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Site Assessment Report for Wilcox Refinery Bristow, Creek County, Oklahoma

Contract No. 68-W6-0013

March 1999

Prepared for:

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MEMORANDUM

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Subj: Site Assessment Report: Wilcox Refinery
Bristow, Creek County, Oklahoma
CERCLIS No. OKD001010917
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Enclosed is the site assessment report for the Wilcox Refinery site in Bristow, Creek County, Oklahoma. The report provides background information, and a detailed discussion of the sampling history and results for this site. The most significant findings are summarized in Section 6.

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1 Introduction

Pursuant to Contract No. 68-W6-0013, the U.S. Environmental Protection Agency (EPA) tasked Ecology and Environment, Inc., (E & E), the Region 6 Superfund Technical Assessment and Response Team (START) contractor, to perform a Site Assessment (SA) at the Wilcox Oil Company (Wilcox) refinery site (EPA Identification No. OKD0010917) located in Bristow, Creek County, Oklahoma. The site assessment follows a Preliminary Assessment (PA) conducted by the Oklahoma Department of Environmental Quality (ODEQ) in December 1994 (ODEQ 1994a), and an Expanded Site Inspection (ESI) performed by Roy F. Weston, Inc., for ODEQ in March 1997 (Weston 1997).

The Wilcox refinery site includes approximately 98 acres of an abandoned and demolished oil refinery and an associated tank farm area. The site is located on the northeastern outskirts of Bristow, near Interstate Highway 44 and approximately 35 miles southwest of Tulsa, Oklahoma. A site location map derived from the U.S. Geological Survey (USGS) Bristow and Slick quadrangles of the 7.5-minute topographic map series is presented in Figure 1-1. The Wilcox site is located approximately 0.2 mile east of State Highway 66, to the east of the Saint Louis and San Francisco (SL&SF) railroad tracks, and south of an unnamed section line road, variously referred to as Refinery Road or Wilcox Road. The geographic coordinates at the northwest corner of the site are approximately 35°50'30" north latitude and 96°23'00" west longitude.

START was tasked to identify the area and extent of contamination by performing a site investigation. START was specifically charged to:

- Conduct an oil spill response;
- Coordinate with federal, state, and local officials;
- Document the area and extent of spill impact;

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- Identify and document cause/probable cause;
- Provide maps, sketches, and photographic documentation;
- Prepare a waste assessment (HAZCAT);
- Conduct a SA for potential removal action under the National Contingency Plan (NCP) and Oil Pollution Act (OPA) of 1990; and
- Determine threat to navigable waters of the United States.

To meet the objectives of this program, E & E performed two phases of field work: April 27, April 28, and June 1 to June 4, 1998; and from August 3 to August 6, 1998. The first phase of field work was postponed from April to June after the collection of two soil and two sediment samples, due to saturated ground conditions at the site after heavy overnight rains. Field activities included the collection of subsurface soil, ground water, surface water, and sediment samples. The samples were submitted for laboratory analysis to determine the presence of benzene, toluene, ethylbenzene, and xylene (BTEX) compounds, polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), metals, and hydrogen ion concentration (pH). Analytical results were used to determine the presence of, and assess the threat to navigable waters from, potential site related contaminants.

2 Background Information

2.1 Site Location and Setting

This section summarizes existing information for the project site. The Wilcox refinery site is located northeast of the City of Bristow, Creek County, Oklahoma (Figure 1-1). The site covers approximately 98 acres and is the location of a former oil refinery and tank farm. Refining began at the site during the 1920s and ended in the 1960s, when the site was abandoned and most steel structures were salvaged and removed. The site is also bordered to the northwest and west by former refinery sites. The Wilcox site includes remnants of the refinery buildings, backfilled pits and ponds, and a number of circular berms that surrounded former large aboveground storage tanks. A site plan showing the layout of the site is presented as Figure 2-1.

