbenzene	96
1,3-Dichlorobenzene	103
1,4-Dichlorobenzene	95
alpha-Chlorotoluene	114
1,2-Dichlorobenzene	96
1,2,4-Trichlorobenzene	106
Hexachlorobutadiene	123
Naphthalene	98

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	104	70-130
1,2-Dichloroethane-d4	107	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: LCS

Lab ID#: 1208594-05A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14083004**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/30/12 06:45 AM**	

Compound	%Recovery
Freon 12	101
Freon 114	103
Chloromethane	119
Vinyl Chloride	91
1,3-Butadiene	93
Bromomethane	104
Chloroethane	104
Freon 11	102
Ethanol	120
Freon 113	101
1,1-Dichloroethene	108
Acetone	104
2-Propanol	117
Carbon Disulfide	110
3-Chloropropene	94
Methylene Chloride	111
Methyl tert-butyl ether	84
trans-1,2-Dichloroethene	103
Hexane	102
1,1-Dichloroethane	96
2-Butanone (Methyl Ethyl Ketone)	89
cis-1,2-Dichloroethene	97
Tetrahydrofuran	108
Chloroform	94
1,1,1-Trichloroethane	92
Cyclohexane	88
Carbon Tetrachloride	97
2,2,4-Trimethylpentane	101
Benzene	96
1,2-Dichloroethane	100
Heptane	89
Trichloroethene	95
1,2-Dichloropropane	100
1,4-Dioxane	85
Bromodichloromethane	97
cis-1,3-Dichloropropene	85
4-Methyl-2-pentanone	86
Toluene	92
trans-1,3-Dichloropropene	84
1,1,2-Trichloroethane	91
Tetrachloroethene	93
2-Hexanone	89

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Client Sample ID: LCS

Lab ID#: 1208594-05A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14083004**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/30/12 06:45 AM**	

Compound	%Recovery
Dibromochloromethane	93
1,2-Dibromoethane (EDB)	90
Chlorobenzene	89
Ethyl Benzene	85
m,p-Xylene	86
o-Xylene	87
Styrene	89
Bromoform	103
Cumene	92
1,1,2,2-Tetrachloroethane	99
Propylbenzene	98
4-Ethyltoluene	85
1,3,5-Trimethylbenzene	105
1,2,4-Trimethylbenzene	90
1,3-Dichlorobenzene	100
1,4-Dichlorobenzene	91
alpha-Chlorotoluene	110
1,2-Dichlorobenzene	94
1,2,4-Trichlorobenzene	118
Hexachlorobutadiene	123
Naphthalene	101

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	104	70-130
1,2-Dichloroethane-d4	109	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: LCSD

Lab ID#: 1208594-05AA

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14083005**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/30/12 07:13 AM**	

Compound	%Recovery
Freon 12	101
Freon 114	101
Chloromethane	120
Vinyl Chloride	93
1,3-Butadiene	98
Bromomethane	104
Chloroethane	106
Freon 11	103
Ethanol	130
Freon 113	100
1,1-Dichloroethene	108
Acetone	104
2-Propanol	117
Carbon Disulfide	110
3-Chloropropene	91
Methylene Chloride	111
Methyl tert-butyl ether	86
trans-1,2-Dichloroethene	104
Hexane	103
1,1-Dichloroethane	97
2-Butanone (Methyl Ethyl Ketone)	85
cis-1,2-Dichloroethene	97
Tetrahydrofuran	109
Chloroform	94
1,1,1-Trichloroethane	94
Cyclohexane	87
Carbon Tetrachloride	98
2,2,4-Trimethylpentane	102
Benzene	96
1,2-Dichloroethane	102
Heptane	88
Trichloroethene	97
1,2-Dichloropropane	102
1,4-Dioxane	87
Bromodichloromethane	98
cis-1,3-Dichloropropene	87
4-Methyl-2-pentanone	86
Toluene	92
trans-1,3-Dichloropropene	83
1,1,2-Trichloroethane	90
Tetrachloroethene	95
2-Hexanone	90

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Client Sample ID: LCSD

Lab ID#: 1208594-05AA

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14083005**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/30/12 07:13 AM**	

Compound	%Recovery
Dibromochloromethane	95
1,2-Dibromoethane (EDB)	92
Chlorobenzene	87
Ethyl Benzene	86
m,p-Xylene	86
o-Xylene	86
Styrene	89
Bromoform	101
Cumene	92
1,1,2,2-Tetrachloroethane	99
Propylbenzene	98
4-Ethyltoluene	86
1,3,5-Trimethylbenzene	104
1,2,4-Trimethylbenzene	90
1,3-Dichlorobenzene	100
1,4-Dichlorobenzene	93
alpha-Chlorotoluene	110
1,2-Dichlorobenzene	95
1,2,4-Trichlorobenzene	121
Hexachlorobutadiene	131 Q
Naphthalene	108

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	105	70-130
1,2-Dichloroethane-d4	107	70-130
4-Bromofluorobenzene	101	70-130

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8/29/2012

Mr. Tommy Jordan
Kemron Environmental Services
1359-A Ellsworth Industrial Boulevard

Atlanta GA 30318

Project Name: Bridgewater, NJ
Project #: SE0416-007
Workorder #: 1208296

Dear Mr. Tommy Jordan

The following report includes the data for the above referenced project for sample(s) received on 8/14/2012 at Air Toxics Ltd.

The data and associated QC analyzed by ATL GC/MS Application #44 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Ausha Scott

Project Manager

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WORK ORDER #: 1208296

Work Order Summary

CLIENT:	Mr. Tommy Jordan Kemron Environmental Services 1359-A Ellsworth Industrial Boulevard Atlanta, GA 30318	**BILL TO:**	Accounts Payable Kemron Environmental Services 1359-A Ellsworth Industrial Boulevard Atlanta, GA 30318
PHONE:	404-516-3172	**P.O. #**	SE0416-007
FAX:	404-636-7162	**PROJECT #**	SE0416-007 Bridgewater, NJ
DATE RECEIVED:	08/14/2012	**CONTACT:**	Ausha Scott
DATE COMPLETED:	08/29/2012		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	HC 100 Treated	ATL GC/MS Application #4		
02A	VR 100 Treated	ATL GC/MS Application #4		
03A	HC 90 Treated	ATL GC/MS Application #4		
04A	VR 90 Treated	ATL GC/MS Application #4		
05A	Lab Blank	ATL GC/MS Application #4	NA	NA
05B	Lab Blank	ATL GC/MS Application #4	NA	NA
06A	CCV	ATL GC/MS Application #4	NA	NA
06B	CCV	ATL GC/MS Application #4	NA	NA
07A	LCS	ATL GC/MS Application #4	NA	NA
07AA	LCSD	ATL GC/MS Application #4	NA	NA
07B	LCS	ATL GC/MS Application #4	NA	NA
07BB	LCSD	ATL GC/MS Application #4	NA	NA

CERTIFIED BY: Heidi Mayo DATE: 08/29/12

Technical Director

Certfication numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NY NELAP - 11291,
TX NELAP - T104704434-12-5, UT NELAP CA009332012-3, WA NELAP - C935
Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2011, Expiration date: 10/17/2012.
Eurofins Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
ATL GC/MS Application
Kemron Environmental Services
Workorder# 1208296

Four VOA Vial-40 mL samples were received on August 14, 2012. <Enter # of samples> Raw Materials sample and/or <enter # of samples> Finished Goods sample were received on <enter date>. The laboratory performed analysis of a portion of each sample placed in 40mL VOA vials via TO-15 methodology using GC/MS in the full scan mode. The sample aliquot was acquired after heating the vials for approximately 10 minutes at 40 deg C. The method involves the injection of the air sample into the GC/MS via a syringe. It is concentrated onto a multisorbent hydrophobic bed which acts as a drying agent. The air sample is then desorbed into the GC/MS system.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page. Target compound non-detects in the samples that are associated with high bias in QC analyses have not been flagged.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the reporting limit.
UJ- Non-detected compound associated with low bias in the CCV and/or LCS.
N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
ATL GC APPLICATION #44 BY GC/MS

Client Sample ID: HC 100 Treated

Lab ID#: 1208296-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	20000	23000	41000	48000
2,2,4-Trimethylpentane	5000	13000	23000	61000
Benzene	5000	1000000	16000	3200000
Toluene	5000	360000	19000	1400000
m,p-Xylene	5000	44000	22000	190000
o-Xylene	5000	6900	22000	30000

Client Sample ID: VR 100 Treated

Lab ID#: 1208296-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	5000	20000	10000	41000
Acetone	5000	29000	12000	68000
Carbon Disulfide	1200	1400	3900	4500
Benzene	1200	46000	4000	150000
Toluene	1200	75000	4700	280000
Ethyl Benzene	1200	2100	5400	9200
m,p-Xylene	1200	22000	5400	97000
o-Xylene	1200	6800	5400	30000
Cumene	1200	4800	6100	24000
4-Ethyltoluene	1200	1400	6100	7000
1,3,5-Trimethylbenzene	1200	3600	6100	17000
1,2,4-Trimethylbenzene	1200	5200	6100	26000
1,4-Dichlorobenzene	1200	1300	7500	7700
1,2-Dichlorobenzene	1200	13000	7500	78000

Client Sample ID: HC 90 Treated

Lab ID#: 1208296-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	5000	630000	16000	2000000
Toluene	5000	430000	19000	1600000
Ethyl Benzene	5000	10000	22000	44000

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Summary of Detected Compounds
ATL GC APPLICATION #44 BY GC/MS

Client Sample ID: HC 90 Treated

Lab ID#: 1208296-03A

m,p-Xylene	5000	160000	22000	710000
o-Xylene	5000	26000	22000	110000
Cumene	5000	27000	24000	130000
1,3,5-Trimethylbenzene	5000	9000	24000	44000
1,2,4-Trimethylbenzene	5000	11000	24000	52000
1,2-Dichlorobenzene	5000	17000	30000	100000

Client Sample ID: VR 90 Treated

Lab ID#: 1208296-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	5000	290000	16000	920000
Toluene	5000	170000	19000	650000
m,p-Xylene	5000	33000	22000	140000
o-Xylene	5000	9200	22000	40000
Cumene	5000	6300	24000	31000
1,2,4-Trimethylbenzene	5000	5200	24000	26000
1,2-Dichlorobenzene	5000	9600	30000	58000

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Client Sample ID: HC 100 Treated

Lab ID#: 1208296-01A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14082728**	**Date of Collection:**	**8/3/12 10:30:00 AM**
Dil. Factor:	**1000**	**Date of Analysis:**	**8/27/12 09:01 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5000	Not Detected	25000	Not Detected
Freon 114	5000	Not Detected	35000	Not Detected
Chloromethane	20000	23000	41000	48000
Vinyl Chloride	5000	Not Detected	13000	Not Detected
1,3-Butadiene	5000	Not Detected	11000	Not Detected
Bromomethane	5000	Not Detected	19000	Not Detected
Chloroethane	5000	Not Detected	13000	Not Detected
Freon 11	5000	Not Detected	28000	Not Detected
Ethanol	20000	Not Detected	38000	Not Detected
Freon 113	5000	Not Detected	38000	Not Detected
1,1-Dichloroethene	5000	Not Detected	20000	Not Detected
Acetone	20000	Not Detected	48000	Not Detected
2-Propanol	20000	Not Detected	49000	Not Detected
Carbon Disulfide	5000	Not Detected	16000	Not Detected
3-Chloropropene	20000	Not Detected	63000	Not Detected
Methylene Chloride	5000	Not Detected	17000	Not Detected
Methyl tert-butyl ether	5000	Not Detected	18000	Not Detected
trans-1,2-Dichloroethene	5000	Not Detected	20000	Not Detected
Hexane	5000	Not Detected	18000	Not Detected
1,1-Dichloroethane	5000	Not Detected	20000	Not Detected
2-Butanone (Methyl Ethyl Ketone)	5000	Not Detected	15000	Not Detected
cis-1,2-Dichloroethene	5000	Not Detected	20000	Not Detected
Tetrahydrofuran	5000	Not Detected	15000	Not Detected
Chloroform	5000	Not Detected	24000	Not Detected
1,1,1-Trichloroethane	5000	Not Detected	27000	Not Detected
Cyclohexane	5000	Not Detected	17000	Not Detected
Carbon Tetrachloride	5000	Not Detected	31000	Not Detected
2,2,4-Trimethylpentane	5000	13000	23000	61000
Benzene	5000	1000000	16000	3200000
1,2-Dichloroethane	5000	Not Detected	20000	Not Detected
Heptane	5000	Not Detected	20000	Not Detected
Trichloroethene	5000	Not Detected	27000	Not Detected
1,2-Dichloropropane	5000	Not Detected	23000	Not Detected
1,4-Dioxane	20000	Not Detected	72000	Not Detected
Bromodichloromethane	5000	Not Detected	34000	Not Detected
cis-1,3-Dichloropropene	5000	Not Detected	23000	Not Detected
4-Methyl-2-pentanone	5000	Not Detected	20000	Not Detected
Toluene	5000	360000	19000	1400000
trans-1,3-Dichloropropene	5000	Not Detected	23000	Not Detected
1,1,2-Trichloroethane	5000	Not Detected	27000	Not Detected
Tetrachloroethene	5000	Not Detected	34000	Not Detected
2-Hexanone	20000	Not Detected	82000	Not Detected

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Client Sample ID: HC 100 Treated

Lab ID#: 1208296-01A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14082728**	**Date of Collection:**	**8/3/12 10:30:00 AM**
Dil. Factor:	**1000**	**Date of Analysis:**	**8/27/12 09:01 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	5000	Not Detected	42000	Not Detected
1,2-Dibromoethane (EDB)	5000	Not Detected	38000	Not Detected
Chlorobenzene	5000	Not Detected	23000	Not Detected
Ethyl Benzene	5000	Not Detected	22000	Not Detected
m,p-Xylene	5000	44000	22000	190000
o-Xylene	5000	6900	22000	30000
Styrene	5000	Not Detected	21000	Not Detected
Bromoform	5000	Not Detected	52000	Not Detected
Cumene	5000	Not Detected	24000	Not Detected
1,1,2,2-Tetrachloroethane	5000	Not Detected	34000	Not Detected
Propylbenzene	5000	Not Detected	24000	Not Detected
4-Ethyltoluene	5000	Not Detected	24000	Not Detected
1,3,5-Trimethylbenzene	5000	Not Detected	24000	Not Detected
1,2,4-Trimethylbenzene	5000	Not Detected	24000	Not Detected
1,3-Dichlorobenzene	5000	Not Detected	30000	Not Detected
1,4-Dichlorobenzene	5000	Not Detected	30000	Not Detected
alpha-Chlorotoluene	5000	Not Detected	26000	Not Detected
1,2-Dichlorobenzene	5000	Not Detected	30000	Not Detected
1,2,4-Trichlorobenzene	20000	Not Detected	150000	Not Detected
Hexachlorobutadiene	20000	Not Detected	210000	Not Detected
Naphthalene	20000	Not Detected	100000	Not Detected

Container Type: VOA Vial-40 mL

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	109	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: VR 100 Treated

Lab ID#: 1208296-02A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14082827**	**Date of Collection:**	**8/3/12 10:30:00 AM**
Dil. Factor:	**250**	**Date of Analysis:**	**8/28/12 08:54 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1200	Not Detected	6200	Not Detected
Freon 114	1200	Not Detected	8700	Not Detected
Chloromethane	5000	20000	10000	41000
Vinyl Chloride	1200	Not Detected	3200	Not Detected
1,3-Butadiene	1200	Not Detected	2800	Not Detected
Bromomethane	1200	Not Detected	4800	Not Detected
Chloroethane	1200	Not Detected	3300	Not Detected
Freon 11	1200	Not Detected	7000	Not Detected
Ethanol	5000	Not Detected	9400	Not Detected
Freon 113	1200	Not Detected	9600	Not Detected
1,1-Dichloroethene	1200	Not Detected	5000	Not Detected
Acetone	5000	29000	12000	68000
2-Propanol	5000	Not Detected	12000	Not Detected
Carbon Disulfide	1200	1400	3900	4500
3-Chloropropene	5000	Not Detected	16000	Not Detected
Methylene Chloride	1200	Not Detected	4300	Not Detected
Methyl tert-butyl ether	1200	Not Detected	4500	Not Detected
trans-1,2-Dichloroethene	1200	Not Detected	5000	Not Detected
Hexane	1200	Not Detected	4400	Not Detected
1,1-Dichloroethane	1200	Not Detected	5000	Not Detected
2-Butanone (Methyl Ethyl Ketone)	1200	Not Detected	3700	Not Detected
cis-1,2-Dichloroethene	1200	Not Detected	5000	Not Detected
Tetrahydrofuran	1200	Not Detected	3700	Not Detected
Chloroform	1200	Not Detected	6100	Not Detected
1,1,1-Trichloroethane	1200	Not Detected	6800	Not Detected
Cyclohexane	1200	Not Detected	4300	Not Detected
Carbon Tetrachloride	1200	Not Detected	7900	Not Detected
2,2,4-Trimethylpentane	1200	Not Detected	5800	Not Detected
Benzene	1200	46000	4000	150000
1,2-Dichloroethane	1200	Not Detected	5000	Not Detected
Heptane	1200	Not Detected	5100	Not Detected
Trichloroethene	1200	Not Detected	6700	Not Detected
1,2-Dichloropropane	1200	Not Detected	5800	Not Detected
1,4-Dioxane	5000	Not Detected	18000	Not Detected
Bromodichloromethane	1200	Not Detected	8400	Not Detected
cis-1,3-Dichloropropene	1200	Not Detected	5700	Not Detected
4-Methyl-2-pentanone	1200	Not Detected	5100	Not Detected
Toluene	1200	75000	4700	280000
trans-1,3-Dichloropropene	1200	Not Detected	5700	Not Detected
1,1,2-Trichloroethane	1200	Not Detected	6800	Not Detected
Tetrachloroethene	1200	Not Detected	8500	Not Detected
2-Hexanone	5000	Not Detected	20000	Not Detected

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Client Sample ID: VR 100 Treated

Lab ID#: 1208296-02A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14082827**	**Date of Collection:**	**8/3/12 10:30:00 AM**
Dil. Factor:	**250**	**Date of Analysis:**	**8/28/12 08:54 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1200	Not Detected	11000	Not Detected
1,2-Dibromoethane (EDB)	1200	Not Detected	9600	Not Detected
Chlorobenzene	1200	Not Detected	5800	Not Detected
Ethyl Benzene	1200	2100	5400	9200
m,p-Xylene	1200	22000	5400	97000
o-Xylene	1200	6800	5400	30000
Styrene	1200	Not Detected	5300	Not Detected
Bromoform	1200	Not Detected	13000	Not Detected
Cumene	1200	4800	6100	24000
1,1,2,2-Tetrachloroethane	1200	Not Detected	8600	Not Detected
Propylbenzene	1200	Not Detected	6100	Not Detected
4-Ethyltoluene	1200	1400	6100	7000
1,3,5-Trimethylbenzene	1200	3600	6100	17000
1,2,4-Trimethylbenzene	1200	5200	6100	26000
1,3-Dichlorobenzene	1200	Not Detected	7500	Not Detected
1,4-Dichlorobenzene	1200	1300	7500	7700
alpha-Chlorotoluene	1200	Not Detected	6500	Not Detected
1,2-Dichlorobenzene	1200	13000	7500	78000
1,2,4-Trichlorobenzene	5000	Not Detected	37000	Not Detected
Hexachlorobutadiene	5000	Not Detected	53000	Not Detected
Naphthalene	5000	Not Detected	26000	Not Detected

Container Type: VOA Vial-40 mL

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	106	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: HC 90 Treated

Lab ID#: 1208296-03A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14082729**	**Date of Collection: 8/13/12 10:45:00 AM**	
Dil. Factor:	**1000**	**Date of Analysis: 8/27/12 09:20 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5000	Not Detected	25000	Not Detected
Freon 114	5000	Not Detected	35000	Not Detected
Chloromethane	20000	Not Detected	41000	Not Detected
Vinyl Chloride	5000	Not Detected	13000	Not Detected
1,3-Butadiene	5000	Not Detected	11000	Not Detected
Bromomethane	5000	Not Detected	19000	Not Detected
Chloroethane	5000	Not Detected	13000	Not Detected
Freon 11	5000	Not Detected	28000	Not Detected
Ethanol	20000	Not Detected	38000	Not Detected
Freon 113	5000	Not Detected	38000	Not Detected
1,1-Dichloroethene	5000	Not Detected	20000	Not Detected
Acetone	20000	Not Detected	48000	Not Detected
2-Propanol	20000	Not Detected	49000	Not Detected
Carbon Disulfide	5000	Not Detected	16000	Not Detected
3-Chloropropene	20000	Not Detected	63000	Not Detected
Methylene Chloride	5000	Not Detected	17000	Not Detected
Methyl tert-butyl ether	5000	Not Detected	18000	Not Detected
trans-1,2-Dichloroethene	5000	Not Detected	20000	Not Detected
Hexane	5000	Not Detected	18000	Not Detected
1,1-Dichloroethane	5000	Not Detected	20000	Not Detected
2-Butanone (Methyl Ethyl Ketone)	5000	Not Detected	15000	Not Detected
cis-1,2-Dichloroethene	5000	Not Detected	20000	Not Detected
Tetrahydrofuran	5000	Not Detected	15000	Not Detected
Chloroform	5000	Not Detected	24000	Not Detected
1,1,1-Trichloroethane	5000	Not Detected	27000	Not Detected
Cyclohexane	5000	Not Detected	17000	Not Detected
Carbon Tetrachloride	5000	Not Detected	31000	Not Detected
2,2,4-Trimethylpentane	5000	Not Detected	23000	Not Detected
Benzene	5000	630000	16000	2000000
1,2-Dichloroethane	5000	Not Detected	20000	Not Detected
Heptane	5000	Not Detected	20000	Not Detected
Trichloroethene	5000	Not Detected	27000	Not Detected
1,2-Dichloropropane	5000	Not Detected	23000	Not Detected
1,4-Dioxane	20000	Not Detected	72000	Not Detected
Bromodichloromethane	5000	Not Detected	34000	Not Detected
cis-1,3-Dichloropropene	5000	Not Detected	23000	Not Detected
4-Methyl-2-pentanone	5000	Not Detected	20000	Not Detected
Toluene	5000	430000	19000	1600000
trans-1,3-Dichloropropene	5000	Not Detected	23000	Not Detected
1,1,2-Trichloroethane	5000	Not Detected	27000	Not Detected
Tetrachloroethene	5000	Not Detected	34000	Not Detected
2-Hexanone	20000	Not Detected	82000	Not Detected

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Client Sample ID: HC 90 Treated

Lab ID#: 1208296-03A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14082729**	**Date of Collection:**	**8/13/12 10:45:00 AM**
Dil. Factor:	**1000**	**Date of Analysis:**	**8/27/12 09:20 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	5000	Not Detected	42000	Not Detected
1,2-Dibromoethane (EDB)	5000	Not Detected	38000	Not Detected
Chlorobenzene	5000	Not Detected	23000	Not Detected
Ethyl Benzene	5000	10000	22000	44000
m,p-Xylene	5000	160000	22000	710000
o-Xylene	5000	26000	22000	110000
Styrene	5000	Not Detected	21000	Not Detected
Bromoform	5000	Not Detected	52000	Not Detected
Cumene	5000	27000	24000	130000
1,1,2,2-Tetrachloroethane	5000	Not Detected	34000	Not Detected
Propylbenzene	5000	Not Detected	24000	Not Detected
4-Ethyltoluene	5000	Not Detected	24000	Not Detected
1,3,5-Trimethylbenzene	5000	9000	24000	44000
1,2,4-Trimethylbenzene	5000	11000	24000	52000
1,3-Dichlorobenzene	5000	Not Detected	30000	Not Detected
1,4-Dichlorobenzene	5000	Not Detected	30000	Not Detected
alpha-Chlorotoluene	5000	Not Detected	26000	Not Detected
1,2-Dichlorobenzene	5000	17000	30000	100000
1,2,4-Trichlorobenzene	20000	Not Detected	150000	Not Detected
Hexachlorobutadiene	20000	Not Detected	210000	Not Detected
Naphthalene	20000	Not Detected	100000	Not Detected

Container Type: VOA Vial-40 mL

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	108	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: VR 90 Treated

Lab ID#: 1208296-04A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14082730**	**Date of Collection:**	**8/13/12 10:45:00 AM**
Dil. Factor:	**1000**	**Date of Analysis:**	**8/27/12 10:05 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5000	Not Detected	25000	Not Detected
Freon 114	5000	Not Detected	35000	Not Detected
Chloromethane	20000	Not Detected	41000	Not Detected
Vinyl Chloride	5000	Not Detected	13000	Not Detected
1,3-Butadiene	5000	Not Detected	11000	Not Detected
Bromomethane	5000	Not Detected	19000	Not Detected
Chloroethane	5000	Not Detected	13000	Not Detected
Freon 11	5000	Not Detected	28000	Not Detected
Ethanol	20000	Not Detected	38000	Not Detected
Freon 113	5000	Not Detected	38000	Not Detected
1,1-Dichloroethene	5000	Not Detected	20000	Not Detected
Acetone	20000	Not Detected	48000	Not Detected
2-Propanol	20000	Not Detected	49000	Not Detected
Carbon Disulfide	5000	Not Detected	16000	Not Detected
3-Chloropropene	20000	Not Detected	63000	Not Detected
Methylene Chloride	5000	Not Detected	17000	Not Detected
Methyl tert-butyl ether	5000	Not Detected	18000	Not Detected
trans-1,2-Dichloroethene	5000	Not Detected	20000	Not Detected
Hexane	5000	Not Detected	18000	Not Detected
1,1-Dichloroethane	5000	Not Detected	20000	Not Detected
2-Butanone (Methyl Ethyl Ketone)	5000	Not Detected	15000	Not Detected
cis-1,2-Dichloroethene	5000	Not Detected	20000	Not Detected
Tetrahydrofuran	5000	Not Detected	15000	Not Detected
Chloroform	5000	Not Detected	24000	Not Detected
1,1,1-Trichloroethane	5000	Not Detected	27000	Not Detected
Cyclohexane	5000	Not Detected	17000	Not Detected
Carbon Tetrachloride	5000	Not Detected	31000	Not Detected
2,2,4-Trimethylpentane	5000	Not Detected	23000	Not Detected
Benzene	5000	290000	16000	920000
1,2-Dichloroethane	5000	Not Detected	20000	Not Detected
Heptane	5000	Not Detected	20000	Not Detected
Trichloroethene	5000	Not Detected	27000	Not Detected
1,2-Dichloropropane	5000	Not Detected	23000	Not Detected
1,4-Dioxane	20000	Not Detected	72000	Not Detected
Bromodichloromethane	5000	Not Detected	34000	Not Detected
cis-1,3-Dichloropropene	5000	Not Detected	23000	Not Detected
4-Methyl-2-pentanone	5000	Not Detected	20000	Not Detected
Toluene	5000	170000	19000	650000
trans-1,3-Dichloropropene	5000	Not Detected	23000	Not Detected
1,1,2-Trichloroethane	5000	Not Detected	27000	Not Detected
Tetrachloroethene	5000	Not Detected	34000	Not Detected
2-Hexanone	20000	Not Detected	82000	Not Detected

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Client Sample ID: VR 90 Treated

Lab ID#: 1208296-04A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14082730**	**Date of Collection:**	**8/13/12 10:45:00 AM**
Dil. Factor:	**1000**	**Date of Analysis:**	**8/27/12 10:05 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	5000	Not Detected	42000	Not Detected
1,2-Dibromoethane (EDB)	5000	Not Detected	38000	Not Detected
Chlorobenzene	5000	Not Detected	23000	Not Detected
Ethyl Benzene	5000	Not Detected	22000	Not Detected
m,p-Xylene	5000	33000	22000	140000
o-Xylene	5000	9200	22000	40000
Styrene	5000	Not Detected	21000	Not Detected
Bromoform	5000	Not Detected	52000	Not Detected
Cumene	5000	6300	24000	31000
1,1,2,2-Tetrachloroethane	5000	Not Detected	34000	Not Detected
Propylbenzene	5000	Not Detected	24000	Not Detected
4-Ethyltoluene	5000	Not Detected	24000	Not Detected
1,3,5-Trimethylbenzene	5000	Not Detected	24000	Not Detected
1,2,4-Trimethylbenzene	5000	5200	24000	26000
1,3-Dichlorobenzene	5000	Not Detected	30000	Not Detected
1,4-Dichlorobenzene	5000	Not Detected	30000	Not Detected
alpha-Chlorotoluene	5000	Not Detected	26000	Not Detected
1,2-Dichlorobenzene	5000	9600	30000	58000
1,2,4-Trichlorobenzene	20000	Not Detected	150000	Not Detected
Hexachlorobutadiene	20000	Not Detected	210000	Not Detected
Naphthalene	20000	Not Detected	100000	Not Detected

Container Type: VOA Vial-40 mL

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	110	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1208296-05A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14082706**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/27/12 08:52 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5.0	Not Detected	25	Not Detected
Freon 114	5.0	Not Detected	35	Not Detected
Chloromethane	20	Not Detected	41	Not Detected
Vinyl Chloride	5.0	Not Detected	13	Not Detected
1,3-Butadiene	5.0	Not Detected	11	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	5.0	Not Detected	13	Not Detected
Freon 11	5.0	Not Detected	28	Not Detected
Ethanol	20	Not Detected	38	Not Detected
Freon 113	5.0	Not Detected	38	Not Detected
1,1-Dichloroethene	5.0	Not Detected	20	Not Detected
Acetone	20	Not Detected	48	Not Detected
2-Propanol	20	Not Detected	49	Not Detected
Carbon Disulfide	5.0	Not Detected	16	Not Detected
3-Chloropropene	20	Not Detected	63	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	5.0	Not Detected	18	Not Detected
trans-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Hexane	5.0	Not Detected	18	Not Detected
1,1-Dichloroethane	5.0	Not Detected	20	Not Detected
2-Butanone (Methyl Ethyl Ketone)	5.0	Not Detected	15	Not Detected
cis-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Tetrahydrofuran	5.0	Not Detected	15	Not Detected
Chloroform	5.0	Not Detected	24	Not Detected
1,1,1-Trichloroethane	5.0	Not Detected	27	Not Detected
Cyclohexane	5.0	Not Detected	17	Not Detected
Carbon Tetrachloride	5.0	Not Detected	31	Not Detected
2,2,4-Trimethylpentane	5.0	Not Detected	23	Not Detected
Benzene	5.0	Not Detected	16	Not Detected
1,2-Dichloroethane	5.0	Not Detected	20	Not Detected
Heptane	5.0	Not Detected	20	Not Detected
Trichloroethene	5.0	Not Detected	27	Not Detected
1,2-Dichloropropane	5.0	Not Detected	23	Not Detected
1,4-Dioxane	20	Not Detected	72	Not Detected
Bromodichloromethane	5.0	Not Detected	34	Not Detected
cis-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
4-Methyl-2-pentanone	5.0	Not Detected	20	Not Detected
Toluene	5.0	Not Detected	19	Not Detected
trans-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
1,1,2-Trichloroethane	5.0	Not Detected	27	Not Detected
Tetrachloroethene	5.0	Not Detected	34	Not Detected
2-Hexanone	20	Not Detected	82	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1208296-05A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14082706**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/27/12 08:52 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	5.0	Not Detected	42	Not Detected
1,2-Dibromoethane (EDB)	5.0	Not Detected	38	Not Detected
Chlorobenzene	5.0	Not Detected	23	Not Detected
Ethyl Benzene	5.0	Not Detected	22	Not Detected
m,p-Xylene	5.0	Not Detected	22	Not Detected
o-Xylene	5.0	Not Detected	22	Not Detected
Styrene	5.0	Not Detected	21	Not Detected
Bromoform	5.0	Not Detected	52	Not Detected
Cumene	5.0	Not Detected	24	Not Detected
1,1,2,2-Tetrachloroethane	5.0	Not Detected	34	Not Detected
Propylbenzene	5.0	Not Detected	24	Not Detected
4-Ethyltoluene	5.0	Not Detected	24	Not Detected
1,3,5-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,2,4-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,3-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,4-Dichlorobenzene	5.0	Not Detected	30	Not Detected
alpha-Chlorotoluene	5.0	Not Detected	26	Not Detected
1,2-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,2,4-Trichlorobenzene	20	Not Detected	150	Not Detected
Hexachlorobutadiene	20	Not Detected	210	Not Detected
Naphthalene	20	Not Detected	100	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	103	70-130
1,2-Dichloroethane-d4	108	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1208296-05B

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14082809**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/28/12 10:54 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5.0	Not Detected	25	Not Detected
Freon 114	5.0	Not Detected	35	Not Detected
Chloromethane	20	Not Detected	41	Not Detected
Vinyl Chloride	5.0	Not Detected	13	Not Detected
1,3-Butadiene	5.0	Not Detected	11	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	5.0	Not Detected	13	Not Detected
Freon 11	5.0	Not Detected	28	Not Detected
Ethanol	20	Not Detected	38	Not Detected
Freon 113	5.0	Not Detected	38	Not Detected
1,1-Dichloroethene	5.0	Not Detected	20	Not Detected
Acetone	20	Not Detected	48	Not Detected
2-Propanol	20	Not Detected	49	Not Detected
Carbon Disulfide	5.0	Not Detected	16	Not Detected
3-Chloropropene	20	Not Detected	63	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	5.0	Not Detected	18	Not Detected
trans-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Hexane	5.0	Not Detected	18	Not Detected
1,1-Dichloroethane	5.0	Not Detected	20	Not Detected
2-Butanone (Methyl Ethyl Ketone)	5.0	Not Detected	15	Not Detected
cis-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Tetrahydrofuran	5.0	Not Detected	15	Not Detected
Chloroform	5.0	Not Detected	24	Not Detected
1,1,1-Trichloroethane	5.0	Not Detected	27	Not Detected
Cyclohexane	5.0	Not Detected	17	Not Detected
Carbon Tetrachloride	5.0	Not Detected	31	Not Detected
2,2,4-Trimethylpentane	5.0	Not Detected	23	Not Detected
Benzene	5.0	Not Detected	16	Not Detected
1,2-Dichloroethane	5.0	Not Detected	20	Not Detected
Heptane	5.0	Not Detected	20	Not Detected
Trichloroethene	5.0	Not Detected	27	Not Detected
1,2-Dichloropropane	5.0	Not Detected	23	Not Detected
1,4-Dioxane	20	Not Detected	72	Not Detected
Bromodichloromethane	5.0	Not Detected	34	Not Detected
cis-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
4-Methyl-2-pentanone	5.0	Not Detected	20	Not Detected
Toluene	5.0	Not Detected	19	Not Detected
trans-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
1,1,2-Trichloroethane	5.0	Not Detected	27	Not Detected
Tetrachloroethene	5.0	Not Detected	34	Not Detected
2-Hexanone	20	Not Detected	82	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1208296-05B

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14082809**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/28/12 10:54 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	5.0	Not Detected	42	Not Detected
1,2-Dibromoethane (EDB)	5.0	Not Detected	38	Not Detected
Chlorobenzene	5.0	Not Detected	23	Not Detected
Ethyl Benzene	5.0	Not Detected	22	Not Detected
m,p-Xylene	5.0	Not Detected	22	Not Detected
o-Xylene	5.0	Not Detected	22	Not Detected
Styrene	5.0	Not Detected	21	Not Detected
Bromoform	5.0	Not Detected	52	Not Detected
Cumene	5.0	Not Detected	24	Not Detected
1,1,2,2-Tetrachloroethane	5.0	Not Detected	34	Not Detected
Propylbenzene	5.0	Not Detected	24	Not Detected
4-Ethyltoluene	5.0	Not Detected	24	Not Detected
1,3,5-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,2,4-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,3-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,4-Dichlorobenzene	5.0	Not Detected	30	Not Detected
alpha-Chlorotoluene	5.0	Not Detected	26	Not Detected
1,2-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,2,4-Trichlorobenzene	20	Not Detected	150	Not Detected
Hexachlorobutadiene	20	Not Detected	210	Not Detected
Naphthalene	20	Not Detected	100	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	108	70-130
4-Bromofluorobenzene	97	70-130

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Client Sample ID: CCV

Lab ID#: 1208296-06A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14082702**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/27/12 06:57 AM**	

Compound	%Recovery
Freon 12	111
Freon 114	112
Chloromethane	126
Vinyl Chloride	96
1,3-Butadiene	104
Bromomethane	88
Chloroethane	115
Freon 11	109
Ethanol	145 Q
Freon 113	104
1,1-Dichloroethene	110
Acetone	117
2-Propanol	128
Carbon Disulfide	99
3-Chloropropene	93
Methylene Chloride	121
Methyl tert-butyl ether	93
trans-1,2-Dichloroethene	101
Hexane	114
1,1-Dichloroethane	105
2-Butanone (Methyl Ethyl Ketone)	98
cis-1,2-Dichloroethene	107
Tetrahydrofuran	129
Chloroform	102
1,1,1-Trichloroethane	99
Cyclohexane	97
Carbon Tetrachloride	104
2,2,4-Trimethylpentane	115
Benzene	107
1,2-Dichloroethane	108
Heptane	103
Trichloroethene	104
1,2-Dichloropropane	112
1,4-Dioxane	102
Bromodichloromethane	108
cis-1,3-Dichloropropene	98
4-Methyl-2-pentanone	99
Toluene	102
trans-1,3-Dichloropropene	92
1,1,2-Trichloroethane	99
Tetrachloroethene	102
2-Hexanone	101

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Client Sample ID: CCV

Lab ID#: 1208296-06A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14082702**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/27/12 06:57 AM**	

Compound	%Recovery
Dibromochloromethane	104
1,2-Dibromoethane (EDB)	98
Chlorobenzene	96
Ethyl Benzene	96
m,p-Xylene	94
o-Xylene	93
Styrene	97
Bromoform	113
Cumene	99
1,1,2,2-Tetrachloroethane	105
Propylbenzene	106
4-Ethyltoluene	95
1,3,5-Trimethylbenzene	112
1,2,4-Trimethylbenzene	98
1,3-Dichlorobenzene	106
1,4-Dichlorobenzene	96
alpha-Chlorotoluene	117
1,2-Dichlorobenzene	98
1,2,4-Trichlorobenzene	108
Hexachlorobutadiene	123
Naphthalene	99

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	105	70-130
1,2-Dichloroethane-d4	104	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: CCV

Lab ID#: 1208296-06B

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14082805**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/28/12 08:56 AM**	

Compound	%Recovery
Freon 12	112
Freon 114	112
Chloromethane	130
Vinyl Chloride	103
1,3-Butadiene	108
Bromomethane	109
Chloroethane	118
Freon 11	108
Ethanol	157 Q
Freon 113	106
1,1-Dichloroethene	114
Acetone	118
2-Propanol	138 Q
Carbon Disulfide	95
3-Chloropropene	94
Methylene Chloride	122
Methyl tert-butyl ether	100
trans-1,2-Dichloroethene	101
Hexane	118
1,1-Dichloroethane	107
2-Butanone (Methyl Ethyl Ketone)	102
cis-1,2-Dichloroethene	110
Tetrahydrofuran	128
Chloroform	101
1,1,1-Trichloroethane	100
Cyclohexane	101
Carbon Tetrachloride	105
2,2,4-Trimethylpentane	119
Benzene	105
1,2-Dichloroethane	106
Heptane	103
Trichloroethene	102
1,2-Dichloropropane	109
1,4-Dioxane	100
Bromodichloromethane	102
cis-1,3-Dichloropropene	100
4-Methyl-2-pentanone	102
Toluene	102
trans-1,3-Dichloropropene	97
1,1,2-Trichloroethane	98
Tetrachloroethene	100
2-Hexanone	107

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Client Sample ID: CCV

Lab ID#: 1208296-06B

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14082805**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/28/12 08:56 AM**	

Compound	%Recovery
Dibromochloromethane	100
1,2-Dibromoethane (EDB)	95
Chlorobenzene	95
Ethyl Benzene	93
m,p-Xylene	93
o-Xylene	95
Styrene	96
Bromoform	111
Cumene	98
1,1,2,2-Tetrachloroethane	102
Propylbenzene	105
4-Ethyltoluene	96
1,3,5-Trimethylbenzene	113
1,2,4-Trimethylbenzene	100
1,3-Dichlorobenzene	104
1,4-Dichlorobenzene	96
alpha-Chlorotoluene	126
1,2-Dichlorobenzene	97
1,2,4-Trichlorobenzene	125
Hexachlorobutadiene	121
Naphthalene	129

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	103	70-130
1,2-Dichloroethane-d4	105	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: LCS

Lab ID#: 1208296-07A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14082703**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/27/12 07:25 AM**	

Compound	%Recovery
Freon 12	103
Freon 114	104
Chloromethane	120
Vinyl Chloride	92
1,3-Butadiene	95
Bromomethane	104
Chloroethane	108
Freon 11	103
Ethanol	136 Q
Freon 113	98
1,1-Dichloroethene	109
Acetone	106
2-Propanol	120
Carbon Disulfide	116
3-Chloropropene	100
Methylene Chloride	112
Methyl tert-butyl ether	88
trans-1,2-Dichloroethene	106
Hexane	105
1,1-Dichloroethane	100
2-Butanone (Methyl Ethyl Ketone)	92
cis-1,2-Dichloroethene	102
Tetrahydrofuran	114
Chloroform	95
1,1,1-Trichloroethane	94
Cyclohexane	92
Carbon Tetrachloride	99
2,2,4-Trimethylpentane	105
Benzene	100
1,2-Dichloroethane	100
Heptane	92
Trichloroethene	97
1,2-Dichloropropane	103
1,4-Dioxane	90
Bromodichloromethane	100
cis-1,3-Dichloropropene	90
4-Methyl-2-pentanone	91
Toluene	94
trans-1,3-Dichloropropene	87
1,1,2-Trichloroethane	94
Tetrachloroethene	96
2-Hexanone	92

eurofins | Air Toxics

Client Sample ID: LCS

Lab ID#: 1208296-07A

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14082703**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/27/12 07:25 AM**	

Compound	%Recovery
Dibromochloromethane	95
1,2-Dibromoethane (EDB)	92
Chlorobenzene	90
Ethyl Benzene	86
m,p-Xylene	89
o-Xylene	89
Styrene	92
Bromoform	104
Cumene	93
1,1,2,2-Tetrachloroethane	99
Propylbenzene	99
4-Ethyltoluene	86
1,3,5-Trimethylbenzene	106
1,2,4-Trimethylbenzene	91
1,3-Dichlorobenzene	100
1,4-Dichlorobenzene	91
alpha-Chlorotoluene	109
1,2-Dichlorobenzene	94
1,2,4-Trichlorobenzene	118
Hexachlorobutadiene	125
Naphthalene	114

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	103	70-130
1,2-Dichloroethane-d4	104	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: LCSD

Lab ID#: 1208296-07AA

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14082704**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/27/12 07:45 AM**	

Compound	%Recovery
Freon 12	104
Freon 114	104
Chloromethane	121
Vinyl Chloride	91
1,3-Butadiene	95
Bromomethane	94
Chloroethane	107
Freon 11	101
Ethanol	132 Q
Freon 113	100
1,1-Dichloroethene	110
Acetone	107
2-Propanol	120
Carbon Disulfide	114
3-Chloropropene	98
Methylene Chloride	112
Methyl tert-butyl ether	88
trans-1,2-Dichloroethene	105
Hexane	105
1,1-Dichloroethane	98
2-Butanone (Methyl Ethyl Ketone)	94
cis-1,2-Dichloroethene	100
Tetrahydrofuran	114
Chloroform	96
1,1,1-Trichloroethane	93
Cyclohexane	91
Carbon Tetrachloride	98
2,2,4-Trimethylpentane	105
Benzene	100
1,2-Dichloroethane	100
Heptane	92
Trichloroethene	99
1,2-Dichloropropane	103
1,4-Dioxane	91
Bromodichloromethane	98
cis-1,3-Dichloropropene	90
4-Methyl-2-pentanone	90
Toluene	94
trans-1,3-Dichloropropene	88
1,1,2-Trichloroethane	92
Tetrachloroethene	95
2-Hexanone	94

eurofins | Air Toxics

Client Sample ID: LCSD

Lab ID#: 1208296-07AA

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14082704**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/27/12 07:45 AM**	

Compound	%Recovery
Dibromochloromethane	96
1,2-Dibromoethane (EDB)	92
Chlorobenzene	89
Ethyl Benzene	88
m,p-Xylene	90
o-Xylene	89
Styrene	91
Bromoform	102
Cumene	93
1,1,2,2-Tetrachloroethane	99
Propylbenzene	99
4-Ethyltoluene	86
1,3,5-Trimethylbenzene	105
1,2,4-Trimethylbenzene	92
1,3-Dichlorobenzene	97
1,4-Dichlorobenzene	90
alpha-Chlorotoluene	105
1,2-Dichlorobenzene	91
1,2,4-Trichlorobenzene	110
Hexachlorobutadiene	113
Naphthalene	95

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	104	70-130
1,2-Dichloroethane-d4	105	70-130
4-Bromofluorobenzene	100	70-130

eurofins | Air Toxics

Client Sample ID: LCS

Lab ID#: 1208296-07B

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14082806**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/28/12 09:20 AM**	

Compound	%Recovery
Freon 12	102
Freon 114	104
Chloromethane	126
Vinyl Chloride	100
1,3-Butadiene	105
Bromomethane	107
Chloroethane	107
Freon 11	101
Ethanol	123
Freon 113	99
1,1-Dichloroethene	111
Acetone	110
2-Propanol	124
Carbon Disulfide	111
3-Chloropropene	99
Methylene Chloride	113
Methyl tert-butyl ether	93
trans-1,2-Dichloroethene	106
Hexane	109
1,1-Dichloroethane	98
2-Butanone (Methyl Ethyl Ketone)	94
cis-1,2-Dichloroethene	102
Tetrahydrofuran	116
Chloroform	95
1,1,1-Trichloroethane	95
Cyclohexane	93
Carbon Tetrachloride	98
2,2,4-Trimethylpentane	108
Benzene	98
1,2-Dichloroethane	98
Heptane	92
Trichloroethene	97
1,2-Dichloropropane	102
1,4-Dioxane	90
Bromodichloromethane	95
cis-1,3-Dichloropropene	93
4-Methyl-2-pentanone	90
Toluene	93
trans-1,3-Dichloropropene	90
1,1,2-Trichloroethane	92
Tetrachloroethene	94
2-Hexanone	96

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Client Sample ID: LCS

Lab ID#: 1208296-07B

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14082806**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/28/12 09:20 AM**	

Compound	%Recovery
Dibromochloromethane	92
1,2-Dibromoethane (EDB)	90
Chlorobenzene	89
Ethyl Benzene	88
m,p-Xylene	88
o-Xylene	89
Styrene	89
Bromoform	100
Cumene	94
1,1,2,2-Tetrachloroethane	98
Propylbenzene	100
4-Ethyltoluene	88
1,3,5-Trimethylbenzene	105
1,2,4-Trimethylbenzene	93
1,3-Dichlorobenzene	102
1,4-Dichlorobenzene	90
alpha-Chlorotoluene	119
1,2-Dichlorobenzene	93
1,2,4-Trichlorobenzene	138 Q
Hexachlorobutadiene	131 Q
Naphthalene	134 Q

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	103	70-130
1,2-Dichloroethane-d4	104	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: LCSD

Lab ID#: 1208296-07BB

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14082807**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/28/12 10:07 AM**	

Compound	%Recovery
Freon 12	100
Freon 114	101
Chloromethane	122
Vinyl Chloride	100
1,3-Butadiene	103
Bromomethane	92
Chloroethane	105
Freon 11	97
Ethanol	135 Q
Freon 113	96
1,1-Dichloroethene	108
Acetone	106
2-Propanol	122
Carbon Disulfide	108
3-Chloropropene	96
Methylene Chloride	108
Methyl tert-butyl ether	89
trans-1,2-Dichloroethene	102
Hexane	106
1,1-Dichloroethane	96
2-Butanone (Methyl Ethyl Ketone)	91
cis-1,2-Dichloroethene	100
Tetrahydrofuran	112
Chloroform	92
1,1,1-Trichloroethane	92
Cyclohexane	91
Carbon Tetrachloride	93
2,2,4-Trimethylpentane	105
Benzene	94
1,2-Dichloroethane	94
Heptane	89
Trichloroethene	94
1,2-Dichloropropane	102
1,4-Dioxane	87
Bromodichloromethane	93
cis-1,3-Dichloropropene	89
4-Methyl-2-pentanone	90
Toluene	89
trans-1,3-Dichloropropene	88
1,1,2-Trichloroethane	89
Tetrachloroethene	90
2-Hexanone	94

eurofins | Air Toxics

Client Sample ID: LCSD

Lab ID#: 1208296-07BB

ATL GC APPLICATION #44 BY GC/MS

File Name:	**14082807**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/28/12 10:07 AM**	

Compound	%Recovery
Dibromochloromethane	90
1,2-Dibromoethane (EDB)	87
Chlorobenzene	87
Ethyl Benzene	84
m,p-Xylene	86
o-Xylene	88
Styrene	87
Bromoform	97
Cumene	90
1,1,2,2-Tetrachloroethane	96
Propylbenzene	97
4-Ethyltoluene	84
1,3,5-Trimethylbenzene	101
1,2,4-Trimethylbenzene	90
1,3-Dichlorobenzene	96
1,4-Dichlorobenzene	87
alpha-Chlorotoluene	116
1,2-Dichlorobenzene	90
1,2,4-Trichlorobenzene	124
Hexachlorobutadiene	127
Naphthalene	132 Q

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	103	70-130
1,2-Dichloroethane-d4	104	70-130
4-Bromofluorobenzene	98	70-130

APPENDIX H

TREATED MATERIAL ANALYTICAL REPORTS

NELAP CERTIFICATE NUMBER 01955
DOD ELAP CERTIFICATE NUMBER ADE - 1482

ANALYTICAL RESULTS

PERFORMED BY

GULF COAST ANALYTICAL LABORATORIES, INC.
7979 GSRI Avenue
Baton Rouge, LA 70820

Report Date 08/14/2012

GCAL Report 212080330

Deliver To	KEMRON 1359A Ellsworth Industrial Blv Atlanta, GA 30318 404-601-6927
Attn	Tommy Jordan

Project Bridgewater NJ / SH0417-007

CASE NARRATIVE

Client: KEMRON **Report:** 212080330

Gulf Coast Analytical Laboratories received and analyzed the sample(s) listed on the sample cross-reference page of this report. Receipt of the sample(s) is documented by the attached chain of custody. This applies only to the sample(s) listed in this report. No sample integrity or quality control exceptions were identified unless noted below.

VOLATILES MASS SPECTROMETRY

The Thiophene analysis was performed using a 1 point calibration with no associated quality control.

In the SW-846 8260B analysis, samples 21208033008 (HC 100A), 21208033009 (HC 100B), 21208033010 (HC 100C), 21208033005 (VR 100 A), 21208033006 (VR 100 B) and 21208033007 (VR 100 C) had to be diluted to bracket the concentration of target compounds within the calibration range of the instrument. The dilution is reflected in elevated detection limits.

In the SW-846 1311/8260B analysis, sample 21208033003 (HC 100 (TCLP)) had to be diluted to bracket the concentration of target compounds within the calibration range of the instrument. The dilution is reflected in elevated detection limits.

In the SW-846 1312/8260B analysis, samples 21208033002 (VR 100 (SPLP)) and 21208033004 (HC 100 (SPLP)) had to be diluted to bracket the concentration of target compounds within the calibration range of the instrument. The dilution is reflected in elevated detection limits.

In the SW-846 1312/8260B analysis for analytical batch 487384, the LCS and/or LCSD recoveries are above the upper control limit for Vinyl Acetate. The LCS/LCSD RPD is above the control limit for Vinyl Acetate. This compound was not detected in the associated samples.

In the SW-846 1311/8260B analysis, a dilution factor of 40 was performed for sample 21208033001 (VR 100 (TCLP)). The reporting limits are at or below the regulatory limits at this dilution.

SEMI-VOLATILES MASS SPECTROMETRY

In the SW-846 1311/8270C analysis, a dilution factor of 10 was performed for samples 21208033001 (VR 100 (TCLP)) and 21208033003 (HC 100 (TCLP)). The reporting limits are at or below the regulatory limit at this dilution.

In the SW-846 1312/8270C analysis, samples 21208033002 (VR 100 (SPLP)) and 21208033004 (HC 100 (SPLP)) had to be diluted to eliminate interference from non-target background. This is reflected in elevated detection limits.

In the SW-846 8270C analysis, samples 21208033005 (VR 100 A), 21208033006 (VR 100 B), 21208033007 (VR 100 C), 21208033008 (HC 100A), 21208033009 (HC 100B), 21208033010 (HC 100C), 1093323 (HC 100C(1093011MS)) and 1093324 (HC 100C(1093011MSD)) was concentrated to a final volume of 10 mLs rather than 1 mL in the extraction process due to the sample matrix. This is reflected in elevated detection limits.

In the SW-846 8270C analysis, the recoveries for the surrogates are reported as diluted out for those analyses performed at a 10 or higher dilution.

In the SW-846 1312/8270C analysis, the recoveries for the surrogates are reported as diluted out for those analyses performed at a 10 or higher dilution.

In the SW-846 1311/8270C analysis, the recoveries for the surrogates are reported as diluted out for those analyses performed at a 10 or higher dilution.

In the SW-846 8270C analysis for prep batch 487057, the MS/MSD spike and surrogate recoveries are not applicable because the spike was diluted out of the samples. All LCS/LCSD recoveries are acceptable.

In the SW-846 1312/8270C analysis for prep batch 487177, the MS/MSD spike and surrogate recoveries are not applicable because the spike was diluted out of the samples. All LCS/LCSD recoveries are acceptable.

METALS

In the SW-846 7471B analysis, a chemical or physical interference necessitated a dilution for samples 21208033008 (HC 100A), 21208033009 (HC 100B) and 21208033010 (HC 100C). This is reflected in the elevated reporting limits.

In the SW-846 6010B analysis, a chemical or physical interference necessitated a dilution for samples 21208033008 (HC 100A), 21208033009 (HC 100B) and 21208033010 (HC 100C). This is reflected in the elevated reporting limits.

In the SW-846 1311/6010B analysis, a chemical or physical interference necessitated a dilution for sample 21208033003 (HC 100 (TCLP)). This is reflected in the elevated reporting limits.

In the SW-846 1312/6010B analysis, a chemical or physical interference necessitated a dilution for sample 21208033004 (HC 100 (SPLP)). This is reflected in the elevated reporting limits.

In the SW-846 1311/6010B analysis, sample 21208033001 (VR 100 (TCLP)) was analyzed at a dilution. The reporting limits are at or below the regulatory limits at this dilution.

In the SW-846 6010B analysis for prep batch 486992, the MS and/or MSD recoveries are outside the control limits for Antimony, Calcium and Cobalt. The LCS recovery is within control limits. This indicates the analysis is in control and the sample is affected by matrix interference. A post-digestion spike was performed on the QC sample for this batch with recoveries of 102% for Antimony, 103% for Calcium and 124% for Cobalt. The MS recovery is not applicable for Chromium, Copper, Iron, Manganese, Nickel and Sodium because the sample concentration is greater than four times the spike concentration.

In the SW-846 1312/6010B analysis for prep batch 487186, the MS and/or MSD recovery is outside the control limits for Selenium. The LCS recovery is within control limits. This indicates the analysis is in control and the sample is affected by matrix interference. A post-digestion spike was performed on the QC sample for this batch with a recovery of 97%. The Sample/Duplicate RPD for Arsenic, Calcium and Zinc is not applicable because the sample and/or duplicate concentration is less than five times the reporting limit.

In the SW-846 7471B analysis for prep batch 486993, the MS recovery is not applicable for Mercury because the sample concentration is greater than four times the spike concentration.

In the SW-846 1311/6010B analysis for prep batch 487188, the LCS recovery is above the upper control limit for Selenium; however, Selenium was not detected above the reporting limit for samples associated with this QC; therefore, the data is reportable.

Laboratory Endorsement

Sample analysis was performed in accordance with approved methodologies provided by the Environmental Protection Agency or other recognized agencies. The samples and their corresponding extracts will be maintained for a period of 30 days unless otherwise arranged. Following this retention period the samples will be disposed in accordance with GCAL's Standard Operating Procedures.

Common Abbreviations Utilized in this Report

ND	Indicates the result was Not Detected at the specified RDL
DO	Indicates the result was Diluted Out
MI	Indicates the result was subject to Matrix Interference
TNTC	Indicates the result was Too Numerous To Count
SUBC	Indicates the analysis was Sub-Contracted
FLD	Indicates the analysis was performed in the Field
PQL	Practical Quantitation Limit
MDL	Method Detection Limit
RDL	Reporting Detection Limit
00:00	Reported as a time equivalent to 12:00 AM

Reporting Flags Utilized in this Report

J	Indicates the result is between the MDL and RDL
U	Indicates the compound was analyzed for but not detected
B	Indicates the analyte was detected in the associated Method Blank

Sample receipt at GCAL is documented through the attached chain of custody. In accordance with NELAC, this report shall be reproduced only in full and with the written permission of GCAL. The results contained within this report relate only to the samples reported. The documented results are presented within this report.

This report pertains only to the samples listed in the Report Sample Summary and should be retained as a permanent record thereof. The results contained within this report are intended for the use of the client. Any unauthorized use of the information contained in this report is prohibited.

I certify that this data package is in compliance with the NELAC standard and terms and conditions of the contract and Statement of Work both technically and for completeness, for other than the conditions in the case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data submitted has been authorized by the Quality Assurance Manager or his/her designee, as verified by the following signature.

Estimated uncertainty of measurement is available upon request. This report is in compliance with the DOD QSM as specified in the contract if applicable.

Robyn Migues
Technical Director
GCAL REPORT 212080330

THIS REPORT CONTAINS _____ PAGES.

Report Sample Summary

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033001	VR 100 (TCLP)	Solid	08/01/2012 11:00	08/03/2012 10:20
21208033002	VR 100 (SPLP)	Solid	08/01/2012 11:00	08/03/2012 10:20
21208033003	HC 100 (TCLP)	Solid	08/01/2012 14:30	08/03/2012 10:20
21208033004	HC 100 (SPLP)	Solid	08/01/2012 14:30	08/03/2012 10:20
21208033005	VR 100 A	Solid	08/01/2012 11:00	08/03/2012 10:20
21208033006	VR 100 B	Solid	08/01/2012 11:00	08/03/2012 10:20
21208033007	VR 100 C	Solid	08/01/2012 11:00	08/03/2012 10:20
21208033008	HC 100A	Solid	08/01/2012 14:30	08/03/2012 10:20
21208033009	HC 100B	Solid	08/01/2012 14:30	08/03/2012 10:20
21208033010	HC 100C	Solid	08/01/2012 14:30	08/03/2012 10:20

Summary of Compounds Detected

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033001	VR 100 (TCLP)	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 8270C TCLP

CAS#	Parameter	Result	RDL	MDL	Units
106-46-7	1,4-Dichlorobenzene	0.083J	0.5000	0.0128	mg/L
1319-77-3	Cresols	0.241J	1.00	0.0341	mg/L
1319-77-3MP	m,p-Cresol	0.214J	0.5000	0.0176	mg/L
95-48-7	o-Cresol	0.026J	0.5000	0.0165	mg/L

SW-846 6010B TCLP

CAS#	Parameter	Result	RDL	MDL	Units
7440-39-3	Barium	0.020J	5.00	0.0079	mg/L
7440-22-4	Silver	0.0032J	0.25	0.0032	mg/L

SW-846 8260B TCLP

CAS#	Parameter	Result	RDL	MDL	Units
71-43-2	Benzene	0.564	0.200	0.00196	mg/L
110-02-1	Thiophene	0			

SW-846 9060M

CAS#	Parameter	Result	RDL	MDL	Units
C-012	Total Organic Carbon	712000	200	97.0	mg/kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033002	VR 100 (SPLP)	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 8270C SPLP

CAS#	Parameter	Result	RDL	MDL	Units
91-57-6	2-Methylnaphthalene	53.8J	100	2.55	ug/L
83-32-9	Acenaphthene	6.33J	100	2.68	ug/L
62-53-3	Aniline	33.2J	100	7.18	ug/L
86-74-8	Carbazole	10.5J	100	2.32	ug/L
86-73-7	Fluorene	16.8J	100	2.88	ug/L
78-59-1	Isophorone	7.70J	100	3.80	ug/L
108-95-2	Phenol	90.2J	100	1.50	ug/L
1319-77-3MP	m,p-Cresol	211	100	3.52	ug/L
95-48-7	o-Cresol	24.6J	100	3.29	ug/L

SW-846 6010B SPLP

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	Aluminum	1.32	0.20	0.024	mg/L

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033002	VR 100 (SPLP)	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 6010B SPLP

CAS#	Parameter	Result	RDL	MDL	Units
7440-39-3	Barium	0.0047J	0.010	0.0016	mg/L
7440-43-9	Cadmium	0.00010J	0.0050	0.00010	mg/L
7440-70-2	Calcium	0.50	0.051	0.024	mg/L
7440-47-3	Chromium	0.0037J	0.010	0.00034	mg/L
7440-48-4	Cobalt	0.0011J	0.010	0.00052	mg/L
7439-89-6	Iron	1.33	0.050	0.027	mg/L
7439-95-4	Magnesium	0.055	0.050	0.012	mg/L
7439-96-5	Manganese	0.017	0.015	0.00083	mg/L
7440-02-0	Nickel	0.0079J	0.040	0.00084	mg/L
7440-09-7	Potassium	0.22J	0.50	0.041	mg/L
7440-28-0	Thallium	0.0067J	0.020	0.0026	mg/L
7440-66-6	Zinc	0.016J	0.020	0.0059	mg/L

SW-846 6010B SPLP

CAS#	Parameter	Result	RDL	MDL	Units
7440-23-5	Sodium	1.82	1.00	0.056	mg/L

SW-846 8260B SPLP

CAS#	Parameter	Result	RDL	MDL	Units
95-63-6	1,2,4-Trimethylbenzene	152	25	0.402	ug/L
108-67-8	1,3,5-Trimethylbenzene	71.5	25	0.263	ug/L
541-73-1	1,3-Dichlorobenzene	15.4J	25	0.400	ug/L
106-46-7	1,4-Dichlorobenzene	91.8	25	0.292	ug/L
78-93-3	2-Butanone	48.3J	130	1.18	ug/L
591-78-6	2-Hexanone	34.2	25	1.51	ug/L
99-87-6	4-Isopropyltoluene	7.21J	25	0.875	ug/L
108-10-1	4-Methyl-2-pentanone	7.16J	25	0.710	ug/L
67-64-1	Acetone	139	130	1.61	ug/L
71-43-2	Benzene	513	25	0.245	ug/L
108-90-7	Chlorobenzene	6.40J	25	0.274	ug/L
75-00-3	Chloroethane	10.3J	25	1.40	ug/L
74-87-3	Chloromethane	35.5	25	0.379	ug/L
100-41-4	Ethylbenzene	35.7	25	0.900	ug/L
98-82-8	Isopropylbenzene (Cumene)	62.9	25	0.292	ug/L
75-09-2	Methylene chloride	3.74J	50	0.510	ug/L
100-42-5	Styrene	34.2	25	0.288	ug/L
110-02-1	Thiophene	15.1			ug/L
108-88-3	Toluene	996	25	0.388	ug/L
1330-20-7	Xylene (total)	574	50	0.615	ug/L
136777-61-2	m,p-Xylene	371	25	0.493	ug/L
95-47-6	o-Xylene	202	25	0.387	ug/L
135-98-8	sec-Butylbenzene	31.0	25	0.441	ug/L
98-06-6	tert-Butylbenzene	7.77J	25	0.290	ug/L

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033002	VR 100 (SPLP)	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 8260B SPLP

CAS#	Parameter	Result	RDL	MDL	Units
95-50-1	1,2-Dichlorobenzene	1450	250	4.29	ug/L
91-20-3	Naphthalene	3580	250	8.75	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033003	HC 100 (TCLP)	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 8260B TCLP

CAS#	Parameter	Result	RDL	MDL	Units
78-93-3	2-Butanone	0.301J	5.00	0.047	mg/L
71-43-2	Benzene	13.0	1.00	0.00980	mg/L
110-02-1	Thiophene	0			

SW-846 8270C TCLP

CAS#	Parameter	Result	RDL	MDL	Units
106-46-7	1,4-Dichlorobenzene	0.062J	0.5000	0.0128	mg/L
1319-77-3	Cresols	0.391J	1.00	0.0341	mg/L
110-86-1	Pyridine	6.47	0.5000	0.1790	mg/L
1319-77-3MP	m,p-Cresol	0.359J	0.5000	0.0176	mg/L
95-48-7	o-Cresol	0.033J	0.5000	0.0165	mg/L

SW-846 6010B TCLP

CAS#	Parameter	Result	RDL	MDL	Units
7440-39-3	Barium	0.055J	5.00	0.0079	mg/L
7440-43-9	Cadmium	0.028J	0.050	0.00052	mg/L
7440-47-3	Chromium	233	0.25	0.0017	mg/L
7439-92-1	Lead	0.46J	0.50	0.014	mg/L
7440-22-4	Silver	0.0085J	0.25	0.0032	mg/L

SW-846 7470A TCLP

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	Mercury	0.00040J	0.0020	0.000075	mg/L

SW-846 9060M

CAS#	Parameter	Result	RDL	MDL	Units
C-012	Total Organic Carbon	475000	200	97.0	mg/kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033004	**HC 100 (SPLP)**	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 8270C SPLP

CAS#	Parameter	Result	RDL	MDL	Units
91-57-6	2-Methylnaphthalene	27.1J	100	2.55	ug/L
83-32-9	Acenaphthene	3.35J	100	2.68	ug/L
62-53-3	Aniline	617	100	7.18	ug/L
86-73-7	Fluorene	12.5J	100	2.88	ug/L
78-59-1	Isophorone	11.2J	100	3.80	ug/L
108-95-2	Phenol	117	100	1.50	ug/L
110-86-1	Pyridine	84.5J	100	35.8	ug/L
1319-77-3MP	m,p-Cresol	361	100	3.52	ug/L
95-48-7	o-Cresol	27.2J	100	3.29	ug/L

SW-846 6010B SPLP

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	Aluminum	12.3	2.00	0.24	mg/L
7440-38-2	Arsenic	0.65	0.10	0.035	mg/L
7440-39-3	Barium	0.025J	0.10	0.016	mg/L
7440-70-2	Calcium	3.88	0.51	0.24	mg/L
7440-47-3	Chromium	217	0.10	0.0034	mg/L
7440-48-4	Cobalt	1.23	0.10	0.0052	mg/L
7440-50-8	Copper	1.35	0.10	0.017	mg/L
7439-89-6	Iron	749	0.50	0.27	mg/L
7439-92-1	Lead	0.54	0.15	0.028	mg/L
7439-95-4	Magnesium	1.10	0.50	0.12	mg/L
7439-96-5	Manganese	17.4	0.15	0.0083	mg/L
7440-02-0	Nickel	122	0.40	0.0084	mg/L
7440-09-7	Potassium	5.20	5.00	0.41	mg/L
7782-49-2	Selenium	0.060J	0.40	0.038	mg/L
7440-23-5	Sodium	162	10.0	0.56	mg/L
7440-62-2	Vanadium	0.67	0.20	0.012	mg/L
7440-66-6	Zinc	0.27	0.20	0.059	mg/L

SW-846 1312/7471A SPLP

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	Mercury	0.00018J	0.00020	0.000075	mg/L

SW-846 8260B SPLP

CAS#	Parameter	Result	RDL	MDL	Units
95-63-6	1,2,4-Trimethylbenzene	176	100	1.61	ug/L
95-50-1	1,2-Dichlorobenzene	980	100	1.72	ug/L
108-67-8	1,3,5-Trimethylbenzene	105	100	1.05	ug/L
541-73-1	1,3-Dichlorobenzene	12.6J	100	1.60	ug/L
106-46-7	1,4-Dichlorobenzene	69.7J	100	1.17	ug/L
78-93-3	2-Butanone	71.5J	500	4.70	ug/L
99-87-6	4-Isopropyltoluene	13.4J	100	3.50	ug/L
67-64-1	Acetone	196J	500	6.44	ug/L

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033004	**HC 100 (SPLP)**	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 8260B SPLP

CAS#	Parameter	Result	RDL	MDL	Units
108-90-7	Chlorobenzene	8.00J	100	1.10	ug/L
75-00-3	Chloroethane	25.2J	100	5.58	ug/L
74-87-3	Chloromethane	42.8J	100	1.51	ug/L
100-41-4	Ethylbenzene	136	100	3.60	ug/L
98-82-8	Isopropylbenzene (Cumene)	233	100	1.17	ug/L
91-20-3	Naphthalene	2550	100	3.50	ug/L
110-02-1	Thiophene	129			ug/L
1330-20-7	Xylene (total)	2720	200	2.46	ug/L
136777-61-2	m,p-Xylene	2170	100	1.97	ug/L
95-47-6	o-Xylene	554	100	1.55	ug/L
135-98-8	sec-Butylbenzene	52.6J	100	1.76	ug/L
98-06-6	tert-Butylbenzene	23.1J	100	1.16	ug/L

SW-846 8260B SPLP

CAS#	Parameter	Result	RDL	MDL	Units
71-43-2	Benzene	13600	1000	9.80	ug/L
108-88-3	Toluene	7450	1000	15.5	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033005	**VR 100 A**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 7471B

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	Mercury	0.33	0.013	0.0060	mg/kg

Library Search Volatiles

CAS#	Parameter	Result	Retention		Units
496-11-7	Indane	60500	10.20		ug/Kg
17965-80-9	1,5-Naphthyridin-2-amine	27500	11.40		ug/Kg
827-52-1	Benzene, cyclohexyl-	84400	12.30		ug/Kg

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
91-57-6	2-Methylnaphthalene	108000	53800	1700	ug/Kg
83-32-9	Acenaphthene	16700J	53800	1410	ug/Kg
62-53-3	Aniline	11100J	53800	4540	ug/Kg
86-73-7	Fluorene	436000	53800	1730	ug/Kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033005	**VR 100 A**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 6010B

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	Aluminum	4330	8.70	0.86	mg/kg
7440-36-0	Antimony	0.45J	2.61	0.11	mg/kg
7440-39-3	Barium	7.17	0.43	0.026	mg/kg
7440-41-7	Beryllium	0.0069J	0.22	0.0022	mg/kg
7440-70-2	Calcium	152	32.6	4.75	mg/kg
7440-47-3	Chromium	5.17	0.43	0.020	mg/kg
7440-48-4	Cobalt	0.47	0.43	0.011	mg/kg
7440-50-8	Copper	314	0.43	0.034	mg/kg
7439-89-6	Iron	4110	4.35	0.76	mg/kg
7439-92-1	Lead	59.2	0.65	0.12	mg/kg
7439-95-4	Magnesium	59.2	4.35	0.47	mg/kg
7439-96-5	Manganese	54.9	0.65	0.015	mg/kg
7440-02-0	Nickel	12.0	1.74	0.023	mg/kg
7440-09-7	Potassium	82.3	21.7	2.29	mg/kg
7782-49-2	Selenium	12.1	1.74	0.14	mg/kg
7440-22-4	Silver	0.043J	0.43	0.024	mg/kg
7440-23-5	Sodium	3470	43.5	3.30	mg/kg
7440-28-0	Thallium	0.69J	0.87	0.096	mg/kg
7440-62-2	Vanadium	1.06	0.87	0.016	mg/kg
7440-66-6	Zinc	8.91	0.87	0.46	mg/kg

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
700-88-9	Benzene, cyclopentyl-	22400	3.07	ug/Kg
132-32-1	9H-Carbazol-3-amine, 9-ethyl-	1190000	4.56	ug/Kg
	Unknown	205000	4.64	ug/Kg
26137-53-1	Naphthalene, 1,2,3-trimethyl-4-prop	178000	4.74	ug/Kg
	Unknown	115000	4.84	ug/Kg
	Unknown	68800	4.99	ug/Kg
5956-09-2	2H-3,9a-Methano-1-benzoxepin, octah	154000	5.05	ug/Kg
10544-50-0	Sulfur, mol. (S8)	116000	5.70	ug/Kg
0-00-0	2-Fluoro-4-piperidinopyrimidine	121000	6.29	ug/Kg
4309-66-4	Stilbene, 4-amino- (E)-	89000	6.38	ug/Kg
	Unknown	112000	7.01	ug/Kg
	Unknown	24500	3.20	ug/Kg
	Unknown	161000	7.16	ug/Kg
2132-84-5	Benzene, (1-methylhexyl)-	33700	3.31	ug/Kg
827-52-1	Benzene, cyclohexyl-	39000	3.43	ug/Kg
933-98-2	Benzene, 1-ethyl-2,3-dimethyl-	69500	3.65	ug/Kg
101-81-5	Diphenylmethane	62800	3.81	ug/Kg
713-36-0	Benzene, 1-methyl-2-(phenylmethyl)-	38400	4.12	ug/Kg
605-39-0	2,2'-Dimethylbiphenyl	48100	4.15	ug/Kg
	Unknown	77200	4.26	ug/Kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033005	**VR 100 A**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 9045C pH

CAS#	Parameter	Result	RDL	MDL	Units
pH	pH	3.97	1.00	1.00	pH unit

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
95-63-6	1,2,4-Trimethylbenzene	136000	104000	7510	ug/Kg
95-50-1	1,2-Dichlorobenzene	972000	104000	5760	ug/Kg
108-67-8	1,3,5-Trimethylbenzene	82700J	104000	7850	ug/Kg
106-46-7	1,4-Dichlorobenzene	77200J	104000	4820	ug/Kg
99-87-6	4-Isopropyltoluene	55700J	104000	4380	ug/Kg
71-43-2	Benzene	30300J	104000	3170	ug/Kg
98-82-8	Isopropylbenzene (Cumene)	75800J	104000	3860	ug/Kg
91-20-3	Naphthalene	2240000	104000	6700	ug/Kg
108-88-3	Toluene	148000	104000	3230	ug/Kg
1330-20-7	Xylene (total)	254000	209000	8370	ug/Kg
136777-61-2	m,p-Xylene	169000	104000	6140	ug/Kg
95-47-6	o-Xylene	86100J	104000	2820	ug/Kg
135-98-8	sec-Butylbenzene	109000	104000	4110	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033006	**VR 100 B**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 7471B

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	Mercury	0.21	0.012	0.0054	mg/kg

SW-846 6010B

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	Aluminum	5550	8.62	0.85	mg/kg
7440-39-3	Barium	9.94	0.43	0.026	mg/kg
7440-41-7	Beryllium	0.0094J	0.22	0.0022	mg/kg
7440-70-2	Calcium	220	32.3	4.71	mg/kg
7440-47-3	Chromium	9.22	0.43	0.019	mg/kg
7440-48-4	Cobalt	0.27J	0.43	0.011	mg/kg
7440-50-8	Copper	42.1	0.43	0.033	mg/kg
7439-89-6	Iron	3050	4.31	0.76	mg/kg
7439-92-1	Lead	76.9	0.65	0.12	mg/kg
7439-95-4	Magnesium	56.9	4.31	0.47	mg/kg
7439-96-5	Manganese	46.0	0.65	0.015	mg/kg
7440-02-0	Nickel	4.96	1.72	0.023	mg/kg
7440-09-7	Potassium	95.1	21.6	2.27	mg/kg
7782-49-2	Selenium	10.1	1.72	0.14	mg/kg
7440-22-4	Silver	0.048J	0.43	0.024	mg/kg
7440-23-5	Sodium	4070	43.1	3.27	mg/kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033006	**VR 100 B**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 6010B

CAS#	Parameter	Result	RDL	MDL	Units
7440-28-0	Thallium	0.42J	0.86	0.095	mg/kg
7440-62-2	Vanadium	1.48	0.86	0.016	mg/kg
7440-66-6	Zinc	6.75	0.86	0.46	mg/kg

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
95-63-6	1,2,4-Trimethylbenzene	143000	94200	6780	ug/Kg
95-50-1	1,2-Dichlorobenzene	1040000	94200	5200	ug/Kg
108-67-8	1,3,5-Trimethylbenzene	84300J	94200	7080	ug/Kg
106-46-7	1,4-Dichlorobenzene	83000J	94200	4350	ug/Kg
99-87-6	4-Isopropyltoluene	54400J	94200	3960	ug/Kg
71-43-2	Benzene	31500J	94200	2860	ug/Kg
98-82-8	Isopropylbenzene (Cumene)	78000J	94200	3490	ug/Kg
91-20-3	Naphthalene	2510000	94200	6050	ug/Kg
108-88-3	Toluene	163000	94200	2920	ug/Kg
1330-20-7	Xylene (total)	259000	188000	7550	ug/Kg
136777-61-2	m,p-Xylene	172000	94200	5540	ug/Kg
95-47-6	o-Xylene	85500J	94200	2540	ug/Kg
135-98-8	sec-Butylbenzene	114000	94200	3710	ug/Kg

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
700-88-9	Benzene, cyclopentyl-	17800	3.07	ug/Kg
26137-53-1	Naphthalene, 1,2,3-trimethyl-4-prop	892000	4.55	ug/Kg
	Unknown	142000	4.64	ug/Kg
13688-68-1	9,9-Dimethyl-9-silafluorene	123000	4.74	ug/Kg
	Unknown	72300	4.84	ug/Kg
	Unknown	52000	4.99	ug/Kg
74150-88-2	N-Cyano-N',N',N'',N''-tetramethyl-1	108000	5.05	ug/Kg
7704-34-9	Sulfur	82100	5.70	ug/Kg
74421-26-4	Benzeneethanol, .beta.-methyl-.beta	73100	6.29	ug/Kg
4309-66-4	Stilbene, 4-amino- (E)-	53500	6.38	ug/Kg
	Unknown	86600	7.02	ug/Kg
	Unknown	23900	3.20	ug/Kg
	Unknown	80100	7.16	ug/Kg
2132-84-5	Benzene, (1-methylhexyl)-	30700	3.31	ug/Kg
827-52-1	Benzene, cyclohexyl-	35900	3.43	ug/Kg
768-19-4	[1,2,4]Triazolo[1,5-a]pyridine, 2-m	54700	3.54	ug/Kg
1667-04-5	Benzene, 2-chloro-1,3,5-trimethyl-	60600	3.65	ug/Kg
101-81-5	Diphenylmethane	52300	3.81	ug/Kg
605-39-0	2,2'-Dimethylbiphenyl	38900	4.15	ug/Kg
778-22-3	Benzene, 1,1'-(1-methylethylidene)b	62400	4.26	ug/Kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033006	**VR 100 B**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 9045C pH

CAS#	Parameter	Result	RDL	MDL	Units
pH	**pH**	**4.06**	**1.00**	**1.00**	**pH unit**

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
121-14-2	**2,4-Dinitrotoluene**	**99400**	**53300**	**6110**	**ug/Kg**
91-57-6	**2-Methylnaphthalene**	**52600J**	**53300**	**1690**	**ug/Kg**
83-32-9	**Acenaphthene**	**9390J**	**53300**	**1400**	**ug/Kg**
62-53-3	**Aniline**	**4800J**	**53300**	**4500**	**ug/Kg**
86-73-7	**Fluorene**	**221000**	**53300**	**1720**	**ug/Kg**

Library Search Volatiles

CAS#	Parameter	Result	Retention	Units
496-11-7	**Indane**	**68600**	**10.20**	**ug/Kg**
1075-38-3	**Benzene, 1-(1,1-dimethylethyl)-3-me**	**47200**	**10.50**	**ug/Kg**
2132-84-5	**Benzene, (1-methylhexyl)-**	**103000**	**11.90**	**ug/Kg**
827-52-1	**Benzene, cyclohexyl-**	**96300**	**12.30**	**ug/Kg**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033007	**VR 100 C**	Solid	08/01/2012 11:00	08/03/2012 10:20

Library Search Volatiles

CAS#	Parameter	Result	Retention	Units
496-11-7	**Indane**	**60500**	**10.20**	**ug/Kg**
1075-38-3	**Benzene, 1-(1,1-dimethylethyl)-3-me**	**41300**	**10.50**	**ug/Kg**
1196-58-3	**Benzene, (1-ethylpropyl)-**	**93400**	**11.70**	**ug/Kg**
2132-84-5	**Benzene, (1-methylhexyl)-**	**96200**	**11.90**	**ug/Kg**
827-52-1	**Benzene, cyclohexyl-**	**110000**	**12.30**	**ug/Kg**

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
95-63-6	**1,2,4-Trimethylbenzene**	**133000**	**98500**	**7090**	**ug/Kg**
95-50-1	**1,2-Dichlorobenzene**	**971000**	**98500**	**5440**	**ug/Kg**
108-67-8	**1,3,5-Trimethylbenzene**	**79000J**	**98500**	**7410**	**ug/Kg**
106-46-7	**1,4-Dichlorobenzene**	**80700J**	**98500**	**4550**	**ug/Kg**
99-87-6	**4-Isopropyltoluene**	**54000J**	**98500**	**4140**	**ug/Kg**
71-43-2	**Benzene**	**30000J**	**98500**	**3000**	**ug/Kg**
98-82-8	**Isopropylbenzene (Cumene)**	**73800J**	**98500**	**3650**	**ug/Kg**
91-20-3	**Naphthalene**	**2490000**	**98500**	**6330**	**ug/Kg**
108-88-3	**Toluene**	**152000**	**98500**	**3050**	**ug/Kg**
1330-20-7	**Xylene (total)**	**248000**	**197000**	**7900**	**ug/Kg**

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033007	**VR 100 C**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
136777-61-2	m,p-Xylene	166000	98500	5790	ug/Kg
95-47-6	o-Xylene	81400J	98500	2660	ug/Kg
135-98-8	sec-Butylbenzene	104000	98500	3880	ug/Kg

SW-846 7471B

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	Mercury	0.28	0.013	0.0060	mg/kg

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
2132-84-5	Benzene, (1-methylhexyl)-	32100	3.31	ug/Kg
26137-53-1	Naphthalene, 1,2,3-trimethyl-4-prop	164000	4.64	ug/Kg
	Unknown	142000	4.74	ug/Kg
	Unknown	79500	4.84	ug/Kg
	Unknown	58500	4.99	ug/Kg
6941-12-4	Propanoic acid, 2-[4-(1,1-dimethyle	127000	5.05	ug/Kg
	Unknown	55800	5.24	ug/Kg
0-00-0	2-Fluoro-4-piperidinopyrimidine	89000	6.29	ug/Kg
4309-66-4	Stilbene, 4-amino- (E)-	94400	6.45	ug/Kg
	Unknown	97800	6.77	ug/Kg
	Unknown	105000	6.92	ug/Kg
827-52-1	Benzene, cyclohexyl-	36200	3.43	ug/Kg
	Unknown	102000	7.16	ug/Kg
3173-56-6	Benzyl isocyanate	30300	3.54	ug/Kg
101-81-5	Diphenylmethane	27400	3.81	ug/Kg
1075-38-3	Benzene, 1-(1,1-dimethylethyl)-3-me	10500	3.86	ug/Kg
605-39-0	2,2'-Dimethylbiphenyl	77500	4.15	ug/Kg
778-22-3	Benzene, 1,1'-(1-methylethylidene)b	121000	4.26	ug/Kg
644-08-6	1,1'-Biphenyl, 4-methyl-	37900	4.37	ug/Kg
	Unknown	999000	4.55	ug/Kg

SW-846 9045C pH

CAS#	Parameter	Result	RDL	MDL	Units
pH	pH	3.97	1.00	1.00	pH unit

SW-846 6010B

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	Aluminum	4390	8.63	0.85	mg/kg
7440-36-0	Antimony	0.20J	2.59	0.10	mg/kg
7440-39-3	Barium	7.38	0.43	0.026	mg/kg
7440-41-7	Beryllium	0.0083J	0.22	0.0022	mg/kg
7440-70-2	Calcium	168	32.4	4.72	mg/kg
7440-47-3	Chromium	3.06	0.43	0.019	mg/kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033007	**VR 100 C**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 6010B

CAS#	Parameter	Result	RDL	MDL	Units
7440-48-4	Cobalt	0.28J	0.43	0.011	mg/kg
7440-50-8	Copper	136	0.43	0.033	mg/kg
7439-89-6	Iron	2700	4.32	0.76	mg/kg
7439-92-1	Lead	60.1	0.65	0.12	mg/kg
7439-95-4	Magnesium	56.5	4.32	0.47	mg/kg
7439-96-5	Manganese	43.7	0.65	0.015	mg/kg
7440-02-0	Nickel	4.80	1.73	0.023	mg/kg
7440-09-7	Potassium	79.9	21.6	2.27	mg/kg
7782-49-2	Selenium	10.9	1.73	0.14	mg/kg
7440-22-4	Silver	0.080J	0.43	0.024	mg/kg
7440-23-5	Sodium	3600	43.2	3.27	mg/kg
7440-28-0	Thallium	0.48J	0.86	0.095	mg/kg
7440-62-2	Vanadium	1.18	0.86	0.016	mg/kg
7440-66-6	Zinc	5.69	0.86	0.46	mg/kg

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
91-57-6	2-Methylnaphthalene	61100	53800	1700	ug/Kg
83-32-9	Acenaphthene	13200J	53800	1410	ug/Kg
62-53-3	Aniline	8590J	53800	4550	ug/Kg
86-73-7	Fluorene	296000	53800	1730	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033008	**HC 100A**	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 6010B

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	Aluminum	514	19.6	1.94	mg/kg
7440-38-2	Arsenic	14.0	3.92	0.34	mg/kg
7440-39-3	Barium	10.3	0.98	0.059	mg/kg
7440-70-2	Calcium	143	73.5	10.7	mg/kg
7440-47-3	Chromium	7310	0.98	0.044	mg/kg
7440-48-4	Cobalt	32.4	0.98	0.025	mg/kg
7440-50-8	Copper	130	0.98	0.076	mg/kg
7439-89-6	Iron	23600	9.81	1.72	mg/kg
7439-92-1	Lead	73.1	1.47	0.28	mg/kg
7439-95-4	Magnesium	46.1	9.81	1.06	mg/kg
7439-96-5	Manganese	566	1.47	0.034	mg/kg
7440-02-0	Nickel	4420	3.92	0.051	mg/kg
7440-09-7	Potassium	176	49.0	5.16	mg/kg
7782-49-2	Selenium	12.1	3.92	0.32	mg/kg
7440-23-5	Sodium	5850	98.1	7.43	mg/kg
7440-28-0	Thallium	1.22J	1.96	0.22	mg/kg
7440-62-2	Vanadium	22.1	1.96	0.037	mg/kg
7440-66-6	Zinc	9.09	1.96	1.04	mg/kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033008	**HC 100A**	Solid	08/01/2012 14:30	08/03/2012 10:20

Library Search Volatiles

CAS#	Parameter	Result	Retention	Units
496-11-7	Indane	8850	10.20	ug/Kg
104-76-7	1-Hexanol, 2-ethyl-	7260	10.30	ug/Kg

SW-846 7471B

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	Mercury	2.41	0.061	0.028	mg/kg

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
108-88-3	Toluene	81600	1.08	ug/Kg
101-81-5	Diphenylmethane	31500	3.81	ug/Kg
620-83-7	Benzene, 1-methyl-4-(phenylmethyl)-	14900	4.15	ug/Kg
13540-56-2	Benzene, 1,2-dimethyl-4-(phenylmeth	25600	4.26	ug/Kg
26137-53-1	Naphthalene, 1,2,3-trimethyl-4-prop	315000	4.55	ug/Kg
	Unknown	56700	4.64	ug/Kg
13688-68-1	9,9-Dimethyl-9-silafluorene	40900	4.74	ug/Kg
	Unknown	20000	4.99	ug/Kg
55012-80-1	Silane, trimethyl[5-methyl-2-(1-met	40400	5.05	ug/Kg
74421-26-4	Benzeneethanol, .beta.-methyl-.beta	20300	6.29	ug/Kg
4309-66-4	Stilbene, 4-amino- (E)-	22000	6.45	ug/Kg
108-38-3	Benzene, 1,3-dimethyl-	72300	1.53	ug/Kg
	Unknown	37800	7.16	ug/Kg
98-82-8	Benzene, (1-methylethyl)-	20800	1.78	ug/Kg
95-63-6	Benzene, 1,2,4-trimethyl-	23100	2.11	ug/Kg
700-88-9	Benzene, cyclopentyl-	8930	3.07	ug/Kg
	Unknown	7600	3.20	ug/Kg
1595-01-3	1-Methyl-4-N-hexylbenzene	10400	3.31	ug/Kg
827-52-1	Benzene, cyclohexyl-	12200	3.43	ug/Kg
4218-48-8	Benzene, 1-ethyl-4-(1-methylethyl)-	20200	3.54	ug/Kg

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
91-57-6	2-Methylnaphthalene	25000	24300	767	ug/Kg
83-32-9	Acenaphthene	4620J	24300	637	ug/Kg
86-73-7	Fluorene	102000	24300	782	ug/Kg
85-01-8	Phenanthrene	4050J	24300	643	ug/Kg

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
95-63-6	1,2,4-Trimethylbenzene	37900	30300	2180	ug/Kg
95-50-1	1,2-Dichlorobenzene	232000	30300	1670	ug/Kg
108-67-8	1,3,5-Trimethylbenzene	27100J	30300	2280	ug/Kg
106-46-7	1,4-Dichlorobenzene	17700J	30300	1400	ug/Kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033008	**HC 100A**	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
99-87-6	4-Isopropyltoluene	17300J	30300	1270	ug/Kg
71-43-2	Benzene	387000	30300	921	ug/Kg
100-41-4	Ethylbenzene	16200J	30300	1110	ug/Kg
98-82-8	Isopropylbenzene (Cumene)	50100	30300	1120	ug/Kg
91-20-3	Naphthalene	608000	30300	1940	ug/Kg
110-02-1	Thiophene	2450			ug/Kg
108-88-3	Toluene	451000	30300	939	ug/Kg
1330-20-7	Xylene (total)	292000	60600	2430	ug/Kg
136777-61-2	m,p-Xylene	237000	30300	1780	ug/Kg
95-47-6	o-Xylene	55200	30300	818	ug/Kg
135-98-8	sec-Butylbenzene	33800	30300	1190	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033009	**HC 100B**	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 6010B

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	Aluminum	539	19.2	1.90	mg/kg
7440-38-2	Arsenic	26.0	3.84	0.33	mg/kg
7440-39-3	Barium	10.4	0.96	0.058	mg/kg
7440-70-2	Calcium	144	72.0	10.5	mg/kg
7440-47-3	Chromium	7720	0.96	0.043	mg/kg
7440-48-4	Cobalt	48.3	0.96	0.024	mg/kg
7440-50-8	Copper	126	0.96	0.074	mg/kg
7439-89-6	Iron	26800	9.60	1.68	mg/kg
7439-92-1	Lead	88.1	1.44	0.27	mg/kg
7439-95-4	Magnesium	46.1	9.60	1.04	mg/kg
7439-96-5	Manganese	606	1.44	0.034	mg/kg
7440-02-0	Nickel	4740	3.84	0.050	mg/kg
7440-09-7	Potassium	187	48.0	5.05	mg/kg
7782-49-2	Selenium	12.9	3.84	0.31	mg/kg
7440-23-5	Sodium	5920	96.0	7.27	mg/kg
7440-28-0	Thallium	1.76J	1.92	0.21	mg/kg
7440-62-2	Vanadium	23.8	1.92	0.036	mg/kg
7440-66-6	Zinc	9.18	1.92	1.02	mg/kg

SW-846 7471B

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	Mercury	2.77	0.069	0.032	mg/kg

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
108-88-3	Toluene	18700	1.08	ug/Kg
101-81-5	Diphenylmethane	19700	3.81	ug/Kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033009	**HC 100B**	Solid	08/01/2012 14:30	08/03/2012 10:20