2.2 Regional Geology and Hydrogeology

2.2.1 Geology

Based on the soil survey for Creek County, the site contains several soil series: the Stephensville and Darnell fine sandy loams, sloping and gently sloping; the Verdigris silt loam; and Oil-waste land (USDA 1959). The Stephensville and Darnell fine sandy loams cover the majority of the site. These soils consist of shallow to moderately deep upland soils developed over reddish-yellow to red sandstone or interbedded sandstone and sandy shale. Runoff is slow to moderate, but internal drainage is moderate to rapid. The site-specific soils characterized in this investigation are presented in the soil boring logs (Appendix A).

The Verdigris silt loam is located in the southwestern portion of the site, along Sand Creek. These soils occupy the flood plains of streams and are moderately well drained; however, they are flooded occasionally to frequently. Parent material consists of slightly acid to weakly alkaline alluvial sediments washed from soils of the prairies.

The Oil-waste land was mapped in discrete areas throughout the site in 1959. These soils are in the tank farm and former refinery equipment areas. The areas mapped in this miscellaneous land type have been practically ruined for agricultural use by oil and salt-water waste from oil wells and production facilities. They are generally gullied and eroded and were barren of vegetation. They ranged in size from 1 acre to several acres (USDA 1959).

2.2.2 Hydrogeology

The Barnsdall Formation is approximately 200 feet thick at the Wilcox site and consists of massive to thin beds of coarse to fine grain sandstone, irregularly interbedded with sandy to silty shale (USGS 1977). Sandstone outcrops of the Barnsdall Formation are common throughout the site, and potentially receive groundwater recharge from downward infiltration of direct precipitation at the surface, as well as infiltration from shallow, perched ground water zones. The Barnsdall Formation is a bedrock aquifer but is not considered to be a Principal Ground Water Resource by the Oklahoma State Department of Health (OSDH) (ODEQ 1994a). However, the site is in close proximity to the Vamoosa-Ada aquifer, an important central Oklahoma regional drinking water aquifer, located west of the site. The site is within the potential recharge area for the Vamoosa-Ada aquifer, as shown in Figure 2-2 (OSDH 1983).

The upper part of the Barnsdall Formation and the Sand Creek alluvial aquifer are unconfined, with a shallow water table. The site is in a potential recharge area and thus is susceptible to ground water contamination from petroleum waste or contaminated soils. Depths to seasonal perched water zones are less than 10 feet and the shallowest regional water bearing formation is reportedly less than 25 feet below ground surface (bgs) (ODEQ 1994a). However, a depth of 45 to 60 feet was reported for the first water saturated sandstone in a nearby former domestic water well ((b) 1998). In summary, the possible ground water contamination mechanisms occurring at the site are 1) recharge to the shallow part of the Barnsdall Formation on site, 2) low potential recharge to the Vamoosa-Ada aquifer west of the site, and 3) discharge of perched ground water to the alluvial aquifer along Sand Creek to the south.

2.3 Site Description and History

2.3.1 Site Description

The Wilcox site includes remnants of an inactive oil refinery and associated tank farm. According to ODEQ personnel, the site boundaries have been revised from those defined in the 1994 PA to include only those areas in which Wilcox Oil Company conducted operations. Although Wilcox Oil Company owned property west of the railroad tracks (currently occupied

by the First Assembly of God Church and pastor's residence), the facility only operated on the lands east of the SL&SF tracks. Other refineries operated on the west side of the railroad tracks (Lorraine Refinery) and north of Refinery Road (Ohio Oil). The current project site covers approximately 98 acres and includes the northern portion of Section 29, Township 16 North, Range 9 East (Indian Meridian) (ODEQ 1994b). The site can be divided into two former operational areas, the refinery area, and the tank farm, with four current property owners, as described below.

The former refinery area, currently owned by (b) (6) and his son (b) (6), is fenced and covers approximately 18 acres at the west end of the project site (ODEQ 1994b). This area is bounded to the south by Sand Creek, to the east by an intermittent tributary to Sand Creek (Tributary 1), by the SL&SF railroad tracks to the west, and by Refinery Road to the north (Figure 2-1). Most of the refinery structures and tanks have been salvaged and removed or are in ruins. Four empty aboveground storage tanks (less than 150,000 gallons capacity each) remain standing on the refinery portion of the property, in addition to a substantial number of abandoned structures, rusted equipment, and partially buried pipelines. The ESI identified a number of potential waste source areas, and provided a basis for further subsurface investigation. These potential waste source areas are depicted in Figure 2-3, along with observed surface drainage pathways from sources toward stream channels. The bare, unvegetated area located in the south-central portion of the refinery area is a former pond, apparently backfilled with solid refinery process waste. This material was subject to HAZCAT testing, as described in Section 3.6. A former refinery office building in the northern part of the refinery has been converted to a residence. An intermittent creek (Tributary 1) flows southward along the eastern edge of the refinery area through a small dam in the southeast corner of the refinery area ((b) Pond) and into Sand Creek.

The former tank farm, currently mostly owned by (b) (6), covers approximately 80 acres and contains waste pits, ponds, and a number of circular berm areas that surrounded former large ASTs (Figure 2-3). All of the tanks have been cut down and removed for salvage; however, visible remnants of the metal tank bottoms and tank bottom sludge (TBS) remain. Many of the berms surrounding the pits, ponds, and former tanks have recently been cut or leveled to prevent ponding and, in some cases, to release liquid tarry waste from the impoundments. An intermittent creek (Tributary 2) is located in the eastern portion of the tank farm and flows south to Sand Creek (Figure 2-3).

Mr. (b) (b owns 3.6 acres of land in the west central portion of the site, including a stock watering pond on Tributary 1 (b) Pond). Three people, Mr. and Mrs. (b and their daughter, live at the (b residence. The (b) raise chickens, rabbits, and cattle on their property. Based on aerial photographs, the (b residence appears to be on top of a former refinery surface impoundment. Aerial photos also indicate that their property includes portions of a former large aboveground storage tank berm area to the north of their house, in addition to a second surface impoundment to the south of the house (Figure 2-3).

A 1.15-acre, fenced, former pipeline pumping station that is currently owned by Sun Oil Company exists in the north-central portion of the site (Figure 2-3). An active Williams Company petroleum pipeline extends from southeast to northwest across the middle of the site and through the Sun Oil property, on a leased right-of-way (ROW). The pipeline ROW apparently dates from the time of purchase by Wilcox Oil Company in 1929 (Table 1; Figure 2-3).

2.3.2 Site History

Wilcox Oil Company operated as a crude oil refinery from the 1920s until the property was sold in November 1963 (ODEQ 1994b). According to a 1930 article published in *The Refiner and Natural Gasoline Manufacturer*, the Wilcox Oil Company refinery was operated as a pilot project from about 1920 to 1928, with a capacity of 1,000 barrels of oil per day, by Riley Petroleum Company (Reid 1930, cited by ODEQ 1994b). Wilcox Oil Company acquired the original 10-acre refinery property (NE¼, NW¼, NW¼ of Section 29) in 1928 from (b) (b) (6) (ODEQ 1994b). A modernized skimming and cracking plant was constructed in 1929. The upgraded facility had an operating capacity of 4,000 barrels of crude oil per day. The main components of the system consisted of a skimming plant, cracking unit, and redistillation battery with a vapor recovery system and continuous treating equipment. The crude oil was brought directly from the nearby oil fields, eliminating some storage and handling facilities, but resulting in crude with high bottom sediment and water content (ODEQ 1994a).

At some unknown later date, the Wilcox Oil Company expanded operations by acquiring the former Lorraine refinery facility located west of the SL&SF railroad, and the tank farm area to the east of the refinery. The company sold the original site plus the expanded areas, totaling approximately 110 acres, to Wendel Sandlin on November 1, 1963. Most of the equipment and storage tanks that remained on site in 1963 were auctioned and have since been salvaged for scrap iron by private landowners and opportunistic salvagers. The Wilcox Oil Company no longer operates in Oklahoma, and, based on information acquired from the Oklahoma Secretary

of State's Office, the company merged with Tenneco Oil Company in 1967. According to file information, (b) (6) acquired the original refinery property from (b) (6) on March 27, 1973 (ODEQ 1994b). (b) (6) acquired the bulk of the current Wilcox site from (b) (b) in 1993 (Appendix B). A summary of current site owners and historical property transfers is presented in Table 2-1.