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
713-36-0	Benzene, 1-methyl-2-(phenylmethyl)-	14600	4.12	ug/Kg
25640-78-2	Isopropylbiphenyl	23700	4.26	ug/Kg
26137-53-1	Naphthalene, 1,2,3-trimethyl-4-prop	190000	4.55	ug/Kg
	Unknown	33400	4.64	ug/Kg
	Unknown	23200	4.74	ug/Kg
55012-80-1	Silane, trimethyl[5-methyl-2-(1-met	24700	5.05	ug/Kg
10544-50-0	Sulfur, mol. (S8)	228000	5.71	ug/Kg
13688-68-1	9,9-Dimethyl-9-silafluorene	18500	6.45	ug/Kg
	Unknown	23300	6.92	ug/Kg
108-38-3	Benzene, 1,3-dimethyl-	16900	1.53	ug/Kg
	Unknown	31100	7.16	ug/Kg
95-47-6	Benzene, 1,2-dimethyl-	4150	1.64	ug/Kg
98-82-8	Benzene, (1-methylethyl)-	4610	1.78	ug/Kg
108-67-8	Benzene, 1,3,5-trimethyl-	2850	1.99	ug/Kg
700-88-9	Benzene, cyclopentyl-	8380	3.07	ug/Kg
	Unknown	8040	3.20	ug/Kg
2132-84-5	Benzene, (1-methylhexyl)-	10100	3.31	ug/Kg
827-52-1	Benzene, cyclohexyl-	11700	3.43	ug/Kg

Library Search Volatiles

CAS#	Parameter	Result	Retention	Units
496-11-7	Indane	10200	10.20	ug/Kg
104-76-7	1-Hexanol, 2-ethyl-	11000	10.30	ug/Kg

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
95-63-6	1,2,4-Trimethylbenzene	43300	29800	2150	ug/Kg
95-50-1	1,2-Dichlorobenzene	265000	29800	1650	ug/Kg
108-67-8	1,3,5-Trimethylbenzene	29700J	29800	2240	ug/Kg
106-46-7	1,4-Dichlorobenzene	19600J	29800	1380	ug/Kg
99-87-6	4-Isopropyltoluene	17600J	29800	1250	ug/Kg
71-43-2	Benzene	479000	29800	906	ug/Kg
100-41-4	Ethylbenzene	18800J	29800	1090	ug/Kg
98-82-8	Isopropylbenzene (Cumene)	56100	29800	1100	ug/Kg
91-20-3	Naphthalene	730000	29800	1910	ug/Kg
110-02-1	Thiophene	3310			ug/Kg
108-88-3	Toluene	528000	29800	924	ug/Kg
1330-20-7	Xylene (total)	338000	59600	2390	ug/Kg
136777-61-2	m,p-Xylene	275000	29800	1750	ug/Kg
95-47-6	o-Xylene	63600	29800	805	ug/Kg
135-98-8	sec-Butylbenzene	36800	29800	1170	ug/Kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033009	HC 100B	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
91-57-6	2-Methylnaphthalene	19100J	23700	751	ug/Kg
83-32-9	Acenaphthene	3690J	23700	623	ug/Kg
86-73-7	Fluorene	76800	23700	765	ug/Kg
85-01-8	Phenanthrene	3240J	23700	630	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033010	HC 100C	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 6010B

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	Aluminum	578	19.9	1.97	mg/kg
7440-38-2	Arsenic	26.3	3.98	0.35	mg/kg
7440-39-3	Barium	11.4	0.99	0.060	mg/kg
7440-70-2	Calcium	143	74.6	10.9	mg/kg
7440-47-3	Chromium	7890	0.99	0.045	mg/kg
7440-48-4	Cobalt	48.5	0.99	0.025	mg/kg
7440-50-8	Copper	150	0.99	0.077	mg/kg
7439-89-6	Iron	28000	9.94	1.74	mg/kg
7439-92-1	Lead	98.4	1.49	0.28	mg/kg
7439-95-4	Magnesium	47.7	9.94	1.08	mg/kg
7439-96-5	Manganese	647	1.49	0.035	mg/kg
7440-02-0	Nickel	4740	3.98	0.052	mg/kg
7440-09-7	Potassium	200	49.7	5.23	mg/kg
7782-49-2	Selenium	13.9	3.98	0.33	mg/kg
7440-23-5	Sodium	6000	99.4	7.54	mg/kg
7440-28-0	Thallium	2.59	1.99	0.22	mg/kg
7440-62-2	Vanadium	24.7	1.99	0.037	mg/kg
7440-66-6	Zinc	9.04	1.99	1.06	mg/kg

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
91-57-6	2-Methylnaphthalene	23800J	24800	784	ug/Kg
83-32-9	Acenaphthene	4400J	24800	650	ug/Kg
208-96-8	Acenaphthylene	1620J	24800	756	ug/Kg
86-73-7	Fluorene	93200	24800	799	ug/Kg
85-01-8	Phenanthrene	3560J	24800	658	ug/Kg

Library Search Volatiles

CAS#	Parameter	Result	Retention	Units
496-11-7	Indane	6820	10.20	ug/Kg
104-76-7	1-Hexanol, 2-ethyl-	10700	10.30	ug/Kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033010	HC 100C	Solid	08/01/2012 14:30	08/03/2012 10:20

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
108-88-3	Toluene	58200	1.08	ug/Kg
827-52-1	Benzene, cyclohexyl-	39600	3.43	ug/Kg
4218-48-8	Benzene, 1-ethyl-4-(1-methylethyl)-	32700	3.54	ug/Kg
778-22-3	Benzene, 1,1'-(1-methylethylidene)b	40800	4.26	ug/Kg
26137-53-1	Naphthalene, 1,2,3-trimethyl-4-prop	303000	4.55	ug/Kg
14064-82-5	Benzenamine, 3-(2-phenylethenyl)-,	54200	4.64	ug/Kg
	Unknown	49900	4.74	ug/Kg
	Unknown	15000	4.84	ug/Kg
74150-88-2	N-Cyano-N',N',N'',N''-tetramethyl-1	37500	5.05	ug/Kg
10544-50-0	Sulfur, mol. (S8)	203000	5.71	ug/Kg
74421-26-4	Benzeneethanol, .beta.-methyl-.beta	19300	6.29	ug/Kg
106-42-3	p-Xylene	55100	1.53	ug/Kg
	Unknown	34600	7.16	ug/Kg
95-47-6	Benzene, 1,2-dimethyl-	13200	1.64	ug/Kg
98-82-8	Benzene, (1-methylethyl)-	15400	1.78	ug/Kg
108-67-8	Benzene, 1,3,5-trimethyl-	9800	1.99	ug/Kg
98-51-1	4-tert-Butyltoluene	23200	2.53	ug/Kg
700-88-9	Benzene, cyclopentyl-	28400	3.07	ug/Kg
1196-58-3	Benzene, (1-ethylpropyl)-	28700	3.20	ug/Kg
	Unknown	34800	3.31	ug/Kg

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
95-63-6	1,2,4-Trimethylbenzene	31600	30600	2210	ug/Kg
95-50-1	1,2-Dichlorobenzene	185000	30600	1690	ug/Kg
108-67-8	1,3,5-Trimethylbenzene	22900J	30600	2300	ug/Kg
106-46-7	1,4-Dichlorobenzene	14500J	30600	1420	ug/Kg
99-87-6	4-Isopropyltoluene	16400J	30600	1290	ug/Kg
71-43-2	Benzene	304000	30600	931	ug/Kg
100-41-4	Ethylbenzene	12900J	30600	1120	ug/Kg
98-82-8	Isopropylbenzene (Cumene)	41600	30600	1130	ug/Kg
91-20-3	Naphthalene	522000	30600	1970	ug/Kg
110-02-1	Thiophene	1970			ug/Kg
108-88-3	Toluene	351000	30600	950	ug/Kg
1330-20-7	Xylene (total)	235000	61300	2460	ug/Kg
136777-61-2	m,p-Xylene	190000	30600	1800	ug/Kg
95-47-6	o-Xylene	45600	30600	827	ug/Kg
135-98-8	sec-Butylbenzene	29600J	30600	1210	ug/Kg

SW-846 7471B

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	Mercury	2.39	0.074	0.034	mg/kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033001	**VR 100 (TCLP)**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 8260B TCLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			40	08/08/2012 17:37	CEK	487299

CAS#	Parameter	Result	RDL	MDL	Units
75-35-4	1,1-Dichloroethene	0.00732U	0.200	0.00732	mg/L
107-06-2	1,2-Dichloroethane	0.00484U	0.200	0.00484	mg/L
78-93-3	2-Butanone	0.00940U	1.00	0.00940	mg/L
71-43-2	**Benzene**	**0.564**	**0.200**	**0.00196**	**mg/L**
56-23-5	Carbon tetrachloride	0.00225U	0.200	0.00225	mg/L
108-90-7	Chlorobenzene	0.00219U	0.200	0.00219	mg/L
67-66-3	Chloroform	0.00246U	0.200	0.00246	mg/L
127-18-4	Tetrachloroethene	0.00564U	0.200	0.00564	mg/L
110-02-1	**Thiophene**	**0**			
79-01-6	Trichloroethene	0.00377U	0.200	0.00377	mg/L
75-01-4	Vinyl chloride	0.00416U	0.200	0.00416	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	2000	2140	ug/L	107	62 - 130
1868-53-7	Dibromofluoromethane	2000	1940	ug/L	97	65 - 127
2037-26-5	Toluene d8	2000	2110	ug/L	106	71 - 134
17060-07-0	1,2-Dichloroethane-d4	2000	1960	ug/L	98	62 - 127

SW-846 8270C TCLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/07/2012 09:00	487177	SW-846 3510C	10	08/08/2012 18:38	KCB	487309

CAS#	Parameter	Result	RDL	MDL	Units
106-46-7	**1,4-Dichlorobenzene**	**0.083J**	**0.5000**	**0.0128**	**mg/L**
95-95-4	2,4,5-Trichlorophenol	0.0159U	0.5000	0.0159	mg/L
88-06-2	2,4,6-Trichlorophenol	0.0138U	0.5000	0.0138	mg/L
121-14-2	2,4-Dinitrotoluene	0.0132U	0.1000	0.0132	mg/L
1319-77-3	**Cresols**	**0.241J**	**1.00**	**0.0341**	**mg/L**
118-74-1	Hexachlorobenzene	0.0125U	0.1000	0.0125	mg/L
87-68-3	Hexachlorobutadiene	0.0096U	0.5000	0.0096	mg/L
67-72-1	Hexachloroethane	0.0150U	0.5000	0.0150	mg/L
98-95-3	Nitrobenzene	0.0165U	0.5000	0.0165	mg/L
87-86-5	Pentachlorophenol	0.0084U	2.50	0.0084	mg/L
110-86-1	Pyridine	0.1790U	0.5000	0.1790	mg/L
1319-77-3MP	**m,p-Cresol**	**0.214J**	**0.5000**	**0.0176**	**mg/L**
95-48-7	**o-Cresol**	**0.026J**	**0.5000**	**0.0165**	**mg/L**

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	250	Diluted Out	ug/L	**0***	48 - 123
321-60-8	2-Fluorobiphenyl	250	Diluted Out	ug/L	**0***	16 - 128
1718-51-0	Terphenyl-d14	250	Diluted Out	ug/L	**0***	38 - 167
4165-62-2	Phenol-d5	500	Diluted Out	ug/L	**0***	10 - 123
367-12-4	2-Fluorophenol	500	Diluted Out	ug/L	**0***	10 - 120
118-79-6	2,4,6-Tribromophenol	500	Diluted Out	ug/L	**0***	44 - 121

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033001	**VR 100 (TCLP)**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 6010B TCLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/06/2012 13:00	487188	SW-846 3010A	5	08/08/2012 16:42	BNB	487293

CAS#	Parameter	Result	RDL	MDL	Units
7440-38-2	Arsenic	0.017U	1.00	0.017	mg/L
7440-39-3	**Barium**	**0.020J**	**5.00**	**0.0079**	**mg/L**
7440-43-9	Cadmium	0.00052U	0.050	0.00052	mg/L
7440-47-3	Chromium	0.0017U	0.25	0.0017	mg/L
7439-92-1	Lead	0.014U	0.50	0.014	mg/L
7782-49-2	Selenium	0.019U	0.50	0.019	mg/L
7440-22-4	**Silver**	**0.0032J**	**0.25**	**0.0032**	**mg/L**

SW-846 7470A TCLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/07/2012 13:00	487189	SW-846 7470A	1	08/09/2012 12:50	BNB	487255

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	Mercury	0.000075U	0.0020	0.000075	mg/L

SW-846 9060M

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	08/09/2012 11:01	AEL	487355

CAS#	Parameter	Result	RDL	MDL	Units
C-012	**Total Organic Carbon**	**712000**	**200**	**97.0**	**mg/kg**

RESULTS REPORTED ON A DRY WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033002	**VR 100 (SPLP)**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 8260B SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			50	08/09/2012 18:58	CEK	487384

CAS#	Parameter	Result	RDL	MDL	Units
95-50-1	**1,2-Dichlorobenzene**	**1450**	**250**	**4.29**	**ug/L**
91-20-3	**Naphthalene**	**3580**	**250**	**8.75**	**ug/L**

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	2500	2530	ug/L	101	78 - 130
1868-53-7	Dibromofluoromethane	2500	2380	ug/L	95	77 - 127
2037-26-5	Toluene d8	2500	2530	ug/L	101	76 - 134
17060-07-0	1,2-Dichloroethane-d4	2500	2360	ug/L	94	71 - 127

SW-846 8260B SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			5	08/09/2012 19:18	CEK	487384

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	0.750U	25	0.750	ug/L
71-55-6	1,1,1-Trichloroethane	0.388U	25	0.388	ug/L
79-34-5	1,1,2,2-Tetrachloroethane	0.560U	25	0.560	ug/L
79-00-5	1,1,2-Trichloroethane	0.895U	25	0.895	ug/L
75-34-3	1,1-Dichloroethane	0.319U	25	0.319	ug/L
75-35-4	1,1-Dichloroethene	0.915U	25	0.915	ug/L
563-58-6	1,1-Dichloropropene	0.357U	25	0.357	ug/L
96-18-4	1,2,3-Trichloropropane	0.317U	25	0.317	ug/L
120-82-1	1,2,4-Trichlorobenzene	0.690U	25	0.690	ug/L
95-63-6	**1,2,4-Trimethylbenzene**	**152**	**25**	**0.402**	**ug/L**
96-12-8	1,2-Dibromo-3-chloropropane	0.412U	25	0.412	ug/L
106-93-4	1,2-Dibromoethane	0.845U	25	0.845	ug/L
107-06-2	1,2-Dichloroethane	0.605U	25	0.605	ug/L
540-59-0	1,2-Dichloroethene(Total)	0.845U	50	0.845	ug/L
78-87-5	1,2-Dichloropropane	0.570U	25	0.570	ug/L
108-67-8	**1,3,5-Trimethylbenzene**	**71.5**	**25**	**0.263**	**ug/L**
541-73-1	**1,3-Dichlorobenzene**	**15.4J**	**25**	**0.400**	**ug/L**
142-28-9	1,3-Dichloropropane	0.565U	25	0.565	ug/L
106-46-7	**1,4-Dichlorobenzene**	**91.8**	**25**	**0.292**	**ug/L**
594-20-7	2,2-Dichloropropane	0.560U	25	0.560	ug/L
78-93-3	**2-Butanone**	**48.3J**	**130**	**1.18**	**ug/L**
95-49-8	2-Chlorotoluene	0.449U	25	0.449	ug/L
591-78-6	**2-Hexanone**	**34.2**	**25**	**1.51**	**ug/L**
106-43-4	4-Chlorotoluene	0.230U	25	0.230	ug/L
99-87-6	**4-Isopropyltoluene**	**7.21J**	**25**	**0.875**	**ug/L**
108-10-1	**4-Methyl-2-pentanone**	**7.16J**	**25**	**0.710**	**ug/L**
67-64-1	**Acetone**	**139**	**130**	**1.61**	**ug/L**
71-43-2	**Benzene**	**513**	**25**	**0.245**	**ug/L**
108-86-1	Bromobenzene	0.473U	25	0.473	ug/L
74-97-5	Bromochloromethane	1.19U	25	1.19	ug/L
75-27-4	Bromodichloromethane	0.353U	25	0.353	ug/L
75-25-2	Bromoform	1.39U	25	1.39	ug/L
74-83-9	Bromomethane	1.38U	25	1.38	ug/L
75-15-0	Carbon disulfide	0.950U	25	0.950	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033002	**VR 100 (SPLP)**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 8260B SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			5	08/09/2012 19:18	CEK	487384

CAS#	Parameter	Result	RDL	MDL	Units
56-23-5	Carbon tetrachloride	0.282U	25	0.282	ug/L
108-90-7	**Chlorobenzene**	**6.40J**	**25**	**0.274**	**ug/L**
75-00-3	**Chloroethane**	**10.3J**	**25**	**1.40**	**ug/L**
67-66-3	Chloroform	0.308U	25	0.308	ug/L
74-87-3	**Chloromethane**	**35.5**	**25**	**0.379**	**ug/L**
124-48-1	Dibromochloromethane	0.665U	25	0.665	ug/L
74-95-3	Dibromomethane	0.985U	25	0.985	ug/L
75-71-8	Dichlorodifluoromethane	0.441U	25	0.441	ug/L
100-41-4	**Ethylbenzene**	**35.7**	**25**	**0.900**	**ug/L**
87-68-3	Hexachlorobutadiene	1.74U	25	1.74	ug/L
98-82-8	**Isopropylbenzene (Cumene)**	**62.9**	**25**	**0.292**	**ug/L**
74-88-4	Methyl iodide	0.485U	25	0.485	ug/L
75-09-2	**Methylene chloride**	**3.74J**	**50**	**0.510**	**ug/L**
100-42-5	**Styrene**	**34.2**	**25**	**0.288**	**ug/L**
127-18-4	Tetrachloroethene	0.705U	25	0.705	ug/L
110-02-1	**Thiophene**	**15.1**			**ug/L**
108-88-3	**Toluene**	**996**	**25**	**0.388**	**ug/L**
79-01-6	Trichloroethene	0.472U	25	0.472	ug/L
75-69-4	Trichlorofluoromethane	0.468U	25	0.468	ug/L
76-13-1	Trichlorotrifluoroethane	0.705U	25	0.705	ug/L
108-05-4	Vinyl acetate	0.985U	25	0.985	ug/L
75-01-4	Vinyl chloride	0.520U	25	0.520	ug/L
1330-20-7	**Xylene (total)**	**574**	**50**	**0.615**	**ug/L**
156-59-2	cis-1,2-Dichloroethene	0.520U	25	0.520	ug/L
10061-01-5	cis-1,3-Dichloropropene	0.525U	25	0.525	ug/L
136777-61-2	**m,p-Xylene**	**371**	**25**	**0.493**	**ug/L**
104-51-8	n-Butylbenzene	0.342U	25	0.342	ug/L
103-65-1	n-Propylbenzene	0.343U	25	0.343	ug/L
95-47-6	**o-Xylene**	**202**	**25**	**0.387**	**ug/L**
135-98-8	**sec-Butylbenzene**	**31.0**	**25**	**0.441**	**ug/L**
1634-04-4	tert-Butyl methyl ether (MTBE)	0.420U	25	0.420	ug/L
98-06-6	**tert-Butylbenzene**	**7.77J**	**25**	**0.290**	**ug/L**
156-60-5	trans-1,2-Dichloroethene	0.478U	25	0.478	ug/L
10061-02-6	trans-1,3-Dichloropropene	0.339U	25	0.339	ug/L
110-57-6	trans-1,4-Dichloro-2-butene	2.15U	25	2.15	ug/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	250	264	ug/L	106	78 - 130
1868-53-7	Dibromofluoromethane	250	239	ug/L	96	77 - 127
2037-26-5	Toluene d8	250	250	ug/L	100	76 - 134
17060-07-0	1,2-Dichloroethane-d4	250	239	ug/L	96	71 - 127

SW-846 8270C SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/07/2012 09:00	487177	SW-846 3510C	10	08/08/2012 19:44	KCB	487309

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	2.34U	100	2.34	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033002	**VR 100 (SPLP)**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 8270C SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/07/2012 09:00	487177	SW-846 3510C	10	08/08/2012 19:44	KCB	487309

CAS#	Parameter	Result	RDL	MDL	Units
122-66-7	1,2Diphenylhydrazine/Azobenzen	2.78U	100	2.78	ug/L
95-95-4	2,4,5-Trichlorophenol	3.17U	100	3.17	ug/L
88-06-2	2,4,6-Trichlorophenol	2.75U	100	2.75	ug/L
120-83-2	2,4-Dichlorophenol	2.17U	100	2.17	ug/L
105-67-9	2,4-Dimethylphenol	6.94U	100	6.94	ug/L
51-28-5	2,4-Dinitrophenol	26.0U	500	26.0	ug/L
121-14-2	2,4-Dinitrotoluene	2.63U	100	2.63	ug/L
606-20-2	2,6-Dinitrotoluene	3.52U	100	3.52	ug/L
91-58-7	2-Chloronaphthalene	2.21U	100	2.21	ug/L
95-57-8	2-Chlorophenol	2.76U	100	2.76	ug/L
91-57-6	**2-Methylnaphthalene**	**53.8J**	**100**	**2.55**	**ug/L**
88-74-4	2-Nitroaniline	1.98U	500	1.98	ug/L
88-75-5	2-Nitrophenol	3.57U	100	3.57	ug/L
91-94-1	3,3'-Dichlorobenzidine	2.97U	200	2.97	ug/L
99-09-2	3-Nitroaniline	2.26U	500	2.26	ug/L
534-52-1	4,6-Dinitro-2-methylphenol	19.8U	500	19.8	ug/L
101-55-3	4-Bromophenyl phenyl ether	3.37U	100	3.37	ug/L
59-50-7	4-Chloro-3-methylphenol	2.34U	100	2.34	ug/L
106-47-8	4-Chloroaniline	4.63U	100	4.63	ug/L
7005-72-3	4-Chlorophenyl phenyl ether	2.68U	100	2.68	ug/L
100-01-6	4-Nitroaniline	2.21U	500	2.21	ug/L
100-02-7	4-Nitrophenol	18.3U	500	18.3	ug/L
83-32-9	**Acenaphthene**	**6.33J**	**100**	**2.68**	**ug/L**
208-96-8	Acenaphthylene	3.03U	100	3.03	ug/L
62-53-3	**Aniline**	**33.2J**	**100**	**7.18**	**ug/L**
120-12-7	Anthracene	3.16U	100	3.16	ug/L
56-55-3	Benzo(a)anthracene	3.16U	100	3.16	ug/L
50-32-8	Benzo(a)pyrene	1.25U	100	1.25	ug/L
205-99-2	Benzo(b)fluoranthene	2.17U	100	2.17	ug/L
191-24-2	Benzo(g,h,i)perylene	2.15U	100	2.15	ug/L
207-08-9	Benzo(k)fluoranthene	2.36U	100	2.36	ug/L
100-51-6	Benzyl alcohol	3.55U	100	3.55	ug/L
111-91-1	Bis(2-Chloroethoxy)methane	2.90U	100	2.90	ug/L
111-44-4	Bis(2-Chloroethyl)ether	2.88U	100	2.88	ug/L
108-60-1	Bis(2-Chloroisopropyl)ether	2.57U	100	2.57	ug/L
117-81-7	Bis(2-Ethylhexyl)phthalate	1.91U	100	1.91	ug/L
85-68-7	Butyl benzyl phthalate	1.65U	100	1.65	ug/L
86-74-8	**Carbazole**	**10.5J**	**100**	**2.32**	**ug/L**
218-01-9	Chrysene	4.33U	100	4.33	ug/L
84-74-2	Di-n-butyl phthalate	1.89U	100	1.89	ug/L
117-84-0	Di-n-octyl phthalate	1.67U	100	1.67	ug/L
53-70-3	Dibenz(a,h)anthracene	2.17U	100	2.17	ug/L
132-64-9	Dibenzofuran	2.27U	100	2.27	ug/L
84-66-2	Diethyl phthalate	3.03U	100	3.03	ug/L
131-11-3	Dimethyl phthalate	2.55U	100	2.55	ug/L
206-44-0	Fluoranthene	2.67U	100	2.67	ug/L
86-73-7	**Fluorene**	**16.8J**	**100**	**2.88**	**ug/L**
118-74-1	Hexachlorobenzene	2.49U	100	2.49	ug/L
87-68-3	Hexachlorobutadiene	1.92U	100	1.92	ug/L
77-47-4	Hexachlorocyclopentadiene	1.74U	100	1.74	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033002	**VR 100 (SPLP)**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 8270C SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/07/2012 09:00	487177	SW-846 3510C	10	08/08/2012 19:44	KCB	487309

CAS#	Parameter	Result	RDL	MDL	Units
67-72-1	Hexachloroethane	2.99U	100	2.99	ug/L
193-39-5	Indeno(1,2,3-cd)pyrene	1.57U	100	1.57	ug/L
78-59-1	**Isophorone**	**7.70J**	**100**	**3.80**	**ug/L**
98-95-3	Nitrobenzene	3.29U	100	3.29	ug/L
87-86-5	Pentachlorophenol	1.68U	500	1.68	ug/L
85-01-8	Phenanthrene	3.04U	100	3.04	ug/L
108-95-2	**Phenol**	**90.2J**	**100**	**1.50**	**ug/L**
129-00-0	Pyrene	4.86U	100	4.86	ug/L
110-86-1	Pyridine	35.8U	100	35.8	ug/L
1319-77-3MP	**m,p-Cresol**	**211**	**100**	**3.52**	**ug/L**
621-64-7	n-Nitrosodi-n-propylamine	3.04U	100	3.04	ug/L
62-75-9	n-Nitrosodimethylamine	3.04U	100	3.04	ug/L
86-30-6	n-Nitrosodiphenylamine	3.64U	100	3.64	ug/L
95-48-7	**o-Cresol**	**24.6J**	**100**	**3.29**	**ug/L**

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	50	Diluted Out	ug/L	**0***	52 - 120
321-60-8	2-Fluorobiphenyl	50	Diluted Out	ug/L	**0***	16 - 128
1718-51-0	Terphenyl-d14	50	Diluted Out	ug/L	**0***	43 - 138
4165-62-2	Phenol-d5	100	Diluted Out	ug/L	**0***	10 - 120
367-12-4	2-Fluorophenol	100	Diluted Out	ug/L	**0***	10 - 120
118-79-6	2,4,6-Tribromophenol	100	Diluted Out	ug/L	**0***	52 - 121

SW-846 6010B SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/07/2012 13:00	487186	SW-846 3010A	1	08/08/2012 20:07	BNB	487274

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	**Aluminum**	**1.32**	**0.20**	**0.024**	**mg/L**
7440-36-0	Antimony	0.0040U	0.060	0.0040	mg/L
7440-38-2	Arsenic	0.0035U	0.010	0.0035	mg/L
7440-39-3	**Barium**	**0.0047J**	**0.010**	**0.0016**	**mg/L**
7440-41-7	Beryllium	0.000082U	0.0050	0.000082	mg/L
7440-43-9	**Cadmium**	**0.00010J**	**0.0050**	**0.00010**	**mg/L**
7440-70-2	**Calcium**	**0.50**	**0.051**	**0.024**	**mg/L**
7440-47-3	**Chromium**	**0.0037J**	**0.010**	**0.00034**	**mg/L**
7440-48-4	**Cobalt**	**0.0011J**	**0.010**	**0.00052**	**mg/L**
7440-50-8	Copper	0.0017U	0.010	0.0017	mg/L
7439-89-6	**Iron**	**1.33**	**0.050**	**0.027**	**mg/L**
7439-92-1	Lead	0.0028U	0.015	0.0028	mg/L
7439-95-4	**Magnesium**	**0.055**	**0.050**	**0.012**	**mg/L**
7439-96-5	**Manganese**	**0.017**	**0.015**	**0.00083**	**mg/L**
7440-02-0	**Nickel**	**0.0079J**	**0.040**	**0.00084**	**mg/L**
7440-09-7	**Potassium**	**0.22J**	**0.50**	**0.041**	**mg/L**
7782-49-2	Selenium	0.0038U	0.040	0.0038	mg/L
7440-22-4	Silver	0.00064U	0.010	0.00064	mg/L
7440-28-0	**Thallium**	**0.0067J**	**0.020**	**0.0026**	**mg/L**
7440-62-2	Vanadium	0.0012U	0.020	0.0012	mg/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033002	**VR 100 (SPLP)**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 6010B SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/07/2012 13:00	487186	SW-846 3010A	1	08/08/2012 20:07	BNB	487274

CAS#	Parameter	Result	RDL	MDL	Units
7440-66-6	**Zinc**	**0.016J**	**0.020**	**0.0059**	**mg/L**

SW-846 6010B SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/07/2012 13:00	487186	SW-846 3010A	1	08/09/2012 16:00	BNB	487362

CAS#	Parameter	Result	RDL	MDL	Units
7440-23-5	**Sodium**	**1.82**	**1.00**	**0.056**	**mg/L**

SW-846 1312/7471A SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/07/2012 13:00	487187	SW-846 1312/7470A	1	08/09/2012 12:19	BNB	487255

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	Mercury	0.000075U	0.00020	0.000075	mg/L

RESULTS REPORTED ON A WET WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033003	**HC 100 (TCLP)**	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 8260B TCLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			200	08/08/2012 19:54	CEK	487299

CAS#	Parameter	Result	RDL	MDL	Units
75-35-4	1,1-Dichloroethene	0.037U	1.00	0.037	mg/L
107-06-2	1,2-Dichloroethane	0.024U	1.00	0.024	mg/L
78-93-3	**2-Butanone**	**0.301J**	**5.00**	**0.047**	**mg/L**
71-43-2	**Benzene**	**13.0**	**1.00**	**0.00980**	**mg/L**
56-23-5	Carbon tetrachloride	0.011U	1.00	0.011	mg/L
108-90-7	Chlorobenzene	0.011U	1.00	0.011	mg/L
67-66-3	Chloroform	0.012U	1.00	0.012	mg/L
127-18-4	Tetrachloroethene	0.028U	1.00	0.028	mg/L
110-02-1	**Thiophene**	**0**			
79-01-6	Trichloroethene	0.019U	1.00	0.019	mg/L
75-01-4	Vinyl chloride	0.021U	1.00	0.021	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	10000	10200	ug/L	102	62 - 130
1868-53-7	Dibromofluoromethane	10000	9600	ug/L	96	65 - 127
2037-26-5	Toluene d8	10000	10500	ug/L	105	71 - 134
17060-07-0	1,2-Dichloroethane-d4	10000	9520	ug/L	95	62 - 127

SW-846 8270C TCLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/07/2012 09:00	487177	SW-846 3510C	10	08/08/2012 19:27	KCB	487309

CAS#	Parameter	Result	RDL	MDL	Units
106-46-7	**1,4-Dichlorobenzene**	**0.062J**	**0.5000**	**0.0128**	**mg/L**
95-95-4	2,4,5-Trichlorophenol	0.0159U	0.5000	0.0159	mg/L
88-06-2	2,4,6-Trichlorophenol	0.0138U	0.5000	0.0138	mg/L
121-14-2	2,4-Dinitrotoluene	0.0132U	0.1000	0.0132	mg/L
1319-77-3	**Cresols**	**0.391J**	**1.00**	**0.0341**	**mg/L**
118-74-1	Hexachlorobenzene	0.0125U	0.1000	0.0125	mg/L
87-68-3	Hexachlorobutadiene	0.0096U	0.5000	0.0096	mg/L
67-72-1	Hexachloroethane	0.0150U	0.5000	0.0150	mg/L
98-95-3	Nitrobenzene	0.0165U	0.5000	0.0165	mg/L
87-86-5	Pentachlorophenol	0.0084U	2.50	0.0084	mg/L
110-86-1	**Pyridine**	**6.47**	**0.5000**	**0.1790**	**mg/L**
1319-77-3MP	**m,p-Cresol**	**0.359J**	**0.5000**	**0.0176**	**mg/L**
95-48-7	**o-Cresol**	**0.033J**	**0.5000**	**0.0165**	**mg/L**

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	250	Diluted Out	ug/L	**0***	48 - 123
321-60-8	2-Fluorobiphenyl	250	Diluted Out	ug/L	**0***	16 - 128
1718-51-0	Terphenyl-d14	250	Diluted Out	ug/L	**0***	38 - 167
4165-62-2	Phenol-d5	500	Diluted Out	ug/L	**0***	10 - 123
367-12-4	2-Fluorophenol	500	Diluted Out	ug/L	**0***	10 - 120
118-79-6	2,4,6-Tribromophenol	500	Diluted Out	ug/L	**0***	44 - 121

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033003	**HC 100 (TCLP)**	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 6010B TCLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/06/2012 13:00	487188	SW-846 3010A	5	08/08/2012 16:49	BNB	487293

CAS#	Parameter	Result	RDL	MDL	Units
7440-38-2	Arsenic	0.017U	1.00	0.017	mg/L
7440-39-3	**Barium**	**0.055J**	**5.00**	**0.0079**	**mg/L**
7440-43-9	**Cadmium**	**0.028J**	**0.050**	**0.00052**	**mg/L**
7440-47-3	**Chromium**	**233**	**0.25**	**0.0017**	**mg/L**
7439-92-1	**Lead**	**0.46J**	**0.50**	**0.014**	**mg/L**
7782-49-2	Selenium	0.019U	0.50	0.019	mg/L
7440-22-4	**Silver**	**0.0085J**	**0.25**	**0.0032**	**mg/L**

SW-846 7470A TCLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/07/2012 13:00	487189	SW-846 7470A	1	08/09/2012 12:52	BNB	487255

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	**Mercury**	**0.00040J**	**0.0020**	**0.000075**	**mg/L**

SW-846 9060M

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	08/09/2012 11:15	AEL	487355

CAS#	Parameter	Result	RDL	MDL	Units
C-012	**Total Organic Carbon**	**475000**	**200**	**97.0**	**mg/kg**

RESULTS REPORTED ON A DRY WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033004	**HC 100 (SPLP)**	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 8260B SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			200	08/09/2012 18:35	CEK	487384

CAS#	Parameter	Result	RDL	MDL	Units
71-43-2	**Benzene**	**13600**	**1000**	**9.80**	**ug/L**
108-88-3	**Toluene**	**7450**	**1000**	**15.5**	**ug/L**

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	10000	10200	ug/L	102	78 - 130
1868-53-7	Dibromofluoromethane	10000	9710	ug/L	97	77 - 127
2037-26-5	Toluene d8	10000	10300	ug/L	103	76 - 134
17060-07-0	1,2-Dichloroethane-d4	10000	9930	ug/L	99	71 - 127

SW-846 8260B SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20	08/09/2012 19:37	CEK	487384

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	3.00U	100	3.00	ug/L
71-55-6	1,1,1-Trichloroethane	1.55U	100	1.55	ug/L
79-34-5	1,1,2,2-Tetrachloroethane	2.24U	100	2.24	ug/L
79-00-5	1,1,2-Trichloroethane	3.58U	100	3.58	ug/L
75-34-3	1,1-Dichloroethane	1.27U	100	1.27	ug/L
75-35-4	1,1-Dichloroethene	3.66U	100	3.66	ug/L
563-58-6	1,1-Dichloropropene	1.43U	100	1.43	ug/L
96-18-4	1,2,3-Trichloropropane	1.27U	100	1.27	ug/L
120-82-1	1,2,4-Trichlorobenzene	2.76U	100	2.76	ug/L
95-63-6	**1,2,4-Trimethylbenzene**	**176**	**100**	**1.61**	**ug/L**
96-12-8	1,2-Dibromo-3-chloropropane	1.65U	100	1.65	ug/L
106-93-4	1,2-Dibromoethane	3.38U	100	3.38	ug/L
95-50-1	**1,2-Dichlorobenzene**	**980**	**100**	**1.72**	**ug/L**
107-06-2	1,2-Dichloroethane	2.42U	100	2.42	ug/L
540-59-0	1,2-Dichloroethene(Total)	3.38U	200	3.38	ug/L
78-87-5	1,2-Dichloropropane	2.28U	100	2.28	ug/L
108-67-8	**1,3,5-Trimethylbenzene**	**105**	**100**	**1.05**	**ug/L**
541-73-1	**1,3-Dichlorobenzene**	**12.6J**	**100**	**1.60**	**ug/L**
142-28-9	1,3-Dichloropropane	2.26U	100	2.26	ug/L
106-46-7	**1,4-Dichlorobenzene**	**69.7J**	**100**	**1.17**	**ug/L**
594-20-7	2,2-Dichloropropane	2.24U	100	2.24	ug/L
78-93-3	**2-Butanone**	**71.5J**	**500**	**4.70**	**ug/L**
95-49-8	2-Chlorotoluene	1.80U	100	1.80	ug/L
591-78-6	2-Hexanone	6.04U	100	6.04	ug/L
106-43-4	4-Chlorotoluene	0.920U	100	0.920	ug/L
99-87-6	**4-Isopropyltoluene**	**13.4J**	**100**	**3.50**	**ug/L**
108-10-1	4-Methyl-2-pentanone	2.84U	100	2.84	ug/L
67-64-1	**Acetone**	**196J**	**500**	**6.44**	**ug/L**
108-86-1	Bromobenzene	1.89U	100	1.89	ug/L
74-97-5	Bromochloromethane	4.76U	100	4.76	ug/L
75-27-4	Bromodichloromethane	1.41U	100	1.41	ug/L
75-25-2	Bromoform	5.56U	100	5.56	ug/L
74-83-9	Bromomethane	5.52U	100	5.52	ug/L
75-15-0	Carbon disulfide	3.80U	100	3.80	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033004	**HC 100 (SPLP)**	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 8260B SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20	08/09/2012 19:37	CEK	487384

CAS#	Parameter	Result	RDL	MDL	Units
56-23-5	Carbon tetrachloride	1.13U	100	1.13	ug/L
108-90-7	**Chlorobenzene**	**8.00J**	**100**	**1.10**	**ug/L**
75-00-3	**Chloroethane**	**25.2J**	**100**	**5.58**	**ug/L**
67-66-3	Chloroform	1.23U	100	1.23	ug/L
74-87-3	**Chloromethane**	**42.8J**	**100**	**1.51**	**ug/L**
124-48-1	Dibromochloromethane	2.66U	100	2.66	ug/L
74-95-3	Dibromomethane	3.94U	100	3.94	ug/L
75-71-8	Dichlorodifluoromethane	1.76U	100	1.76	ug/L
100-41-4	**Ethylbenzene**	**136**	**100**	**3.60**	**ug/L**
87-68-3	Hexachlorobutadiene	6.94U	100	6.94	ug/L
98-82-8	**Isopropylbenzene (Cumene)**	**233**	**100**	**1.17**	**ug/L**
74-88-4	Methyl iodide	1.94U	100	1.94	ug/L
75-09-2	Methylene chloride	2.04U	200	2.04	ug/L
91-20-3	**Naphthalene**	**2550**	**100**	**3.50**	**ug/L**
100-42-5	Styrene	1.15U	100	1.15	ug/L
127-18-4	Tetrachloroethene	2.82U	100	2.82	ug/L
110-02-1	**Thiophene**	**129**			**ug/L**
79-01-6	Trichloroethene	1.89U	100	1.89	ug/L
75-69-4	Trichlorofluoromethane	1.87U	100	1.87	ug/L
76-13-1	Trichlorotrifluoroethane	2.82U	100	2.82	ug/L
108-05-4	Vinyl acetate	3.94U	100	3.94	ug/L
75-01-4	Vinyl chloride	2.08U	100	2.08	ug/L
1330-20-7	**Xylene (total)**	**2720**	**200**	**2.46**	**ug/L**
156-59-2	cis-1,2-Dichloroethene	2.08U	100	2.08	ug/L
10061-01-5	cis-1,3-Dichloropropene	2.10U	100	2.10	ug/L
136777-61-2	**m,p-Xylene**	**2170**	**100**	**1.97**	**ug/L**
104-51-8	n-Butylbenzene	1.37U	100	1.37	ug/L
103-65-1	n-Propylbenzene	1.37U	100	1.37	ug/L
95-47-6	**o-Xylene**	**554**	**100**	**1.55**	**ug/L**
135-98-8	**sec-Butylbenzene**	**52.6J**	**100**	**1.76**	**ug/L**
1634-04-4	tert-Butyl methyl ether (MTBE)	1.68U	100	1.68	ug/L
98-06-6	**tert-Butylbenzene**	**23.1J**	**100**	**1.16**	**ug/L**
156-60-5	trans-1,2-Dichloroethene	1.91U	100	1.91	ug/L
10061-02-6	trans-1,3-Dichloropropene	1.36U	100	1.36	ug/L
110-57-6	trans-1,4-Dichloro-2-butene	8.58U	100	8.58	ug/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	1000	1030	ug/L	103	78 - 130
1868-53-7	Dibromofluoromethane	1000	967	ug/L	97	77 - 127
2037-26-5	Toluene d8	1000	996	ug/L	100	76 - 134
17060-07-0	1,2-Dichloroethane-d4	1000	984	ug/L	98	71 - 127

SW-846 8270C SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/07/2012 09:00	487177	SW-846 3510C	10	08/08/2012 20:00	KCB	487309

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	2.34U	100	2.34	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033004	**HC 100 (SPLP)**	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 8270C SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/07/2012 09:00	487177	SW-846 3510C	10	08/08/2012 20:00	KCB	487309

CAS#	Parameter	Result	RDL	MDL	Units
122-66-7	1,2Diphenylhydrazine/Azobenzen	2.78U	100	2.78	ug/L
95-95-4	2,4,5-Trichlorophenol	3.17U	100	3.17	ug/L
88-06-2	2,4,6-Trichlorophenol	2.75U	100	2.75	ug/L
120-83-2	2,4-Dichlorophenol	2.17U	100	2.17	ug/L
105-67-9	2,4-Dimethylphenol	6.94U	100	6.94	ug/L
51-28-5	2,4-Dinitrophenol	26.0U	500	26.0	ug/L
121-14-2	2,4-Dinitrotoluene	2.63U	100	2.63	ug/L
606-20-2	2,6-Dinitrotoluene	3.52U	100	3.52	ug/L
91-58-7	2-Chloronaphthalene	2.21U	100	2.21	ug/L
95-57-8	2-Chlorophenol	2.76U	100	2.76	ug/L
91-57-6	**2-Methylnaphthalene**	**27.1J**	**100**	**2.55**	**ug/L**
88-74-4	2-Nitroaniline	1.98U	500	1.98	ug/L
88-75-5	2-Nitrophenol	3.57U	100	3.57	ug/L
91-94-1	3,3'-Dichlorobenzidine	2.97U	200	2.97	ug/L
99-09-2	3-Nitroaniline	2.26U	500	2.26	ug/L
534-52-1	4,6-Dinitro-2-methylphenol	19.8U	500	19.8	ug/L
101-55-3	4-Bromophenyl phenyl ether	3.37U	100	3.37	ug/L
59-50-7	4-Chloro-3-methylphenol	2.34U	100	2.34	ug/L
106-47-8	4-Chloroaniline	4.63U	100	4.63	ug/L
7005-72-3	4-Chlorophenyl phenyl ether	2.68U	100	2.68	ug/L
100-01-6	4-Nitroaniline	2.21U	500	2.21	ug/L
100-02-7	4-Nitrophenol	18.3U	500	18.3	ug/L
83-32-9	**Acenaphthene**	**3.35J**	**100**	**2.68**	**ug/L**
208-96-8	Acenaphthylene	3.03U	100	3.03	ug/L
62-53-3	**Aniline**	**617**	**100**	**7.18**	**ug/L**
120-12-7	Anthracene	3.16U	100	3.16	ug/L
56-55-3	Benzo(a)anthracene	3.16U	100	3.16	ug/L
50-32-8	Benzo(a)pyrene	1.25U	100	1.25	ug/L
205-99-2	Benzo(b)fluoranthene	2.17U	100	2.17	ug/L
191-24-2	Benzo(g,h,i)perylene	2.15U	100	2.15	ug/L
207-08-9	Benzo(k)fluoranthene	2.36U	100	2.36	ug/L
100-51-6	Benzyl alcohol	3.55U	100	3.55	ug/L
111-91-1	Bis(2-Chloroethoxy)methane	2.90U	100	2.90	ug/L
111-44-4	Bis(2-Chloroethyl)ether	2.88U	100	2.88	ug/L
108-60-1	Bis(2-Chloroisopropyl)ether	2.57U	100	2.57	ug/L
117-81-7	Bis(2-Ethylhexyl)phthalate	1.91U	100	1.91	ug/L
85-68-7	Butyl benzyl phthalate	1.65U	100	1.65	ug/L
86-74-8	Carbazole	2.32U	100	2.32	ug/L
218-01-9	Chrysene	4.33U	100	4.33	ug/L
84-74-2	Di-n-butyl phthalate	1.89U	100	1.89	ug/L
117-84-0	Di-n-octyl phthalate	1.67U	100	1.67	ug/L
53-70-3	Dibenz(a,h)anthracene	2.17U	100	2.17	ug/L
132-64-9	Dibenzofuran	2.27U	100	2.27	ug/L
84-66-2	Diethyl phthalate	3.03U	100	3.03	ug/L
131-11-3	Dimethyl phthalate	2.55U	100	2.55	ug/L
206-44-0	Fluoranthene	2.67U	100	2.67	ug/L
86-73-7	**Fluorene**	**12.5J**	**100**	**2.88**	**ug/L**
118-74-1	Hexachlorobenzene	2.49U	100	2.49	ug/L
87-68-3	Hexachlorobutadiene	1.92U	100	1.92	ug/L
77-47-4	Hexachlorocyclopentadiene	1.74U	100	1.74	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033004	**HC 100 (SPLP)**	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 8270C SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/07/2012 09:00	487177	SW-846 3510C	10	08/08/2012 20:00	KCB	487309

CAS#	Parameter	Result	RDL	MDL	Units
67-72-1	Hexachloroethane	2.99U	100	2.99	ug/L
193-39-5	Indeno(1,2,3-cd)pyrene	1.57U	100	1.57	ug/L
78-59-1	**Isophorone**	**11.2J**	**100**	**3.80**	**ug/L**
98-95-3	Nitrobenzene	3.29U	100	3.29	ug/L
87-86-5	Pentachlorophenol	1.68U	500	1.68	ug/L
85-01-8	Phenanthrene	3.04U	100	3.04	ug/L
108-95-2	**Phenol**	**117**	**100**	**1.50**	**ug/L**
129-00-0	Pyrene	4.86U	100	4.86	ug/L
110-86-1	**Pyridine**	**84.5J**	**100**	**35.8**	**ug/L**
1319-77-3MP	**m,p-Cresol**	**361**	**100**	**3.52**	**ug/L**
621-64-7	n-Nitrosodi-n-propylamine	3.04U	100	3.04	ug/L
62-75-9	n-Nitrosodimethylamine	3.04U	100	3.04	ug/L
86-30-6	n-Nitrosodiphenylamine	3.64U	100	3.64	ug/L
95-48-7	**o-Cresol**	**27.2J**	**100**	**3.29**	**ug/L**

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	50	Diluted Out	ug/L	**0***	52 - 120
321-60-8	2-Fluorobiphenyl	50	Diluted Out	ug/L	**0***	16 - 128
1718-51-0	Terphenyl-d14	50	Diluted Out	ug/L	**0***	43 - 138
4165-62-2	Phenol-d5	100	Diluted Out	ug/L	**0***	10 - 120
367-12-4	2-Fluorophenol	100	Diluted Out	ug/L	**0***	10 - 120
118-79-6	2,4,6-Tribromophenol	100	Diluted Out	ug/L	**0***	52 - 121

SW-846 6010B SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/07/2012 13:00	487186	SW-846 3010A	10	08/09/2012 16:35	BNB	487362

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	**Aluminum**	**12.3**	**2.00**	**0.24**	**mg/L**
7440-36-0	Antimony	0.040U	0.60	0.040	mg/L
7440-38-2	**Arsenic**	**0.65**	**0.10**	**0.035**	**mg/L**
7440-39-3	**Barium**	**0.025J**	**0.10**	**0.016**	**mg/L**
7440-41-7	Beryllium	0.00082U	0.050	0.00082	mg/L
7440-43-9	Cadmium	0.0010U	0.050	0.0010	mg/L
7440-70-2	**Calcium**	**3.88**	**0.51**	**0.24**	**mg/L**
7440-47-3	**Chromium**	**217**	**0.10**	**0.0034**	**mg/L**
7440-48-4	**Cobalt**	**1.23**	**0.10**	**0.0052**	**mg/L**
7440-50-8	**Copper**	**1.35**	**0.10**	**0.017**	**mg/L**
7439-89-6	**Iron**	**749**	**0.50**	**0.27**	**mg/L**
7439-92-1	**Lead**	**0.54**	**0.15**	**0.028**	**mg/L**
7439-95-4	**Magnesium**	**1.10**	**0.50**	**0.12**	**mg/L**
7439-96-5	**Manganese**	**17.4**	**0.15**	**0.0083**	**mg/L**
7440-02-0	**Nickel**	**122**	**0.40**	**0.0084**	**mg/L**
7440-09-7	**Potassium**	**5.20**	**5.00**	**0.41**	**mg/L**
7782-49-2	**Selenium**	**0.060J**	**0.40**	**0.038**	**mg/L**
7440-22-4	Silver	0.0064U	0.10	0.0064	mg/L
7440-23-5	**Sodium**	**162**	**10.0**	**0.56**	**mg/L**
7440-28-0	Thallium	0.026U	0.20	0.026	mg/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033004	**HC 100 (SPLP)**	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 6010B SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/07/2012 13:00	487186	SW-846 3010A	10	08/09/2012 16:35	BNB	487362

CAS#	Parameter	Result	RDL	MDL	Units
7440-62-2	**Vanadium**	**0.67**	**0.20**	**0.012**	**mg/L**
7440-66-6	**Zinc**	**0.27**	**0.20**	**0.059**	**mg/L**

SW-846 1312/7471A SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/07/2012 13:00	487187	SW-846 1312/7470A	1	08/09/2012 12:26	BNB	487255

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	**Mercury**	**0.00018J**	**0.00020**	**0.000075**	**mg/L**

RESULTS REPORTED ON A WET WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033005	**VR 100 A**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20000	08/05/2012 19:24	CEK	487041

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	2820U	104000	2820	ug/Kg
71-55-6	1,1,1-Trichloroethane	4950U	104000	4950	ug/Kg
79-34-5	1,1,2,2-Tetrachloroethane	2380U	104000	2380	ug/Kg
79-00-5	1,1,2-Trichloroethane	2800U	104000	2800	ug/Kg
75-34-3	1,1-Dichloroethane	3110U	104000	3110	ug/Kg
75-35-4	1,1-Dichloroethene	4840U	104000	4840	ug/Kg
563-58-6	1,1-Dichloropropene	5090U	104000	5090	ug/Kg
96-18-4	1,2,3-Trichloropropane	2400U	104000	2400	ug/Kg
120-82-1	1,2,4-Trichlorobenzene	7410U	104000	7410	ug/Kg
95-63-6	**1,2,4-Trimethylbenzene**	**136000**	**104000**	**7510**	**ug/Kg**
96-12-8	1,2-Dibromo-3-chloropropane	8370U	104000	8370	ug/Kg
106-93-4	1,2-Dibromoethane	3010U	104000	3010	ug/Kg
95-50-1	**1,2-Dichlorobenzene**	**972000**	**104000**	**5760**	**ug/Kg**
107-06-2	1,2-Dichloroethane	4130U	104000	4130	ug/Kg
540-59-0	1,2-Dichloroethene(Total)	4880U	209000	4880	ug/Kg
78-87-5	1,2-Dichloropropane	3210U	104000	3210	ug/Kg
108-67-8	**1,3,5-Trimethylbenzene**	**82700J**	**104000**	**7850**	**ug/Kg**
541-73-1	1,3-Dichlorobenzene	5430U	104000	5430	ug/Kg
142-28-9	1,3-Dichloropropane	3300U	104000	3300	ug/Kg
106-46-7	**1,4-Dichlorobenzene**	**77200J**	**104000**	**4820**	**ug/Kg**
594-20-7	2,2-Dichloropropane	5200U	104000	5200	ug/Kg
78-93-3	2-Butanone	10800U	104000	10800	ug/Kg
95-49-8	2-Chlorotoluene	4570U	104000	4570	ug/Kg
591-78-6	2-Hexanone	9040U	104000	9040	ug/Kg
106-43-4	4-Chlorotoluene	4900U	104000	4900	ug/Kg
99-87-6	**4-Isopropyltoluene**	**55700J**	**104000**	**4380**	**ug/Kg**
108-10-1	4-Methyl-2-pentanone	2750U	104000	2750	ug/Kg
67-64-1	Acetone	21500U	522000	21500	ug/Kg
71-43-2	**Benzene**	**30300J**	**104000**	**3170**	**ug/Kg**
108-86-1	Bromobenzene	3260U	104000	3260	ug/Kg
74-97-5	Bromochloromethane	2820U	104000	2820	ug/Kg
75-27-4	Bromodichloromethane	3380U	104000	3380	ug/Kg
75-25-2	Bromoform	3320U	104000	3320	ug/Kg
74-83-9	Bromomethane	6320U	104000	6320	ug/Kg
75-15-0	Carbon disulfide	6780U	104000	6780	ug/Kg
56-23-5	Carbon tetrachloride	4220U	104000	4220	ug/Kg
108-90-7	Chlorobenzene	3110U	104000	3110	ug/Kg
75-00-3	Chloroethane	6910U	104000	6910	ug/Kg
67-66-3	Chloroform	4490U	104000	4490	ug/Kg
74-87-3	Chloromethane	4950U	104000	4950	ug/Kg
124-48-1	Dibromochloromethane	4550U	104000	4550	ug/Kg
74-95-3	Dibromomethane	4820U	104000	4820	ug/Kg
75-71-8	Dichlorodifluoromethane	4670U	104000	4670	ug/Kg
100-41-4	Ethylbenzene	3820U	104000	3820	ug/Kg
87-68-3	Hexachlorobutadiene	4470U	104000	4470	ug/Kg
98-82-8	**Isopropylbenzene (Cumene)**	**75800J**	**104000**	**3860**	**ug/Kg**
74-88-4	Methyl iodide	25700U	104000	25700	ug/Kg
75-09-2	Methylene chloride	9220U	209000	9220	ug/Kg
91-20-3	**Naphthalene**	**2240000**	**104000**	**6700**	**ug/Kg**
100-42-5	Styrene	3210U	104000	3210	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033005	**VR 100 A**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20000	08/05/2012 19:24	CEK	487041

CAS#	Parameter	Result	RDL	MDL	Units
127-18-4	Tetrachloroethene	6180U	104000	6180	ug/Kg
110-02-1	Thiophene	ND			ug/Kg
108-88-3	**Toluene**	**148000**	**104000**	**3230**	**ug/Kg**
79-01-6	Trichloroethene	4450U	104000	4450	ug/Kg
75-69-4	Trichlorofluoromethane	5450U	104000	5450	ug/Kg
76-13-1	Trichlorotrifluoroethane	4170U	104000	4170	ug/Kg
108-05-4	Vinyl acetate	2940U	104000	2940	ug/Kg
75-01-4	Vinyl chloride	5680U	104000	5680	ug/Kg
1330-20-7	**Xylene (total)**	**254000**	**209000**	**8370**	**ug/Kg**
156-59-2	cis-1,2-Dichloroethene	3090U	104000	3090	ug/Kg
10061-01-5	cis-1,3-Dichloropropene	3860U	104000	3860	ug/Kg
136777-61-2	**m,p-Xylene**	**169000**	**104000**	**6140**	**ug/Kg**
104-51-8	n-Butylbenzene	4860U	104000	4860	ug/Kg
103-65-1	n-Propylbenzene	15400U	104000	15400	ug/Kg
95-47-6	**o-Xylene**	**86100J**	**104000**	**2820**	**ug/Kg**
135-98-8	**sec-Butylbenzene**	**109000**	**104000**	**4110**	**ug/Kg**
1634-04-4	tert-Butyl methyl ether (MTBE)	2550U	104000	2550	ug/Kg
98-06-6	tert-Butylbenzene	5340U	104000	5340	ug/Kg
156-60-5	trans-1,2-Dichloroethene	2730U	104000	2730	ug/Kg
10061-02-6	trans-1,3-Dichloropropene	3550U	104000	3550	ug/Kg
110-57-6	trans-1,4-Dichloro-2-butene	10800U	104000	10800	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	960000	957000	ug/Kg	100	62 - 127
1868-53-7	Dibromofluoromethane	960000	945000	ug/Kg	98	65 - 130
2037-26-5	Toluene d8	960000	1000000	ug/Kg	104	71 - 132
17060-07-0	1,2-Dichloroethane-d4	960000	944000	ug/Kg	98	62 - 125

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20000	08/05/2012 19:24	CEK	487521

CAS#	Parameter	Result	Retention	Units
496-11-7	**Indane**	**60500**	**10.20**	**ug/Kg**
17965-80-9	**1,5-Naphthyridin-2-amine**	**27500**	**11.40**	**ug/Kg**
827-52-1	**Benzene, cyclohexyl-**	**84400**	**12.30**	**ug/Kg**

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/06/2012 06:10	487057	3550C	5	08/06/2012 17:08	JEW	487108

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	2020U	53800	2020	ug/Kg
122-66-7	1,2Diphenylhydrazine/Azobenzen	1220U	53800	1220	ug/Kg
95-95-4	2,4,5-Trichlorophenol	2720U	53800	2720	ug/Kg
88-06-2	2,4,6-Trichlorophenol	21900U	53800	21900	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033005	**VR 100 A**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/06/2012 06:10	487057	3550C	5	08/06/2012 17:08	JEW	487108

CAS#	Parameter	Result	RDL	MDL	Units
120-83-2	2,4-Dichlorophenol	4450U	53800	4450	ug/Kg
105-67-9	2,4-Dimethylphenol	24700U	53800	24700	ug/Kg
51-28-5	2,4-Dinitrophenol	22900U	53800	22900	ug/Kg
121-14-2	2,4-Dinitrotoluene	6170U	53800	6170	ug/Kg
606-20-2	2,6-Dinitrotoluene	5320U	53800	5320	ug/Kg
91-58-7	2-Chloronaphthalene	689U	53800	689	ug/Kg
95-57-8	2-Chlorophenol	2210U	53800	2210	ug/Kg
91-57-6	**2-Methylnaphthalene**	**108000**	**53800**	**1700**	**ug/Kg**
88-74-4	2-Nitroaniline	2960U	269000	2960	ug/Kg
88-75-5	2-Nitrophenol	3660U	53800	3660	ug/Kg
91-94-1	3,3'-Dichlorobenzidine	18300U	108000	18300	ug/Kg
99-09-2	3-Nitroaniline	3870U	269000	3870	ug/Kg
534-52-1	4,6-Dinitro-2-methylphenol	24100U	269000	24100	ug/Kg
101-55-3	4-Bromophenyl phenyl ether	4040U	53800	4040	ug/Kg
59-50-7	4-Chloro-3-methylphenol	5740U	53800	5740	ug/Kg
106-47-8	4-Chloroaniline	4530U	53800	4530	ug/Kg
7005-72-3	4-Chlorophenyl phenyl ether	4360U	53800	4360	ug/Kg
100-01-6	4-Nitroaniline	35800U	269000	35800	ug/Kg
100-02-7	4-Nitrophenol	34800U	269000	34800	ug/Kg
83-32-9	**Acenaphthene**	**16700J**	**53800**	**1410**	**ug/Kg**
208-96-8	Acenaphthylene	1640U	53800	1640	ug/Kg
62-53-3	**Aniline**	**11100J**	**53800**	**4540**	**ug/Kg**
120-12-7	Anthracene	1340U	53800	1340	ug/Kg
56-55-3	Benzo(a)anthracene	4760U	53800	4760	ug/Kg
50-32-8	Benzo(a)pyrene	1440U	53800	1440	ug/Kg
205-99-2	Benzo(b)fluoranthene	8260U	53800	8260	ug/Kg
191-24-2	Benzo(g,h,i)perylene	1820U	53800	1820	ug/Kg
207-08-9	Benzo(k)fluoranthene	1240U	53800	1240	ug/Kg
100-51-6	Benzyl alcohol	5970U	53800	5970	ug/Kg
111-91-1	Bis(2-Chloroethoxy)methane	3050U	53800	3050	ug/Kg
111-44-4	Bis(2-Chloroethyl)ether	4550U	53800	4550	ug/Kg
108-60-1	Bis(2-Chloroisopropyl)ether	4250U	53800	4250	ug/Kg
117-81-7	Bis(2-Ethylhexyl)phthalate	2690U	53800	2690	ug/Kg
85-68-7	Butyl benzyl phthalate	1450U	53800	1450	ug/Kg
86-74-8	Carbazole	3720U	53800	3720	ug/Kg
218-01-9	Chrysene	1500U	53800	1500	ug/Kg
84-74-2	Di-n-butyl phthalate	1710U	53800	1710	ug/Kg
117-84-0	Di-n-octyl phthalate	1770U	53800	1770	ug/Kg
53-70-3	Dibenz(a,h)anthracene	1570U	53800	1570	ug/Kg
132-64-9	Dibenzofuran	837U	53800	837	ug/Kg
84-66-2	Diethyl phthalate	2180U	53800	2180	ug/Kg
131-11-3	Dimethyl phthalate	908U	53800	908	ug/Kg
206-44-0	Fluoranthene	1050U	53800	1050	ug/Kg
86-73-7	**Fluorene**	**436000**	**53800**	**1730**	**ug/Kg**
118-74-1	Hexachlorobenzene	6710U	53800	6710	ug/Kg
87-68-3	Hexachlorobutadiene	3220U	53800	3220	ug/Kg
77-47-4	Hexachlorocyclopentadiene	26700U	53800	26700	ug/Kg
67-72-1	Hexachloroethane	1960U	53800	1960	ug/Kg
193-39-5	Indeno(1,2,3-cd)pyrene	3310U	53800	3310	ug/Kg
78-59-1	Isophorone	2300U	53800	2300	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033005	**VR 100 A**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/06/2012 06:10	487057	3550C	5	08/06/2012 17:08	JEW	487108

CAS#	Parameter	Result	RDL	MDL	Units
98-95-3	Nitrobenzene	1930U	53800	1930	ug/Kg
87-86-5	Pentachlorophenol	30400U	269000	30400	ug/Kg
85-01-8	Phenanthrene	1430U	53800	1430	ug/Kg
108-95-2	Phenol	5430U	53800	5430	ug/Kg
129-00-0	Pyrene	1240U	53800	1240	ug/Kg
110-86-1	Pyridine	26400U	53800	26400	ug/Kg
1319-77-3MP	m,p-Cresol	6340U	53800	6340	ug/Kg
621-64-7	n-Nitrosodi-n-propylamine	1990U	53800	1990	ug/Kg
62-75-9	n-Nitrosodimethylamine	9940U	53800	9940	ug/Kg
86-30-6	n-Nitrosodiphenylamine	1240U	53800	1240	ug/Kg
95-48-7	o-Cresol	1940U	53800	1940	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	5000	Diluted Out	ug/Kg	**0***	46 - 123
321-60-8	2-Fluorobiphenyl	5000	Diluted Out	ug/Kg	**0***	47 - 127
1718-51-0	Terphenyl-d14	5000	Diluted Out	ug/Kg	**0***	38 - 167
4165-62-2	Phenol-d5	10000	Diluted Out	ug/Kg	**0***	43 - 123
367-12-4	2-Fluorophenol	10000	Diluted Out	ug/Kg	**0***	51 - 119
118-79-6	2,4,6-Tribromophenol	10000	Diluted Out	ug/Kg	**0***	44 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			5	08/06/2012 17:08	JEW	487173

CAS#	Parameter	Result	Retention	Units
700-88-9	**Benzene, cyclopentyl-**	**22400**	**3.07**	**ug/Kg**
132-32-1	**9H-Carbazol-3-amine, 9-ethyl-**	**1190000**	**4.56**	**ug/Kg**
	Unknown	**205000**	**4.64**	**ug/Kg**
26137-53-1	**Naphthalene, 1,2,3-trimethyl-4-prop**	**178000**	**4.74**	**ug/Kg**
	Unknown	**115000**	**4.84**	**ug/Kg**
	Unknown	**68800**	**4.99**	**ug/Kg**
5956-09-2	**2H-3,9a-Methano-1-benzoxepin, octah**	**154000**	**5.05**	**ug/Kg**
10544-50-0	**Sulfur, mol. (S8)**	**116000**	**5.70**	**ug/Kg**
0-00-0	**2-Fluoro-4-piperidinopyrimidine**	**121000**	**6.29**	**ug/Kg**
4309-66-4	**Stilbene, 4-amino- (E)-**	**89000**	**6.38**	**ug/Kg**
	Unknown	**112000**	**7.01**	**ug/Kg**
	Unknown	**24500**	**3.20**	**ug/Kg**
	Unknown	**161000**	**7.16**	**ug/Kg**
2132-84-5	**Benzene, (1-methylhexyl)-**	**33700**	**3.31**	**ug/Kg**
827-52-1	**Benzene, cyclohexyl-**	**39000**	**3.43**	**ug/Kg**
933-98-2	**Benzene, 1-ethyl-2,3-dimethyl-**	**69500**	**3.65**	**ug/Kg**
101-81-5	**Diphenylmethane**	**62800**	**3.81**	**ug/Kg**
713-36-0	**Benzene, 1-methyl-2-(phenylmethyl)-**	**38400**	**4.12**	**ug/Kg**
605-39-0	**2,2'-Dimethylbiphenyl**	**48100**	**4.15**	**ug/Kg**
	Unknown	**77200**	**4.26**	**ug/Kg**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033005	**VR 100 A**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 7471B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/03/2012 16:00	486993	SW-846 7471B	1	08/05/2012 14:14	BNB	487022

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	**Mercury**	**0.33**	**0.013**	**0.0060**	**mg/kg**

SW-846 6010B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/03/2012 16:00	486992	SW-846 3050B	1	08/06/2012 15:26	BNB	487110

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	**Aluminum**	**4330**	**8.70**	**0.86**	**mg/kg**
7440-36-0	**Antimony**	**0.45J**	**2.61**	**0.11**	**mg/kg**
7440-38-2	Arsenic	0.15U	1.74	0.15	mg/kg
7440-39-3	**Barium**	**7.17**	**0.43**	**0.026**	**mg/kg**
7440-41-7	**Beryllium**	**0.0069J**	**0.22**	**0.0022**	**mg/kg**
7440-43-9	Cadmium	0.0098U	0.22	0.0098	mg/kg
7440-70-2	**Calcium**	**152**	**32.6**	**4.75**	**mg/kg**
7440-47-3	**Chromium**	**5.17**	**0.43**	**0.020**	**mg/kg**
7440-48-4	**Cobalt**	**0.47**	**0.43**	**0.011**	**mg/kg**
7440-50-8	**Copper**	**314**	**0.43**	**0.034**	**mg/kg**
7439-89-6	**Iron**	**4110**	**4.35**	**0.76**	**mg/kg**
7439-92-1	**Lead**	**59.2**	**0.65**	**0.12**	**mg/kg**
7439-95-4	**Magnesium**	**59.2**	**4.35**	**0.47**	**mg/kg**
7439-96-5	**Manganese**	**54.9**	**0.65**	**0.015**	**mg/kg**
7440-02-0	**Nickel**	**12.0**	**1.74**	**0.023**	**mg/kg**
7440-09-7	**Potassium**	**82.3**	**21.7**	**2.29**	**mg/kg**
7782-49-2	**Selenium**	**12.1**	**1.74**	**0.14**	**mg/kg**
7440-22-4	**Silver**	**0.043J**	**0.43**	**0.024**	**mg/kg**
7440-23-5	**Sodium**	**3470**	**43.5**	**3.30**	**mg/kg**
7440-28-0	**Thallium**	**0.69J**	**0.87**	**0.096**	**mg/kg**
7440-62-2	**Vanadium**	**1.06**	**0.87**	**0.016**	**mg/kg**
7440-66-6	**Zinc**	**8.91**	**0.87**	**0.46**	**mg/kg**

SW-846 9045C pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	08/07/2012 13:00	OLT	487010

CAS#	Parameter	Result	RDL	MDL	Units
pH	**pH**	**3.97**	**1.00**	**1.00**	**pH unit**

RESULTS REPORTED ON A DRY WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033006	**VR 100 B**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20000	08/05/2012 19:43	CEK	487041

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	2540U	94200	2540	ug/Kg
71-55-6	1,1,1-Trichloroethane	4460U	94200	4460	ug/Kg
79-34-5	1,1,2,2-Tetrachloroethane	2150U	94200	2150	ug/Kg
79-00-5	1,1,2-Trichloroethane	2520U	94200	2520	ug/Kg
75-34-3	1,1-Dichloroethane	2810U	94200	2810	ug/Kg
75-35-4	1,1-Dichloroethene	4370U	94200	4370	ug/Kg
563-58-6	1,1-Dichloropropene	4600U	94200	4600	ug/Kg
96-18-4	1,2,3-Trichloropropane	2170U	94200	2170	ug/Kg
120-82-1	1,2,4-Trichlorobenzene	6690U	94200	6690	ug/Kg
95-63-6	**1,2,4-Trimethylbenzene**	**143000**	**94200**	**6780**	**ug/Kg**
96-12-8	1,2-Dibromo-3-chloropropane	7550U	94200	7550	ug/Kg
106-93-4	1,2-Dibromoethane	2710U	94200	2710	ug/Kg
95-50-1	**1,2-Dichlorobenzene**	**1040000**	**94200**	**5200**	**ug/Kg**
107-06-2	1,2-Dichloroethane	3730U	94200	3730	ug/Kg
540-59-0	1,2-Dichloroethene(Total)	4410U	188000	4410	ug/Kg
78-87-5	1,2-Dichloropropane	2900U	94200	2900	ug/Kg
108-67-8	**1,3,5-Trimethylbenzene**	**84300J**	**94200**	**7080**	**ug/Kg**
541-73-1	1,3-Dichlorobenzene	4900U	94200	4900	ug/Kg
142-28-9	1,3-Dichloropropane	2980U	94200	2980	ug/Kg
106-46-7	**1,4-Dichlorobenzene**	**83000J**	**94200**	**4350**	**ug/Kg**
594-20-7	2,2-Dichloropropane	4690U	94200	4690	ug/Kg
78-93-3	2-Butanone	9760U	94200	9760	ug/Kg
95-49-8	2-Chlorotoluene	4130U	94200	4130	ug/Kg
591-78-6	2-Hexanone	8160U	94200	8160	ug/Kg
106-43-4	4-Chlorotoluene	4430U	94200	4430	ug/Kg
99-87-6	**4-Isopropyltoluene**	**54400J**	**94200**	**3960**	**ug/Kg**
108-10-1	4-Methyl-2-pentanone	2490U	94200	2490	ug/Kg
67-64-1	Acetone	19400U	471000	19400	ug/Kg
71-43-2	**Benzene**	**31500J**	**94200**	**2860**	**ug/Kg**
108-86-1	Bromobenzene	2940U	94200	2940	ug/Kg
74-97-5	Bromochloromethane	2540U	94200	2540	ug/Kg
75-27-4	Bromodichloromethane	3050U	94200	3050	ug/Kg
75-25-2	Bromoform	3000U	94200	3000	ug/Kg
74-83-9	Bromomethane	5710U	94200	5710	ug/Kg
75-15-0	Carbon disulfide	6120U	94200	6120	ug/Kg
56-23-5	Carbon tetrachloride	3810U	94200	3810	ug/Kg
108-90-7	Chlorobenzene	2810U	94200	2810	ug/Kg
75-00-3	Chloroethane	6240U	94200	6240	ug/Kg
67-66-3	Chloroform	4050U	94200	4050	ug/Kg
74-87-3	Chloromethane	4460U	94200	4460	ug/Kg
124-48-1	Dibromochloromethane	4110U	94200	4110	ug/Kg
74-95-3	Dibromomethane	4350U	94200	4350	ug/Kg
75-71-8	Dichlorodifluoromethane	4220U	94200	4220	ug/Kg
100-41-4	Ethylbenzene	3450U	94200	3450	ug/Kg
87-68-3	Hexachlorobutadiene	4030U	94200	4030	ug/Kg
98-82-8	**Isopropylbenzene (Cumene)**	**78000J**	**94200**	**3490**	**ug/Kg**
74-88-4	Methyl iodide	23200U	94200	23200	ug/Kg
75-09-2	Methylene chloride	8330U	188000	8330	ug/Kg
91-20-3	**Naphthalene**	**2510000**	**94200**	**6050**	**ug/Kg**
100-42-5	Styrene	2900U	94200	2900	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033006	**VR 100 B**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20000	08/05/2012 19:43	CEK	487041

CAS#	Parameter	Result	RDL	MDL	Units
127-18-4	Tetrachloroethene	5580U	94200	5580	ug/Kg
110-02-1	Thiophene	ND			ug/Kg
108-88-3	**Toluene**	**163000**	**94200**	**2920**	**ug/Kg**
79-01-6	Trichloroethene	4010U	94200	4010	ug/Kg
75-69-4	Trichlorofluoromethane	4920U	94200	4920	ug/Kg
76-13-1	Trichlorotrifluoroethane	3770U	94200	3770	ug/Kg
108-05-4	Vinyl acetate	2660U	94200	2660	ug/Kg
75-01-4	Vinyl chloride	5120U	94200	5120	ug/Kg
1330-20-7	**Xylene (total)**	**259000**	**188000**	**7550**	**ug/Kg**
156-59-2	cis-1,2-Dichloroethene	2790U	94200	2790	ug/Kg
10061-01-5	cis-1,3-Dichloropropene	3490U	94200	3490	ug/Kg
136777-61-2	**m,p-Xylene**	**172000**	**94200**	**5540**	**ug/Kg**
104-51-8	n-Butylbenzene	4390U	94200	4390	ug/Kg
103-65-1	n-Propylbenzene	13900U	94200	13900	ug/Kg
95-47-6	**o-Xylene**	**85500J**	**94200**	**2540**	**ug/Kg**
135-98-8	**sec-Butylbenzene**	**114000**	**94200**	**3710**	**ug/Kg**
1634-04-4	tert-Butyl methyl ether (MTBE)	2300U	94200	2300	ug/Kg
98-06-6	tert-Butylbenzene	4820U	94200	4820	ug/Kg
156-60-5	trans-1,2-Dichloroethene	2470U	94200	2470	ug/Kg
10061-02-6	trans-1,3-Dichloropropene	3200U	94200	3200	ug/Kg
110-57-6	trans-1,4-Dichloro-2-butene	9760U	94200	9760	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	874000	884000	ug/Kg	101	62 - 127
1868-53-7	Dibromofluoromethane	874000	873000	ug/Kg	100	65 - 130
2037-26-5	Toluene d8	874000	925000	ug/Kg	106	71 - 132
17060-07-0	1,2-Dichloroethane-d4	874000	896000	ug/Kg	103	62 - 125

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20000	08/05/2012 19:43	CEK	487521

CAS#	Parameter	Result	Retention	Units
496-11-7	**Indane**	**68600**	**10.20**	**ug/Kg**
1075-38-3	**Benzene, 1-(1,1-dimethylethyl)-3-me**	**47200**	**10.50**	**ug/Kg**
2132-84-5	**Benzene, (1-methylhexyl)-**	**103000**	**11.90**	**ug/Kg**
827-52-1	**Benzene, cyclohexyl-**	**96300**	**12.30**	**ug/Kg**

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/06/2012 06:10	487057	3550C	5	08/06/2012 17:22	JEW	487108

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	2000U	53300	2000	ug/Kg
122-66-7	1,2Diphenylhydrazine/Azobenzen	1210U	53300	1210	ug/Kg
95-95-4	2,4,5-Trichlorophenol	2700U	53300	2700	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033006	**VR 100 B**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/06/2012 06:10	487057	3550C	5	08/06/2012 17:22	JEW	487108

CAS#	Parameter	Result	RDL	MDL	Units
88-06-2	2,4,6-Trichlorophenol	21700U	53300	21700	ug/Kg
120-83-2	2,4-Dichlorophenol	4410U	53300	4410	ug/Kg
105-67-9	2,4-Dimethylphenol	24500U	53300	24500	ug/Kg
51-28-5	2,4-Dinitrophenol	22700U	53300	22700	ug/Kg
121-14-2	**2,4-Dinitrotoluene**	**99400**	**53300**	**6110**	**ug/Kg**
606-20-2	2,6-Dinitrotoluene	5270U	53300	5270	ug/Kg
91-58-7	2-Chloronaphthalene	683U	53300	683	ug/Kg
95-57-8	2-Chlorophenol	2190U	53300	2190	ug/Kg
91-57-6	**2-Methylnaphthalene**	**52600J**	**53300**	**1690**	**ug/Kg**
88-74-4	2-Nitroaniline	2930U	267000	2930	ug/Kg
88-75-5	2-Nitrophenol	3630U	53300	3630	ug/Kg
91-94-1	3,3'-Dichlorobenzidine	18100U	107000	18100	ug/Kg
99-09-2	3-Nitroaniline	3830U	267000	3830	ug/Kg
534-52-1	4,6-Dinitro-2-methylphenol	23900U	267000	23900	ug/Kg
101-55-3	4-Bromophenyl phenyl ether	4010U	53300	4010	ug/Kg
59-50-7	4-Chloro-3-methylphenol	5690U	53300	5690	ug/Kg
106-47-8	4-Chloroaniline	4490U	53300	4490	ug/Kg
7005-72-3	4-Chlorophenyl phenyl ether	4320U	53300	4320	ug/Kg
100-01-6	4-Nitroaniline	35500U	267000	35500	ug/Kg
100-02-7	4-Nitrophenol	34500U	267000	34500	ug/Kg
83-32-9	**Acenaphthene**	**9390J**	**53300**	**1400**	**ug/Kg**
208-96-8	Acenaphthylene	1630U	53300	1630	ug/Kg
62-53-3	**Aniline**	**4800J**	**53300**	**4500**	**ug/Kg**
120-12-7	Anthracene	1330U	53300	1330	ug/Kg
56-55-3	Benzo(a)anthracene	4720U	53300	4720	ug/Kg
50-32-8	Benzo(a)pyrene	1430U	53300	1430	ug/Kg
205-99-2	Benzo(b)fluoranthene	8190U	53300	8190	ug/Kg
191-24-2	Benzo(g,h,i)perylene	1810U	53300	1810	ug/Kg
207-08-9	Benzo(k)fluoranthene	1230U	53300	1230	ug/Kg
100-51-6	Benzyl alcohol	5910U	53300	5910	ug/Kg
111-91-1	Bis(2-Chloroethoxy)methane	3020U	53300	3020	ug/Kg
111-44-4	Bis(2-Chloroethyl)ether	4510U	53300	4510	ug/Kg
108-60-1	Bis(2-Chloroisopropyl)ether	4210U	53300	4210	ug/Kg
117-81-7	Bis(2-Ethylhexyl)phthalate	2660U	53300	2660	ug/Kg
85-68-7	Butyl benzyl phthalate	1430U	53300	1430	ug/Kg
86-74-8	Carbazole	3680U	53300	3680	ug/Kg
218-01-9	Chrysene	1490U	53300	1490	ug/Kg
84-74-2	Di-n-butyl phthalate	1690U	53300	1690	ug/Kg
117-84-0	Di-n-octyl phthalate	1750U	53300	1750	ug/Kg
53-70-3	Dibenz(a,h)anthracene	1560U	53300	1560	ug/Kg
132-64-9	Dibenzofuran	830U	53300	830	ug/Kg
84-66-2	Diethyl phthalate	2160U	53300	2160	ug/Kg
131-11-3	Dimethyl phthalate	900U	53300	900	ug/Kg
206-44-0	Fluoranthene	1040U	53300	1040	ug/Kg
86-73-7	**Fluorene**	**221000**	**53300**	**1720**	**ug/Kg**
118-74-1	Hexachlorobenzene	6650U	53300	6650	ug/Kg
87-68-3	Hexachlorobutadiene	3190U	53300	3190	ug/Kg
77-47-4	Hexachlorocyclopentadiene	26500U	53300	26500	ug/Kg
67-72-1	Hexachloroethane	1950U	53300	1950	ug/Kg
193-39-5	Indeno(1,2,3-cd)pyrene	3280U	53300	3280	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033006	**VR 100 B**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/06/2012 06:10	487057	3550C	5	08/06/2012 17:22	JEW	487108

CAS#	Parameter	Result	RDL	MDL	Units
78-59-1	Isophorone	2280U	53300	2280	ug/Kg
98-95-3	Nitrobenzene	1910U	53300	1910	ug/Kg
87-86-5	Pentachlorophenol	30100U	267000	30100	ug/Kg
85-01-8	Phenanthrene	1410U	53300	1410	ug/Kg
108-95-2	Phenol	5380U	53300	5380	ug/Kg
129-00-0	Pyrene	1230U	53300	1230	ug/Kg
110-86-1	Pyridine	26200U	53300	26200	ug/Kg
1319-77-3MP	m,p-Cresol	6280U	53300	6280	ug/Kg
621-64-7	n-Nitrosodi-n-propylamine	1970U	53300	1970	ug/Kg
62-75-9	n-Nitrosodimethylamine	9850U	53300	9850	ug/Kg
86-30-6	n-Nitrosodiphenylamine	1230U	53300	1230	ug/Kg
95-48-7	o-Cresol	1920U	53300	1920	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	5000	Diluted Out	ug/Kg	**0***	46 - 123
321-60-8	2-Fluorobiphenyl	5000	Diluted Out	ug/Kg	**0***	47 - 127
1718-51-0	Terphenyl-d14	5000	Diluted Out	ug/Kg	**0***	38 - 167
4165-62-2	Phenol-d5	10000	Diluted Out	ug/Kg	**0***	43 - 123
367-12-4	2-Fluorophenol	10000	Diluted Out	ug/Kg	**0***	51 - 119
118-79-6	2,4,6-Tribromophenol	10000	Diluted Out	ug/Kg	**0***	44 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			5	08/06/2012 17:22	JEW	487173

CAS#	Parameter	Result	Retention	Units
700-88-9	**Benzene, cyclopentyl-**	**17800**	**3.07**	**ug/Kg**
26137-53-1	**Naphthalene, 1,2,3-trimethyl-4-prop**	**892000**	**4.55**	**ug/Kg**
	Unknown	**142000**	**4.64**	**ug/Kg**
13688-68-1	**9,9-Dimethyl-9-silafluorene**	**123000**	**4.74**	**ug/Kg**
	Unknown	**72300**	**4.84**	**ug/Kg**
	Unknown	**52000**	**4.99**	**ug/Kg**
74150-88-2	**N-Cyano-N',N',N'',N''-tetramethyl-1**	**108000**	**5.05**	**ug/Kg**
7704-34-9	**Sulfur**	**82100**	**5.70**	**ug/Kg**
74421-26-4	**Benzeneethanol, .beta.-methyl-.beta**	**73100**	**6.29**	**ug/Kg**
4309-66-4	**Stilbene, 4-amino- (E)-**	**53500**	**6.38**	**ug/Kg**
	Unknown	**86600**	**7.02**	**ug/Kg**
	Unknown	**23900**	**3.20**	**ug/Kg**
	Unknown	**80100**	**7.16**	**ug/Kg**
2132-84-5	**Benzene, (1-methylhexyl)-**	**30700**	**3.31**	**ug/Kg**
827-52-1	**Benzene, cyclohexyl-**	**35900**	**3.43**	**ug/Kg**
768-19-4	**[1,2,4]Triazolo[1,5-a]pyridine, 2-m**	**54700**	**3.54**	**ug/Kg**
1667-04-5	**Benzene, 2-chloro-1,3,5-trimethyl-**	**60600**	**3.65**	**ug/Kg**
101-81-5	**Diphenylmethane**	**52300**	**3.81**	**ug/Kg**
605-39-0	**2,2'-Dimethylbiphenyl**	**38900**	**4.15**	**ug/Kg**
778-22-3	**Benzene, 1,1'-(1-methylethylidene)b**	**62400**	**4.26**	**ug/Kg**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033006	**VR 100 B**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 7471B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/03/2012 16:00	486993	SW-846 7471B	1	08/05/2012 14:15	BNB	487022

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	**Mercury**	**0.21**	**0.012**	**0.0054**	**mg/kg**

SW-846 6010B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/03/2012 16:00	486992	SW-846 3050B	1	08/06/2012 15:34	BNB	487110

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	**Aluminum**	**5550**	**8.62**	**0.85**	**mg/kg**
7440-36-0	Antimony	0.10U	2.59	0.10	mg/kg
7440-38-2	Arsenic	0.15U	1.72	0.15	mg/kg
7440-39-3	**Barium**	**9.94**	**0.43**	**0.026**	**mg/kg**
7440-41-7	**Beryllium**	**0.0094J**	**0.22**	**0.0022**	**mg/kg**
7440-43-9	Cadmium	0.0097U	0.22	0.0097	mg/kg
7440-70-2	**Calcium**	**220**	**32.3**	**4.71**	**mg/kg**
7440-47-3	**Chromium**	**9.22**	**0.43**	**0.019**	**mg/kg**
7440-48-4	**Cobalt**	**0.27J**	**0.43**	**0.011**	**mg/kg**
7440-50-8	**Copper**	**42.1**	**0.43**	**0.033**	**mg/kg**
7439-89-6	**Iron**	**3050**	**4.31**	**0.76**	**mg/kg**
7439-92-1	**Lead**	**76.9**	**0.65**	**0.12**	**mg/kg**
7439-95-4	**Magnesium**	**56.9**	**4.31**	**0.47**	**mg/kg**
7439-96-5	**Manganese**	**46.0**	**0.65**	**0.015**	**mg/kg**
7440-02-0	**Nickel**	**4.96**	**1.72**	**0.023**	**mg/kg**
7440-09-7	**Potassium**	**95.1**	**21.6**	**2.27**	**mg/kg**
7782-49-2	**Selenium**	**10.1**	**1.72**	**0.14**	**mg/kg**
7440-22-4	**Silver**	**0.048J**	**0.43**	**0.024**	**mg/kg**
7440-23-5	**Sodium**	**4070**	**43.1**	**3.27**	**mg/kg**
7440-28-0	**Thallium**	**0.42J**	**0.86**	**0.095**	**mg/kg**
7440-62-2	**Vanadium**	**1.48**	**0.86**	**0.016**	**mg/kg**
7440-66-6	**Zinc**	**6.75**	**0.86**	**0.46**	**mg/kg**

SW-846 9045C pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	08/07/2012 13:00	OLT	487010

CAS#	Parameter	Result	RDL	MDL	Units
pH	**pH**	**4.06**	**1.00**	**1.00**	**pH unit**

RESULTS REPORTED ON A DRY WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033007	**VR 100 C**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20000	08/05/2012 20:04	CEK	487041

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	2660U	98500	2660	ug/Kg
71-55-6	1,1,1-Trichloroethane	4670U	98500	4670	ug/Kg
79-34-5	1,1,2,2-Tetrachloroethane	2250U	98500	2250	ug/Kg
79-00-5	1,1,2-Trichloroethane	2640U	98500	2640	ug/Kg
75-34-3	1,1-Dichloroethane	2940U	98500	2940	ug/Kg
75-35-4	1,1-Dichloroethene	4570U	98500	4570	ug/Kg
563-58-6	1,1-Dichloropropene	4810U	98500	4810	ug/Kg
96-18-4	1,2,3-Trichloropropane	2270U	98500	2270	ug/Kg
120-82-1	1,2,4-Trichlorobenzene	7000U	98500	7000	ug/Kg
95-63-6	**1,2,4-Trimethylbenzene**	**133000**	**98500**	**7090**	**ug/Kg**
96-12-8	1,2-Dibromo-3-chloropropane	7900U	98500	7900	ug/Kg
106-93-4	1,2-Dibromoethane	2840U	98500	2840	ug/Kg
95-50-1	**1,2-Dichlorobenzene**	**971000**	**98500**	**5440**	**ug/Kg**
107-06-2	1,2-Dichloroethane	3900U	98500	3900	ug/Kg
540-59-0	1,2-Dichloroethene(Total)	4610U	197000	4610	ug/Kg
78-87-5	1,2-Dichloropropane	3030U	98500	3030	ug/Kg
108-67-8	**1,3,5-Trimethylbenzene**	**79000J**	**98500**	**7410**	**ug/Kg**
541-73-1	1,3-Dichlorobenzene	5120U	98500	5120	ug/Kg
142-28-9	1,3-Dichloropropane	3110U	98500	3110	ug/Kg
106-46-7	**1,4-Dichlorobenzene**	**80700J**	**98500**	**4550**	**ug/Kg**
594-20-7	2,2-Dichloropropane	4910U	98500	4910	ug/Kg
78-93-3	2-Butanone	10200U	98500	10200	ug/Kg
95-49-8	2-Chlorotoluene	4320U	98500	4320	ug/Kg
591-78-6	2-Hexanone	8530U	98500	8530	ug/Kg
106-43-4	4-Chlorotoluene	4630U	98500	4630	ug/Kg
99-87-6	**4-Isopropyltoluene**	**54000J**	**98500**	**4140**	**ug/Kg**
108-10-1	4-Methyl-2-pentanone	2600U	98500	2600	ug/Kg
67-64-1	Acetone	20300U	493000	20300	ug/Kg
71-43-2	**Benzene**	**30000J**	**98500**	**3000**	**ug/Kg**
108-86-1	Bromobenzene	3070U	98500	3070	ug/Kg
74-97-5	Bromochloromethane	2660U	98500	2660	ug/Kg
75-27-4	Bromodichloromethane	3190U	98500	3190	ug/Kg
75-25-2	Bromoform	3130U	98500	3130	ug/Kg
74-83-9	Bromomethane	5970U	98500	5970	ug/Kg
75-15-0	Carbon disulfide	6400U	98500	6400	ug/Kg
56-23-5	Carbon tetrachloride	3980U	98500	3980	ug/Kg
108-90-7	Chlorobenzene	2940U	98500	2940	ug/Kg
75-00-3	Chloroethane	6520U	98500	6520	ug/Kg
67-66-3	Chloroform	4240U	98500	4240	ug/Kg
74-87-3	Chloromethane	4670U	98500	4670	ug/Kg
124-48-1	Dibromochloromethane	4300U	98500	4300	ug/Kg
74-95-3	Dibromomethane	4550U	98500	4550	ug/Kg
75-71-8	Dichlorodifluoromethane	4410U	98500	4410	ug/Kg
100-41-4	Ethylbenzene	3610U	98500	3610	ug/Kg
87-68-3	Hexachlorobutadiene	4220U	98500	4220	ug/Kg
98-82-8	**Isopropylbenzene (Cumene)**	**73800J**	**98500**	**3650**	**ug/Kg**
74-88-4	Methyl iodide	24200U	98500	24200	ug/Kg
75-09-2	Methylene chloride	8710U	197000	8710	ug/Kg
91-20-3	**Naphthalene**	**2490000**	**98500**	**6330**	**ug/Kg**
100-42-5	Styrene	3030U	98500	3030	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033007	**VR 100 C**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20000	08/05/2012 20:04	CEK	487041