2.4 Previous Investigations

The EPA completed a Potential Hazardous Waste Site Identification form on June 7, 1994. In response, the ODEQ completed a PA for the Wilcox site and adjacent refinery and tank farm sites, on December 15, 1994. The PA indicated that contamination of soil and ground water at the site had been observed and that potential receptors exist for these pathways (ODEQ 1994a). The PA then recommended a site inspection be conducted in order to better characterize the site and to determine whether threats to human health and the environment exist. The ESI was conducted by Roy F. Weston (Weston) for ODEQ in November 1996, and their results were presented in the ESI report dated March 1997.

The ESI revealed the presence of numerous backfilled ponds and oily waste pits, 11 large tank bottom areas, assorted waste disposal areas, and other potential contaminant sources (Figure 2-3). Many of the tank bottom areas contained a thin layer of oily, tarry, black asphalt-like material generally referred to as tank bottom sludge (TBS). Former containment features of the impoundments and tank bottom areas were cut or leveled after site closure, thus facilitating surface migration of source contaminants. Based on surface soil, stream sediment, and oily waste sampling results from the ESI, the contaminants of concern at the site are total petroleum hydrocarbons (TPH), benzene, selected polycyclic aromatic hydrocarbons (PAHs), and selected metals. A summary of the ESI analytical results is presented in Table 2-2.

E & E conducted a site discovery survey under OPA in June 1997, and two site reconnaissance visits were performed by START in March and April 1998. During its site visits, START observed that the site owners had filled in Pond 1 and the 'oily waste' pit with site soil. The berm surrounding Pond 2 was breached and the pond drained toward Sand Creek. Four ASTs still remain on the (b) property at the west end of the site. Of these ASTs, two are empty, and two contain thin layers of watery, oily sludge.

2.5 Hazards/Incidents of Concern

The presence of hazardous substances at the site is a concern. There are possible concerns associated with the sources at the site and the migration of, or exposure to, site-

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attributable hazardous substances through the ground water, surface water, soil exposure, and air pathways. The site overlies a shallow unconfined aquifer that private residents north of the site use as a water source. In addition, the site overlies a potential recharge zone to the Vamoosa-Ada aquifer, a public water supply source. A release to surface water is of concern because of the proximity to surface water bodies and the lack of containment structures around potential waste sources. Wetland frontages occur in the downstream segments of Sand Creek, and further downstream in the Little Deep Fork Creek (Weston 1997). Areas of known surface soil and suspected subsurface soil contamination are located near and beneath on-site residences. However, on-site sources occur within fenced sections of private properties and the nearby population is relatively small. A release to the air to the nearby population is of some concern because of the known surface soil contamination at the site.

Table 2-1

LAND OWNERSHIP HISTORY
WILCOX REFINERY, BRISTOW, OKLAHOMA

Address	Acreage (Parcel Location On Site)	Property Owners	Date of Transfer
[redacted]	18 (Western 1/5th)	[redacted]	1/22/79[1]
		[redacted]	3/27/73[1]
		[redacted]	4/21/67[1]
		[redacted]	3/6/67[1]
		[redacted]	7/15/66[1]
		[redacted]	11/1/63[1]
		Wilcox Oil Company	1/4/29[1]
		[redacted]	Unknown
[redacted]	78.85 (Eastern 4/5th)	[redacted]	1993[2]
		[redacted]	1992[3]
[redacted]	3.6 (West Central)	[redacted]	1/95[3]
		[redacted]	Unknown
[redacted]	1.15 (North West Central)	Sun Pipeline Co.[4]	Unknown

Key:

1 = Potentially Responsible Party (PRP) Search, Oklahoma Department of Environmental Quality (ODEQ), 12/12/94
2 = [redacted] Personal Communication, 7/17/98
3 = [redacted] Personal Communication, 7/28/98
4 = [redacted] Personal Communication, 7/21/98

Table 2-2

SUMMARY OF EXPANDED SITE INSPECTION
ANALYTICAL RESULTS
WILCOX REFINERY, BRISTOW, OKLAHOMA

Analyte	Maximum Concentration (mg/kg)			
	Oily Waste	Surface Soil	Stream Sediment	Background Soil
Acetone	2.2	48J		ND
Benzene	0.27			ND
Toluene				ND
Ethylbenzene				ND
Xylenes				ND
Benzo(ghi)perylene		0.44		ND
Chrysene		0.69		0.05
2-Methylnaphthalene	1,400			ND
Phenanthrene	520	0.79		0.034
Pyrene	260J	0.56		0.062
Pesticides/PCBs				ND
Total Petroleum Hydrocarbons	875,000	NA	NA	NA
Aluminum	22,100			5,580
Antimony	7.7			ND (4)
Arsenic	8.7			1.5
Barium	191			58.2
Beryllium	1.2			0.28
Copper	100	127	5.5 (upstream)	5.3
Cyanide	2			ND (0.7)
Lead	47,000	55,049J	117J (upstream)	26.3
Magnesium	5,080		6,260 (upstream)	744
Manganese	938			233
Mercury	0.11	0.18		ND (0.07)
Potassium	3,300			961
Selenium	0.84			ND (1)
Silver	2			ND (1)
Vanadium	38.1			11.2
Zinc	160	132	31.7 (upstream)	34.8

Note: Blank spaces indicate analyte was not detected at concentrations greater than three times background soil concentrations.
Shaded results exceed one or more To Be Considered materials in Section 5.1.1.

Key:

ESI - Expanded Site Inspection, Roy F. Weston, Inc., March 1997
J - Estimated value
L - Reported concentration is between the instrument detection limit and the CRDL
NA - Not analyzed
ND - Not detected
mg/kg - Milligrams per kilogram

3 Actions Taken

This section describes the field activities performed during the SA at Wilcox refinery. Field activities were performed in accordance with the *Sampling QA/QC Work Plans* and *Health and Safety Plan* developed for the site (E & E 1998a, b, c). Copies of the Phase 1 and 2 Work Plans, and the Health and Safety Plan are presented in Appendices C and D, respectively. Field activities were documented in the field logbook (Appendix E) and with photographs (Appendix F).

3.1 Source Evaluation and Sample Locations

Subsurface soil and ground water samples were taken in order to assess contaminant migration (vertical and horizontal), investigate geologic conditions, and determine the potential threat to navigable waters. Site access was obtained from each landowner prior to field mobilization (Appendix G). Samples collected during the first phase of work were generally collected at downgradient locations in relation to potential source areas identified from the ESI. The second phase of sampling concentrated on assessing the potential impacts to surface waters in Tributaries 1 and 2, from known source areas identified from the ESI and from the first phase sampling results. A summary of the rationale for each sample location is presented in Appendix H.

Soil, ground water, surface water, and sediment samples were collected at the site in order to identify site-related contaminants in environmental media. A total of 55 subsurface soil samples, eight groundwater samples, four surface water samples, two sediment samples, and 12 field quality control (QC) samples were collected. A summary of the number and dates of samples collected for each phase of field work, and for each sampling medium, is presented in Table 3-1. The samples were submitted for laboratory analysis to determine the presence of volatile BTEX compounds, semi-volatile PAHs, TPH, metals, and pH. A summary list of the

analyses performed for each medium sampled is presented in Table 3-2. All first phase samples were shipped via Federal Express to the E & E Laboratory in Buffalo, New York, and the second phase samples were shipped to PDP Analytical Services in Houston, Texas. All analytical results are presented and evaluated in Section 4.