CAS#	Parameter	Result	RDL	MDL	Units
127-18-4	Tetrachloroethene	5830U	98500	5830	ug/Kg
110-02-1	Thiophene	ND			ug/Kg
108-88-3	**Toluene**	**152000**	**98500**	**3050**	**ug/Kg**
79-01-6	Trichloroethene	4200U	98500	4200	ug/Kg
75-69-4	Trichlorofluoromethane	5140U	98500	5140	ug/Kg
76-13-1	Trichlorotrifluoroethane	3940U	98500	3940	ug/Kg
108-05-4	Vinyl acetate	2780U	98500	2780	ug/Kg
75-01-4	Vinyl chloride	5360U	98500	5360	ug/Kg
1330-20-7	**Xylene (total)**	**248000**	**197000**	**7900**	**ug/Kg**
156-59-2	cis-1,2-Dichloroethene	2920U	98500	2920	ug/Kg
10061-01-5	cis-1,3-Dichloropropene	3650U	98500	3650	ug/Kg
136777-61-2	**m,p-Xylene**	**166000**	**98500**	**5790**	**ug/Kg**
104-51-8	n-Butylbenzene	4590U	98500	4590	ug/Kg
103-65-1	n-Propylbenzene	14600U	98500	14600	ug/Kg
95-47-6	**o-Xylene**	**81400J**	**98500**	**2660**	**ug/Kg**
135-98-8	**sec-Butylbenzene**	**104000**	**98500**	**3880**	**ug/Kg**
1634-04-4	tert-Butyl methyl ether (MTBE)	2400U	98500	2400	ug/Kg
98-06-6	tert-Butylbenzene	5050U	98500	5050	ug/Kg
156-60-5	trans-1,2-Dichloroethene	2580U	98500	2580	ug/Kg
10061-02-6	trans-1,3-Dichloropropene	3350U	98500	3350	ug/Kg
110-57-6	trans-1,4-Dichloro-2-butene	10200U	98500	10200	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	906000	920000	ug/Kg	102	62 - 127
1868-53-7	Dibromofluoromethane	906000	904000	ug/Kg	100	65 - 130
2037-26-5	Toluene d8	906000	952000	ug/Kg	105	71 - 132
17060-07-0	1,2-Dichloroethane-d4	906000	889000	ug/Kg	98	62 - 125

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20000	08/05/2012 20:04	CEK	487521

CAS#	Parameter	Result	Retention	Units
496-11-7	**Indane**	**60500**	**10.20**	**ug/Kg**
1075-38-3	**Benzene, 1-(1,1-dimethylethyl)-3-me**	**41300**	**10.50**	**ug/Kg**
1196-58-3	**Benzene, (1-ethylpropyl)-**	**93400**	**11.70**	**ug/Kg**
2132-84-5	**Benzene, (1-methylhexyl)-**	**96200**	**11.90**	**ug/Kg**
827-52-1	**Benzene, cyclohexyl-**	**110000**	**12.30**	**ug/Kg**

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/06/2012 06:10	487057	3550C	5	08/06/2012 17:36	JEW	487108

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	2020U	53800	2020	ug/Kg
122-66-7	1,2Diphenylhydrazine/Azobenzen	1220U	53800	1220	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033007	**VR 100 C**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/06/2012 06:10	487057	3550C	5	08/06/2012 17:36	JEW	487108

CAS#	Parameter	Result	RDL	MDL	Units
95-95-4	2,4,5-Trichlorophenol	2720U	53800	2720	ug/Kg
88-06-2	2,4,6-Trichlorophenol	21900U	53800	21900	ug/Kg
120-83-2	2,4-Dichlorophenol	4450U	53800	4450	ug/Kg
105-67-9	2,4-Dimethylphenol	24700U	53800	24700	ug/Kg
51-28-5	2,4-Dinitrophenol	22900U	53800	22900	ug/Kg
121-14-2	2,4-Dinitrotoluene	6170U	53800	6170	ug/Kg
606-20-2	2,6-Dinitrotoluene	5320U	53800	5320	ug/Kg
91-58-7	2-Chloronaphthalene	690U	53800	690	ug/Kg
95-57-8	2-Chlorophenol	2210U	53800	2210	ug/Kg
91-57-6	**2-Methylnaphthalene**	**61100**	**53800**	**1700**	**ug/Kg**
88-74-4	2-Nitroaniline	2960U	269000	2960	ug/Kg
88-75-5	2-Nitrophenol	3660U	53800	3660	ug/Kg
91-94-1	3,3'-Dichlorobenzidine	18300U	108000	18300	ug/Kg
99-09-2	3-Nitroaniline	3870U	269000	3870	ug/Kg
534-52-1	4,6-Dinitro-2-methylphenol	24100U	269000	24100	ug/Kg
101-55-3	4-Bromophenyl phenyl ether	4040U	53800	4040	ug/Kg
59-50-7	4-Chloro-3-methylphenol	5740U	53800	5740	ug/Kg
106-47-8	4-Chloroaniline	4540U	53800	4540	ug/Kg
7005-72-3	4-Chlorophenyl phenyl ether	4360U	53800	4360	ug/Kg
100-01-6	4-Nitroaniline	35800U	269000	35800	ug/Kg
100-02-7	4-Nitrophenol	34800U	269000	34800	ug/Kg
83-32-9	**Acenaphthene**	**13200J**	**53800**	**1410**	**ug/Kg**
208-96-8	Acenaphthylene	1640U	53800	1640	ug/Kg
62-53-3	**Aniline**	**8590J**	**53800**	**4550**	**ug/Kg**
120-12-7	Anthracene	1340U	53800	1340	ug/Kg
56-55-3	Benzo(a)anthracene	4760U	53800	4760	ug/Kg
50-32-8	Benzo(a)pyrene	1440U	53800	1440	ug/Kg
205-99-2	Benzo(b)fluoranthene	8270U	53800	8270	ug/Kg
191-24-2	Benzo(g,h,i)perylene	1820U	53800	1820	ug/Kg
207-08-9	Benzo(k)fluoranthene	1240U	53800	1240	ug/Kg
100-51-6	Benzyl alcohol	5970U	53800	5970	ug/Kg
111-91-1	Bis(2-Chloroethoxy)methane	3050U	53800	3050	ug/Kg
111-44-4	Bis(2-Chloroethyl)ether	4550U	53800	4550	ug/Kg
108-60-1	Bis(2-Chloroisopropyl)ether	4250U	53800	4250	ug/Kg
117-81-7	Bis(2-Ethylhexyl)phthalate	2690U	53800	2690	ug/Kg
85-68-7	Butyl benzyl phthalate	1450U	53800	1450	ug/Kg
86-74-8	Carbazole	3720U	53800	3720	ug/Kg
218-01-9	Chrysene	1500U	53800	1500	ug/Kg
84-74-2	Di-n-butyl phthalate	1710U	53800	1710	ug/Kg
117-84-0	Di-n-octyl phthalate	1770U	53800	1770	ug/Kg
53-70-3	Dibenz(a,h)anthracene	1570U	53800	1570	ug/Kg
132-64-9	Dibenzofuran	838U	53800	838	ug/Kg
84-66-2	Diethyl phthalate	2180U	53800	2180	ug/Kg
131-11-3	Dimethyl phthalate	908U	53800	908	ug/Kg
206-44-0	Fluoranthene	1050U	53800	1050	ug/Kg
86-73-7	**Fluorene**	**296000**	**53800**	**1730**	**ug/Kg**
118-74-1	Hexachlorobenzene	6720U	53800	6720	ug/Kg
87-68-3	Hexachlorobutadiene	3220U	53800	3220	ug/Kg
77-47-4	Hexachlorocyclopentadiene	26700U	53800	26700	ug/Kg
67-72-1	Hexachloroethane	1970U	53800	1970	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033007	**VR 100 C**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/06/2012 06:10	487057	3550C	5	08/06/2012 17:36	JEW	487108

CAS#	Parameter	Result	RDL	MDL	Units
193-39-5	Indeno(1,2,3-cd)pyrene	3320U	53800	3320	ug/Kg
78-59-1	Isophorone	2300U	53800	2300	ug/Kg
98-95-3	Nitrobenzene	1930U	53800	1930	ug/Kg
87-86-5	Pentachlorophenol	30400U	269000	30400	ug/Kg
85-01-8	Phenanthrene	1430U	53800	1430	ug/Kg
108-95-2	Phenol	5430U	53800	5430	ug/Kg
129-00-0	Pyrene	1240U	53800	1240	ug/Kg
110-86-1	Pyridine	26400U	53800	26400	ug/Kg
1319-77-3MP	m,p-Cresol	6340U	53800	6340	ug/Kg
621-64-7	n-Nitrosodi-n-propylamine	1990U	53800	1990	ug/Kg
62-75-9	n-Nitrosodimethylamine	9950U	53800	9950	ug/Kg
86-30-6	n-Nitrosodiphenylamine	1240U	53800	1240	ug/Kg
95-48-7	o-Cresol	1940U	53800	1940	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	5000	Diluted Out	ug/Kg	**0***	46 - 123
321-60-8	2-Fluorobiphenyl	5000	Diluted Out	ug/Kg	**0***	47 - 127
1718-51-0	Terphenyl-d14	5000	Diluted Out	ug/Kg	**0***	38 - 167
4165-62-2	Phenol-d5	10000	Diluted Out	ug/Kg	**0***	43 - 123
367-12-4	2-Fluorophenol	10000	Diluted Out	ug/Kg	**0***	51 - 119
118-79-6	2,4,6-Tribromophenol	10000	Diluted Out	ug/Kg	**0***	44 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			5	08/06/2012 17:36	JEW	487173

CAS#	Parameter	Result	Retention	Units
2132-84-5	**Benzene, (1-methylhexyl)-**	**32100**	**3.31**	**ug/Kg**
26137-53-1	**Naphthalene, 1,2,3-trimethyl-4-prop**	**164000**	**4.64**	**ug/Kg**
	Unknown	**142000**	**4.74**	**ug/Kg**
	Unknown	**79500**	**4.84**	**ug/Kg**
	Unknown	**58500**	**4.99**	**ug/Kg**
6941-12-4	**Propanoic acid, 2-[4-(1,1-dimethyle**	**127000**	**5.05**	**ug/Kg**
	Unknown	**55800**	**5.24**	**ug/Kg**
0-00-0	**2-Fluoro-4-piperidinopyrimidine**	**89000**	**6.29**	**ug/Kg**
4309-66-4	**Stilbene, 4-amino- (E)-**	**94400**	**6.45**	**ug/Kg**
	Unknown	**97800**	**6.77**	**ug/Kg**
	Unknown	**105000**	**6.92**	**ug/Kg**
827-52-1	**Benzene, cyclohexyl-**	**36200**	**3.43**	**ug/Kg**
	Unknown	**102000**	**7.16**	**ug/Kg**
3173-56-6	**Benzyl isocyanate**	**30300**	**3.54**	**ug/Kg**
101-81-5	**Diphenylmethane**	**27400**	**3.81**	**ug/Kg**
1075-38-3	**Benzene, 1-(1,1-dimethylethyl)-3-me**	**10500**	**3.86**	**ug/Kg**
605-39-0	**2,2'-Dimethylbiphenyl**	**77500**	**4.15**	**ug/Kg**
778-22-3	**Benzene, 1,1'-(1-methylethylidene)b**	**121000**	**4.26**	**ug/Kg**
644-08-6	**1,1'-Biphenyl, 4-methyl-**	**37900**	**4.37**	**ug/Kg**
	Unknown	**999000**	**4.55**	**ug/Kg**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033007	**VR 100 C**	Solid	08/01/2012 11:00	08/03/2012 10:20

SW-846 7471B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/03/2012 16:00	486993	SW-846 7471B	1	08/05/2012 14:17	BNB	487022

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	**Mercury**	**0.28**	**0.013**	**0.0060**	**mg/kg**

SW-846 6010B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/03/2012 16:00	486992	SW-846 3050B	1	08/06/2012 15:41	BNB	487110

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	**Aluminum**	**4390**	**8.63**	**0.85**	**mg/kg**
7440-36-0	**Antimony**	**0.20J**	**2.59**	**0.10**	**mg/kg**
7440-38-2	Arsenic	0.15U	1.73	0.15	mg/kg
7440-39-3	**Barium**	**7.38**	**0.43**	**0.026**	**mg/kg**
7440-41-7	**Beryllium**	**0.0083J**	**0.22**	**0.0022**	**mg/kg**
7440-43-9	Cadmium	0.0097U	0.22	0.0097	mg/kg
7440-70-2	**Calcium**	**168**	**32.4**	**4.72**	**mg/kg**
7440-47-3	**Chromium**	**3.06**	**0.43**	**0.019**	**mg/kg**
7440-48-4	**Cobalt**	**0.28J**	**0.43**	**0.011**	**mg/kg**
7440-50-8	**Copper**	**136**	**0.43**	**0.033**	**mg/kg**
7439-89-6	**Iron**	**2700**	**4.32**	**0.76**	**mg/kg**
7439-92-1	**Lead**	**60.1**	**0.65**	**0.12**	**mg/kg**
7439-95-4	**Magnesium**	**56.5**	**4.32**	**0.47**	**mg/kg**
7439-96-5	**Manganese**	**43.7**	**0.65**	**0.015**	**mg/kg**
7440-02-0	**Nickel**	**4.80**	**1.73**	**0.023**	**mg/kg**
7440-09-7	**Potassium**	**79.9**	**21.6**	**2.27**	**mg/kg**
7782-49-2	**Selenium**	**10.9**	**1.73**	**0.14**	**mg/kg**
7440-22-4	**Silver**	**0.080J**	**0.43**	**0.024**	**mg/kg**
7440-23-5	**Sodium**	**3600**	**43.2**	**3.27**	**mg/kg**
7440-28-0	**Thallium**	**0.48J**	**0.86**	**0.095**	**mg/kg**
7440-62-2	**Vanadium**	**1.18**	**0.86**	**0.016**	**mg/kg**
7440-66-6	**Zinc**	**5.69**	**0.86**	**0.46**	**mg/kg**

SW-846 9045C pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	08/07/2012 13:00	OLT	487010

CAS#	Parameter	Result	RDL	MDL	Units
pH	**pH**	**3.97**	**1.00**	**1.00**	**pH unit**

RESULTS REPORTED ON A DRY WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033008	**HC 100A**	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			5000	08/05/2012 17:40	CEK	487041

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	818U	30300	818	ug/Kg
71-55-6	1,1,1-Trichloroethane	1440U	30300	1440	ug/Kg
79-34-5	1,1,2,2-Tetrachloroethane	690U	30300	690	ug/Kg
79-00-5	1,1,2-Trichloroethane	812U	30300	812	ug/Kg
75-34-3	1,1-Dichloroethane	902U	30300	902	ug/Kg
75-35-4	1,1-Dichloroethene	1410U	30300	1410	ug/Kg
563-58-6	1,1-Dichloropropene	1480U	30300	1480	ug/Kg
96-18-4	1,2,3-Trichloropropane	696U	30300	696	ug/Kg
120-82-1	1,2,4-Trichlorobenzene	2150U	30300	2150	ug/Kg
95-63-6	**1,2,4-Trimethylbenzene**	**37900**	**30300**	**2180**	**ug/Kg**
96-12-8	1,2-Dibromo-3-chloropropane	2430U	30300	2430	ug/Kg
106-93-4	1,2-Dibromoethane	872U	30300	872	ug/Kg
95-50-1	**1,2-Dichlorobenzene**	**232000**	**30300**	**1670**	**ug/Kg**
107-06-2	1,2-Dichloroethane	1200U	30300	1200	ug/Kg
540-59-0	1,2-Dichloroethene(Total)	1420U	60600	1420	ug/Kg
78-87-5	1,2-Dichloropropane	933U	30300	933	ug/Kg
108-67-8	**1,3,5-Trimethylbenzene**	**27100J**	**30300**	**2280**	**ug/Kg**
541-73-1	1,3-Dichlorobenzene	1570U	30300	1570	ug/Kg
142-28-9	1,3-Dichloropropane	957U	30300	957	ug/Kg
106-46-7	**1,4-Dichlorobenzene**	**17700J**	**30300**	**1400**	**ug/Kg**
594-20-7	2,2-Dichloropropane	1510U	30300	1510	ug/Kg
78-93-3	2-Butanone	3140U	30300	3140	ug/Kg
95-49-8	2-Chlorotoluene	1330U	30300	1330	ug/Kg
591-78-6	2-Hexanone	2620U	30300	2620	ug/Kg
106-43-4	4-Chlorotoluene	1420U	30300	1420	ug/Kg
99-87-6	**4-Isopropyltoluene**	**17300J**	**30300**	**1270**	**ug/Kg**
108-10-1	4-Methyl-2-pentanone	799U	30300	799	ug/Kg
67-64-1	Acetone	6240U	151000	6240	ug/Kg
71-43-2	**Benzene**	**387000**	**30300**	**921**	**ug/Kg**
108-86-1	Bromobenzene	945U	30300	945	ug/Kg
74-97-5	Bromochloromethane	818U	30300	818	ug/Kg
75-27-4	Bromodichloromethane	981U	30300	981	ug/Kg
75-25-2	Bromoform	963U	30300	963	ug/Kg
74-83-9	Bromomethane	1840U	30300	1840	ug/Kg
75-15-0	Carbon disulfide	1970U	30300	1970	ug/Kg
56-23-5	Carbon tetrachloride	1220U	30300	1220	ug/Kg
108-90-7	Chlorobenzene	902U	30300	902	ug/Kg
75-00-3	Chloroethane	2000U	30300	2000	ug/Kg
67-66-3	Chloroform	1300U	30300	1300	ug/Kg
74-87-3	Chloromethane	1440U	30300	1440	ug/Kg
124-48-1	Dibromochloromethane	1320U	30300	1320	ug/Kg
74-95-3	Dibromomethane	1400U	30300	1400	ug/Kg
75-71-8	Dichlorodifluoromethane	1360U	30300	1360	ug/Kg
100-41-4	**Ethylbenzene**	**16200J**	**30300**	**1110**	**ug/Kg**
87-68-3	Hexachlorobutadiene	1300U	30300	1300	ug/Kg
98-82-8	**Isopropylbenzene (Cumene)**	**50100**	**30300**	**1120**	**ug/Kg**
74-88-4	Methyl iodide	7450U	30300	7450	ug/Kg
75-09-2	Methylene chloride	2680U	60600	2680	ug/Kg
91-20-3	**Naphthalene**	**608000**	**30300**	**1940**	**ug/Kg**
100-42-5	Styrene	933U	30300	933	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033008	**HC 100A**	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			5000	08/05/2012 17:40	CEK	487041

CAS#	Parameter	Result	RDL	MDL	Units
127-18-4	Tetrachloroethene	1790U	30300	1790	ug/Kg
110-02-1	**Thiophene**	**2450**			**ug/Kg**
108-88-3	**Toluene**	**451000**	**30300**	**939**	**ug/Kg**
79-01-6	Trichloroethene	1290U	30300	1290	ug/Kg
75-69-4	Trichlorofluoromethane	1580U	30300	1580	ug/Kg
76-13-1	Trichlorotrifluoroethane	1210U	30300	1210	ug/Kg
108-05-4	Vinyl acetate	854U	30300	854	ug/Kg
75-01-4	Vinyl chloride	1650U	30300	1650	ug/Kg
1330-20-7	**Xylene (total)**	**292000**	**60600**	**2430**	**ug/Kg**
156-59-2	cis-1,2-Dichloroethene	896U	30300	896	ug/Kg
10061-01-5	cis-1,3-Dichloropropene	1120U	30300	1120	ug/Kg
136777-61-2	**m,p-Xylene**	**237000**	**30300**	**1780**	**ug/Kg**
104-51-8	n-Butylbenzene	1410U	30300	1410	ug/Kg
103-65-1	n-Propylbenzene	4480U	30300	4480	ug/Kg
95-47-6	**o-Xylene**	**55200**	**30300**	**818**	**ug/Kg**
135-98-8	**sec-Butylbenzene**	**33800**	**30300**	**1190**	**ug/Kg**
1634-04-4	tert-Butyl methyl ether (MTBE)	739U	30300	739	ug/Kg
98-06-6	tert-Butylbenzene	1550U	30300	1550	ug/Kg
156-60-5	trans-1,2-Dichloroethene	793U	30300	793	ug/Kg
10061-02-6	trans-1,3-Dichloropropene	1030U	30300	1030	ug/Kg
110-57-6	trans-1,4-Dichloro-2-butene	3140U	30300	3140	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	247000	260000	ug/Kg	105	62 - 127
1868-53-7	Dibromofluoromethane	247000	241000	ug/Kg	98	65 - 130
2037-26-5	Toluene d8	247000	260000	ug/Kg	105	71 - 132
17060-07-0	1,2-Dichloroethane-d4	247000	245000	ug/Kg	99	62 - 125

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			5000	08/05/2012 17:40	CEK	487521

CAS#	Parameter	Result	Retention	Units
496-11-7	**Indane**	**8850**	**10.20**	**ug/Kg**
104-76-7	**1-Hexanol, 2-ethyl-**	**7260**	**10.30**	**ug/Kg**

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/06/2012 06:10	487057	3550C	2	08/06/2012 17:51	JEW	487108

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	911U	24300	911	ug/Kg
122-66-7	1,2Diphenylhydrazine/Azobenzen	549U	24300	549	ug/Kg
95-95-4	2,4,5-Trichlorophenol	1230U	24300	1230	ug/Kg
88-06-2	2,4,6-Trichlorophenol	9860U	24300	9860	ug/Kg
120-83-2	2,4-Dichlorophenol	2010U	24300	2010	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033008	**HC 100A**	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/06/2012 06:10	487057	3550C	2	08/06/2012 17:51	JEW	487108

CAS#	Parameter	Result	RDL	MDL	Units
105-67-9	2,4-Dimethylphenol	11200U	24300	11200	ug/Kg
51-28-5	2,4-Dinitrophenol	10300U	24300	10300	ug/Kg
121-14-2	2,4-Dinitrotoluene	2780U	24300	2780	ug/Kg
606-20-2	2,6-Dinitrotoluene	2400U	24300	2400	ug/Kg
91-58-7	2-Chloronaphthalene	311U	24300	311	ug/Kg
95-57-8	2-Chlorophenol	996U	24300	996	ug/Kg
91-57-6	**2-Methylnaphthalene**	**25000**	**24300**	**767**	**ug/Kg**
88-74-4	2-Nitroaniline	1330U	121000	1330	ug/Kg
88-75-5	2-Nitrophenol	1650U	24300	1650	ug/Kg
91-94-1	3,3'-Dichlorobenzidine	8260U	48500	8260	ug/Kg
99-09-2	3-Nitroaniline	1740U	121000	1740	ug/Kg
534-52-1	4,6-Dinitro-2-methylphenol	10900U	121000	10900	ug/Kg
101-55-3	4-Bromophenyl phenyl ether	1820U	24300	1820	ug/Kg
59-50-7	4-Chloro-3-methylphenol	2590U	24300	2590	ug/Kg
106-47-8	4-Chloroaniline	2040U	24300	2040	ug/Kg
7005-72-3	4-Chlorophenyl phenyl ether	1970U	24300	1970	ug/Kg
100-01-6	4-Nitroaniline	16200U	121000	16200	ug/Kg
100-02-7	4-Nitrophenol	15700U	121000	15700	ug/Kg
83-32-9	**Acenaphthene**	**4620J**	**24300**	**637**	**ug/Kg**
208-96-8	Acenaphthylene	740U	24300	740	ug/Kg
62-53-3	Aniline	2050U	24300	2050	ug/Kg
120-12-7	Anthracene	606U	24300	606	ug/Kg
56-55-3	Benzo(a)anthracene	2150U	24300	2150	ug/Kg
50-32-8	Benzo(a)pyrene	651U	24300	651	ug/Kg
205-99-2	Benzo(b)fluoranthene	3730U	24300	3730	ug/Kg
191-24-2	Benzo(g,h,i)perylene	822U	24300	822	ug/Kg
207-08-9	Benzo(k)fluoranthene	561U	24300	561	ug/Kg
100-51-6	Benzyl alcohol	2690U	24300	2690	ug/Kg
111-91-1	Bis(2-Chloroethoxy)methane	1370U	24300	1370	ug/Kg
111-44-4	Bis(2-Chloroethyl)ether	2050U	24300	2050	ug/Kg
108-60-1	Bis(2-Chloroisopropyl)ether	1910U	24300	1910	ug/Kg
117-81-7	Bis(2-Ethylhexyl)phthalate	1210U	24300	1210	ug/Kg
85-68-7	Butyl benzyl phthalate	652U	24300	652	ug/Kg
86-74-8	Carbazole	1680U	24300	1680	ug/Kg
218-01-9	Chrysene	677U	24300	677	ug/Kg
84-74-2	Di-n-butyl phthalate	771U	24300	771	ug/Kg
117-84-0	Di-n-octyl phthalate	798U	24300	798	ug/Kg
53-70-3	Dibenz(a,h)anthracene	710U	24300	710	ug/Kg
132-64-9	Dibenzofuran	378U	24300	378	ug/Kg
84-66-2	Diethyl phthalate	983U	24300	983	ug/Kg
131-11-3	Dimethyl phthalate	409U	24300	409	ug/Kg
206-44-0	Fluoranthene	474U	24300	474	ug/Kg
86-73-7	**Fluorene**	**102000**	**24300**	**782**	**ug/Kg**
118-74-1	Hexachlorobenzene	3030U	24300	3030	ug/Kg
87-68-3	Hexachlorobutadiene	1450U	24300	1450	ug/Kg
77-47-4	Hexachlorocyclopentadiene	12000U	24300	12000	ug/Kg
67-72-1	Hexachloroethane	886U	24300	886	ug/Kg
193-39-5	Indeno(1,2,3-cd)pyrene	1490U	24300	1490	ug/Kg
78-59-1	Isophorone	1040U	24300	1040	ug/Kg
98-95-3	Nitrobenzene	871U	24300	871	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033008	**HC 100A**	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/06/2012 06:10	487057	3550C	2	08/06/2012 17:51	JEW	487108

CAS#	Parameter	Result	RDL	MDL	Units
87-86-5	Pentachlorophenol	13700U	121000	13700	ug/Kg
85-01-8	**Phenanthrene**	**4050J**	**24300**	**643**	**ug/Kg**
108-95-2	Phenol	2450U	24300	2450	ug/Kg
129-00-0	Pyrene	558U	24300	558	ug/Kg
110-86-1	Pyridine	11900U	24300	11900	ug/Kg
1319-77-3MP	m,p-Cresol	2860U	24300	2860	ug/Kg
621-64-7	n-Nitrosodi-n-propylamine	897U	24300	897	ug/Kg
62-75-9	n-Nitrosodimethylamine	4480U	24300	4480	ug/Kg
86-30-6	n-Nitrosodiphenylamine	560U	24300	560	ug/Kg
95-48-7	o-Cresol	876U	24300	876	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	5000	Diluted Out	ug/Kg	**0***	46 - 123
321-60-8	2-Fluorobiphenyl	5000	Diluted Out	ug/Kg	**0***	47 - 127
1718-51-0	Terphenyl-d14	5000	Diluted Out	ug/Kg	**0***	38 - 167
4165-62-2	Phenol-d5	10000	Diluted Out	ug/Kg	**0***	43 - 123
367-12-4	2-Fluorophenol	10000	Diluted Out	ug/Kg	**0***	51 - 119
118-79-6	2,4,6-Tribromophenol	10000	Diluted Out	ug/Kg	**0***	44 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			2	08/06/2012 17:51	JEW	487173

CAS#	Parameter	Result	Retention	Units
108-88-3	**Toluene**	**81600**	**1.08**	**ug/Kg**
101-81-5	**Diphenylmethane**	**31500**	**3.81**	**ug/Kg**
620-83-7	**Benzene, 1-methyl-4-(phenylmethyl)-**	**14900**	**4.15**	**ug/Kg**
13540-56-2	**Benzene, 1,2-dimethyl-4-(phenylmeth**	**25600**	**4.26**	**ug/Kg**
26137-53-1	**Naphthalene, 1,2,3-trimethyl-4-prop**	**315000**	**4.55**	**ug/Kg**
	Unknown	**56700**	**4.64**	**ug/Kg**
13688-68-1	**9,9-Dimethyl-9-silafluorene**	**40900**	**4.74**	**ug/Kg**
	Unknown	**20000**	**4.99**	**ug/Kg**
55012-80-1	**Silane, trimethyl[5-methyl-2-(1-met**	**40400**	**5.05**	**ug/Kg**
74421-26-4	**Benzeneethanol, .beta.-methyl-.beta**	**20300**	**6.29**	**ug/Kg**
4309-66-4	**Stilbene, 4-amino- (E)-**	**22000**	**6.45**	**ug/Kg**
108-38-3	**Benzene, 1,3-dimethyl-**	**72300**	**1.53**	**ug/Kg**
	Unknown	**37800**	**7.16**	**ug/Kg**
98-82-8	**Benzene, (1-methylethyl)-**	**20800**	**1.78**	**ug/Kg**
95-63-6	**Benzene, 1,2,4-trimethyl-**	**23100**	**2.11**	**ug/Kg**
700-88-9	**Benzene, cyclopentyl-**	**8930**	**3.07**	**ug/Kg**
	Unknown	**7600**	**3.20**	**ug/Kg**
1595-01-3	**1-Methyl-4-N-hexylbenzene**	**10400**	**3.31**	**ug/Kg**
827-52-1	**Benzene, cyclohexyl-**	**12200**	**3.43**	**ug/Kg**
4218-48-8	**Benzene, 1-ethyl-4-(1-methylethyl)-**	**20200**	**3.54**	**ug/Kg**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033008	**HC 100A**	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 7471B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/03/2012 16:00	486993	SW-846 7471B	5	08/05/2012 14:26	BNB	487022

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	**Mercury**	**2.41**	**0.061**	**0.028**	**mg/kg**

SW-846 6010B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/03/2012 16:00	486992	SW-846 3050B	2	08/06/2012 16:34	BNB	487110

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	**Aluminum**	**514**	**19.6**	**1.94**	**mg/kg**
7440-36-0	Antimony	0.24U	5.88	0.24	mg/kg
7440-38-2	**Arsenic**	**14.0**	**3.92**	**0.34**	**mg/kg**
7440-39-3	**Barium**	**10.3**	**0.98**	**0.059**	**mg/kg**
7440-41-7	Beryllium	0.0049U	0.49	0.0049	mg/kg
7440-43-9	Cadmium	0.022U	0.49	0.022	mg/kg
7440-70-2	**Calcium**	**143**	**73.5**	**10.7**	**mg/kg**
7440-47-3	**Chromium**	**7310**	**0.98**	**0.044**	**mg/kg**
7440-48-4	**Cobalt**	**32.4**	**0.98**	**0.025**	**mg/kg**
7440-50-8	**Copper**	**130**	**0.98**	**0.076**	**mg/kg**
7439-89-6	**Iron**	**23600**	**9.81**	**1.72**	**mg/kg**
7439-92-1	**Lead**	**73.1**	**1.47**	**0.28**	**mg/kg**
7439-95-4	**Magnesium**	**46.1**	**9.81**	**1.06**	**mg/kg**
7439-96-5	**Manganese**	**566**	**1.47**	**0.034**	**mg/kg**
7440-02-0	**Nickel**	**4420**	**3.92**	**0.051**	**mg/kg**
7440-09-7	**Potassium**	**176**	**49.0**	**5.16**	**mg/kg**
7782-49-2	**Selenium**	**12.1**	**3.92**	**0.32**	**mg/kg**
7440-22-4	Silver	0.054U	0.98	0.054	mg/kg
7440-23-5	**Sodium**	**5850**	**98.1**	**7.43**	**mg/kg**
7440-28-0	**Thallium**	**1.22J**	**1.96**	**0.22**	**mg/kg**
7440-62-2	**Vanadium**	**22.1**	**1.96**	**0.037**	**mg/kg**
7440-66-6	**Zinc**	**9.09**	**1.96**	**1.04**	**mg/kg**

SW-846 9045C pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	08/07/2012 13:00	OLT	487010

CAS#	Parameter	Result	RDL	MDL	Units
pH	pH	<2	1.00	1.00	pH unit

RESULTS REPORTED ON A DRY WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033009	**HC 100B**	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			5000	08/05/2012 18:02	CEK	487041

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	805U	29800	805	ug/Kg
71-55-6	1,1,1-Trichloroethane	1410U	29800	1410	ug/Kg
79-34-5	1,1,2,2-Tetrachloroethane	680U	29800	680	ug/Kg
79-00-5	1,1,2-Trichloroethane	799U	29800	799	ug/Kg
75-34-3	1,1-Dichloroethane	888U	29800	888	ug/Kg
75-35-4	1,1-Dichloroethene	1380U	29800	1380	ug/Kg
563-58-6	1,1-Dichloropropene	1450U	29800	1450	ug/Kg
96-18-4	1,2,3-Trichloropropane	686U	29800	686	ug/Kg
120-82-1	1,2,4-Trichlorobenzene	2120U	29800	2120	ug/Kg
95-63-6	**1,2,4-Trimethylbenzene**	**43300**	**29800**	**2150**	**ug/Kg**
96-12-8	1,2-Dibromo-3-chloropropane	2390U	29800	2390	ug/Kg
106-93-4	1,2-Dibromoethane	858U	29800	858	ug/Kg
95-50-1	**1,2-Dichlorobenzene**	**265000**	**29800**	**1650**	**ug/Kg**
107-06-2	1,2-Dichloroethane	1180U	29800	1180	ug/Kg
540-59-0	1,2-Dichloroethene(Total)	1390U	59600	1390	ug/Kg
78-87-5	1,2-Dichloropropane	918U	29800	918	ug/Kg
108-67-8	**1,3,5-Trimethylbenzene**	**29700J**	**29800**	**2240**	**ug/Kg**
541-73-1	1,3-Dichlorobenzene	1550U	29800	1550	ug/Kg
142-28-9	1,3-Dichloropropane	942U	29800	942	ug/Kg
106-46-7	**1,4-Dichlorobenzene**	**19600J**	**29800**	**1380**	**ug/Kg**
594-20-7	2,2-Dichloropropane	1480U	29800	1480	ug/Kg
78-93-3	2-Butanone	3090U	29800	3090	ug/Kg
95-49-8	2-Chlorotoluene	1310U	29800	1310	ug/Kg
591-78-6	2-Hexanone	2580U	29800	2580	ug/Kg
106-43-4	4-Chlorotoluene	1400U	29800	1400	ug/Kg
99-87-6	**4-Isopropyltoluene**	**17600J**	**29800**	**1250**	**ug/Kg**
108-10-1	4-Methyl-2-pentanone	787U	29800	787	ug/Kg
67-64-1	Acetone	6140U	149000	6140	ug/Kg
71-43-2	**Benzene**	**479000**	**29800**	**906**	**ug/Kg**
108-86-1	Bromobenzene	930U	29800	930	ug/Kg
74-97-5	Bromochloromethane	805U	29800	805	ug/Kg
75-27-4	Bromodichloromethane	966U	29800	966	ug/Kg
75-25-2	Bromoform	948U	29800	948	ug/Kg
74-83-9	Bromomethane	1810U	29800	1810	ug/Kg
75-15-0	Carbon disulfide	1940U	29800	1940	ug/Kg
56-23-5	Carbon tetrachloride	1200U	29800	1200	ug/Kg
108-90-7	Chlorobenzene	888U	29800	888	ug/Kg
75-00-3	Chloroethane	1970U	29800	1970	ug/Kg
67-66-3	Chloroform	1280U	29800	1280	ug/Kg
74-87-3	Chloromethane	1410U	29800	1410	ug/Kg
124-48-1	Dibromochloromethane	1300U	29800	1300	ug/Kg
74-95-3	Dibromomethane	1380U	29800	1380	ug/Kg
75-71-8	Dichlorodifluoromethane	1340U	29800	1340	ug/Kg
100-41-4	**Ethylbenzene**	**18800J**	**29800**	**1090**	**ug/Kg**
87-68-3	Hexachlorobutadiene	1280U	29800	1280	ug/Kg
98-82-8	**Isopropylbenzene (Cumene)**	**56100**	**29800**	**1100**	**ug/Kg**
74-88-4	Methyl iodide	7330U	29800	7330	ug/Kg
75-09-2	Methylene chloride	2630U	59600	2630	ug/Kg
91-20-3	**Naphthalene**	**730000**	**29800**	**1910**	**ug/Kg**
100-42-5	Styrene	918U	29800	918	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033009	**HC 100B**	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			5000	08/05/2012 18:02	CEK	487041

CAS#	Parameter	Result	RDL	MDL	Units
127-18-4	Tetrachloroethene	1760U	29800	1760	ug/Kg
110-02-1	**Thiophene**	**3310**			**ug/Kg**
108-88-3	**Toluene**	**528000**	**29800**	**924**	**ug/Kg**
79-01-6	Trichloroethene	1270U	29800	1270	ug/Kg
75-69-4	Trichlorofluoromethane	1560U	29800	1560	ug/Kg
76-13-1	Trichlorotrifluoroethane	1190U	29800	1190	ug/Kg
108-05-4	Vinyl acetate	841U	29800	841	ug/Kg
75-01-4	Vinyl chloride	1620U	29800	1620	ug/Kg
1330-20-7	**Xylene (total)**	**338000**	**59600**	**2390**	**ug/Kg**
156-59-2	cis-1,2-Dichloroethene	882U	29800	882	ug/Kg
10061-01-5	cis-1,3-Dichloropropene	1100U	29800	1100	ug/Kg
136777-61-2	**m,p-Xylene**	**275000**	**29800**	**1750**	**ug/Kg**
104-51-8	n-Butylbenzene	1390U	29800	1390	ug/Kg
103-65-1	n-Propylbenzene	4410U	29800	4410	ug/Kg
95-47-6	**o-Xylene**	**63600**	**29800**	**805**	**ug/Kg**
135-98-8	**sec-Butylbenzene**	**36800**	**29800**	**1170**	**ug/Kg**
1634-04-4	tert-Butyl methyl ether (MTBE)	727U	29800	727	ug/Kg
98-06-6	tert-Butylbenzene	1530U	29800	1530	ug/Kg
156-60-5	trans-1,2-Dichloroethene	781U	29800	781	ug/Kg
10061-02-6	trans-1,3-Dichloropropene	1010U	29800	1010	ug/Kg
110-57-6	trans-1,4-Dichloro-2-butene	3090U	29800	3090	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	249000	255000	ug/Kg	103	62 - 127
1868-53-7	Dibromofluoromethane	249000	240000	ug/Kg	97	65 - 130
2037-26-5	Toluene d8	249000	256000	ug/Kg	103	71 - 132
17060-07-0	1,2-Dichloroethane-d4	249000	244000	ug/Kg	98	62 - 125

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			5000	08/05/2012 18:02	CEK	487521

CAS#	Parameter	Result	Retention	Units
496-11-7	**Indane**	**10200**	**10.20**	**ug/Kg**
104-76-7	**1-Hexanol, 2-ethyl-**	**11000**	**10.30**	**ug/Kg**

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/06/2012 06:10	487057	3550C	2	08/06/2012 18:05	JEW	487108

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	891U	23700	891	ug/Kg
122-66-7	1,2Diphenylhydrazine/Azobenzen	537U	23700	537	ug/Kg
95-95-4	2,4,5-Trichlorophenol	1200U	23700	1200	ug/Kg
88-06-2	2,4,6-Trichlorophenol	9650U	23700	9650	ug/Kg
120-83-2	2,4-Dichlorophenol	1960U	23700	1960	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033009	**HC 100B**	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/06/2012 06:10	487057	3550C	2	08/06/2012 18:05	JEW	487108

CAS#	Parameter	Result	RDL	MDL	Units
105-67-9	2,4-Dimethylphenol	10900U	23700	10900	ug/Kg
51-28-5	2,4-Dinitrophenol	10100U	23700	10100	ug/Kg
121-14-2	2,4-Dinitrotoluene	2720U	23700	2720	ug/Kg
606-20-2	2,6-Dinitrotoluene	2350U	23700	2350	ug/Kg
91-58-7	2-Chloronaphthalene	304U	23700	304	ug/Kg
95-57-8	2-Chlorophenol	975U	23700	975	ug/Kg
91-57-6	**2-Methylnaphthalene**	**19100J**	**23700**	**751**	**ug/Kg**
88-74-4	2-Nitroaniline	1310U	119000	1310	ug/Kg
88-75-5	2-Nitrophenol	1620U	23700	1620	ug/Kg
91-94-1	3,3'-Dichlorobenzidine	8080U	47500	8080	ug/Kg
99-09-2	3-Nitroaniline	1710U	119000	1710	ug/Kg
534-52-1	4,6-Dinitro-2-methylphenol	10600U	119000	10600	ug/Kg
101-55-3	4-Bromophenyl phenyl ether	1780U	23700	1780	ug/Kg
59-50-7	4-Chloro-3-methylphenol	2530U	23700	2530	ug/Kg
106-47-8	4-Chloroaniline	2000U	23700	2000	ug/Kg
7005-72-3	4-Chlorophenyl phenyl ether	1920U	23700	1920	ug/Kg
100-01-6	4-Nitroaniline	15800U	119000	15800	ug/Kg
100-02-7	4-Nitrophenol	15400U	119000	15400	ug/Kg
83-32-9	**Acenaphthene**	**3690J**	**23700**	**623**	**ug/Kg**
208-96-8	Acenaphthylene	724U	23700	724	ug/Kg
62-53-3	Aniline	2010U	23700	2010	ug/Kg
120-12-7	Anthracene	593U	23700	593	ug/Kg
56-55-3	Benzo(a)anthracene	2100U	23700	2100	ug/Kg
50-32-8	Benzo(a)pyrene	637U	23700	637	ug/Kg
205-99-2	Benzo(b)fluoranthene	3650U	23700	3650	ug/Kg
191-24-2	Benzo(g,h,i)perylene	805U	23700	805	ug/Kg
207-08-9	Benzo(k)fluoranthene	549U	23700	549	ug/Kg
100-51-6	Benzyl alcohol	2630U	23700	2630	ug/Kg
111-91-1	Bis(2-Chloroethoxy)methane	1340U	23700	1340	ug/Kg
111-44-4	Bis(2-Chloroethyl)ether	2010U	23700	2010	ug/Kg
108-60-1	Bis(2-Chloroisopropyl)ether	1870U	23700	1870	ug/Kg
117-81-7	Bis(2-Ethylhexyl)phthalate	1190U	23700	1190	ug/Kg
85-68-7	Butyl benzyl phthalate	638U	23700	638	ug/Kg
86-74-8	Carbazole	1640U	23700	1640	ug/Kg
218-01-9	Chrysene	663U	23700	663	ug/Kg
84-74-2	Di-n-butyl phthalate	754U	23700	754	ug/Kg
117-84-0	Di-n-octyl phthalate	781U	23700	781	ug/Kg
53-70-3	Dibenz(a,h)anthracene	694U	23700	694	ug/Kg
132-64-9	Dibenzofuran	370U	23700	370	ug/Kg
84-66-2	Diethyl phthalate	962U	23700	962	ug/Kg
131-11-3	Dimethyl phthalate	401U	23700	401	ug/Kg
206-44-0	Fluoranthene	464U	23700	464	ug/Kg
86-73-7	**Fluorene**	**76800**	**23700**	**765**	**ug/Kg**
118-74-1	Hexachlorobenzene	2960U	23700	2960	ug/Kg
87-68-3	Hexachlorobutadiene	1420U	23700	1420	ug/Kg
77-47-4	Hexachlorocyclopentadiene	11800U	23700	11800	ug/Kg
67-72-1	Hexachloroethane	867U	23700	867	ug/Kg
193-39-5	Indeno(1,2,3-cd)pyrene	1460U	23700	1460	ug/Kg
78-59-1	Isophorone	1020U	23700	1020	ug/Kg
98-95-3	Nitrobenzene	852U	23700	852	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033009	**HC 100B**	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/06/2012 06:10	487057	3550C	2	08/06/2012 18:05	JEW	487108

CAS#	Parameter	Result	RDL	MDL	Units
87-86-5	Pentachlorophenol	13400U	119000	13400	ug/Kg
85-01-8	**Phenanthrene**	**3240J**	**23700**	**630**	**ug/Kg**
108-95-2	Phenol	2400U	23700	2400	ug/Kg
129-00-0	Pyrene	546U	23700	546	ug/Kg
110-86-1	Pyridine	11700U	23700	11700	ug/Kg
1319-77-3MP	m,p-Cresol	2800U	23700	2800	ug/Kg
621-64-7	n-Nitrosodi-n-propylamine	878U	23700	878	ug/Kg
62-75-9	n-Nitrosodimethylamine	4390U	23700	4390	ug/Kg
86-30-6	n-Nitrosodiphenylamine	548U	23700	548	ug/Kg
95-48-7	o-Cresol	857U	23700	857	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	5000	Diluted Out	ug/Kg	**0***	46 - 123
321-60-8	2-Fluorobiphenyl	5000	Diluted Out	ug/Kg	**0***	47 - 127
1718-51-0	Terphenyl-d14	5000	Diluted Out	ug/Kg	**0***	38 - 167
4165-62-2	Phenol-d5	10000	Diluted Out	ug/Kg	**0***	43 - 123
367-12-4	2-Fluorophenol	10000	Diluted Out	ug/Kg	**0***	51 - 119
118-79-6	2,4,6-Tribromophenol	10000	Diluted Out	ug/Kg	**0***	44 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			2	08/06/2012 18:05	JEW	487173

CAS#	Parameter	Result	Retention	Units
108-88-3	**Toluene**	**18700**	**1.08**	**ug/Kg**
101-81-5	**Diphenylmethane**	**19700**	**3.81**	**ug/Kg**
713-36-0	**Benzene, 1-methyl-2-(phenylmethyl)-**	**14600**	**4.12**	**ug/Kg**
25640-78-2	**Isopropylbiphenyl**	**23700**	**4.26**	**ug/Kg**
26137-53-1	**Naphthalene, 1,2,3-trimethyl-4-prop**	**190000**	**4.55**	**ug/Kg**
	Unknown	**33400**	**4.64**	**ug/Kg**
	Unknown	**23200**	**4.74**	**ug/Kg**
55012-80-1	**Silane, trimethyl[5-methyl-2-(1-met**	**24700**	**5.05**	**ug/Kg**
10544-50-0	**Sulfur, mol. (S8)**	**228000**	**5.71**	**ug/Kg**
13688-68-1	**9,9-Dimethyl-9-silafluorene**	**18500**	**6.45**	**ug/Kg**
	Unknown	**23300**	**6.92**	**ug/Kg**
108-38-3	**Benzene, 1,3-dimethyl-**	**16900**	**1.53**	**ug/Kg**
	Unknown	**31100**	**7.16**	**ug/Kg**
95-47-6	**Benzene, 1,2-dimethyl-**	**4150**	**1.64**	**ug/Kg**
98-82-8	**Benzene, (1-methylethyl)-**	**4610**	**1.78**	**ug/Kg**
108-67-8	**Benzene, 1,3,5-trimethyl-**	**2850**	**1.99**	**ug/Kg**
700-88-9	**Benzene, cyclopentyl-**	**8380**	**3.07**	**ug/Kg**
	Unknown	**8040**	**3.20**	**ug/Kg**
2132-84-5	**Benzene, (1-methylhexyl)-**	**10100**	**3.31**	**ug/Kg**
827-52-1	**Benzene, cyclohexyl-**	**11700**	**3.43**	**ug/Kg**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033009	**HC 100B**	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 7471B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/03/2012 16:00	486993	SW-846 7471B	5	08/05/2012 14:33	BNB	487022

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	**Mercury**	**2.77**	**0.069**	**0.032**	**mg/kg**

SW-846 6010B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/03/2012 16:00	486992	SW-846 3050B	2	08/07/2012 12:35	BNB	487175

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	**Aluminum**	**539**	**19.2**	**1.90**	**mg/kg**
7440-36-0	Antimony	0.23U	5.76	0.23	mg/kg
7440-38-2	**Arsenic**	**26.0**	**3.84**	**0.33**	**mg/kg**
7440-39-3	**Barium**	**10.4**	**0.96**	**0.058**	**mg/kg**
7440-41-7	Beryllium	0.0048U	0.48	0.0048	mg/kg
7440-43-9	Cadmium	0.022U	0.48	0.022	mg/kg
7440-70-2	**Calcium**	**144**	**72.0**	**10.5**	**mg/kg**
7440-47-3	**Chromium**	**7720**	**0.96**	**0.043**	**mg/kg**
7440-48-4	**Cobalt**	**48.3**	**0.96**	**0.024**	**mg/kg**
7440-50-8	**Copper**	**126**	**0.96**	**0.074**	**mg/kg**
7439-89-6	**Iron**	**26800**	**9.60**	**1.68**	**mg/kg**
7439-92-1	**Lead**	**88.1**	**1.44**	**0.27**	**mg/kg**
7439-95-4	**Magnesium**	**46.1**	**9.60**	**1.04**	**mg/kg**
7439-96-5	**Manganese**	**606**	**1.44**	**0.034**	**mg/kg**
7440-02-0	**Nickel**	**4740**	**3.84**	**0.050**	**mg/kg**
7440-09-7	**Potassium**	**187**	**48.0**	**5.05**	**mg/kg**
7782-49-2	**Selenium**	**12.9**	**3.84**	**0.31**	**mg/kg**
7440-22-4	Silver	0.053U	0.96	0.053	mg/kg
7440-23-5	**Sodium**	**5920**	**96.0**	**7.27**	**mg/kg**
7440-28-0	**Thallium**	**1.76J**	**1.92**	**0.21**	**mg/kg**
7440-62-2	**Vanadium**	**23.8**	**1.92**	**0.036**	**mg/kg**
7440-66-6	**Zinc**	**9.18**	**1.92**	**1.02**	**mg/kg**

SW-846 9045C pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	08/07/2012 13:00	OLT	487010

CAS#	Parameter	Result	RDL	MDL	Units
pH	pH	<2	1.00	1.00	pH unit

RESULTS REPORTED ON A DRY WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033010	HC 100C	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			5000	08/05/2012 18:23	CEK	487041

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	827U	30600	827	ug/Kg
71-55-6	1,1,1-Trichloroethane	1450U	30600	1450	ug/Kg
79-34-5	1,1,2,2-Tetrachloroethane	699U	30600	699	ug/Kg
79-00-5	1,1,2-Trichloroethane	821U	30600	821	ug/Kg
75-34-3	1,1-Dichloroethane	913U	30600	913	ug/Kg
75-35-4	1,1-Dichloroethene	1420U	30600	1420	ug/Kg
563-58-6	1,1-Dichloropropene	1500U	30600	1500	ug/Kg
96-18-4	1,2,3-Trichloropropane	705U	30600	705	ug/Kg
120-82-1	1,2,4-Trichlorobenzene	2180U	30600	2180	ug/Kg
95-63-6	**1,2,4-Trimethylbenzene**	**31600**	**30600**	**2210**	**ug/Kg**
96-12-8	1,2-Dibromo-3-chloropropane	2460U	30600	2460	ug/Kg
106-93-4	1,2-Dibromoethane	882U	30600	882	ug/Kg
95-50-1	**1,2-Dichlorobenzene**	**185000**	**30600**	**1690**	**ug/Kg**
107-06-2	1,2-Dichloroethane	1210U	30600	1210	ug/Kg
540-59-0	1,2-Dichloroethene(Total)	1430U	61300	1430	ug/Kg
78-87-5	1,2-Dichloropropane	944U	30600	944	ug/Kg
108-67-8	**1,3,5-Trimethylbenzene**	**22900J**	**30600**	**2300**	**ug/Kg**
541-73-1	1,3-Dichlorobenzene	1590U	30600	1590	ug/Kg
142-28-9	1,3-Dichloropropane	968U	30600	968	ug/Kg
106-46-7	**1,4-Dichlorobenzene**	**14500J**	**30600**	**1420**	**ug/Kg**
594-20-7	2,2-Dichloropropane	1530U	30600	1530	ug/Kg
78-93-3	2-Butanone	3170U	30600	3170	ug/Kg
95-49-8	2-Chlorotoluene	1340U	30600	1340	ug/Kg
591-78-6	2-Hexanone	2650U	30600	2650	ug/Kg
106-43-4	4-Chlorotoluene	1440U	30600	1440	ug/Kg
99-87-6	**4-Isopropyltoluene**	**16400J**	**30600**	**1290**	**ug/Kg**
108-10-1	4-Methyl-2-pentanone	809U	30600	809	ug/Kg
67-64-1	Acetone	6310U	153000	6310	ug/Kg
71-43-2	**Benzene**	**304000**	**30600**	**931**	**ug/Kg**
108-86-1	Bromobenzene	956U	30600	956	ug/Kg
74-97-5	Bromochloromethane	827U	30600	827	ug/Kg
75-27-4	Bromodichloromethane	993U	30600	993	ug/Kg
75-25-2	Bromoform	974U	30600	974	ug/Kg
74-83-9	Bromomethane	1860U	30600	1860	ug/Kg
75-15-0	Carbon disulfide	1990U	30600	1990	ug/Kg
56-23-5	Carbon tetrachloride	1240U	30600	1240	ug/Kg
108-90-7	Chlorobenzene	913U	30600	913	ug/Kg
75-00-3	Chloroethane	2030U	30600	2030	ug/Kg
67-66-3	Chloroform	1320U	30600	1320	ug/Kg
74-87-3	Chloromethane	1450U	30600	1450	ug/Kg
124-48-1	Dibromochloromethane	1340U	30600	1340	ug/Kg
74-95-3	Dibromomethane	1420U	30600	1420	ug/Kg
75-71-8	Dichlorodifluoromethane	1370U	30600	1370	ug/Kg
100-41-4	**Ethylbenzene**	**12900J**	**30600**	**1120**	**ug/Kg**
87-68-3	Hexachlorobutadiene	1310U	30600	1310	ug/Kg
98-82-8	**Isopropylbenzene (Cumene)**	**41600**	**30600**	**1130**	**ug/Kg**
74-88-4	Methyl iodide	7540U	30600	7540	ug/Kg
75-09-2	Methylene chloride	2710U	61300	2710	ug/Kg
91-20-3	**Naphthalene**	**522000**	**30600**	**1970**	**ug/Kg**
100-42-5	Styrene	944U	30600	944	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033010	**HC 100C**	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			5000	08/05/2012 18:23	CEK	487041

CAS#	Parameter	Result	RDL	MDL	Units
127-18-4	Tetrachloroethene	1810U	30600	1810	ug/Kg
110-02-1	**Thiophene**	**1970**			**ug/Kg**
108-88-3	**Toluene**	**351000**	**30600**	**950**	**ug/Kg**
79-01-6	Trichloroethene	1310U	30600	1310	ug/Kg
75-69-4	Trichlorofluoromethane	1600U	30600	1600	ug/Kg
76-13-1	Trichlorotrifluoroethane	1230U	30600	1230	ug/Kg
108-05-4	Vinyl acetate	864U	30600	864	ug/Kg
75-01-4	Vinyl chloride	1670U	30600	1670	ug/Kg
1330-20-7	**Xylene (total)**	**235000**	**61300**	**2460**	**ug/Kg**
156-59-2	cis-1,2-Dichloroethene	907U	30600	907	ug/Kg
10061-01-5	cis-1,3-Dichloropropene	1130U	30600	1130	ug/Kg
136777-61-2	**m,p-Xylene**	**190000**	**30600**	**1800**	**ug/Kg**
104-51-8	n-Butylbenzene	1430U	30600	1430	ug/Kg
103-65-1	n-Propylbenzene	4530U	30600	4530	ug/Kg
95-47-6	**o-Xylene**	**45600**	**30600**	**827**	**ug/Kg**
135-98-8	**sec-Butylbenzene**	**29600J**	**30600**	**1210**	**ug/Kg**
1634-04-4	tert-Butyl methyl ether (MTBE)	748U	30600	748	ug/Kg
98-06-6	tert-Butylbenzene	1570U	30600	1570	ug/Kg
156-60-5	trans-1,2-Dichloroethene	803U	30600	803	ug/Kg
10061-02-6	trans-1,3-Dichloropropene	1040U	30600	1040	ug/Kg
110-57-6	trans-1,4-Dichloro-2-butene	3170U	30600	3170	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	245000	255000	ug/Kg	104	62 - 127
1868-53-7	Dibromofluoromethane	245000	237000	ug/Kg	97	65 - 130
2037-26-5	Toluene d8	245000	258000	ug/Kg	105	71 - 132
17060-07-0	1,2-Dichloroethane-d4	245000	240000	ug/Kg	98	62 - 125

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			5000	08/05/2012 18:23	CEK	487521

CAS#	Parameter	Result	Retention	Units
496-11-7	**Indane**	**6820**	**10.20**	**ug/Kg**
104-76-7	**1-Hexanol, 2-ethyl-**	**10700**	**10.30**	**ug/Kg**

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/06/2012 06:10	487057	3550C	2	08/06/2012 18:19	JEW	487108

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	931U	24800	931	ug/Kg
122-66-7	1,2Diphenylhydrazine/Azobenzen	561U	24800	561	ug/Kg
95-95-4	2,4,5-Trichlorophenol	1250U	24800	1250	ug/Kg
88-06-2	2,4,6-Trichlorophenol	10100U	24800	10100	ug/Kg
120-83-2	2,4-Dichlorophenol	2050U	24800	2050	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033010	**HC 100C**	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/06/2012 06:10	487057	3550C	2	08/06/2012 18:19	JEW	487108

CAS#	Parameter	Result	RDL	MDL	Units
105-67-9	2,4-Dimethylphenol	11400U	24800	11400	ug/Kg
51-28-5	2,4-Dinitrophenol	10600U	24800	10600	ug/Kg
121-14-2	2,4-Dinitrotoluene	2840U	24800	2840	ug/Kg
606-20-2	2,6-Dinitrotoluene	2450U	24800	2450	ug/Kg
91-58-7	2-Chloronaphthalene	318U	24800	318	ug/Kg
95-57-8	2-Chlorophenol	1020U	24800	1020	ug/Kg
91-57-6	**2-Methylnaphthalene**	**23800J**	**24800**	**784**	**ug/Kg**
88-74-4	2-Nitroaniline	1360U	124000	1360	ug/Kg
88-75-5	2-Nitrophenol	1690U	24800	1690	ug/Kg
91-94-1	3,3'-Dichlorobenzidine	8440U	49600	8440	ug/Kg
99-09-2	3-Nitroaniline	1780U	124000	1780	ug/Kg
534-52-1	4,6-Dinitro-2-methylphenol	11100U	124000	11100	ug/Kg
101-55-3	4-Bromophenyl phenyl ether	1860U	24800	1860	ug/Kg
59-50-7	4-Chloro-3-methylphenol	2640U	24800	2640	ug/Kg
106-47-8	4-Chloroaniline	2090U	24800	2090	ug/Kg
7005-72-3	4-Chlorophenyl phenyl ether	2010U	24800	2010	ug/Kg
100-01-6	4-Nitroaniline	16500U	124000	16500	ug/Kg
100-02-7	4-Nitrophenol	16000U	124000	16000	ug/Kg
83-32-9	**Acenaphthene**	**4400J**	**24800**	**650**	**ug/Kg**
208-96-8	**Acenaphthylene**	**1620J**	**24800**	**756**	**ug/Kg**
62-53-3	Aniline	2090U	24800	2090	ug/Kg
120-12-7	Anthracene	619U	24800	619	ug/Kg
56-55-3	Benzo(a)anthracene	2190U	24800	2190	ug/Kg
50-32-8	Benzo(a)pyrene	665U	24800	665	ug/Kg
205-99-2	Benzo(b)fluoranthene	3810U	24800	3810	ug/Kg
191-24-2	Benzo(g,h,i)perylene	840U	24800	840	ug/Kg
207-08-9	Benzo(k)fluoranthene	573U	24800	573	ug/Kg
100-51-6	Benzyl alcohol	2750U	24800	2750	ug/Kg
111-91-1	Bis(2-Chloroethoxy)methane	1400U	24800	1400	ug/Kg
111-44-4	Bis(2-Chloroethyl)ether	2100U	24800	2100	ug/Kg
108-60-1	Bis(2-Chloroisopropyl)ether	1960U	24800	1960	ug/Kg
117-81-7	Bis(2-Ethylhexyl)phthalate	1240U	24800	1240	ug/Kg
85-68-7	Butyl benzyl phthalate	666U	24800	666	ug/Kg
86-74-8	Carbazole	1710U	24800	1710	ug/Kg
218-01-9	Chrysene	692U	24800	692	ug/Kg
84-74-2	Di-n-butyl phthalate	787U	24800	787	ug/Kg
117-84-0	Di-n-octyl phthalate	816U	24800	816	ug/Kg
53-70-3	Dibenz(a,h)anthracene	725U	24800	725	ug/Kg
132-64-9	Dibenzofuran	386U	24800	386	ug/Kg
84-66-2	Diethyl phthalate	1000U	24800	1000	ug/Kg
131-11-3	Dimethyl phthalate	418U	24800	418	ug/Kg
206-44-0	Fluoranthene	484U	24800	484	ug/Kg
86-73-7	**Fluorene**	**93200**	**24800**	**799**	**ug/Kg**
118-74-1	Hexachlorobenzene	3090U	24800	3090	ug/Kg
87-68-3	Hexachlorobutadiene	1480U	24800	1480	ug/Kg
77-47-4	Hexachlorocyclopentadiene	12300U	24800	12300	ug/Kg
67-72-1	Hexachloroethane	905U	24800	905	ug/Kg
193-39-5	Indeno(1,2,3-cd)pyrene	1530U	24800	1530	ug/Kg
78-59-1	Isophorone	1060U	24800	1060	ug/Kg
98-95-3	Nitrobenzene	890U	24800	890	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033010	**HC 100C**	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/06/2012 06:10	487057	3550C	2	08/06/2012 18:19	JEW	487108

CAS#	Parameter	Result	RDL	MDL	Units
87-86-5	Pentachlorophenol	14000U	124000	14000	ug/Kg
85-01-8	**Phenanthrene**	**3560J**	**24800**	**658**	**ug/Kg**
108-95-2	Phenol	2500U	24800	2500	ug/Kg
129-00-0	Pyrene	570U	24800	570	ug/Kg
110-86-1	Pyridine	12200U	24800	12200	ug/Kg
1319-77-3MP	m,p-Cresol	2920U	24800	2920	ug/Kg
621-64-7	n-Nitrosodi-n-propylamine	917U	24800	917	ug/Kg
62-75-9	n-Nitrosodimethylamine	4580U	24800	4580	ug/Kg
86-30-6	n-Nitrosodiphenylamine	572U	24800	572	ug/Kg
95-48-7	o-Cresol	895U	24800	895	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	5000	Diluted Out	ug/Kg	**0***	46 - 123
321-60-8	2-Fluorobiphenyl	5000	Diluted Out	ug/Kg	**0***	47 - 127
1718-51-0	Terphenyl-d14	5000	Diluted Out	ug/Kg	**0***	38 - 167
4165-62-2	Phenol-d5	10000	Diluted Out	ug/Kg	**0***	43 - 123
367-12-4	2-Fluorophenol	10000	Diluted Out	ug/Kg	**0***	51 - 119
118-79-6	2,4,6-Tribromophenol	10000	Diluted Out	ug/Kg	**0***	44 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			2	08/06/2012 18:19	JEW	487173

CAS#	Parameter	Result	Retention	Units
108-88-3	**Toluene**	**58200**	**1.08**	**ug/Kg**
827-52-1	**Benzene, cyclohexyl-**	**39600**	**3.43**	**ug/Kg**
4218-48-8	**Benzene, 1-ethyl-4-(1-methylethyl)-**	**32700**	**3.54**	**ug/Kg**
778-22-3	**Benzene, 1,1'-(1-methylethylidene)b**	**40800**	**4.26**	**ug/Kg**
26137-53-1	**Naphthalene, 1,2,3-trimethyl-4-prop**	**303000**	**4.55**	**ug/Kg**
14064-82-5	**Benzenamine, 3-(2-phenylethenyl)-,**	**54200**	**4.64**	**ug/Kg**
	Unknown	**49900**	**4.74**	**ug/Kg**
	Unknown	**15000**	**4.84**	**ug/Kg**
74150-88-2	**N-Cyano-N',N',N'',N''-tetramethyl-1**	**37500**	**5.05**	**ug/Kg**
10544-50-0	**Sulfur, mol. (S8)**	**203000**	**5.71**	**ug/Kg**
74421-26-4	**Benzeneethanol, .beta.-methyl-.beta**	**19300**	**6.29**	**ug/Kg**
106-42-3	**p-Xylene**	**55100**	**1.53**	**ug/Kg**
	Unknown	**34600**	**7.16**	**ug/Kg**
95-47-6	**Benzene, 1,2-dimethyl-**	**13200**	**1.64**	**ug/Kg**
98-82-8	**Benzene, (1-methylethyl)-**	**15400**	**1.78**	**ug/Kg**
108-67-8	**Benzene, 1,3,5-trimethyl-**	**9800**	**1.99**	**ug/Kg**
98-51-1	**4-tert-Butyltoluene**	**23200**	**2.53**	**ug/Kg**
700-88-9	**Benzene, cyclopentyl-**	**28400**	**3.07**	**ug/Kg**
1196-58-3	**Benzene, (1-ethylpropyl)-**	**28700**	**3.20**	**ug/Kg**
	Unknown	**34800**	**3.31**	**ug/Kg**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208033010	**HC 100C**	Solid	08/01/2012 14:30	08/03/2012 10:20

SW-846 7471B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/03/2012 16:00	486993	SW-846 7471B	5	08/05/2012 14:35	BNB	487022

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	**Mercury**	**2.39**	**0.074**	**0.034**	**mg/kg**

SW-846 6010B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/03/2012 16:00	486992	SW-846 3050B	2	08/07/2012 12:43	BNB	487175

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	**Aluminum**	**578**	**19.9**	**1.97**	**mg/kg**
7440-36-0	Antimony	0.24U	5.96	0.24	mg/kg
7440-38-2	**Arsenic**	**26.3**	**3.98**	**0.35**	**mg/kg**
7440-39-3	**Barium**	**11.4**	**0.99**	**0.060**	**mg/kg**
7440-41-7	Beryllium	0.0050U	0.50	0.0050	mg/kg
7440-43-9	Cadmium	0.022U	0.50	0.022	mg/kg
7440-70-2	**Calcium**	**143**	**74.6**	**10.9**	**mg/kg**
7440-47-3	**Chromium**	**7890**	**0.99**	**0.045**	**mg/kg**
7440-48-4	**Cobalt**	**48.5**	**0.99**	**0.025**	**mg/kg**
7440-50-8	**Copper**	**150**	**0.99**	**0.077**	**mg/kg**
7439-89-6	**Iron**	**28000**	**9.94**	**1.74**	**mg/kg**
7439-92-1	**Lead**	**98.4**	**1.49**	**0.28**	**mg/kg**
7439-95-4	**Magnesium**	**47.7**	**9.94**	**1.08**	**mg/kg**
7439-96-5	**Manganese**	**647**	**1.49**	**0.035**	**mg/kg**
7440-02-0	**Nickel**	**4740**	**3.98**	**0.052**	**mg/kg**
7440-09-7	**Potassium**	**200**	**49.7**	**5.23**	**mg/kg**
7782-49-2	**Selenium**	**13.9**	**3.98**	**0.33**	**mg/kg**
7440-22-4	Silver	0.055U	0.99	0.055	mg/kg
7440-23-5	**Sodium**	**6000**	**99.4**	**7.54**	**mg/kg**
7440-28-0	**Thallium**	**2.59**	**1.99**	**0.22**	**mg/kg**
7440-62-2	**Vanadium**	**24.7**	**1.99**	**0.037**	**mg/kg**
7440-66-6	**Zinc**	**9.04**	**1.99**	**1.06**	**mg/kg**

SW-846 9045C pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	08/07/2012 13:00	OLT	487010

CAS#	Parameter	Result	RDL	MDL	Units
pH	pH	>DL	1.00	1.00	pH unit

RESULTS REPORTED ON A DRY WEIGHT BASIS

GC/MS Volatiles Quality Control Summary

Analytical Batch 487041	**Client ID**	MB487041	LCS487041	LCSD487041
Prep Batch N/A	**GCAL ID**	1093281	1093282	1093283
	Sample Type	Method Blank	LCS	LCSD
	Analytical Date	08/05/2012 13:31	08/05/2012 11:50	08/05/2012 12:10
	Matrix	Solid	Solid	Solid

SW-846 8260B		**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
67-64-1	Acetone	51.5U	51.5	2500	1690	68	38 - 152	1880	75	11	30
74-97-5	Bromochloromethane	6.75U	6.75	2500	2590	104	73 - 127	2540	102	2	30
75-27-4	Bromodichloromethane	8.10U	8.10	2500	2820	113	74 - 126	2720	109	4	30
75-25-2	Bromoform	7.95U	7.95	2500	2470	99	67 - 122	2540	102	3	30
74-83-9	Bromomethane	15.2U	15.2	2500	2360	94	48 - 139	2310	92	2	30
75-15-0	Carbon disulfide	16.3U	16.3	2500	2780	111	68 - 133	2640	106	5	30
56-23-5	Carbon tetrachloride	10.1U	10.1	2500	2780	111	71 - 133	2700	108	3	30
75-00-3	Chloroethane	16.6U	16.6	2500	2650	106	57 - 144	2600	104	2	30
136777-61-2	m,p-Xylene	14.7U	14.7	5000	5190	104	72 - 128	4950	99	5	30
67-66-3	Chloroform	10.8U	10.8	2500	2750	110	74 - 124	2650	106	4	30
74-87-3	Chloromethane	11.9U	11.9	2500	2760	110	61 - 130	2690	108	3	30
124-48-1	Dibromochloromethane	10.9U	10.9	2500	2750	110	74 - 122	2690	108	2	30
74-95-3	Dibromomethane	11.6U	11.6	2500	2720	109	72 - 125	2580	103	5	30
75-71-8	Dichlorodifluoromethane	11.2U	11.2	2500	2640	106	59 - 138	2720	109	3	30
75-34-3	1,1-Dichloroethane	7.45U	7.45	2500	2670	107	71 - 126	2580	103	3	30
107-06-2	1,2-Dichloroethane	9.90U	9.90	2500	2700	108	68 - 126	2670	107	1	30
156-59-2	cis-1,2-Dichloroethene	7.40U	7.40	2500	2680	107	72 - 130	2610	104	3	30
156-60-5	trans-1,2-Dichloroethene	6.55U	6.55	2500	2660	106	67 - 134	2570	103	3	30
75-09-2	Methylene chloride	22.1U	22.1	2500	2400	96	66 - 130	2330	93	3	30
78-87-5	1,2-Dichloropropane	7.70U	7.70	2500	2740	110	72 - 129	2640	106	4	30
10061-01-5	cis-1,3-Dichloropropene	9.25U	9.25	2500	2480	99	72 - 129	2410	96	3	30
10061-02-6	trans-1,3-Dichloropropene	8.50U	8.50	2500	2410	96	72 - 126	2370	95	2	30
100-41-4	Ethylbenzene	9.15U	9.15	2500	2840	114	74 - 130	2770	111	2	30
591-78-6	2-Hexanone	21.7U	21.7	2500	2050	82	47 - 137	2300	92	11	30
98-82-8	Isopropylbenzene (Cumene)	9.25U	9.25	2500	2640	106	74 - 125	2440	98	8	30
78-93-3	2-Butanone	25.9U	25.9	2500	2130	85	47 - 142	2300	92	8	30
74-88-4	Methyl iodide	61.5U	61.5	2500	2520	101	54 - 140	2440	98	3	30
108-10-1	4-Methyl-2-pentanone	6.60U	6.60	2500	2370	95	52 - 136	2610	104	10	30
103-65-1	n-Propylbenzene	37.0U	37.0	2500	2880	115	73 - 137	2760	110	4	30
100-42-5	Styrene	7.70U	7.70	2500	2510	100	72 - 128	2440	98	3	30
127-18-4	Tetrachloroethene	14.8U	14.8	2500	2900	116	70 - 127	2770	111	5	30
630-20-6	1,1,1,2-Tetrachloroethane	6.75U	6.75	2500	2690	108	77 - 122	2570	103	5	30
79-34-5	1,1,2,2-Tetrachloroethane	5.70U	5.70	2500	2480	99	66 - 129	2720	109	9	30

GC/MS Volatiles Quality Control Summary

Analytical Batch 487041		**Client ID**	MB487041			LCS487041			LCSD487041			
Prep Batch N/A		**GCAL ID**	1093281			1093282			1093283			
		Sample Type	Method Blank			LCS			LCSD			
		Analytical Date	08/05/2012 13:31			08/05/2012 11:50			08/05/2012 12:10			
		Matrix	Solid			Solid			Solid			
SW-846 8260B		**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
120-82-1	1,2,4-Trichlorobenzene	17.8U	17.8	2500	2260	90	64 - 135	2330	93	3	30
71-55-6	1,1,1-Trichloroethane	11.9U	11.9	2500	2820	113	70 - 130	2760	110	2	30
79-00-5	1,1,2-Trichloroethane	6.70U	6.70	2500	2540	102	74 - 120	2560	102	0.8	30
75-69-4	Trichlorofluoromethane	13.1U	13.1	2500	2700	108	64 - 141	2640	106	2	30
96-18-4	1,2,3-Trichloropropane	5.75U	5.75	2500	2280	91	63 - 132	2540	102	11	30
95-63-6	1,2,4-Trimethylbenzene	18.0U	18.0	2500	2570	103	75 - 130	2450	98	5	30
108-67-8	1,3,5-Trimethylbenzene	18.8U	18.8	2500	2610	104	74 - 136	2490	100	5	30
75-01-4	Vinyl chloride	13.6U	13.6	2500	2690	108	67 - 131	2740	110	2	30
95-47-6	o-Xylene	6.75U	6.75	2500	2590	104	69 - 133	2460	98	5	30
96-12-8	1,2-Dibromo-3-chloropropane	20.1U	20.1	2500	2120	85	60 - 123	2530	101	18	30
106-93-4	1,2-Dibromoethane	7.20U	7.20	2500	2620	105	74 - 122	2640	106	0.8	30
108-05-4	Vinyl acetate	7.05U	7.05	2500	2340	94	53 - 140	2330	93	0.4	30
1634-04-4	tert-Butyl methyl ether (MTBE)	6.10U	6.10	2500	2470	99	69 - 126	2540	102	3	30
540-59-0	1,2-Dichloroethene(Total)	11.7U	11.7	5000	5340	107	72 - 129	5180	104	3	30
99-87-6	4-Isopropyltoluene	10.5U	10.5	2500	2660	106	71 - 136	2440	98	9	30
1330-20-7	Xylene (total)	20.1U	20.1	7500	7790	104	71 - 129	7410	99	5	30
110-57-6	trans-1,4-Dichloro-2-butene	25.9U	25.9	2500	2100	84	44 - 146	2330	93	10	30
594-20-7	2,2-Dichloropropane	12.5U	12.5	2500	2820	113	74 - 129	2740	110	3	30
76-13-1	Trichlorotrifluoroethane	10.0U	10.0	2500	2790	112	66 - 139	2660	106	5	30
563-58-6	1,1-Dichloropropene	12.2U	12.2	2500	2800	112	70 - 138	2710	108	3	30
142-28-9	1,3-Dichloropropane	7.90U	7.90	2500	2550	102	77 - 121	2550	102	0	30
108-86-1	Bromobenzene	7.80U	7.80	2500	2630	105	73 - 124	2640	106	0.4	30
95-49-8	2-Chlorotoluene	11.0U	11.0	2500	2790	112	75 - 132	2720	109	3	30
106-43-4	4-Chlorotoluene	11.8U	11.8	2500	2890	116	74 - 133	2850	114	1	30
98-06-6	tert-Butylbenzene	12.8U	12.8	2500	2630	105	72 - 136	2480	99	6	30
135-98-8	sec-Butylbenzene	9.85U	9.85	2500	2690	108	72 - 141	2490	100	8	30
541-73-1	1,3-Dichlorobenzene	13.0U	13.0	2500	2740	110	77 - 127	2650	106	3	30
106-46-7	1,4-Dichlorobenzene	11.6U	11.6	2500	2580	103	74 - 123	2550	102	1	30
104-51-8	n-Butylbenzene	11.7U	11.7	2500	2660	106	68 - 144	2430	97	9	30
95-50-1	1,2-Dichlorobenzene	13.8U	13.8	2500	2610	104	76 - 125	2620	105	0.4	30
87-68-3	Hexachlorobutadiene	10.7U	10.7	2500	3250	130	71 - 140	2830	113	14	30
91-20-3	Naphthalene	16.1U	16.1	2500	1880	75	54 - 132	2200	88	16	30
75-35-4	1,1-Dichloroethene	11.6U	11.6	2500	2720	109	68 - 129	2630	105	3	30

GC/MS Volatiles Quality Control Summary

Analytical Batch	487041	**Client ID**	MB487041			LCS487041				LCSD487041		
Prep Batch	N/A	**GCAL ID**	1093281			1093282				1093283		
		Sample Type	Method Blank			LCS				LCSD		
		Analytical Date	08/05/2012 13:31			08/05/2012 11:50				08/05/2012 12:10		
		Matrix	Solid			Solid				Solid		
SW-846 8260B		**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**			**RPD**	
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**	
71-43-2	Benzene	7.60U	7.60	2500	2750	110	73 - 128	2630	105	4	30	
79-01-6	Trichloroethene	10.7U	10.7	2500	2770	111	78 - 127	2640	106	5	30	
108-88-3	Toluene	7.75U	7.75	2500	2650	106	74 - 121	2530	101	5	30	
108-90-7	Chlorobenzene	7.45U	7.45	2500	2690	108	75 - 121	2560	102	5	30	
110-02-1	Thiophene	0.00										
Surrogate												
460-00-4	4-Bromofluorobenzene	2480	99	2500	2600	104	62 - 127	2570	103			
1868-53-7	Dibromofluoromethane	2480	99	2500	2500	100	65 - 130	2520	101			
2037-26-5	Toluene d8	2580	103	2500	2470	99	71 - 132	2510	100			
17060-07-0	1,2-Dichloroethane-d4	2490	100	2500	2470	99	62 - 125	2420	97			

GC/MS Volatiles Quality Control Summary

Analytical Batch	487299	**Client ID**	MB487299			LCS487299			LCSD487299			
Prep Batch	N/A	**GCAL ID**	1094486			1094487			1094488			
		Sample Type	Method Blank			LCS			LCSD			
		Analytical Date	08/08/2012 14:06			08/08/2012 12:44			08/08/2012 13:04			
		Matrix	Water			Water			Water			
SW-846 8260B TCLP		**Units**	mg/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
56-23-5	Carbon tetrachloride	0.0000563U	0.0000563	0.050	0.055	110	76 - 128	0.052	104	6	30
67-66-3	Chloroform	0.0000616U	0.0000616	0.050	0.054	107	75 - 122	0.052	104	4	30
107-06-2	1,2-Dichloroethane	0.000121U	0.000121	0.050	0.052	103	71 - 129	0.052	103	0	30
78-93-3	2-Butanone	0.000235U	0.000235	0.050	0.049	99	58 - 137	0.052	104	6	30
127-18-4	Tetrachloroethene	0.000141U	0.000141	0.050	0.058	115	68 - 128	0.054	109	7	30
75-01-4	Vinyl chloride	0.000104U	0.000104	0.050	0.052	105	68 - 132	0.053	106	2	30
75-35-4	1,1-Dichloroethene	0.000183U	0.000183	0.050	0.054	107	69 - 129	0.054	107	0	20
71-43-2	Benzene	0.0000490U	0.0000490	0.050	0.054	107	70 - 129	0.053	106	2	20
79-01-6	Trichloroethene	0.0000943U	0.0000943	0.050	0.052	105	76 - 129	0.052	104	0	20
108-90-7	Chlorobenzene	0.0000548U	0.0000548	0.050	0.052	103	74 - 123	0.051	102	2	20
Surrogate											
460-00-4	4-Bromofluorobenzene	47.9	96	50	51.2	102	62 - 130	51.5	103		
1868-53-7	Dibromofluoromethane	50.5	101	50	50	100	65 - 127	49.9	100		
2037-26-5	Toluene d8	52.5	105	50	49.9	100	71 - 134	50.2	100		
17060-07-0	1,2-Dichloroethane-d4	49.3	99	50	49.1	98	62 - 127	49.5	99		

Analytical Batch	487299	**Client ID**	2012153 (TCLP)			1093554MS			1093554MSD			
Prep Batch	N/A	**GCAL ID**	21208062701			1094654			1094655			
		Sample Type	SAMPLE			MS			MSD			
		Analytical Date	08/08/2012 16:17			08/08/2012 18:14			08/08/2012 18:34			
		Matrix	Solid			Solid			Solid			
SW-846 8260B TCLP		**Units**	mg/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
56-23-5	Carbon tetrachloride	0.00	0.00225	2.00	2.12	106	76 - 128	2.14	107	0.9	30
67-66-3	Chloroform	0.00	0.00246	2.00	2.03	102	75 - 122	2.04	102	0.5	30
107-06-2	1,2-Dichloroethane	0.00	0.00484	2.00	1.97	99	71 - 129	1.97	99	0	30
78-93-3	2-Butanone	0.00	0.00940	2.00	1.69	85	58 - 137	1.84	92	8	30
127-18-4	Tetrachloroethene	0.00	0.00564	2.00	2.31	116	68 - 128	2.36	118	2	30
75-01-4	Vinyl chloride	0.00	0.00416	2.00	2.13	107	68 - 132	2.12	106	0.5	30
75-35-4	1,1-Dichloroethene	0.00	0.00732	2.00	2.06	103	69 - 129	2.17	109	5	30
71-43-2	Benzene	0.00	0.00196	2.00	2.09	105	70 - 129	2.12	106	1	30
79-01-6	Trichloroethene	0.00	0.00377	2.00	2.07	104	76 - 129	2.06	103	0.5	30

GC/MS Volatiles Quality Control Summary

Analytical Batch	487299	**Client ID**	2012153 (TCLP)		1093554MS			1093554MSD			
Prep Batch	N/A	**GCAL ID**	21208062701		1094654			1094655			
		Sample Type	SAMPLE		MS			MSD			
		Analytical Date	08/08/2012 16:17		08/08/2012 18:14			08/08/2012 18:34			
		Matrix	Solid		Solid			Solid			
SW-846 8260B TCLP		**Units**	mg/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
108-90-7	Chlorobenzene	0.00	0.00219	2.00	2.05	103	74 - 123	2.11	106	3	30
Surrogate											
460-00-4	4-Bromofluorobenzene			2000	2060	103	62 - 130	2140	107		
1868-53-7	Dibromofluoromethane			2000	1970	99	65 - 127	1940	97		
2037-26-5	Toluene d8			2000	2010	101	71 - 134	2060	103		
17060-07-0	1,2-Dichloroethane-d4			2000	1860	93	62 - 127	1870	94		

GC/MS Volatiles Quality Control Summary

Analytical Batch 487384		**Client ID**	MB487384			LCS487384				LCSD487384		
Prep Batch N/A		**GCAL ID**	1094936			1094937				1094938		
		Sample Type	Method Blank			LCS				LCSD		
		Analytical Date	08/09/2012 13:18			08/09/2012 11:15				08/09/2012 11:57		
		Matrix	Water			Water				Water		
SW-846 8260B SPLP			**Units**	ug/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
			Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
67-64-1	Acetone		0.322U	0.322	50.0	39.0	78	44 - 156	38.2	76	2	30
74-97-5	Bromochloromethane		0.238U	0.238	50.0	49.2	98	76 - 130	46.9	94	5	30
75-27-4	Bromodichloromethane		0.071U	0.071	50.0	47.1	94	74 - 125	45.6	91	3	30
75-25-2	Bromoform		0.278U	0.278	50.0	44.7	89	64 - 122	43.9	88	2	30
74-83-9	Bromomethane		0.276U	0.276	50.0	45.3	91	47 - 138	46.5	93	3	30
75-15-0	Carbon disulfide		0.190U	0.190	50.0	48.2	96	69 - 136	46.9	94	3	30
56-23-5	Carbon tetrachloride		0.056U	0.056	50.0	50.7	101	76 - 128	48.5	97	4	30
75-00-3	Chloroethane		0.279U	0.279	50.0	44.9	90	62 - 141	42.1	84	6	30
136777-61-2	m,p-Xylene		0.099U	0.099	100	99.1	99	74 - 126	98.2	98	0.9	30
67-66-3	Chloroform		0.062U	0.062	50.0	46.3	93	75 - 122	45.1	90	3	30
74-87-3	Chloromethane		0.076U	0.076	50.0	43.6	87	59 - 132	43.3	87	0.7	30
124-48-1	Dibromochloromethane		0.133U	0.133	50.0	45.5	91	71 - 123	46.7	93	3	30
74-95-3	Dibromomethane		0.197U	0.197	50.0	45.5	91	72 - 129	45.4	91	0.2	30
75-71-8	Dichlorodifluoromethane		0.088U	0.088	50.0	47.0	94	58 - 140	46.6	93	0.9	30
75-34-3	1,1-Dichloroethane		0.064U	0.064	50.0	46.3	93	74 - 127	45.0	90	3	30
107-06-2	1,2-Dichloroethane		0.121U	0.121	50.0	47.0	94	71 - 129	45.6	91	3	30
156-59-2	cis-1,2-Dichloroethene		0.104U	0.104	50.0	47.4	95	73 - 130	46.3	93	2	30
156-60-5	trans-1,2-Dichloroethene		0.096U	0.096	50.0	46.2	92	69 - 132	45.5	91	2	30
75-09-2	Methylene chloride		0.102U	0.102	50.0	45.1	90	68 - 132	45.0	90	0.2	30
78-87-5	1,2-Dichloropropane		0.114U	0.114	50.0	48.0	96	72 - 128	45.7	91	5	30
10061-01-5	cis-1,3-Dichloropropene		0.105U	0.105	50.0	48.0	96	71 - 132	47.1	94	2	30
10061-02-6	trans-1,3-Dichloropropene		0.068U	0.068	50.0	50.1	100	71 - 131	48.7	97	3	30
100-41-4	Ethylbenzene		0.180U	0.180	50.0	49.1	98	74 - 126	48.0	96	2	30
591-78-6	2-Hexanone		0.302U	0.302	50.0	42.7	85	50 - 135	44.4	89	4	30
98-82-8	Isopropylbenzene (Cumene)		0.058U	0.058	50.0	53.3	107	71 - 125	52.7	105	1	30
78-93-3	2-Butanone		0.235U	0.235	50.0	43.3	87	58 - 137	43.6	87	0.7	30
74-88-4	Methyl iodide		0.097U	0.097	50.0	44.5	89	57 - 141	46.7	93	5	30
108-10-1	4-Methyl-2-pentanone		0.142U	0.142	50.0	43.2	86	57 - 132	42.6	85	1	30
103-65-1	n-Propylbenzene		0.069U	0.069	50.0	51.3	103	75 - 129	50.7	101	1	30
100-42-5	Styrene		0.058U	0.058	50.0	44.7	89	71 - 127	43.5	87	3	30
127-18-4	Tetrachloroethene		0.141U	0.141	50.0	48.9	98	68 - 128	48.9	98	0	30
630-20-6	1,1,1,2-Tetrachloroethane		0.150U	0.150	50.0	47.9	96	75 - 124	48.9	98	2	30
79-34-5	1,1,2,2-Tetrachloroethane		0.112U	0.112	50.0	43.8	88	70 - 122	43.8	88	0	30

GC/MS Volatiles Quality Control Summary

Analytical Batch 487384		**Client ID**	MB487384			LCS487384				LCSD487384		
Prep Batch N/A		**GCAL ID**	1094936			1094937				1094938		
		Sample Type	Method Blank			LCS				LCSD		
		Analytical Date	08/09/2012 13:18			08/09/2012 11:15				08/09/2012 11:57		
		Matrix	Water			Water				Water		
SW-846 8260B SPLP		**Units**	ug/L	**Spike**	**Result**		**Control**		**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**			**% R**	**RPD**	**Limit**
120-82-1	1,2,4-Trichlorobenzene	0.138U	0.138	50.0	50.2	100	61 - 135		50.8	102	1	30
71-55-6	1,1,1-Trichloroethane	0.078U	0.078	50.0	48.1	96	76 - 126		46.4	93	4	30
79-00-5	1,1,2-Trichloroethane	0.179U	0.179	50.0	46.7	93	72 - 121		46.4	93	0.6	30
75-69-4	Trichlorofluoromethane	0.094U	0.094	50.0	45.3	91	72 - 136		43.3	87	5	30
96-18-4	1,2,3-Trichloropropane	0.063U	0.063	50.0	43.5	87	70 - 120		44.4	89	2	30
95-63-6	1,2,4-Trimethylbenzene	0.080U	0.080	50.0	52.3	105	74 - 125		52.3	105	0	30
108-67-8	1,3,5-Trimethylbenzene	0.053U	0.053	50.0	51.0	102	71 - 132		51.5	103	1	30
75-01-4	Vinyl chloride	0.104U	0.104	50.0	46.5	93	68 - 132		44.8	90	4	30
95-47-6	o-Xylene	0.077U	0.077	50.0	50.6	101	73 - 130		50.4	101	0.4	30
96-12-8	1,2-Dibromo-3-chloropropane	0.082U	0.082	50.0	38.2	76	57 - 121		38.3	77	0.3	30
106-93-4	1,2-Dibromoethane	0.169U	0.169	50.0	46.7	93	70 - 124		46.9	94	0.4	30
108-05-4	Vinyl acetate	0.197U	0.197	50.0	120	**240***	54 - 147		108	**216***	11	30
1634-04-4	tert-Butyl methyl ether (MTBE)	0.084U	0.084	50.0	44.5	89	71 - 125		44.7	89	0.4	30
540-59-0	1,2-Dichloroethene(Total)	0.169U	0.169	100	93.6	94	74 - 128		91.8	92	2	30
99-87-6	4-Isopropyltoluene	0.175U	0.175	50.0	55.0	110	71 - 129		54.1	108	2	30
1330-20-7	Xylene (total)	0.123U	0.123	150	150	100	74 - 127		149	99	0.7	30
110-57-6	trans-1,4-Dichloro-2-butene	0.429U	0.429	50.0	39.7	79	56 - 132		41.3	83	4	30
594-20-7	2,2-Dichloropropane	0.112U	0.112	50.0	48.4	97	77 - 124		45.6	91	6	30
76-13-1	Trichlorotrifluoroethane	0.141U	0.141	50.0	50.2	100	72 - 136		48.4	97	4	30
563-58-6	1,1-Dichloropropene	0.071U	0.071	50.0	49.4	99	72 - 131		48.7	97	1	30
142-28-9	1,3-Dichloropropane	0.113U	0.113	50.0	46.3	93	74 - 122		45.8	92	1	30
108-86-1	Bromobenzene	0.095U	0.095	50.0	46.3	93	71 - 120		47.1	94	2	30
95-49-8	2-Chlorotoluene	0.090U	0.090	50.0	48.3	97	72 - 127		49.3	99	2	30
106-43-4	4-Chlorotoluene	0.046U	0.046	50.0	49.2	98	75 - 126		49.6	99	0.8	30
98-06-6	tert-Butylbenzene	0.058U	0.058	50.0	51.8	104	72 - 126		51.2	102	1	30
135-98-8	sec-Butylbenzene	0.088U	0.088	50.0	52.9	106	70 - 136		52.6	105	0.6	30
541-73-1	1,3-Dichlorobenzene	0.080U	0.080	50.0	47.0	94	74 - 126		47.3	95	0.6	30
106-46-7	1,4-Dichlorobenzene	0.058U	0.058	50.0	45.1	90	72 - 122		45.6	91	1	30
104-51-8	n-Butylbenzene	0.068U	0.068	50.0	53.4	107	69 - 134		52.9	106	0.9	30
95-50-1	1,2-Dichlorobenzene	0.086U	0.086	50.0	46.4	93	71 - 126		46.8	94	0.9	30
87-68-3	Hexachlorobutadiene	0.347U	0.347	50.0	51.3	103	61 - 144		49.7	99	3	30
91-20-3	Naphthalene	0.175U	0.175	50.0	39.9	80	57 - 138		41.8	84	5	30
75-35-4	1,1-Dichloroethene	0.183U	0.183	50.0	47.9	96	69 - 129		46.4	93	3	22