3.2 Soil Coring/Sampling

START used a Geoprobe™ hydraulic push sampler to initiate the first phase of field work in April and June 1998, to explore subsurface lithology, and determine the presence of site-related contaminants. Twenty-eight samples from nineteen 2-inch diameter soil cores were obtained to a maximum depth of 20 feet bgs within potential source areas. Samples were first logged by the field geologist, screened for the presence of volatile organic vapors using an HNu photoionization detector (PID), and transferred by hand from the acetate collection sleeves to the appropriate sample jars. Each borehole was sealed with bentonite pellets after sample collection.

In addition, during the second phase of field work in August 1998, a total of 27 hand-driven, slam-bar borings were advanced to obtain shallow subsurface soil samples and/or perched ground water samples. The location of all soil borings is shown in Figure 3-1. The Geoprobe™ soil cores and hand-driven samples were also used to interpret site-specific lithology, which is presented on boring logs in Appendix A. A summary of soil boring parameters for each location including total depth, depth to water if encountered, depth to bedrock if present, and observations of contamination, is presented in Table 3-3. The areal distribution of the depth to bedrock data is also depicted in Figure 3-2.

Fifty-five soil samples and six duplicates were collected from the subsurface (Table 3-2). The soil samples submitted to the laboratory were analyzed for BTEX compounds using EPA Method 8015B Mod., for PAHs using EPA Method 8310, for TPH using the Texas Natural Resource Conservation Commission (TNRCC) Method 1005, for metals using EPA Method 6010B, and for soil pH using EPA Method 9045C (Table 3-2). Soil sampling results are presented in Section 4.1.

3.3 Ground Water Sampling

Eight ground water samples and one duplicate were collected at the water table where encountered (Table 3-1). All ground water sample locations and the associated soil borings are depicted in Figure 3-3. Samples were obtained where possible from open soil borings using the

stainless steel or acetate soil sampling tubes as bailers. Samples were placed in the appropriate containers, and cooled to 4° Celsius. Ground water samples were submitted for laboratory analysis to determine the presence of BTEX compounds and TPH. Ground water sampling results are presented in Section 4.2.

3.4 Surface Water Sampling

Four surface water samples and one duplicate were collected near the water surface from the upstream (north) and downstream (south) ends of (b) pond; and from the upstream and downstream ends of Tributary 2 at the property boundaries. All surface water sample locations are depicted in Figure 3-3. Samples were obtained directly in the appropriate containers, at or near the water surface. Samples were cooled to 4° Celsius and submitted to the laboratory for analysis of BTEX compounds and TPH (Table 3-2). Surface water sampling results are presented in Section 4.3.

3.5 Sediment Sampling

Two sediment samples were collected to fill a data gap in the ESI sampling program, and to evaluate the potential for contaminant migration from Pond 2 toward Sand Creek. Sediment samples were collected at the surface from depositional features in the drainage channel, using dedicated stainless steel sampling trowels. The sediment samples submitted to the laboratory were analyzed for BTEX, PAHs, TPH, metals, and pH (Table 3-2). Sediment sampling results are presented in Section 4.4.

3.6 HAZCAT Testing

START performed a series of simple field chemistry tests on one soil sample collected from the unvegetated area on the (b) (6) property, in the west central portion of the site. The tests are designed to identify the hazard category (HAZCAT) of unknown samples in the following classifications: solubility/specific gravity, acid/base, oxidizer, flammable, chlorinated hydrocarbon, cyanide, sulfide, and hazard class. The HAZCAT test results are presented in Section 4.5.

3.7 Global Positioning System and Total Station Survey

Geographic coordinates of all soil boring locations were determined by START by using a hand-held Global Positioning System (GPS) instrument operating in autonomous mode, based on the North American Datum-83, with accuracy estimated at +/- 50 feet circular error probable.

The accuracy of the GPS survey is not deemed appropriate for the location of sampling points which are located manually in Section 3 figures to an estimated accuracy of ± 20 feet circular error.