GCAL Report 212080330

GC/MS Volatiles Quality Control Summary

Analytical Batch 487384	**Client ID**	MB487384	LCS487384	LCSD487384	
Prep Batch N/A	**GCAL ID**	1094936	1094937	1094938	
	Sample Type	Method Blank	LCS	LCSD	
	Analytical Date	08/09/2012 13:18	08/09/2012 11:15	08/09/2012 11:57	
	Matrix	Water	Water	Water	

SW-846 8260B SPLP		**Units**	ug/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
71-43-2	Benzene	0.049U	0.049	50.0	46.4	93	70 - 129	45.8	92	1	21
79-01-6	Trichloroethene	0.094U	0.094	50.0	45.3	91	76 - 129	45.0	90	0.7	24
108-88-3	Toluene	0.078U	0.078	50.0	44.8	90	72 - 120	44.7	89	0.2	21
108-90-7	Chlorobenzene	0.055U	0.055	50.0	46.1	92	74 - 123	46.0	92	0.2	21
110-02-1	Thiophene	0.00									
Surrogate											
460-00-4	4-Bromofluorobenzene	49.1	98	50	50.9	102	78 - 130	50.8	102		
1868-53-7	Dibromofluoromethane	49.1	98	50	49.7	99	77 - 127	49.1	98		
2037-26-5	Toluene d8	50.6	101	50	49.8	100	76 - 134	49.6	99		
17060-07-0	1,2-Dichloroethane-d4	51.5	103	50	49.6	99	71 - 127	48.5	97		

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	487108	**Client ID**	MB487057	LCS487057	LCSD487057
Prep Batch	487057	**GCAL ID**	1093320	1093321	1093322
Prep Method	3550C	**Sample Type**	Method Blank	LCS	LCSD
		Prep Date	08/06/2012 06:10	08/06/2012 06:10	08/06/2012 06:10
		Analytical Date	08/06/2012 13:36	08/06/2012 13:50	08/06/2012 14:04
		Matrix	Solid	Solid	Solid

SW-846 8270C		**Units**	ug/Kg	**Spike**	**Result**	**% R**	**Control**	**Result**	**% R**	**RPD**	**RPD**
		Result	**RDL**	**Added**			**Limits % R**				**Limit**
208-96-8	Acenaphthylene	10.1U	10.1								
120-12-7	Anthracene	8.24U	8.24								
56-55-3	Benzo(a)anthracene	29.2U	29.2								
205-99-2	Benzo(b)fluoranthene	50.7U	50.7								
207-08-9	Benzo(k)fluoranthene	7.63U	7.63								
191-24-2	Benzo(g,h,i)perylene	11.2U	11.2								
50-32-8	Benzo(a)pyrene	8.85U	8.85								
85-68-7	Butyl benzyl phthalate	8.87U	8.87								
111-91-1	Bis(2-Chloroethoxy)methane	18.7U	18.7								
111-44-4	Bis(2-Chloroethyl)ether	27.9U	27.9								
108-60-1	Bis(2-Chloroisopropyl)ether	26.0U	26.0								
117-81-7	Bis(2-Ethylhexyl)phthalate	16.5U	16.5								
101-55-3	4-Bromophenyl phenyl ether	24.8U	24.8								
86-74-8	Carbazole	22.8U	22.8								
7005-72-3	4-Chlorophenyl phenyl ether	26.7U	26.7								
218-01-9	Chrysene	9.21U	9.21								
53-70-3	Dibenz(a,h)anthracene	9.65U	9.65								
132-64-9	Dibenzofuran	5.13U	5.13								
91-94-1	3,3'-Dichlorobenzidine	112U	112								
120-83-2	2,4-Dichlorophenol	27.3U	27.3								
84-66-2	Diethyl phthalate	13.4U	13.4								
105-67-9	2,4-Dimethylphenol	152U	152								
131-11-3	Dimethyl phthalate	5.57U	5.57								
117-84-0	Di-n-octyl phthalate	10.9U	10.9								
51-28-5	2,4-Dinitrophenol	141U	141								
606-20-2	2,6-Dinitrotoluene	32.6U	32.6								
206-44-0	Fluoranthene	6.44U	6.44								
86-73-7	Fluorene	10.6U	10.6								
118-74-1	Hexachlorobenzene	41.2U	41.2								
87-68-3	Hexachlorobutadiene	19.7U	19.7								
77-47-4	Hexachlorocyclopentadiene	164U	164								
67-72-1	Hexachloroethane	12.0U	12.0								

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	487108	**Client ID**	MB487057			LCS487057			LCSD487057			
Prep Batch	487057	**GCAL ID**	1093320			1093321			1093322			
Prep Method	3550C	**Sample Type**	Method Blank			LCS			LCSD			
		Prep Date	08/06/2012 06:10			08/06/2012 06:10			08/06/2012 06:10			
		Analytical Date	08/06/2012 13:36			08/06/2012 13:50			08/06/2012 14:04			
		Matrix	Solid			Solid			Solid			
SW-846 8270C		**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**		**RPD**	**RPD**	
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**		**Limit**	
78-59-1	Isophorone	14.1U	14.1									
193-39-5	Indeno(1,2,3-cd)pyrene	20.3U	20.3									
91-57-6	2-Methylnaphthalene	10.4U	10.4									
95-48-7	o-Cresol	11.9U	11.9									
98-95-3	Nitrobenzene	11.8U	11.8									
88-75-5	2-Nitrophenol	22.4U	22.4									
62-75-9	n-Nitrosodimethylamine	61.0U	61.0									
86-30-6	n-Nitrosodiphenylamine	7.61U	7.61									
85-01-8	Phenanthrene	8.75U	8.75									
95-95-4	2,4,5-Trichlorophenol	16.7U	16.7									
88-06-2	2,4,6-Trichlorophenol	134U	134									
100-51-6	Benzyl alcohol	36.6U	36.6									
62-53-3	Aniline	27.9U	27.9									
110-86-1	Pyridine	162U	162									
99-09-2	3-Nitroaniline	23.7U	23.7									
100-01-6	4-Nitroaniline	220U	220									
84-74-2	Di-n-butyl phthalate	10.5U	10.5									
122-66-7	1,2Diphenylhydrazine/Azobenzen	7.46U	7.46									
88-74-4	2-Nitroaniline	18.1U	18.1									
91-58-7	2-Chloronaphthalene	4.23U	4.23									
106-47-8	4-Chloroaniline	27.8U	27.8									
1319-77-3MP	m,p-Cresol	38.9U	38.9									
534-52-1	4,6-Dinitro-2-methylphenol	148U	148									
108-95-2	Phenol	33.3U	33.3	3330	2820	85	42 - 120	2970	89	5	40	
95-57-8	2-Chlorophenol	13.5U	13.5	3330	3080	92	48 - 120	3120	94	1	40	
106-46-7	1,4-Dichlorobenzene	6.23U	6.23	3330	2850	86	42 - 120	2920	88	2	40	
621-64-7	n-Nitrosodi-n-propylamine	12.2U	12.2	3330	2910	87	46 - 120	2920	88	0.3	40	
120-82-1	1,2,4-Trichlorobenzene	12.4U	12.4	3330	2740	82	46 - 120	2690	81	2	40	
59-50-7	4-Chloro-3-methylphenol	35.2U	35.2	3330	2730	82	46 - 120	2930	88	7	40	
83-32-9	Acenaphthene	8.66U	8.66	3330	2730	82	50 - 120	2730	82	0	40	
100-02-7	4-Nitrophenol	213U	213	3330	2970	89	32 - 120	2800	84	6	40	
121-14-2	2,4-Dinitrotoluene	37.8U	37.8	3330	3060	92	45 - 120	3090	93	1	40	

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	487108	**Client ID**	MB487057	LCS487057	LCSD487057
Prep Batch	487057	**GCAL ID**	1093320	1093321	1093322
Prep Method	3550C	**Sample Type**	Method Blank	LCS	LCSD
		Prep Date	08/06/2012 06:10	08/06/2012 06:10	08/06/2012 06:10
		Analytical Date	08/06/2012 13:36	08/06/2012 13:50	08/06/2012 14:04
		Matrix	Solid	Solid	Solid

SW-846 8270C		**Units**	ug/Kg	**Spike**							
		Result	**RDL**	**Added**	**Result**	**% R**	**Control Limits % R**	**Result**	**% R**	**RPD**	**RPD Limit**
87-86-5	Pentachlorophenol	186U	186	3330	3470	104	30 - 124	3630	109	5	40
129-00-0	Pyrene	7.59U	7.59	3330	2340	70	38 - 136	2480	74	6	40
Surrogate											
4165-60-0	Nitrobenzene-d5	1470	88	1670	1440	86	46 - 123	1390	83		
321-60-8	2-Fluorobiphenyl	1470	88	1670	1400	84	47 - 127	1330	80		
1718-51-0	Terphenyl-d14	1280	77	1670	1260	76	38 - 167	1330	80		
4165-62-2	Phenol-d5	2780	83	3330	3030	91	43 - 123	3090	93		
367-12-4	2-Fluorophenol	2930	88	3330	3090	93	51 - 119	3110	93		
118-79-6	2,4,6-Tribromophenol	3450	104	3330	3240	97	44 - 121	3220	97		

Analytical Batch	487108	**Client ID**	HC 100C	1093011MS	1093011MSD
Prep Batch	487057	**GCAL ID**	21208033010	1093323	1093324
Prep Method	3550C	**Sample Type**	SAMPLE	MS	MSD
		Prep Date	08/06/2012 06:10	08/06/2012 06:10	08/06/2012 06:10
		Analytical Date	08/06/2012 18:19	08/06/2012 18:34	08/06/2012 18:48
		Matrix	Solid	Solid	Solid

SW-846 8270C		**Units**	ug/Kg	**Spike**							
		Result	**RDL**	**Added**	**Result**	**% R**	**Control Limits % R**	**Result**	**% R**	**RPD**	**RPD Limit**
108-95-2	Phenol	0.00	2000	10000	9450	95	42 - 120	8450	85	11	40
95-57-8	2-Chlorophenol	0.00	813	10000	9700	97	48 - 120	9200	92	5	40
106-46-7	1,4-Dichlorobenzene	8620	374	10000	19800	112	42 - 120	22200	**136***	11	40
621-64-7	n-Nitrosodi-n-propylamine	0.00	732	10000	9240	92	46 - 120	7310	73	23	40
120-82-1	1,2,4-Trichlorobenzene	0.00	743	10000	10300	103	46 - 120	9720	97	6	40
59-50-7	4-Chloro-3-methylphenol	0.00	2110	10000	18000	**180***	46 - 120	15100	**151***	18	40
83-32-9	Acenaphthene	3510	519	10000	12900	94	50 - 120	17200	**137***	29	40
100-02-7	4-Nitrophenol	0.00	12800	10000	0.00	**0***	32 - 120	0.00	**0***	0	40
121-14-2	2,4-Dinitrotoluene	0.00	2270	10000	0.00	**0***	45 - 120	0.00	**0***	0	40
87-86-5	Pentachlorophenol	0.00	11200	10000	13300	**133***	30 - 124	12800	**128***	4	40
129-00-0	Pyrene	0.00	455	10000	8740	87	38 - 136	7350	74	17	40
Surrogate											
4165-60-0	Nitrobenzene-d5	0	**0***	5000	0	**0***	46 - 123	0	**0***		

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	487108	**Client ID**	HC 100C	1093011MS	1093011MSD
Prep Batch	487057	**GCAL ID**	21208033010	1093323	1093324
Prep Method	3550C	**Sample Type**	SAMPLE	MS	MSD
		Prep Date	08/06/2012 06:10	08/06/2012 06:10	08/06/2012 06:10
		Analytical Date	08/06/2012 18:19	08/06/2012 18:34	08/06/2012 18:48
		Matrix	Solid	Solid	Solid

SW-846 8270C		**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
321-60-8	2-Fluorobiphenyl	0	0*	5000	0	0*	47 - 127	0	0*		
1718-51-0	Terphenyl-d14	0	0*	5000	0	0*	38 - 167	0	0*		
4165-62-2	Phenol-d5	0	0*	10000	0	0*	43 - 123	0	0*		
367-12-4	2-Fluorophenol	0	0*	10000	0	0*	51 - 119	0	0*		
118-79-6	2,4,6-Tribromophenol	0	0*	10000	0	0*	44 - 121	0	0*		

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	487309	**Client ID**	MB487177	LCS487177	LCSD487177
Prep Batch	487177	**GCAL ID**	1093842	1093843	1093844
Prep Method	SW-846	**Sample Type**	Method Blank	LCS	LCSD
	3510C	**Prep Date**	08/07/2012 09:00	08/07/2012 09:00	08/07/2012 09:00
		Analytical Date	08/08/2012 13:15	08/08/2012 13:32	08/08/2012 13:49
		Matrix	Water	Water	Water

SW-846 8270C TCLP		**Units**	mg/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
118-74-1	Hexachlorobenzene	0.0012U	0.0012	0.100	0.085	85	61 - 120	0.085	85	0.5	30
87-68-3	Hexachlorobutadiene	0.0010U	0.0010	0.100	0.089	89	17 - 120	0.088	88	1	30
67-72-1	Hexachloroethane	0.0015U	0.0015	0.100	0.093	93	21 - 120	0.093	93	0	30
95-48-7	o-Cresol	0.0016U	0.0016	0.100	0.073	73	31 - 125	0.074	74	2	30
98-95-3	Nitrobenzene	0.0016U	0.0016	0.100	0.086	86	53 - 120	0.085	85	1	30
95-95-4	2,4,5-Trichlorophenol	0.0016U	0.0016	0.100	0.094	94	60 - 120	0.098	98	5	30
88-06-2	2,4,6-Trichlorophenol	0.0014U	0.0014	0.100	0.090	90	59 - 120	0.092	92	3	30
110-86-1	Pyridine	0.0179U	0.0179	0.100	0.037	37	10 - 120	0.039	39	4	30
1319-77-3	Cresols	0.0034U	0.0034	0.200	0.136	68	24 - 125	0.141	71	4	30
1319-77-3MP	m,p-Cresol	0.0018U	0.0018	0.100	0.064	64	24 - 125	0.066	66	4	30
106-46-7	1,4-Dichlorobenzene	0.0013U	0.0013	0.100	0.089	89	22 - 120	0.089	89	0.4	30
121-14-2	2,4-Dinitrotoluene	0.0013U	0.0013	0.100	0.099	99	37 - 138	0.094	94	5	30
87-86-5	Pentachlorophenol	0.0008U	0.0008	0.100	0.095	95	20 - 120	0.098	98	3	30
Surrogate											
4165-60-0	Nitrobenzene-d5	42.2	84	50	45.7	91	48 - 123	44.6	89		
321-60-8	2-Fluorobiphenyl	40.9	82	50	46.9	94	16 - 128	45.3	91		
1718-51-0	Terphenyl-d14	47.3	95	50	39.7	79	38 - 167	49.1	98		
4165-62-2	Phenol-d5	32.9	33	100	37.6	38	10 - 123	36.4	36		
367-12-4	2-Fluorophenol	49.5	50	100	51.6	52	10 - 120	53.8	54		
118-79-6	2,4,6-Tribromophenol	80.6	81	100	97.1	97	44 - 121	96.8	97		

Analytical Batch	487309	**Client ID**	VR 100 (TCLP)	1093002MS	1093002MSD
Prep Batch	487177	**GCAL ID**	21208033001	1093845	1093846
Prep Method	SW-846	**Sample Type**	SAMPLE	MS	MSD
	3510C	**Prep Date**	08/07/2012 09:00	08/07/2012 09:00	08/07/2012 09:00
		Analytical Date	08/08/2012 18:38	08/08/2012 18:54	08/08/2012 19:25
		Matrix	Solid	Solid	Solid

SW-846 8270C TCLP		**Units**	mg/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
118-74-1	Hexachlorobenzene	0.00	0.0125	0.500	0.400	80	61 - 120	0.442	88	10	30
87-68-3	Hexachlorobutadiene	0.00	0.0096	0.500	0.409	82	17 - 120	0.470	94	14	30

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	487309	**Client ID**	VR 100 (TCLP)	1093002MS	1093002MSD
Prep Batch	487177	**GCAL ID**	21208033001	1093845	1093846
Prep Method	SW-846	**Sample Type**	SAMPLE	MS	MSD
	3510C	**Prep Date**	08/07/2012 09:00	08/07/2012 09:00	08/07/2012 09:00
		Analytical Date	08/08/2012 18:38	08/08/2012 18:54	08/08/2012 19:25
		Matrix	Solid	Solid	Solid

SW-846 8270C TCLP		**Units**	mg/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
67-72-1	Hexachloroethane	0.00	0.0150	0.500	0.467	93	21 - 120	0.509	102	9	30
95-48-7	o-Cresol	0.026	0.0165	0.500	0.371	69	31 - 125	0.437	82	16	30
98-95-3	Nitrobenzene	0.00	0.0165	0.500	0.427	85	53 - 120	0.484	97	13	30
95-95-4	2,4,5-Trichlorophenol	0.00	0.0159	0.500	0.419	84	60 - 120	0.472	94	12	30
88-06-2	2,4,6-Trichlorophenol	0.00	0.0138	0.500	0.416	83	59 - 120	0.460	92	10	30
110-86-1	Pyridine	0.014	0.1790	0.500	0.232	44	10 - 120	0.273	52	16	30
1319-77-3	Cresols	0.241	0.0341	1.00	0.910	67	24 - 125	1.01	77	10	30
1319-77-3MP	m,p-Cresol	0.214	0.0176	0.500	0.539	65	24 - 125	0.578	73	7	30
106-46-7	1,4-Dichlorobenzene	0.083	0.0128	1.00	0.531	45	22 - 120	0.575	49	8	30
121-14-2	2,4-Dinitrotoluene	0.00	0.0132	1.00	0.446	45	37 - 138	0.432	43	3	30
87-86-5	Pentachlorophenol	0.00	0.0084	1.00	0.438	44	25 - 158	0.476	48	8	30

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	487309	**Client ID**	MB487177	LCS487177	LCSD487177
Prep Batch	487177	**GCAL ID**	1093842	1093843	1093844
Prep Method	SW-846	**Sample Type**	Method Blank	LCS	LCSD
	3510C	**Prep Date**	08/07/2012 09:00	08/07/2012 09:00	08/07/2012 09:00
		Analytical Date	08/08/2012 13:15	08/08/2012 13:32	08/08/2012 13:49
		Matrix	Water	Water	Water

SW-846 8270C TCLP		**Units**	ug/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
208-96-8	Acenaphthylene	0.303U	0.303	100	97.6	98	57 - 123	97.1	97	0.5	50
120-12-7	Anthracene	0.316U	0.316	100	95.4	95	59 - 120	97.4	97	2	50
56-55-3	Benzo(a)anthracene	0.316U	0.316	100	89.6	90	57 - 121	91.6	92	2	50
205-99-2	Benzo(b)fluoranthene	0.217U	0.217	100	86.1	86	41 - 127	105	105	20	50
207-08-9	Benzo(k)fluoranthene	0.236U	0.236	100	93.1	93	37 - 136	86.2	86	8	50
191-24-2	Benzo(g,h,i)perylene	0.215U	0.215	100	91.9	92	32 - 141	95.6	96	4	50
50-32-8	Benzo(a)pyrene	0.125U	0.125	100	92.0	92	47 - 124	96.1	96	4	50
85-68-7	Butyl benzyl phthalate	0.165U	0.165	100	92.4	92	58 - 126	97.9	98	6	50
111-91-1	Bis(2-Chloroethoxy)methane	0.290U	0.290	100	89.2	89	60 - 120	87.8	88	2	50
111-44-4	Bis(2-Chloroethyl)ether	0.288U	0.288	100	94.5	95	54 - 120	94.4	94	0.1	50
108-60-1	Bis(2-Chloroisopropyl)ether	0.257U	0.257	100	92.3	92	51 - 120	92.9	93	0.6	50
117-81-7	Bis(2-Ethylhexyl)phthalate	0.191U	0.191	100	96.3	96	55 - 130	103	103	7	50
101-55-3	4-Bromophenyl phenyl ether	0.337U	0.337	100	88.3	88	60 - 120	92.5	93	5	50
86-74-8	Carbazole	0.232U	0.232	100	90.3	90	59 - 120	91.0	91	0.8	50
7005-72-3	4-Chlorophenyl phenyl ether	0.268U	0.268	99	91.2	92	59 - 120	89.1	90	2	50
218-01-9	Chrysene	0.433U	0.433	100	88.1	88	60 - 120	91.1	91	3	50
53-70-3	Dibenz(a,h)anthracene	0.217U	0.217	100	102	102	31 - 143	103	103	1	50
132-64-9	Dibenzofuran	0.227U	0.227	100	90.7	91	60 - 120	88.7	89	2	50
91-94-1	3,3'-Dichlorobenzidine	0.297U	0.297	100	95.2	95	54 - 135	97.7	98	3	50
120-83-2	2,4-Dichlorophenol	0.217U	0.217	100	87.7	88	61 - 120	90.2	90	3	50
84-66-2	Diethyl phthalate	0.303U	0.303	100	92.2	92	52 - 128	89.6	90	3	50
105-67-9	2,4-Dimethylphenol	0.694U	0.694	100	80.6	81	43 - 120	84.9	85	5	50
131-11-3	Dimethyl phthalate	0.255U	0.255	100	90.1	90	62 - 120	90.1	90	0	50
117-84-0	Di-n-octyl phthalate	0.167U	0.167	100	89.9	90	47 - 133	93.7	94	4	50
51-28-5	2,4-Dinitrophenol	2.60U	2.60	100	78.9	79	25 - 136	82.6	83	5	50
606-20-2	2,6-Dinitrotoluene	0.352U	0.352	100	97.2	97	58 - 120	95.6	96	2	50
206-44-0	Fluoranthene	0.267U	0.267	100	96.7	97	60 - 120	92.7	93	4	50
86-73-7	Fluorene	0.288U	0.288	100	92.8	93	58 - 120	90.9	91	2	50
118-74-1	Hexachlorobenzene	0.249U	0.249	100	84.6	85	54 - 120	85.3	85	0.8	50
87-68-3	Hexachlorobutadiene	0.192U	0.192	100	89.2	89	47 - 120	87.8	88	2	50
77-47-4	Hexachlorocyclopentadiene	0.174U	0.174	100	88.1	88	28 - 120	90.8	91	3	50
67-72-1	Hexachloroethane	0.299U	0.299	100	93.0	93	40 - 120	93.3	93	0.3	50

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	487309	**Client ID**	MB487177	LCS487177	LCSD487177
Prep Batch	487177	**GCAL ID**	1093842	1093843	1093844
Prep Method	SW-846	**Sample Type**	Method Blank	LCS	LCSD
	3510C	**Prep Date**	08/07/2012 09:00	08/07/2012 09:00	08/07/2012 09:00
		Analytical Date	08/08/2012 13:15	08/08/2012 13:32	08/08/2012 13:49
		Matrix	Water	Water	Water

SW-846 8270C TCLP		**Units**	ug/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
78-59-1	Isophorone	0.380U	0.380	100	90.9	91	56 - 120	91.8	92	1	50
193-39-5	Indeno(1,2,3-cd)pyrene	0.157U	0.157	100	95.4	95	40 - 154	99.3	99	4	50
91-57-6	2-Methylnaphthalene	0.255U	0.255	100	87.8	88	45 - 121	88.9	89	1	50
95-48-7	o-Cresol	0.329U	0.329	100	72.8	73	40 - 120	74.3	74	2	50
98-95-3	Nitrobenzene	0.329U	0.329	100	86.1	86	49 - 120	84.7	85	2	50
88-75-5	2-Nitrophenol	0.357U	0.357	100	89.2	89	60 - 120	90.7	91	2	50
62-75-9	n-Nitrosodimethylamine	0.304U	0.304	100	62.4	62	21 - 120	60.2	60	4	50
86-30-6	n-Nitrosodiphenylamine	0.364U	0.364	100	87.8	88	63 - 122	92.1	92	5	50
85-01-8	Phenanthrene	0.304U	0.304	100	91.6	92	65 - 120	90.9	91	0.8	50
95-95-4	2,4,5-Trichlorophenol	0.317U	0.317	100	93.5	94	58 - 120	98.4	98	5	50
88-06-2	2,4,6-Trichlorophenol	0.275U	0.275	100	89.5	90	57 - 120	92.1	92	3	50
100-51-6	Benzyl alcohol	0.355U	0.355	100	77.5	78	44 - 120	83.0	83	7	50
62-53-3	Aniline	0.718U	0.718	100	272	**272***	19 - 124	259	**259***	5	50
110-86-1	Pyridine	3.58U	3.58	100	37.3	37	2 - 120	38.6	39	3	50
99-09-2	3-Nitroaniline	0.226U	0.226	100	87.4	87	57 - 126	87.3	87	0.1	50
100-01-6	4-Nitroaniline	0.221U	0.221	101	95.0	94	45 - 138	91.0	90	4	50
84-74-2	Di-n-butyl phthalate	0.189U	0.189	100	97.5	98	58 - 130	93.4	93	4	50
122-66-7	1,2Diphenylhydrazine/Azobenzen	0.278U	0.278	100	85.6	86	57 - 120	87.8	88	3	50
88-74-4	2-Nitroaniline	0.198U	0.198	100	94.7	95	58 - 121	90.9	91	4	50
91-58-7	2-Chloronaphthalene	0.221U	0.221	100	85.5	86	56 - 120	84.2	84	2	50
106-47-8	4-Chloroaniline	0.463U	0.463	100	126	126	50 - 134	125	125	0.8	50
1319-77-3MP	m,p-Cresol	0.352U	0.352	100	63.5	64	35 - 120	66.3	66	4	50
534-52-1	4,6-Dinitro-2-methylphenol	1.98U	1.98	100	85.7	86	52 - 120	91.3	91	6	50
108-95-2	Phenol	0.150U	0.150	100	40.9	41	16 - 120	42.3	42	3	25
95-57-8	2-Chlorophenol	0.276U	0.276	100	79.9	80	48 - 120	84.6	85	6	24
106-46-7	1,4-Dichlorobenzene	0.255U	0.255	100	89.4	89	44 - 120	89.3	89	0.1	30
621-64-7	n-Nitrosodi-n-propylamine	0.304U	0.304	100	97.9	98	55 - 120	96.0	96	2	32
120-82-1	1,2,4-Trichlorobenzene	0.234U	0.234	100	86.8	87	49 - 120	87.2	87	0.5	31
59-50-7	4-Chloro-3-methylphenol	0.234U	0.234	100	82.5	83	50 - 120	85.9	86	4	26
83-32-9	Acenaphthene	0.268U	0.268	100	89.4	89	56 - 120	87.7	88	2	32
100-02-7	4-Nitrophenol	1.83U	1.83	100	42.9	43	3 - 120	50.8	51	17	31
121-14-2	2,4-Dinitrotoluene	0.263U	0.263	100	98.7	99	57 - 127	94.4	94	4	33

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	487309	**Client ID**	MB487177	LCS487177	LCSD487177
Prep Batch	487177	**GCAL ID**	1093842	1093843	1093844
Prep Method	SW-846	**Sample Type**	Method Blank	LCS	LCSD
	3510C	**Prep Date**	08/07/2012 09:00	08/07/2012 09:00	08/07/2012 09:00
		Analytical Date	08/08/2012 13:15	08/08/2012 13:32	08/08/2012 13:49
		Matrix	Water	Water	Water

SW-846 8270C TCLP		**Units**	ug/L								
		Result	**RDL**	**Spike Added**	**Result**	**% R**	**Control Limits % R**	**Result**	**% R**	**RPD**	**RPD Limit**
87-86-5	Pentachlorophenol	0.168U	0.168	100	95.4	95	50 - 120	98.4	98	3	32
129-00-0	Pyrene	0.486U	0.486	100	91.3	91	50 - 120	96.1	96	5	30
Surrogate											
4165-60-0	Nitrobenzene-d5	42.2	84	50	45.7	91	52 - 120	44.6	89		
321-60-8	2-Fluorobiphenyl	40.9	82	50	46.9	94	16 - 128	45.3	91		
1718-51-0	Terphenyl-d14	47.3	95	50	39.7	79	43 - 138	49.1	98		
4165-62-2	Phenol-d5	32.9	33	100	37.6	38	10 - 120	36.4	36		
367-12-4	2-Fluorophenol	49.5	50	100	51.6	52	10 - 120	53.8	54		
118-79-6	2,4,6-Tribromophenol	80.6	81	100	97.1	97	52 - 121	96.8	97		

Analytical Batch	487309	**Client ID**	VR 100 (TCLP)	1093002MS	1093002MSD
Prep Batch	487177	**GCAL ID**	21208033001	1093845	1093846
Prep Method	SW-846	**Sample Type**	SAMPLE	MS	MSD
	3510C	**Prep Date**	08/07/2012 09:00	08/07/2012 09:00	08/07/2012 09:00
		Analytical Date	08/08/2012 18:38	08/08/2012 18:54	08/08/2012 19:25
		Matrix	Solid	Solid	Solid

SW-846 8270C TCLP		**Units**	ug/L								
		Result	**RDL**	**Spike Added**	**Result**	**% R**	**Control Limits % R**	**Result**	**% R**	**RPD**	**RPD Limit**
118-74-1	Hexachlorobenzene	0.00	12.5	500	400	80	54 - 120	442	88	10	50
87-68-3	Hexachlorobutadiene	0.00	9.60	500	409	82	47 - 120	470	94	14	50
67-72-1	Hexachloroethane	0.00	15.0	500	467	93	40 - 120	509	102	9	50
95-48-7	o-Cresol	26.0	16.5	500	371	69	40 - 120	437	82	16	50
98-95-3	Nitrobenzene	0.00	16.5	500	427	85	49 - 120	484	97	13	50
95-95-4	2,4,5-Trichlorophenol	0.00	15.9	500	419	84	58 - 120	472	94	12	50
88-06-2	2,4,6-Trichlorophenol	0.00	13.8	500	416	83	57 - 120	460	92	10	50
110-86-1	Pyridine	14.0	179	500	232	44	2 - 120	273	52	16	50
1319-77-3MP	m,p-Cresol	214	17.6	500	539	65	35 - 120	578	73	7	50
106-46-7	1,4-Dichlorobenzene	83.0	12.8	1000	531	45	44 - 120	575	49	8	30
121-14-2	2,4-Dinitrotoluene	0.00	13.2	1000	446	**45***	57 - 127	432	**43***	3	33
87-86-5	Pentachlorophenol	0.00	8.40	1000	438	**44***	50 - 120	476	**48***	8	32

Inorganics Quality Control Summary

Analytical Batch	487022	**Client ID**	MB486993		LCS486993		
Prep Batch	486993	**GCAL ID**	1093019		1093020		
Prep Method	SW-846 7471B	**Sample Type**	Method Blank		LCS		
		Prep Date	08/03/2012 16:00		08/03/2012 16:00		
		Analytical Date	08/05/2012 14:05		08/05/2012 14:07		
		Matrix	Solid		Solid		
SW-846 7471B		**Units**	mg/kg	**Spike**	**Result**		**Control**
		Result	**RDL**	**Added**		**% R**	**Limits % R**
7439-97-6	Mercury	0.0046U	0.0046	0.25	0.27	109	80 - 120

Analytical Batch	487022	**Client ID**	HC 100A		1093009MS		
Prep Batch	486993	**GCAL ID**	21208033008		1093022		
Prep Method	SW-846 7471B	**Sample Type**	SAMPLE		MS		
		Prep Date	08/03/2012 16:00		08/03/2012 16:00		
		Analytical Date	08/05/2012 14:26		08/05/2012 14:30		
		Matrix	Solid		Solid		
SW-846 7471B		**Units**	mg/kg	**Spike**	**Result**		**Control**
		Result	**RDL**	**Added**		**% R**	**Limits % R**
7439-97-6	Mercury	1.96	0.023	0.25	2.07	**43***	75 - 125

Analytical Batch	487022	**Client ID**	HC 100A		1093009DUP		
Prep Batch	486993	**GCAL ID**	21208033008		1093021		
Prep Method	SW-846 7471B	**Sample Type**	SAMPLE		DUP		
		Prep Date	08/03/2012 16:00		08/03/2012 16:00		
		Analytical Date	08/05/2012 14:26		08/05/2012 14:28		
		Matrix	Solid		Solid		
SW-846 7471B		**Units**	mg/kg	**Result**		**RPD**	**RPD**
		Result	**RDL**				**Limit**
7439-97-6	Mercury	1.96	0.023	1.72		13	20

Inorganics Quality Control Summary

Analytical Batch	487110	**Client ID**	MB486992	LCS486992
Prep Batch	486992	**GCAL ID**	1093015	1093016
Prep Method	SW-846	**Sample Type**	Method Blank	LCS
	3050B	**Prep Date**	08/03/2012 16:00	08/03/2012 16:00
		Analytical Date	08/06/2012 15:03	08/06/2012 15:11
		Matrix	Solid	Solid

SW-846 6010B		**Units**	mg/kg	**Spike**	**Result**		**Control**
		Result	**RDL**	**Added**		**% R**	**Limits % R**
7429-90-5	Aluminum	2.08J	0.79	200	202	101	80 - 120
7440-36-0	Antimony	0.097U	0.097	20.0	19.8	99	80 - 120
7440-38-2	Arsenic	0.14U	0.14	20.0	18.9	94	80 - 120
7440-39-3	Barium	0.024U	0.024	20.0	20.0	100	80 - 120
7440-41-7	Beryllium	0.0045J	0.0020	20.0	19.8	99	80 - 120
7440-43-9	Cadmium	0.011J	0.0090	20.0	20.2	101	80 - 120
7440-70-2	Calcium	16.6J	4.37	200	227	113	80 - 120
7440-47-3	Chromium	0.026J	0.018	20.0	19.8	99	80 - 120
7440-48-4	Cobalt	0.010U	0.010	20.0	20.4	102	80 - 120
7440-50-8	Copper	0.031U	0.031	20.0	19.5	97	80 - 120
7439-89-6	Iron	2.28J	0.70	200	201	101	80 - 120
7439-92-1	Lead	0.11U	0.11	20.0	20.6	103	80 - 120
7439-95-4	Magnesium	1.05J	0.43	200	204	102	80 - 120
7439-96-5	Manganese	0.014U	0.014	20.0	19.3	96	80 - 120
7440-02-0	Nickel	0.021U	0.021	20.0	20.6	103	80 - 120
7440-09-7	Potassium	2.11U	2.11	400	401	100	80 - 120
7782-49-2	Selenium	0.18J	0.13	20.0	20.7	104	80 - 120
7440-22-4	Silver	0.059J	0.022	20.0	19.0	95	80 - 120
7440-23-5	Sodium	11.4J	3.03	800	830	104	80 - 120
7440-28-0	Thallium	0.088U	0.088	20.0	21.0	105	80 - 120
7440-62-2	Vanadium	0.048J	0.015	20.0	19.6	98	80 - 120
7440-66-6	Zinc	0.43U	0.43	20.0	20.3	101	80 - 120

Inorganics Quality Control Summary

Analytical Batch	487110	**Client ID**	HC 100A	1093009MS
Prep Batch	486992	**GCAL ID**	21208033008	1093018
Prep Method	SW-846	**Sample Type**	SAMPLE	MS
	3050B	**Prep Date**	08/03/2012 16:00	08/03/2012 16:00
		Analytical Date	08/06/2012 16:34	08/06/2012 16:50
		Matrix	Solid	Solid

SW-846 6010B		**Units**	mg/kg	**Spike**	**Result**		**Control**
		Result	**RDL**	**Added**		**% R**	**Limits % R**
7429-90-5	Aluminum	419	1.58	200	603	92	75 - 125
7440-36-0	Antimony	0.0	0.19	20.0	8.32	**42***	75 - 125
7440-38-2	Arsenic	11.4	0.28	20.0	33.5	110	75 - 125
7440-39-3	Barium	8.37	0.048	20.0	24.9	82	75 - 125
7440-41-7	Beryllium	0.0	0.0040	20.0	18.7	94	75 - 125
7440-43-9	Cadmium	0.0	0.018	20.0	20.0	100	75 - 125
7440-70-2	Calcium	117	8.75	200	385	**134***	75 - 125
7440-47-3	Chromium	5960	0.036	20.0	5590	**-2000***	75 - 125
7440-48-4	Cobalt	26.4	0.020	20.0	54.8	**142***	75 - 125
7440-50-8	Copper	106	0.062	20.0	107	**2***	75 - 125
7439-89-6	Iron	19200	1.40	200	20000	**395***	75 - 125
7439-92-1	Lead	59.6	0.23	20.0	83.9	122	75 - 125
7439-95-4	Magnesium	37.6	0.87	200	226	94	75 - 125
7439-96-5	Manganese	462	0.028	20.0	464	**13***	75 - 125
7440-02-0	Nickel	3610	0.042	20.0	3460	**-700***	75 - 125
7440-09-7	Potassium	143	4.21	400	557	103	75 - 125
7782-49-2	Selenium	9.87	0.26	20.0	30.0	101	75 - 125
7440-22-4	Silver	0.0	0.044	20.0	17.5	87	75 - 125
7440-23-5	Sodium	4770	6.06	800	5330	**70***	75 - 125
7440-28-0	Thallium	1.00	0.18	20.0	19.6	93	75 - 125
7440-62-2	Vanadium	18.0	0.030	20.0	37.0	95	75 - 125
7440-66-6	Zinc	7.41	0.85	20.0	29.9	112	75 - 125

Inorganics Quality Control Summary

Analytical Batch	487110	**Client ID**	HC 100A	1093009DUP
Prep Batch	486992	**GCAL ID**	21208033008	1093017
Prep Method	SW-846	**Sample Type**	SAMPLE	DUP
	3050B	**Prep Date**	08/03/2012 16:00	08/03/2012 16:00
		Analytical Date	08/06/2012 16:34	08/06/2012 16:42
		Matrix	Solid	Solid

SW-846 6010B		**Units**	mg/kg	**Result**		**RPD**
		Result	**RDL**		**RPD**	**Limit**
7429-90-5	Aluminum	419	1.58	403	4	20
7440-36-0	Antimony	0.0	0.19	0.0	0	20
7440-38-2	Arsenic	11.4	0.28	14.6	**25***	20
7440-39-3	Barium	8.37	0.048	7.17	15	20
7440-41-7	Beryllium	0.0	0.0040	0.0	0	20
7440-43-9	Cadmium	0.0	0.018	0.0	0	20
7440-70-2	Calcium	117	8.75	255	**74***	20
7440-47-3	Chromium	5960	0.036	5220	13	20
7440-48-4	Cobalt	26.4	0.020	32.3	20	20
7440-50-8	Copper	106	0.062	117	10	20
7439-89-6	Iron	19200	1.40	17300	10	20
7439-92-1	Lead	59.6	0.23	71.3	18	20
7439-95-4	Magnesium	37.6	0.87	39.0	4	20
7439-96-5	Manganese	462	0.028	392	16	20
7440-02-0	Nickel	3610	0.042	3100	15	20
7440-09-7	Potassium	143	4.21	139	3	20
7782-49-2	Selenium	9.87	0.26	9.50	4	20
7440-22-4	Silver	0.0	0.044	0.0	0	20
7440-23-5	Sodium	4770	6.06	4570	4	20
7440-28-0	Thallium	1.00	0.18	0.93	7	20
7440-62-2	Vanadium	18.0	0.030	15.4	16	20
7440-66-6	Zinc	7.41	0.85	12.9	**54***	20

Inorganics Quality Control Summary

Analytical Batch	487293	**Client ID**	MB487188	LCS487188	
Prep Batch	487188	**GCAL ID**	1093899	1093900	
Prep Method	SW-846	**Sample Type**	Method Blank	LCS	
	3010A	**Prep Date**	08/06/2012 13:00	08/06/2012 13:00	
		Analytical Date	08/08/2012 14:56	08/08/2012 15:03	
		Matrix	Water	Water	

SW-846 6010B TCLP		**Units**	mg/L	**Spike**	**Result**		**Control**
		Result	**RDL**	**Added**		**% R**	**Limits % R**
7440-38-2	Arsenic	0.0035U	0.0035	1.00	1.13	113	80 - 120
7440-39-3	Barium	0.0016U	0.0016	6.00	6.62	110	80 - 120
7440-43-9	Cadmium	0.00010U	0.00010	1.00	1.08	108	80 - 120
7440-47-3	Chromium	0.00034U	0.00034	1.00	1.05	105	80 - 120
7439-92-1	Lead	0.0028U	0.0028	1.00	1.0	100	80 - 120
7782-49-2	Selenium	0.0053J	0.0038	1.00	1.23	**123***	80 - 120
7440-22-4	Silver	0.0016J	0.00064	1.00	1.09	109	80 - 120

Analytical Batch	487293	**Client ID**	TR #'S 18124- 18126	1092991MS	1092991MSD	
Prep Batch	487188	**GCAL ID**	21208032701	1093901	1093902	
Prep Method	SW-846	**Sample Type**	SAMPLE	MS	MSD	
	3010A	**Prep Date**	08/06/2012 13:00	08/06/2012 13:00	08/06/2012 13:00	
		Analytical Date	08/08/2012 15:10	08/08/2012 15:17	08/08/2012 15:24	
		Matrix	Solid	Solid	Solid	

SW-846 6010B TCLP		**Units**	mg/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
7440-38-2	Arsenic	0.0	0.017	1.00	0.99	99	75 - 125	1.05	105	6	20
7440-39-3	Barium	0.36	0.0079	6.00	6.32	99	75 - 125	6.84	108	8	20
7440-43-9	Cadmium	0.0	0.00052	1.00	0.98	98	75 - 125	1.05	105	7	20
7440-47-3	Chromium	0.0	0.0017	1.00	0.96	96	75 - 125	1.03	103	7	20
7439-92-1	Lead	0.0046	0.014	1.00	0.94	94	75 - 125	1.02	101	8	20
7782-49-2	Selenium	0.054	0.019	1.00	0.99	93	75 - 125	1.12	106	12	20
7440-22-4	Silver	0.0085	0.0032	1.00	0.95	94	75 - 125	1.02	101	7	20

Inorganics Quality Control Summary

Analytical Batch	487255	**Client ID**	MB487189			LCS487189		
Prep Batch	487189	**GCAL ID**	1093903			1093904		
Prep Method	SW-846 7470A	**Sample Type**	Method Blank			LCS		
		Prep Date	08/07/2012 13:00			08/07/2012 13:00		
		Analytical Date	08/09/2012 12:27			08/09/2012 12:29		
		Matrix	Water			Water		
SW-846 7470A TCLP		**Units**	mg/L	**Spike**	**Result**		**Control**	
		Result	**RDL**	**Added**		**% R**	**Limits % R**	
7439-97-6	Mercury	0.00008J	0.000075	0.00500	0.00523	105	80 - 120	

Analytical Batch	487255	**Client ID**	TR #'S 18124- 18126			1092991MS			1092991MSD			
Prep Batch	487189	**GCAL ID**	21208032701			1093905			1093906			
Prep Method	SW-846 7470A	**Sample Type**	SAMPLE			MS			MSD			
		Prep Date	08/07/2012 13:00			08/07/2012 13:00			08/07/2012 13:00			
		Analytical Date	08/09/2012 12:31			08/09/2012 12:32			08/09/2012 12:34			
		Matrix	Solid			Solid			Solid			
SW-846 7470A TCLP		**Units**	mg/L	**Spike**	**Result**		**Control**	**Result**			**RPD**	
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**	
7439-97-6	Mercury	0.00009	0.000075	0.00500	0.00480	94	75 - 125	0.00498	98	4	20	

Inorganics Quality Control Summary

Analytical Batch	487274	**Client ID**	MB487186	LCS487186
Prep Batch	487186	**GCAL ID**	1093891	1093892
Prep Method	SW-846	**Sample Type**	Method Blank	LCS
	3010A	**Prep Date**	08/07/2012 13:00	08/07/2012 13:00
		Analytical Date	08/08/2012 19:53	08/08/2012 20:01
		Matrix	Water	Water

SW-846 6010B SPLP		**Units**	mg/L	**Spike**	**Result**		**Control**
		Result	**RDL**	**Added**		**% R**	**Limits % R**
7429-90-5	Aluminum	0.024U	0.024	5.00	5.28	106	80 - 120
7440-36-0	Antimony	0.0040U	0.0040	0.50	0.49	98	80 - 120
7440-38-2	Arsenic	0.0035U	0.0035	0.50	0.53	106	80 - 120
7440-39-3	Barium	0.0023J	0.0016	0.50	0.51	102	80 - 120
7440-41-7	Beryllium	0.000082U	0.000082	0.50	0.50	100	80 - 120
7440-43-9	Cadmium	0.00010U	0.00010	0.50	0.51	101	80 - 120
7440-70-2	Calcium	0.088	0.024	5.00	5.21	104	80 - 120
7440-47-3	Chromium	0.00034U	0.00034	0.50	0.51	102	80 - 120
7440-48-4	Cobalt	0.00052U	0.00052	0.50	0.50	100	80 - 120
7440-50-8	Copper	0.0020J	0.0017	0.50	0.51	101	80 - 120
7439-89-6	Iron	0.027U	0.027	5.00	5.44	109	80 - 120
7439-92-1	Lead	0.0028U	0.0028	0.50	0.51	102	80 - 120
7439-95-4	Magnesium	0.017J	0.012	5.00	5.42	108	80 - 120
7439-96-5	Manganese	0.00083U	0.00083	0.50	0.51	103	80 - 120
7440-02-0	Nickel	0.00084U	0.00084	0.50	0.52	104	80 - 120
7440-09-7	Potassium	0.21J	0.041	10.0	10.4	104	80 - 120
7782-49-2	Selenium	0.0038U	0.0038	0.50	0.51	101	80 - 120
7440-22-4	Silver	0.00064U	0.00064	0.50	0.51	102	80 - 120
7440-23-5	Sodium	0.056U	0.056	20.0	21.5	108	80 - 120
7440-28-0	Thallium	0.0047J	0.0026	0.50	0.49	98	80 - 120
7440-62-2	Vanadium	0.0012U	0.0012	0.50	0.51	101	80 - 120
7440-66-6	Zinc	0.012J	0.0059	0.50	0.51	102	80 - 120

Inorganics Quality Control Summary

Analytical Batch	487274	**Client ID**	VR 100 (SPLP)	1093003MS	1093003MSD
Prep Batch	487186	**GCAL ID**	21208033002	1093893	1093894
Prep Method	SW-846 3010A	**Sample Type**	SAMPLE	MS	MSD
		Prep Date	08/07/2012 13:00	08/07/2012 13:00	08/07/2012 13:00
		Analytical Date	08/08/2012 20:07	08/08/2012 20:15	08/08/2012 20:21
		Matrix	Solid	Solid	Solid

SW-846 6010B SPLP		**Units**	mg/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
7429-90-5	Aluminum	1.32	0.024	5.00	6.68	107	75 - 125	6.72	108	0.6	20
7440-36-0	Antimony	0.0	0.0040	0.50	0.49	97	75 - 125	0.50	99	2	20
7440-38-2	Arsenic	0.0	0.0035	0.50	0.57	114	75 - 125	0.59	118	3	20
7440-39-3	Barium	0.0047	0.0016	0.50	0.50	100	75 - 125	0.51	102	2	20
7440-41-7	Beryllium	0.0	0.000082	0.50	0.49	98	75 - 125	0.50	100	2	20
7440-43-9	Cadmium	0.00010	0.00010	0.50	0.49	99	75 - 125	0.50	101	2	20
7440-70-2	Calcium	0.50	0.024	5.00	5.62	103	75 - 125	5.73	105	2	20
7440-47-3	Chromium	0.0037	0.00034	0.50	0.50	100	75 - 125	0.51	102	2	20
7440-48-4	Cobalt	0.0011	0.00052	0.50	0.50	99	75 - 125	0.51	101	2	20
7440-50-8	Copper	0.0	0.0017	0.50	0.50	99	75 - 125	0.51	101	2	20
7439-89-6	Iron	1.33	0.027	5.00	6.86	111	75 - 125	6.93	112	1	20
7439-92-1	Lead	0.0	0.0028	0.50	0.50	100	75 - 125	0.51	103	2	20
7439-95-4	Magnesium	0.055	0.012	5.00	5.46	108	75 - 125	5.48	109	0.4	20
7439-96-5	Manganese	0.017	0.00083	0.50	0.53	102	75 - 125	0.54	104	2	20
7440-02-0	Nickel	0.0079	0.00084	0.50	0.52	102	75 - 125	0.53	105	2	20
7440-09-7	Potassium	0.22	0.041	10.0	10.3	101	75 - 125	10.5	103	2	20
7782-49-2	Selenium	0.0	0.0038	0.50	0.34	**68***	75 - 125	0.35	**69***	3	20
7440-22-4	Silver	0.0	0.00064	0.50	0.49	98	75 - 125	0.50	101	2	20
7440-28-0	Thallium	0.0067	0.0026	0.50	0.47	93	75 - 125	0.49	96	4	20
7440-62-2	Vanadium	0.0	0.0012	0.50	0.50	99	75 - 125	0.51	101	2	20
7440-66-6	Zinc	0.016	0.0059	0.50	0.51	98	75 - 125	0.51	100	0	20

Analytical Batch	487362	**Client ID**	VR 100 (SPLP)	1093003MS	1093003MSD
Prep Batch	487186	**GCAL ID**	21208033002	1093893	1093894
Prep Method	SW-846 3010A	**Sample Type**	SAMPLE	MS	MSD
		Prep Date	08/07/2012 13:00	08/07/2012 13:00	08/07/2012 13:00
		Analytical Date	08/09/2012 16:00	08/09/2012 16:08	08/09/2012 16:14
		Matrix	Solid	Solid	Solid

SW-846 6010B SPLP		**Units**	mg/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
7440-23-5	Sodium	1.82	0.056	20.0	23.1	107	75 - 125	24.2	112	5	20

GCAL Report 212080330

Inorganics Quality Control Summary

Analytical Batch	487255	**Client ID**	MB487187			LCS487187		
Prep Batch	487187	**GCAL ID**	1093895			1093896		
Prep Method	SW-846 7470A	**Sample Type**	Method Blank			LCS		
		Prep Date	08/07/2012 13:00			08/07/2012 13:00		
		Analytical Date	08/09/2012 12:13			08/09/2012 12:15		
		Matrix	Water			Water		
SW-846 1312/7471A SPLP		**Units**	mg/L	**Spike**	**Result**		**Control**	
		Result	**RDL**	**Added**		**% R**	**Limits % R**	
7439-97-6	Mercury	0.000075U	0.000075	0.00500	0.00474	95	80 - 120	

Analytical Batch	487255	**Client ID**	VR 100 (SPLP)			1093003MS			1093003MSD			
Prep Batch	487187	**GCAL ID**	21208033002			1093897			1093898			
Prep Method	SW-846 7470A	**Sample Type**	SAMPLE			MS			MSD			
		Prep Date	08/07/2012 13:00			08/07/2012 13:00			08/07/2012 13:00			
		Analytical Date	08/09/2012 12:19			08/09/2012 12:21			08/09/2012 12:23			
		Matrix	Solid			Solid			Solid			
SW-846 1312/7471A SPLP		**Units**	mg/L	**Spike**	**Result**		**Control**	**Result**			**RPD**	
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**	
7439-97-6	Mercury	0.00000	0.000075	0.00500	0.00493	99	75 - 125	0.00525	105	6	20	

General Chemistry Quality Control Summary

Analytical Batch 487010	**Client ID**	COMP (01)		1092551DUP		
Prep Batch N/A	**GCAL ID**	21208022501		1093138		
	Sample Type	SAMPLE		DUP		
	Analytical Date	08/07/2012 13:00		08/07/2012 13:00		
	Matrix	Solid		Solid		
SW-846 9045C pH		**Units**	pH unit	**Result**	**RPD**	**RPD Limit**
		Result	**RDL**			
pH	pH	6.75	1.00	6.76	0.1	1

General Chemistry Quality Control Summary

Analytical Batch	487355	**Client ID**	MB487355			LCS487355				LCSD487355		
Prep Batch	N/A	**GCAL ID**	1094755			1094756				1094757		
		Sample Type	Method Blank			LCS				LCSD		
		Analytical Date	08/09/2012 09:23			08/09/2012 09:33				08/09/2012 09:43		
		Matrix	Solid			Solid				Solid		
SW-846 9060M		**Units**	mg/kg	**Spike**	**Result**		**Control**	**Result**			**RPD**	
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**	
C-012	Total Organic Carbon	97.0U	97.0	10000	10600	106	69 - 128	10100	101	5	25	

Analytical Batch	487355	**Client ID**	08353-MW-13 (10-15)	1092495DUP			
Prep Batch	N/A	**GCAL ID**	21208021901	1094760			
		Sample Type	SAMPLE	DUP			
		Analytical Date	08/09/2012 09:54	08/09/2012 10:41			
		Matrix	Solid	Solid			
SW-846 9060M		**Units**	mg/kg	**Result**		**RPD**	
		Result	**RDL**		**RPD**	**Limit**	
C-012	Total Organic Carbon	0.000	97.0	0.000	0	25	

Chain of Custody Record

GCAL
GULF COAST ANALYTICAL LABORATORIES, INC
7979 GSRI AVE, BATON ROUGE LA 70820-7402
(225) 769-4900 FAX (225) 767-5717

Lab use only

Client Name	Client #	Group#	Due Date
Kemron	4794	212080330	8/14/12

Report to:
Client: Kemron Environmental
Address: 1359A Ellsworth Ind Blvd ATL, GA 30318
Contact: Tommy Jordan
Phone: 404-636-0928
Fax: 404-636-7162

Bill to:
Client: same
Address:
Contact:
Phone:
Fax:

P.O. Number

Project Name/Number: Bridge Water NJ/SH-0417-007

Sampled By: Ashley Clayborn

Analytical Requests & Methods

Matrix	Date	Time (2400)	Comp	Grab	Sample Description	Preservatives	No. Containers	Total VOC+TICs+thiophenes+naphthalene	Total SVOC+TICS	Total TAL Metals	TCLP VOCs+TICS+thiophenes+Naphthalene	TCLP SVOCs+TICS	TCLP TAL Metals	SPLP VOCs+TICS+thiophenes+naphthalene	SPLP SVOCs+TICS	SPLP TAL Metals	Total Organic Carbon	Soil pH
SD	8-1-2012	11:00		✓	VR 100	NA	6				X	X	X	X	X	X	X	
SD	8-1-2012	14:30		✓	HC 100	NA	6				X	X	X	X	X	X	X	
SD	8-1-2012	1100		✓	VR 100 A	NA	2	X	X	X								X
SD	8-1-2012	1100		✓	VR 100 B	NA	2	X	X	X								X
SD	8-1-2012	1100		✓	VR 100 C	NA	2	X	X	X								X
SD	8-1-2012	14:30		✓	HC 100 A	NA	2	X	X	X								X
SD	8-1-2012	14:30		✓	HC 100 B	NA	2	X	X	X								X
SD	8-1-2012	14:30		✓	HC 100C	NA	2	X	X	X								X
								/										

5.9

Remarks:

Lab ID

1, 2
3, 4
5
6
7
8
9
10

Turn Around Time: ___ 24 - 48 hrs ___ 3 days ___ 1 week X standard other ___

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Ashley Clayborn		8/2/12	13:00
Fed Ex	[signature]	8/3/12	1020
7986 9129 6251			

Note:
* VOC analysis include thiophen+napthalene use a 1pt calibration for thiophene+napthalene.
Report dry weights. Will likely require more than 2 days drying.

By submitting these samples, you agree to the terms and conditions contained in our most recent schedule of services.

Matrix: W = water, S=Soil, SD=Solid, L=Liquid, SL=Sludge, O=Oil, CT=Charcoal Tube, OVM=Organic Vapor Monitor, XT=XAD Tube, A=Air Bag, SUM=Summa Canister

GCAL
GULF COAST ANALYTICAL LABORATORIES, INC

SAMPLE RECEIVING CHECKLIST

SAMPLE DELIVERY GROUP	212080330
Client 4794 - KEMRON	**Transport Method** FEDEX
Profile 232522 - Bridgewater Acid Tar	**Received By** Saucier, Charlotte
Line Item(s) 1 - Sludge	**Receive Date(s)** 08/03/12

CHECKLIST			
Were all samples received using proper thermal preservation?	☑ Yes	☐ No	☐ NA
When used, were all custody seals intact?	☑ Yes	☐ No	☐ NA
Were all samples received in proper containers?	☑ Yes	☐ No	☐ NA
Were all samples received using proper chemical preservation?	☑ Yes	☐ No	☐ NA
Was preservative added to any container at the lab?	☐ Yes	☑ No	☐ NA
Were all containers received in good condition?	☑ Yes	☐ No	☐ NA
Were all VOA vials received with no head space?	☐ Yes	☐ No	☑ NA
Do all sample labels match the Chain of Custody?	☑ Yes	☐ No	☐ NA
Did the Chain of Custody list the sampling technician?	☑ Yes	☐ No	☐ NA

COOLERS

Airbill	Temp(oC)
	5.9

DISCREPANCIES

None

LABORATORY PRESERVATIONS

None

NOTES

Revision 1.2

NELAP CERTIFICATE NUMBER 01955
DOD ELAP CERTIFICATE NUMBER ADE - 1482

ANALYTICAL RESULTS

PERFORMED BY

GULF COAST ANALYTICAL LABORATORIES, INC.
7979 GSRI Avenue
Baton Rouge, LA 70820

Report Date 08/27/2012

GCAL Report 212081321

Deliver To	KEMRON 1359A Ellsworth Industrial Blv Atlanta, GA 30318 404-601-6927
Attn	Tommy Jordan

Project Bridgewater NJ / SH-0417-007

CASE NARRATIVE

Client: KEMRON **Report:** 212081321

Gulf Coast Analytical Laboratories received and analyzed the sample(s) listed on the sample cross-reference page of this report. Receipt of the sample(s) is documented by the attached chain of custody. This applies only to the sample(s) listed in this report. No sample integrity or quality control exceptions were identified unless noted below.

VOLATILES MASS SPECTROMETRY

In the SW-846 8260B analysis, Thiophene is included in the reportable analyte list. As per client instructions, a one point calibration was performed for this analyte. If was not detected it is reported as ND. This analyte is not included in GCAL's scope of accreditation.

In the SW-846 8260B analysis, samples 21208132105 (VR90A TREATED), 21208132106 (VR90B TREATED), 21208132107 (VR90C TREATED), 21208132108 (HC90A TREATED), 21208132109 (HC90B TREATED), and 21208132110 (HC90C TREATED) had to be diluted to bracket the concentration of target compounds within the calibration range of the instrument. The dilutions are reflected in elevated detection limits.

In the SW-846 1312/8260B analysis, samples 21208132102 (VR90 TREATED (SPLP)) and 21208132104 (HC90 TREATED (SPLP)) had to be diluted to bracket the concentration of target compounds within the calibration range of the instrument. The dilutions are reflected in elevated detection limits.

In the SW-846 1311/8260B analysis, a dilution factor of 40 was performed for samples 21208132101 (VR90 TREATED (TCLP)) and 21208132103 (HC90 TREATED (TCLP)). The dilutions are reflected in elevated detection limits.

SEMI-VOLATILES MASS SPECTROMETRY

In the SW-846 1311/8270C analysis, a dilution factor of 10 was performed for samples 21208132101 (VR90 TREATED (TCLP)) and 21208132103 (HC90 TREATED (TCLP)). The reporting limits are at or below the regulatory limit at this dilution. The recoveries for the surrogates are reported as diluted out.

In the SW-846 1312/8270C analysis, sample 21208132102 (VR90 TREATED (SPLP)) had to be diluted to eliminate interference from non-target background. This is reflected in elevated detection limits.

In the SW-846 1312/8270C analysis, sample 21208132104 (HC90 TREATED (SPLP)) had to be diluted to bracket the concentration of target compounds within the calibration range of the instrument. This is reflected in elevated detection limits. This sample had one surrogate outside of control limits in the acid fraction and one surrogate recovery outside control limits in the base-neutral fraction in the 4X and the surrogates were diluted out of the 50X..

In the SW-846 8270C analysis, samples 21208132105 (VR90A TREATED), 21208132106 (VR90B TREATED), 21208132107 (VR90C TREATED), 21208132108 (HC90A TREATED), 21208132109 (HC90B TREATED), and 21208132110 (HC90C TREATED) had to be diluted to eliminate interference from non-target background. This is reflected in elevated detection limits. The recoveries for the surrogates are reported as diluted out for those analyses performed at a 10 or higher dilution.

METALS

In the SW-846 1311/6010B analysis, sample 21208132101 (VR90 TREATED (TCLP)) was analyzed at a dilution. The reporting limits are at or below the regulatory limits at this dilution.

In the SW-846 1311/6010B analysis, a chemical or physical interference necessitated a dilution for samples 21208132103 (HC90 TREATED (TCLP)) and 21208132104 (HC90 TREATED (SPLP)). This is reflected in the elevated detection limits.

In the SW-846 6010B analysis, a chemical or physical interference necessitated a dilution for samples 21208132108 (HC90A TREATED), 21208132109 (HC90B TREATED), and 21208132110 (HC90C TREATED). This is reflected in elevated detection limits.

In the SW-846 7471B analysis, samples 21208132105 (VR90A TREATED), 21208132106 (VR90B TREATED), 21208132107 (VR90C TREATED), 21208132108 (HC90A TREATED), 21208132109 (HC90B TREATED) and 21208132110 (HC90C TREATED) had to be diluted in order to bracket the concentration within the calibration range of the instrument.

In the SW-846 7471B analysis for prep batch 487647, the MS recovery is not applicable for Mercury because the sample concentration is greater than four times the spike concentration.

In the SW-846 1312/6010B analysis for prep batch 487804, the MS/MSD recoveries are not applicable for Iron because the sample concentration is greater than four times the spike concentration.

In the SW-846 1311/6010B analysis for prep batch 487805, the LCS recovery is above the upper control limit for Selenium; however, Selenium was not detected above the reporting limit for samples associated with this QC; therefore, the data is reportable.

Laboratory Endorsement

Sample analysis was performed in accordance with approved methodologies provided by the Environmental Protection Agency or other recognized agencies. The samples and their corresponding extracts will be maintained for a period of 30 days unless otherwise arranged. Following this retention period the samples will be disposed in accordance with GCAL's Standard Operating Procedures.

Common Abbreviations Utilized in this Report

ND	Indicates the result was Not Detected at the specified RDL
DO	Indicates the result was Diluted Out
MI	Indicates the result was subject to Matrix Interference
TNTC	Indicates the result was Too Numerous To Count
SUBC	Indicates the analysis was Sub-Contracted
FLD	Indicates the analysis was performed in the Field
PQL	Practical Quantitation Limit
MDL	Method Detection Limit
RDL	Reporting Detection Limit
00:00	Reported as a time equivalent to 12:00 AM

Reporting Flags Utilized in this Report

J	Indicates the result is between the MDL and RDL
U	Indicates the compound was analyzed for but not detected
B	Indicates the analyte was detected in the associated Method Blank

Sample receipt at GCAL is documented through the attached chain of custody. In accordance with NELAC, this report shall be reproduced only in full and with the written permission of GCAL. The results contained within this report relate only to the samples reported. The documented results are presented within this report.

This report pertains only to the samples listed in the Report Sample Summary and should be retained as a permanent record thereof. The results contained within this report are intended for the use of the client. Any unauthorized use of the information contained in this report is prohibited.

I certify that this data package is in compliance with the NELAC standard and terms and conditions of the contract and Statement of Work both technically and for completeness, for other than the conditions in the case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data submitted has been authorized by the Quality Assurance Manager or his/her designee, as verified by the following signature.

Estimated uncertainty of measurement is available upon request. This report is in compliance with the DOD QSM as specified in the contract if applicable.

Robyn Migues
Technical Director
GCAL REPORT 212081321

THIS REPORT CONTAINS _____ PAGES.

Report Sample Summary

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132101	VR90 TREATED (TCLP)	Solid	08/10/2012 16:00	08/11/2012 10:00
21208132102	VR90 TREATED (SPLP)	Solid	08/10/2012 16:00	08/11/2012 10:00
21208132103	HC90 TREATED (TCLP)	Solid	08/10/2012 15:55	08/11/2012 10:00
21208132104	HC90 TREATED (SPLP)	Solid	08/10/2012 15:55	08/11/2012 10:00
21208132105	VR90A TREATED	Solid	08/10/2012 16:00	08/11/2012 10:00
21208132106	VR90B TREATED	Solid	08/10/2012 16:00	08/11/2012 10:00
21208132107	VR90C TREATED	Solid	08/10/2012 16:00	08/11/2012 10:00
21208132108	HC90A TREATED	Solid	08/10/2012 15:55	08/11/2012 10:00
21208132109	HC90B TREATED	Solid	08/10/2012 15:55	08/11/2012 10:00
21208132110	HC90C TREATED	Solid	08/10/2012 15:55	08/11/2012 10:00

Summary of Compounds Detected

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132101	**VR90 TREATED (TCLP)**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 9060M

CAS#	Parameter	Result	RDL	MDL	Units
C-012	Total Organic Carbon	69300	200	97.0	mg/kg

SW-846 8260B TCLP

CAS#	Parameter	Result	RDL	MDL	Units
71-43-2	Benzene	0.080J	0.200	0.00196	mg/L
91-20-3	Naphthalene	0.173J	0.200	0.00700	mg/L

SW-846 6010B TCLP

CAS#	Parameter	Result	RDL	MDL	Units
7440-39-3	Barium	0.13J	5.00	0.0079	mg/L
7440-47-3	Chromium	0.068J	0.25	0.0017	mg/L
7439-92-1	Lead	0.028J	0.50	0.014	mg/L
7440-22-4	Silver	0.0033J	0.25	0.0032	mg/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132102	**VR90 TREATED (SPLP)**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 8270C SPLP

CAS#	Parameter	Result	RDL	MDL	Units
91-57-6	2-Methylnaphthalene	60.8	40.0	1.02	ug/L
83-32-9	Acenaphthene	6.37J	40.0	1.07	ug/L
62-53-3	Aniline	66.1	40.0	2.87	ug/L
86-74-8	Carbazole	18.5J	40.0	0.928	ug/L
132-64-9	Dibenzofuran	3.69J	40.0	0.908	ug/L
86-73-7	Fluorene	18.8J	40.0	1.15	ug/L
78-59-1	Isophorone	11.6J	40.0	1.52	ug/L
108-95-2	Phenol	109	40.0	0.600	ug/L
110-86-1	Pyridine	159	40.0	14.3	ug/L
86-30-6	n-Nitrosodiphenylamine	8.91J	40.0	1.46	ug/L

SW-846 6010B SPLP

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	Aluminum	1.87	0.20	0.024	mg/L
7440-39-3	Barium	0.0047J	0.010	0.0016	mg/L
7440-70-2	Calcium	0.84	0.051	0.024	mg/L
7440-47-3	Chromium	0.031	0.010	0.00034	mg/L
7440-48-4	Cobalt	0.0022J	0.010	0.00052	mg/L
7440-50-8	Copper	0.0028J	0.010	0.0017	mg/L
7439-89-6	Iron	43.0	0.050	0.027	mg/L
7439-92-1	Lead	0.0059J	0.015	0.0028	mg/L

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132102	**VR90 TREATED (SPLP)**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 6010B SPLP

CAS#	Parameter	Result	RDL	MDL	Units
7439-95-4	Magnesium	0.28	0.050	0.012	mg/L
7439-96-5	Manganese	1.23	0.015	0.00083	mg/L
7440-02-0	Nickel	0.019J	0.040	0.00084	mg/L
7440-09-7	Potassium	0.11J	0.20	0.041	mg/L
7440-23-5	Sodium	16.3	1.00	0.056	mg/L
7440-66-6	Zinc	0.033	0.020	0.0059	mg/L

SW-846 8260B SPLP

CAS#	Parameter	Result	RDL	MDL	Units
95-63-6	1,2,4-Trimethylbenzene	155	130	2.01	ug/L
95-50-1	1,2-Dichlorobenzene	1400	130	2.15	ug/L
108-67-8	1,3,5-Trimethylbenzene	65.7J	130	1.32	ug/L
541-73-1	1,3-Dichlorobenzene	16.0J	130	2.00	ug/L
106-46-7	1,4-Dichlorobenzene	103J	130	1.46	ug/L
67-64-1	Acetone	117J	630	8.05	ug/L
71-43-2	Benzene	2620	130	1.23	ug/L
100-41-4	Ethylbenzene	46.1J	130	4.50	ug/L
98-82-8	Isopropylbenzene (Cumene)	113J	130	1.46	ug/L
75-09-2	Methylene chloride	18.3J	250	2.55	ug/L
91-20-3	Naphthalene	4120	130	4.38	ug/L
108-88-3	Toluene	2120	130	1.94	ug/L
1330-20-7	Xylene (total)	743	250	3.08	ug/L
136777-61-2	m,p-Xylene	517	130	2.46	ug/L
95-47-6	o-Xylene	226	130	1.93	ug/L
135-98-8	sec-Butylbenzene	30.1J	130	2.20	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132103	**HC90 TREATED (TCLP)**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 8270C TCLP

CAS#	Parameter	Result	RDL	MDL	Units
110-86-1	Pyridine	2.37	0.5000	0.1790	mg/L

SW-846 6010B TCLP

CAS#	Parameter	Result	RDL	MDL	Units
7440-38-2	Arsenic	0.37J	1.00	0.017	mg/L
7440-39-3	Barium	0.051J	5.00	0.0079	mg/L
7440-43-9	Cadmium	0.0028J	0.050	0.00052	mg/L
7440-47-3	Chromium	186	0.25	0.0017	mg/L
7439-92-1	Lead	0.42J	0.50	0.014	mg/L
7782-49-2	Selenium	0.034J	0.50	0.019	mg/L

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132103	HC90 TREATED (TCLP)	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 7470A TCLP

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	Mercury	0.00009J	0.0020	0.000075	mg/L

SW-846 8260B TCLP

CAS#	Parameter	Result	RDL	MDL	Units
71-43-2	Benzene	2.52	0.200	0.00196	mg/L
91-20-3	Naphthalene	2.36	0.200	0.00700	mg/L
110-02-1	Thiophene	0.040			mg/L

SW-846 9060M

CAS#	Parameter	Result	RDL	MDL	Units
C-012	Total Organic Carbon	64900	200	97.0	mg/kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132104	HC90 TREATED (SPLP)	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 8270C SPLP

CAS#	Parameter	Result	RDL	MDL	Units
91-57-6	2-Methylnaphthalene	20.3J	40.0	1.02	ug/L
83-32-9	Acenaphthene	2.52J	40.0	1.07	ug/L
86-73-7	Fluorene	6.87J	40.0	1.15	ug/L
78-59-1	Isophorone	5.24J	40.0	1.52	ug/L
1319-77-3MP	m,p-Cresol	185	40.0	1.41	ug/L

SW-846 8270C SPLP

CAS#	Parameter	Result	RDL	MDL	Units
62-53-3	Aniline	1980	500	35.9	ug/L
110-86-1	Pyridine	1760	500	179	ug/L

SW-846 6010B SPLP

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	Aluminum	9.28	1.00	0.12	mg/L
7440-38-2	Arsenic	0.43	0.050	0.017	mg/L
7440-39-3	Barium	0.018	0.015	0.0079	mg/L
7440-43-9	Cadmium	0.0017J	0.0050	0.00052	mg/L
7440-70-2	Calcium	3.21	0.26	0.12	mg/L
7440-47-3	Chromium	204	0.050	0.0017	mg/L
7440-48-4	Cobalt	0.93	0.050	0.0026	mg/L
7440-50-8	Copper	0.57	0.050	0.0085	mg/L
7439-89-6	Iron	523	0.25	0.13	mg/L

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132104	**HC90 TREATED (SPLP)**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 6010B SPLP

CAS#	Parameter	Result	RDL	MDL	Units
7439-92-1	Lead	0.34	0.075	0.014	mg/L
7439-95-4	Magnesium	1.01	0.25	0.061	mg/L
7439-96-5	Manganese	16.3	0.075	0.0042	mg/L
7440-02-0	Nickel	93.0	0.20	0.0042	mg/L
7440-09-7	Potassium	3.18	1.00	0.20	mg/L
7440-23-5	Sodium	111	5.00	0.28	mg/L
7440-62-2	Vanadium	0.64	0.10	0.0061	mg/L
7440-66-6	Zinc	0.26	0.10	0.029	mg/L

SW-846 8260B SPLP

CAS#	Parameter	Result	RDL	MDL	Units
95-63-6	1,2,4-Trimethylbenzene	191J	250	4.02	ug/L
95-50-1	1,2-Dichlorobenzene	1000	250	4.29	ug/L
108-67-8	1,3,5-Trimethylbenzene	80.0J	250	2.63	ug/L
106-46-7	1,4-Dichlorobenzene	78.4J	250	2.92	ug/L
67-64-1	Acetone	216J	1300	16.1	ug/L
71-43-2	Benzene	4520	250	2.45	ug/L
74-87-3	Chloromethane	20.8J	250	3.79	ug/L
100-41-4	Ethylbenzene	92.7J	250	9.00	ug/L
98-82-8	Isopropylbenzene (Cumene)	251	250	2.92	ug/L
75-09-2	Methylene chloride	25.9J	500	5.10	ug/L
91-20-3	Naphthalene	3240	250	8.75	ug/L
110-02-1	Thiophene	54.8			ug/L
108-88-3	Toluene	3870	250	3.88	ug/L
1330-20-7	Xylene (total)	2000	500	6.15	ug/L
136777-61-2	m,p-Xylene	1610	250	4.93	ug/L
95-47-6	o-Xylene	387	250	3.87	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132105	**VR90A TREATED**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
91-57-6	2-Methylnaphthalene	52700J	116000	3670	ug/Kg
83-32-9	Acenaphthene	11900J	116000	3050	ug/Kg
86-73-7	Fluorene	242000	116000	3740	ug/Kg

SW-846 9045C pH

CAS#	Parameter	Result	RDL	MDL	Units
pH	pH	4.23	1.00	1.00	pH unit

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132105	**VR90A TREATED**	Solid	08/10/2012 16:00	08/11/2012 10:00

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
700-88-9	Benzene, cyclopentyl-	97700	3.51	ug/Kg
643-58-3	1,1'-Biphenyl, 2-methyl-	30400	4.82	ug/Kg
132-32-1	9H-Carbazol-3-amine, 9-ethyl-	1030000	4.99	ug/Kg
6416-39-3	1H-Indene, 2,3-dihydro-1-methyl-3-p	94900	5.02	ug/Kg
834-24-2	Benzenamine, 4-(2-phenylethenyl)-	199000	5.07	ug/Kg
26137-53-1	Naphthalene, 1,2,3-trimethyl-4-prop	222000	5.17	ug/Kg
	Unknown	198000	5.25	ug/Kg
	Unknown	88800	5.42	ug/Kg
55012-80-1	Silane, trimethyl[5-methyl-2-(1-met	147000	5.47	ug/Kg
	Unknown	68300	6.70	ug/Kg
	Unknown	60800	7.48	ug/Kg
	Unknown	72900	3.63	ug/Kg
	Unknown	67000	7.64	ug/Kg
2132-84-5	Benzene, (1-methylhexyl)-	95200	3.75	ug/Kg
827-52-1	Benzene, cyclohexyl-	109000	3.87	ug/Kg
72403-15-7	Benzene, (1-chloroethyl)methyl-	84200	4.08	ug/Kg
101-81-5	Diphenylmethane	127000	4.25	ug/Kg
620-83-7	Benzene, 1-methyl-4-(phenylmethyl)-	44300	4.56	ug/Kg
605-39-0	2,2'-Dimethylbiphenyl	58400	4.59	ug/Kg
4957-14-6	Benzene, 1,1'-methylenebis[4-methyl	128000	4.70	ug/Kg

SW-846 6010B

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	Aluminum	3290	9.39	0.93	mg/kg
7440-36-0	Antimony	0.18J	2.82	0.11	mg/kg
7440-39-3	Barium	7.26	0.47	0.028	mg/kg
7440-41-7	Beryllium	0.0054J	0.23	0.0023	mg/kg
7440-70-2	Calcium	169	35.2	5.13	mg/kg
7440-47-3	Chromium	4.30	0.47	0.021	mg/kg
7440-48-4	Cobalt	0.17J	0.47	0.012	mg/kg
7440-50-8	Copper	24.7	0.47	0.036	mg/kg
7439-89-6	Iron	6660	4.69	0.82	mg/kg
7439-92-1	Lead	73.1	0.70	0.13	mg/kg
7439-95-4	Magnesium	50.7	4.69	0.51	mg/kg
7439-96-5	Manganese	101	0.70	0.016	mg/kg
7440-02-0	Nickel	4.94	1.88	0.025	mg/kg
7440-09-7	Potassium	58.7	23.5	2.47	mg/kg
7782-49-2	Selenium	9.40	1.88	0.15	mg/kg
7440-23-5	Sodium	3150	46.9	3.56	mg/kg
7440-28-0	Thallium	0.33J	0.94	0.10	mg/kg
7440-62-2	Vanadium	0.045J	0.94	0.018	mg/kg
7440-66-6	Zinc	6.13	1.88	0.50	mg/kg

SW-846 7471B

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	Mercury	0.91	0.027	0.012	mg/kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132105	**VR90A TREATED**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
95-63-6	1,2,4-Trimethylbenzene	224000J	269000	19300	ug/Kg
95-50-1	1,2-Dichlorobenzene	1290000	269000	14800	ug/Kg
108-67-8	1,3,5-Trimethylbenzene	83200J	269000	20200	ug/Kg
106-46-7	1,4-Dichlorobenzene	112000J	269000	12400	ug/Kg
99-87-6	4-Isopropyltoluene	135000J	269000	11300	ug/Kg
71-43-2	Benzene	201000J	269000	8170	ug/Kg
98-82-8	Isopropylbenzene (Cumene)	187000J	269000	9940	ug/Kg
91-20-3	Naphthalene	4670000	269000	17200	ug/Kg
108-88-3	Toluene	381000	269000	8330	ug/Kg
1330-20-7	Xylene (total)	544000	537000	21500	ug/Kg
136777-61-2	m,p-Xylene	361000	269000	15800	ug/Kg
95-47-6	o-Xylene	183000J	269000	7250	ug/Kg
135-98-8	sec-Butylbenzene	112000J	269000	10600	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132106	**VR90B TREATED**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 9045C pH

CAS#	Parameter	Result	RDL	MDL	Units
pH	pH	4.42	1.00	1.00	pH unit

SW-846 7471B

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	Mercury	1.13	0.029	0.013	mg/kg

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
700-88-9	Benzene, cyclopentyl-	173000	3.52	ug/Kg
21895-17-0	Benzene, 1-methyl-2-[(4-methylpheny	61400	4.88	ug/Kg
4309-66-4	Stilbene, 4-amino- (E)-	1830000	4.99	ug/Kg
7614-93-9	Benzene, 1,1'-(3-methyl-1-propene-1	186000	5.02	ug/Kg
26137-53-1	Naphthalene, 1,2,3-trimethyl-4-prop	388000	5.07	ug/Kg
13688-68-1	9,9-Dimethyl-9-silafluorene	490000	5.18	ug/Kg
	Unknown	253000	5.25	ug/Kg
74764-34-4	1-Butanamine, N-(phenyl-2-pyridinyl	70400	5.38	ug/Kg
	Unknown	159000	5.42	ug/Kg
14051-53-7	1-Benzopyrylium, 2-phenyl-	255000	5.47	ug/Kg
	Unknown	170000	7.48	ug/Kg
5279-14-1	Benzene, (1-nitropropyl)-	83700	3.64	ug/Kg
	Unknown	170000	7.64	ug/Kg
2132-84-5	Benzene, (1-methylhexyl)-	128000	3.75	ug/Kg
827-52-1	Benzene, cyclohexyl-	148000	3.88	ug/Kg
4920-99-4	Benzene, 1-ethyl-3-(1-methylethyl)-	93700	3.98	ug/Kg
26968-58-1	Benzene, (chloromethyl)ethyl-	112000	4.08	ug/Kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132106	**VR90B TREATED**	Solid	08/10/2012 16:00	08/11/2012 10:00

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
101-81-5	Diphenylmethane	171000	4.25	ug/Kg
620-83-7	Benzene, 1-methyl-4-(phenylmethyl)-	76200	4.59	ug/Kg
13540-56-2	Benzene, 1,2-dimethyl-4-(phenylmeth	172000	4.70	ug/Kg

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
91-57-6	2-Methylnaphthalene	106000J	118000	3720	ug/Kg
83-32-9	Acenaphthene	22100J	118000	3090	ug/Kg
86-73-7	Fluorene	505000	118000	3790	ug/Kg

SW-846 6010B

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	Aluminum	3800	9.50	0.94	mg/kg
7440-36-0	Antimony	0.47J	2.85	0.12	mg/kg
7440-39-3	Barium	8.06	0.48	0.029	mg/kg
7440-41-7	Beryllium	0.0052J	0.24	0.0024	mg/kg
7440-70-2	Calcium	150	35.6	5.20	mg/kg
7440-47-3	Chromium	5.85	0.48	0.021	mg/kg
7440-48-4	Cobalt	0.18J	0.48	0.012	mg/kg
7440-50-8	Copper	26.1	0.48	0.037	mg/kg
7439-89-6	Iron	6910	4.75	0.83	mg/kg
7439-92-1	Lead	73.4	0.71	0.14	mg/kg
7439-95-4	Magnesium	55.5	4.75	0.52	mg/kg
7439-96-5	Manganese	113	0.71	0.017	mg/kg
7440-02-0	Nickel	5.65	1.90	0.025	mg/kg
7440-09-7	Potassium	59.1	23.8	2.50	mg/kg
7782-49-2	Selenium	10.2	1.90	0.16	mg/kg
7440-23-5	Sodium	3260	47.5	3.60	mg/kg
7440-28-0	Thallium	0.61J	0.95	0.10	mg/kg
7440-62-2	Vanadium	0.037J	0.95	0.018	mg/kg
7440-66-6	Zinc	5.54	1.90	0.51	mg/kg

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
95-63-6	1,2,4-Trimethylbenzene	213000J	265000	19100	ug/Kg
95-50-1	1,2-Dichlorobenzene	1210000	265000	14600	ug/Kg
108-67-8	1,3,5-Trimethylbenzene	77000J	265000	19900	ug/Kg
106-46-7	1,4-Dichlorobenzene	105000J	265000	12300	ug/Kg
99-87-6	4-Isopropyltoluene	132000J	265000	11100	ug/Kg
71-43-2	Benzene	184000J	265000	8060	ug/Kg
98-82-8	Isopropylbenzene (Cumene)	187000J	265000	9810	ug/Kg
91-20-3	Naphthalene	4380000	265000	17000	ug/Kg
108-88-3	Toluene	369000	265000	8220	ug/Kg
1330-20-7	Xylene (total)	535000	530000	21300	ug/Kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132106	**VR90B TREATED**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
136777-61-2	m,p-Xylene	352000	265000	15600	ug/Kg
95-47-6	o-Xylene	183000J	265000	7160	ug/Kg
135-98-8	sec-Butylbenzene	102000J	265000	10400	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132107	**VR90C TREATED**	Solid	08/10/2012 16:00	08/11/2012 10:00

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
700-88-9	Benzene, cyclopentyl-	161000	3.52	ug/Kg
13688-68-1	9,9-Dimethyl-9-silafluorene	1580000	4.99	ug/Kg
6416-39-3	1H-Indene, 2,3-dihydro-1-methyl-3-p	157000	5.02	ug/Kg
26137-53-1	Naphthalene, 1,2,3-trimethyl-4-prop	324000	5.07	ug/Kg
132-32-1	9H-Carbazol-3-amine, 9-ethyl-	424000	5.18	ug/Kg
	Unknown	214000	5.25	ug/Kg
	Unknown	166000	5.42	ug/Kg
	Unknown	254000	5.47	ug/Kg
	Unknown	102000	5.66	ug/Kg
74421-26-4	Benzeneethanol, .beta.-methyl-.beta	114000	6.70	ug/Kg
13688-68-1	9,9-Dimethyl-9-silafluorene	98000	6.87	ug/Kg
	Unknown	215000	3.64	ug/Kg
	Unknown	150000	7.64	ug/Kg
1595-10-4	1-Methyl-2-N-hexylbenzene	321000	3.75	ug/Kg
827-52-1	Benzene, cyclohexyl-	379000	3.88	ug/Kg
4920-99-4	Benzene, 1-ethyl-3-(1-methylethyl)-	242000	3.98	ug/Kg
26968-58-1	Benzene, (chloromethyl)ethyl-	198000	4.08	ug/Kg
101-81-5	Diphenylmethane	319000	4.25	ug/Kg
620-83-7	Benzene, 1-methyl-4-(phenylmethyl)-	155000	4.59	ug/Kg
13540-56-2	Benzene, 1,2-dimethyl-4-(phenylmeth	343000	4.70	ug/Kg

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
91-57-6	2-Methylnaphthalene	91400J	119000	3750	ug/Kg
83-32-9	Acenaphthene	18800J	119000	3110	ug/Kg
86-73-7	Fluorene	427000	119000	3820	ug/Kg

SW-846 6010B

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	Aluminum	4040	9.58	0.95	mg/kg
7440-39-3	Barium	8.50	0.48	0.029	mg/kg
7440-70-2	Calcium	141	35.9	5.24	mg/kg
7440-47-3	Chromium	50.3	0.48	0.022	mg/kg
7440-48-4	Cobalt	0.015J	0.48	0.012	mg/kg
7440-50-8	Copper	27.0	0.48	0.037	mg/kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132107	**VR90C TREATED**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 6010B

CAS#	Parameter	Result	RDL	MDL	Units
7439-89-6	Iron	21100	4.79	0.84	mg/kg
7439-92-1	Lead	74.1	0.72	0.14	mg/kg
7439-95-4	Magnesium	53.9	4.79	0.52	mg/kg
7439-96-5	Manganese	220	0.72	0.017	mg/kg
7440-02-0	Nickel	5.43	1.92	0.025	mg/kg
7440-09-7	Potassium	67.6	23.9	2.52	mg/kg
7782-49-2	Selenium	11.7	1.92	0.16	mg/kg
7440-23-5	Sodium	3430	47.9	3.63	mg/kg
7440-28-0	Thallium	0.39J	0.96	0.11	mg/kg
7440-66-6	Zinc	5.17	1.92	0.51	mg/kg

SW-846 9045C pH

CAS#	Parameter	Result	RDL	MDL	Units
pH	pH	4.47	1.00	1.00	pH unit

SW-846 7471B

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	Mercury	1.0	0.026	0.012	mg/kg

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
95-63-6	1,2,4-Trimethylbenzene	230000J	276000	19800	ug/Kg
95-50-1	1,2-Dichlorobenzene	1250000	276000	15200	ug/Kg
108-67-8	1,3,5-Trimethylbenzene	85000J	276000	20700	ug/Kg
106-46-7	1,4-Dichlorobenzene	106000J	276000	12700	ug/Kg
99-87-6	4-Isopropyltoluene	139000J	276000	11600	ug/Kg
71-43-2	Benzene	186000J	276000	8380	ug/Kg
98-82-8	Isopropylbenzene (Cumene)	192000J	276000	10200	ug/Kg
91-20-3	Naphthalene	4320000	276000	17700	ug/Kg
108-88-3	Toluene	381000	276000	8550	ug/Kg
1330-20-7	Xylene (total)	554000	551000	22100	ug/Kg
136777-61-2	m,p-Xylene	371000	276000	16200	ug/Kg
95-47-6	o-Xylene	184000J	276000	7440	ug/Kg
135-98-8	sec-Butylbenzene	113000J	276000	10900	ug/Kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132108	**HC90A TREATED**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
91-57-6	2-Methylnaphthalene	53200J	106000	3370	ug/Kg
83-32-9	Acenaphthene	10800J	106000	2790	ug/Kg
86-73-7	Fluorene	238000	106000	3430	ug/Kg

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
95-63-6	1,2,4-Trimethylbenzene	89100	53200	3830	ug/Kg
95-50-1	1,2-Dichlorobenzene	538000	53200	2940	ug/Kg
108-67-8	1,3,5-Trimethylbenzene	53100J	53200	4000	ug/Kg
106-46-7	1,4-Dichlorobenzene	42800J	53200	2460	ug/Kg
99-87-6	4-Isopropyltoluene	37300J	53200	2240	ug/Kg
71-43-2	Benzene	656000	53200	1620	ug/Kg
100-41-4	Ethylbenzene	38500J	53200	1950	ug/Kg
98-82-8	Isopropylbenzene (Cumene)	135000	53200	1970	ug/Kg
91-20-3	Naphthalene	1820000	53200	3420	ug/Kg
110-02-1	Thiophene	5230			ug/Kg
108-88-3	Toluene	938000	53200	1650	ug/Kg
1330-20-7	Xylene (total)	769000	106000	4270	ug/Kg
136777-61-2	m,p-Xylene	638000	53200	3130	ug/Kg
95-47-6	o-Xylene	131000	53200	1440	ug/Kg
135-98-8	sec-Butylbenzene	76500	53200	2100	ug/Kg
98-06-6	tert-Butylbenzene	19400J	53200	2730	ug/Kg

SW-846 7471B

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	Mercury	2.50	0.061	0.028	mg/kg

SW-846 6010B

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	Aluminum	392	43.0	4.25	mg/kg
7440-39-3	Barium	6.99	2.15	0.13	mg/kg
7440-47-3	Chromium	6910	2.15	0.097	mg/kg
7440-48-4	Cobalt	41.8	2.15	0.054	mg/kg
7440-50-8	Copper	92.1	2.15	0.17	mg/kg
7439-89-6	Iron	24300	21.5	3.77	mg/kg
7439-92-1	Lead	66.7	3.23	0.61	mg/kg
7439-95-4	Magnesium	37.5	21.5	2.33	mg/kg
7439-96-5	Manganese	635	3.23	0.075	mg/kg
7440-02-0	Nickel	3420	8.60	0.11	mg/kg
7440-09-7	Potassium	132	108	11.3	mg/kg
7782-49-2	Selenium	8.71	8.60	0.70	mg/kg
7440-62-2	Vanadium	25.4	4.30	0.081	mg/kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132108	**HC90A TREATED**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 6010B

CAS#	Parameter	Result	RDL	MDL	Units
7440-38-2	Arsenic	18.8	8.60	0.75	mg/kg
7440-70-2	Calcium	147J	161	23.5	mg/kg
7440-23-5	Sodium	3950	215	16.3	mg/kg
7440-66-6	Zinc	10.4	8.60	2.29	mg/kg

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
108-88-3	Toluene	216000	1.50	ug/Kg
72403-15-7	Benzene, (1-chloroethyl)methyl-	88800	4.08	ug/Kg
101-81-5	Diphenylmethane	120000	4.25	ug/Kg
620-83-7	Benzene, 1-methyl-4-(phenylmethyl)-	55900	4.59	ug/Kg
778-22-3	Benzene, 1,1'-(1-methylethylidene)b	113000	4.70	ug/Kg
26137-53-1	Naphthalene, 1,2,3-trimethyl-4-prop	1120000	4.99	ug/Kg
6416-39-3	1H-Indene, 2,3-dihydro-1-methyl-3-p	112000	5.02	ug/Kg
26137-53-1	Naphthalene, 1,2,3-trimethyl-4-prop	248000	5.07	ug/Kg
	Unknown	207000	5.17	ug/Kg
5956-09-2	2H-3,9a-Methano-1-benzoxepin, octah	162000	5.47	ug/Kg
10544-50-0	Sulfur, mol. (S8)	156000	6.15	ug/Kg
106-42-3	p-Xylene	97000	1.97	ug/Kg
	Unknown	49500	7.48	ug/Kg
98-82-8	Benzene, (1-methylethyl)-	30900	2.23	ug/Kg
526-73-8	Benzene, 1,2,3-trimethyl-	34900	2.55	ug/Kg
700-88-9	Benzene, cyclopentyl-	52300	3.51	ug/Kg
5279-14-1	Benzene, (1-nitropropyl)-	62400	3.63	ug/Kg
2132-84-5	Benzene, (1-methylhexyl)-	99000	3.75	ug/Kg
827-52-1	Benzene, cyclohexyl-	131000	3.87	ug/Kg
4815-57-0	Benzene, 1,4-dipropyl-	65300	3.98	ug/Kg

SW-846 9045C pH

CAS#	Parameter	Result	RDL	MDL	Units
pH	pH	1.58	1.00	1.00	pH unit

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132109	**HC90B TREATED**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 7471B

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	Mercury	3.14	0.072	0.033	mg/kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132109	**HC90B TREATED**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 6010B

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	Aluminum	505	48.1	4.75	mg/kg
7440-36-0	Antimony	0.89J	14.4	0.58	mg/kg
7440-39-3	Barium	11.2	2.40	0.14	mg/kg
7440-47-3	Chromium	7640	2.40	0.11	mg/kg
7440-48-4	Cobalt	49.2	2.40	0.060	mg/kg
7440-50-8	Copper	94.4	2.40	0.19	mg/kg
7439-89-6	Iron	28700	24.0	4.21	mg/kg
7439-92-1	Lead	90.1	3.60	0.68	mg/kg
7439-95-4	Magnesium	45.1	24.0	2.61	mg/kg
7439-96-5	Manganese	724	3.60	0.084	mg/kg
7440-02-0	Nickel	3750	9.61	0.13	mg/kg
7440-09-7	Potassium	178	120	12.6	mg/kg
7782-49-2	Selenium	10.6	9.61	0.79	mg/kg
7440-62-2	Vanadium	30.3	4.81	0.090	mg/kg

SW-846 6010B

CAS#	Parameter	Result	RDL	MDL	Units
7440-38-2	Arsenic	21.1	9.61	0.84	mg/kg
7440-70-2	Calcium	179J	180	26.3	mg/kg
7440-23-5	Sodium	4640	240	18.2	mg/kg
7440-66-6	Zinc	12.3	9.61	2.56	mg/kg

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
108-88-3	Toluene	255000	1.51	ug/Kg
26968-58-1	Benzene, (chloromethyl)ethyl-	115000	4.08	ug/Kg
101-81-5	Diphenylmethane	151000	4.25	ug/Kg
605-39-0	2,2'-Dimethylbiphenyl	76800	4.60	ug/Kg
13540-56-2	Benzene, 1,2-dimethyl-4-(phenylmeth	144000	4.70	ug/Kg
26137-53-1	Naphthalene, 1,2,3-trimethyl-4-prop	827000	4.99	ug/Kg
6416-39-3	1H-Indene, 2,3-dihydro-1-methyl-3-p	84900	5.02	ug/Kg
834-24-2	Benzenamine, 4-(2-phenylethenyl)-	178000	5.08	ug/Kg
	Unknown	192000	5.18	ug/Kg
0-00-0	9,9-Dimethyl-9-sila-9,10-dihydrophe	94100	5.27	ug/Kg
55012-80-1	Silane, trimethyl[5-methyl-2-(1-met	133000	5.47	ug/Kg
106-42-3	p-Xylene	227000	1.97	ug/Kg
10544-50-0	Sulfur, mol. (S8)	126000	6.15	ug/Kg
98-82-8	Benzene, (1-methylethyl)-	62300	2.23	ug/Kg
95-36-3	1,2,4-Trimethylbenzene	70300	2.55	ug/Kg
700-88-9	Benzene, cyclopentyl-	83700	3.52	ug/Kg
2132-86-7	Benzene, (1-propylbutyl)-	103000	3.64	ug/Kg
2132-84-5	Benzene, (1-methylhexyl)-	152000	3.75	ug/Kg
827-52-1	Benzene, cyclohexyl-	287000	3.88	ug/Kg
4920-99-4	Benzene, 1-ethyl-3-(1-methylethyl)-	112000	3.98	ug/Kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132109	**HC90B TREATED**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
91-57-6	2-Methylnaphthalene	51900J	119000	3760	ug/Kg
83-32-9	Acenaphthene	9350J	119000	3120	ug/Kg
86-73-7	Fluorene	205000	119000	3830	ug/Kg

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
95-63-6	1,2,4-Trimethylbenzene	82200	45600	3280	ug/Kg
95-50-1	1,2-Dichlorobenzene	503000	45600	2520	ug/Kg
108-67-8	1,3,5-Trimethylbenzene	50700	45600	3430	ug/Kg
106-46-7	1,4-Dichlorobenzene	38200J	45600	2110	ug/Kg
99-87-6	4-Isopropyltoluene	33800J	45600	1910	ug/Kg
71-43-2	Benzene	476000	45600	1390	ug/Kg
100-41-4	Ethylbenzene	33900J	45600	1670	ug/Kg
98-82-8	Isopropylbenzene (Cumene)	123000	45600	1690	ug/Kg
91-20-3	Naphthalene	1720000	45600	2930	ug/Kg
110-02-1	Thiophene	3750			ug/Kg
108-88-3	Toluene	711000	45600	1410	ug/Kg
1330-20-7	Xylene (total)	667000	91200	3660	ug/Kg
136777-61-2	m,p-Xylene	550000	45600	2680	ug/Kg
95-47-6	o-Xylene	117000	45600	1230	ug/Kg
135-98-8	sec-Butylbenzene	77500	45600	1800	ug/Kg
98-06-6	tert-Butylbenzene	19500J	45600	2330	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132110	**HC90C TREATED**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 7471B

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	Mercury	1.67	0.064	0.030	mg/kg

SW-846 6010B

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	Aluminum	503	43.8	4.33	mg/kg
7440-36-0	Antimony	8.61J	13.1	0.53	mg/kg
7440-39-3	Barium	8.24	2.19	0.13	mg/kg
7440-47-3	Chromium	14000	2.19	0.099	mg/kg
7440-48-4	Cobalt	88.5	2.19	0.055	mg/kg
7440-50-8	Copper	201	2.19	0.17	mg/kg
7439-89-6	Iron	49700	21.9	3.84	mg/kg
7439-92-1	Lead	77.4	3.28	0.62	mg/kg
7439-95-4	Magnesium	46.0	21.9	2.38	mg/kg
7439-96-5	Manganese	1310	3.28	0.077	mg/kg
7440-02-0	Nickel	6700	8.76	0.11	mg/kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132110	**HC90C TREATED**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 6010B

CAS#	Parameter	Result	RDL	MDL	Units
7440-09-7	Potassium	192	109	11.5	mg/kg
7782-49-2	Selenium	10.9	8.76	0.72	mg/kg
7440-62-2	Vanadium	53.8	4.38	0.082	mg/kg

SW-846 6010B

CAS#	Parameter	Result	RDL	MDL	Units
7440-38-2	Arsenic	43.3	8.76	0.76	mg/kg
7440-70-2	Calcium	173	164	23.9	mg/kg
7440-23-5	Sodium	5920	219	16.6	mg/kg
7440-66-6	Zinc	17.2	8.76	2.33	mg/kg

SW-846 8260B

CAS#	Parameter	Result	RDL	MDL	Units
95-63-6	1,2,4-Trimethylbenzene	66000	54200	3900	ug/Kg
95-50-1	1,2-Dichlorobenzene	413000	54200	2990	ug/Kg
108-67-8	1,3,5-Trimethylbenzene	37900J	54200	4080	ug/Kg
106-46-7	1,4-Dichlorobenzene	30200J	54200	2500	ug/Kg
99-87-6	4-Isopropyltoluene	33000J	54200	2280	ug/Kg
71-43-2	Benzene	282000	54200	1650	ug/Kg
100-41-4	Ethylbenzene	21500J	54200	1980	ug/Kg
98-82-8	Isopropylbenzene (Cumene)	93700	54200	2010	ug/Kg
91-20-3	Naphthalene	1570000	54200	3480	ug/Kg
110-02-1	Thiophene	2630			ug/Kg
108-88-3	Toluene	454000	54200	1680	ug/Kg
1330-20-7	Xylene (total)	464000	108000	4350	ug/Kg
136777-61-2	m,p-Xylene	376000	54200	3190	ug/Kg
95-47-6	o-Xylene	89600	54200	1460	ug/Kg
135-98-8	sec-Butylbenzene	51700J	54200	2140	ug/Kg
98-06-6	tert-Butylbenzene	12800J	54200	2770	ug/Kg

SW-846 8270C

CAS#	Parameter	Result	RDL	MDL	Units
91-57-6	2-Methylnaphthalene	101000J	108000	3430	ug/Kg
83-32-9	Acenaphthene	18500J	108000	2840	ug/Kg
86-73-7	Fluorene	402000	108000	3490	ug/Kg

Library Search Semivolatiles

CAS#	Parameter	Result	Retention		Units
106-42-3	p-Xylene	275000	1.97		ug/Kg
102-46-5	Benzene, 4-(chloromethyl)-1,2-dimet	120000	4.08		ug/Kg
101-81-5	Diphenylmethane	174000	4.25		ug/Kg
620-83-7	Benzene, 1-methyl-4-(phenylmethyl)-	52200	4.56		ug/Kg
778-22-3	Benzene, 1,1'-(1-methylethylidene)b	151000	4.70		ug/Kg

Summary of Compounds Detected (con't)

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132110	**HC90C TREATED**	Solid	08/10/2012 15:55	08/11/2012 10:00

Library Search Semivolatiles

CAS#	Parameter	Result	Retention	Units
26137-53-1	Naphthalene, 1,2,3-trimethyl-4-prop	1660000	4.99	ug/Kg
6416-39-3	1H-Indene, 2,3-dihydro-1-methyl-3-p	151000	5.02	ug/Kg
	Unknown	340000	5.07	ug/Kg
834-24-2	Benzenamine, 4-(2-phenylethenyl)-	311000	5.17	ug/Kg
	Unknown	303000	5.27	ug/Kg
55012-80-1	Silane, trimethyl[5-methyl-2-(1-met	254000	5.47	ug/Kg
108-38-3	Benzene, 1,3-dimethyl-	65500	2.08	ug/Kg
778-22-3	Benzene, 1,1'-(1-methylethylidene)b	107000	6.70	ug/Kg
526-73-8	Benzene, 1,2,3-trimethyl-	83200	2.43	ug/Kg
108-67-8	Benzene, 1,3,5-trimethyl-	111000	2.55	ug/Kg
700-88-9	Benzene, cyclopentyl-	130000	3.51	ug/Kg
	Unknown	170000	3.63	ug/Kg
	Unknown	145000	3.74	ug/Kg
827-52-1	Benzene, cyclohexyl-	190000	3.87	ug/Kg
4920-99-4	Benzene, 1-ethyl-3-(1-methylethyl)-	92300	3.98	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132101	**VR90 TREATED (TCLP)**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 8260B TCLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			40	08/16/2012 13:54	EDS	487887

CAS#	Parameter	Result	RDL	MDL	Units
75-35-4	1,1-Dichloroethene	0.00732U	0.200	0.00732	mg/L
107-06-2	1,2-Dichloroethane	0.00484U	0.200	0.00484	mg/L
78-93-3	2-Butanone	0.00940U	1.00	0.00940	mg/L
71-43-2	**Benzene**	**0.080J**	**0.200**	**0.00196**	**mg/L**
56-23-5	Carbon tetrachloride	0.00225U	0.200	0.00225	mg/L
108-90-7	Chlorobenzene	0.00219U	0.200	0.00219	mg/L
67-66-3	Chloroform	0.00246U	0.200	0.00246	mg/L
91-20-3	**Naphthalene**	**0.173J**	**0.200**	**0.00700**	**mg/L**
127-18-4	Tetrachloroethene	0.00564U	0.200	0.00564	mg/L
110-02-1	Thiophene	ND			mg/L
79-01-6	Trichloroethene	0.00377U	0.200	0.00377	mg/L
75-01-4	Vinyl chloride	0.00416U	0.200	0.00416	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	2	2.07	mg/L	104	62 - 130
1868-53-7	Dibromofluoromethane	2	2.04	mg/L	102	65 - 127
2037-26-5	Toluene d8	2	2	mg/L	100	71 - 134
17060-07-0	1,2-Dichloroethane-d4	2	2.09	mg/L	105	62 - 127

SW-846 8270C TCLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/16/2012 13:00	487810	SW-846 3510C	10	08/17/2012 17:01	JWM	487968

CAS#	Parameter	Result	RDL	MDL	Units
106-46-7	1,4-Dichlorobenzene	0.0128U	0.5000	0.0128	mg/L
95-95-4	2,4,5-Trichlorophenol	0.0159U	0.5000	0.0159	mg/L
88-06-2	2,4,6-Trichlorophenol	0.0138U	0.5000	0.0138	mg/L
121-14-2	2,4-Dinitrotoluene	0.0132U	0.1000	0.0132	mg/L
1319-77-3	Cresols	0.0341U	1.00	0.0341	mg/L
118-74-1	Hexachlorobenzene	0.0125U	0.1000	0.0125	mg/L
87-68-3	Hexachlorobutadiene	0.0096U	0.5000	0.0096	mg/L
67-72-1	Hexachloroethane	0.0150U	0.5000	0.0150	mg/L
98-95-3	Nitrobenzene	0.0165U	0.5000	0.0165	mg/L
87-86-5	Pentachlorophenol	0.0084U	2.50	0.0084	mg/L
110-86-1	Pyridine	0.1790U	0.5000	0.1790	mg/L
1319-77-3MP	m,p-Cresol	0.0176U	0.5000	0.0176	mg/L
95-48-7	o-Cresol	0.0165U	0.5000	0.0165	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	250	Diluted Out	ug/L	**0***	48 - 123
321-60-8	2-Fluorobiphenyl	250	Diluted Out	ug/L	**0***	16 - 128
1718-51-0	Terphenyl-d14	250	Diluted Out	ug/L	**0***	38 - 167
4165-62-2	Phenol-d5	500	Diluted Out	ug/L	**0***	10 - 123
367-12-4	2-Fluorophenol	500	Diluted Out	ug/L	**0***	10 - 120
118-79-6	2,4,6-Tribromophenol	500	Diluted Out	ug/L	**0***	44 - 121

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132101	**VR90 TREATED (TCLP)**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 6010B TCLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/15/2012 12:40	487805	SW-846 3010A	5	08/16/2012 09:27	BNB	487877

CAS#	Parameter	Result	RDL	MDL	Units
7440-38-2	Arsenic	0.017U	1.00	0.017	mg/L
7440-39-3	**Barium**	**0.13J**	**5.00**	**0.0079**	**mg/L**
7440-43-9	Cadmium	0.00052U	0.050	0.00052	mg/L
7440-47-3	**Chromium**	**0.068J**	**0.25**	**0.0017**	**mg/L**
7439-92-1	**Lead**	**0.028J**	**0.50**	**0.014**	**mg/L**
7782-49-2	Selenium	0.019U	0.50	0.019	mg/L
7440-22-4	**Silver**	**0.0033J**	**0.25**	**0.0032**	**mg/L**

SW-846 7470A TCLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/15/2012 12:40	487807	SW-846 7470A	1	08/16/2012 12:08	CLB	487888

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	Mercury	0.000075U	0.0020	0.000075	mg/L

SW-846 9060M

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	08/20/2012 09:47	AEL	487971

CAS#	Parameter	Result	RDL	MDL	Units
C-012	**Total Organic Carbon**	**69300**	**200**	**97.0**	**mg/kg**

RESULTS REPORTED ON A DRY WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132102	**VR90 TREATED (SPLP)**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 8260B SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			25	08/15/2012 13:44	LBH	487788

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	3.75U	130	3.75	ug/L
71-55-6	1,1,1-Trichloroethane	1.94U	130	1.94	ug/L
79-34-5	1,1,2,2-Tetrachloroethane	2.80U	130	2.80	ug/L
79-00-5	1,1,2-Trichloroethane	4.48U	130	4.48	ug/L
75-34-3	1,1-Dichloroethane	1.59U	130	1.59	ug/L
75-35-4	1,1-Dichloroethene	4.58U	130	4.58	ug/L
563-58-6	1,1-Dichloropropene	1.79U	130	1.79	ug/L
96-18-4	1,2,3-Trichloropropane	1.58U	130	1.58	ug/L
120-82-1	1,2,4-Trichlorobenzene	3.45U	130	3.45	ug/L
95-63-6	**1,2,4-Trimethylbenzene**	**155**	**130**	**2.01**	**ug/L**
96-12-8	1,2-Dibromo-3-chloropropane	2.06U	130	2.06	ug/L
106-93-4	1,2-Dibromoethane	4.23U	130	4.23	ug/L
95-50-1	**1,2-Dichlorobenzene**	**1400**	**130**	**2.15**	**ug/L**
107-06-2	1,2-Dichloroethane	3.03U	130	3.03	ug/L
540-59-0	1,2-Dichloroethene(Total)	4.23U	250	4.23	ug/L
78-87-5	1,2-Dichloropropane	2.85U	130	2.85	ug/L
108-67-8	**1,3,5-Trimethylbenzene**	**65.7J**	**130**	**1.32**	**ug/L**
541-73-1	**1,3-Dichlorobenzene**	**16.0J**	**130**	**2.00**	**ug/L**
142-28-9	1,3-Dichloropropane	2.83U	130	2.83	ug/L
106-46-7	**1,4-Dichlorobenzene**	**103J**	**130**	**1.46**	**ug/L**
594-20-7	2,2-Dichloropropane	2.80U	130	2.80	ug/L
78-93-3	2-Butanone	5.88U	630	5.88	ug/L
95-49-8	2-Chlorotoluene	2.25U	130	2.25	ug/L
591-78-6	2-Hexanone	7.55U	130	7.55	ug/L
106-43-4	4-Chlorotoluene	1.15U	130	1.15	ug/L
99-87-6	4-Isopropyltoluene	4.38U	130	4.38	ug/L
108-10-1	4-Methyl-2-pentanone	3.55U	130	3.55	ug/L
67-64-1	**Acetone**	**117J**	**630**	**8.05**	**ug/L**
71-43-2	**Benzene**	**2620**	**130**	**1.23**	**ug/L**
108-86-1	Bromobenzene	2.37U	130	2.37	ug/L
74-97-5	Bromochloromethane	5.95U	130	5.95	ug/L
75-27-4	Bromodichloromethane	1.76U	130	1.76	ug/L
75-25-2	Bromoform	6.95U	130	6.95	ug/L
74-83-9	Bromomethane	6.90U	130	6.90	ug/L
75-15-0	Carbon disulfide	4.75U	130	4.75	ug/L
56-23-5	Carbon tetrachloride	1.41U	130	1.41	ug/L
108-90-7	Chlorobenzene	1.37U	130	1.37	ug/L
75-00-3	Chloroethane	6.98U	130	6.98	ug/L
67-66-3	Chloroform	1.54U	130	1.54	ug/L
74-87-3	Chloromethane	1.89U	130	1.89	ug/L
124-48-1	Dibromochloromethane	3.33U	130	3.33	ug/L
74-95-3	Dibromomethane	4.93U	130	4.93	ug/L
75-71-8	Dichlorodifluoromethane	2.21U	130	2.21	ug/L
100-41-4	**Ethylbenzene**	**46.1J**	**130**	**4.50**	**ug/L**
87-68-3	Hexachlorobutadiene	8.68U	130	8.68	ug/L
98-82-8	**Isopropylbenzene (Cumene)**	**113J**	**130**	**1.46**	**ug/L**
74-88-4	Methyl iodide	2.42U	130	2.42	ug/L
75-09-2	**Methylene chloride**	**18.3J**	**250**	**2.55**	**ug/L**
91-20-3	**Naphthalene**	**4120**	**130**	**4.38**	**ug/L**
100-42-5	Styrene	1.44U	130	1.44	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132102	**VR90 TREATED (SPLP)**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 8260B SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			25	08/15/2012 13:44	LBH	487788

CAS#	Parameter	Result	RDL	MDL	Units
127-18-4	Tetrachloroethene	3.53U	130	3.53	ug/L
110-02-1	Thiophene	ND			ug/L
108-88-3	**Toluene**	**2120**	**130**	**1.94**	**ug/L**
79-01-6	Trichloroethene	2.36U	130	2.36	ug/L
75-69-4	Trichlorofluoromethane	2.34U	130	2.34	ug/L
76-13-1	Trichlorotrifluoroethane	3.53U	130	3.53	ug/L
108-05-4	Vinyl acetate	4.93U	130	4.93	ug/L
75-01-4	Vinyl chloride	2.60U	130	2.60	ug/L
1330-20-7	**Xylene (total)**	**743**	**250**	**3.08**	**ug/L**
156-59-2	cis-1,2-Dichloroethene	2.60U	130	2.60	ug/L
10061-01-5	cis-1,3-Dichloropropene	2.63U	130	2.63	ug/L
136777-61-2	**m,p-Xylene**	**517**	**130**	**2.46**	**ug/L**
104-51-8	n-Butylbenzene	1.71U	130	1.71	ug/L
103-65-1	n-Propylbenzene	1.72U	130	1.72	ug/L
95-47-6	**o-Xylene**	**226**	**130**	**1.93**	**ug/L**
135-98-8	**sec-Butylbenzene**	**30.1J**	**130**	**2.20**	**ug/L**
1634-04-4	tert-Butyl methyl ether (MTBE)	2.10U	130	2.10	ug/L
98-06-6	tert-Butylbenzene	1.45U	130	1.45	ug/L
156-60-5	trans-1,2-Dichloroethene	2.39U	130	2.39	ug/L
10061-02-6	trans-1,3-Dichloropropene	1.70U	130	1.70	ug/L
110-57-6	trans-1,4-Dichloro-2-butene	10.7U	130	10.7	ug/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	1250	1270	ug/L	102	78 - 130
1868-53-7	Dibromofluoromethane	1250	1250	ug/L	100	77 - 127
2037-26-5	Toluene d8	1250	1280	ug/L	102	76 - 134
17060-07-0	1,2-Dichloroethane-d4	1250	1290	ug/L	103	71 - 127

SW-846 8270C SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/16/2012 13:00	487810	SW-846 3510C	4	08/20/2012 12:44	KCB	488079

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	0.936U	40.0	0.936	ug/L
122-66-7	1,2Diphenylhydrazine/Azobenzen	1.11U	40.0	1.11	ug/L
95-95-4	2,4,5-Trichlorophenol	1.27U	40.0	1.27	ug/L
88-06-2	2,4,6-Trichlorophenol	1.10U	40.0	1.10	ug/L
120-83-2	2,4-Dichlorophenol	0.868U	40.0	0.868	ug/L
105-67-9	2,4-Dimethylphenol	2.78U	40.0	2.78	ug/L
51-28-5	2,4-Dinitrophenol	10.4U	200	10.4	ug/L
121-14-2	2,4-Dinitrotoluene	1.05U	40.0	1.05	ug/L
606-20-2	2,6-Dinitrotoluene	1.41U	40.0	1.41	ug/L
91-58-7	2-Chloronaphthalene	0.884U	40.0	0.884	ug/L
95-57-8	2-Chlorophenol	1.10U	40.0	1.10	ug/L
91-57-6	**2-Methylnaphthalene**	**60.8**	**40.0**	**1.02**	**ug/L**
88-74-4	2-Nitroaniline	0.792U	200	0.792	ug/L
88-75-5	2-Nitrophenol	1.43U	40.0	1.43	ug/L
91-94-1	3,3'-Dichlorobenzidine	1.19U	80.0	1.19	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132102	**VR90 TREATED (SPLP)**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 8270C SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/16/2012 13:00	487810	SW-846 3510C	4	08/20/2012 12:44	KCB	488079

CAS#	Parameter	Result	RDL	MDL	Units
99-09-2	3-Nitroaniline	0.904U	200	0.904	ug/L
534-52-1	4,6-Dinitro-2-methylphenol	7.92U	200	7.92	ug/L
101-55-3	4-Bromophenyl phenyl ether	1.35U	40.0	1.35	ug/L
59-50-7	4-Chloro-3-methylphenol	0.936U	40.0	0.936	ug/L
106-47-8	4-Chloroaniline	1.85U	40.0	1.85	ug/L
7005-72-3	4-Chlorophenyl phenyl ether	1.07U	40.0	1.07	ug/L
100-01-6	4-Nitroaniline	0.884U	200	0.884	ug/L
100-02-7	4-Nitrophenol	7.32U	200	7.32	ug/L
83-32-9	**Acenaphthene**	**6.37J**	**40.0**	**1.07**	**ug/L**
208-96-8	Acenaphthylene	1.21U	40.0	1.21	ug/L
62-53-3	**Aniline**	**66.1**	**40.0**	**2.87**	**ug/L**
120-12-7	Anthracene	1.26U	40.0	1.26	ug/L
56-55-3	Benzo(a)anthracene	1.26U	40.0	1.26	ug/L
50-32-8	Benzo(a)pyrene	0.500U	40.0	0.500	ug/L
205-99-2	Benzo(b)fluoranthene	0.868U	40.0	0.868	ug/L
191-24-2	Benzo(g,h,i)perylene	0.860U	40.0	0.860	ug/L
207-08-9	Benzo(k)fluoranthene	0.944U	40.0	0.944	ug/L
100-51-6	Benzyl alcohol	1.42U	40.0	1.42	ug/L
111-91-1	Bis(2-Chloroethoxy)methane	1.16U	40.0	1.16	ug/L
111-44-4	Bis(2-Chloroethyl)ether	1.15U	40.0	1.15	ug/L
108-60-1	Bis(2-Chloroisopropyl)ether	1.03U	40.0	1.03	ug/L
117-81-7	Bis(2-Ethylhexyl)phthalate	0.764U	40.0	0.764	ug/L
85-68-7	Butyl benzyl phthalate	0.660U	40.0	0.660	ug/L
86-74-8	**Carbazole**	**18.5J**	**40.0**	**0.928**	**ug/L**
218-01-9	Chrysene	1.73U	40.0	1.73	ug/L
84-74-2	Di-n-butyl phthalate	0.756U	40.0	0.756	ug/L
117-84-0	Di-n-octyl phthalate	0.668U	40.0	0.668	ug/L
53-70-3	Dibenz(a,h)anthracene	0.868U	40.0	0.868	ug/L
132-64-9	**Dibenzofuran**	**3.69J**	**40.0**	**0.908**	**ug/L**
84-66-2	Diethyl phthalate	1.21U	40.0	1.21	ug/L
131-11-3	Dimethyl phthalate	1.02U	40.0	1.02	ug/L
206-44-0	Fluoranthene	1.07U	40.0	1.07	ug/L
86-73-7	**Fluorene**	**18.8J**	**40.0**	**1.15**	**ug/L**
118-74-1	Hexachlorobenzene	0.996U	40.0	0.996	ug/L
87-68-3	Hexachlorobutadiene	0.768U	40.0	0.768	ug/L
77-47-4	Hexachlorocyclopentadiene	0.696U	40.0	0.696	ug/L
67-72-1	Hexachloroethane	1.20U	40.0	1.20	ug/L
193-39-5	Indeno(1,2,3-cd)pyrene	0.628U	40.0	0.628	ug/L
78-59-1	**Isophorone**	**11.6J**	**40.0**	**1.52**	**ug/L**
98-95-3	Nitrobenzene	1.32U	40.0	1.32	ug/L
87-86-5	Pentachlorophenol	0.672U	200	0.672	ug/L
85-01-8	Phenanthrene	1.22U	40.0	1.22	ug/L
108-95-2	**Phenol**	**109**	**40.0**	**0.600**	**ug/L**
129-00-0	Pyrene	1.94U	40.0	1.94	ug/L
110-86-1	**Pyridine**	**159**	**40.0**	**14.3**	**ug/L**
1319-77-3MP	m,p-Cresol	1.41U	40.0	1.41	ug/L
621-64-7	n-Nitrosodi-n-propylamine	1.22U	40.0	1.22	ug/L
62-75-9	n-Nitrosodimethylamine	1.22U	40.0	1.22	ug/L
86-30-6	**n-Nitrosodiphenylamine**	**8.91J**	**40.0**	**1.46**	**ug/L**
95-48-7	o-Cresol	1.32U	40.0	1.32	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132102	**VR90 TREATED (SPLP)**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 8270C SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/16/2012 13:00	487810	SW-846 3510C	4	08/20/2012 12:44	KCB	488079

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	50	50.8	ug/L	102	52 - 120
321-60-8	2-Fluorobiphenyl	50	43.5	ug/L	87	16 - 128
1718-51-0	Terphenyl-d14	50	29.1	ug/L	58	43 - 138
4165-62-2	Phenol-d5	100	40.5	ug/L	41	10 - 120
367-12-4	2-Fluorophenol	100	60.5	ug/L	61	10 - 120
118-79-6	2,4,6-Tribromophenol	100	78.2	ug/L	78	52 - 121

SW-846 6010B SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/15/2012 12:40	487804	SW-846 3010A	1	08/17/2012 18:09	CLB	487998

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	**Aluminum**	**1.87**	**0.20**	**0.024**	**mg/L**
7440-36-0	Antimony	0.0040U	0.060	0.0040	mg/L
7440-38-2	Arsenic	0.0035U	0.010	0.0035	mg/L
7440-39-3	**Barium**	**0.0047J**	**0.010**	**0.0016**	**mg/L**
7440-41-7	Beryllium	0.000082U	0.0050	0.000082	mg/L
7440-43-9	Cadmium	0.00010U	0.0050	0.00010	mg/L
7440-70-2	**Calcium**	**0.84**	**0.051**	**0.024**	**mg/L**
7440-47-3	**Chromium**	**0.031**	**0.010**	**0.00034**	**mg/L**
7440-48-4	**Cobalt**	**0.0022J**	**0.010**	**0.00052**	**mg/L**
7440-50-8	**Copper**	**0.0028J**	**0.010**	**0.0017**	**mg/L**
7439-89-6	**Iron**	**43.0**	**0.050**	**0.027**	**mg/L**
7439-92-1	**Lead**	**0.0059J**	**0.015**	**0.0028**	**mg/L**
7439-95-4	**Magnesium**	**0.28**	**0.050**	**0.012**	**mg/L**
7439-96-5	**Manganese**	**1.23**	**0.015**	**0.00083**	**mg/L**
7440-02-0	**Nickel**	**0.019J**	**0.040**	**0.00084**	**mg/L**
7440-09-7	**Potassium**	**0.11J**	**0.20**	**0.041**	**mg/L**
7782-49-2	Selenium	0.0038U	0.040	0.0038	mg/L
7440-22-4	Silver	0.00064U	0.010	0.00064	mg/L
7440-23-5	**Sodium**	**16.3**	**1.00**	**0.056**	**mg/L**
7440-28-0	Thallium	0.0026U	0.020	0.0026	mg/L
7440-62-2	Vanadium	0.0012U	0.020	0.0012	mg/L
7440-66-6	**Zinc**	**0.033**	**0.020**	**0.0059**	**mg/L**

SW-846 1312/7471A SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/15/2012 12:40	487806	SW-846 1312/7470A	1	08/15/2012 17:41	CLB	487828

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	Mercury	0.000075U	0.00020	0.000075	mg/L

RESULTS REPORTED ON A DRY WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132103	**HC90 TREATED (TCLP)**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 8260B TCLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			40	08/16/2012 14:15	EDS	487887

CAS#	Parameter	Result	RDL	MDL	Units
75-35-4	1,1-Dichloroethene	0.00732U	0.200	0.00732	mg/L
107-06-2	1,2-Dichloroethane	0.00484U	0.200	0.00484	mg/L
78-93-3	2-Butanone	0.00940U	1.00	0.00940	mg/L
71-43-2	**Benzene**	**2.52**	**0.200**	**0.00196**	**mg/L**
56-23-5	Carbon tetrachloride	0.00225U	0.200	0.00225	mg/L
108-90-7	Chlorobenzene	0.00219U	0.200	0.00219	mg/L
67-66-3	Chloroform	0.00246U	0.200	0.00246	mg/L
91-20-3	**Naphthalene**	**2.36**	**0.200**	**0.00700**	**mg/L**
127-18-4	Tetrachloroethene	0.00564U	0.200	0.00564	mg/L
110-02-1	**Thiophene**	**0.040**			**mg/L**
79-01-6	Trichloroethene	0.00377U	0.200	0.00377	mg/L
75-01-4	Vinyl chloride	0.00416U	0.200	0.00416	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	2	2	mg/L	100	62 - 130
1868-53-7	Dibromofluoromethane	2	2.01	mg/L	101	65 - 127
2037-26-5	Toluene d8	2	1.98	mg/L	99	71 - 134
17060-07-0	1,2-Dichloroethane-d4	2	2.05	mg/L	103	62 - 127

SW-846 8270C TCLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/16/2012 13:00	487810	SW-846 3510C	10	08/17/2012 17:15	JWM	487968

CAS#	Parameter	Result	RDL	MDL	Units
106-46-7	1,4-Dichlorobenzene	0.0128U	0.5000	0.0128	mg/L
95-95-4	2,4,5-Trichlorophenol	0.0159U	0.5000	0.0159	mg/L
88-06-2	2,4,6-Trichlorophenol	0.0138U	0.5000	0.0138	mg/L
121-14-2	2,4-Dinitrotoluene	0.0132U	0.1000	0.0132	mg/L
1319-77-3	Cresols	0.0341U	1.00	0.0341	mg/L
118-74-1	Hexachlorobenzene	0.0125U	0.1000	0.0125	mg/L
87-68-3	Hexachlorobutadiene	0.0096U	0.5000	0.0096	mg/L
67-72-1	Hexachloroethane	0.0150U	0.5000	0.0150	mg/L
98-95-3	Nitrobenzene	0.0165U	0.5000	0.0165	mg/L
87-86-5	Pentachlorophenol	0.0084U	2.50	0.0084	mg/L
110-86-1	**Pyridine**	**2.37**	**0.5000**	**0.1790**	**mg/L**
1319-77-3MP	m,p-Cresol	0.0176U	0.5000	0.0176	mg/L
95-48-7	o-Cresol	0.0165U	0.5000	0.0165	mg/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	250	Diluted Out	ug/L	**0***	48 - 123
321-60-8	2-Fluorobiphenyl	250	Diluted Out	ug/L	**0***	16 - 128
1718-51-0	Terphenyl-d14	250	Diluted Out	ug/L	**0***	38 - 167
4165-62-2	Phenol-d5	500	Diluted Out	ug/L	**0***	10 - 123
367-12-4	2-Fluorophenol	500	Diluted Out	ug/L	**0***	10 - 120
118-79-6	2,4,6-Tribromophenol	500	Diluted Out	ug/L	**0***	44 - 121

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132103	**HC90 TREATED (TCLP)**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 6010B TCLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/15/2012 12:40	487805	SW-846 3010A	5	08/16/2012 10:48	BNB	487877

CAS#	Parameter	Result	RDL	MDL	Units
7440-38-2	**Arsenic**	**0.37J**	**1.00**	**0.017**	**mg/L**
7440-39-3	**Barium**	**0.051J**	**5.00**	**0.0079**	**mg/L**
7440-43-9	**Cadmium**	**0.0028J**	**0.050**	**0.00052**	**mg/L**
7440-47-3	**Chromium**	**186**	**0.25**	**0.0017**	**mg/L**
7439-92-1	**Lead**	**0.42J**	**0.50**	**0.014**	**mg/L**
7782-49-2	**Selenium**	**0.034J**	**0.50**	**0.019**	**mg/L**
7440-22-4	Silver	0.0032U	0.25	0.0032	mg/L

SW-846 7470A TCLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/15/2012 12:40	487807	SW-846 7470A	1	08/16/2012 12:10	CLB	487888

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	**Mercury**	**0.00009J**	**0.0020**	**0.000075**	**mg/L**

SW-846 9060M

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	08/20/2012 10:05	AEL	487971

CAS#	Parameter	Result	RDL	MDL	Units
C-012	**Total Organic Carbon**	**64900**	**200**	**97.0**	**mg/kg**

RESULTS REPORTED ON A DRY WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132104	**HC90 TREATED (SPLP)**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 8260B SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			50	08/15/2012 14:05	LBH	487788

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	7.50U	250	7.50	ug/L
71-55-6	1,1,1-Trichloroethane	3.88U	250	3.88	ug/L
79-34-5	1,1,2,2-Tetrachloroethane	5.60U	250	5.60	ug/L
79-00-5	1,1,2-Trichloroethane	8.95U	250	8.95	ug/L
75-34-3	1,1-Dichloroethane	3.19U	250	3.19	ug/L
75-35-4	1,1-Dichloroethene	9.15U	250	9.15	ug/L
563-58-6	1,1-Dichloropropene	3.57U	250	3.57	ug/L
96-18-4	1,2,3-Trichloropropane	3.17U	250	3.17	ug/L
120-82-1	1,2,4-Trichlorobenzene	6.90U	250	6.90	ug/L
95-63-6	**1,2,4-Trimethylbenzene**	**191J**	**250**	**4.02**	**ug/L**
96-12-8	1,2-Dibromo-3-chloropropane	4.12U	250	4.12	ug/L
106-93-4	1,2-Dibromoethane	8.45U	250	8.45	ug/L
95-50-1	**1,2-Dichlorobenzene**	**1000**	**250**	**4.29**	**ug/L**
107-06-2	1,2-Dichloroethane	6.05U	250	6.05	ug/L
540-59-0	1,2-Dichloroethene(Total)	8.45U	500	8.45	ug/L
78-87-5	1,2-Dichloropropane	5.70U	250	5.70	ug/L
108-67-8	**1,3,5-Trimethylbenzene**	**80.0J**	**250**	**2.63**	**ug/L**
541-73-1	1,3-Dichlorobenzene	4.00U	250	4.00	ug/L
142-28-9	1,3-Dichloropropane	5.65U	250	5.65	ug/L
106-46-7	**1,4-Dichlorobenzene**	**78.4J**	**250**	**2.92**	**ug/L**
594-20-7	2,2-Dichloropropane	5.60U	250	5.60	ug/L
78-93-3	2-Butanone	11.8U	1300	11.8	ug/L
95-49-8	2-Chlorotoluene	4.49U	250	4.49	ug/L
591-78-6	2-Hexanone	15.1U	250	15.1	ug/L
106-43-4	4-Chlorotoluene	2.30U	250	2.30	ug/L
99-87-6	4-Isopropyltoluene	8.75U	250	8.75	ug/L
108-10-1	4-Methyl-2-pentanone	7.10U	250	7.10	ug/L
67-64-1	**Acetone**	**216J**	**1300**	**16.1**	**ug/L**
71-43-2	**Benzene**	**4520**	**250**	**2.45**	**ug/L**
108-86-1	Bromobenzene	4.73U	250	4.73	ug/L
74-97-5	Bromochloromethane	11.9U	250	11.9	ug/L
75-27-4	Bromodichloromethane	3.53U	250	3.53	ug/L
75-25-2	Bromoform	13.9U	250	13.9	ug/L
74-83-9	Bromomethane	13.8U	250	13.8	ug/L
75-15-0	Carbon disulfide	9.50U	250	9.50	ug/L
56-23-5	Carbon tetrachloride	2.82U	250	2.82	ug/L
108-90-7	Chlorobenzene	2.74U	250	2.74	ug/L
75-00-3	Chloroethane	14.0U	250	14.0	ug/L
67-66-3	Chloroform	3.08U	250	3.08	ug/L
74-87-3	**Chloromethane**	**20.8J**	**250**	**3.79**	**ug/L**
124-48-1	Dibromochloromethane	6.65U	250	6.65	ug/L
74-95-3	Dibromomethane	9.85U	250	9.85	ug/L
75-71-8	Dichlorodifluoromethane	4.41U	250	4.41	ug/L
100-41-4	**Ethylbenzene**	**92.7J**	**250**	**9.00**	**ug/L**
87-68-3	Hexachlorobutadiene	17.4U	250	17.4	ug/L
98-82-8	**Isopropylbenzene (Cumene)**	**251**	**250**	**2.92**	**ug/L**
74-88-4	Methyl iodide	4.85U	250	4.85	ug/L
75-09-2	**Methylene chloride**	**25.9J**	**500**	**5.10**	**ug/L**
91-20-3	**Naphthalene**	**3240**	**250**	**8.75**	**ug/L**
100-42-5	Styrene	2.88U	250	2.88	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132104	**HC90 TREATED (SPLP)**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 8260B SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			50	08/15/2012 14:05	LBH	487788

CAS#	Parameter	Result	RDL	MDL	Units
127-18-4	Tetrachloroethene	7.05U	250	7.05	ug/L
110-02-1	**Thiophene**	**54.8**			**ug/L**
108-88-3	**Toluene**	**3870**	**250**	**3.88**	**ug/L**
79-01-6	Trichloroethene	4.72U	250	4.72	ug/L
75-69-4	Trichlorofluoromethane	4.68U	250	4.68	ug/L
76-13-1	Trichlorotrifluoroethane	7.05U	250	7.05	ug/L
108-05-4	Vinyl acetate	9.85U	250	9.85	ug/L
75-01-4	Vinyl chloride	5.20U	250	5.20	ug/L
1330-20-7	**Xylene (total)**	**2000**	**500**	**6.15**	**ug/L**
156-59-2	cis-1,2-Dichloroethene	5.20U	250	5.20	ug/L
10061-01-5	cis-1,3-Dichloropropene	5.25U	250	5.25	ug/L
136777-61-2	**m,p-Xylene**	**1610**	**250**	**4.93**	**ug/L**
104-51-8	n-Butylbenzene	3.42U	250	3.42	ug/L
103-65-1	n-Propylbenzene	3.43U	250	3.43	ug/L
95-47-6	**o-Xylene**	**387**	**250**	**3.87**	**ug/L**
135-98-8	sec-Butylbenzene	4.41U	250	4.41	ug/L
1634-04-4	tert-Butyl methyl ether (MTBE)	4.20U	250	4.20	ug/L
98-06-6	tert-Butylbenzene	2.90U	250	2.90	ug/L
156-60-5	trans-1,2-Dichloroethene	4.78U	250	4.78	ug/L
10061-02-6	trans-1,3-Dichloropropene	3.39U	250	3.39	ug/L
110-57-6	trans-1,4-Dichloro-2-butene	21.5U	250	21.5	ug/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	2500	2480	ug/L	99	78 - 130
1868-53-7	Dibromofluoromethane	2500	2530	ug/L	101	77 - 127
2037-26-5	Toluene d8	2500	2530	ug/L	101	76 - 134
17060-07-0	1,2-Dichloroethane-d4	2500	2620	ug/L	105	71 - 127

SW-846 8270C SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/16/2012 13:00	487810	SW-846 3510C	50	08/17/2012 17:58	KCB	487970

CAS#	Parameter	Result	RDL	MDL	Units
62-53-3	**Aniline**	**1980**	**500**	**35.9**	**ug/L**
110-86-1	**Pyridine**	**1760**	**500**	**179**	**ug/L**

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	50	Diluted Out	ug/L	**0***	52 - 120
321-60-8	2-Fluorobiphenyl	50	Diluted Out	ug/L	**0***	16 - 128
1718-51-0	Terphenyl-d14	50	Diluted Out	ug/L	**0***	43 - 138
4165-62-2	Phenol-d5	100	Diluted Out	ug/L	**0***	10 - 120
367-12-4	2-Fluorophenol	100	Diluted Out	ug/L	**0***	10 - 120
118-79-6	2,4,6-Tribromophenol	100	Diluted Out	ug/L	**0***	52 - 121

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132104	**HC90 TREATED (SPLP)**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 8270C SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/16/2012 13:00	487810	SW-846 3510C	4	08/20/2012 13:01	KCB	488079

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	0.936U	40.0	0.936	ug/L
122-66-7	1,2Diphenylhydrazine/Azobenzen	1.11U	40.0	1.11	ug/L
95-95-4	2,4,5-Trichlorophenol	1.27U	40.0	1.27	ug/L
88-06-2	2,4,6-Trichlorophenol	1.10U	40.0	1.10	ug/L
120-83-2	2,4-Dichlorophenol	0.868U	40.0	0.868	ug/L
105-67-9	2,4-Dimethylphenol	2.78U	40.0	2.78	ug/L
51-28-5	2,4-Dinitrophenol	10.4U	200	10.4	ug/L
121-14-2	2,4-Dinitrotoluene	1.05U	40.0	1.05	ug/L
606-20-2	2,6-Dinitrotoluene	1.41U	40.0	1.41	ug/L
91-58-7	2-Chloronaphthalene	0.884U	40.0	0.884	ug/L
95-57-8	2-Chlorophenol	1.10U	40.0	1.10	ug/L
91-57-6	**2-Methylnaphthalene**	**20.3J**	**40.0**	**1.02**	**ug/L**
88-74-4	2-Nitroaniline	0.792U	200	0.792	ug/L
88-75-5	2-Nitrophenol	1.43U	40.0	1.43	ug/L
91-94-1	3,3'-Dichlorobenzidine	1.19U	80.0	1.19	ug/L
99-09-2	3-Nitroaniline	0.904U	200	0.904	ug/L
534-52-1	4,6-Dinitro-2-methylphenol	7.92U	200	7.92	ug/L
101-55-3	4-Bromophenyl phenyl ether	1.35U	40.0	1.35	ug/L
59-50-7	4-Chloro-3-methylphenol	0.936U	40.0	0.936	ug/L
106-47-8	4-Chloroaniline	1.85U	40.0	1.85	ug/L
7005-72-3	4-Chlorophenyl phenyl ether	1.07U	40.0	1.07	ug/L
100-01-6	4-Nitroaniline	0.884U	200	0.884	ug/L
100-02-7	4-Nitrophenol	7.32U	200	7.32	ug/L
83-32-9	**Acenaphthene**	**2.52J**	**40.0**	**1.07**	**ug/L**
208-96-8	Acenaphthylene	1.21U	40.0	1.21	ug/L
120-12-7	Anthracene	1.26U	40.0	1.26	ug/L
56-55-3	Benzo(a)anthracene	1.26U	40.0	1.26	ug/L
50-32-8	Benzo(a)pyrene	0.500U	40.0	0.500	ug/L
205-99-2	Benzo(b)fluoranthene	0.868U	40.0	0.868	ug/L
191-24-2	Benzo(g,h,i)perylene	0.860U	40.0	0.860	ug/L
207-08-9	Benzo(k)fluoranthene	0.944U	40.0	0.944	ug/L
100-51-6	Benzyl alcohol	1.42U	40.0	1.42	ug/L
111-91-1	Bis(2-Chloroethoxy)methane	1.16U	40.0	1.16	ug/L
111-44-4	Bis(2-Chloroethyl)ether	1.15U	40.0	1.15	ug/L
108-60-1	Bis(2-Chloroisopropyl)ether	1.03U	40.0	1.03	ug/L
117-81-7	Bis(2-Ethylhexyl)phthalate	0.764U	40.0	0.764	ug/L
85-68-7	Butyl benzyl phthalate	0.660U	40.0	0.660	ug/L
86-74-8	Carbazole	0.928U	40.0	0.928	ug/L
218-01-9	Chrysene	1.73U	40.0	1.73	ug/L
84-74-2	Di-n-butyl phthalate	0.756U	40.0	0.756	ug/L
117-84-0	Di-n-octyl phthalate	0.668U	40.0	0.668	ug/L
53-70-3	Dibenz(a,h)anthracene	0.868U	40.0	0.868	ug/L
132-64-9	Dibenzofuran	0.908U	40.0	0.908	ug/L
84-66-2	Diethyl phthalate	1.21U	40.0	1.21	ug/L
131-11-3	Dimethyl phthalate	1.02U	40.0	1.02	ug/L
206-44-0	Fluoranthene	1.07U	40.0	1.07	ug/L
86-73-7	**Fluorene**	**6.87J**	**40.0**	**1.15**	**ug/L**
118-74-1	Hexachlorobenzene	0.996U	40.0	0.996	ug/L
87-68-3	Hexachlorobutadiene	0.768U	40.0	0.768	ug/L
77-47-4	Hexachlorocyclopentadiene	0.696U	40.0	0.696	ug/L

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132104	**HC90 TREATED (SPLP)**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 8270C SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/16/2012 13:00	487810	SW-846 3510C	4	08/20/2012 13:01	KCB	488079

CAS#	Parameter	Result	RDL	MDL	Units
67-72-1	Hexachloroethane	1.20U	40.0	1.20	ug/L
193-39-5	Indeno(1,2,3-cd)pyrene	0.628U	40.0	0.628	ug/L
78-59-1	**Isophorone**	**5.24J**	**40.0**	**1.52**	**ug/L**
98-95-3	Nitrobenzene	1.32U	40.0	1.32	ug/L
87-86-5	Pentachlorophenol	0.672U	200	0.672	ug/L
85-01-8	Phenanthrene	1.22U	40.0	1.22	ug/L
108-95-2	Phenol	0.600U	40.0	0.600	ug/L
129-00-0	Pyrene	1.94U	40.0	1.94	ug/L
1319-77-3MP	**m,p-Cresol**	**185**	**40.0**	**1.41**	**ug/L**
621-64-7	n-Nitrosodi-n-propylamine	1.22U	40.0	1.22	ug/L
62-75-9	n-Nitrosodimethylamine	1.22U	40.0	1.22	ug/L
86-30-6	n-Nitrosodiphenylamine	1.46U	40.0	1.46	ug/L
95-48-7	o-Cresol	1.32U	40.0	1.32	ug/L

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	50	28.1	ug/L	56	52 - 120
321-60-8	2-Fluorobiphenyl	50	26.3	ug/L	53	16 - 128
1718-51-0	Terphenyl-d14	50	16.8	ug/L	**34***	43 - 138
4165-62-2	Phenol-d5	100	33.9	ug/L	34	10 - 120
367-12-4	2-Fluorophenol	100	43.9	ug/L	44	10 - 120
118-79-6	2,4,6-Tribromophenol	100	44.7	ug/L	**45***	52 - 121

SW-846 6010B SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/15/2012 12:40	487804	SW-846 3010A	5	08/17/2012 18:44	CLB	487998

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	**Aluminum**	**9.28**	**1.00**	**0.12**	**mg/L**
7440-36-0	Antimony	0.020U	0.060	0.020	mg/L
7440-38-2	**Arsenic**	**0.43**	**0.050**	**0.017**	**mg/L**
7440-39-3	**Barium**	**0.018**	**0.015**	**0.0079**	**mg/L**
7440-41-7	Beryllium	0.00041U	0.0050	0.00041	mg/L
7440-43-9	**Cadmium**	**0.0017J**	**0.0050**	**0.00052**	**mg/L**
7440-70-2	**Calcium**	**3.21**	**0.26**	**0.12**	**mg/L**
7440-47-3	**Chromium**	**204**	**0.050**	**0.0017**	**mg/L**
7440-48-4	**Cobalt**	**0.93**	**0.050**	**0.0026**	**mg/L**
7440-50-8	**Copper**	**0.57**	**0.050**	**0.0085**	**mg/L**
7439-89-6	**Iron**	**523**	**0.25**	**0.13**	**mg/L**
7439-92-1	**Lead**	**0.34**	**0.075**	**0.014**	**mg/L**
7439-95-4	**Magnesium**	**1.01**	**0.25**	**0.061**	**mg/L**
7439-96-5	**Manganese**	**16.3**	**0.075**	**0.0042**	**mg/L**
7440-02-0	**Nickel**	**93.0**	**0.20**	**0.0042**	**mg/L**
7440-09-7	**Potassium**	**3.18**	**1.00**	**0.20**	**mg/L**
7782-49-2	Selenium	0.019U	0.040	0.019	mg/L
7440-22-4	Silver	0.0032U	0.010	0.0032	mg/L
7440-23-5	**Sodium**	**111**	**5.00**	**0.28**	**mg/L**
7440-28-0	Thallium	0.013U	0.020	0.013	mg/L
7440-62-2	**Vanadium**	**0.64**	**0.10**	**0.0061**	**mg/L**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132104	**HC90 TREATED (SPLP)**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 6010B SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/15/2012 12:40	487804	SW-846 3010A	5	08/17/2012 18:44	CLB	487998

CAS#	Parameter	Result	RDL	MDL	Units
7440-66-6	**Zinc**	**0.26**	**0.10**	**0.029**	**mg/L**

SW-846 1312/7471A SPLP

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/15/2012 12:40	487806	SW-846 1312/7470A	1	08/15/2012 17:47	CLB	487828

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	Mercury	0.000075U	0.00020	0.000075	mg/L

RESULTS REPORTED ON A DRY WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132105	**VR90A TREATED**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			50000	08/14/2012 17:38	CEK	487705

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	7250U	269000	7250	ug/Kg
71-55-6	1,1,1-Trichloroethane	12700U	269000	12700	ug/Kg
79-34-5	1,1,2,2-Tetrachloroethane	6130U	269000	6130	ug/Kg
79-00-5	1,1,2-Trichloroethane	7200U	269000	7200	ug/Kg
75-34-3	1,1-Dichloroethane	8010U	269000	8010	ug/Kg
75-35-4	1,1-Dichloroethene	12500U	269000	12500	ug/Kg
563-58-6	1,1-Dichloropropene	13100U	269000	13100	ug/Kg
96-18-4	1,2,3-Trichloropropane	6180U	269000	6180	ug/Kg
120-82-1	1,2,4-Trichlorobenzene	19100U	269000	19100	ug/Kg
95-63-6	**1,2,4-Trimethylbenzene**	**224000J**	**269000**	**19300**	**ug/Kg**
96-12-8	1,2-Dibromo-3-chloropropane	21500U	269000	21500	ug/Kg
106-93-4	1,2-Dibromoethane	7740U	269000	7740	ug/Kg
95-50-1	**1,2-Dichlorobenzene**	**1290000**	**269000**	**14800**	**ug/Kg**
107-06-2	1,2-Dichloroethane	10600U	269000	10600	ug/Kg
540-59-0	1,2-Dichloroethene(Total)	12600U	537000	12600	ug/Kg
78-87-5	1,2-Dichloropropane	8270U	269000	8270	ug/Kg
108-67-8	**1,3,5-Trimethylbenzene**	**83200J**	**269000**	**20200**	**ug/Kg**
541-73-1	1,3-Dichlorobenzene	14000U	269000	14000	ug/Kg
142-28-9	1,3-Dichloropropane	8490U	269000	8490	ug/Kg
106-46-7	**1,4-Dichlorobenzene**	**112000J**	**269000**	**12400**	**ug/Kg**
594-20-7	2,2-Dichloropropane	13400U	269000	13400	ug/Kg
78-93-3	2-Butanone	27800U	269000	27800	ug/Kg
95-49-8	2-Chlorotoluene	11800U	269000	11800	ug/Kg
591-78-6	2-Hexanone	23300U	269000	23300	ug/Kg
106-43-4	4-Chlorotoluene	12600U	269000	12600	ug/Kg
99-87-6	**4-Isopropyltoluene**	**135000J**	**269000**	**11300**	**ug/Kg**
108-10-1	4-Methyl-2-pentanone	7090U	269000	7090	ug/Kg
67-64-1	Acetone	55300U	1340000	55300	ug/Kg
71-43-2	**Benzene**	**201000J**	**269000**	**8170**	**ug/Kg**
108-86-1	Bromobenzene	8380U	269000	8380	ug/Kg
74-97-5	Bromochloromethane	7250U	269000	7250	ug/Kg
75-27-4	Bromodichloromethane	8700U	269000	8700	ug/Kg
75-25-2	Bromoform	8540U	269000	8540	ug/Kg
74-83-9	Bromomethane	16300U	269000	16300	ug/Kg
75-15-0	Carbon disulfide	17500U	269000	17500	ug/Kg
56-23-5	Carbon tetrachloride	10900U	269000	10900	ug/Kg
108-90-7	Chlorobenzene	8010U	269000	8010	ug/Kg
75-00-3	Chloroethane	17800U	269000	17800	ug/Kg
67-66-3	Chloroform	11600U	269000	11600	ug/Kg
74-87-3	Chloromethane	12700U	269000	12700	ug/Kg
124-48-1	Dibromochloromethane	11700U	269000	11700	ug/Kg
74-95-3	Dibromomethane	12400U	269000	12400	ug/Kg
75-71-8	Dichlorodifluoromethane	12000U	269000	12000	ug/Kg
100-41-4	Ethylbenzene	9830U	269000	9830	ug/Kg
87-68-3	Hexachlorobutadiene	11500U	269000	11500	ug/Kg
98-82-8	**Isopropylbenzene (Cumene)**	**187000J**	**269000**	**9940**	**ug/Kg**
74-88-4	Methyl iodide	66100U	269000	66100	ug/Kg
75-09-2	Methylene chloride	23700U	537000	23700	ug/Kg
91-20-3	**Naphthalene**	**4670000**	**269000**	**17200**	**ug/Kg**
100-42-5	Styrene	8270U	269000	8270	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132105	**VR90A TREATED**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			50000	08/14/2012 17:38	CEK	487705

CAS#	Parameter	Result	RDL	MDL	Units
127-18-4	Tetrachloroethene	15900U	269000	15900	ug/Kg
110-02-1	Thiophene	ND			ug/Kg
108-88-3	**Toluene**	**381000**	**269000**	**8330**	**ug/Kg**
79-01-6	Trichloroethene	11400U	269000	11400	ug/Kg
75-69-4	Trichlorofluoromethane	14000U	269000	14000	ug/Kg
76-13-1	Trichlorotrifluoroethane	10700U	269000	10700	ug/Kg
108-05-4	Vinyl acetate	7580U	269000	7580	ug/Kg
75-01-4	Vinyl chloride	14600U	269000	14600	ug/Kg
1330-20-7	**Xylene (total)**	**544000**	**537000**	**21500**	**ug/Kg**
156-59-2	cis-1,2-Dichloroethene	7950U	269000	7950	ug/Kg
10061-01-5	cis-1,3-Dichloropropene	9940U	269000	9940	ug/Kg
136777-61-2	**m,p-Xylene**	**361000**	**269000**	**15800**	**ug/Kg**
104-51-8	n-Butylbenzene	12500U	269000	12500	ug/Kg
103-65-1	n-Propylbenzene	39700U	269000	39700	ug/Kg
95-47-6	**o-Xylene**	**183000J**	**269000**	**7250**	**ug/Kg**
135-98-8	**sec-Butylbenzene**	**112000J**	**269000**	**10600**	**ug/Kg**
1634-04-4	tert-Butyl methyl ether (MTBE)	6550U	269000	6550	ug/Kg
98-06-6	tert-Butylbenzene	13800U	269000	13800	ug/Kg
156-60-5	trans-1,2-Dichloroethene	7040U	269000	7040	ug/Kg
10061-02-6	trans-1,3-Dichloropropene	9130U	269000	9130	ug/Kg
110-57-6	trans-1,4-Dichloro-2-butene	27800U	269000	27800	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	2290000	2310000	ug/Kg	101	62 - 127
1868-53-7	Dibromofluoromethane	2290000	2310000	ug/Kg	101	65 - 130
2037-26-5	Toluene d8	2290000	2310000	ug/Kg	101	71 - 132
17060-07-0	1,2-Dichloroethane-d4	2290000	2350000	ug/Kg	103	62 - 125

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			50000	08/14/2012 17:38	JCK	488227

CAS#	Parameter	Result	Retention	Units
	No tics detected	ND		ug/Kg

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/14/2012 08:52	487664	3550C	10	08/15/2012 18:31	JWM	487843

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	4360U	116000	4360	ug/Kg
122-66-7	1,2Diphenylhydrazine/Azobenzen	2630U	116000	2630	ug/Kg
95-95-4	2,4,5-Trichlorophenol	5870U	116000	5870	ug/Kg
88-06-2	2,4,6-Trichlorophenol	47200U	116000	47200	ug/Kg
120-83-2	2,4-Dichlorophenol	9600U	116000	9600	ug/Kg
105-67-9	2,4-Dimethylphenol	53400U	116000	53400	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132105	**VR90A TREATED**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/14/2012 08:52	487664	3550C	10	08/15/2012 18:31	JWM	487843

CAS#	Parameter	Result	RDL	MDL	Units
51-28-5	2,4-Dinitrophenol	49500U	116000	49500	ug/Kg
121-14-2	2,4-Dinitrotoluene	13300U	116000	13300	ug/Kg
606-20-2	2,6-Dinitrotoluene	11500U	116000	11500	ug/Kg
91-58-7	2-Chloronaphthalene	1490U	116000	1490	ug/Kg
95-57-8	2-Chlorophenol	4770U	116000	4770	ug/Kg
91-57-6	**2-Methylnaphthalene**	**52700J**	**116000**	**3670**	**ug/Kg**
88-74-4	2-Nitroaniline	6380U	581000	6380	ug/Kg
88-75-5	2-Nitrophenol	7900U	116000	7900	ug/Kg
91-94-1	3,3'-Dichlorobenzidine	39500U	232000	39500	ug/Kg
99-09-2	3-Nitroaniline	8340U	581000	8340	ug/Kg
534-52-1	4,6-Dinitro-2-methylphenol	52100U	581000	52100	ug/Kg
101-55-3	4-Bromophenyl phenyl ether	8720U	116000	8720	ug/Kg
59-50-7	4-Chloro-3-methylphenol	12400U	116000	12400	ug/Kg
106-47-8	4-Chloroaniline	9790U	116000	9790	ug/Kg
7005-72-3	4-Chlorophenyl phenyl ether	9410U	116000	9410	ug/Kg
100-01-6	4-Nitroaniline	77300U	581000	77300	ug/Kg
100-02-7	4-Nitrophenol	75100U	581000	75100	ug/Kg
83-32-9	**Acenaphthene**	**11900J**	**116000**	**3050**	**ug/Kg**
208-96-8	Acenaphthylene	3540U	116000	3540	ug/Kg
62-53-3	Aniline	9810U	116000	9810	ug/Kg
120-12-7	Anthracene	2900U	116000	2900	ug/Kg
56-55-3	Benzo(a)anthracene	10300U	116000	10300	ug/Kg
50-32-8	Benzo(a)pyrene	3110U	116000	3110	ug/Kg
205-99-2	Benzo(b)fluoranthene	17800U	116000	17800	ug/Kg
191-24-2	Benzo(g,h,i)perylene	3940U	116000	3940	ug/Kg
207-08-9	Benzo(k)fluoranthene	2690U	116000	2690	ug/Kg
100-51-6	Benzyl alcohol	12900U	116000	12900	ug/Kg
111-91-1	Bis(2-Chloroethoxy)methane	6570U	116000	6570	ug/Kg
111-44-4	Bis(2-Chloroethyl)ether	9830U	116000	9830	ug/Kg
108-60-1	Bis(2-Chloroisopropyl)ether	9160U	116000	9160	ug/Kg
117-81-7	Bis(2-Ethylhexyl)phthalate	5800U	116000	5800	ug/Kg
85-68-7	Butyl benzyl phthalate	3120U	116000	3120	ug/Kg
86-74-8	Carbazole	8020U	116000	8020	ug/Kg
218-01-9	Chrysene	3240U	116000	3240	ug/Kg
84-74-2	Di-n-butyl phthalate	3690U	116000	3690	ug/Kg
117-84-0	Di-n-octyl phthalate	3820U	116000	3820	ug/Kg
53-70-3	Dibenz(a,h)anthracene	3400U	116000	3400	ug/Kg
132-64-9	Dibenzofuran	1810U	116000	1810	ug/Kg
84-66-2	Diethyl phthalate	4710U	116000	4710	ug/Kg
131-11-3	Dimethyl phthalate	1960U	116000	1960	ug/Kg
206-44-0	Fluoranthene	2270U	116000	2270	ug/Kg
86-73-7	**Fluorene**	**242000**	**116000**	**3740**	**ug/Kg**
118-74-1	Hexachlorobenzene	14500U	116000	14500	ug/Kg
87-68-3	Hexachlorobutadiene	6940U	116000	6940	ug/Kg
77-47-4	Hexachlorocyclopentadiene	57600U	116000	57600	ug/Kg
67-72-1	Hexachloroethane	4240U	116000	4240	ug/Kg
193-39-5	Indeno(1,2,3-cd)pyrene	7150U	116000	7150	ug/Kg
78-59-1	Isophorone	4970U	116000	4970	ug/Kg
98-95-3	Nitrobenzene	4170U	116000	4170	ug/Kg
87-86-5	Pentachlorophenol	65500U	581000	65500	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132105	**VR90A TREATED**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/14/2012 08:52	487664	3550C	10	08/15/2012 18:31	JWM	487843

CAS#	Parameter	Result	RDL	MDL	Units
85-01-8	Phenanthrene	3080U	116000	3080	ug/Kg
108-95-2	Phenol	11700U	116000	11700	ug/Kg
129-00-0	Pyrene	2670U	116000	2670	ug/Kg
110-86-1	Pyridine	57100U	116000	57100	ug/Kg
1319-77-3MP	m,p-Cresol	13700U	116000	13700	ug/Kg
621-64-7	n-Nitrosodi-n-propylamine	4300U	116000	4300	ug/Kg
62-75-9	n-Nitrosodimethylamine	21500U	116000	21500	ug/Kg
86-30-6	n-Nitrosodiphenylamine	2680U	116000	2680	ug/Kg
95-48-7	o-Cresol	4190U	116000	4190	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	5000	Diluted Out	ug/Kg	**0***	46 - 123
321-60-8	2-Fluorobiphenyl	5000	Diluted Out	ug/Kg	**0***	47 - 127
1718-51-0	Terphenyl-d14	5000	Diluted Out	ug/Kg	**0***	38 - 167
4165-62-2	Phenol-d5	10000	Diluted Out	ug/Kg	**0***	43 - 123
367-12-4	2-Fluorophenol	10000	Diluted Out	ug/Kg	**0***	51 - 119
118-79-6	2,4,6-Tribromophenol	10000	Diluted Out	ug/Kg	**0***	44 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10	08/15/2012 18:31	JWM	487904

CAS#	Parameter	Result	Retention	Units
700-88-9	**Benzene, cyclopentyl-**	**97700**	**3.51**	**ug/Kg**
643-58-3	**1,1'-Biphenyl, 2-methyl-**	**30400**	**4.82**	**ug/Kg**
132-32-1	**9H-Carbazol-3-amine, 9-ethyl-**	**1030000**	**4.99**	**ug/Kg**
6416-39-3	**1H-Indene, 2,3-dihydro-1-methyl-3-p**	**94900**	**5.02**	**ug/Kg**
834-24-2	**Benzenamine, 4-(2-phenylethenyl)-**	**199000**	**5.07**	**ug/Kg**
26137-53-1	**Naphthalene, 1,2,3-trimethyl-4-prop**	**222000**	**5.17**	**ug/Kg**
	Unknown	**198000**	**5.25**	**ug/Kg**
	Unknown	**88800**	**5.42**	**ug/Kg**
55012-80-1	**Silane, trimethyl[5-methyl-2-(1-met**	**147000**	**5.47**	**ug/Kg**
	Unknown	**68300**	**6.70**	**ug/Kg**
	Unknown	**60800**	**7.48**	**ug/Kg**
	Unknown	**72900**	**3.63**	**ug/Kg**
	Unknown	**67000**	**7.64**	**ug/Kg**
2132-84-5	**Benzene, (1-methylhexyl)-**	**95200**	**3.75**	**ug/Kg**
827-52-1	**Benzene, cyclohexyl-**	**109000**	**3.87**	**ug/Kg**
72403-15-7	**Benzene, (1-chloroethyl)methyl-**	**84200**	**4.08**	**ug/Kg**
101-81-5	**Diphenylmethane**	**127000**	**4.25**	**ug/Kg**
620-83-7	**Benzene, 1-methyl-4-(phenylmethyl)-**	**44300**	**4.56**	**ug/Kg**
605-39-0	**2,2'-Dimethylbiphenyl**	**58400**	**4.59**	**ug/Kg**
4957-14-6	**Benzene, 1,1'-methylenebis[4-methyl**	**128000**	**4.70**	**ug/Kg**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132105	**VR90A TREATED**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 7471B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/13/2012 16:30	487647	SW-846 7471B	2	08/14/2012 16:15	CLB	487729

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	**Mercury**	**0.91**	**0.027**	**0.012**	**mg/kg**

SW-846 6010B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/14/2012 07:00	487645	SW-846 3050B	1	08/16/2012 18:21	BNB	487921

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	**Aluminum**	**3290**	**9.39**	**0.93**	**mg/kg**
7440-36-0	**Antimony**	**0.18J**	**2.82**	**0.11**	**mg/kg**
7440-38-2	Arsenic	0.16U	1.88	0.16	mg/kg
7440-39-3	**Barium**	**7.26**	**0.47**	**0.028**	**mg/kg**
7440-41-7	**Beryllium**	**0.0054J**	**0.23**	**0.0023**	**mg/kg**
7440-43-9	Cadmium	0.011U	0.23	0.011	mg/kg
7440-70-2	**Calcium**	**169**	**35.2**	**5.13**	**mg/kg**
7440-47-3	**Chromium**	**4.30**	**0.47**	**0.021**	**mg/kg**
7440-48-4	**Cobalt**	**0.17J**	**0.47**	**0.012**	**mg/kg**
7440-50-8	**Copper**	**24.7**	**0.47**	**0.036**	**mg/kg**
7439-89-6	**Iron**	**6660**	**4.69**	**0.82**	**mg/kg**
7439-92-1	**Lead**	**73.1**	**0.70**	**0.13**	**mg/kg**
7439-95-4	**Magnesium**	**50.7**	**4.69**	**0.51**	**mg/kg**
7439-96-5	**Manganese**	**101**	**0.70**	**0.016**	**mg/kg**
7440-02-0	**Nickel**	**4.94**	**1.88**	**0.025**	**mg/kg**
7440-09-7	**Potassium**	**58.7**	**23.5**	**2.47**	**mg/kg**
7782-49-2	**Selenium**	**9.40**	**1.88**	**0.15**	**mg/kg**
7440-22-4	Silver	0.026U	0.47	0.026	mg/kg
7440-23-5	**Sodium**	**3150**	**46.9**	**3.56**	**mg/kg**
7440-28-0	**Thallium**	**0.33J**	**0.94**	**0.10**	**mg/kg**
7440-62-2	**Vanadium**	**0.045J**	**0.94**	**0.018**	**mg/kg**
7440-66-6	**Zinc**	**6.13**	**1.88**	**0.50**	**mg/kg**

SW-846 9045C pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	08/16/2012 09:00	OLT	487695

CAS#	Parameter	Result	RDL	MDL	Units
pH	**pH**	**4.23**	**1.00**	**1.00**	**pH unit**

RESULTS REPORTED ON A DRY WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132106	**VR90B TREATED**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			50000	08/14/2012 17:59	CEK	487705

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	7160U	265000	7160	ug/Kg
71-55-6	1,1,1-Trichloroethane	12600U	265000	12600	ug/Kg
79-34-5	1,1,2,2-Tetrachloroethane	6050U	265000	6050	ug/Kg
79-00-5	1,1,2-Trichloroethane	7110U	265000	7110	ug/Kg
75-34-3	1,1-Dichloroethane	7900U	265000	7900	ug/Kg
75-35-4	1,1-Dichloroethene	12300U	265000	12300	ug/Kg
563-58-6	1,1-Dichloropropene	12900U	265000	12900	ug/Kg
96-18-4	1,2,3-Trichloropropane	6100U	265000	6100	ug/Kg
120-82-1	1,2,4-Trichlorobenzene	18800U	265000	18800	ug/Kg
95-63-6	**1,2,4-Trimethylbenzene**	**213000J**	**265000**	**19100**	**ug/Kg**
96-12-8	1,2-Dibromo-3-chloropropane	21300U	265000	21300	ug/Kg
106-93-4	1,2-Dibromoethane	7640U	265000	7640	ug/Kg
95-50-1	**1,2-Dichlorobenzene**	**1210000**	**265000**	**14600**	**ug/Kg**
107-06-2	1,2-Dichloroethane	10500U	265000	10500	ug/Kg
540-59-0	1,2-Dichloroethene(Total)	12400U	530000	12400	ug/Kg
78-87-5	1,2-Dichloropropane	8170U	265000	8170	ug/Kg
108-67-8	**1,3,5-Trimethylbenzene**	**77000J**	**265000**	**19900**	**ug/Kg**
541-73-1	1,3-Dichlorobenzene	13800U	265000	13800	ug/Kg
142-28-9	1,3-Dichloropropane	8380U	265000	8380	ug/Kg
106-46-7	**1,4-Dichlorobenzene**	**105000J**	**265000**	**12300**	**ug/Kg**
594-20-7	2,2-Dichloropropane	13200U	265000	13200	ug/Kg
78-93-3	2-Butanone	27500U	265000	27500	ug/Kg
95-49-8	2-Chlorotoluene	11600U	265000	11600	ug/Kg
591-78-6	2-Hexanone	23000U	265000	23000	ug/Kg
106-43-4	4-Chlorotoluene	12500U	265000	12500	ug/Kg
99-87-6	**4-Isopropyltoluene**	**132000J**	**265000**	**11100**	**ug/Kg**
108-10-1	4-Methyl-2-pentanone	7000U	265000	7000	ug/Kg
67-64-1	Acetone	54600U	1330000	54600	ug/Kg
71-43-2	**Benzene**	**184000J**	**265000**	**8060**	**ug/Kg**
108-86-1	Bromobenzene	8270U	265000	8270	ug/Kg
74-97-5	Bromochloromethane	7160U	265000	7160	ug/Kg
75-27-4	Bromodichloromethane	8590U	265000	8590	ug/Kg
75-25-2	Bromoform	8430U	265000	8430	ug/Kg
74-83-9	Bromomethane	16100U	265000	16100	ug/Kg
75-15-0	Carbon disulfide	17200U	265000	17200	ug/Kg
56-23-5	Carbon tetrachloride	10700U	265000	10700	ug/Kg
108-90-7	Chlorobenzene	7900U	265000	7900	ug/Kg
75-00-3	Chloroethane	17600U	265000	17600	ug/Kg
67-66-3	Chloroform	11400U	265000	11400	ug/Kg
74-87-3	Chloromethane	12600U	265000	12600	ug/Kg
124-48-1	Dibromochloromethane	11600U	265000	11600	ug/Kg
74-95-3	Dibromomethane	12300U	265000	12300	ug/Kg
75-71-8	Dichlorodifluoromethane	11900U	265000	11900	ug/Kg
100-41-4	Ethylbenzene	9710U	265000	9710	ug/Kg
87-68-3	Hexachlorobutadiene	11400U	265000	11400	ug/Kg
98-82-8	**Isopropylbenzene (Cumene)**	**187000J**	**265000**	**9810**	**ug/Kg**
74-88-4	Methyl iodide	65200U	265000	65200	ug/Kg
75-09-2	Methylene chloride	23400U	530000	23400	ug/Kg
91-20-3	**Naphthalene**	**4380000**	**265000**	**17000**	**ug/Kg**
100-42-5	Styrene	8170U	265000	8170	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132106	**VR90B TREATED**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			50000	08/14/2012 17:59	CEK	487705

CAS#	Parameter	Result	RDL	MDL	Units
127-18-4	Tetrachloroethene	15700U	265000	15700	ug/Kg
110-02-1	Thiophene	ND			ug/Kg
108-88-3	**Toluene**	**369000**	**265000**	**8220**	**ug/Kg**
79-01-6	Trichloroethene	11300U	265000	11300	ug/Kg
75-69-4	Trichlorofluoromethane	13800U	265000	13800	ug/Kg
76-13-1	Trichlorotrifluoroethane	10600U	265000	10600	ug/Kg
108-05-4	Vinyl acetate	7480U	265000	7480	ug/Kg
75-01-4	Vinyl chloride	14400U	265000	14400	ug/Kg
1330-20-7	**Xylene (total)**	**535000**	**530000**	**21300**	**ug/Kg**
156-59-2	cis-1,2-Dichloroethene	7850U	265000	7850	ug/Kg
10061-01-5	cis-1,3-Dichloropropene	9810U	265000	9810	ug/Kg
136777-61-2	**m,p-Xylene**	**352000**	**265000**	**15600**	**ug/Kg**
104-51-8	n-Butylbenzene	12400U	265000	12400	ug/Kg
103-65-1	n-Propylbenzene	39200U	265000	39200	ug/Kg
95-47-6	**o-Xylene**	**183000J**	**265000**	**7160**	**ug/Kg**
135-98-8	**sec-Butylbenzene**	**102000J**	**265000**	**10400**	**ug/Kg**
1634-04-4	tert-Butyl methyl ether (MTBE)	6470U	265000	6470	ug/Kg
98-06-6	tert-Butylbenzene	13600U	265000	13600	ug/Kg
156-60-5	trans-1,2-Dichloroethene	6950U	265000	6950	ug/Kg
10061-02-6	trans-1,3-Dichloropropene	9020U	265000	9020	ug/Kg
110-57-6	trans-1,4-Dichloro-2-butene	27500U	265000	27500	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	2230000	2260000	ug/Kg	101	62 - 127
1868-53-7	Dibromofluoromethane	2230000	2190000	ug/Kg	98	65 - 130
2037-26-5	Toluene d8	2230000	2240000	ug/Kg	100	71 - 132
17060-07-0	1,2-Dichloroethane-d4	2230000	2260000	ug/Kg	101	62 - 125

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			50000	08/14/2012 17:59	JCK	488227

CAS#	Parameter	Result	Retention	Units
	No tics detected	ND		ug/Kg

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/14/2012 08:52	487664	3550C	10	08/15/2012 18:48	JWM	487843

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	4420U	118000	4420	ug/Kg
122-66-7	1,2Diphenylhydrazine/Azobenzen	2660U	118000	2660	ug/Kg
95-95-4	2,4,5-Trichlorophenol	5950U	118000	5950	ug/Kg
88-06-2	2,4,6-Trichlorophenol	47800U	118000	47800	ug/Kg
120-83-2	2,4-Dichlorophenol	9720U	118000	9720	ug/Kg
105-67-9	2,4-Dimethylphenol	54000U	118000	54000	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132106	**VR90B TREATED**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/14/2012 08:52	487664	3550C	10	08/15/2012 18:48	JWM	487843

CAS#	Parameter	Result	RDL	MDL	Units
51-28-5	2,4-Dinitrophenol	50100U	118000	50100	ug/Kg
121-14-2	2,4-Dinitrotoluene	13500U	118000	13500	ug/Kg
606-20-2	2,6-Dinitrotoluene	11600U	118000	11600	ug/Kg
91-58-7	2-Chloronaphthalene	1510U	118000	1510	ug/Kg
95-57-8	2-Chlorophenol	4830U	118000	4830	ug/Kg
91-57-6	**2-Methylnaphthalene**	**106000J**	**118000**	**3720**	**ug/Kg**
88-74-4	2-Nitroaniline	6460U	588000	6460	ug/Kg
88-75-5	2-Nitrophenol	8000U	118000	8000	ug/Kg
91-94-1	3,3'-Dichlorobenzidine	40000U	235000	40000	ug/Kg
99-09-2	3-Nitroaniline	8450U	588000	8450	ug/Kg
534-52-1	4,6-Dinitro-2-methylphenol	52700U	588000	52700	ug/Kg
101-55-3	4-Bromophenyl phenyl ether	8830U	118000	8830	ug/Kg
59-50-7	4-Chloro-3-methylphenol	12500U	118000	12500	ug/Kg
106-47-8	4-Chloroaniline	9910U	118000	9910	ug/Kg
7005-72-3	4-Chlorophenyl phenyl ether	9530U	118000	9530	ug/Kg
100-01-6	4-Nitroaniline	78300U	588000	78300	ug/Kg
100-02-7	4-Nitrophenol	76000U	588000	76000	ug/Kg
83-32-9	**Acenaphthene**	**22100J**	**118000**	**3090**	**ug/Kg**
208-96-8	Acenaphthylene	3580U	118000	3580	ug/Kg
62-53-3	Aniline	9930U	118000	9930	ug/Kg
120-12-7	Anthracene	2940U	118000	2940	ug/Kg
56-55-3	Benzo(a)anthracene	10400U	118000	10400	ug/Kg
50-32-8	Benzo(a)pyrene	3150U	118000	3150	ug/Kg
205-99-2	Benzo(b)fluoranthene	18100U	118000	18100	ug/Kg
191-24-2	Benzo(g,h,i)perylene	3990U	118000	3990	ug/Kg
207-08-9	Benzo(k)fluoranthene	2720U	118000	2720	ug/Kg
100-51-6	Benzyl alcohol	13000U	118000	13000	ug/Kg
111-91-1	Bis(2-Chloroethoxy)methane	6650U	118000	6650	ug/Kg
111-44-4	Bis(2-Chloroethyl)ether	9950U	118000	9950	ug/Kg
108-60-1	Bis(2-Chloroisopropyl)ether	9280U	118000	9280	ug/Kg
117-81-7	Bis(2-Ethylhexyl)phthalate	5870U	118000	5870	ug/Kg
85-68-7	Butyl benzyl phthalate	3160U	118000	3160	ug/Kg
86-74-8	Carbazole	8120U	118000	8120	ug/Kg
218-01-9	Chrysene	3280U	118000	3280	ug/Kg
84-74-2	Di-n-butyl phthalate	3730U	118000	3730	ug/Kg
117-84-0	Di-n-octyl phthalate	3870U	118000	3870	ug/Kg
53-70-3	Dibenz(a,h)anthracene	3440U	118000	3440	ug/Kg
132-64-9	Dibenzofuran	1830U	118000	1830	ug/Kg
84-66-2	Diethyl phthalate	4770U	118000	4770	ug/Kg
131-11-3	Dimethyl phthalate	1980U	118000	1980	ug/Kg
206-44-0	Fluoranthene	2300U	118000	2300	ug/Kg
86-73-7	**Fluorene**	**505000**	**118000**	**3790**	**ug/Kg**
118-74-1	Hexachlorobenzene	14700U	118000	14700	ug/Kg
87-68-3	Hexachlorobutadiene	7030U	118000	7030	ug/Kg
77-47-4	Hexachlorocyclopentadiene	58300U	118000	58300	ug/Kg
67-72-1	Hexachloroethane	4290U	118000	4290	ug/Kg
193-39-5	Indeno(1,2,3-cd)pyrene	7240U	118000	7240	ug/Kg
78-59-1	Isophorone	5030U	118000	5030	ug/Kg
98-95-3	Nitrobenzene	4220U	118000	4220	ug/Kg
87-86-5	Pentachlorophenol	66400U	588000	66400	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132106	**VR90B TREATED**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/14/2012 08:52	487664	3550C	10	08/15/2012 18:48	JWM	487843

CAS#	Parameter	Result	RDL	MDL	Units
85-01-8	Phenanthrene	3120U	118000	3120	ug/Kg
108-95-2	Phenol	11900U	118000	11900	ug/Kg
129-00-0	Pyrene	2710U	118000	2710	ug/Kg
110-86-1	Pyridine	57800U	118000	57800	ug/Kg
1319-77-3MP	m,p-Cresol	13800U	118000	13800	ug/Kg
621-64-7	n-Nitrosodi-n-propylamine	4350U	118000	4350	ug/Kg
62-75-9	n-Nitrosodimethylamine	21700U	118000	21700	ug/Kg
86-30-6	n-Nitrosodiphenylamine	2710U	118000	2710	ug/Kg
95-48-7	o-Cresol	4240U	118000	4240	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	5000	Diluted Out	ug/Kg	**0***	46 - 123
321-60-8	2-Fluorobiphenyl	5000	Diluted Out	ug/Kg	**0***	47 - 127
1718-51-0	Terphenyl-d14	5000	Diluted Out	ug/Kg	**0***	38 - 167
4165-62-2	Phenol-d5	10000	Diluted Out	ug/Kg	**0***	43 - 123
367-12-4	2-Fluorophenol	10000	Diluted Out	ug/Kg	**0***	51 - 119
118-79-6	2,4,6-Tribromophenol	10000	Diluted Out	ug/Kg	**0***	44 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10	08/15/2012 18:48	JWM	487904

CAS#	Parameter	Result	Retention	Units
700-88-9	**Benzene, cyclopentyl-**	**173000**	**3.52**	**ug/Kg**
21895-17-0	**Benzene, 1-methyl-2-[(4-methylpheny**	**61400**	**4.88**	**ug/Kg**
4309-66-4	**Stilbene, 4-amino- (E)-**	**1830000**	**4.99**	**ug/Kg**
7614-93-9	**Benzene, 1,1'-(3-methyl-1-propene-1**	**186000**	**5.02**	**ug/Kg**
26137-53-1	**Naphthalene, 1,2,3-trimethyl-4-prop**	**388000**	**5.07**	**ug/Kg**
13688-68-1	**9,9-Dimethyl-9-silafluorene**	**490000**	**5.18**	**ug/Kg**
	Unknown	**253000**	**5.25**	**ug/Kg**
74764-34-4	**1-Butanamine, N-(phenyl-2-pyridinyl**	**70400**	**5.38**	**ug/Kg**
	Unknown	**159000**	**5.42**	**ug/Kg**
14051-53-7	**1-Benzopyrylium, 2-phenyl-**	**255000**	**5.47**	**ug/Kg**
	Unknown	**170000**	**7.48**	**ug/Kg**
5279-14-1	**Benzene, (1-nitropropyl)-**	**83700**	**3.64**	**ug/Kg**
	Unknown	**170000**	**7.64**	**ug/Kg**
2132-84-5	**Benzene, (1-methylhexyl)-**	**128000**	**3.75**	**ug/Kg**
827-52-1	**Benzene, cyclohexyl-**	**148000**	**3.88**	**ug/Kg**
4920-99-4	**Benzene, 1-ethyl-3-(1-methylethyl)-**	**93700**	**3.98**	**ug/Kg**
26968-58-1	**Benzene, (chloromethyl)ethyl-**	**112000**	**4.08**	**ug/Kg**
101-81-5	**Diphenylmethane**	**171000**	**4.25**	**ug/Kg**
620-83-7	**Benzene, 1-methyl-4-(phenylmethyl)-**	**76200**	**4.59**	**ug/Kg**
13540-56-2	**Benzene, 1,2-dimethyl-4-(phenylmeth**	**172000**	**4.70**	**ug/Kg**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132106	**VR90B TREATED**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 7471B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/13/2012 16:30	487647	SW-846 7471B	2	08/14/2012 16:16	CLB	487729

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	**Mercury**	**1.13**	**0.029**	**0.013**	**mg/kg**

SW-846 6010B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/14/2012 07:00	487645	SW-846 3050B	1	08/16/2012 18:27	BNB	487921

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	**Aluminum**	**3800**	**9.50**	**0.94**	**mg/kg**
7440-36-0	**Antimony**	**0.47J**	**2.85**	**0.12**	**mg/kg**
7440-38-2	Arsenic	0.17U	1.90	0.17	mg/kg
7440-39-3	**Barium**	**8.06**	**0.48**	**0.029**	**mg/kg**
7440-41-7	**Beryllium**	**0.0052J**	**0.24**	**0.0024**	**mg/kg**
7440-43-9	Cadmium	0.011U	0.24	0.011	mg/kg
7440-70-2	**Calcium**	**150**	**35.6**	**5.20**	**mg/kg**
7440-47-3	**Chromium**	**5.85**	**0.48**	**0.021**	**mg/kg**
7440-48-4	**Cobalt**	**0.18J**	**0.48**	**0.012**	**mg/kg**
7440-50-8	**Copper**	**26.1**	**0.48**	**0.037**	**mg/kg**
7439-89-6	**Iron**	**6910**	**4.75**	**0.83**	**mg/kg**
7439-92-1	**Lead**	**73.4**	**0.71**	**0.14**	**mg/kg**
7439-95-4	**Magnesium**	**55.5**	**4.75**	**0.52**	**mg/kg**
7439-96-5	**Manganese**	**113**	**0.71**	**0.017**	**mg/kg**
7440-02-0	**Nickel**	**5.65**	**1.90**	**0.025**	**mg/kg**
7440-09-7	**Potassium**	**59.1**	**23.8**	**2.50**	**mg/kg**
7782-49-2	**Selenium**	**10.2**	**1.90**	**0.16**	**mg/kg**
7440-22-4	Silver	0.026U	0.48	0.026	mg/kg
7440-23-5	**Sodium**	**3260**	**47.5**	**3.60**	**mg/kg**
7440-28-0	**Thallium**	**0.61J**	**0.95**	**0.10**	**mg/kg**
7440-62-2	**Vanadium**	**0.037J**	**0.95**	**0.018**	**mg/kg**
7440-66-6	**Zinc**	**5.54**	**1.90**	**0.51**	**mg/kg**

SW-846 9045C pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	08/16/2012 09:00	OLT	487695

CAS#	Parameter	Result	RDL	MDL	Units
pH	**pH**	**4.42**	**1.00**	**1.00**	**pH unit**

RESULTS REPORTED ON A DRY WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132107	**VR90C TREATED**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			50000	08/14/2012 18:20	CEK	487705

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	7440U	276000	7440	ug/Kg
71-55-6	1,1,1-Trichloroethane	13100U	276000	13100	ug/Kg
79-34-5	1,1,2,2-Tetrachloroethane	6290U	276000	6290	ug/Kg
79-00-5	1,1,2-Trichloroethane	7390U	276000	7390	ug/Kg
75-34-3	1,1-Dichloroethane	8210U	276000	8210	ug/Kg
75-35-4	1,1-Dichloroethene	12800U	276000	12800	ug/Kg
563-58-6	1,1-Dichloropropene	13500U	276000	13500	ug/Kg
96-18-4	1,2,3-Trichloropropane	6340U	276000	6340	ug/Kg
120-82-1	1,2,4-Trichlorobenzene	19600U	276000	19600	ug/Kg
95-63-6	**1,2,4-Trimethylbenzene**	**230000J**	**276000**	**19800**	**ug/Kg**
96-12-8	1,2-Dibromo-3-chloropropane	22100U	276000	22100	ug/Kg
106-93-4	1,2-Dibromoethane	7940U	276000	7940	ug/Kg
95-50-1	**1,2-Dichlorobenzene**	**1250000**	**276000**	**15200**	**ug/Kg**
107-06-2	1,2-Dichloroethane	10900U	276000	10900	ug/Kg
540-59-0	1,2-Dichloroethene(Total)	12900U	551000	12900	ug/Kg
78-87-5	1,2-Dichloropropane	8490U	276000	8490	ug/Kg
108-67-8	**1,3,5-Trimethylbenzene**	**85000J**	**276000**	**20700**	**ug/Kg**
541-73-1	1,3-Dichlorobenzene	14300U	276000	14300	ug/Kg
142-28-9	1,3-Dichloropropane	8710U	276000	8710	ug/Kg
106-46-7	**1,4-Dichlorobenzene**	**106000J**	**276000**	**12700**	**ug/Kg**
594-20-7	2,2-Dichloropropane	13700U	276000	13700	ug/Kg
78-93-3	2-Butanone	28600U	276000	28600	ug/Kg
95-49-8	2-Chlorotoluene	12100U	276000	12100	ug/Kg
591-78-6	2-Hexanone	23900U	276000	23900	ug/Kg
106-43-4	4-Chlorotoluene	13000U	276000	13000	ug/Kg
99-87-6	**4-Isopropyltoluene**	**139000J**	**276000**	**11600**	**ug/Kg**
108-10-1	4-Methyl-2-pentanone	7280U	276000	7280	ug/Kg
67-64-1	Acetone	56800U	1380000	56800	ug/Kg
71-43-2	**Benzene**	**186000J**	**276000**	**8380**	**ug/Kg**
108-86-1	Bromobenzene	8600U	276000	8600	ug/Kg
74-97-5	Bromochloromethane	7440U	276000	7440	ug/Kg
75-27-4	Bromodichloromethane	8930U	276000	8930	ug/Kg
75-25-2	Bromoform	8770U	276000	8770	ug/Kg
74-83-9	Bromomethane	16700U	276000	16700	ug/Kg
75-15-0	Carbon disulfide	17900U	276000	17900	ug/Kg
56-23-5	Carbon tetrachloride	11100U	276000	11100	ug/Kg
108-90-7	Chlorobenzene	8210U	276000	8210	ug/Kg
75-00-3	Chloroethane	18200U	276000	18200	ug/Kg
67-66-3	Chloroform	11900U	276000	11900	ug/Kg
74-87-3	Chloromethane	13100U	276000	13100	ug/Kg
124-48-1	Dibromochloromethane	12000U	276000	12000	ug/Kg
74-95-3	Dibromomethane	12700U	276000	12700	ug/Kg
75-71-8	Dichlorodifluoromethane	12300U	276000	12300	ug/Kg
100-41-4	Ethylbenzene	10100U	276000	10100	ug/Kg
87-68-3	Hexachlorobutadiene	11800U	276000	11800	ug/Kg
98-82-8	**Isopropylbenzene (Cumene)**	**192000J**	**276000**	**10200**	**ug/Kg**
74-88-4	Methyl iodide	67800U	276000	67800	ug/Kg
75-09-2	Methylene chloride	24400U	551000	24400	ug/Kg
91-20-3	**Naphthalene**	**4320000**	**276000**	**17700**	**ug/Kg**
100-42-5	Styrene	8490U	276000	8490	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132107	**VR90C TREATED**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			50000	08/14/2012 18:20	CEK	487705

CAS#	Parameter	Result	RDL	MDL	Units
127-18-4	Tetrachloroethene	16300U	276000	16300	ug/Kg
110-02-1	Thiophene	ND			ug/Kg
108-88-3	**Toluene**	**381000**	**276000**	**8550**	**ug/Kg**
79-01-6	Trichloroethene	11700U	276000	11700	ug/Kg
75-69-4	Trichlorofluoromethane	14400U	276000	14400	ug/Kg
76-13-1	Trichlorotrifluoroethane	11000U	276000	11000	ug/Kg
108-05-4	Vinyl acetate	7770U	276000	7770	ug/Kg
75-01-4	Vinyl chloride	15000U	276000	15000	ug/Kg
1330-20-7	**Xylene (total)**	**554000**	**551000**	**22100**	**ug/Kg**
156-59-2	cis-1,2-Dichloroethene	8160U	276000	8160	ug/Kg
10061-01-5	cis-1,3-Dichloropropene	10200U	276000	10200	ug/Kg
136777-61-2	**m,p-Xylene**	**371000**	**276000**	**16200**	**ug/Kg**
104-51-8	n-Butylbenzene	12800U	276000	12800	ug/Kg
103-65-1	n-Propylbenzene	40700U	276000	40700	ug/Kg
95-47-6	**o-Xylene**	**184000J**	**276000**	**7440**	**ug/Kg**
135-98-8	**sec-Butylbenzene**	**113000J**	**276000**	**10900**	**ug/Kg**
1634-04-4	tert-Butyl methyl ether (MTBE)	6730U	276000	6730	ug/Kg
98-06-6	tert-Butylbenzene	14100U	276000	14100	ug/Kg
156-60-5	trans-1,2-Dichloroethene	7220U	276000	7220	ug/Kg
10061-02-6	trans-1,3-Dichloropropene	9370U	276000	9370	ug/Kg
110-57-6	trans-1,4-Dichloro-2-butene	28600U	276000	28600	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	2300000	2370000	ug/Kg	103	62 - 127
1868-53-7	Dibromofluoromethane	2300000	2330000	ug/Kg	101	65 - 130
2037-26-5	Toluene d8	2300000	2330000	ug/Kg	101	71 - 132
17060-07-0	1,2-Dichloroethane-d4	2300000	2330000	ug/Kg	101	62 - 125

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			50000	08/14/2012 18:20	JCK	488227

CAS#	Parameter	Result	Retention	Units
	No tics detected	ND		ug/Kg

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/14/2012 08:52	487664	3550C	10	08/15/2012 19:05	JWM	487843

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	4450U	119000	4450	ug/Kg
122-66-7	1,2Diphenylhydrazine/Azobenzen	2680U	119000	2680	ug/Kg
95-95-4	2,4,5-Trichlorophenol	5990U	119000	5990	ug/Kg
88-06-2	2,4,6-Trichlorophenol	48200U	119000	48200	ug/Kg
120-83-2	2,4-Dichlorophenol	9790U	119000	9790	ug/Kg
105-67-9	2,4-Dimethylphenol	54500U	119000	54500	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132107	**VR90C TREATED**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/14/2012 08:52	487664	3550C	10	08/15/2012 19:05	JWM	487843

CAS#	Parameter	Result	RDL	MDL	Units
51-28-5	2,4-Dinitrophenol	50500U	119000	50500	ug/Kg
121-14-2	2,4-Dinitrotoluene	13600U	119000	13600	ug/Kg
606-20-2	2,6-Dinitrotoluene	11700U	119000	11700	ug/Kg
91-58-7	2-Chloronaphthalene	1520U	119000	1520	ug/Kg
95-57-8	2-Chlorophenol	4870U	119000	4870	ug/Kg
91-57-6	**2-Methylnaphthalene**	**91400J**	**119000**	**3750**	**ug/Kg**
88-74-4	2-Nitroaniline	6510U	593000	6510	ug/Kg
88-75-5	2-Nitrophenol	8060U	119000	8060	ug/Kg
91-94-1	3,3'-Dichlorobenzidine	40300U	237000	40300	ug/Kg
99-09-2	3-Nitroaniline	8520U	593000	8520	ug/Kg
534-52-1	4,6-Dinitro-2-methylphenol	53100U	593000	53100	ug/Kg
101-55-3	4-Bromophenyl phenyl ether	8900U	119000	8900	ug/Kg
59-50-7	4-Chloro-3-methylphenol	12600U	119000	12600	ug/Kg
106-47-8	4-Chloroaniline	9990U	119000	9990	ug/Kg
7005-72-3	4-Chlorophenyl phenyl ether	9610U	119000	9610	ug/Kg
100-01-6	4-Nitroaniline	78900U	593000	78900	ug/Kg
100-02-7	4-Nitrophenol	76600U	593000	76600	ug/Kg
83-32-9	**Acenaphthene**	**18800J**	**119000**	**3110**	**ug/Kg**
208-96-8	Acenaphthylene	3610U	119000	3610	ug/Kg
62-53-3	Aniline	10000U	119000	10000	ug/Kg
120-12-7	Anthracene	2960U	119000	2960	ug/Kg
56-55-3	Benzo(a)anthracene	10500U	119000	10500	ug/Kg
50-32-8	Benzo(a)pyrene	3180U	119000	3180	ug/Kg
205-99-2	Benzo(b)fluoranthene	18200U	119000	18200	ug/Kg
191-24-2	Benzo(g,h,i)perylene	4020U	119000	4020	ug/Kg
207-08-9	Benzo(k)fluoranthene	2740U	119000	2740	ug/Kg
100-51-6	Benzyl alcohol	13100U	119000	13100	ug/Kg
111-91-1	Bis(2-Chloroethoxy)methane	6710U	119000	6710	ug/Kg
111-44-4	Bis(2-Chloroethyl)ether	10000U	119000	10000	ug/Kg
108-60-1	Bis(2-Chloroisopropyl)ether	9350U	119000	9350	ug/Kg
117-81-7	Bis(2-Ethylhexyl)phthalate	5920U	119000	5920	ug/Kg
85-68-7	Butyl benzyl phthalate	3180U	119000	3180	ug/Kg
86-74-8	Carbazole	8180U	119000	8180	ug/Kg
218-01-9	Chrysene	3310U	119000	3310	ug/Kg
84-74-2	Di-n-butyl phthalate	3760U	119000	3760	ug/Kg
117-84-0	Di-n-octyl phthalate	3900U	119000	3900	ug/Kg
53-70-3	Dibenz(a,h)anthracene	3470U	119000	3470	ug/Kg
132-64-9	Dibenzofuran	1840U	119000	1840	ug/Kg
84-66-2	Diethyl phthalate	4800U	119000	4800	ug/Kg
131-11-3	Dimethyl phthalate	2000U	119000	2000	ug/Kg
206-44-0	Fluoranthene	2320U	119000	2320	ug/Kg
86-73-7	**Fluorene**	**427000**	**119000**	**3820**	**ug/Kg**
118-74-1	Hexachlorobenzene	14800U	119000	14800	ug/Kg
87-68-3	Hexachlorobutadiene	7090U	119000	7090	ug/Kg
77-47-4	Hexachlorocyclopentadiene	58800U	119000	58800	ug/Kg
67-72-1	Hexachloroethane	4330U	119000	4330	ug/Kg
193-39-5	Indeno(1,2,3-cd)pyrene	7300U	119000	7300	ug/Kg
78-59-1	Isophorone	5070U	119000	5070	ug/Kg
98-95-3	Nitrobenzene	4250U	119000	4250	ug/Kg
87-86-5	Pentachlorophenol	66900U	593000	66900	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132107	**VR90C TREATED**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/14/2012 08:52	487664	3550C	10	08/15/2012 19:05	JWM	487843

CAS#	Parameter	Result	RDL	MDL	Units
85-01-8	Phenanthrene	3140U	119000	3140	ug/Kg
108-95-2	Phenol	12000U	119000	12000	ug/Kg
129-00-0	Pyrene	2730U	119000	2730	ug/Kg
110-86-1	Pyridine	58200U	119000	58200	ug/Kg
1319-77-3MP	m,p-Cresol	14000U	119000	14000	ug/Kg
621-64-7	n-Nitrosodi-n-propylamine	4380U	119000	4380	ug/Kg
62-75-9	n-Nitrosodimethylamine	21900U	119000	21900	ug/Kg
86-30-6	n-Nitrosodiphenylamine	2730U	119000	2730	ug/Kg
95-48-7	o-Cresol	4280U	119000	4280	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	5000	Diluted Out	ug/Kg	**0***	46 - 123
321-60-8	2-Fluorobiphenyl	5000	Diluted Out	ug/Kg	**0***	47 - 127
1718-51-0	Terphenyl-d14	5000	Diluted Out	ug/Kg	**0***	38 - 167
4165-62-2	Phenol-d5	10000	Diluted Out	ug/Kg	**0***	43 - 123
367-12-4	2-Fluorophenol	10000	Diluted Out	ug/Kg	**0***	51 - 119
118-79-6	2,4,6-Tribromophenol	10000	Diluted Out	ug/Kg	**0***	44 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10	08/15/2012 19:05	JWM	487904

CAS#	Parameter	Result	Retention	Units
700-88-9	**Benzene, cyclopentyl-**	**161000**	**3.52**	**ug/Kg**
13688-68-1	**9,9-Dimethyl-9-silafluorene**	**1580000**	**4.99**	**ug/Kg**
6416-39-3	**1H-Indene, 2,3-dihydro-1-methyl-3-p**	**157000**	**5.02**	**ug/Kg**
26137-53-1	**Naphthalene, 1,2,3-trimethyl-4-prop**	**324000**	**5.07**	**ug/Kg**
132-32-1	**9H-Carbazol-3-amine, 9-ethyl-**	**424000**	**5.18**	**ug/Kg**
	Unknown	**214000**	**5.25**	**ug/Kg**
	Unknown	**166000**	**5.42**	**ug/Kg**
	Unknown	**254000**	**5.47**	**ug/Kg**
	Unknown	**102000**	**5.66**	**ug/Kg**
74421-26-4	**Benzeneethanol, .beta.-methyl-.beta**	**114000**	**6.70**	**ug/Kg**
13688-68-1	**9,9-Dimethyl-9-silafluorene**	**98000**	**6.87**	**ug/Kg**
	Unknown	**215000**	**3.64**	**ug/Kg**
	Unknown	**150000**	**7.64**	**ug/Kg**
1595-10-4	**1-Methyl-2-N-hexylbenzene**	**321000**	**3.75**	**ug/Kg**
827-52-1	**Benzene, cyclohexyl-**	**379000**	**3.88**	**ug/Kg**
4920-99-4	**Benzene, 1-ethyl-3-(1-methylethyl)-**	**242000**	**3.98**	**ug/Kg**
26968-58-1	**Benzene, (chloromethyl)ethyl-**	**198000**	**4.08**	**ug/Kg**
101-81-5	**Diphenylmethane**	**319000**	**4.25**	**ug/Kg**
620-83-7	**Benzene, 1-methyl-4-(phenylmethyl)-**	**155000**	**4.59**	**ug/Kg**
13540-56-2	**Benzene, 1,2-dimethyl-4-(phenylmeth**	**343000**	**4.70**	**ug/Kg**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132107	**VR90C TREATED**	Solid	08/10/2012 16:00	08/11/2012 10:00

SW-846 7471B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/13/2012 16:30	487647	SW-846 7471B	2	08/14/2012 16:18	CLB	487729

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	**Mercury**	**1.0**	**0.026**	**0.012**	**mg/kg**

SW-846 6010B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/14/2012 07:00	487645	SW-846 3050B	1	08/16/2012 18:34	BNB	487921

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	**Aluminum**	**4040**	**9.58**	**0.95**	**mg/kg**
7440-36-0	Antimony	0.12U	2.87	0.12	mg/kg
7440-38-2	Arsenic	0.17U	1.92	0.17	mg/kg
7440-39-3	**Barium**	**8.50**	**0.48**	**0.029**	**mg/kg**
7440-41-7	Beryllium	0.0024U	0.24	0.0024	mg/kg
7440-43-9	Cadmium	0.011U	0.24	0.011	mg/kg
7440-70-2	**Calcium**	**141**	**35.9**	**5.24**	**mg/kg**
7440-47-3	**Chromium**	**50.3**	**0.48**	**0.022**	**mg/kg**
7440-48-4	**Cobalt**	**0.015J**	**0.48**	**0.012**	**mg/kg**
7440-50-8	**Copper**	**27.0**	**0.48**	**0.037**	**mg/kg**
7439-89-6	**Iron**	**21100**	**4.79**	**0.84**	**mg/kg**
7439-92-1	**Lead**	**74.1**	**0.72**	**0.14**	**mg/kg**
7439-95-4	**Magnesium**	**53.9**	**4.79**	**0.52**	**mg/kg**
7439-96-5	**Manganese**	**220**	**0.72**	**0.017**	**mg/kg**
7440-02-0	**Nickel**	**5.43**	**1.92**	**0.025**	**mg/kg**
7440-09-7	**Potassium**	**67.6**	**23.9**	**2.52**	**mg/kg**
7782-49-2	**Selenium**	**11.7**	**1.92**	**0.16**	**mg/kg**
7440-22-4	Silver	0.026U	0.48	0.026	mg/kg
7440-23-5	**Sodium**	**3430**	**47.9**	**3.63**	**mg/kg**
7440-28-0	**Thallium**	**0.39J**	**0.96**	**0.11**	**mg/kg**
7440-62-2	Vanadium	0.018U	0.96	0.018	mg/kg
7440-66-6	**Zinc**	**5.17**	**1.92**	**0.51**	**mg/kg**

SW-846 9045C pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	08/16/2012 09:00	OLT	487695

CAS#	Parameter	Result	RDL	MDL	Units
pH	**pH**	**4.47**	**1.00**	**1.00**	**pH unit**

RESULTS REPORTED ON A DRY WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132108	**HC90A TREATED**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10000	08/14/2012 20:38	CEK	487705

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	1440U	53200	1440	ug/Kg
71-55-6	1,1,1-Trichloroethane	2520U	53200	2520	ug/Kg
79-34-5	1,1,2,2-Tetrachloroethane	1210U	53200	1210	ug/Kg
79-00-5	1,1,2-Trichloroethane	1430U	53200	1430	ug/Kg
75-34-3	1,1-Dichloroethane	1590U	53200	1590	ug/Kg
75-35-4	1,1-Dichloroethene	2470U	53200	2470	ug/Kg
563-58-6	1,1-Dichloropropene	2600U	53200	2600	ug/Kg
96-18-4	1,2,3-Trichloropropane	1220U	53200	1220	ug/Kg
120-82-1	1,2,4-Trichlorobenzene	3780U	53200	3780	ug/Kg
95-63-6	**1,2,4-Trimethylbenzene**	**89100**	**53200**	**3830**	**ug/Kg**
96-12-8	1,2-Dibromo-3-chloropropane	4270U	53200	4270	ug/Kg
106-93-4	1,2-Dibromoethane	1530U	53200	1530	ug/Kg
95-50-1	**1,2-Dichlorobenzene**	**538000**	**53200**	**2940**	**ug/Kg**
107-06-2	1,2-Dichloroethane	2110U	53200	2110	ug/Kg
540-59-0	1,2-Dichloroethene(Total)	2490U	106000	2490	ug/Kg
78-87-5	1,2-Dichloropropane	1640U	53200	1640	ug/Kg
108-67-8	**1,3,5-Trimethylbenzene**	**53100J**	**53200**	**4000**	**ug/Kg**
541-73-1	1,3-Dichlorobenzene	2770U	53200	2770	ug/Kg
142-28-9	1,3-Dichloropropane	1680U	53200	1680	ug/Kg
106-46-7	**1,4-Dichlorobenzene**	**42800J**	**53200**	**2460**	**ug/Kg**
594-20-7	2,2-Dichloropropane	2650U	53200	2650	ug/Kg
78-93-3	2-Butanone	5510U	53200	5510	ug/Kg
95-49-8	2-Chlorotoluene	2330U	53200	2330	ug/Kg
591-78-6	2-Hexanone	4610U	53200	4610	ug/Kg
106-43-4	4-Chlorotoluene	2500U	53200	2500	ug/Kg
99-87-6	**4-Isopropyltoluene**	**37300J**	**53200**	**2240**	**ug/Kg**
108-10-1	4-Methyl-2-pentanone	1410U	53200	1410	ug/Kg
67-64-1	Acetone	11000U	266000	11000	ug/Kg
71-43-2	**Benzene**	**656000**	**53200**	**1620**	**ug/Kg**
108-86-1	Bromobenzene	1660U	53200	1660	ug/Kg
74-97-5	Bromochloromethane	1440U	53200	1440	ug/Kg
75-27-4	Bromodichloromethane	1720U	53200	1720	ug/Kg
75-25-2	Bromoform	1690U	53200	1690	ug/Kg
74-83-9	Bromomethane	3230U	53200	3230	ug/Kg
75-15-0	Carbon disulfide	3460U	53200	3460	ug/Kg
56-23-5	Carbon tetrachloride	2150U	53200	2150	ug/Kg
108-90-7	Chlorobenzene	1590U	53200	1590	ug/Kg
75-00-3	Chloroethane	3520U	53200	3520	ug/Kg
67-66-3	Chloroform	2290U	53200	2290	ug/Kg
74-87-3	Chloromethane	2520U	53200	2520	ug/Kg
124-48-1	Dibromochloromethane	2320U	53200	2320	ug/Kg
74-95-3	Dibromomethane	2460U	53200	2460	ug/Kg
75-71-8	Dichlorodifluoromethane	2380U	53200	2380	ug/Kg
100-41-4	**Ethylbenzene**	**38500J**	**53200**	**1950**	**ug/Kg**
87-68-3	Hexachlorobutadiene	2280U	53200	2280	ug/Kg
98-82-8	**Isopropylbenzene (Cumene)**	**135000**	**53200**	**1970**	**ug/Kg**
74-88-4	Methyl iodide	13100U	53200	13100	ug/Kg
75-09-2	Methylene chloride	4710U	106000	4710	ug/Kg
91-20-3	**Naphthalene**	**1820000**	**53200**	**3420**	**ug/Kg**
100-42-5	Styrene	1640U	53200	1640	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132108	**HC90A TREATED**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10000	08/14/2012 20:38	CEK	487705

CAS#	Parameter	Result	RDL	MDL	Units
127-18-4	Tetrachloroethene	3150U	53200	3150	ug/Kg
110-02-1	**Thiophene**	**5230**			**ug/Kg**
108-88-3	**Toluene**	**938000**	**53200**	**1650**	**ug/Kg**
79-01-6	Trichloroethene	2270U	53200	2270	ug/Kg
75-69-4	Trichlorofluoromethane	2780U	53200	2780	ug/Kg
76-13-1	Trichlorotrifluoroethane	2130U	53200	2130	ug/Kg
108-05-4	Vinyl acetate	1500U	53200	1500	ug/Kg
75-01-4	Vinyl chloride	2900U	53200	2900	ug/Kg
1330-20-7	**Xylene (total)**	**769000**	**106000**	**4270**	**ug/Kg**
156-59-2	cis-1,2-Dichloroethene	1580U	53200	1580	ug/Kg
10061-01-5	cis-1,3-Dichloropropene	1970U	53200	1970	ug/Kg
136777-61-2	**m,p-Xylene**	**638000**	**53200**	**3130**	**ug/Kg**
104-51-8	n-Butylbenzene	2480U	53200	2480	ug/Kg
103-65-1	n-Propylbenzene	7870U	53200	7870	ug/Kg
95-47-6	**o-Xylene**	**131000**	**53200**	**1440**	**ug/Kg**
135-98-8	**sec-Butylbenzene**	**76500**	**53200**	**2100**	**ug/Kg**
1634-04-4	tert-Butyl methyl ether (MTBE)	1300U	53200	1300	ug/Kg
98-06-6	**tert-Butylbenzene**	**19400J**	**53200**	**2730**	**ug/Kg**
156-60-5	trans-1,2-Dichloroethene	1390U	53200	1390	ug/Kg
10061-02-6	trans-1,3-Dichloropropene	1810U	53200	1810	ug/Kg
110-57-6	trans-1,4-Dichloro-2-butene	5510U	53200	5510	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	495000	513000	ug/Kg	104	62 - 127
1868-53-7	Dibromofluoromethane	495000	491000	ug/Kg	99	65 - 130
2037-26-5	Toluene d8	495000	495000	ug/Kg	100	71 - 132
17060-07-0	1,2-Dichloroethane-d4	495000	498000	ug/Kg	101	62 - 125

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10000	08/14/2012 20:38	JCK	488227

CAS#	Parameter	Result	Retention	Units
	No tics detected	ND		ug/Kg

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/14/2012 08:52	487664	3550C	10	08/15/2012 19:22	JWM	487843

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	4000U	106000	4000	ug/Kg
122-66-7	1,2Diphenylhydrazine/Azobenzen	2410U	106000	2410	ug/Kg
95-95-4	2,4,5-Trichlorophenol	5380U	106000	5380	ug/Kg
88-06-2	2,4,6-Trichlorophenol	43200U	106000	43200	ug/Kg
120-83-2	2,4-Dichlorophenol	8800U	106000	8800	ug/Kg
105-67-9	2,4-Dimethylphenol	48900U	106000	48900	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132108	**HC90A TREATED**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/14/2012 08:52	487664	3550C	10	08/15/2012 19:22	JWM	487843

CAS#	Parameter	Result	RDL	MDL	Units
51-28-5	2,4-Dinitrophenol	45300U	106000	45300	ug/Kg
121-14-2	2,4-Dinitrotoluene	12200U	106000	12200	ug/Kg
606-20-2	2,6-Dinitrotoluene	10500U	106000	10500	ug/Kg
91-58-7	2-Chloronaphthalene	1360U	106000	1360	ug/Kg
95-57-8	2-Chlorophenol	4370U	106000	4370	ug/Kg
91-57-6	**2-Methylnaphthalene**	**53200J**	**106000**	**3370**	**ug/Kg**
88-74-4	2-Nitroaniline	5850U	532000	5850	ug/Kg
88-75-5	2-Nitrophenol	7240U	106000	7240	ug/Kg
91-94-1	3,3'-Dichlorobenzidine	36200U	213000	36200	ug/Kg
99-09-2	3-Nitroaniline	7650U	532000	7650	ug/Kg
534-52-1	4,6-Dinitro-2-methylphenol	47700U	532000	47700	ug/Kg
101-55-3	4-Bromophenyl phenyl ether	7990U	106000	7990	ug/Kg
59-50-7	4-Chloro-3-methylphenol	11300U	106000	11300	ug/Kg
106-47-8	4-Chloroaniline	8970U	106000	8970	ug/Kg
7005-72-3	4-Chlorophenyl phenyl ether	8630U	106000	8630	ug/Kg
100-01-6	4-Nitroaniline	70900U	532000	70900	ug/Kg
100-02-7	4-Nitrophenol	68800U	532000	68800	ug/Kg
83-32-9	**Acenaphthene**	**10800J**	**106000**	**2790**	**ug/Kg**
208-96-8	Acenaphthylene	3240U	106000	3240	ug/Kg
62-53-3	Aniline	8990U	106000	8990	ug/Kg
120-12-7	Anthracene	2660U	106000	2660	ug/Kg
56-55-3	Benzo(a)anthracene	9410U	106000	9410	ug/Kg
50-32-8	Benzo(a)pyrene	2850U	106000	2850	ug/Kg
205-99-2	Benzo(b)fluoranthene	16300U	106000	16300	ug/Kg
191-24-2	Benzo(g,h,i)perylene	3610U	106000	3610	ug/Kg
207-08-9	Benzo(k)fluoranthene	2460U	106000	2460	ug/Kg
100-51-6	Benzyl alcohol	11800U	106000	11800	ug/Kg
111-91-1	Bis(2-Chloroethoxy)methane	6020U	106000	6020	ug/Kg
111-44-4	Bis(2-Chloroethyl)ether	9000U	106000	9000	ug/Kg
108-60-1	Bis(2-Chloroisopropyl)ether	8400U	106000	8400	ug/Kg
117-81-7	Bis(2-Ethylhexyl)phthalate	5320U	106000	5320	ug/Kg
85-68-7	Butyl benzyl phthalate	2860U	106000	2860	ug/Kg
86-74-8	Carbazole	7350U	106000	7350	ug/Kg
218-01-9	Chrysene	2970U	106000	2970	ug/Kg
84-74-2	Di-n-butyl phthalate	3380U	106000	3380	ug/Kg
117-84-0	Di-n-octyl phthalate	3500U	106000	3500	ug/Kg
53-70-3	Dibenz(a,h)anthracene	3110U	106000	3110	ug/Kg
132-64-9	Dibenzofuran	1660U	106000	1660	ug/Kg
84-66-2	Diethyl phthalate	4310U	106000	4310	ug/Kg
131-11-3	Dimethyl phthalate	1800U	106000	1800	ug/Kg
206-44-0	Fluoranthene	2080U	106000	2080	ug/Kg
86-73-7	**Fluorene**	**238000**	**106000**	**3430**	**ug/Kg**
118-74-1	Hexachlorobenzene	13300U	106000	13300	ug/Kg
87-68-3	Hexachlorobutadiene	6360U	106000	6360	ug/Kg
77-47-4	Hexachlorocyclopentadiene	52800U	106000	52800	ug/Kg
67-72-1	Hexachloroethane	3890U	106000	3890	ug/Kg
193-39-5	Indeno(1,2,3-cd)pyrene	6560U	106000	6560	ug/Kg
78-59-1	Isophorone	4560U	106000	4560	ug/Kg
98-95-3	Nitrobenzene	3820U	106000	3820	ug/Kg
87-86-5	Pentachlorophenol	60100U	532000	60100	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132108	**HC90A TREATED**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/14/2012 08:52	487664	3550C	10	08/15/2012 19:22	JWM	487843

CAS#	Parameter	Result	RDL	MDL	Units
85-01-8	Phenanthrene	2820U	106000	2820	ug/Kg
108-95-2	Phenol	10700U	106000	10700	ug/Kg
129-00-0	Pyrene	2450U	106000	2450	ug/Kg
110-86-1	Pyridine	52300U	106000	52300	ug/Kg
1319-77-3MP	m,p-Cresol	12500U	106000	12500	ug/Kg
621-64-7	n-Nitrosodi-n-propylamine	3940U	106000	3940	ug/Kg
62-75-9	n-Nitrosodimethylamine	19700U	106000	19700	ug/Kg
86-30-6	n-Nitrosodiphenylamine	2450U	106000	2450	ug/Kg
95-48-7	o-Cresol	3840U	106000	3840	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	5000	Diluted Out	ug/Kg	**0***	46 - 123
321-60-8	2-Fluorobiphenyl	5000	Diluted Out	ug/Kg	**0***	47 - 127
1718-51-0	Terphenyl-d14	5000	Diluted Out	ug/Kg	**0***	38 - 167
4165-62-2	Phenol-d5	10000	Diluted Out	ug/Kg	**0***	43 - 123
367-12-4	2-Fluorophenol	10000	Diluted Out	ug/Kg	**0***	51 - 119
118-79-6	2,4,6-Tribromophenol	10000	Diluted Out	ug/Kg	**0***	44 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10	08/15/2012 19:22	JWM	487904

CAS#	Parameter	Result	Retention	Units
108-88-3	**Toluene**	**216000**	**1.50**	**ug/Kg**
72403-15-7	**Benzene, (1-chloroethyl)methyl-**	**88800**	**4.08**	**ug/Kg**
101-81-5	**Diphenylmethane**	**120000**	**4.25**	**ug/Kg**
620-83-7	**Benzene, 1-methyl-4-(phenylmethyl)-**	**55900**	**4.59**	**ug/Kg**
778-22-3	**Benzene, 1,1'-(1-methylethylidene)b**	**113000**	**4.70**	**ug/Kg**
26137-53-1	**Naphthalene, 1,2,3-trimethyl-4-prop**	**1120000**	**4.99**	**ug/Kg**
6416-39-3	**1H-Indene, 2,3-dihydro-1-methyl-3-p**	**112000**	**5.02**	**ug/Kg**
26137-53-1	**Naphthalene, 1,2,3-trimethyl-4-prop**	**248000**	**5.07**	**ug/Kg**
	Unknown	**207000**	**5.17**	**ug/Kg**
5956-09-2	**2H-3,9a-Methano-1-benzoxepin, octah**	**162000**	**5.47**	**ug/Kg**
10544-50-0	**Sulfur, mol. (S8)**	**156000**	**6.15**	**ug/Kg**
106-42-3	**p-Xylene**	**97000**	**1.97**	**ug/Kg**
	Unknown	**49500**	**7.48**	**ug/Kg**
98-82-8	**Benzene, (1-methylethyl)-**	**30900**	**2.23**	**ug/Kg**
526-73-8	**Benzene, 1,2,3-trimethyl-**	**34900**	**2.55**	**ug/Kg**
700-88-9	**Benzene, cyclopentyl-**	**52300**	**3.51**	**ug/Kg**
5279-14-1	**Benzene, (1-nitropropyl)-**	**62400**	**3.63**	**ug/Kg**
2132-84-5	**Benzene, (1-methylhexyl)-**	**99000**	**3.75**	**ug/Kg**
827-52-1	**Benzene, cyclohexyl-**	**131000**	**3.87**	**ug/Kg**
4815-57-0	**Benzene, 1,4-dipropyl-**	**65300**	**3.98**	**ug/Kg**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132108	**HC90A TREATED**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 7471B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/13/2012 16:30	487647	SW-846 7471B	5	08/14/2012 16:19	CLB	487729

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	**Mercury**	**2.50**	**0.061**	**0.028**	**mg/kg**

SW-846 6010B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/14/2012 07:00	487645	SW-846 3050B	5	08/15/2012 20:29	BNB	487796

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	**Aluminum**	**392**	**43.0**	**4.25**	**mg/kg**
7440-36-0	Antimony	0.52U	12.9	0.52	mg/kg
7440-39-3	**Barium**	**6.99**	**2.15**	**0.13**	**mg/kg**
7440-41-7	Beryllium	0.011U	1.08	0.011	mg/kg
7440-43-9	Cadmium	0.048U	1.08	0.048	mg/kg
7440-47-3	**Chromium**	**6910**	**2.15**	**0.097**	**mg/kg**
7440-48-4	**Cobalt**	**41.8**	**2.15**	**0.054**	**mg/kg**
7440-50-8	**Copper**	**92.1**	**2.15**	**0.17**	**mg/kg**
7439-89-6	**Iron**	**24300**	**21.5**	**3.77**	**mg/kg**
7439-92-1	**Lead**	**66.7**	**3.23**	**0.61**	**mg/kg**
7439-95-4	**Magnesium**	**37.5**	**21.5**	**2.33**	**mg/kg**
7439-96-5	**Manganese**	**635**	**3.23**	**0.075**	**mg/kg**
7440-02-0	**Nickel**	**3420**	**8.60**	**0.11**	**mg/kg**
7440-09-7	**Potassium**	**132**	**108**	**11.3**	**mg/kg**
7782-49-2	**Selenium**	**8.71**	**8.60**	**0.70**	**mg/kg**
7440-22-4	Silver	0.12U	2.15	0.12	mg/kg
7440-28-0	Thallium	0.47U	4.30	0.47	mg/kg
7440-62-2	**Vanadium**	**25.4**	**4.30**	**0.081**	**mg/kg**

SW-846 6010B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/14/2012 07:00	487645	SW-846 3050B	5	08/16/2012 18:40	BNB	487921

CAS#	Parameter	Result	RDL	MDL	Units
7440-38-2	**Arsenic**	**18.8**	**8.60**	**0.75**	**mg/kg**
7440-70-2	**Calcium**	**147J**	**161**	**23.5**	**mg/kg**
7440-23-5	**Sodium**	**3950**	**215**	**16.3**	**mg/kg**
7440-66-6	**Zinc**	**10.4**	**8.60**	**2.29**	**mg/kg**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132108	**HC90A TREATED**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 9045C pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	08/27/2012 15:30	OLT	488634

CAS#	Parameter	Result	RDL	MDL	Units
pH	**pH**	**1.58**	**1.00**	**1.00**	**pH unit**

RESULTS REPORTED ON A DRY WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132109	**HC90B TREATED**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10000	08/14/2012 21:02	CEK	487705

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	1230U	45600	1230	ug/Kg
71-55-6	1,1,1-Trichloroethane	2160U	45600	2160	ug/Kg
79-34-5	1,1,2,2-Tetrachloroethane	1040U	45600	1040	ug/Kg
79-00-5	1,1,2-Trichloroethane	1220U	45600	1220	ug/Kg
75-34-3	1,1-Dichloroethane	1360U	45600	1360	ug/Kg
75-35-4	1,1-Dichloroethene	2120U	45600	2120	ug/Kg
563-58-6	1,1-Dichloropropene	2220U	45600	2220	ug/Kg
96-18-4	1,2,3-Trichloropropane	1050U	45600	1050	ug/Kg
120-82-1	1,2,4-Trichlorobenzene	3240U	45600	3240	ug/Kg
95-63-6	**1,2,4-Trimethylbenzene**	**82200**	**45600**	**3280**	**ug/Kg**
96-12-8	1,2-Dibromo-3-chloropropane	3660U	45600	3660	ug/Kg
106-93-4	1,2-Dibromoethane	1310U	45600	1310	ug/Kg
95-50-1	**1,2-Dichlorobenzene**	**503000**	**45600**	**2520**	**ug/Kg**
107-06-2	1,2-Dichloroethane	1810U	45600	1810	ug/Kg
540-59-0	1,2-Dichloroethene(Total)	2130U	91200	2130	ug/Kg
78-87-5	1,2-Dichloropropane	1400U	45600	1400	ug/Kg
108-67-8	**1,3,5-Trimethylbenzene**	**50700**	**45600**	**3430**	**ug/Kg**
541-73-1	1,3-Dichlorobenzene	2370U	45600	2370	ug/Kg
142-28-9	1,3-Dichloropropane	1440U	45600	1440	ug/Kg
106-46-7	**1,4-Dichlorobenzene**	**38200J**	**45600**	**2110**	**ug/Kg**
594-20-7	2,2-Dichloropropane	2270U	45600	2270	ug/Kg
78-93-3	2-Butanone	4720U	45600	4720	ug/Kg
95-49-8	2-Chlorotoluene	2000U	45600	2000	ug/Kg
591-78-6	2-Hexanone	3950U	45600	3950	ug/Kg
106-43-4	4-Chlorotoluene	2140U	45600	2140	ug/Kg
99-87-6	**4-Isopropyltoluene**	**33800J**	**45600**	**1910**	**ug/Kg**
108-10-1	4-Methyl-2-pentanone	1200U	45600	1200	ug/Kg
67-64-1	Acetone	9390U	228000	9390	ug/Kg
71-43-2	**Benzene**	**476000**	**45600**	**1390**	**ug/Kg**
108-86-1	Bromobenzene	1420U	45600	1420	ug/Kg
74-97-5	Bromochloromethane	1230U	45600	1230	ug/Kg
75-27-4	Bromodichloromethane	1480U	45600	1480	ug/Kg
75-25-2	Bromoform	1450U	45600	1450	ug/Kg
74-83-9	Bromomethane	2760U	45600	2760	ug/Kg
75-15-0	Carbon disulfide	2960U	45600	2960	ug/Kg
56-23-5	Carbon tetrachloride	1840U	45600	1840	ug/Kg
108-90-7	Chlorobenzene	1360U	45600	1360	ug/Kg
75-00-3	Chloroethane	3020U	45600	3020	ug/Kg
67-66-3	Chloroform	1960U	45600	1960	ug/Kg
74-87-3	Chloromethane	2160U	45600	2160	ug/Kg
124-48-1	Dibromochloromethane	1990U	45600	1990	ug/Kg
74-95-3	Dibromomethane	2110U	45600	2110	ug/Kg
75-71-8	Dichlorodifluoromethane	2040U	45600	2040	ug/Kg
100-41-4	**Ethylbenzene**	**33900J**	**45600**	**1670**	**ug/Kg**
87-68-3	Hexachlorobutadiene	1950U	45600	1950	ug/Kg
98-82-8	**Isopropylbenzene (Cumene)**	**123000**	**45600**	**1690**	**ug/Kg**
74-88-4	Methyl iodide	11200U	45600	11200	ug/Kg
75-09-2	Methylene chloride	4030U	91200	4030	ug/Kg
91-20-3	**Naphthalene**	**1720000**	**45600**	**2930**	**ug/Kg**
100-42-5	Styrene	1400U	45600	1400	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132109	**HC90B TREATED**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10000	08/14/2012 21:02	CEK	487705

CAS#	Parameter	Result	RDL	MDL	Units
127-18-4	Tetrachloroethene	2700U	45600	2700	ug/Kg
110-02-1	**Thiophene**	**3750**			**ug/Kg**
108-88-3	**Toluene**	**711000**	**45600**	**1410**	**ug/Kg**
79-01-6	Trichloroethene	1940U	45600	1940	ug/Kg
75-69-4	Trichlorofluoromethane	2380U	45600	2380	ug/Kg
76-13-1	Trichlorotrifluoroethane	1820U	45600	1820	ug/Kg
108-05-4	Vinyl acetate	1290U	45600	1290	ug/Kg
75-01-4	Vinyl chloride	2480U	45600	2480	ug/Kg
1330-20-7	**Xylene (total)**	**667000**	**91200**	**3660**	**ug/Kg**
156-59-2	cis-1,2-Dichloroethene	1350U	45600	1350	ug/Kg
10061-01-5	cis-1,3-Dichloropropene	1690U	45600	1690	ug/Kg
136777-61-2	**m,p-Xylene**	**550000**	**45600**	**2680**	**ug/Kg**
104-51-8	n-Butylbenzene	2120U	45600	2120	ug/Kg
103-65-1	n-Propylbenzene	6740U	45600	6740	ug/Kg
95-47-6	**o-Xylene**	**117000**	**45600**	**1230**	**ug/Kg**
135-98-8	**sec-Butylbenzene**	**77500**	**45600**	**1800**	**ug/Kg**
1634-04-4	tert-Butyl methyl ether (MTBE)	1110U	45600	1110	ug/Kg
98-06-6	**tert-Butylbenzene**	**19500J**	**45600**	**2330**	**ug/Kg**
156-60-5	trans-1,2-Dichloroethene	1190U	45600	1190	ug/Kg
10061-02-6	trans-1,3-Dichloropropene	1550U	45600	1550	ug/Kg
110-57-6	trans-1,4-Dichloro-2-butene	4720U	45600	4720	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	379000	394000	ug/Kg	104	62 - 127
1868-53-7	Dibromofluoromethane	379000	386000	ug/Kg	102	65 - 130
2037-26-5	Toluene d8	379000	381000	ug/Kg	100	71 - 132
17060-07-0	1,2-Dichloroethane-d4	379000	390000	ug/Kg	103	62 - 125

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10000	08/14/2012 21:02	JCK	488227

CAS#	Parameter	Result	Retention	Units
	No tics detected	ND		ug/Kg

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/14/2012 08:52	487664	3550C	10	08/15/2012 19:39	JWM	487843

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	4470U	119000	4470	ug/Kg
122-66-7	1,2Diphenylhydrazine/Azobenzen	2690U	119000	2690	ug/Kg
95-95-4	2,4,5-Trichlorophenol	6010U	119000	6010	ug/Kg
88-06-2	2,4,6-Trichlorophenol	48300U	119000	48300	ug/Kg
120-83-2	2,4-Dichlorophenol	9830U	119000	9830	ug/Kg
105-67-9	2,4-Dimethylphenol	54700U	119000	54700	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132109	**HC90B TREATED**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/14/2012 08:52	487664	3550C	10	08/15/2012 19:39	JWM	487843

CAS#	Parameter	Result	RDL	MDL	Units
51-28-5	2,4-Dinitrophenol	50700U	119000	50700	ug/Kg
121-14-2	2,4-Dinitrotoluene	13600U	119000	13600	ug/Kg
606-20-2	2,6-Dinitrotoluene	11800U	119000	11800	ug/Kg
91-58-7	2-Chloronaphthalene	1520U	119000	1520	ug/Kg
95-57-8	2-Chlorophenol	4880U	119000	4880	ug/Kg
91-57-6	**2-Methylnaphthalene**	**51900J**	**119000**	**3760**	**ug/Kg**
88-74-4	2-Nitroaniline	6540U	595000	6540	ug/Kg
88-75-5	2-Nitrophenol	8090U	119000	8090	ug/Kg
91-94-1	3,3'-Dichlorobenzidine	40500U	238000	40500	ug/Kg
99-09-2	3-Nitroaniline	8540U	595000	8540	ug/Kg
534-52-1	4,6-Dinitro-2-methylphenol	53300U	595000	53300	ug/Kg
101-55-3	4-Bromophenyl phenyl ether	8930U	119000	8930	ug/Kg
59-50-7	4-Chloro-3-methylphenol	12700U	119000	12700	ug/Kg
106-47-8	4-Chloroaniline	10000U	119000	10000	ug/Kg
7005-72-3	4-Chlorophenyl phenyl ether	9640U	119000	9640	ug/Kg
100-01-6	4-Nitroaniline	79200U	595000	79200	ug/Kg
100-02-7	4-Nitrophenol	76900U	595000	76900	ug/Kg
83-32-9	**Acenaphthene**	**9350J**	**119000**	**3120**	**ug/Kg**
208-96-8	Acenaphthylene	3620U	119000	3620	ug/Kg
62-53-3	Aniline	10000U	119000	10000	ug/Kg
120-12-7	Anthracene	2970U	119000	2970	ug/Kg
56-55-3	Benzo(a)anthracene	10500U	119000	10500	ug/Kg
50-32-8	Benzo(a)pyrene	3190U	119000	3190	ug/Kg
205-99-2	Benzo(b)fluoranthene	18300U	119000	18300	ug/Kg
191-24-2	Benzo(g,h,i)perylene	4030U	119000	4030	ug/Kg
207-08-9	Benzo(k)fluoranthene	2750U	119000	2750	ug/Kg
100-51-6	Benzyl alcohol	13200U	119000	13200	ug/Kg
111-91-1	Bis(2-Chloroethoxy)methane	6730U	119000	6730	ug/Kg
111-44-4	Bis(2-Chloroethyl)ether	10100U	119000	10100	ug/Kg
108-60-1	Bis(2-Chloroisopropyl)ether	9380U	119000	9380	ug/Kg
117-81-7	Bis(2-Ethylhexyl)phthalate	5940U	119000	5940	ug/Kg
85-68-7	Butyl benzyl phthalate	3200U	119000	3200	ug/Kg
86-74-8	Carbazole	8210U	119000	8210	ug/Kg
218-01-9	Chrysene	3320U	119000	3320	ug/Kg
84-74-2	Di-n-butyl phthalate	3780U	119000	3780	ug/Kg
117-84-0	Di-n-octyl phthalate	3910U	119000	3910	ug/Kg
53-70-3	Dibenz(a,h)anthracene	3480U	119000	3480	ug/Kg
132-64-9	Dibenzofuran	1850U	119000	1850	ug/Kg
84-66-2	Diethyl phthalate	4820U	119000	4820	ug/Kg
131-11-3	Dimethyl phthalate	2010U	119000	2010	ug/Kg
206-44-0	Fluoranthene	2320U	119000	2320	ug/Kg
86-73-7	**Fluorene**	**205000**	**119000**	**3830**	**ug/Kg**
118-74-1	Hexachlorobenzene	14800U	119000	14800	ug/Kg
87-68-3	Hexachlorobutadiene	7110U	119000	7110	ug/Kg
77-47-4	Hexachlorocyclopentadiene	59000U	119000	59000	ug/Kg
67-72-1	Hexachloroethane	4340U	119000	4340	ug/Kg
193-39-5	Indeno(1,2,3-cd)pyrene	7330U	119000	7330	ug/Kg
78-59-1	Isophorone	5090U	119000	5090	ug/Kg
98-95-3	Nitrobenzene	4270U	119000	4270	ug/Kg
87-86-5	Pentachlorophenol	67100U	595000	67100	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132109	**HC90B TREATED**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/14/2012 08:52	487664	3550C	10	08/15/2012 19:39	JWM	487843

CAS#	Parameter	Result	RDL	MDL	Units
85-01-8	Phenanthrene	3150U	119000	3150	ug/Kg
108-95-2	Phenol	12000U	119000	12000	ug/Kg
129-00-0	Pyrene	2740U	119000	2740	ug/Kg
110-86-1	Pyridine	58400U	119000	58400	ug/Kg
1319-77-3MP	m,p-Cresol	14000U	119000	14000	ug/Kg
621-64-7	n-Nitrosodi-n-propylamine	4400U	119000	4400	ug/Kg
62-75-9	n-Nitrosodimethylamine	22000U	119000	22000	ug/Kg
86-30-6	n-Nitrosodiphenylamine	2740U	119000	2740	ug/Kg
95-48-7	o-Cresol	4290U	119000	4290	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	5000	Diluted Out	ug/Kg	**0***	46 - 123
321-60-8	2-Fluorobiphenyl	5000	Diluted Out	ug/Kg	**0***	47 - 127
1718-51-0	Terphenyl-d14	5000	Diluted Out	ug/Kg	**0***	38 - 167
4165-62-2	Phenol-d5	10000	Diluted Out	ug/Kg	**0***	43 - 123
367-12-4	2-Fluorophenol	10000	Diluted Out	ug/Kg	**0***	51 - 119
118-79-6	2,4,6-Tribromophenol	10000	Diluted Out	ug/Kg	**0***	44 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10	08/15/2012 19:39	JWM	487904

CAS#	Parameter	Result	Retention	Units
108-88-3	**Toluene**	**255000**	**1.51**	**ug/Kg**
26968-58-1	**Benzene, (chloromethyl)ethyl-**	**115000**	**4.08**	**ug/Kg**
101-81-5	**Diphenylmethane**	**151000**	**4.25**	**ug/Kg**
605-39-0	**2,2'-Dimethylbiphenyl**	**76800**	**4.60**	**ug/Kg**
13540-56-2	**Benzene, 1,2-dimethyl-4-(phenylmeth**	**144000**	**4.70**	**ug/Kg**
26137-53-1	**Naphthalene, 1,2,3-trimethyl-4-prop**	**827000**	**4.99**	**ug/Kg**
6416-39-3	**1H-Indene, 2,3-dihydro-1-methyl-3-p**	**84900**	**5.02**	**ug/Kg**
834-24-2	**Benzenamine, 4-(2-phenylethenyl)-**	**178000**	**5.08**	**ug/Kg**
	Unknown	**192000**	**5.18**	**ug/Kg**
0-00-0	**9,9-Dimethyl-9-sila-9,10-dihydrophe**	**94100**	**5.27**	**ug/Kg**
55012-80-1	**Silane, trimethyl[5-methyl-2-(1-met**	**133000**	**5.47**	**ug/Kg**
106-42-3	**p-Xylene**	**227000**	**1.97**	**ug/Kg**
10544-50-0	**Sulfur, mol. (S8)**	**126000**	**6.15**	**ug/Kg**
98-82-8	**Benzene, (1-methylethyl)-**	**62300**	**2.23**	**ug/Kg**
95-36-3	**1,2,4-Trimethylbenzene**	**70300**	**2.55**	**ug/Kg**
700-88-9	**Benzene, cyclopentyl-**	**83700**	**3.52**	**ug/Kg**
2132-86-7	**Benzene, (1-propylbutyl)-**	**103000**	**3.64**	**ug/Kg**
2132-84-5	**Benzene, (1-methylhexyl)-**	**152000**	**3.75**	**ug/Kg**
827-52-1	**Benzene, cyclohexyl-**	**287000**	**3.88**	**ug/Kg**
4920-99-4	**Benzene, 1-ethyl-3-(1-methylethyl)-**	**112000**	**3.98**	**ug/Kg**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132109	**HC90B TREATED**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 7471B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/13/2012 16:30	487647	SW-846 7471B	5	08/14/2012 16:21	CLB	487729

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	**Mercury**	**3.14**	**0.072**	**0.033**	**mg/kg**

SW-846 6010B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/14/2012 07:00	487645	SW-846 3050B	5	08/15/2012 20:36	BNB	487796

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	**Aluminum**	**505**	**48.1**	**4.75**	**mg/kg**
7440-36-0	**Antimony**	**0.89J**	**14.4**	**0.58**	**mg/kg**
7440-39-3	**Barium**	**11.2**	**2.40**	**0.14**	**mg/kg**
7440-41-7	Beryllium	0.012U	1.20	0.012	mg/kg
7440-43-9	Cadmium	0.054U	1.20	0.054	mg/kg
7440-47-3	**Chromium**	**7640**	**2.40**	**0.11**	**mg/kg**
7440-48-4	**Cobalt**	**49.2**	**2.40**	**0.060**	**mg/kg**
7440-50-8	**Copper**	**94.4**	**2.40**	**0.19**	**mg/kg**
7439-89-6	**Iron**	**28700**	**24.0**	**4.21**	**mg/kg**
7439-92-1	**Lead**	**90.1**	**3.60**	**0.68**	**mg/kg**
7439-95-4	**Magnesium**	**45.1**	**24.0**	**2.61**	**mg/kg**
7439-96-5	**Manganese**	**724**	**3.60**	**0.084**	**mg/kg**
7440-02-0	**Nickel**	**3750**	**9.61**	**0.13**	**mg/kg**
7440-09-7	**Potassium**	**178**	**120**	**12.6**	**mg/kg**
7782-49-2	**Selenium**	**10.6**	**9.61**	**0.79**	**mg/kg**
7440-22-4	Silver	0.13U	2.40	0.13	mg/kg
7440-28-0	Thallium	0.53U	4.81	0.53	mg/kg
7440-62-2	**Vanadium**	**30.3**	**4.81**	**0.090**	**mg/kg**

SW-846 6010B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/14/2012 07:00	487645	SW-846 3050B	5	08/16/2012 18:47	BNB	487921

CAS#	Parameter	Result	RDL	MDL	Units
7440-38-2	**Arsenic**	**21.1**	**9.61**	**0.84**	**mg/kg**
7440-70-2	**Calcium**	**179J**	**180**	**26.3**	**mg/kg**
7440-23-5	**Sodium**	**4640**	**240**	**18.2**	**mg/kg**
7440-66-6	**Zinc**	**12.3**	**9.61**	**2.56**	**mg/kg**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132109	**HC90B TREATED**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 9045C pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	08/16/2012 09:40	OLT	487695

CAS#	Parameter	Result	RDL	MDL	Units
pH	pH	1.00U	2.00	1.00	pH unit

RESULTS REPORTED ON A DRY WEIGHT BASIS

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132110	**HC90C TREATED**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10000	08/14/2012 21:24	CEK	487705

CAS#	Parameter	Result	RDL	MDL	Units
630-20-6	1,1,1,2-Tetrachloroethane	1460U	54200	1460	ug/Kg
71-55-6	1,1,1-Trichloroethane	2570U	54200	2570	ug/Kg
79-34-5	1,1,2,2-Tetrachloroethane	1240U	54200	1240	ug/Kg
79-00-5	1,1,2-Trichloroethane	1450U	54200	1450	ug/Kg
75-34-3	1,1-Dichloroethane	1620U	54200	1620	ug/Kg
75-35-4	1,1-Dichloroethene	2510U	54200	2510	ug/Kg
563-58-6	1,1-Dichloropropene	2640U	54200	2640	ug/Kg
96-18-4	1,2,3-Trichloropropane	1250U	54200	1250	ug/Kg
120-82-1	1,2,4-Trichlorobenzene	3850U	54200	3850	ug/Kg
95-63-6	**1,2,4-Trimethylbenzene**	**66000**	**54200**	**3900**	**ug/Kg**
96-12-8	1,2-Dibromo-3-chloropropane	4350U	54200	4350	ug/Kg
106-93-4	1,2-Dibromoethane	1560U	54200	1560	ug/Kg
95-50-1	**1,2-Dichlorobenzene**	**413000**	**54200**	**2990**	**ug/Kg**
107-06-2	1,2-Dichloroethane	2150U	54200	2150	ug/Kg
540-59-0	1,2-Dichloroethene(Total)	2540U	108000	2540	ug/Kg
78-87-5	1,2-Dichloropropane	1670U	54200	1670	ug/Kg
108-67-8	**1,3,5-Trimethylbenzene**	**37900J**	**54200**	**4080**	**ug/Kg**
541-73-1	1,3-Dichlorobenzene	2820U	54200	2820	ug/Kg
142-28-9	1,3-Dichloropropane	1710U	54200	1710	ug/Kg
106-46-7	**1,4-Dichlorobenzene**	**30200J**	**54200**	**2500**	**ug/Kg**
594-20-7	2,2-Dichloropropane	2700U	54200	2700	ug/Kg
78-93-3	2-Butanone	5610U	54200	5610	ug/Kg
95-49-8	2-Chlorotoluene	2370U	54200	2370	ug/Kg
591-78-6	2-Hexanone	4690U	54200	4690	ug/Kg
106-43-4	4-Chlorotoluene	2550U	54200	2550	ug/Kg
99-87-6	**4-Isopropyltoluene**	**33000J**	**54200**	**2280**	**ug/Kg**
108-10-1	4-Methyl-2-pentanone	1430U	54200	1430	ug/Kg
67-64-1	Acetone	11200U	271000	11200	ug/Kg
71-43-2	**Benzene**	**282000**	**54200**	**1650**	**ug/Kg**
108-86-1	Bromobenzene	1690U	54200	1690	ug/Kg
74-97-5	Bromochloromethane	1460U	54200	1460	ug/Kg
75-27-4	Bromodichloromethane	1760U	54200	1760	ug/Kg
75-25-2	Bromoform	1720U	54200	1720	ug/Kg
74-83-9	Bromomethane	3280U	54200	3280	ug/Kg
75-15-0	Carbon disulfide	3520U	54200	3520	ug/Kg
56-23-5	Carbon tetrachloride	2190U	54200	2190	ug/Kg
108-90-7	Chlorobenzene	1620U	54200	1620	ug/Kg
75-00-3	Chloroethane	3590U	54200	3590	ug/Kg
67-66-3	Chloroform	2330U	54200	2330	ug/Kg
74-87-3	Chloromethane	2570U	54200	2570	ug/Kg
124-48-1	Dibromochloromethane	2360U	54200	2360	ug/Kg
74-95-3	Dibromomethane	2500U	54200	2500	ug/Kg
75-71-8	Dichlorodifluoromethane	2430U	54200	2430	ug/Kg
100-41-4	**Ethylbenzene**	**21500J**	**54200**	**1980**	**ug/Kg**
87-68-3	Hexachlorobutadiene	2320U	54200	2320	ug/Kg
98-82-8	**Isopropylbenzene (Cumene)**	**93700**	**54200**	**2010**	**ug/Kg**
74-88-4	Methyl iodide	13300U	54200	13300	ug/Kg
75-09-2	Methylene chloride	4790U	108000	4790	ug/Kg
91-20-3	**Naphthalene**	**1570000**	**54200**	**3480**	**ug/Kg**
100-42-5	Styrene	1670U	54200	1670	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132110	**HC90C TREATED**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 8260B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10000	08/14/2012 21:24	CEK	487705

CAS#	Parameter	Result	RDL	MDL	Units
127-18-4	Tetrachloroethene	3210U	54200	3210	ug/Kg
110-02-1	**Thiophene**	**2630**			**ug/Kg**
108-88-3	**Toluene**	**454000**	**54200**	**1680**	**ug/Kg**
79-01-6	Trichloroethene	2310U	54200	2310	ug/Kg
75-69-4	Trichlorofluoromethane	2830U	54200	2830	ug/Kg
76-13-1	Trichlorotrifluoroethane	2170U	54200	2170	ug/Kg
108-05-4	Vinyl acetate	1530U	54200	1530	ug/Kg
75-01-4	Vinyl chloride	2950U	54200	2950	ug/Kg
1330-20-7	**Xylene (total)**	**464000**	**108000**	**4350**	**ug/Kg**
156-59-2	cis-1,2-Dichloroethene	1600U	54200	1600	ug/Kg
10061-01-5	cis-1,3-Dichloropropene	2010U	54200	2010	ug/Kg
136777-61-2	**m,p-Xylene**	**376000**	**54200**	**3190**	**ug/Kg**
104-51-8	n-Butylbenzene	2530U	54200	2530	ug/Kg
103-65-1	n-Propylbenzene	8010U	54200	8010	ug/Kg
95-47-6	**o-Xylene**	**89600**	**54200**	**1460**	**ug/Kg**
135-98-8	**sec-Butylbenzene**	**51700J**	**54200**	**2140**	**ug/Kg**
1634-04-4	tert-Butyl methyl ether (MTBE)	1320U	54200	1320	ug/Kg
98-06-6	**tert-Butylbenzene**	**12800J**	**54200**	**2770**	**ug/Kg**
156-60-5	trans-1,2-Dichloroethene	1420U	54200	1420	ug/Kg
10061-02-6	trans-1,3-Dichloropropene	1840U	54200	1840	ug/Kg
110-57-6	trans-1,4-Dichloro-2-butene	5610U	54200	5610	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
460-00-4	4-Bromofluorobenzene	495000	513000	ug/Kg	104	62 - 127
1868-53-7	Dibromofluoromethane	495000	502000	ug/Kg	101	65 - 130
2037-26-5	Toluene d8	495000	501000	ug/Kg	101	71 - 132
17060-07-0	1,2-Dichloroethane-d4	495000	512000	ug/Kg	103	62 - 125

Library Search Volatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10000	08/14/2012 21:24	JCK	488227

CAS#	Parameter	Result	Retention	Units
	No tics detected	ND		ug/Kg

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/14/2012 08:52	487664	3550C	10	08/15/2012 19:56	JWM	487843

CAS#	Parameter	Result	RDL	MDL	Units
120-82-1	1,2,4-Trichlorobenzene	4070U	108000	4070	ug/Kg
122-66-7	1,2Diphenylhydrazine/Azobenzen	2450U	108000	2450	ug/Kg
95-95-4	2,4,5-Trichlorophenol	5480U	108000	5480	ug/Kg
88-06-2	2,4,6-Trichlorophenol	44000U	108000	44000	ug/Kg
120-83-2	2,4-Dichlorophenol	8950U	108000	8950	ug/Kg
105-67-9	2,4-Dimethylphenol	49800U	108000	49800	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132110	**HC90C TREATED**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/14/2012 08:52	487664	3550C	10	08/15/2012 19:56	JWM	487843

CAS#	Parameter	Result	RDL	MDL	Units
51-28-5	2,4-Dinitrophenol	46200U	108000	46200	ug/Kg
121-14-2	2,4-Dinitrotoluene	12400U	108000	12400	ug/Kg
606-20-2	2,6-Dinitrotoluene	10700U	108000	10700	ug/Kg
91-58-7	2-Chloronaphthalene	1390U	108000	1390	ug/Kg
95-57-8	2-Chlorophenol	4450U	108000	4450	ug/Kg
91-57-6	**2-Methylnaphthalene**	**101000J**	**108000**	**3430**	**ug/Kg**
88-74-4	2-Nitroaniline	5960U	542000	5960	ug/Kg
88-75-5	2-Nitrophenol	7370U	108000	7370	ug/Kg
91-94-1	3,3'-Dichlorobenzidine	36900U	217000	36900	ug/Kg
99-09-2	3-Nitroaniline	7790U	542000	7790	ug/Kg
534-52-1	4,6-Dinitro-2-methylphenol	48600U	542000	48600	ug/Kg
101-55-3	4-Bromophenyl phenyl ether	8140U	108000	8140	ug/Kg
59-50-7	4-Chloro-3-methylphenol	11600U	108000	11600	ug/Kg
106-47-8	4-Chloroaniline	9130U	108000	9130	ug/Kg
7005-72-3	4-Chlorophenyl phenyl ether	8780U	108000	8780	ug/Kg
100-01-6	4-Nitroaniline	72100U	542000	72100	ug/Kg
100-02-7	4-Nitrophenol	70100U	542000	70100	ug/Kg
83-32-9	**Acenaphthene**	**18500J**	**108000**	**2840**	**ug/Kg**
208-96-8	Acenaphthylene	3300U	108000	3300	ug/Kg
62-53-3	Aniline	9150U	108000	9150	ug/Kg
120-12-7	Anthracene	2710U	108000	2710	ug/Kg
56-55-3	Benzo(a)anthracene	9580U	108000	9580	ug/Kg
50-32-8	Benzo(a)pyrene	2910U	108000	2910	ug/Kg
205-99-2	Benzo(b)fluoranthene	16600U	108000	16600	ug/Kg
191-24-2	Benzo(g,h,i)perylene	3670U	108000	3670	ug/Kg
207-08-9	Benzo(k)fluoranthene	2510U	108000	2510	ug/Kg
100-51-6	Benzyl alcohol	12000U	108000	12000	ug/Kg
111-91-1	Bis(2-Chloroethoxy)methane	6130U	108000	6130	ug/Kg
111-44-4	Bis(2-Chloroethyl)ether	9170U	108000	9170	ug/Kg
108-60-1	Bis(2-Chloroisopropyl)ether	8550U	108000	8550	ug/Kg
117-81-7	Bis(2-Ethylhexyl)phthalate	5410U	108000	5410	ug/Kg
85-68-7	Butyl benzyl phthalate	2910U	108000	2910	ug/Kg
86-74-8	Carbazole	7480U	108000	7480	ug/Kg
218-01-9	Chrysene	3030U	108000	3030	ug/Kg
84-74-2	Di-n-butyl phthalate	3440U	108000	3440	ug/Kg
117-84-0	Di-n-octyl phthalate	3560U	108000	3560	ug/Kg
53-70-3	Dibenz(a,h)anthracene	3170U	108000	3170	ug/Kg
132-64-9	Dibenzofuran	1690U	108000	1690	ug/Kg
84-66-2	Diethyl phthalate	4390U	108000	4390	ug/Kg
131-11-3	Dimethyl phthalate	1830U	108000	1830	ug/Kg
206-44-0	Fluoranthene	2120U	108000	2120	ug/Kg
86-73-7	**Fluorene**	**402000**	**108000**	**3490**	**ug/Kg**
118-74-1	Hexachlorobenzene	13500U	108000	13500	ug/Kg
87-68-3	Hexachlorobutadiene	6480U	108000	6480	ug/Kg
77-47-4	Hexachlorocyclopentadiene	53800U	108000	53800	ug/Kg
67-72-1	Hexachloroethane	3960U	108000	3960	ug/Kg
193-39-5	Indeno(1,2,3-cd)pyrene	6670U	108000	6670	ug/Kg
78-59-1	Isophorone	4640U	108000	4640	ug/Kg
98-95-3	Nitrobenzene	3890U	108000	3890	ug/Kg
87-86-5	Pentachlorophenol	61200U	542000	61200	ug/Kg

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132110	**HC90C TREATED**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 8270C

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/14/2012 08:52	487664	3550C	10	08/15/2012 19:56	JWM	487843

CAS#	Parameter	Result	RDL	MDL	Units
85-01-8	Phenanthrene	2870U	108000	2870	ug/Kg
108-95-2	Phenol	10900U	108000	10900	ug/Kg
129-00-0	Pyrene	2490U	108000	2490	ug/Kg
110-86-1	Pyridine	53200U	108000	53200	ug/Kg
1319-77-3MP	m,p-Cresol	12800U	108000	12800	ug/Kg
621-64-7	n-Nitrosodi-n-propylamine	4010U	108000	4010	ug/Kg
62-75-9	n-Nitrosodimethylamine	20000U	108000	20000	ug/Kg
86-30-6	n-Nitrosodiphenylamine	2500U	108000	2500	ug/Kg
95-48-7	o-Cresol	3910U	108000	3910	ug/Kg

CAS#	Surrogate	Conc. Spiked	Conc. Rec	Units	% Recovery	Rec Limits
4165-60-0	Nitrobenzene-d5	5000	Diluted Out	ug/Kg	**0***	46 - 123
321-60-8	2-Fluorobiphenyl	5000	Diluted Out	ug/Kg	**0***	47 - 127
1718-51-0	Terphenyl-d14	5000	Diluted Out	ug/Kg	**0***	38 - 167
4165-62-2	Phenol-d5	10000	Diluted Out	ug/Kg	**0***	43 - 123
367-12-4	2-Fluorophenol	10000	Diluted Out	ug/Kg	**0***	51 - 119
118-79-6	2,4,6-Tribromophenol	10000	Diluted Out	ug/Kg	**0***	44 - 121

Library Search Semivolatiles

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10	08/15/2012 19:56	JWM	487904

CAS#	Parameter	Result	Retention	Units
106-42-3	**p-Xylene**	**275000**	**1.97**	**ug/Kg**
102-46-5	**Benzene, 4-(chloromethyl)-1,2-dimet**	**120000**	**4.08**	**ug/Kg**
101-81-5	**Diphenylmethane**	**174000**	**4.25**	**ug/Kg**
620-83-7	**Benzene, 1-methyl-4-(phenylmethyl)-**	**52200**	**4.56**	**ug/Kg**
778-22-3	**Benzene, 1,1'-(1-methylethylidene)b**	**151000**	**4.70**	**ug/Kg**
26137-53-1	**Naphthalene, 1,2,3-trimethyl-4-prop**	**1660000**	**4.99**	**ug/Kg**
6416-39-3	**1H-Indene, 2,3-dihydro-1-methyl-3-p**	**151000**	**5.02**	**ug/Kg**
	Unknown	**340000**	**5.07**	**ug/Kg**
834-24-2	**Benzenamine, 4-(2-phenylethenyl)-**	**311000**	**5.17**	**ug/Kg**
	Unknown	**303000**	**5.27**	**ug/Kg**
55012-80-1	**Silane, trimethyl[5-methyl-2-(1-met**	**254000**	**5.47**	**ug/Kg**
108-38-3	**Benzene, 1,3-dimethyl-**	**65500**	**2.08**	**ug/Kg**
778-22-3	**Benzene, 1,1'-(1-methylethylidene)b**	**107000**	**6.70**	**ug/Kg**
526-73-8	**Benzene, 1,2,3-trimethyl-**	**83200**	**2.43**	**ug/Kg**
108-67-8	**Benzene, 1,3,5-trimethyl-**	**111000**	**2.55**	**ug/Kg**
700-88-9	**Benzene, cyclopentyl-**	**130000**	**3.51**	**ug/Kg**
	Unknown	**170000**	**3.63**	**ug/Kg**
	Unknown	**145000**	**3.74**	**ug/Kg**
827-52-1	**Benzene, cyclohexyl-**	**190000**	**3.87**	**ug/Kg**
4920-99-4	**Benzene, 1-ethyl-3-(1-methylethyl)-**	**92300**	**3.98**	**ug/Kg**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132110	**HC90C TREATED**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 7471B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/13/2012 16:30	487647	SW-846 7471B	5	08/14/2012 16:22	CLB	487729

CAS#	Parameter	Result	RDL	MDL	Units
7439-97-6	**Mercury**	**1.67**	**0.064**	**0.030**	**mg/kg**

SW-846 6010B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/14/2012 07:00	487645	SW-846 3050B	5	08/15/2012 20:44	BNB	487796

CAS#	Parameter	Result	RDL	MDL	Units
7429-90-5	**Aluminum**	**503**	**43.8**	**4.33**	**mg/kg**
7440-36-0	**Antimony**	**8.61J**	**13.1**	**0.53**	**mg/kg**
7440-39-3	**Barium**	**8.24**	**2.19**	**0.13**	**mg/kg**
7440-41-7	Beryllium	0.011U	1.09	0.011	mg/kg
7440-43-9	Cadmium	0.049U	1.09	0.049	mg/kg
7440-47-3	**Chromium**	**14000**	**2.19**	**0.099**	**mg/kg**
7440-48-4	**Cobalt**	**88.5**	**2.19**	**0.055**	**mg/kg**
7440-50-8	**Copper**	**201**	**2.19**	**0.17**	**mg/kg**
7439-89-6	**Iron**	**49700**	**21.9**	**3.84**	**mg/kg**
7439-92-1	**Lead**	**77.4**	**3.28**	**0.62**	**mg/kg**
7439-95-4	**Magnesium**	**46.0**	**21.9**	**2.38**	**mg/kg**
7439-96-5	**Manganese**	**1310**	**3.28**	**0.077**	**mg/kg**
7440-02-0	**Nickel**	**6700**	**8.76**	**0.11**	**mg/kg**
7440-09-7	**Potassium**	**192**	**109**	**11.5**	**mg/kg**
7782-49-2	**Selenium**	**10.9**	**8.76**	**0.72**	**mg/kg**
7440-22-4	Silver	0.12U	2.19	0.12	mg/kg
7440-28-0	Thallium	0.48U	4.38	0.48	mg/kg
7440-62-2	**Vanadium**	**53.8**	**4.38**	**0.082**	**mg/kg**

SW-846 6010B

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
08/14/2012 07:00	487645	SW-846 3050B	5	08/16/2012 18:54	BNB	487921

CAS#	Parameter	Result	RDL	MDL	Units
7440-38-2	**Arsenic**	**43.3**	**8.76**	**0.76**	**mg/kg**
7440-70-2	**Calcium**	**173**	**164**	**23.9**	**mg/kg**
7440-23-5	**Sodium**	**5920**	**219**	**16.6**	**mg/kg**
7440-66-6	**Zinc**	**17.2**	**8.76**	**2.33**	**mg/kg**

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21208132110	**HC90C TREATED**	Solid	08/10/2012 15:55	08/11/2012 10:00

SW-846 9045C pH

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	08/16/2012 09:40	OLT	487695

CAS#	Parameter	Result	RDL	MDL	Units
pH	pH	1.00U	2.00	1.00	pH unit

RESULTS REPORTED ON A DRY WEIGHT BASIS

GC/MS Volatiles Quality Control Summary

Analytical Batch 487705		**Client ID**	MB487705			LCS487705				LCSD487705		
Prep Batch N/A		**GCAL ID**	1096440			1096441				1096442		
		Sample Type	Method Blank			LCS				LCSD		
		Analytical Date	08/14/2012 12:51			08/14/2012 11:09				08/14/2012 11:30		
		Matrix	Solid			Solid				Solid		
SW-846 8260B		**Units**	ug/Kg	**Spike**	**Result**		**Control**		**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**			**% R**	**RPD**	**Limit**
67-64-1	Acetone	51.5U	51.5	2500	3030	121	38 - 152		2890	116	5	30
74-97-5	Bromochloromethane	6.75U	6.75	2500	2890	116	73 - 127		2780	111	4	30
75-27-4	Bromodichloromethane	8.10U	8.10	2500	2950	118	74 - 126		2760	110	7	30
75-25-2	Bromoform	7.95U	7.95	2500	2970	119	67 - 122		2930	117	1	30
74-83-9	Bromomethane	15.2U	15.2	2500	2570	103	48 - 139		2500	100	3	30
75-15-0	Carbon disulfide	16.3U	16.3	2500	2810	112	68 - 133		2520	101	11	30
56-23-5	Carbon tetrachloride	10.1U	10.1	2500	3000	120	71 - 133		2800	112	7	30
75-00-3	Chloroethane	16.6U	16.6	2500	2780	111	57 - 144		2620	105	6	30
136777-61-2	m,p-Xylene	14.7U	14.7	5000	5280	106	72 - 128		5070	101	4	30
67-66-3	Chloroform	10.8U	10.8	2500	2840	114	74 - 124		2670	107	6	30
74-87-3	Chloromethane	11.9U	11.9	2500	2750	110	61 - 130		2660	106	3	30
124-48-1	Dibromochloromethane	10.9U	10.9	2500	2720	109	74 - 122		2630	105	3	30
74-95-3	Dibromomethane	11.6U	11.6	2500	2960	118	72 - 125		2870	115	3	30
75-71-8	Dichlorodifluoromethane	11.2U	11.2	2500	2890	116	59 - 138		2720	109	6	30
75-34-3	1,1-Dichloroethane	7.45U	7.45	2500	2820	113	71 - 126		2690	108	5	30
107-06-2	1,2-Dichloroethane	9.90U	9.90	2500	2760	110	68 - 126		2690	108	3	30
156-59-2	cis-1,2-Dichloroethene	7.40U	7.40	2500	2730	109	72 - 130		2560	102	6	30
156-60-5	trans-1,2-Dichloroethene	6.55U	6.55	2500	2710	108	67 - 134		2540	102	6	30
75-09-2	Methylene chloride	22.1U	22.1	2500	2540	102	66 - 130		2420	97	5	30
78-87-5	1,2-Dichloropropane	7.70U	7.70	2500	2850	114	72 - 129		2700	108	5	30
10061-01-5	cis-1,3-Dichloropropene	9.25U	9.25	2500	2620	105	72 - 129		2490	100	5	30
10061-02-6	trans-1,3-Dichloropropene	8.50U	8.50	2500	2620	105	72 - 126		2490	100	5	30
100-41-4	Ethylbenzene	9.15U	9.15	2500	2920	117	74 - 130		2760	110	6	30
591-78-6	2-Hexanone	21.7U	21.7	2500	3070	123	47 - 137		3000	120	2	30
98-82-8	Isopropylbenzene (Cumene)	9.25U	9.25	2500	2640	106	74 - 125		2500	100	5	30
78-93-3	2-Butanone	25.9U	25.9	2500	3360	134	47 - 142		3340	134	0.6	30
74-88-4	Methyl iodide	61.5U	61.5	2500	2620	105	54 - 140		2500	100	5	30
108-10-1	4-Methyl-2-pentanone	6.60U	6.60	2500	2840	114	52 - 136		2790	112	2	30
103-65-1	n-Propylbenzene	37.0U	37.0	2500	2810	112	73 - 137		2640	106	6	30
100-42-5	Styrene	7.70U	7.70	2500	2650	106	72 - 128		2540	102	4	30
127-18-4	Tetrachloroethene	14.8U	14.8	2500	2910	116	70 - 127		2790	112	4	30
630-20-6	1,1,1,2-Tetrachloroethane	6.75U	6.75	2500	2720	109	77 - 122		2610	104	4	30
79-34-5	1,1,2,2-Tetrachloroethane	5.70U	5.70	2500	3050	122	66 - 129		2870	115	6	30

GCAL Report 212081321

GC/MS Volatiles Quality Control Summary

Analytical Batch 487705		**Client ID**	MB487705			LCS487705			LCSD487705			
Prep Batch N/A		**GCAL ID**	1096440			1096441			1096442			
		Sample Type	Method Blank			LCS			LCSD			
		Analytical Date	08/14/2012 12:51			08/14/2012 11:09			08/14/2012 11:30			
		Matrix	Solid			Solid			Solid			
SW-846 8260B		**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
120-82-1	1,2,4-Trichlorobenzene	17.8U	17.8	2500	2820	113	64 - 135	2640	106	7	30
71-55-6	1,1,1-Trichloroethane	11.9U	11.9	2500	2950	118	70 - 130	2730	109	8	30
79-00-5	1,1,2-Trichloroethane	6.70U	6.70	2500	2900	116	74 - 120	2790	112	4	30
75-69-4	Trichlorofluoromethane	13.1U	13.1	2500	2900	116	64 - 141	2730	109	6	30
96-18-4	1,2,3-Trichloropropane	5.75U	5.75	2500	2810	112	63 - 132	2800	112	0.4	30
95-63-6	1,2,4-Trimethylbenzene	18.0U	18.0	2500	2620	105	75 - 130	2490	100	5	30
108-67-8	1,3,5-Trimethylbenzene	18.8U	18.8	2500	3000	120	74 - 136	2800	112	7	30
75-01-4	Vinyl chloride	13.6U	13.6	2500	2800	112	67 - 131	2480	99	12	30
95-47-6	o-Xylene	6.75U	6.75	2500	2640	106	69 - 133	2500	100	5	30
96-12-8	1,2-Dibromo-3-chloropropane	20.1U	20.1	2500	3000	120	60 - 123	2970	119	1	30
106-93-4	1,2-Dibromoethane	7.20U	7.20	2500	2990	120	74 - 122	2900	116	3	30
108-05-4	Vinyl acetate	7.05U	7.05	2500	2100	84	53 - 140	1860	74	12	30
1634-04-4	tert-Butyl methyl ether (MTBE)	6.10U	6.10	2500	2800	112	69 - 126	2760	110	1	30
540-59-0	1,2-Dichloroethene(Total)	11.7U	11.7	5000	5440	109	72 - 129	5100	102	6	30
99-87-6	4-Isopropyltoluene	10.5U	10.5	2500	2630	105	71 - 136	2450	98	7	30
1330-20-7	Xylene (total)	20.1U	20.1	7500	7920	106	71 - 129	7570	101	5	30
110-57-6	trans-1,4-Dichloro-2-butene	25.9U	25.9	2500	2650	106	44 - 146	2550	102	4	30
594-20-7	2,2-Dichloropropane	12.5U	12.5	2500	2860	114	74 - 129	2630	105	8	30
76-13-1	Trichlorotrifluoroethane	10.0U	10.0	2500	2890	116	66 - 139	2670	107	8	30
563-58-6	1,1-Dichloropropene	12.2U	12.2	2500	2920	117	70 - 138	2680	107	9	30
142-28-9	1,3-Dichloropropane	7.90U	7.90	2500	2860	114	77 - 121	2770	111	3	30
108-86-1	Bromobenzene	7.80U	7.80	2500	2890	116	73 - 124	2780	111	4	30
95-49-8	2-Chlorotoluene	11.0U	11.0	2500	2830	113	75 - 132	2670	107	6	30
106-43-4	4-Chlorotoluene	11.8U	11.8	2500	2760	110	74 - 133	2620	105	5	30
98-06-6	tert-Butylbenzene	12.8U	12.8	2500	2830	113	72 - 136	2660	106	6	30
135-98-8	sec-Butylbenzene	9.85U	9.85	2500	2980	119	72 - 141	2760	110	8	30
541-73-1	1,3-Dichlorobenzene	13.0U	13.0	2500	2830	113	77 - 127	2680	107	5	30
106-46-7	1,4-Dichlorobenzene	11.6U	11.6	2500	2780	111	74 - 123	2670	107	4	30
104-51-8	n-Butylbenzene	11.7U	11.7	2500	2920	117	68 - 144	2710	108	7	30
95-50-1	1,2-Dichlorobenzene	13.8U	13.8	2500	2870	115	76 - 125	2720	109	5	30
87-68-3	Hexachlorobutadiene	10.7U	10.7	2500	2500	100	71 - 140	2310	92	8	30
91-20-3	Naphthalene	16.1U	16.1	2500	2980	119	54 - 132	2880	115	3	30
75-35-4	1,1-Dichloroethene	11.6U	11.6	2500	2870	115	68 - 129	2610	104	9	30

GC/MS Volatiles Quality Control Summary

Analytical Batch	487705	**Client ID**	MB487705			LCS487705				LCSD487705		
Prep Batch	N/A	**GCAL ID**	1096440			1096441				1096442		
		Sample Type	Method Blank			LCS				LCSD		
		Analytical Date	08/14/2012 12:51			08/14/2012 11:09				08/14/2012 11:30		
		Matrix	Solid			Solid				Solid		
SW-846 8260B		**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
71-43-2	Benzene	7.60U	7.60	2500	2810	112	73 - 128	2700	108	4	30
79-01-6	Trichloroethene	10.7U	10.7	2500	3030	121	78 - 127	2870	115	5	30
108-88-3	Toluene	7.75U	7.75	2500	2760	110	74 - 121	2640	106	4	30
108-90-7	Chlorobenzene	7.45U	7.45	2500	2830	113	75 - 121	2690	108	5	30
110-02-1	Thiophene	0.00									
Surrogate											
460-00-4	4-Bromofluorobenzene	2520	101	2500	2560	102	62 - 127	2560	102		
1868-53-7	Dibromofluoromethane	2490	100	2500	2540	102	65 - 130	2490	100		
2037-26-5	Toluene d8	2500	100	2500	2490	100	71 - 132	2520	101		
17060-07-0	1,2-Dichloroethane-d4	2570	103	2500	2470	99	62 - 125	2480	99		

GC/MS Volatiles Quality Control Summary

Analytical Batch 487887		**Client ID**	MB487887			LCS487887			LCSD487887		
Prep Batch N/A		**GCAL ID**	1097122			1097123			1097124		
		Sample Type	Method Blank			LCS			LCSD		
		Analytical Date	08/16/2012 10:15			08/16/2012 09:15			08/16/2012 09:35		
		Matrix	Water			Water			Water		
SW-846 8260B TCLP		**Units**	mg/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
56-23-5	Carbon tetrachloride	0.0000563U	0.0000563	0.050	0.040	80	76 - 128	0.040	80	0	30
67-66-3	Chloroform	0.0000616U	0.0000616	0.050	0.047	95	75 - 122	0.048	96	2	30
107-06-2	1,2-Dichloroethane	0.000121U	0.000121	0.050	0.047	95	71 - 129	0.049	97	4	30
78-93-3	2-Butanone	0.000235U	0.000235	0.050	0.055	110	58 - 137	0.056	112	2	30
127-18-4	Tetrachloroethene	0.000141U	0.000141	0.050	0.044	87	68 - 128	0.043	86	2	30
75-01-4	Vinyl chloride	0.000104U	0.000104	0.050	0.043	85	68 - 132	0.042	84	2	30
91-20-3	Naphthalene	0.000175U	0.000175	0.050	0.050	101	57 - 125	0.053	105	6	35
75-35-4	1,1-Dichloroethene	0.000183U	0.000183	0.050	0.044	88	69 - 129	0.043	86	2	20
71-43-2	Benzene	0.0000490U	0.0000490	0.050	0.046	92	70 - 129	0.045	91	2	20
79-01-6	Trichloroethene	0.0000943U	0.0000943	0.050	0.045	90	76 - 129	0.045	90	0	20
108-90-7	Chlorobenzene	0.0000548U	0.0000548	0.050	0.046	92	74 - 123	0.046	93	0	20
110-02-1	Thiophene	0.00									
Surrogate											
460-00-4	4-Bromofluorobenzene	48.4	97	50	50.7	101	62 - 130	50.6	101		
1868-53-7	Dibromofluoromethane	50.5	101	50	51.6	103	65 - 127	51.2	102		
2037-26-5	Toluene d8	50.9	102	50	49.1	98	71 - 134	49.4	99		
17060-07-0	1,2-Dichloroethane-d4	51	102	50	50.9	102	62 - 127	50.5	101		

GC/MS Volatiles Quality Control Summary

Analytical Batch 487788		**Client ID**	MB487788			LCS487788				LCSD487788		
Prep Batch N/A		**GCAL ID**	1096739			1096740				1096741		
		Sample Type	Method Blank			LCS				LCSD		
		Analytical Date	08/15/2012 12:15			08/15/2012 09:32				08/15/2012 10:12		
		Matrix	Water			Water				Water		
SW-846 8260B SPLP			**Units**	ug/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
			Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
67-64-1	Acetone		0.322U	0.322	50.0	48.3	97	44 - 156	48.5	97	0.4	30
74-97-5	Bromochloromethane		0.238U	0.238	50.0	53.2	106	76 - 130	54.7	109	3	30
75-27-4	Bromodichloromethane		0.071U	0.071	50.0	52.1	104	74 - 125	55.3	111	6	30
75-25-2	Bromoform		0.278U	0.278	50.0	50.4	101	64 - 122	54.2	108	7	30
74-83-9	Bromomethane		0.276U	0.276	50.0	47.6	95	47 - 138	48.4	97	2	30
75-15-0	Carbon disulfide		0.190U	0.190	50.0	50.1	100	69 - 136	51.2	102	2	30
56-23-5	Carbon tetrachloride		0.056U	0.056	50.0	51.8	104	76 - 128	52.7	105	2	30
75-00-3	Chloroethane		0.279U	0.279	50.0	50.7	101	62 - 141	52.6	105	4	30
136777-61-2	m,p-Xylene		0.099U	0.099	100	93.7	94	74 - 126	98.2	98	5	30
67-66-3	Chloroform		0.062U	0.062	50.0	52.1	104	75 - 122	54.3	109	4	30
74-87-3	Chloromethane		0.076U	0.076	50.0	51.3	103	59 - 132	52.3	105	2	30
124-48-1	Dibromochloromethane		0.133U	0.133	50.0	48.0	96	71 - 123	50.6	101	5	30
74-95-3	Dibromomethane		0.197U	0.197	50.0	55.5	111	72 - 129	58.6	117	5	30
75-71-8	Dichlorodifluoromethane		0.088U	0.088	50.0	49.4	99	58 - 140	49.0	98	0.8	30
75-34-3	1,1-Dichloroethane		0.064U	0.064	50.0	50.5	101	74 - 127	52.2	104	3	30
107-06-2	1,2-Dichloroethane		0.121U	0.121	50.0	52.1	104	71 - 129	53.9	108	3	30
156-59-2	cis-1,2-Dichloroethene		0.104U	0.104	50.0	49.7	99	73 - 130	51.9	104	4	30
156-60-5	trans-1,2-Dichloroethene		0.096U	0.096	50.0	50.7	101	69 - 132	51.2	102	1	30
75-09-2	Methylene chloride		0.102U	0.102	50.0	48.0	96	68 - 132	49.7	99	3	30
78-87-5	1,2-Dichloropropane		0.114U	0.114	50.0	51.2	102	72 - 128	53.5	107	4	30
10061-01-5	cis-1,3-Dichloropropene		0.105U	0.105	50.0	47.7	95	71 - 132	50.0	100	5	30
10061-02-6	trans-1,3-Dichloropropene		0.068U	0.068	50.0	48.1	96	71 - 131	50.7	101	5	30
100-41-4	Ethylbenzene		0.180U	0.180	50.0	51.4	103	74 - 126	54.5	109	6	30
591-78-6	2-Hexanone		0.302U	0.302	50.0	48.3	97	50 - 135	50.1	100	4	30
98-82-8	Isopropylbenzene (Cumene)		0.058U	0.058	50.0	47.2	94	71 - 125	49.3	99	4	30
78-93-3	2-Butanone		0.235U	0.235	50.0	53.1	106	58 - 137	55.2	110	4	30
74-88-4	Methyl iodide		0.097U	0.097	50.0	44.6	89	57 - 141	48.0	96	7	30
108-10-1	4-Methyl-2-pentanone		0.142U	0.142	50.0	46.6	93	57 - 132	50.1	100	7	30
103-65-1	n-Propylbenzene		0.069U	0.069	50.0	52.7	105	75 - 129	54.4	109	3	30
100-42-5	Styrene		0.058U	0.058	50.0	47.3	95	71 - 127	49.9	100	5	30
127-18-4	Tetrachloroethene		0.141U	0.141	50.0	50.4	101	68 - 128	52.0	104	3	30
630-20-6	1,1,1,2-Tetrachloroethane		0.150U	0.150	50.0	47.7	95	75 - 124	51.5	103	8	30
79-34-5	1,1,2,2-Tetrachloroethane		0.112U	0.112	50.0	53.1	106	70 - 122	56.0	112	5	30

GC/MS Volatiles Quality Control Summary

Analytical Batch 487788		**Client ID**	MB487788			LCS487788			LCSD487788			
Prep Batch N/A		**GCAL ID**	1096739			1096740			1096741			
		Sample Type	Method Blank			LCS			LCSD			
		Analytical Date	08/15/2012 12:15			08/15/2012 09:32			08/15/2012 10:12			
		Matrix	Water			Water			Water			
SW-846 8260B SPLP		**Units**	ug/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
120-82-1	1,2,4-Trichlorobenzene	0.138U	0.138	50.0	46.5	93	61 - 135	55.1	110	17	30
71-55-6	1,1,1-Trichloroethane	0.078U	0.078	50.0	51.0	102	76 - 126	51.0	102	0	30
79-00-5	1,1,2-Trichloroethane	0.179U	0.179	50.0	51.1	102	72 - 121	54.5	109	6	30
75-69-4	Trichlorofluoromethane	0.094U	0.094	50.0	50.4	101	72 - 136	49.8	100	1	30
96-18-4	1,2,3-Trichloropropane	0.063U	0.063	50.0	50.3	101	70 - 120	53.7	107	7	30
95-63-6	1,2,4-Trimethylbenzene	0.080U	0.080	50.0	49.5	99	74 - 125	51.6	103	4	30
108-67-8	1,3,5-Trimethylbenzene	0.053U	0.053	50.0	55.9	112	71 - 132	58.2	116	4	30
75-01-4	Vinyl chloride	0.104U	0.104	50.0	48.9	98	68 - 132	49.0	98	0.2	30
95-47-6	o-Xylene	0.077U	0.077	50.0	46.6	93	73 - 130	49.3	99	6	30
96-12-8	1,2-Dibromo-3-chloropropane	0.082U	0.082	50.0	46.3	93	57 - 121	50.2	100	8	30
106-93-4	1,2-Dibromoethane	0.169U	0.169	50.0	51.1	102	70 - 124	54.3	109	6	30
108-05-4	Vinyl acetate	0.197U	0.197	50.0	34.8	70	54 - 147	34.7	69	0.3	30
1634-04-4	tert-Butyl methyl ether (MTBE)	0.084U	0.084	50.0	51.6	103	71 - 125	53.8	108	4	30
540-59-0	1,2-Dichloroethene(Total)	0.169U	0.169	100	100	100	74 - 128	103	103	3	30
99-87-6	4-Isopropyltoluene	0.175U	0.175	50.0	50.0	100	71 - 129	51.9	104	4	30
1330-20-7	Xylene (total)	0.123U	0.123	150	140	93	74 - 127	147	98	5	30
110-57-6	trans-1,4-Dichloro-2-butene	0.429U	0.429	50.0	47.4	95	56 - 132	51.3	103	8	30
594-20-7	2,2-Dichloropropane	0.112U	0.112	50.0	50.0	100	77 - 124	51.9	104	4	30
76-13-1	Trichlorotrifluoroethane	0.141U	0.141	50.0	51.9	104	72 - 136	49.0	98	6	30
563-58-6	1,1-Dichloropropene	0.071U	0.071	50.0	50.2	100	72 - 131	50.8	102	1	30
142-28-9	1,3-Dichloropropane	0.113U	0.113	50.0	50.4	101	74 - 122	53.5	107	6	30
108-86-1	Bromobenzene	0.095U	0.095	50.0	53.4	107	71 - 120	56.0	112	5	30
95-49-8	2-Chlorotoluene	0.090U	0.090	50.0	51.8	104	72 - 127	54.4	109	5	30
106-43-4	4-Chlorotoluene	0.046U	0.046	50.0	51.2	102	75 - 126	53.5	107	4	30
98-06-6	tert-Butylbenzene	0.058U	0.058	50.0	54.2	108	72 - 126	55.9	112	3	30
135-98-8	sec-Butylbenzene	0.088U	0.088	50.0	57.0	114	70 - 136	58.3	117	2	30
541-73-1	1,3-Dichlorobenzene	0.080U	0.080	50.0	51.8	104	74 - 126	55.3	111	7	30
106-46-7	1,4-Dichlorobenzene	0.058U	0.058	50.0	52.1	104	72 - 122	55.2	110	6	30
104-51-8	n-Butylbenzene	0.068U	0.068	50.0	56.2	112	69 - 134	58.9	118	5	30
95-50-1	1,2-Dichlorobenzene	0.086U	0.086	50.0	51.6	103	71 - 126	55.0	110	6	30
87-68-3	Hexachlorobutadiene	0.347U	0.347	50.0	48.4	97	61 - 144	55.9	112	14	30
91-20-3	Naphthalene	0.175U	0.175	50.0	43.7	87	57 - 138	52.6	105	18	30
75-35-4	1,1-Dichloroethene	0.183U	0.183	50.0	48.6	97	69 - 129	49.4	99	2	22

GC/MS Volatiles Quality Control Summary

Analytical Batch	487788	**Client ID**	MB487788		LCS487788			LCSD487788			
Prep Batch	N/A	**GCAL ID**	1096739		1096740			1096741			
		Sample Type	Method Blank		LCS			LCSD			
		Analytical Date	08/15/2012 12:15		08/15/2012 09:32			08/15/2012 10:12			
		Matrix	Water		Water			Water			
SW-846 8260B SPLP		**Units**	ug/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
71-43-2	Benzene	0.049U	0.049	50.0	50.6	101	70 - 129	52.2	104	3	21
79-01-6	Trichloroethene	0.094U	0.094	50.0	51.6	103	76 - 129	53.4	107	3	24
108-88-3	Toluene	0.078U	0.078	50.0	48.9	98	72 - 120	51.2	102	5	21
108-90-7	Chlorobenzene	0.055U	0.055	50.0	50.0	100	74 - 123	53.1	106	6	21
110-02-1	Thiophene	0.00									
Surrogate											
460-00-4	4-Bromofluorobenzene	49.4	99	50	49.1	98	78 - 130	50.1	100		
1868-53-7	Dibromofluoromethane	53.3	107	50	51.3	103	77 - 127	51.1	102		
2037-26-5	Toluene d8	51.6	103	50	49	98	76 - 134	49.2	98		
17060-07-0	1,2-Dichloroethane-d4	53.5	107	50	50.2	100	71 - 127	50.6	101		

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	487843	**Client ID**	MB487664			LCS487664			LCSD487664			
Prep Batch	487664	**GCAL ID**	1096307			1096308			1096309			
Prep Method	3550C	**Sample Type**	Method Blank			LCS			LCSD			
		Prep Date	08/14/2012 08:52			08/14/2012 08:52			08/14/2012 08:52			
		Analytical Date	08/15/2012 17:40			08/15/2012 17:57			08/15/2012 18:14			
		Matrix	Solid			Solid			Solid			
SW-846 8270C		**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
208-96-8	Acenaphthylene	10.1U	10.1								
120-12-7	Anthracene	8.24U	8.24								
56-55-3	Benzo(a)anthracene	29.2U	29.2								
205-99-2	Benzo(b)fluoranthene	50.7U	50.7								
207-08-9	Benzo(k)fluoranthene	7.63U	7.63								
191-24-2	Benzo(g,h,i)perylene	11.2U	11.2								
50-32-8	Benzo(a)pyrene	8.85U	8.85								
85-68-7	Butyl benzyl phthalate	8.87U	8.87								
111-91-1	Bis(2-Chloroethoxy)methane	18.7U	18.7								
111-44-4	Bis(2-Chloroethyl)ether	27.9U	27.9								
108-60-1	Bis(2-Chloroisopropyl)ether	26.0U	26.0								
117-81-7	Bis(2-Ethylhexyl)phthalate	16.5U	16.5								
101-55-3	4-Bromophenyl phenyl ether	24.8U	24.8								
86-74-8	Carbazole	22.8U	22.8								
7005-72-3	4-Chlorophenyl phenyl ether	26.7U	26.7								
218-01-9	Chrysene	9.21U	9.21								
53-70-3	Dibenz(a,h)anthracene	9.65U	9.65								
132-64-9	Dibenzofuran	5.13U	5.13								
91-94-1	3,3'-Dichlorobenzidine	112U	112								
120-83-2	2,4-Dichlorophenol	27.3U	27.3								
84-66-2	Diethyl phthalate	13.4U	13.4								
105-67-9	2,4-Dimethylphenol	152U	152								
131-11-3	Dimethyl phthalate	5.57U	5.57								
117-84-0	Di-n-octyl phthalate	10.9U	10.9								
51-28-5	2,4-Dinitrophenol	141U	141								
606-20-2	2,6-Dinitrotoluene	32.6U	32.6								
206-44-0	Fluoranthene	6.44U	6.44								
86-73-7	Fluorene	10.6U	10.6								
118-74-1	Hexachlorobenzene	41.2U	41.2								
87-68-3	Hexachlorobutadiene	19.7U	19.7								
77-47-4	Hexachlorocyclopentadiene	164U	164								
67-72-1	Hexachloroethane	12.0U	12.0								

GCAL Report 212081321

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	487843	**Client ID**	MB487664			LCS487664			LCSD487664			
Prep Batch	487664	**GCAL ID**	1096307			1096308			1096309			
Prep Method	3550C	**Sample Type**	Method Blank			LCS			LCSD			
		Prep Date	08/14/2012 08:52			08/14/2012 08:52			08/14/2012 08:52			
		Analytical Date	08/15/2012 17:40			08/15/2012 17:57			08/15/2012 18:14			
		Matrix	Solid			Solid			Solid			
SW-846 8270C		**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
78-59-1	Isophorone	14.1U	14.1								
193-39-5	Indeno(1,2,3-cd)pyrene	20.3U	20.3								
91-57-6	2-Methylnaphthalene	10.4U	10.4								
95-48-7	o-Cresol	11.9U	11.9								
98-95-3	Nitrobenzene	11.8U	11.8								
88-75-5	2-Nitrophenol	22.4U	22.4								
62-75-9	n-Nitrosodimethylamine	61.0U	61.0								
86-30-6	n-Nitrosodiphenylamine	7.61U	7.61								
85-01-8	Phenanthrene	8.75U	8.75								
95-95-4	2,4,5-Trichlorophenol	16.7U	16.7								
88-06-2	2,4,6-Trichlorophenol	134U	134								
100-51-6	Benzyl alcohol	36.6U	36.6								
62-53-3	Aniline	27.9U	27.9								
110-86-1	Pyridine	162U	162								
99-09-2	3-Nitroaniline	23.7U	23.7								
100-01-6	4-Nitroaniline	220U	220								
84-74-2	Di-n-butyl phthalate	10.5U	10.5								
122-66-7	1,2Diphenylhydrazine/Azobenzen	7.46U	7.46								
88-74-4	2-Nitroaniline	18.1U	18.1								
91-58-7	2-Chloronaphthalene	4.23U	4.23								
106-47-8	4-Chloroaniline	27.8U	27.8								
1319-77-3MP	m,p-Cresol	38.9U	38.9								
534-52-1	4,6-Dinitro-2-methylphenol	148U	148								
108-95-2	Phenol	33.3U	33.3	3330	2650	80	42 - 120	2760	83	4	40
95-57-8	2-Chlorophenol	13.5U	13.5	3330	2690	81	48 - 120	2870	86	6	40
106-46-7	1,4-Dichlorobenzene	6.23U	6.23	3330	2480	74	42 - 120	2610	78	5	40
621-64-7	n-Nitrosodi-n-propylamine	12.2U	12.2	3330	2660	80	46 - 120	2850	86	7	40
120-82-1	1,2,4-Trichlorobenzene	12.4U	12.4	3330	2560	77	46 - 120	2650	80	3	40
59-50-7	4-Chloro-3-methylphenol	35.2U	35.2	3330	2930	88	46 - 120	3020	91	3	40
83-32-9	Acenaphthene	8.66U	8.66	3330	2760	83	50 - 120	2880	86	4	40
100-02-7	4-Nitrophenol	213U	213	3330	2700	81	32 - 120	2750	83	2	40
121-14-2	2,4-Dinitrotoluene	37.8U	37.8	3330	2860	86	45 - 120	2970	89	4	40

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	487843	**Client ID**	MB487664	LCS487664	LCSD487664
Prep Batch	487664	**GCAL ID**	1096307	1096308	1096309
Prep Method	3550C	**Sample Type**	Method Blank	LCS	LCSD
		Prep Date	08/14/2012 08:52	08/14/2012 08:52	08/14/2012 08:52
		Analytical Date	08/15/2012 17:40	08/15/2012 17:57	08/15/2012 18:14
		Matrix	Solid	Solid	Solid

SW-846 8270C		**Units**	ug/Kg	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
87-86-5	Pentachlorophenol	186U	186	3330	2630	79	30 - 124	2720	82	3	40
129-00-0	Pyrene	7.59U	7.59	3330	2660	80	38 - 136	2880	86	8	40
Surrogate											
4165-60-0	Nitrobenzene-d5	1570	94	1670	1540	92	46 - 123	1530	92		
321-60-8	2-Fluorobiphenyl	1560	94	1670	1480	89	47 - 127	1570	94		
1718-51-0	Terphenyl-d14	1550	93	1670	1360	82	38 - 167	1450	87		
4165-62-2	Phenol-d5	2740	82	3330	2710	81	43 - 123	2830	85		
367-12-4	2-Fluorophenol	2760	83	3330	2690	81	51 - 119	2850	86		
118-79-6	2,4,6-Tribromophenol	2670	80	3330	2690	81	44 - 121	2770	83		

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	487968	**Client ID**	MB487810	LCS487810	LCSD487810
Prep Batch	487810	**GCAL ID**	1096879	1096880	1096881
Prep Method	SW-846	**Sample Type**	Method Blank	LCS	LCSD
	3510C	**Prep Date**	08/16/2012 13:00	08/16/2012 13:00	08/16/2012 13:00
		Analytical Date	08/17/2012 09:14	08/17/2012 09:29	08/17/2012 09:44
		Matrix	Water	Water	Water

SW-846 8270C TCLP		**Units**	mg/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
118-74-1	Hexachlorobenzene	0.0012U	0.0012	0.100	0.089	89	61 - 120	0.085	85	4	30
87-68-3	Hexachlorobutadiene	0.0010U	0.0010	0.100	0.091	91	17 - 120	0.086	86	6	30
67-72-1	Hexachloroethane	0.0015U	0.0015	0.100	0.089	89	21 - 120	0.086	86	4	30
95-48-7	o-Cresol	0.0016U	0.0016	0.100	0.082	82	31 - 125	0.081	81	0.7	30
98-95-3	Nitrobenzene	0.0016U	0.0016	0.100	0.091	91	53 - 120	0.087	87	5	30
95-95-4	2,4,5-Trichlorophenol	0.0016U	0.0016	0.100	0.101	101	60 - 120	0.096	96	5	30
88-06-2	2,4,6-Trichlorophenol	0.0014U	0.0014	0.100	0.090	90	59 - 120	0.086	86	5	30
110-86-1	Pyridine	0.0179U	0.0179	0.100	0.052	52	10 - 120	0.054	54	3	30
1319-77-3	Cresols	0.0034U	0.0034	0.200	0.154	77	24 - 125	0.156	78	1	30
1319-77-3MP	m,p-Cresol	0.0018U	0.0018	0.100	0.074	74	24 - 125	0.076	76	3	30
106-46-7	1,4-Dichlorobenzene	0.0013U	0.0013	0.100	0.088	88	22 - 120	0.084	84	5	30
121-14-2	2,4-Dinitrotoluene	0.0013U	0.0013	0.100	0.102	102	37 - 138	0.098	98	4	30
87-86-5	Pentachlorophenol	0.0008U	0.0008	0.100	0.104	104	20 - 120	0.097	97	7	30
Surrogate											
4165-60-0	Nitrobenzene-d5	43.7	87	50	46.7	93	48 - 123	45.1	90		
321-60-8	2-Fluorobiphenyl	43.4	87	50	46.7	93	16 - 128	44.5	89		
1718-51-0	Terphenyl-d14	50.2	100	50	47.6	95	38 - 167	47	94		
4165-62-2	Phenol-d5	36.1	36	100	37.8	38	10 - 123	38.3	38		
367-12-4	2-Fluorophenol	53.2	53	100	55.9	56	10 - 120	56.7	57		
118-79-6	2,4,6-Tribromophenol	81.3	81	100	94.6	95	44 - 121	88.9	89		

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	487968	**Client ID**	MB487810	LCS487810	LCSD487810
Prep Batch	487810	**GCAL ID**	1096879	1096880	1096881
Prep Method	SW-846	**Sample Type**	Method Blank	LCS	LCSD
	3510C	**Prep Date**	08/16/2012 13:00	08/16/2012 13:00	08/16/2012 13:00
		Analytical Date	08/17/2012 09:14	08/17/2012 09:29	08/17/2012 09:44
		Matrix	Water	Water	Water

SW-846 8270C TCLP		**Units**	ug/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
208-96-8	Acenaphthylene	0.303U	0.303	100	98.7	99	57 - 123	93.9	94	5	50
120-12-7	Anthracene	0.316U	0.316	100	101	101	59 - 120	96.6	97	4	50
56-55-3	Benzo(a)anthracene	0.316U	0.316	100	99.5	100	57 - 121	94.5	95	5	50
205-99-2	Benzo(b)fluoranthene	0.217U	0.217	100	84.9	85	41 - 127	82.6	83	3	50
207-08-9	Benzo(k)fluoranthene	0.236U	0.236	100	115	115	37 - 136	105	105	9	50
191-24-2	Benzo(g,h,i)perylene	0.215U	0.215	100	89.6	90	32 - 141	85.3	85	5	50
50-32-8	Benzo(a)pyrene	0.125U	0.125	100	97.9	98	47 - 124	94.4	94	4	50
85-68-7	Butyl benzyl phthalate	0.165U	0.165	100	104	104	58 - 126	99.3	99	5	50
111-91-1	Bis(2-Chloroethoxy)methane	0.290U	0.290	100	93.3	93	60 - 120	90.2	90	3	50
111-44-4	Bis(2-Chloroethyl)ether	0.288U	0.288	100	88.1	88	54 - 120	88.8	89	0.8	50
108-60-1	Bis(2-Chloroisopropyl)ether	0.257U	0.257	100	88.5	89	51 - 120	89.7	90	1	50
117-81-7	Bis(2-Ethylhexyl)phthalate	0.191U	0.191	100	109	109	55 - 130	104	104	5	50
101-55-3	4-Bromophenyl phenyl ether	0.337U	0.337	100	94.5	95	60 - 120	90.3	90	5	50
86-74-8	Carbazole	0.232U	0.232	100	96.1	96	59 - 120	92.4	92	4	50
7005-72-3	4-Chlorophenyl phenyl ether	0.268U	0.268	99	95.9	97	59 - 120	94.1	95	2	50
218-01-9	Chrysene	0.433U	0.433	100	97.7	98	60 - 120	91.3	91	7	50
53-70-3	Dibenz(a,h)anthracene	0.217U	0.217	100	96.6	97	31 - 143	91.3	91	6	50
132-64-9	Dibenzofuran	0.227U	0.227	100	93.5	94	60 - 120	87.5	88	7	50
91-94-1	3,3'-Dichlorobenzidine	0.297U	0.297	100	90.6	91	54 - 135	86.6	87	5	50
120-83-2	2,4-Dichlorophenol	0.217U	0.217	100	95.1	95	61 - 120	91.3	91	4	50
84-66-2	Diethyl phthalate	0.303U	0.303	100	101	101	52 - 128	97.8	98	3	50
105-67-9	2,4-Dimethylphenol	0.694U	0.694	100	92.7	93	43 - 120	88.8	89	4	50
131-11-3	Dimethyl phthalate	0.255U	0.255	100	97.5	98	62 - 120	93.4	93	4	50
117-84-0	Di-n-octyl phthalate	0.167U	0.167	100	105	105	47 - 133	99.6	100	5	50
51-28-5	2,4-Dinitrophenol	2.60U	2.60	100	90.0	90	25 - 136	89.0	89	1	50
606-20-2	2,6-Dinitrotoluene	0.352U	0.352	100	103	103	58 - 120	96.6	97	6	50
206-44-0	Fluoranthene	0.267U	0.267	100	102	102	60 - 120	98.6	99	3	50
86-73-7	Fluorene	0.288U	0.288	100	98.2	98	58 - 120	93.8	94	5	50
118-74-1	Hexachlorobenzene	0.249U	0.249	100	88.7	89	54 - 120	85.0	85	4	50
87-68-3	Hexachlorobutadiene	0.192U	0.192	100	90.9	91	47 - 120	86.1	86	5	50
77-47-4	Hexachlorocyclopentadiene	0.174U	0.174	100	85.0	85	28 - 120	79.9	80	6	50
67-72-1	Hexachloroethane	0.299U	0.299	100	89.2	89	40 - 120	85.7	86	4	50

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	487968	**Client ID**	MB487810	LCS487810	LCSD487810
Prep Batch	487810	**GCAL ID**	1096879	1096880	1096881
Prep Method	SW-846	**Sample Type**	Method Blank	LCS	LCSD
	3510C	**Prep Date**	08/16/2012 13:00	08/16/2012 13:00	08/16/2012 13:00
		Analytical Date	08/17/2012 09:14	08/17/2012 09:29	08/17/2012 09:44
		Matrix	Water	Water	Water

SW-846 8270C TCLP		**Units**	ug/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
78-59-1	Isophorone	0.380U	0.380	100	98.5	99	56 - 120	95.5	96	3	50
193-39-5	Indeno(1,2,3-cd)pyrene	0.157U	0.157	100	95.8	96	40 - 154	92.8	93	3	50
91-57-6	2-Methylnaphthalene	0.255U	0.255	100	91.6	92	45 - 121	87.2	87	5	50
95-48-7	o-Cresol	0.329U	0.329	100	81.6	82	40 - 120	80.9	81	0.9	50
98-95-3	Nitrobenzene	0.329U	0.329	100	91.4	91	49 - 120	87.0	87	5	50
88-75-5	2-Nitrophenol	0.357U	0.357	100	99.1	99	60 - 120	94.9	95	4	50
62-75-9	n-Nitrosodimethylamine	0.304U	0.304	100	61.7	62	21 - 120	66.1	66	7	50
86-30-6	n-Nitrosodiphenylamine	0.364U	0.364	100	95.2	95	63 - 122	91.4	91	4	50
85-01-8	Phenanthrene	0.304U	0.304	100	93.7	94	65 - 120	89.9	90	4	50
95-95-4	2,4,5-Trichlorophenol	0.317U	0.317	100	101	101	58 - 120	95.6	96	5	50
88-06-2	2,4,6-Trichlorophenol	0.275U	0.275	100	90.4	90	57 - 120	85.8	86	5	50
100-51-6	Benzyl alcohol	0.355U	0.355	100	70.6	71	44 - 120	71.5	72	1	50
62-53-3	Aniline	0.718U	0.718	100	96.2	96	19 - 124	96.5	97	0.3	50
110-86-1	Pyridine	3.58U	3.58	100	52.3	52	2 - 120	54.4	54	4	50
99-09-2	3-Nitroaniline	0.226U	0.226	100	87.4	87	57 - 126	89.1	89	2	50
100-01-6	4-Nitroaniline	0.221U	0.221	101	99.5	99	45 - 138	93.6	93	6	50
84-74-2	Di-n-butyl phthalate	0.189U	0.189	100	109	109	58 - 130	105	105	4	50
122-66-7	1,2Diphenylhydrazine/Azobenzen	0.278U	0.278	100	94.7	95	57 - 120	91.7	92	3	50
88-74-4	2-Nitroaniline	0.198U	0.198	100	96.0	96	58 - 121	92.8	93	3	50
91-58-7	2-Chloronaphthalene	0.221U	0.221	100	90.7	91	56 - 120	85.5	86	6	50
106-47-8	4-Chloroaniline	0.463U	0.463	100	93.2	93	50 - 134	91.8	92	2	50
1319-77-3MP	m,p-Cresol	0.352U	0.352	100	73.7	74	35 - 120	76.4	76	4	50
534-52-1	4,6-Dinitro-2-methylphenol	1.98U	1.98	100	94.3	94	52 - 120	89.4	89	5	50
108-95-2	Phenol	0.150U	0.150	100	42.8	43	16 - 120	42.0	42	2	25
95-57-8	2-Chlorophenol	0.276U	0.276	100	88.9	89	48 - 120	86.7	87	3	24
106-46-7	1,4-Dichlorobenzene	0.255U	0.255	100	88.4	88	44 - 120	83.6	84	6	30
621-64-7	n-Nitrosodi-n-propylamine	0.304U	0.304	100	94.0	94	55 - 120	94.2	94	0.2	32
120-82-1	1,2,4-Trichlorobenzene	0.234U	0.234	100	92.3	92	49 - 120	86.9	87	6	31
59-50-7	4-Chloro-3-methylphenol	0.234U	0.234	100	99.0	99	50 - 120	96.4	96	3	26
83-32-9	Acenaphthene	0.268U	0.268	100	93.7	94	56 - 120	90.2	90	4	32
100-02-7	4-Nitrophenol	1.83U	1.83	100	38.9	39	3 - 120	37.5	38	4	31
121-14-2	2,4-Dinitrotoluene	0.263U	0.263	100	102	102	57 - 127	97.6	98	4	33

GC/MS Semi-Volatiles Quality Control Summary

Analytical Batch	487968	**Client ID**	MB487810	LCS487810	LCSD487810
Prep Batch	487810	**GCAL ID**	1096879	1096880	1096881
Prep Method	SW-846	**Sample Type**	Method Blank	LCS	LCSD
	3510C	**Prep Date**	08/16/2012 13:00	08/16/2012 13:00	08/16/2012 13:00
		Analytical Date	08/17/2012 09:14	08/17/2012 09:29	08/17/2012 09:44
		Matrix	Water	Water	Water

SW-846 8270C TCLP		**Units**	ug/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
87-86-5	Pentachlorophenol	0.168U	0.168	100	104	104	50 - 120	97.4	97	7	32
129-00-0	Pyrene	0.486U	0.486	100	97.5	98	50 - 120	93.6	94	4	30
Surrogate											
4165-60-0	Nitrobenzene-d5	43.7	87	50	46.7	93	52 - 120	45.1	90		
321-60-8	2-Fluorobiphenyl	43.4	87	50	46.7	93	16 - 128	44.5	89		
1718-51-0	Terphenyl-d14	50.2	100	50	47.6	95	43 - 138	47	94		
4165-62-2	Phenol-d5	36.1	36	100	37.8	38	10 - 120	38.3	38		
367-12-4	2-Fluorophenol	53.2	53	100	55.9	56	10 - 120	56.7	57		
118-79-6	2,4,6-Tribromophenol	81.3	81	100	94.6	95	52 - 121	88.9	89		

Inorganics Quality Control Summary

Analytical Batch	487729	**Client ID**	MB487647			LCS487647		
Prep Batch	487647	**GCAL ID**	1096209			1096210		
Prep Method	SW-846 7471B	**Sample Type**	Method Blank			LCS		
		Prep Date	08/13/2012 16:30			08/13/2012 16:30		
		Analytical Date	08/14/2012 15:15			08/14/2012 15:16		
		Matrix	Solid			Solid		
SW-846 7471B		**Units**	mg/kg	**Spike**	**Result**		**Control**	
		Result	**RDL**	**Added**		**% R**	**Limits % R**	
7439-97-6	Mercury	0.0046U	0.0046	0.25	0.24	97	80 - 120	

Analytical Batch	487729	**Client ID**	DIRT/ROCK			1096191MS		
Prep Batch	487647	**GCAL ID**	21208132802			1096245		
Prep Method	SW-846 7471B	**Sample Type**	SAMPLE			MS		
		Prep Date	08/13/2012 16:30			08/13/2012 16:30		
		Analytical Date	08/14/2012 15:18			08/14/2012 15:21		
		Matrix	Solid			Solid		
SW-846 7471B		**Units**	mg/kg	**Spike**	**Result**		**Control**	
		Result	**RDL**	**Added**		**% R**	**Limits % R**	
7439-97-6	Mercury	14.2	0.46	0.25	12.4	**-700***	75 - 125	

Analytical Batch	487729	**Client ID**	DIRT/ROCK		1096191DUP		
Prep Batch	487647	**GCAL ID**	21208132802		1096244		
Prep Method	SW-846 7471B	**Sample Type**	SAMPLE		DUP		
		Prep Date	08/13/2012 16:30		08/13/2012 16:30		
		Analytical Date	08/14/2012 15:18		08/14/2012 15:19		
		Matrix	Solid		Solid		
SW-846 7471B		**Units**	mg/kg	**Result**		**RPD**	
		Result	**RDL**		**RPD**	**Limit**	
7439-97-6	Mercury	14.2	0.46	14.8	4	20	

Inorganics Quality Control Summary

Analytical Batch	487796	**Client ID**	MB487645	LCS487645
Prep Batch	487645	**GCAL ID**	1096201	1096202
Prep Method	SW-846	**Sample Type**	Method Blank	LCS
	3050B	**Prep Date**	08/14/2012 07:00	08/14/2012 07:00
		Analytical Date	08/15/2012 15:34	08/15/2012 15:57
		Matrix	Solid	Solid

SW-846 6010B		**Units**	mg/kg	**Spike**	**Result**		**Control**
		Result	**RDL**	**Added**		**% R**	**Limits % R**
7429-90-5	Aluminum	1.93J	0.79	200	207	103	80 - 120
7440-36-0	Antimony	0.097U	0.097	20.0	21.2	106	80 - 120
7440-38-2	Arsenic	0.14U	0.14	20.0	20.7	104	80 - 120
7440-39-3	Barium	0.024U	0.024	20.0	21.2	106	80 - 120
7440-41-7	Beryllium	0.0020U	0.0020	20.0	20.6	103	80 - 120
7440-43-9	Cadmium	0.0090U	0.0090	20.0	22.0	110	80 - 120
7440-70-2	Calcium	29.7J	4.37	200	226	113	80 - 120
7440-47-3	Chromium	0.018U	0.018	20.0	21.2	106	80 - 120
7440-48-4	Cobalt	0.010U	0.010	20.0	22.2	111	80 - 120
7440-50-8	Copper	0.031U	0.031	20.0	20.8	104	80 - 120
7439-89-6	Iron	0.70U	0.70	200	212	106	80 - 120
7439-92-1	Lead	0.11U	0.11	20.0	22.3	112	80 - 120
7439-95-4	Magnesium	1.11J	0.43	200	217	109	80 - 120
7439-96-5	Manganese	0.014U	0.014	20.0	21.0	105	80 - 120
7440-02-0	Nickel	0.021U	0.021	20.0	21.9	109	80 - 120
7440-09-7	Potassium	2.11U	2.11	400	408	102	80 - 120
7782-49-2	Selenium	0.13U	0.13	20.0	22.2	111	80 - 120
7440-22-4	Silver	0.022U	0.022	20.0	20.1	101	80 - 120
7440-23-5	Sodium	10.6J	3.03	800	858	107	80 - 120
7440-28-0	Thallium	0.088U	0.088	20.0	21.9	110	80 - 120
7440-62-2	Vanadium	0.050J	0.015	20.0	21.0	105	80 - 120
7440-66-6	Zinc	0.87J	0.43	20.0	22.3	111	80 - 120

Inorganics Quality Control Summary

Analytical Batch	487877	**Client ID**	MB487805	LCS487805	
Prep Batch	487805	**GCAL ID**	1096832	1096833	
Prep Method	SW-846	**Sample Type**	Method Blank	LCS	
	3010A	**Prep Date**	08/15/2012 12:40	08/15/2012 12:40	
		Analytical Date	08/16/2012 09:14	08/16/2012 09:21	
		Matrix	Water	Water	

SW-846 6010B TCLP		**Units**	mg/L	**Spike**	**Result**		**Control**
		Result	**RDL**	**Added**		**% R**	**Limits % R**
7440-38-2	Arsenic	0.0035U	0.0035	1.00	0.99	99	80 - 120
7440-39-3	Barium	0.0016U	0.0016	6.00	6.51	108	80 - 120
7440-43-9	Cadmium	0.00010U	0.00010	1.00	1.09	109	80 - 120
7440-47-3	Chromium	0.00034U	0.00034	1.00	1.00	100	80 - 120
7439-92-1	Lead	0.0028U	0.0028	1.00	1.07	107	80 - 120
7782-49-2	Selenium	0.012J	0.0038	1.00	1.21	**121***	80 - 120
7440-22-4	Silver	0.00064U	0.00064	1.00	1.03	103	80 - 120

Analytical Batch	487877	**Client ID**	VR90 TREATED (TCLP)	1096108MS	1096108MSD	
Prep Batch	487805	**GCAL ID**	21208132101	1096834	1096835	
Prep Method	SW-846	**Sample Type**	SAMPLE	MS	MSD	
	3010A	**Prep Date**	08/15/2012 12:40	08/15/2012 12:40	08/15/2012 12:40	
		Analytical Date	08/16/2012 09:27	08/16/2012 09:34	08/16/2012 09:41	
		Matrix	Solid	Solid	Solid	

SW-846 6010B TCLP		**Units**	mg/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
7440-38-2	Arsenic	0.0	0.017	1.00	0.86	86	75 - 125	0.96	96	11	20
7440-39-3	Barium	0.13	0.0079	6.00	5.99	98	75 - 125	6.70	110	11	20
7440-43-9	Cadmium	0.0	0.00052	1.00	0.99	99	75 - 125	1.11	111	11	20
7440-47-3	Chromium	0.068	0.0017	1.00	0.98	91	75 - 125	1.10	103	12	20
7439-92-1	Lead	0.028	0.014	1.00	1.01	98	75 - 125	1.10	107	9	20
7782-49-2	Selenium	0.0058	0.019	1.00	1.03	103	75 - 125	1.13	113	9	20
7440-22-4	Silver	0.0033	0.0032	1.00	0.91	90	75 - 125	1.02	102	11	20

Inorganics Quality Control Summary

Analytical Batch	487888	**Client ID**	MB487807			LCS487807		
Prep Batch	487807	**GCAL ID**	1096841			1096842		
Prep Method	SW-846 7470A	**Sample Type**	Method Blank			LCS		
		Prep Date	08/15/2012 12:40			08/15/2012 12:40		
		Analytical Date	08/16/2012 11:47			08/16/2012 11:49		
		Matrix	Water			Water		
SW-846 7470A TCLP		**Units**	mg/L	**Spike**	**Result**		**Control**	
		Result	**RDL**	**Added**		**% R**	**Limits % R**	
7439-97-6	Mercury	0.000075U	0.000075	0.00500	0.00511	102	80 - 120	

Analytical Batch	487888	**Client ID**	106208IDW1			1096428MS			1096428MSD			
Prep Batch	487807	**GCAL ID**	21208140201			1096843			1096844			
Prep Method	SW-846 7470A	**Sample Type**	SAMPLE			MS			MSD			
		Prep Date	08/15/2012 12:40			08/15/2012 12:40			08/15/2012 12:40			
		Analytical Date	08/16/2012 11:50			08/16/2012 11:52			08/16/2012 11:53			
		Matrix	Solid			Solid			Solid			
SW-846 7470A TCLP		**Units**	mg/L	**Spike**	**Result**		**Control**	**Result**			**RPD**	
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**	
7439-97-6	Mercury	0.00011	0.000075	0.00500	0.00488	95	75 - 125	0.00477	93	2	20	

Inorganics Quality Control Summary

Analytical Batch	487998	**Client ID**	MB487804	LCS487804
Prep Batch	487804	**GCAL ID**	1096823	1096824
Prep Method	SW-846	**Sample Type**	Method Blank	LCS
	3010A	**Prep Date**	08/15/2012 12:40	08/15/2012 12:40
		Analytical Date	08/17/2012 17:55	08/17/2012 18:03
		Matrix	Water	Water

SW-846 6010B SPLP		**Units**	mg/L	**Spike**	**Result**		**Control**
		Result	**RDL**	**Added**		**% R**	**Limits % R**
7429-90-5	Aluminum	0.024U	0.024	5.00	5.07	101	80 - 120
7440-36-0	Antimony	0.0040U	0.0040	0.50	0.49	98	80 - 120
7440-38-2	Arsenic	0.0035U	0.0035	0.50	0.56	112	80 - 120
7440-39-3	Barium	0.0017J	0.0016	0.50	0.51	102	80 - 120
7440-41-7	Beryllium	0.000082U	0.000082	0.50	0.50	99	80 - 120
7440-43-9	Cadmium	0.00010U	0.00010	0.50	0.50	99	80 - 120
7440-70-2	Calcium	0.14	0.024	5.00	5.15	103	80 - 120
7440-47-3	Chromium	0.00034U	0.00034	0.50	0.51	103	80 - 120
7440-48-4	Cobalt	0.00052U	0.00052	0.50	0.50	100	80 - 120
7440-50-8	Copper	0.0022J	0.0017	0.50	0.53	106	80 - 120
7439-89-6	Iron	0.027U	0.027	5.00	5.04	101	80 - 120
7439-92-1	Lead	0.0028U	0.0028	0.50	0.50	100	80 - 120
7439-95-4	Magnesium	0.028J	0.012	5.00	4.96	99	80 - 120
7439-96-5	Manganese	0.00083U	0.00083	0.50	0.53	107	80 - 120
7440-02-0	Nickel	0.00098J	0.00084	0.50	0.50	101	80 - 120
7440-09-7	Potassium	0.045J	0.041	10.0	9.88	99	80 - 120
7782-49-2	Selenium	0.0038U	0.0038	0.50	0.50	100	80 - 120
7440-22-4	Silver	0.00064U	0.00064	0.50	0.52	104	80 - 120
7440-23-5	Sodium	0.056U	0.056	20.0	21.0	105	80 - 120
7440-28-0	Thallium	0.0026U	0.0026	0.50	0.49	98	80 - 120
7440-62-2	Vanadium	0.0012U	0.0012	0.50	0.51	103	80 - 120
7440-66-6	Zinc	0.0059U	0.0059	0.50	0.50	101	80 - 120

Inorganics Quality Control Summary

Analytical Batch	487998	**Client ID**	VR90 TREATED (SPLP)	1096109MS	1096109MSD
Prep Batch	487804	**GCAL ID**	21208132102	1096829	1096830
Prep Method	SW-846	**Sample Type**	SAMPLE	MS	MSD
	3010A	**Prep Date**	08/15/2012 12:40	08/15/2012 12:40	08/15/2012 12:40
		Analytical Date	08/17/2012 18:09	08/17/2012 18:17	08/17/2012 18:24
		Matrix	Solid	Solid	Solid

SW-846 6010B SPLP		**Units**	mg/L	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
7429-90-5	Aluminum	1.87	0.024	5.00	6.41	91	75 - 125	6.97	102	8	20
7440-36-0	Antimony	0.0	0.0040	0.50	0.44	89	75 - 125	0.48	97	9	20
7440-38-2	Arsenic	0.0	0.0035	0.50	0.51	102	75 - 125	0.56	111	9	20
7440-39-3	Barium	0.0047	0.0016	0.50	0.46	92	75 - 125	0.50	100	8	20
7440-41-7	Beryllium	0.0	0.000082	0.50	0.46	92	75 - 125	0.50	100	8	20
7440-43-9	Cadmium	0.0	0.00010	0.50	0.44	89	75 - 125	0.48	96	9	20
7440-70-2	Calcium	0.84	0.024	5.00	5.39	91	75 - 125	5.85	100	8	20
7440-47-3	Chromium	0.031	0.00034	0.50	0.49	92	75 - 125	0.53	100	8	20
7440-48-4	Cobalt	0.0022	0.00052	0.50	0.47	93	75 - 125	0.52	103	10	20
7440-50-8	Copper	0.0028	0.0017	0.50	0.47	93	75 - 125	0.51	102	8	20
7439-89-6	Iron	43.0	0.027	5.00	45.7	**56***	75 - 125	49.5	**131***	8	20
7439-92-1	Lead	0.0059	0.0028	0.50	0.46	91	75 - 125	0.50	100	8	20
7439-95-4	Magnesium	0.28	0.012	5.00	4.78	90	75 - 125	5.17	98	8	20
7439-96-5	Manganese	1.23	0.00083	0.50	1.68	89	75 - 125	1.82	117	8	20
7440-02-0	Nickel	0.019	0.00084	0.50	0.48	93	75 - 125	0.52	101	8	20
7440-09-7	Potassium	0.11	0.041	10.0	9.53	94	75 - 125	10.3	102	8	20
7782-49-2	Selenium	0.0	0.0038	0.50	0.46	91	75 - 125	0.50	100	8	20
7440-22-4	Silver	0.0	0.00064	0.50	0.47	94	75 - 125	0.51	102	8	20
7440-23-5	Sodium	16.3	0.056	20.0	35.9	98	75 - 125	39.2	115	9	20
7440-28-0	Thallium	0.0	0.0026	0.50	0.44	89	75 - 125	0.49	97	11	20
7440-62-2	Vanadium	0.0	0.0012	0.50	0.46	91	75 - 125	0.49	98	6	20
7440-66-6	Zinc	0.033	0.0059	0.50	0.48	90	75 - 125	0.52	98	8	20

Inorganics Quality Control Summary

Analytical Batch	487828	**Client ID**	MB487806			LCS487806		
Prep Batch	487806	**GCAL ID**	1096836			1096837		
Prep Method	SW-846 7470A	**Sample Type**	Method Blank			LCS		
		Prep Date	08/15/2012 12:40			08/15/2012 12:40		
		Analytical Date	08/15/2012 17:38			08/15/2012 17:39		
		Matrix	Water			Water		
SW-846 1312/7471A SPLP		**Units**	mg/L	**Spike**	**Result**		**Control**	
		Result	**RDL**	**Added**		**% R**	**Limits % R**	
7439-97-6	Mercury	0.000075U	0.000075	0.00500	0.00505	101	80 - 120	

Analytical Batch	487828	**Client ID**	VR90 TREATED (SPLP)			1096109MS			1096109MSD			
Prep Batch	487806	**GCAL ID**	21208132102			1096838			1096839			
Prep Method	SW-846 7470A	**Sample Type**	SAMPLE			MS			MSD			
		Prep Date	08/15/2012 12:40			08/15/2012 12:40			08/15/2012 12:40			
		Analytical Date	08/15/2012 17:41			08/15/2012 17:43			08/15/2012 17:44			
		Matrix	Solid			Solid			Solid			
SW-846 1312/7471A SPLP		**Units**	mg/L	**Spike**	**Result**		**Control**	**Result**			**RPD**	
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**	
7439-97-6	Mercury	0.00000	0.000075	0.00500	0.00508	102	75 - 125	0.00537	107	6	20	

General Chemistry Quality Control Summary

Analytical Batch	487695	**Client ID**	PROFILE		1096049DUP		
Prep Batch	N/A	**GCAL ID**	21208131301		1096418		
		Sample Type	SAMPLE		DUP		
		Analytical Date	08/16/2012 09:00		08/16/2012 09:00		
		Matrix	Solid		Solid		
SW-846 9045C pH			**Units**	pH unit	**Result**		**RPD**
			Result	**RDL**		**RPD**	**Limit**
pH	pH		6.13	1.00	6.14	0.2	1

Analytical Batch	488634	**Client ID**	HC90A TREATED		1096115DUP		
Prep Batch	N/A	**GCAL ID**	21208132108		1100628		
		Sample Type	SAMPLE		DUP		
		Analytical Date	08/27/2012 15:30		08/27/2012 15:30		
		Matrix	Solid		Solid		
SW-846 9045C pH			**Units**	pH unit	**Result**		**RPD**
			Result	**RDL**		**RPD**	**Limit**
pH	pH		1.58	1.00	1.60	1	1

General Chemistry Quality Control Summary

Analytical Batch 487971	**Client ID**	MB487971			LCS487971			LCSD487971			
Prep Batch N/A	**GCAL ID**	1097474			1097475			1097476			
	Sample Type	Method Blank			LCS			LCSD			
	Analytical Date	08/20/2012 08:31			08/20/2012 08:40			08/20/2012 08:49			
	Matrix	Solid			Solid			Solid			
SW-846 9060M		**Units**	mg/kg	**Spike**	**Result**		**Control**	**Result**			**RPD**
		Result	**RDL**	**Added**		**% R**	**Limits % R**		**% R**	**RPD**	**Limit**
C-012 Total Organic Carbon		97.0U	97.0	10000	10200	102	69 - 128	10500	105	3	25

Analytical Batch 487971	**Client ID**	02247-MW5		1094866DUP		
Prep Batch N/A	**GCAL ID**	21208091301		1097479		
	Sample Type	SAMPLE		DUP		
	Analytical Date	08/20/2012 08:51		08/20/2012 09:12		
	Matrix	Solid		Solid		
SW-846 9060M		**Units**	mg/kg	**Result**		**RPD**
		Result	**RDL**		**RPD**	**Limit**
C-012 Total Organic Carbon		0.000	97.0	0.000	0	25

GCAL

GULF COAST ANALYTICAL LABORATORIES, INC

7979 GSRI AVE, BATON ROUGE LA 70820-7402
(225) 769-4900 FAX (225) 767-5717

Chain of Custody Record

Lab use only			
Kemron	4794	212081321	8/21/12
Client Name	Client #	Group#	Due Date

Report to:
Client: Kemron Environmental
Address: 1359A Ellsworth Ind Blvd
Atlanta GA, 30318
Contact: Tommy Jordan
Phone: 404-636-0928
Fax: 404-636-7162

Bill to:
Client: Same
Address:
Contact:
Phone:
Fax:

P.O. Number:

Project Name/Number: Bridgewater NJ / SH-0417-007

Sampled By: Tommy Jordan

Analytical Requests & Methods

3.8

Matrix	Date	Time (2400)	Comp	Grab	Sample Description	Preservatives	No. Containers	Total VOC + Tics + thiophenes + napthalene	Total SVOC + TICs	Total TAL Metals	TCLP VOCs + ~~Tics~~ + thiophenes + napthalene	TCLP SVOCs + ~~Tics~~	TCLP ~~TAL~~ Metals	SPLP VOCs + ~~Tics~~ + thiophenes + napthalene	SPLP SVOCs + ~~TICs~~	SPLP TAL Metals	Total Organic Carbon	Soil pH	Remarks:	Lab ID
SD	8/10/12	1600		✓	VR90 treated	NA	3				X	X	X	X	X	X	X			1,2
SD	8/10/12	1555		✓	HC90 treated	NA	3				X	X	X	X	X	X	X			3,4
SD	8/10/12	1600		✓	VR 90 A treated	NA	1	X	X	X								X		5
SD	8/10/12	1600		✓	VR 90 B treated	NA	1	X	X	X								X		6
SD	8/10/12	1600		✓	VR 90 C treated	NA	1	X	X	X								X		7
SD	8/10/12	1555		✓	HC 90A treated	NA	1	X	X	X								X		8
SD	8/10/12	1555		✓	HC90B treated	NA	1	X	X	X								X		9
SD	8/10/12	1555		✓	HC 90 C treated	NA	1	X	X	X								X		10

Turn Around Time: 24 - 48 hrs 3 days 1 week X standard other

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
[signature]		8/10/12	1612
FedEx	[signature]	8/11/12	1000
7987 2282 8809			

Note: * VOC Analysis include thiophen + napthalene use a 1pt calibration for thiophen + napthalene per dry weights. Will likely require more than 2 day

By submitting these samples, you agree to the terms and conditions contained in our most recent schedule of services.

Matrix: W = water, S=Soil, SD=Solid, L=Liquid, SL=Sludge, O=Oil, CT=Charcoal Tube, OVM=Organic Vapor Monitor, XT=XAD Tube, A=Air Bag, SUM=Summa Canister

GCAL
GULF COAST ANALYTICAL LABORATORIES, INC

SAMPLE RECEIVING CHECKLIST

SAMPLE DELIVERY GROUP	212081321
Client 4794 - KEMRON	**Transport Method** FEDEX
Profile 232522 - Bridgewater Acid Tar	**Received By** Saucier, Charlotte
Line Item(s) 1 - Sludge	**Receive Date(s)** 08/11/12

CHECKLIST			
Were all samples received using proper thermal preservation?	☑ Yes	☐ No	☐ NA
When used, were all custody seals intact?	☑ Yes	☐ No	☐ NA
Were all samples received in proper containers?	☑ Yes	☐ No	☐ NA
Were all samples received using proper chemical preservation?	☑ Yes	☐ No	☐ NA
Was preservative added to any container at the lab?	☐ Yes	☑ No	☐ NA
Were all containers received in good condition?	☑ Yes	☐ No	☐ NA
Were all VOA vials received with no head space?	☐ Yes	☐ No	☑ NA
Do all sample labels match the Chain of Custody?	☑ Yes	☐ No	☐ NA
Did the Chain of Custody list the sampling technician?	☑ Yes	☐ No	☐ NA

COOLERS

Airbill	Temp(oC)
7987 2282 8809	3.8

DISCREPANCIES

None

LABORATORY PRESERVATIONS

None

NOTES

Revision 1.2

APPENDIX I

TREATED MATERIAL PROPERTIES DATA SHEETS

POCKET VANE SHEAR

REPORT FORM

PROJECT:	Bridgewater
PROJECT No.:	SH0416
TESTING DATE:	9/2/12
TESTED BY:	TAJ
TRACKING CODE:	8300_PVS

POCKET VANE SHEAR		
SAMPLE NO.	HC 90 Treated	
DEPTH (FT)		
TRACKING CODE		
FOOT SIZE (S,M,L)	L	L
INITIAL DIAL READING	0	NA
FINIAL DIAL READING	0.4	NA
REVOLUTIONS MOVED	1.4	NA
SHEAR STRENGTH (TSF)	0.28	NA
AVERAGE SHEAR STRENGTH (TSF)	0.28	

Notes: Reading taken from the top of the treated 2 x 4 inch core

POCKET VANE SHEAR

REPORT FORM

PROJECT:	Bridgewater
PROJECT No.:	SH0416
TESTING DATE:	8/29/12
TESTED BY:	TAJ
TRACKING CODE:	8262_PVS

POCKET VANE SHEAR		
SAMPLE NO.	HC100 Treated	
DEPTH (FT)		
TRACKING CODE		
FOOT SIZE (S,M,L)	L	L
INITIAL DIAL READING	3.1	0
FINIAL DIAL READING	4.8	3
REVOLUTIONS MOVED	1.17	1.3
SHEAR STRENGTH (TSF)	0.234	0.26
AVERAGE SHEAR STRENGTH (TSF)	0.247	

Notes: Test performed in reactor after treatment and cooled

POCKET VANE SHEAR

REPORT FORM

PROJECT:	Bridgewater
PROJECT No.:	SH0416
TESTING DATE:	9/2/12
TESTED BY:	TAJ
TRACKING CODE:	8256_PVS

POCKET VANE SHEAR		
SAMPLE NO.	VR100 Treated	
DEPTH (FT)		
TRACKING CODE		
FOOT SIZE (S,M,L)	L	L
INITIAL DIAL READING	0	0
FINIAL DIAL READING	0	0
DIVISIONS MOVED	3	3
SHEAR STRENGTH (TSF)	0.6	0.6
AVERAGE SHEAR STRENGTH (TSF)	> 0.6	

Notes: Readins taken from inside the treated reactor. The material did not shear with the instrument

POCKET VANE SHEAR

REPORT FORM

PROJECT:	Bridgewater
PROJECT No.:	SH0416
TESTING DATE:	8/14/2012
TESTED BY:	TAJ
TRACKING CODE:	8255_PVS

POCKET VANE SHEAR		
SAMPLE NO.	VR 90 Treated	
DEPTH (FT)		
TRACKING CODE		
FOOT SIZE (S,M,L)	L	L
INITIAL DIAL READING	1.5	3
FINIAL DIAL READING	1.5	1.5
REVOLUTIONS MOVED	3	3
SHEAR STRENGTH (TSF)	0.6	0.6
AVERAGE SHEAR STRENGTH (TSF)	> 0.6	

Notes: readings taken from top of treated 2.4 inch mold. Maxed out the instrument. Sample did not shear

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	Bridgewater		
PROJECT No.:	SH0416		
SAMPLE No.:	VR90		
TESTING DATE:	29-Aug-12	LOADING RATE:	0.04 in./min.
TESTED BY:	TNR	TRACKING CODE:	8255_US

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	162.92	g
3. WT WET SOIL + TARE	197.04	g
4. WT DRY SOIL + TARE	194.35	g
5. WT WATER, Ww	2.69	g
6. WT DRY SOIL, Ws	31.43	g
7. MOISTURE CONTENT, W	**8.56**	**%**

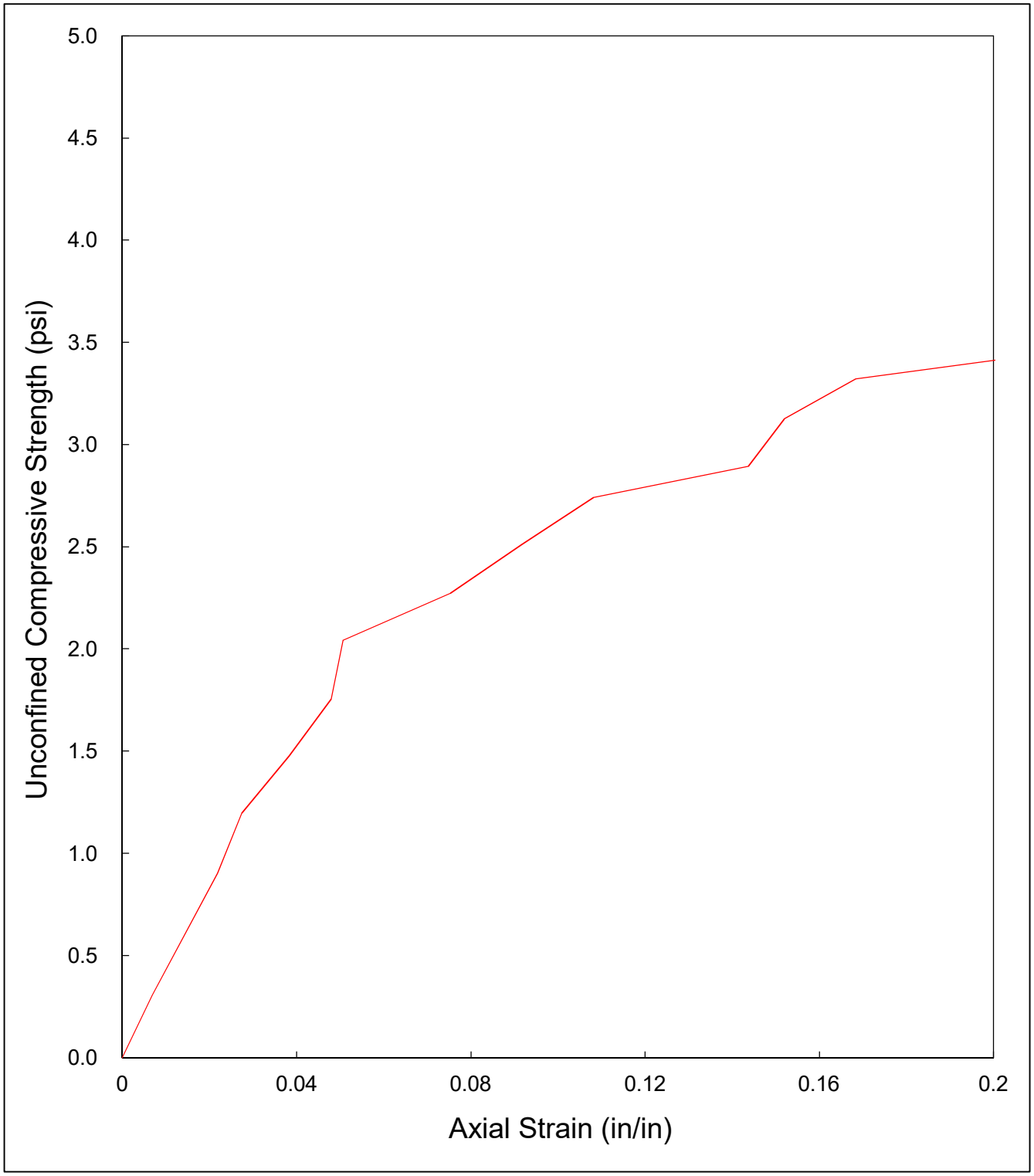
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.05	in.	3.59	in.
No. 2	2.05	in.	3.67	in.
No. 3	2.01	in.	3.69	in.
Average	**2.04**	**in.**	**3.65**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***216.49***	***g***
Initial Area, Ao	3.25	in²
Initial Volume, Vo	11.89	in³
Initial Bulk Unit Weight,	69.4	lb/ft³
Initial Dry Unit Weight	63.9	lb/ft³
15 % Strain (0.15 Lo)	0.55	in.
UCS	4.4	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.255	0.0000	0.0
1	0.025	0.025	3.277	0.0068	0.3
3	0.080	0.080	3.328	0.0219	0.9
4	0.100	0.100	3.346	0.0274	1.2
5	0.140	0.140	3.384	0.0383	1.5
6	0.175	0.175	3.418	0.0479	1.8
7	0.185	0.185	3.428	0.0507	2.0
8	0.275	0.275	3.520	0.0753	2.3
9	0.335	0.335	3.583	0.0917	2.5
10	0.395	0.395	3.649	0.1082	2.7
11	0.525	0.525	3.801	0.1437	2.9
12	0.555	0.555	3.838	0.1520	3.1
13	0.615	0.615	3.914	0.1684	3.3
14	0.745	0.745	4.089	0.2040	3.4
15	0.785	0.785	4.146	0.2149	3.6
16	0.795	0.795	4.160	0.2177	3.8
17	0.865	0.865	4.265	0.2368	4.0
18	0.975	0.975	4.440	0.2670	4.1
19	1.125	1.125	4.703	0.3080	4.0
20	1.150	1.150	4.750	0.3149	4.2
21	1.175	1.175	4.798	0.3217	4.4
22	1.255	1.255	4.958	0.3436	4.4
21	1.270	1.270	4.990	0.3477	4.2
19	1.280	1.280	5.011	0.3505	3.8

UNCONFINED COMPRESSION TESTING

Sample No. VR90



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UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	Bridgewater		
PROJECT No.:	SH0416		
SAMPLE No.:	VR90		
TESTING DATE:	8/29/2012	LOADING RATE:	0.04 in./min.
TESTED BY:	TNR	TRACKING CODE:	8255_US

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	8.6	**%**
BULK UNIT WEIGHT	69.4	lb/ft³
DRY UNIT WEIGHT	63.9	lb/ft³
UCS *	4.4	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	Bridgewater		
PROJECT No.:	SH0416		
SAMPLE No.:	VR 100		
TESTING DATE:	22-Aug-12	LOADING RATE:	0.04 in./min.
TESTED BY:	TNR	TRACKING CODE:	8256_US

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	163.27	g
3. WT WET SOIL + TARE	210.23	g
4. WT DRY SOIL + TARE	205.51	g
5. WT WATER, Ww	4.72	g
6. WT DRY SOIL, Ws	42.24	g
7. MOISTURE CONTENT, W	**11.17**	**%**

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	***LENGTH***
No. 1	2.01 in.	3.88 in.
No. 2	2.00 in.	3.88 in.
No. 3	2.02 in.	3.89 in.
Average	**2.01 in.**	**3.88 in.**

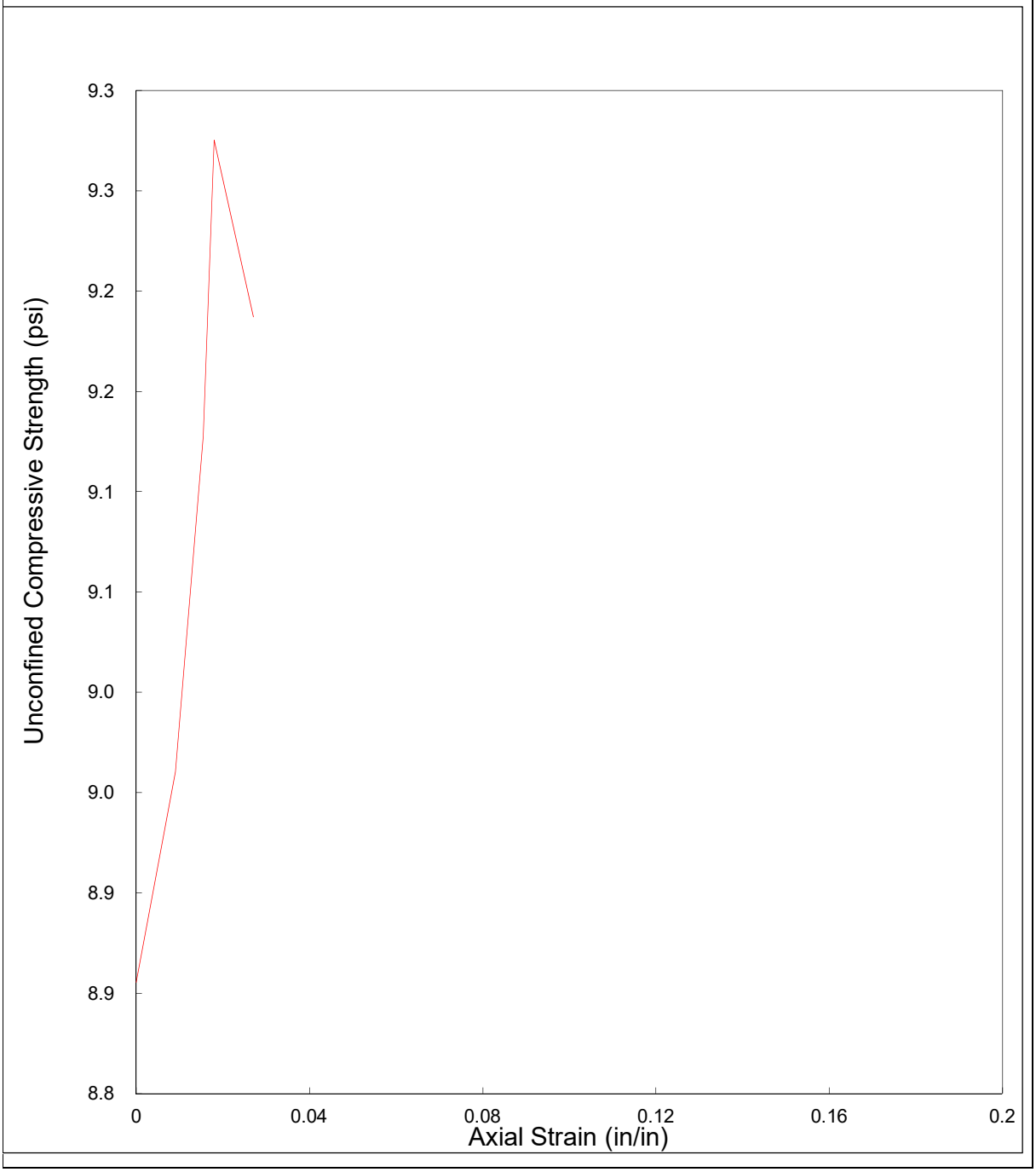
SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	***223.23 g***
Initial Area, Ao	3.17 in²
Initial Volume, Vo	12.32 in³
Initial Bulk Unit Weight,	69.0 lb/ft³
Initial Dry Unit Weight	62.1 lb/ft³
15 % Strain (0.15 Lo)	0.58 in.
UCS	9.3 lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.173	0.0000	0.0
1	0.035	0.035	3.202	0.0090	0.3
2	0.060	0.060	3.223	0.0155	0.6
3	0.070	0.070	3.231	0.0180	0.9
4	0.105	0.105	3.261	0.0270	1.2
5	0.115	0.115	3.270	0.0296	1.5
6	0.135	0.135	3.287	0.0348	1.8
7	0.160	0.160	3.309	0.0412	2.1
8	0.180	0.180	3.327	0.0464	2.4
9	0.205	0.205	3.350	0.0528	2.7
10	0.235	0.235	3.378	0.0605	3.0
11	0.260	0.260	3.401	0.0670	3.2
13	0.265	0.265	3.406	0.0683	3.8
14	0.320	0.320	3.458	0.0824	4.0
15	0.340	0.340	3.478	0.0876	4.3
16	0.365	0.365	3.502	0.0940	4.6
17	0.400	0.400	3.538	0.1030	4.8
26	0.665	0.665	3.829	0.1713	6.8
27	0.695	0.695	3.865	0.1790	7.0
28	0.745	0.745	3.927	0.1919	7.1
29	0.775	0.775	3.965	0.1996	7.3
30	0.810	0.810	4.010	0.2087	7.5
32	0.835	0.835	4.043	0.2151	7.9
33	0.875	0.875	4.096	0.2254	8.1
34	0.930	0.930	4.173	0.2396	8.1
35	0.955	0.955	4.208	0.2460	8.3
36	0.985	0.985	4.252	0.2537	8.5
37	1.025	1.025	4.311	0.2640	8.6
38	1.075	1.075	4.388	0.2769	8.7
38	1.080	1.080	4.396	0.2782	8.6
39	1.085	1.085	4.404	0.2795	8.9
40	1.155	1.155	4.517	0.2975	8.9
41	1.190	1.190	4.576	0.3065	9.0
42	1.205	1.205	4.601	0.3104	9.1
43	1.225	1.225	4.636	0.3156	9.3
44	1.310	1.310	4.789	0.3375	9.2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)

UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS



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COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	11.2	**%**
BULK UNIT WEIGHT	69.0	lb/ft^3
DRY UNIT WEIGHT	62.1	lb/ft^3
UCS *	9.3	lb/in^2

* UCS - UNCONFINED COMPRESSIVE STRENGTH

http://atlantadocs/ATG/BANK/8000-8499/8256_US

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	Bridgewater		
PROJECT No.:	SH0416		
SAMPLE No.:	HC100		
TESTING DATE:	22-Aug-12	LOADING RATE:	0.04 in./min.
TESTED BY:	TNR	TRACKING CODE:	8262_US

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	160.88	g
3. WT WET SOIL + TARE	197.90	g
4. WT DRY SOIL + TARE	191.21	g
5. WT WATER, Ww	6.69	g
6. WT DRY SOIL, Ws	30.33	g
7. MOISTURE CONTENT, W	**22.06**	**%**

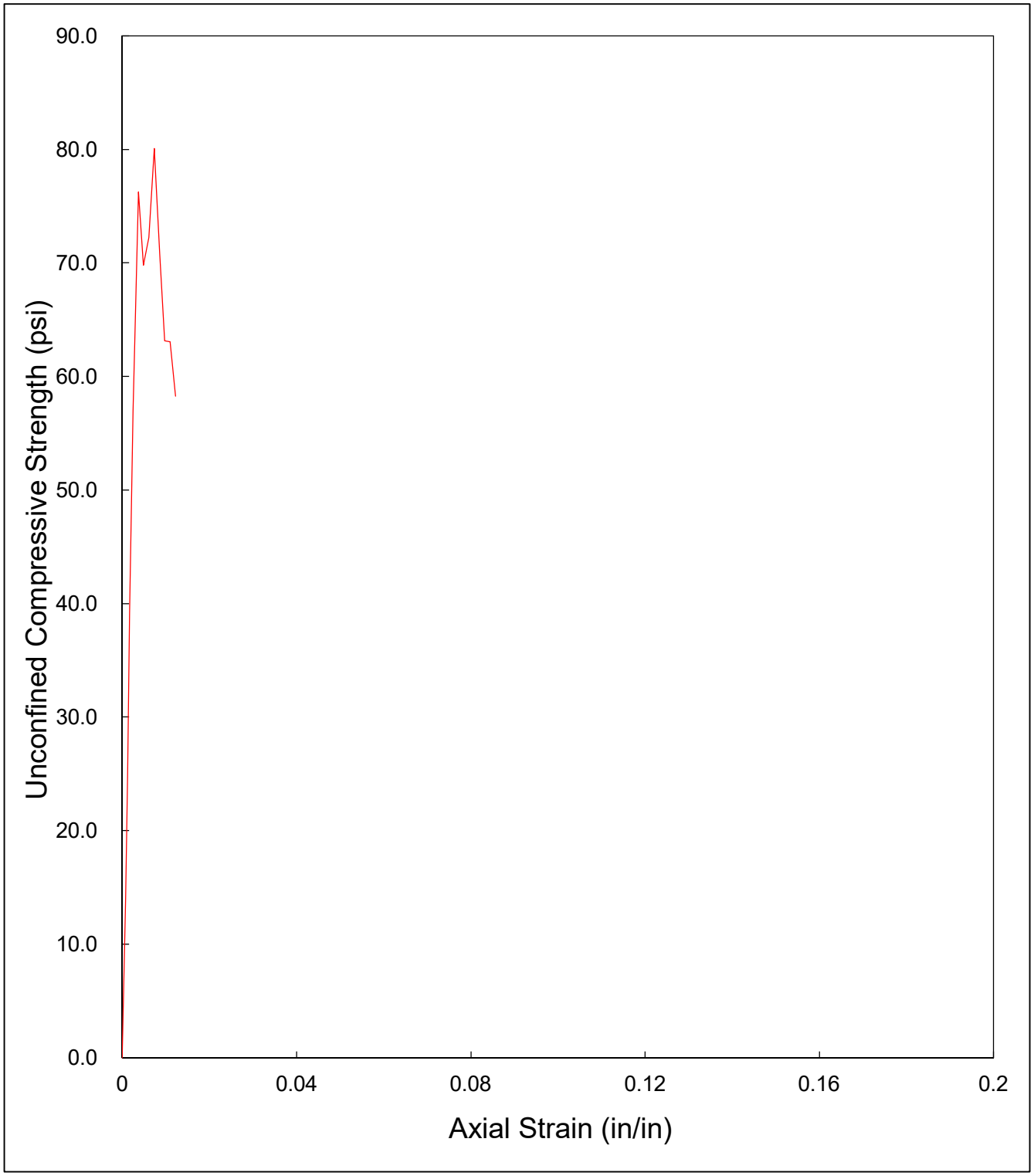
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.00	in.	4.08	in.
No. 2	2.00	in.	4.13	in.
No. 3	1.99	in.	4.10	in.
Average	**2.00**	**in.**	**4.10**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***289.47***	***g***
Initial Area, Ao	3.14	in²
Initial Volume, Vo	12.86	in³
Initial Bulk Unit Weight,	85.7	lb/ft³
Initial Dry Unit Weight	70.2	lb/ft³
15 % Strain (0.15 Lo)	0.62	in.
UCS	80.1	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.136	0.0000	0.0
44	0.003	0.003	3.139	0.0007	14.0
78	0.005	0.005	3.140	0.0012	24.8
123	0.007	0.007	3.142	0.0017	39.2
179	0.010	0.010	3.144	0.0024	56.9
240	0.015	0.015	3.148	0.0037	76.2
220	0.020	0.020	3.152	0.0049	69.8
228	0.025	0.025	3.156	0.0061	72.3
253	0.030	0.030	3.159	0.0073	80.1
224	0.035	0.035	3.163	0.0085	70.8
200	0.040	0.040	3.167	0.0098	63.1
200	0.045	0.045	3.171	0.0110	63.1
185	0.050	0.050	3.175	0.0122	58.3

UNCONFINED COMPRESSION TESTING

Sample No. HC100



http://atlantadocs/ATG/BANK/8000-8499/8262_US

UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	Bridgewater		
PROJECT No.:	SH0416		
SAMPLE No.:	HC100		
TESTING DATE:	8/22/2012	LOADING RATE:	0.04 in./min.
TESTED BY:	TNR	TRACKING CODE:	8262_US

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	22.1	**%**
BULK UNIT WEIGHT	85.7	lb/ft³
DRY UNIT WEIGHT	70.2	lb/ft³
UCS *	80.1	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	Bridgewater		
PROJECT No.:	SH0416		
SAMPLE No.:	HC 90-Treated		
TESTING DATE:	29-Aug-12	LOADING RATE:	0.04 in./min.
TESTED BY:	TNR	TRACKING CODE:	8300_US

MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	167.33	g
3. WT WET SOIL + TARE	208.69	g
4. WT DRY SOIL + TARE	206.55	g
5. WT WATER, Ww	2.14	g
6. WT DRY SOIL, Ws	39.22	g
7. MOISTURE CONTENT, W	**5.46**	**%**

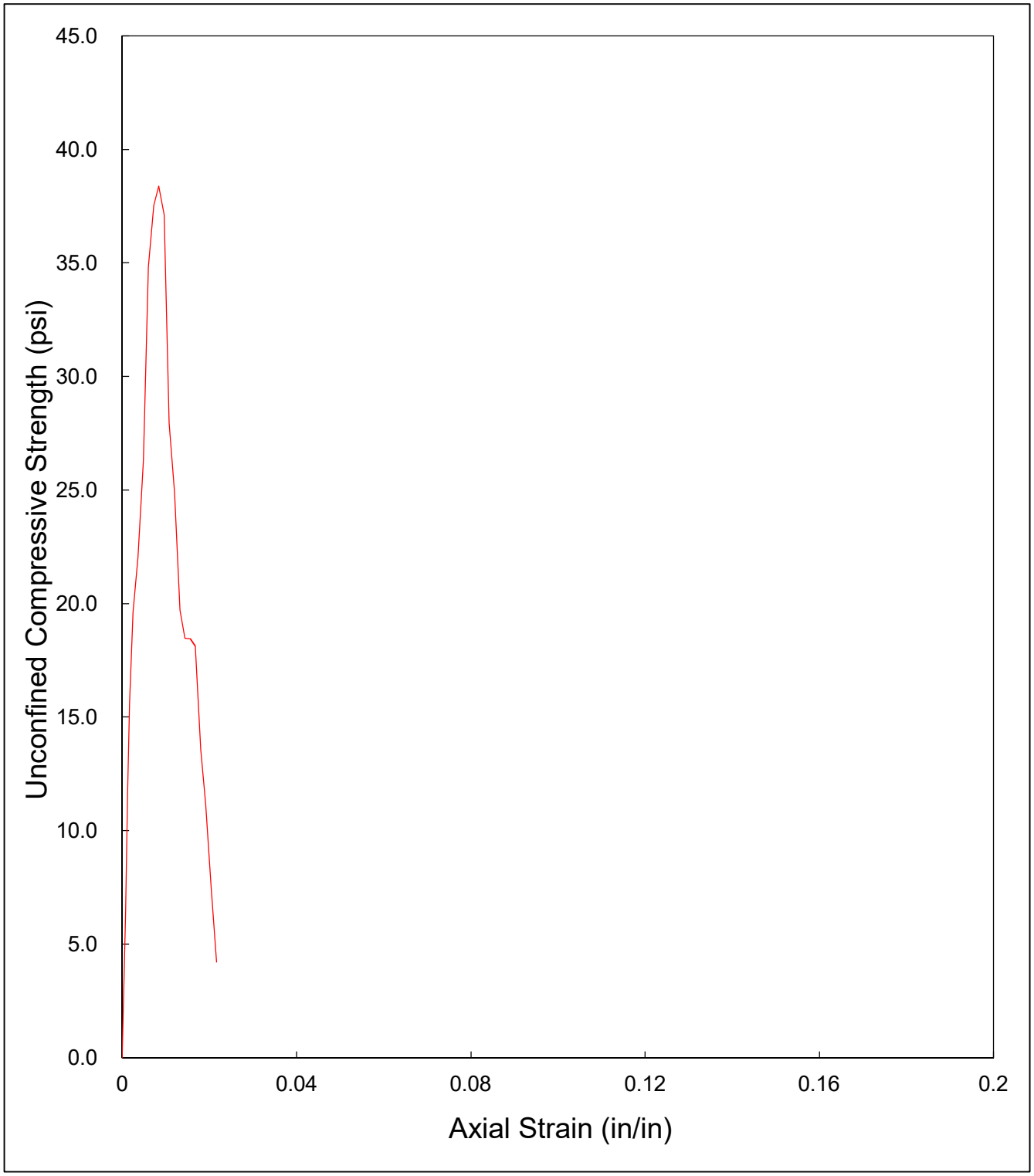
SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.08	in.	4.17	in.
No. 2	2.01	in.	4.19	in.
No. 3	2.02	in.	4.16	in.
Average	**2.04**	**in.**	**4.17**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***277.81***	***g***
Initial Area, Ao	3.25	in²
Initial Volume, Vo	13.58	in³
Initial Bulk Unit Weight,	77.9	lb/ft³
Initial Dry Unit Weight	73.9	lb/ft³
15 % Strain (0.15 Lo)	0.63	in.
UCS	38.4	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.255	0.0000	0.0
21	0.003	0.003	3.257	0.0007	6.4
38	0.005	0.005	3.259	0.0012	11.7
51	0.007	0.007	3.260	0.0017	15.6
64	0.010	0.010	3.262	0.0024	19.6
72	0.015	0.015	3.266	0.0036	22.0
86	0.020	0.020	3.270	0.0048	26.3
114	0.025	0.025	3.274	0.0060	34.8
123	0.030	0.030	3.278	0.0072	37.5
126	0.035	0.035	3.282	0.0084	38.4
122	0.040	0.040	3.286	0.0096	37.1
92	0.045	0.045	3.290	0.0108	28.0
82	0.050	0.050	3.294	0.0120	24.9
65	0.055	0.055	3.298	0.0132	19.7
61	0.060	0.060	3.302	0.0144	18.5
61	0.065	0.065	3.306	0.0156	18.5
60	0.070	0.070	3.310	0.0168	18.1
45	0.075	0.075	3.314	0.0180	13.6
37	0.080	0.080	3.318	0.0192	11.2
25	0.085	0.085	3.322	0.0204	7.5
14	0.090	0.090	3.326	0.0216	4.2

UNCONFINED COMPRESSION TESTING

Sample No. HC 90-Treated



http://atlantadocs/ATG/BANK/8000-8499/8300_US

UNCONFINED COMPRESSION TEST

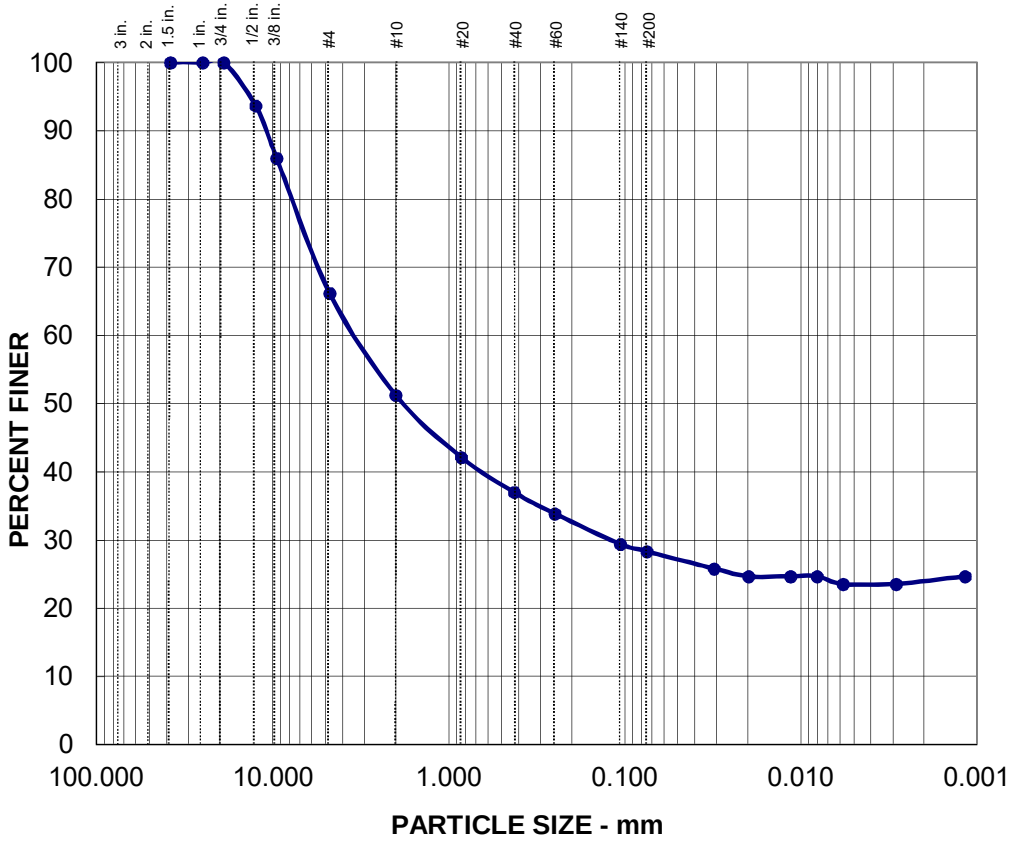
ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	Bridgewater		
PROJECT No.:	SH0416		
SAMPLE No.:	HC 90-Treated		
TESTING DATE:	8/29/2012	LOADING RATE:	0.04 in./min.
TESTED BY:	TNR	TRACKING CODE:	8300_US

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	5.5	**%**
BULK UNIT WEIGHT	77.9	lb/ft³
DRY UNIT WEIGHT	73.9	lb/ft³
UCS *	38.4	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
33.8	37.9	4.3	24.0

SAMPLE INFORMATION	
Project Name:	Bridgewater
Project Number:	SH416
Sample Name:	HC100C
Sample Location:	Silty Sand
Testing Date:	08/03/12

SAMPLE CLASSIFICATION	
Liquid Limit:	
Plastic Limit:	
Plasticity Index:	
USCS Classification	
Classification	SM
AASHTO Classification	
Classification	A-2-4
Group Index	-1
DESCRIPTION: Silty Sand with Gravel	

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PARTICLE SIZE DISTRIBUTION TEST REPORT PAGE 2 OF 2

http://atlantadocs/ATG/BANK/8000-8499/8262_GR

SIEVE AND HYDROMETER ANALYSIS

REPORT FORM
ASTM D422

PROJECT:	Bridgewater
PROJECT No.:	SH416
SAMPLE No.:	HC100C
SAMPLE DESCRIPT:	Silty Sand
TESTING DATE:	08/03/12
TESTED BY:	ZOD
TRACKING CODE:	8262_GR

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	113.50 g
WT WET SOIL + TARE	216.27 g
WT DRY SOIL + TARE	201.33 g
WT WATER, Ww	14.94 g
WT DRY SOIL, Ws	87.83 g
ASTM MOISTURE	17.01 %
EPA MOISTURE	14.54 %

SIEVE NUMBER	CUMULATIVE WEIGHT RETAINED
1.5	0.00 g
1.0	0.00 g
0.75	0.00 g
0.5	5.57 g
0.375	12.32 g
#4	29.70 g
#10	42.82 g
#20	50.82 g
#40	55.32 g
#60	58.10 g
#140	62.01 g
#200	62.95 g

HYDROMETER ANALYSIS	
HYDROMETER No.	20023
Wt OF DRY SOIL, Ws	24.88
DATE TESTING INITIATED	41128
TIME TESTING INITIATED	1030

DATE	TIME	ELAPSED TIME (minutes)	TEMP. (oC)	HYDROMETER READINGS
08/07/12	0:00	2	26.0	24.0
08/07/12	0:00	5	26.0	23.0
08/07/12	0:00	15	26.0	23.0
08/07/12	0:00	30	26.0	23.0
08/07/12	0:00	60	26.0	22.0
08/07/12	0:00	240	26.0	22.0
08/08/12	0:00	1440	26.0	23.0

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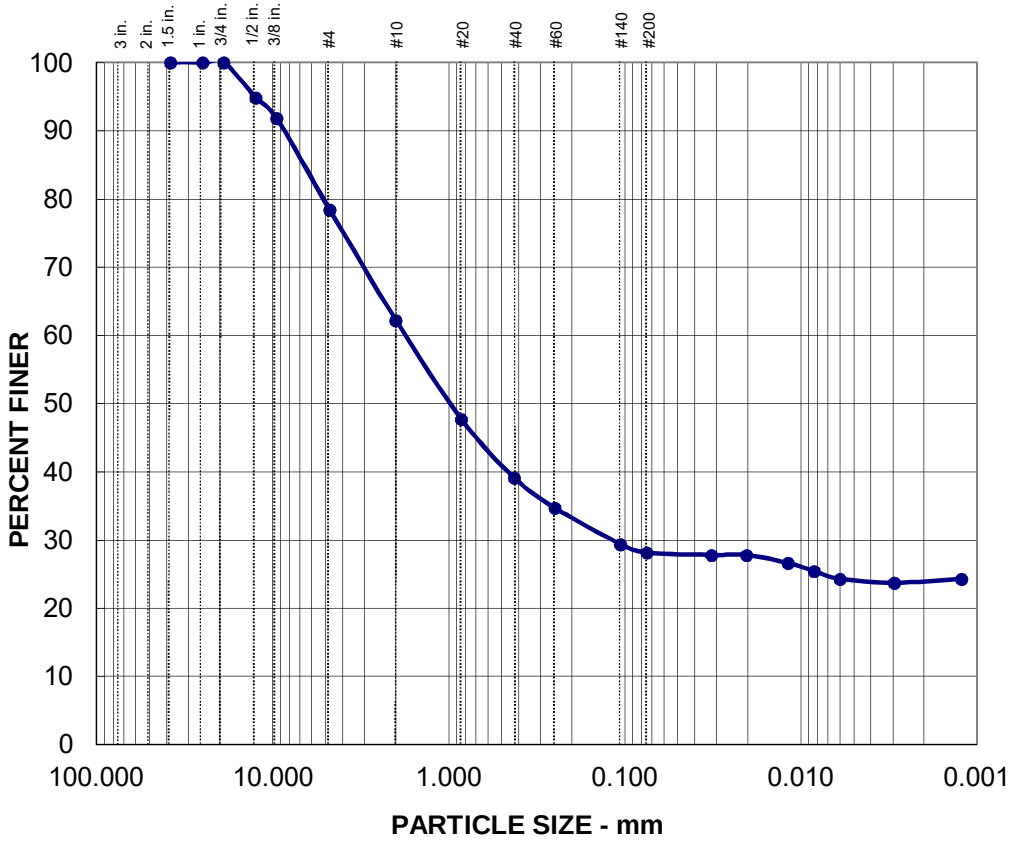
PARTICLE SIZE DISTRIBUTION TEST REPORT PAGE 1 OF 2

http://atlantadocs/ATG/BANK/8000-8499/8262_GR

PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
21.6	50.3	3.8	24.4

SAMPLE INFORMATION	
Project Name:	Bridgewater
Project Number:	SH416
Sample Name:	HC90C
Sample Location:	Silty Sand
Testing Date:	08/19/12

SAMPLE CLASSIFICATION	
Liquid Limit:	
Plastic Limit:	
Plasticity Index:	
USCS Classification	
Classification	SM
AASHTO Classification	
Classification	A-2-4
Group Index	-1
DESCRIPTION: Silty Sand with Gravel	

KEMRON ENVIRONMENTAL SERVICES

PARTICLE SIZE DISTRIBUTION TEST REPORT PAGE 2 OF 2

http://atlantadocs/ATG/BANK/8000-8499/8300_GR

SIEVE AND HYDROMETER ANALYSIS

REPORT FORM
ASTM D422

PROJECT:	Bridgewater
PROJECT No.:	SH416
SAMPLE No.:	HC90C
SAMPLE DESCRIPT:	Silty Sand
TESTING DATE:	08/19/12
TESTED BY:	ZOD
TRACKING CODE:	8300_GR

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	167.43 g
WT WET SOIL + TARE	268.30 g
WT DRY SOIL + TARE	251.72 g
WT WATER, Ww	16.58 g
WT DRY SOIL, Ws	84.29 g
ASTM MOISTURE	19.67 %
EPA MOISTURE	16.44 %

SIEVE NUMBER	CUMULATIVE WEIGHT RETAINED
1.5	0.00 g
1.0	0.00 g
0.75	0.00 g
0.5	4.35 g
0.375	6.90 g
#4	18.21 g
#10	31.87 g
#20	44.08 g
#40	51.32 g
#60	55.06 g
#140	59.54 g
#200	60.57 g

HYDROMETER ANALYSIS	
HYDROMETER No.	20023
Wt OF DRY SOIL, Ws	23.72
DATE TESTING INITIATED	41141
TIME TESTING INITIATED	1100

DATE	TIME	ELAPSED TIME (minutes)	TEMP. (oC)	HYDROMETER READINGS
08/20/12	0:00	2	22.0	26.0
08/20/12	0:00	5	22.0	26.0
08/20/12	0:00	15	22.0	25.0
08/20/12	0:00	30	22.0	24.0
08/20/12	0:00	60	22.0	23.0
08/20/12	0:00	240	24.0	22.0
08/21/12	0:00	1440	22.0	23.0

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ENVIRONMENTAL SERVICES

PARTICLE SIZE DISTRIBUTION TEST REPORT PAGE 1 OF 2

http://atlantadocs/ATG/BANK/8000-8499/8300_GR

SOLID SPECIFIC GRAVITY

ASTM D 854
DATA SHEET

PROJECT:	Bridgewater
PROJECT No.:	SH0416
TESTING DATE:	8/3/2012
TESTED BY:	ZOD
TRACKING CODE:	8262_SG
SAMPLE NO:	HC100C

SOLID SPECIFIC GRAVITY		
1. SAMPLE NUMBER		
2. FLASK NUMBER	5	
3. TEMPERATURE	26.0	°C
4. WT. FLASK & WATER	249.18	g
5. WT. WATER, FLASK & SOIL	270.36	g
6. WT OF SOIL	21.18	g
7. CALIBRATION WATER & FLASK	359.65	g
8. DEAIRED SAMPLE	364.71	g
9. SPECIFIC GRAVITY	1.31	
10. CORRECTION FACTOR K	0.9986	
11. Gs @ 20 °C	1.31	

SOLID SPECIFIC GRAVITY

ASTM D 854
DATA SHEET

PROJECT:	Bridgewater
PROJECT No.:	SH0416
TESTING DATE:	8/23/2012
TESTED BY:	ZOD
TRACKING CODE:	8300_SG
SAMPLE NO:	HC90C

SOLID SPECIFIC GRAVITY		
1. SAMPLE NUMBER		
2. FLASK NUMBER	5	
3. TEMPERATURE	26.0	°C
4. WT. FLASK & WATER	248.26	g
5. WT. WATER, FLASK & SOIL	269.93	g
6. WT OF SOIL	21.67	g
7. CALIBRATION WATER & FLASK	359.65	g
8. DEAIRED SAMPLE	367.37	g
9. SPECIFIC GRAVITY	1.55	
10. CORRECTION FACTOR K	0.9986	
11. Gs @ 20 °C	1.55	

TOTAL POROSITY

Report Form

By Calculation

PROJECT:	Bridgewater
PROJECT No.:	SH0416
SAMPLE No.:	HC100
TESTING DATE:	8/29/2012
TESTED BY:	ZOD
TRACKING CODE:	8262_PR

Total porosity and Pore Volume Calculation		
SAMPLE No.		
1. Bulk Density	85.70	lbs/ft^3
2. Moisture Content	25.46	%
3. Specific Gravity	1.31	-
4. Dry Density	68.31	lbs/ft^3
6. Weight of Solids(1)	1.0947	g
7. Volume of Solids(1)	0.8356	cm^3
8. Volume of Voids(1)	0.1644	cm^3
9. Total Porosity (*n*)	**16.4**	**%**
10. Reactor Sample Volume		**cc**
11. Pore Volume	**0.0**	**cc**

1 Calculated for 1 cubic centimeter

http://atlantadocs/ATG/BANK/8000-8499/8262_Total Porosity

TOTAL POROSITY

Report Form

By Calculation

PROJECT:	Bridgewater
PROJECT No.:	SH0416
SAMPLE No.:	HC 90
TESTING DATE:	8/14/2012
TESTED BY:	TNR
TRACKING CODE:	8300_PR

Total porosity and Pore Volume Calculation		
SAMPLE No.		
1. Bulk Density	77.9	lbs/ft^3
2. Moisture Content	19.5	%
3. Specific Gravity	1.6	-
4. Dry Density	65.2	lbs/ft^3
6. Weight of Solids(1)	1.0443	g
7. Volume of Solids(1)	0.6738	cm^3
8. Volume of Voids(1)	0.3262	cm^3
9. Total Porosity (*n*)	**32.6**	**%**
10. Reactor Sample Volume		**cc**
11. Pore Volume	**0.0**	**cc**

1 Calculated for 1 cubic centimeter

http://atlantadocs/ATG/BANK/8000-8499/8300_PR

MOISTURE CONTENT DETERMINATION

REPORT FORM

ASTM D 2216

PROJECT:	Bridgewater
PROJECT No.:	SH-0416
SAMPLE No.:	VR100
TESTING DATE:	08/01/12
TESTED BY:	ZOD
TRACKING CODE:	8256_MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	1.2833 g	1.2873 g	1.2885 g
3. WT WET SOIL + TARE	4.7143 g	4.5305 g	4.0580 g
4. WT DRY SOIL + TARE	4.3785 g	4.1853 g	3.7708 g
5. WT WATER, Ww	0.3358 g	0.3452 g	0.2872 g
6. WT DRY SOIL, Ws	3.0952 g	2.8980 g	2.4823 g
7. ASTM MOISTURE CONTENT	10.85 %	11.91 %	11.57 %
8. PERCENT SOLIDS	90.21 %	89.36 %	89.63 %
9. AVERAGE ASTM MOISTURE CONTENT	11.44 %		
10. AVERAGE PERCENT SOLIDS	89.73 %		

MOISTURE CONTENT DETERMINATION

REPORT FORM

ASTM D 2216

PROJECT:	Bridgewater
PROJECT No.:	SH0416
SAMPLE No.:	VR 90C Treated
TESTING DATE:	08/09/12
TESTED BY:	MMR
TRACKING CODE:	8255_MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	1.2726 g	1.2746 g	1.2856 g
3. WT WET SOIL + TARE	8.1756 g	10.8927 g	11.6359 g
4. WT DRY SOIL + TARE	6.6302 g	8.7656 g	9.7032 g
5. WT WATER, Ww	1.5454 g	2.1271 g	1.9327 g
6. WT DRY SOIL, Ws	5.3576 g	7.4910 g	8.4176 g
7. ASTM MOISTURE CONTENT	28.85 %	28.40 %	22.96 %
8. PERCENT SOLIDS	77.61 %	77.88 %	81.33 %
9. AVERAGE ASTM MOISTURE CONTENT	26.73 %		
10. AVERAGE PERCENT SOLIDS	78.94 %		

http://atlantadocs/ATG/BANK/8000-8499/8255_MC

MOISTURE CONTENT DETERMINATION

REPORT FORM

ASTM D 2216

PROJECT:	Bridgewater
PROJECT No.:	SH-0416
SAMPLE No.:	HC100
TESTING DATE:	08/01/12
TESTED BY:	ZOD
TRACKING CODE:	8262_MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	1.2800 g	1.2808 g	1.2865 g
3. WT WET SOIL + TARE	3.7838 g	4.4080 g	4.3748 g
4. WT DRY SOIL + TARE	3.3134 g	3.7434 g	3.7325 g
5. WT WATER, Ww	0.4704 g	0.6646 g	0.6423 g
6. WT DRY SOIL, Ws	2.0334 g	2.4626 g	2.4460 g
7. ASTM MOISTURE CONTENT	23.13 %	26.99 %	26.26 %
8. PERCENT SOLIDS	81.21 %	78.75 %	79.20 %
9. AVERAGE ASTM MOISTURE CONTENT	25.46 %		
10. AVERAGE PERCENT SOLIDS	79.72 %		

http://atlantadocs/ATG/BANK/8000-8499/8262_MC

MOISTURE CONTENT DETERMINATION

REPORT FORM

ASTM D 2216

PROJECT:	Bridgewater
PROJECT No.:	SH0416
SAMPLE No.:	HC 90C Treated
TESTING DATE:	08/09/12
TESTED BY:	MMR
TRACKING CODE:	8300_MC

MOISTURE CONTENT (Dry & Wet Basis)			
1. MOISTURE TIN NO.	A	B	C
2. WT MOISTURE TIN (tare weight)	1.2886 g	1.2882 g	1.2839 g
3. WT WET SOIL + TARE	14.0499 g	18.4395 g	12.0045 g
4. WT DRY SOIL + TARE	12.3235 g	15.6114 g	9.9839 g
5. WT WATER, Ww	1.7264 g	2.8281 g	2.0206 g
6. WT DRY SOIL, Ws	11.0349 g	14.3232 g	8.7000 g
7. ASTM MOISTURE CONTENT	15.64 %	19.74 %	23.23 %
8. PERCENT SOLIDS	86.47 %	83.51 %	81.15 %
9. AVERAGE ASTM MOISTURE CONTENT	19.54 %		
10. AVERAGE PERCENT SOLIDS	83.71 %		

KEMRON ENVIRONMENTAL SERVICES

Project: Bridgewater SH 0416 Sample: HC 100C
Test: Reheated treated sample
Date: 8/24/2012

Observations Reheated Treated Sample HC 100C

Temperature °C	Heating Time (min)	Observations
32.5	9	No movement of the material.
50.3	20	No movement of the material.
68.8	30	No movement of the material.
82.7	40	One green bead appeared at the contact between the glass beads and the HC. No movement of the material.
87.4	45	No movement of the material.
93.1	50	No movement of the material.
93.1	60	Two more green beads at the contact between the glass beads and the HC. No movement of the material.
93.0	70	No movement of the material.
93.8	80	HC material begins to turn a green tint
95.3	90	Test complete. The HC material did not move. Material has a slight green tint.

KEMRON
ENVIRONMENTAL SERVICES

Project: Bridgewater SH 0416 Sample: VR 100C
Test: Reheated treated sample
Date: 8/24/2012

Observations Reheated Treated Sample VR 100C

Temperature °C	Heating Time (min)	Observations
32.5	5	No movement of the material.
46.7	20	No movement of the material.
65.5	30	VR seems to be moving downward
76.0	40	VR is moving downward further on the glass beads.
91.8	45	VR continues moving downward more on the glass beads.
96.1	50	It appears the VR has moved down the vial about half an inch.
96.0	60	The movement is slow but it keeps going down.
96.3	70	The movement is slow but it keeps going down.
96.1	80	VR is going down the glass beads 3/4 of an inch
96.4	90	Test complete. VR continued to move down slowly. The longer the material was heated the movement continue. The material moved 1 inch.

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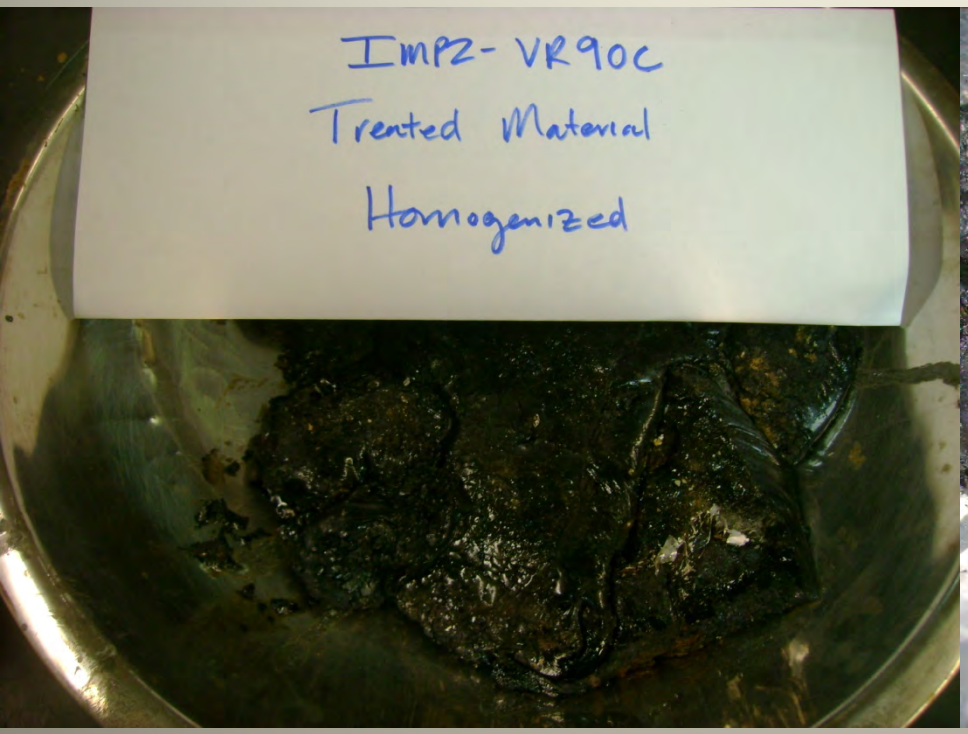
BRIDGEWATER
SH0416

ACID TAR STUDY:
Treated Physical Properties Characterization

IMP2 – VR



Treated Material

IMP2 – VR90C

IMP2 – VR

Treated Material

IMP2 – VR100C

IMP2 - HC

Treated Material

IMP2 – HC90C

IMP2 - HC

Treated Material

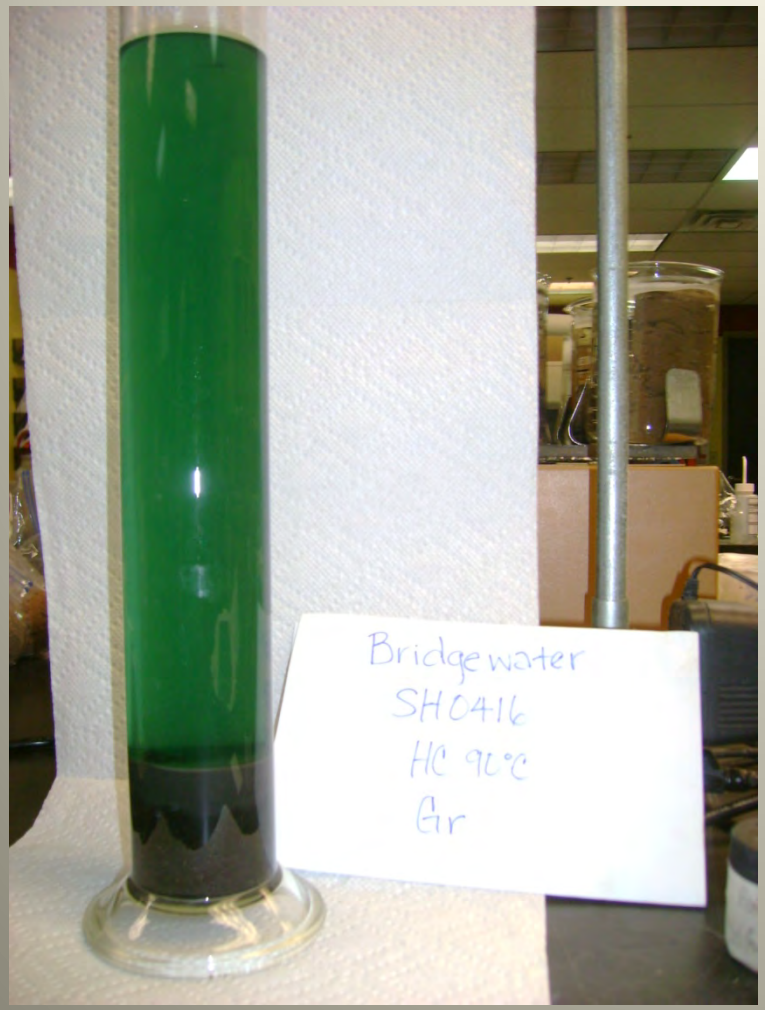
IMP2 – HC100C

IMP2 - HC

Treated Material

IMP2 – HC100C

Particle Size Distribution



HC 90C treated material hydrometer test at 24 hours

HC 100C treated material hydrometer test at 24 hours

Unconfined Compressive Strength

UCS Testing for HC 90 C treated material.

Unconfined Compressive Strength

UCS Testing for HC 100C treated material.

Unconfined Compressive Strength

UCS Testing for VR 90 C treated material.

Unconfined Compressive Strength

UCS Testing for VR 100 C treated material.

Hydraulic Conductivity

Perm Sample of HC 100 C treated material.

Hydraulic Conductivity

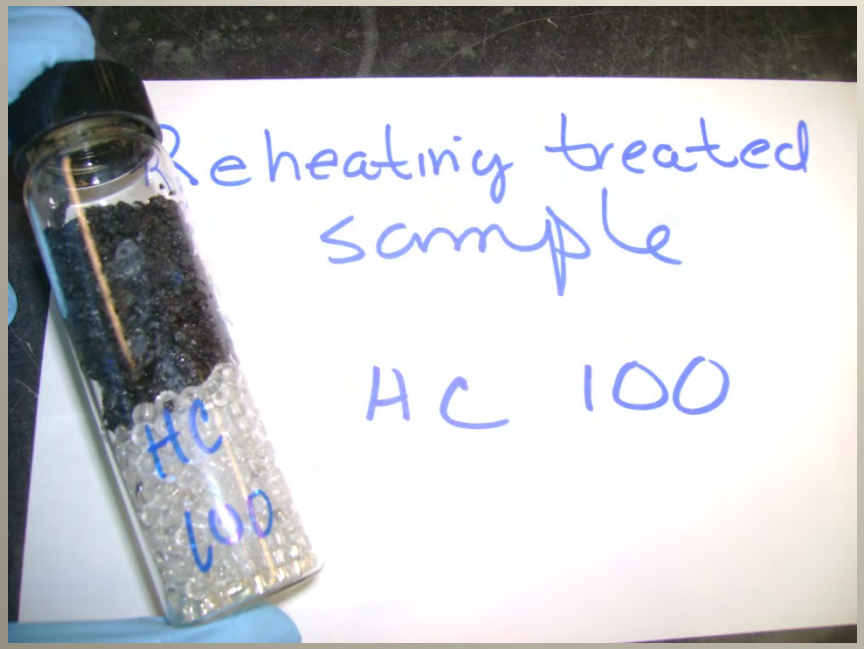
Perm Test of VR and HC treated material expanding.

Bridgewater
SH0416

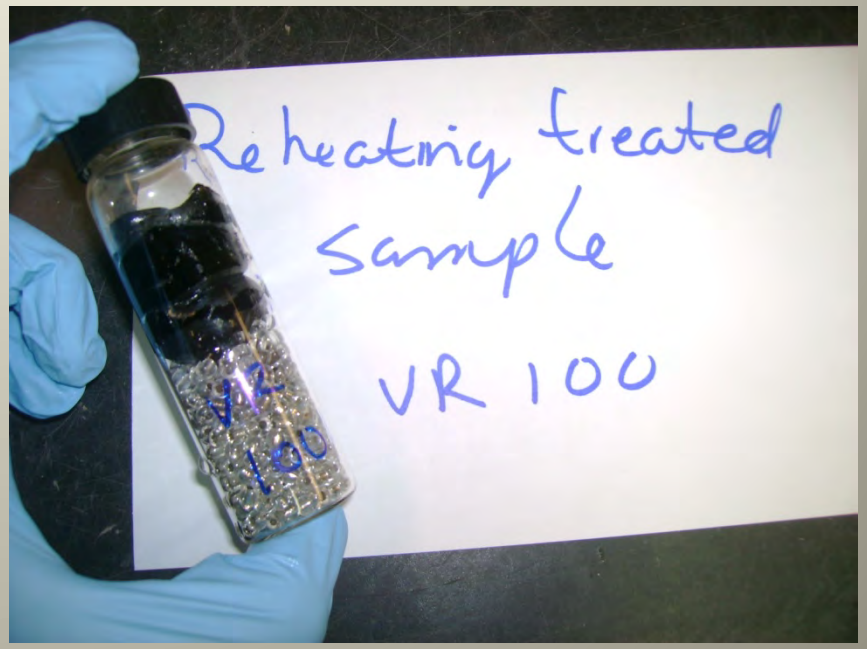
Reheated Treated Sample

HC 100C & VR 100C

Samples



HC 100°C (1.4 inch of glass beads and 1.4 inch of HC 100°C)



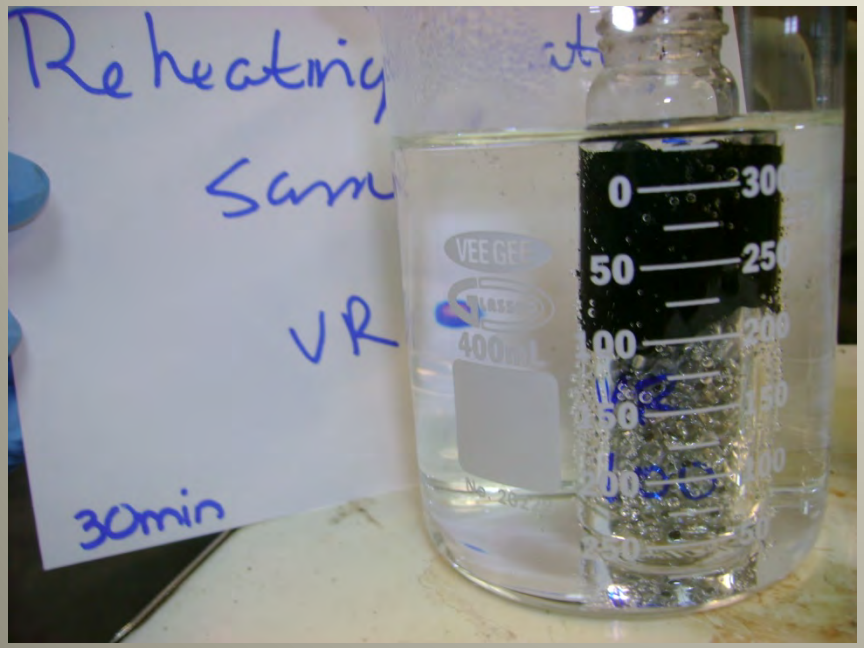
VR 100°C (1.4 inch of glass beads and 1.4 inch of VR 100°C)

Initial set up

Set up

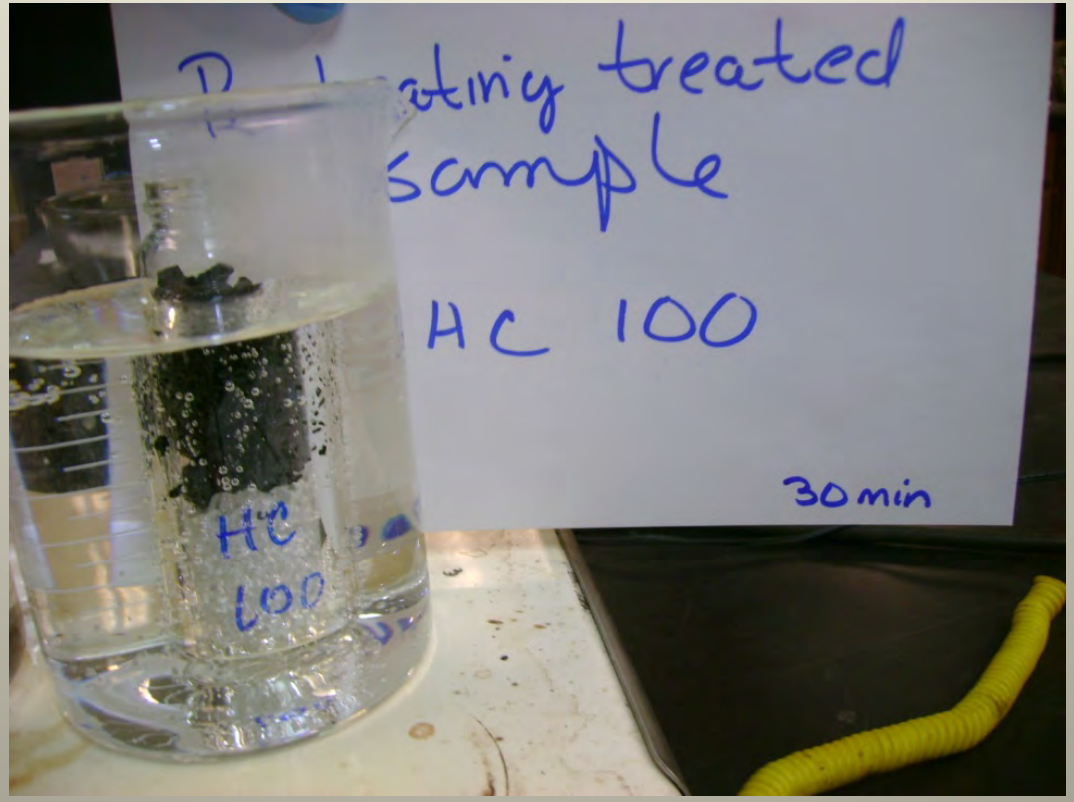
- **hot plate**
- **2 beakers**
- **water**
- **thermometers**

30 minutes of heating



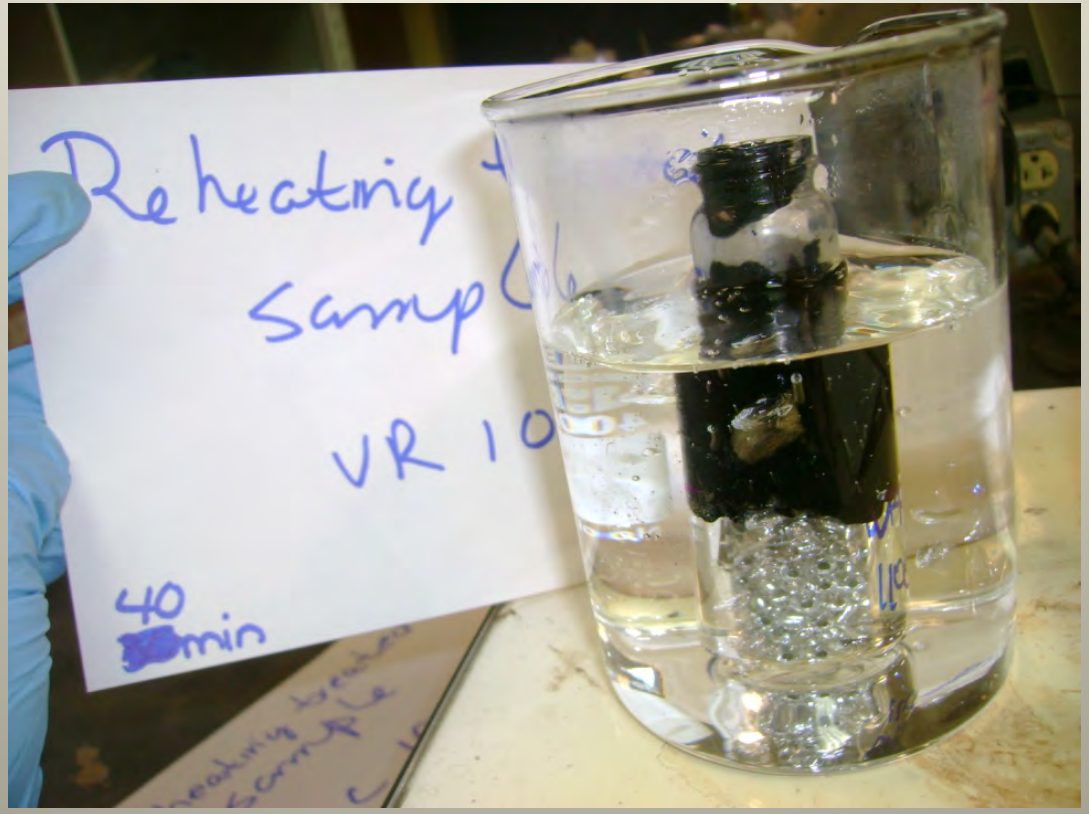
VR seems to be moving downward at 65.5°C

30 minutes of heating



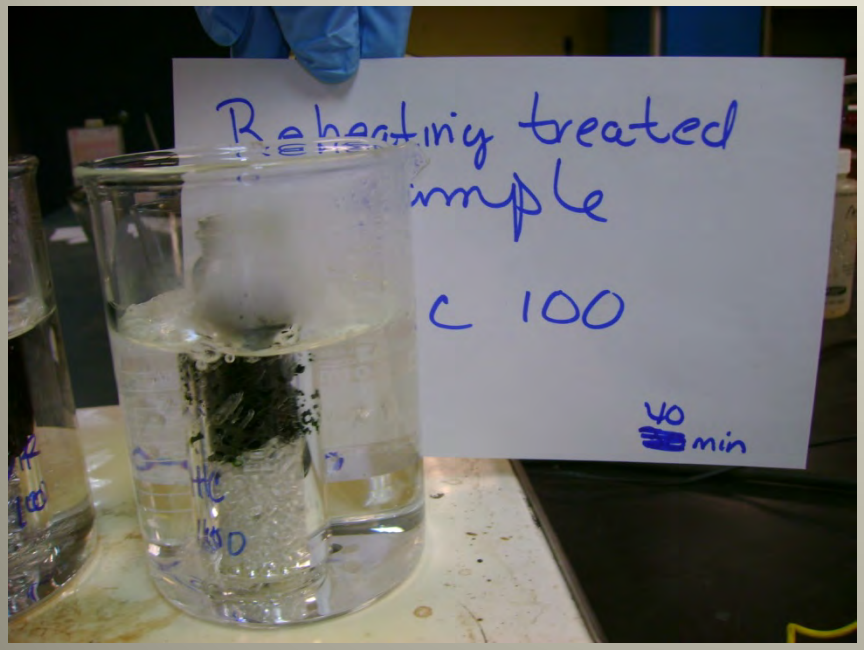
No movement of the material at a temperature of 68.8°C

40 minutes of heating



VR is moving downward further on the glass beads. Sample is at 76.0°C

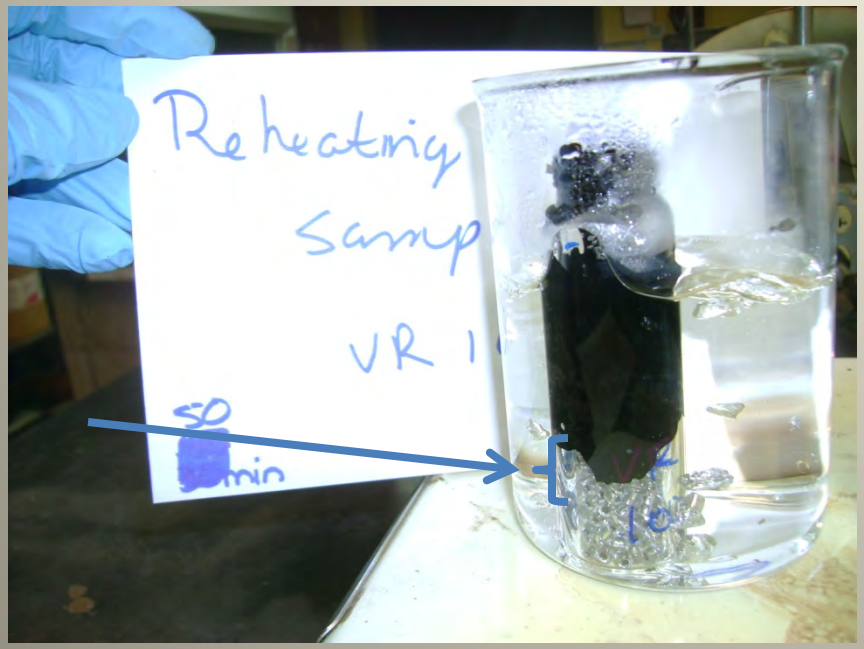
40 minutes of heating



No movement of the HC material. Sample temperature is 82.7°C

At 45 min, one green tinted glass bead appeared at the contact between the glass beads and the HC.

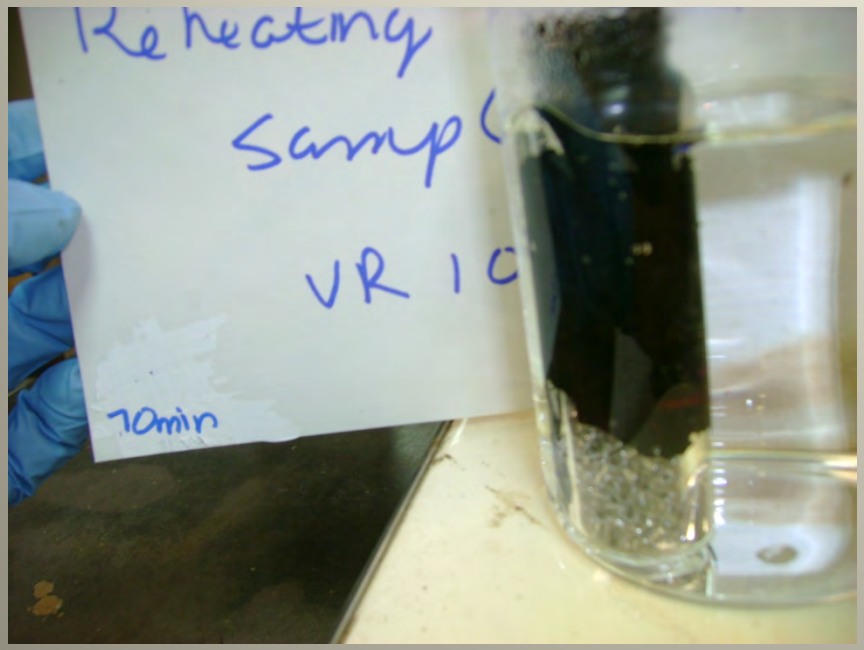
50 minutes of heating



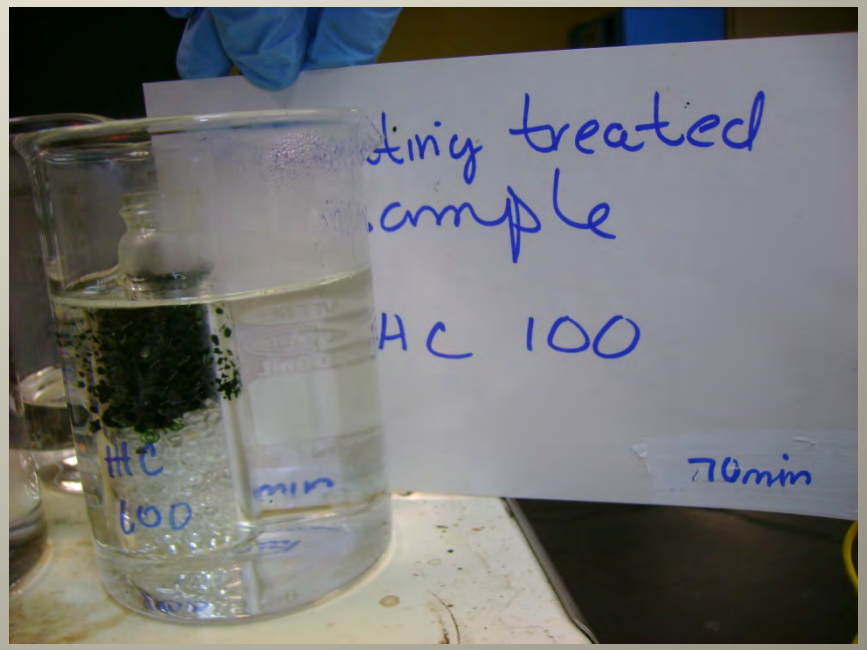
VR is moving down the vial about half an inch at 96.1°C

HC is still not moving at 93.1°C

70 minutes of heating

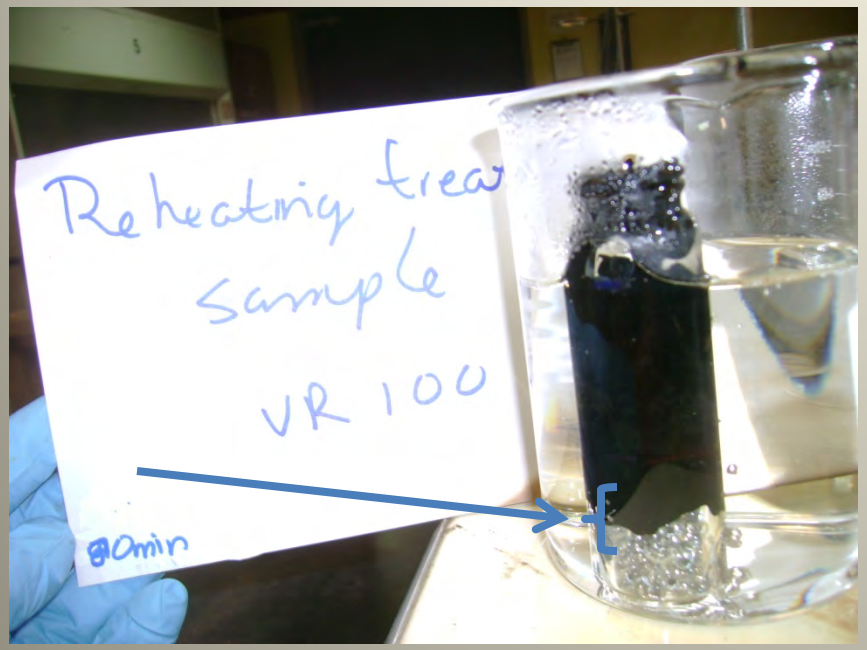


The movement is slow but the VR material keeps going down the glass beads at 96.3°C



HC is not moving. Two more tinted glass beads appeared at 93.0°C

80 minutes of heating



The VR material is going down the glass beads ¾ of an inch .
Temperature is 96.1°C

HC material begins to turn a green tint.

90 minutes of heating

Test complete, final temperature 96.4°C. The VR material continued to move down slowly the longer the material was heated. The material moved 1 inch in 90 minutes.

90 minutes of heating

Test complete. The HC material did not move. Final temperature 95.3°C. Material has a slight green tint.

APPENDIX J

BULK TREATMENT TABLES and PHOTOs

CLIENT
ACID TAR STUDY
BULK THERMAL TREATMENT: Round 1

TABLE 1

MATERIAL CHARACTERIZATION
Physical Properties Testing

Sample ID		Treatment Duration	Moisture Content		Treatment Range	Material Description		Post Treatment Condensate (ambient temperature after being chilled)	Bulk Treatment VOC Off Gas Monitoring
CH2M Hill ID	Kemron ID	Days	Untreated (%)	Treated (%)	^{0} (C)	Untreated	Treated		
IMP2 - HC - 011212	IMP2 - HC - Bucket 1	7	132.03	18.05	100.9 - 105.3	Hard black material with some free liquid present.	Air pores visible throughout sample, shinny black finish, hard and brittle texture, odor like superglue, free liquid present after treatment (condensate?)	LEL: 36% VOC: 1604ppm	Day 1: PID = 204ppm Day 2: PID = 31.7ppm Day 3: PID = 62.8ppm Day 4: PID = 13.6ppm Day 5: PID = NT Day 6: PID = NT Day 7: PID = 0.0 ppm Note: the material stiill maintained a very strong chemical odor after treatment.
	IMP2 - HC - Bucket 2	7	78.68	18.15	97.8 - 102.5	Hard black material with some free liquid present.	Air pores visible throughout sample, shinny black finish, hard and brittle texture, odor like superglue, free liquid present after treatment (condensate?)	**Description:** Top Section: yellow in color, density similar to oil (floats), strong odor of gasoline. Middle Section: Opague Cream in color, darkened as depth increased, the bottom of this layer was mixed with grey residue. Bottom Section: Residue of a light grayish brown color, gritty texture, tacky. Washes away with acetone.	
IMP2 - VR - 011212	IMP2 - VR - Bucket 3	7	94.14	40.21	99.5 - 105.9	Soft black tarry material with some free liquid present.	No air pores visible, semi-semi-glossy black finish, rubber-like texture, odor like superglue, no free liquid present (condensate?).		
	IMP2 - VR - Bucket 4	7	109.37	22.09	90.9 - 103.3	Soft black tarry material with some free liquid present.	No air pores visible, semi-glossy finish, rubber-like texture, odor like superglue, no free liquid present (condensate).		

NT = Not Tested

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ACID TAR STUDY:
Bulk Thermal Treatment Round 1
Impoundment 2 HC and VR

IMP2 - HC - 011212

Untreated Material

IMP2 – HC – 011212 as received

IMP2 - HC - 011212

Treated Material

*24 hours after treatment and chilled

IMP2 – HC – 011212 (KEMRON Bucket 1)

Treated Material

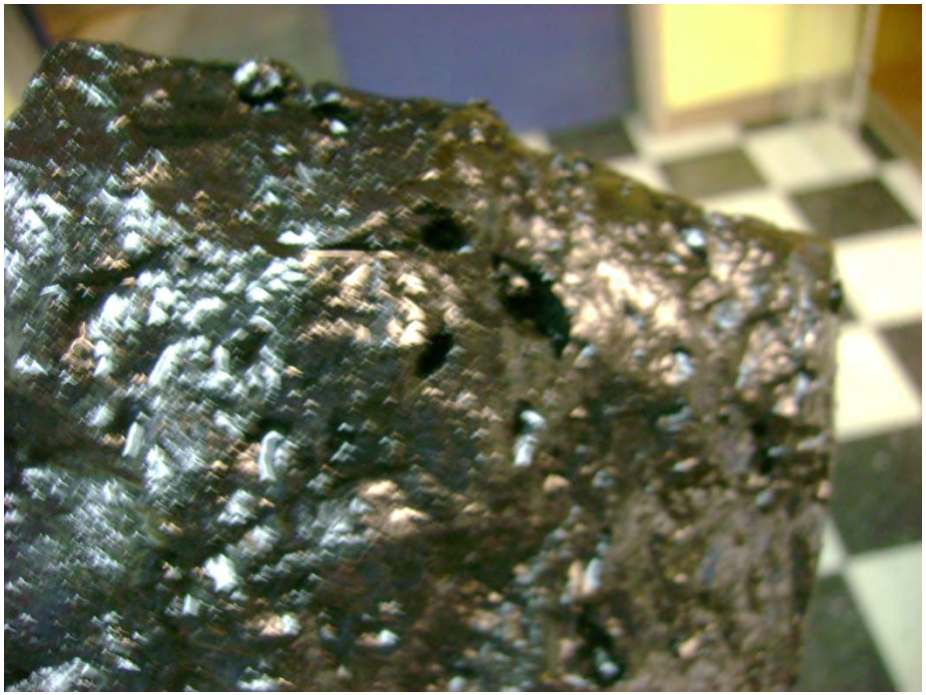
*24 hours after treatment and chilled

IMP2 – HC – 011212 (KEMRON Bucket 2)

IMP2 - HC - 011212

Treated Material

IMP2 – HC – 011212 (KEMRON Bucket 1)



Treated Material

IMP2 – HC – 011212 (KEMRON Bucket 2)

IMP2 - VR - 011212

Untreated Material

IMP2 – VR – 011212 as received

IMP2 - VR - 011212

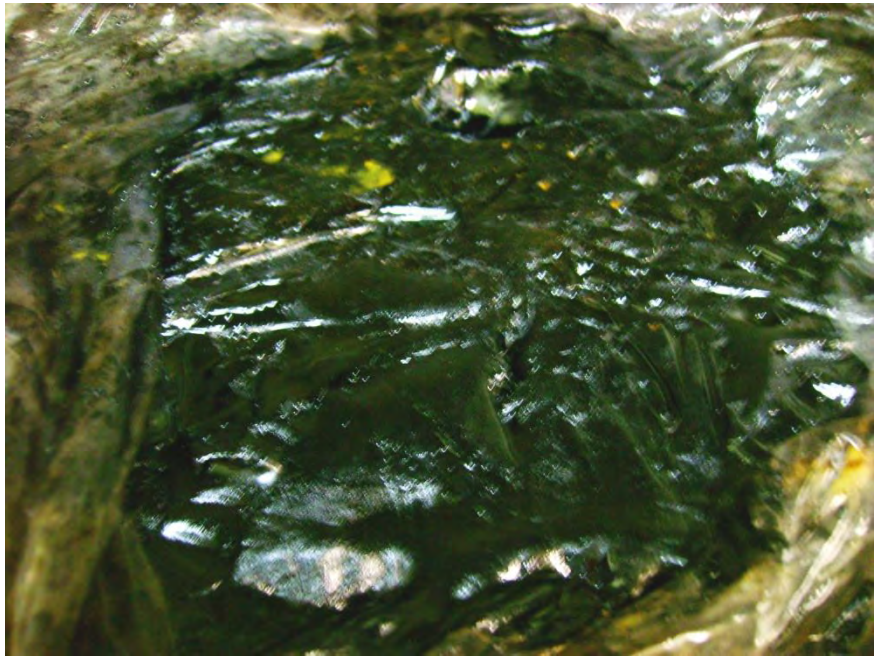
Treated Material

*24 hours after treatment and chilled
IMP2 – VR – 011212 (KEMRON Bucket 3)

Treated Material

*24 hours after treatment and chilled
IMP2 – VR – 011212 (KEMRON Bucket 4)

IMP2 - VR - 011212



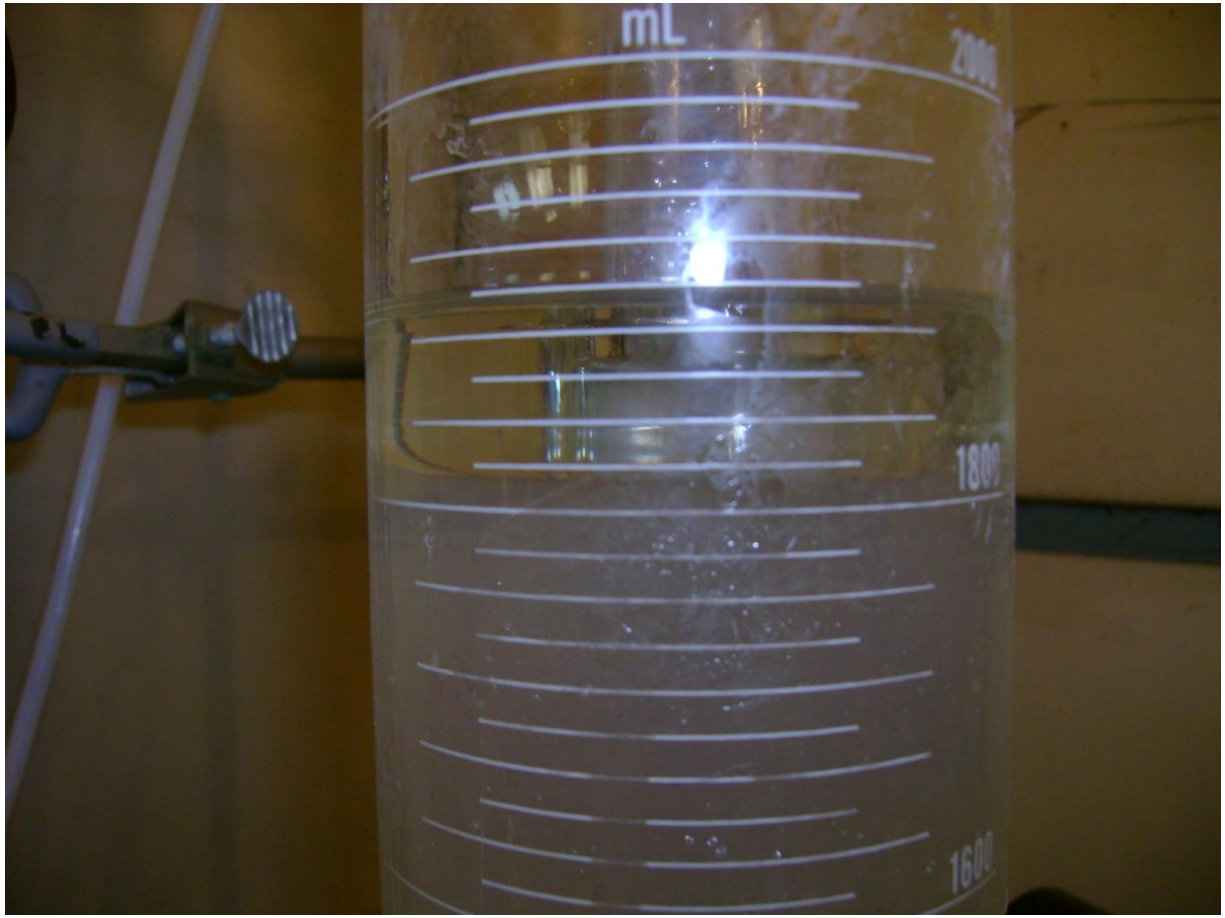
Treated Material

IMP2 – VR – 011212 (KEMRON Bucket 3)

Treated Material

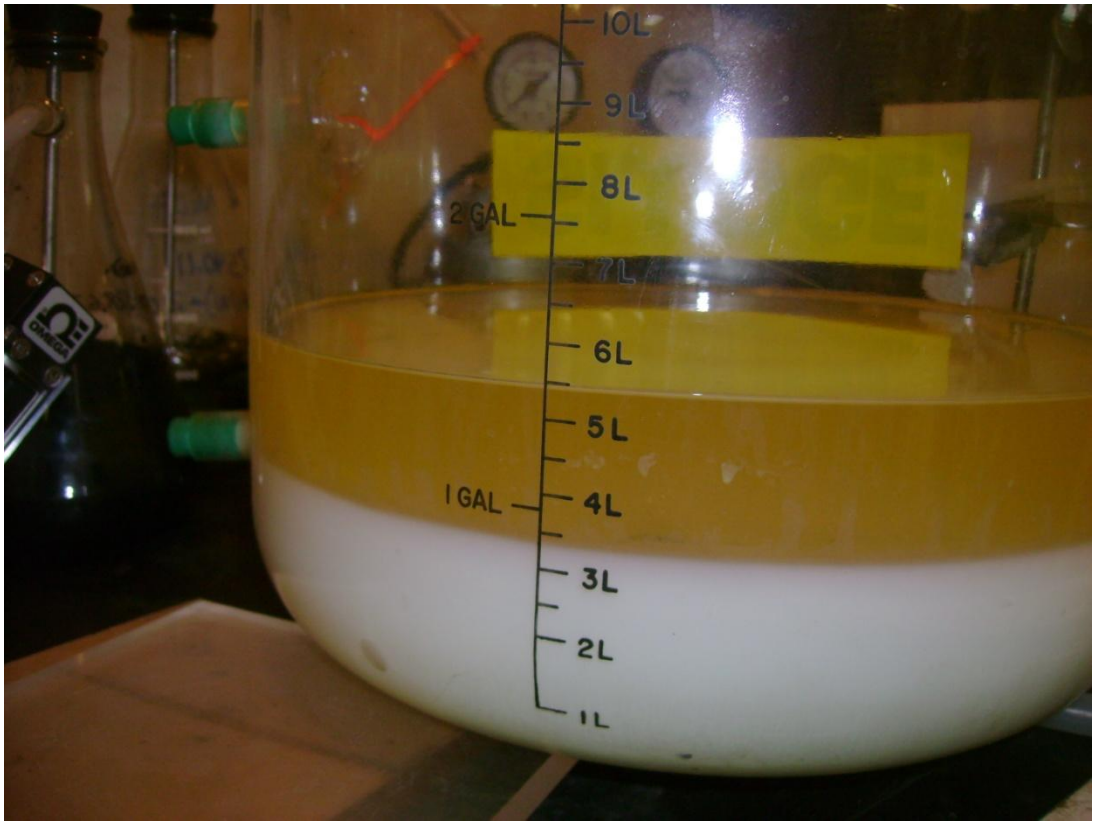
IMP2 – VR – 011212 (KEMRON Bucket 4)

Lnapl in Manometer



Lnapl collecting in manometer during treatment.

Bulk Treatment Condensate

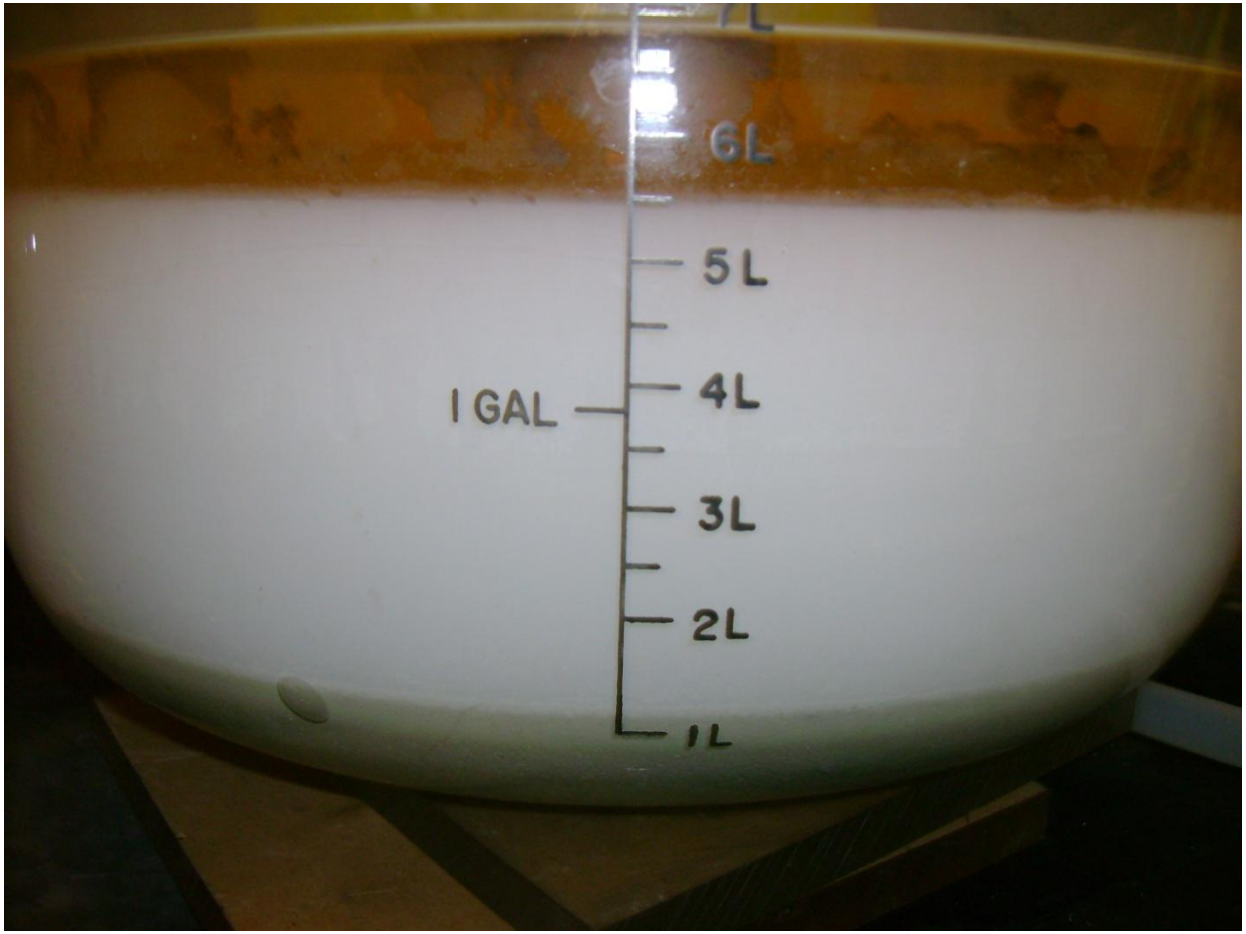


Bulk Condensate during Treatment

Bulk Treatment Condensate

Bulk Condensate 24 hours after Treatment

Bulk Treatment Condensate



Bulk Condensate 24 hours after Treatment

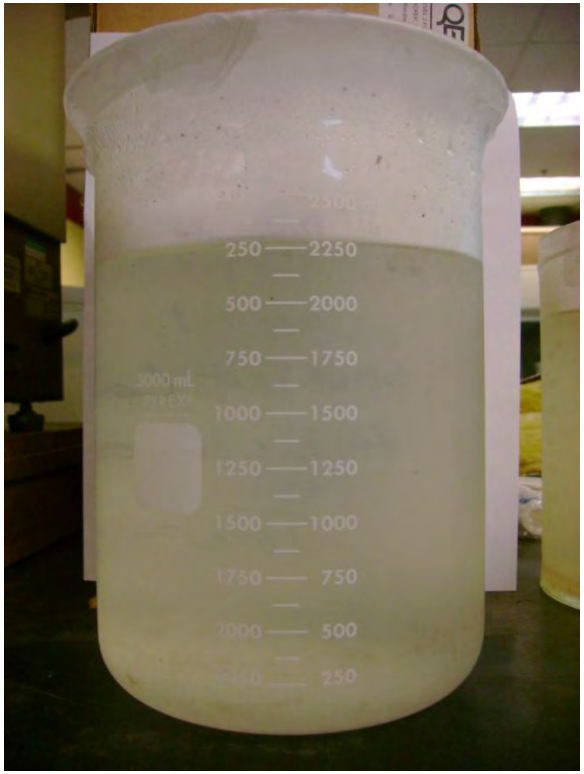
Bulk Treatment Condensate

Top Section of Bulk Treatment Condensate

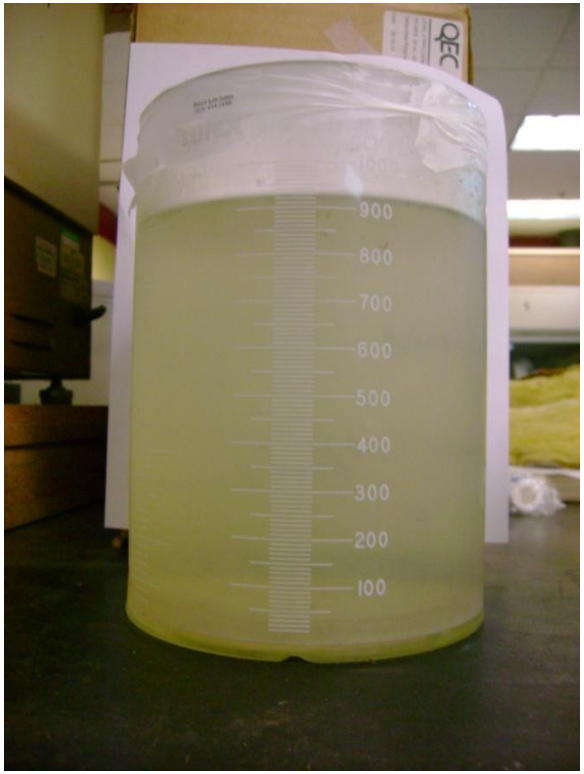
Yellow in color, density similar to oil, and odor like gasoline

*Each section of condensate was removed with low flow pump from condensate jug.

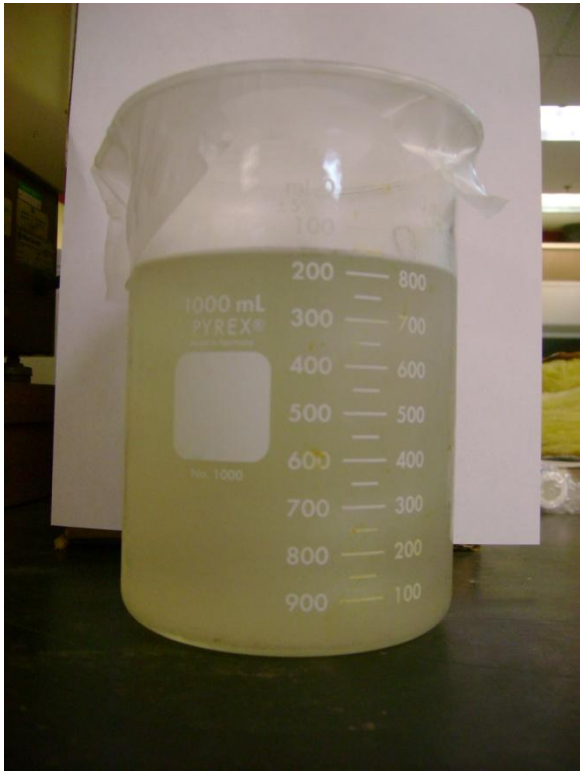
Bulk Treatment Condensate



Middle Section
1 of 3



Middle Section
2 of 3



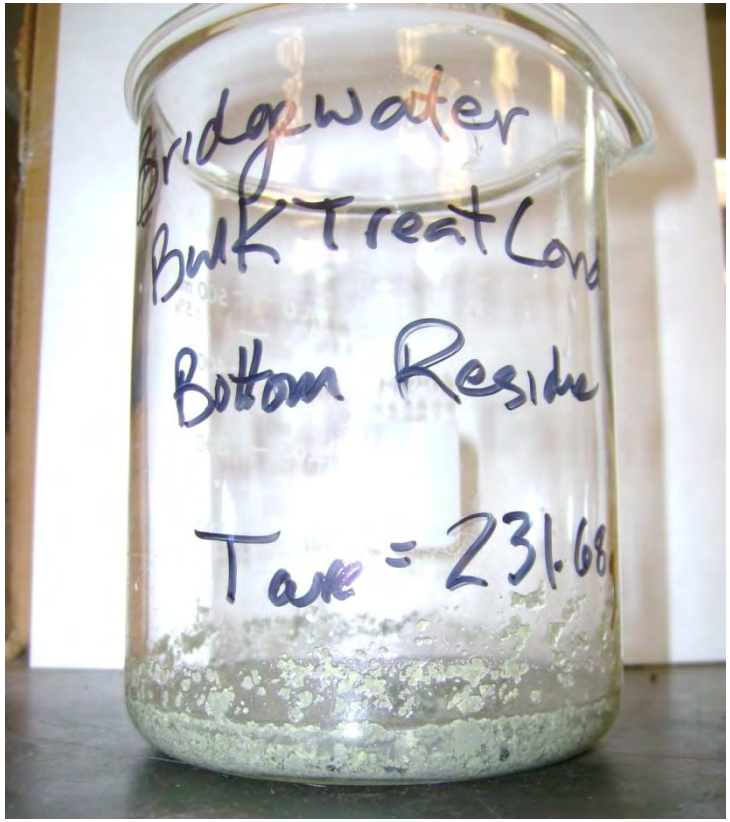
Middle Section
3 of 3

Middle Section of Bulk Treatment Condensate

Opaque cream in color (darkening towards the bottom where Residue is collected)

*Each section of condensate was removed with low flow pump from condensate jug.

Bulk Treatment Condensate



Bottom Section of Bulk Treatment Condensate

Light grayish brown in color, gritty texture, and tacky residue.

CLIENT
ACID TAR STUDY
BULK THERMAL TREATMENT: Round 2

TABLE 1

MATERIAL CHARACTERIZATION
Physical Properties Testing

Sample ID		Treatment Duration	Material Weight		Moisture Content		Treatment Range	Material Description		Post Treatment Condensate (ambient temperature after being chilled)	Bulk Treatment VOC Off Gas Monitoring
CH2M Hill ID	Kemron ID	Days	Untreated (g)	Treated (g)	Untreated (%)	Treated (%)	(^{0}C)	Untreated	Treated		
IMP1 - HC	IMP1 - HC - Bucket 1	7	13,606.5	7,053.5	62.09	6.2	96.7 - 100.6	Black, rubber like tar, shinny finish, free liquid on bottom of sample, and odor like super glue.	Black, hard and brittle like concrete, dull finish, no visible free liquid, odor like a Sharpie marker.	LEL: 28 VOC: 354ppm CO: 5 H2S: 1 Total Volume: 2.0 pH: 2.79	Day 1: PID = 36.2ppm Day 2: PID = 16.9ppm Day 3: PID = 18.4ppm Day 4: PID = 6.2ppm Day 5: PID = 4.0 Day 6: PID = 5.0 Day 7: PID = 0.0 ppm Note: the material stiill maintained a very strong chemical odor after treatment.
	IMP1 - HC - Bucket 2	7	10,782.0	5,745.0	124.24	12.0	97.3 - 111.2	Black, rubber like tar with gritty soil, shinny finish, free liquid throughout sample, and odor like super glue.	Black, hard with visble pore wholes, very shinny, no visible free liquid, odor like gasoline.	**Description:** Top Section: yellow in color, density similar to oil (floats), strong odor of gasoline. Bottom Section: Opague Cream in color, darkened in color as depth increased.	
	IMP1 - HC - Bucket 3	7	10,237.0	4,069.0	139.21	9.1	96.7 - 117.8	Black, rubber like tar with gritty soil, shinny finish, free liquid on bottom of sample, and odor like super glue.	Black, hard, very shinny, no visible free liquid, odor like gasoline.		
	IMP1 - HC - Bucket 4	7	13,482.5	7,725.0	177.09	1.6	86.7 - 104.5	Black, rubber like (crumbles when handled), non-shinny finish, no visible free liquid in sample, and odor like super glue.	Black and grey, brittle like ash, dull finish, no visible free liquid, odor like burnt hair.		

NT = Not Tested
TIP = Test in Progress

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ACID TAR STUDY:
Bulk Thermal Treatment Round 2
Impoundment 1 HC

IMP1 - HC

Untreated Material

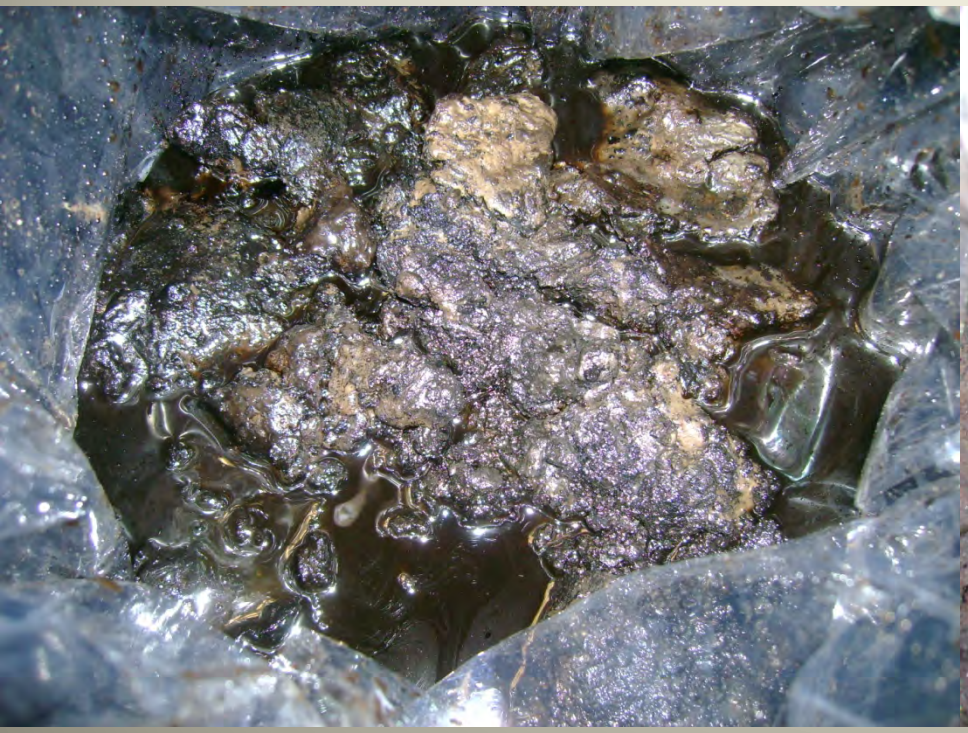
IMP1 – HC – KEMRON Bucket 1

Treated Material

IMP1 – HC – KEMRON Bucket 1

* 7 day thermal treatment

IMP1 - HC



Untreated Material

IMP1 – HC – KEMRON Bucket 2

Treated Material

IMP1 – HC – KEMRON Bucket 2

* 7 day thermal treatment

IMP1 - HC

Untreated Material

IMP1 – HC – KEMRON Bucket 3

Treated Material

IMP1 – HC – KEMRON Bucket 3

* 7 day thermal treatment

IMP1 - HC

Untreated Material

IMP1 – HC – KEMRON Bucket 4

Treated Material

IMP1 – HC – KEMRON Bucket 4

* 7 day thermal treatment

Thermal Bulk Treatment Round 2 Oven Bucket Layout

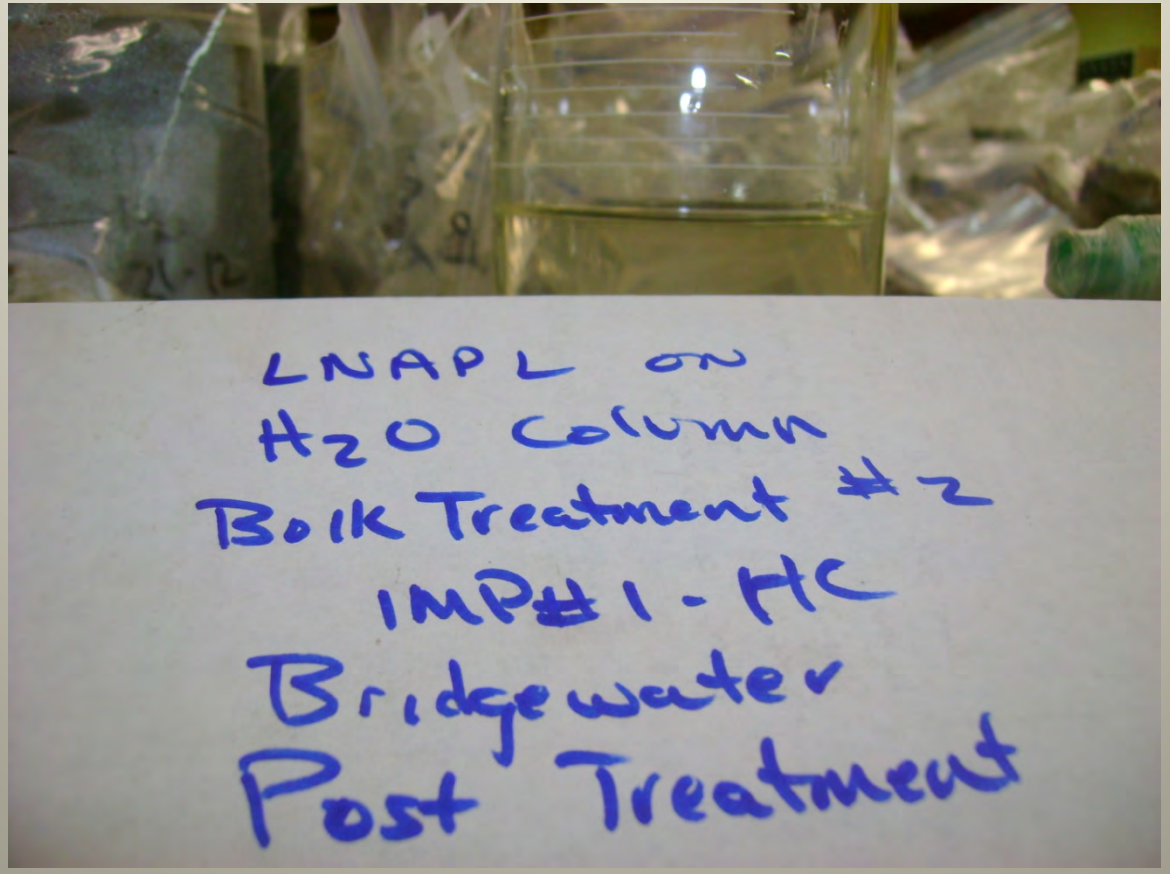
Bucket 1

Bucket 3

Bucket 2

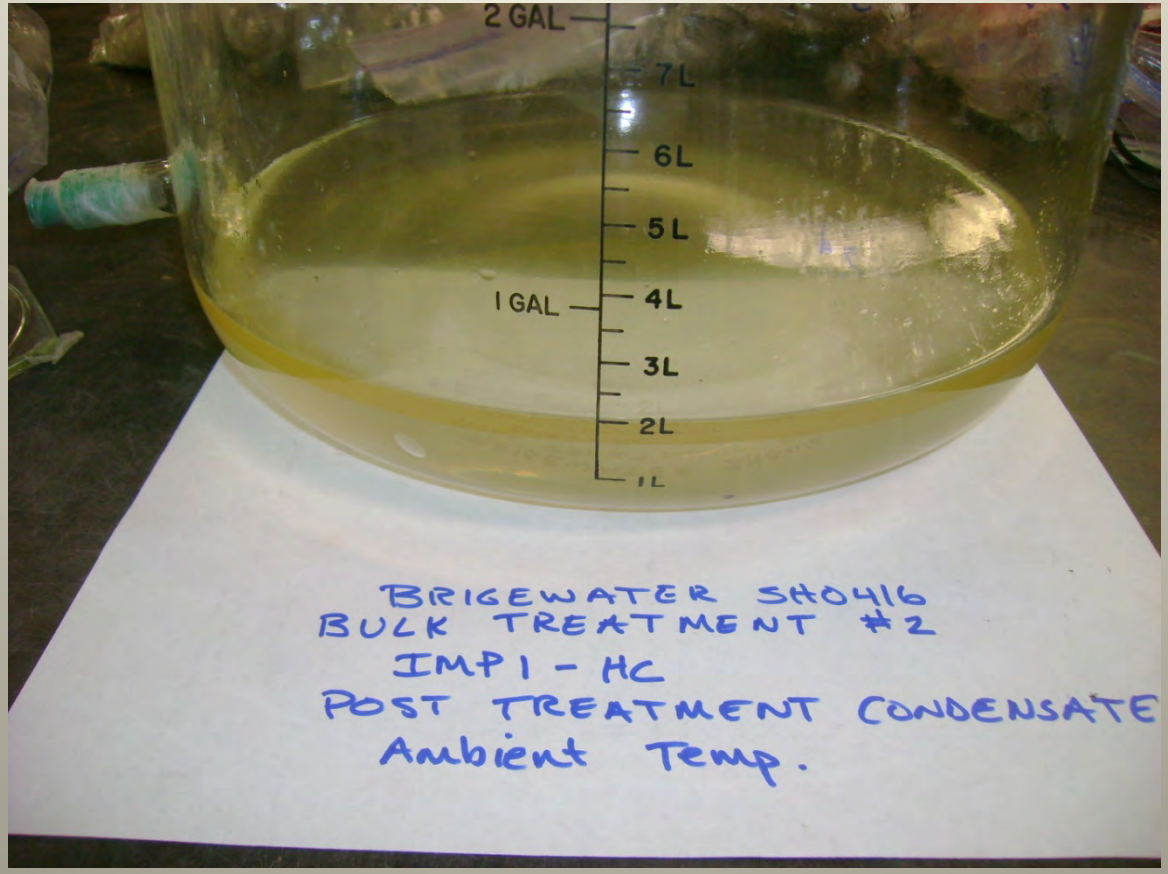
Bucket 4

LNAPL in Manometer



LNAPL collected in manometer post treatment.

Bulk Treatment Condensate

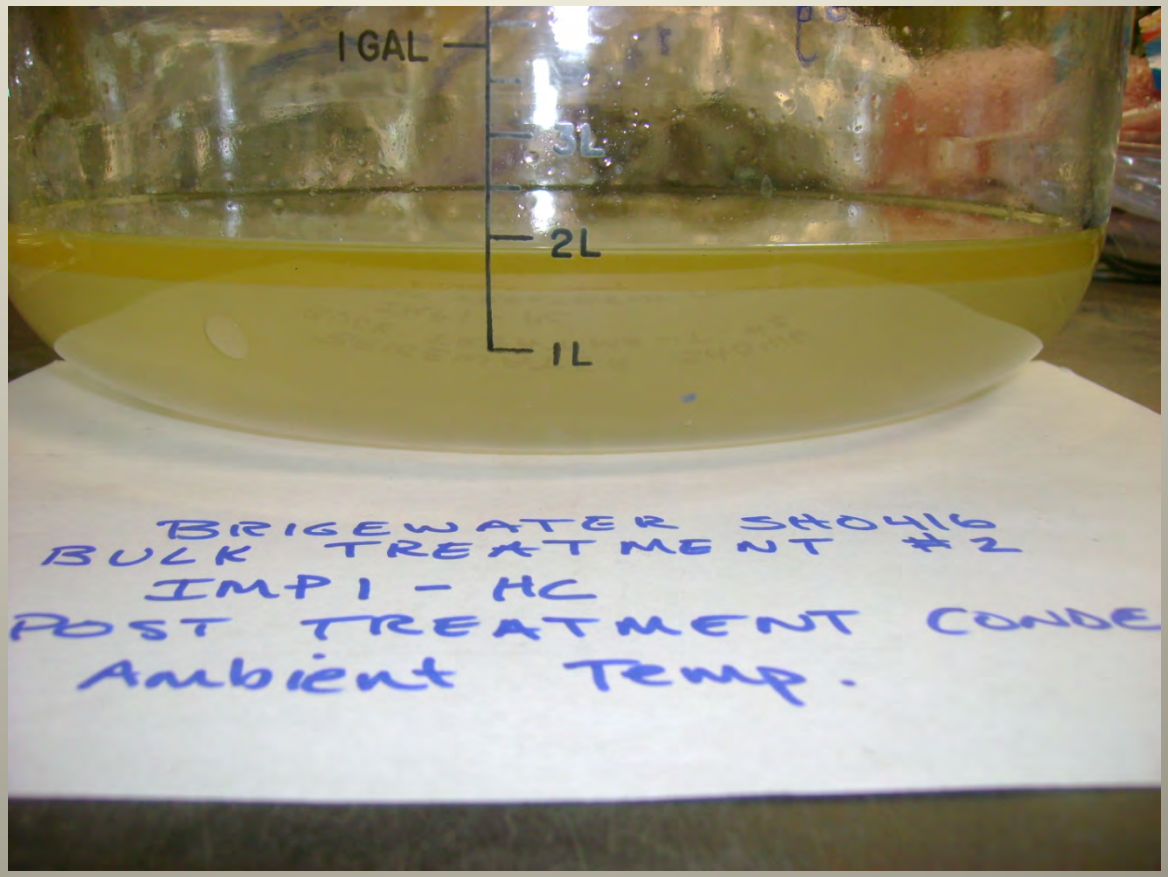


Bulk Condensate post treatment.

Bulk Treatment Condensate

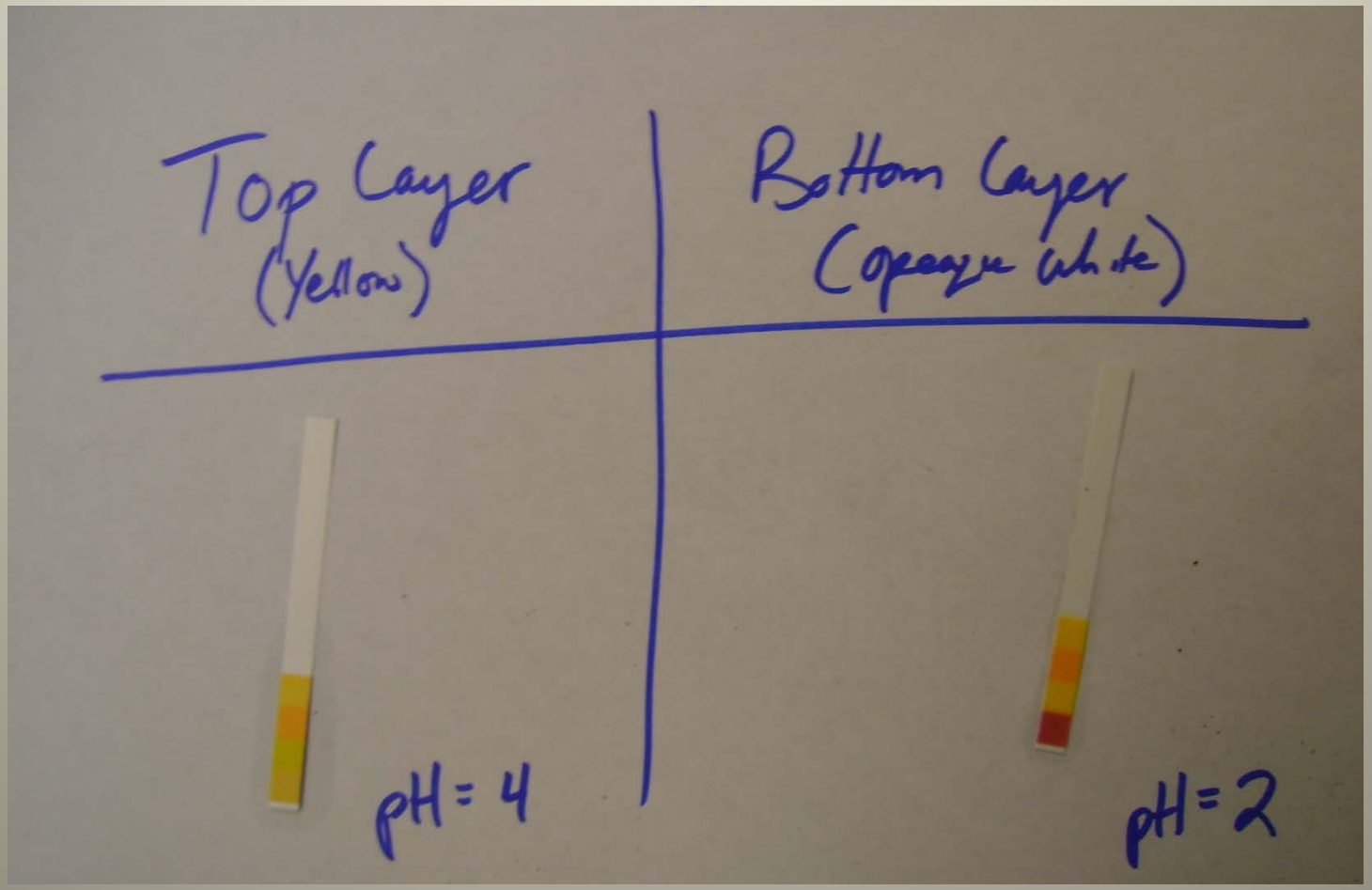
Top Layer

Bottom Layer



Bulk Condensate post treatment.

Bulk Treatment Condensate



Condensate Layer post treatment pH test.

KEMRON ENVIRONMENTAL SERVICES

CLIENT
ACID TAR STUDY
BULK THERMAL TREATMENT: Round 3

TABLE 1

MATERIAL CHARACTERIZATION
Physical Properties Testing

Sample ID		Treatment Duration	Material Weight		Moisture Content		Treatment Range	Material Description		Post Treatment Condensate (ambient temperature after being chilled)	Bulk Treatment VOC Off Gas Monitoring
CH2M Hill ID	Kemron ID	Days	Untreated (g)	Treated (g)	Untreated (%)	Treated (%)	(^{0}C)	Untreated	Treated		
IMP1 - CA	IMP1 - CA - Bucket 1	7	23,947.5	20,186.4	28.58	16.4	89.5 - 98.1	Black, visible free liquid, gritty soil texture, odor like super glue.	Light Grey, rubber like texture in bucket, brittle when forcefully removed from bucket, dull finish, no visible free liquid, air pores visible on surface, odor like "Playdough."	LEL: >55 VOC: 2527ppm CO: 155 H2S: 355 Total Volume: 9.5	Day 1: PID = NT Day 2: PID = NT Day 3: PID = 0.0 ppm Day 4: PID = 0.0 ppm Day 5: PID = 0.0 ppm Day 6: PID = 4.2 ppm Day 7: PID = 0.0 ppm
IMP1 - CL	IMP1 - CL - Bucket 2	7	16,257.0	13,823.5	42.83	70.47*	97.8 - 101.5	Drak Grey/Black color, plyable tar with gritty soil, shinny finish, free liquid throughout sample, and odor like super glue.	Drak Grey/Black color, rubber like - plyable, dull finish, free liquid on bottom of sample, and no real odor.	**Description:** Top Section: yellow in color, density similar to oil (floats), strong odor of gasoline. 2nd Section: Opague Cream in color, darkened in color as depth increased. 3nd Section: White/Grey in color, darkened in color as depth increased, strongest odor of gas than other layers. Bottom Section: Light yellow in color, odor of gas.	
IMP1 - VR	IMP1 - VR - Bucket 3	7	10,591.0	8,267.5	77.62	25.6	98.5 - 106.9	Black, rubber like tar with gritty soil, shinny finish, free liquid on bottom of sample, and odor like super glue.	Black, hard, very shinny, no visible free liquid, odor like tar glue with gasoline.		
IMP1 - SSL	IMP1 - SSL - Bucket 4	7	15,743.5	13,070.9	36.86	19.4	100.1 - 103.8	Drak Grey color, plyable tar with gritty soil, shinny finish, free liquid throughout sample, and odor like super glue.	Grey, brittle like ash, dull finish, no visible free liquid, pocket of white material (calcium), no real odor.		

NT = Not Tested
TIP = Test in Progress
* = Free moisture visibly present after treatment

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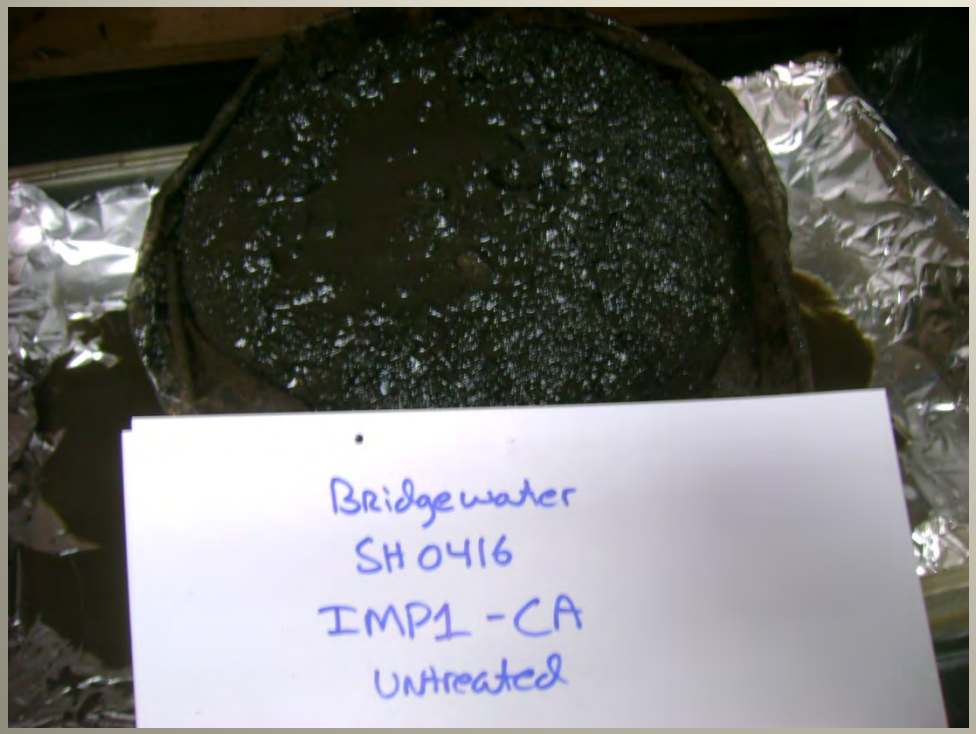
ACID TAR STUDY:
Bulk Thermal Treatment Round 3
Impoundment 1 CA, CL, VR, and SSL

IMP1 - CA



Untreated Material

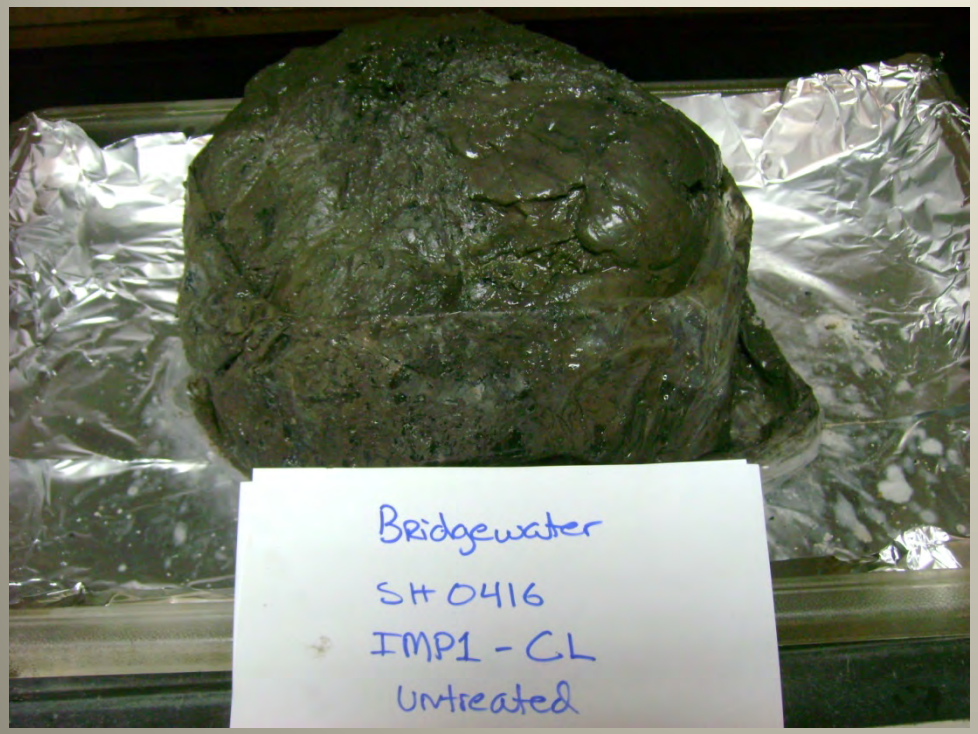
IMP1 – CA – KEMRON Bucket 1

Treated Material

IMP1 – CA – KEMRON Bucket 1

* 7 day thermal treatment

IMP1 - CL



Untreated Material

IMP1 – CL – KEMRON Bucket 2

Treated Material

IMP1 – CL – KEMRON Bucket 2

* 7 day thermal treatment

IMP1 - VR

Untreated Material

IMP1 – VR – KEMRON Bucket 3

Treated Material

IMP1 – VR – KEMRON Bucket 3

* 7 day thermal treatment

IMP1 - SSL

Untreated Material

IMP1 – SSL – KEMRON Bucket 4

Treated Material

IMP1 – SSL – KEMRON Bucket 4

* 7 day thermal treatment

Thermal Bulk Treatment Round 3 Oven Bucket Layout

Bucket 1

Bucket 2

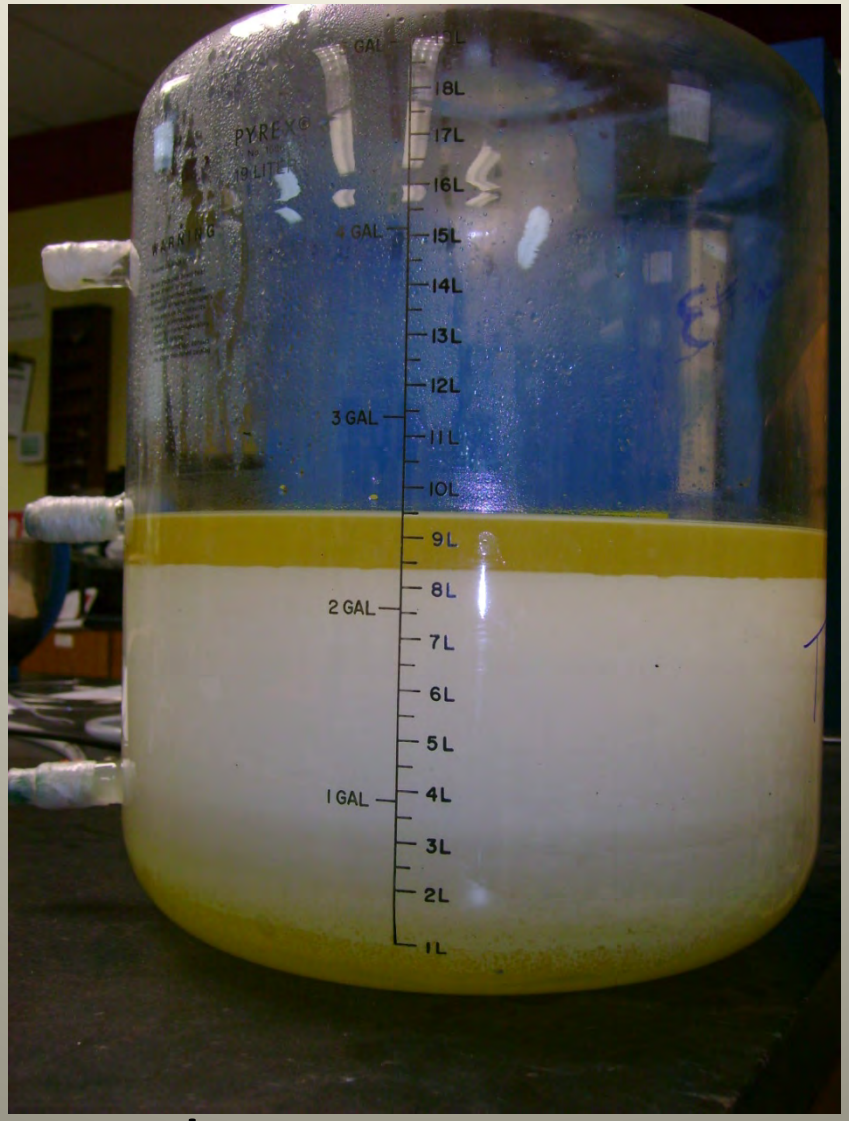
Bucket 3

Bucket 4

250mL of Tap Water in Manometer

* 210mL of Tap Water after 7 day Thermal Treatment

Bulk Treatment Condensate



Bulk Condensate post treatment.

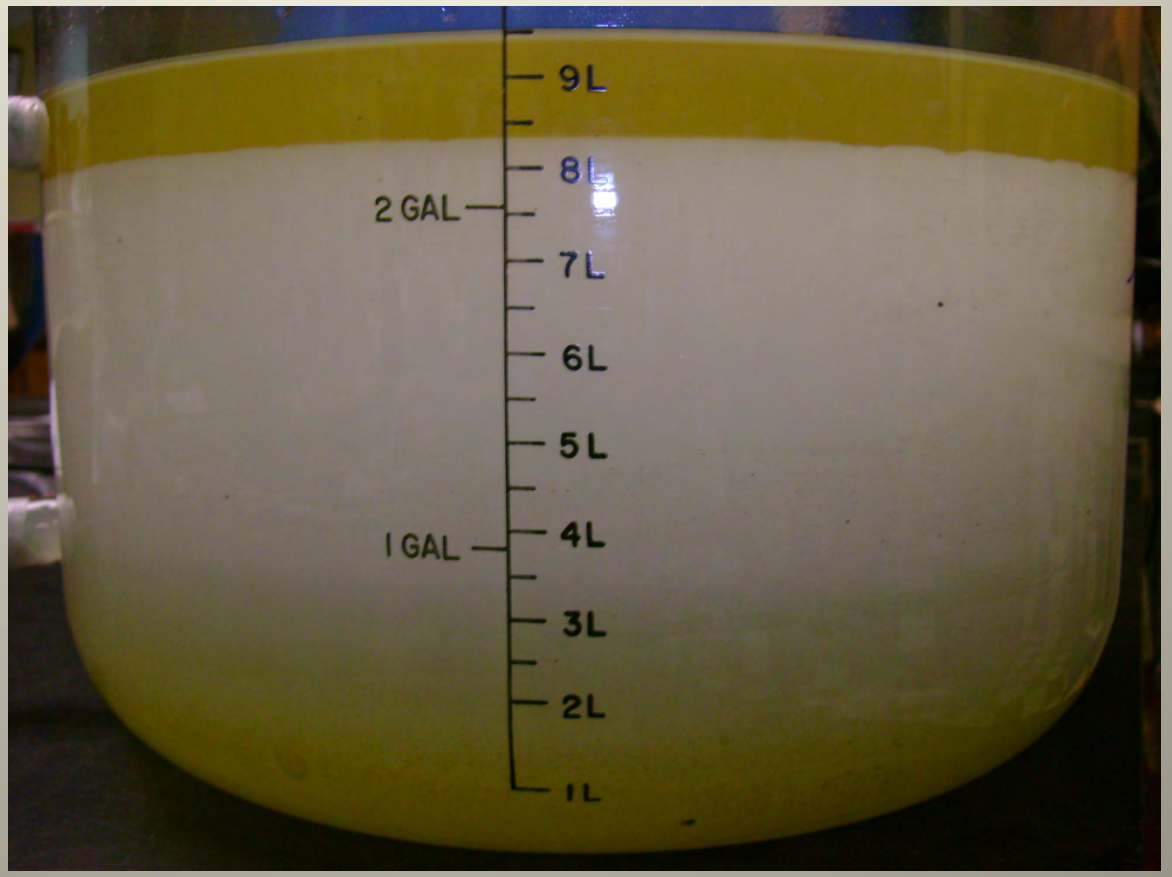
Bulk Treatment Condensate

Top Layer

2nd Layer

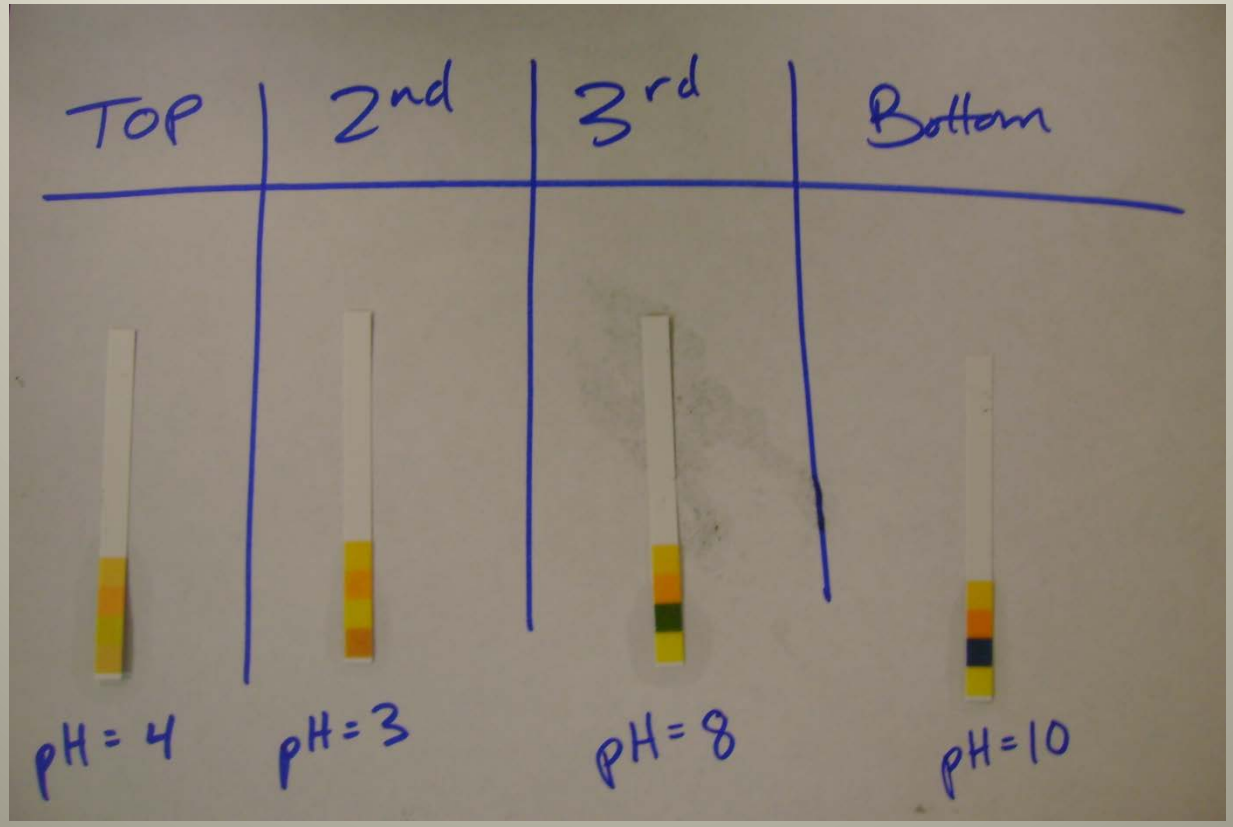
3rd Layer

Bottom Layer



Bulk Condensate post treatment.

Bulk Treatment Condensate



Condensate Layer post treatment pH test.

ATTACHMENT 3

PHOTO LOG

(TO BE PROVIDED)