A preliminary land survey was conducted by START on August 8, 1998 using a Sokkia Set-4E Total Intelligent Station surveying instrument. The main purpose of the survey was to determine elevations; and northing and easting locations of the steep embankment area near sampling location SB05 and Tributary 2 relative to a site benchmark established at the SL&SF railroad crossing on Refinery Road. It was anticipated that cross-sectional views of the former tank berm and Tributary 2 stream bank would be required to evaluate the probable migration of hydrocarbon contamination in SB05 toward the stream. However, no contaminants were detected in the second phase soil borings designed to assess the expected subsurface migration pathway, and no further topographical evaluation is required in this vicinity.

Table 3-1

SUMMARY OF THE NUMBER OF SAMPLES COLLECTED
WILCOX REFINERY
BRISTOW, OKLAHOMA

Medium	Depth Range (inches, feet-bgs)	Number of Samples	Date(s) Sampled
Phase 1			
Geoprobe™ Soil	0 to 15 feet	28	4/27 - 6/4/98
Soil Duplicate	0 to 15 feet	3	6/1 - 6/3/98
Ground Water (GW)	2 to 16 feet	5	6/1 - 6/3/98
GW Duplicate	7 to 8 feet	1	6/3/98
Sediment	0 to 3 inches	2	4/28/98
Trip Blank	NA	2	6/2 - 6/3/98
Phase 2			
Slam-bar Soil	0 to 3 feet	16	8/4 - 8/6/98
Soil Duplicate	0 to 3 feet	1	8/6/98
JMC® Boring Soil	2 to 12 feet	11	8/4 - 8/6/98
Soil Duplicate	2 to 12 feet	2	8/5 - 8/6/98
Ground Water	6 to 8 feet	3	8/5 - 8/6/98
Surface Water (SW)	NA	4	8/4 - 8/6/98
SW Duplicate	NA	1	8/5/98
Trip Blank	NA	2	8/4 - 8/6/98
TOTAL		**81**	

Key:

bgs - below ground surface
NA - Not applicable

Table 3-2

SUMMARY OF THE ANALYTICAL PROGRAM
WILCOX REFINERY, BRISTOW, OKLAHOMA

Medium	Number of Samples[a]	BTEX[b] 8021B Mod.	TPH[c] 1005	PAHs[d] 8310	Metals[e] 6010B	pH[f] 9045C
Soil	61	X	X	X	X	X
Ground Water	9	X	X*			
Surface Water	5	X	X			
Sediment	2	X	X	X	X	X
Trip Blank	4	X				
TOTAL	**81**					

Key:

a - Includes all media, duplicates, and field quality control samples collected
b - Benzene, toluene, ethylbenzene, and xylenes by GC Method 8021B Modified
c - Total petroleum hydrocarbons by GC Method 1005 per TNRCC
d - Polycyclic aromatic hydrocarbons by HPLC Method 8310
e - 23 metals by ICP Method 6010B
f - Hydrogen ion concentration expressed in negative log units by Method 9045C
* - TPH was not analyzed in Sample GW08 due to low sample volume

Table 3-3

SOIL BORING PARAMETERS
WILCOX REFINERY, BRISTOW, OKLAHOMA

Soil Boring Number	Total Depth (feet)	Depth to Water (feet)	Depth to Bedrock (feet)	Field Observation of Contamination
SB-X	6.0	0.0*	6.0	None observed
SB-1	11.0	0.0*	11.0	Black staining with strong petroleum odor noted from 0.0 to 10 feet bgs
SB-2	2.1	Not encountered	2.1	None observed
SB-3	1.5	Not encountered	1.5	None observed
SB-4	5.0	Not encountered	5.0	Trace dark petroleum staining with slight petroleum odor at 4-feet bgs
SB-5	20.0	15.5	Not encountered	Petroleum odor throughout, trace oil product (0-3'), slight staining (4-8'), sheen on groundwater
SB-6	2.2	Not encountered	2.2	None observed
SB-7	5.0	Not encountered	5.0	None observed
SB-8	2.0	Not encountered	2.0	None observed
SB-9	2.2	Not encountered	2.0	None observed
SB-10	4.3	Not encountered	4.0	None observed
SB-11	3.0	Not encountered	3.0	None observed
SB-12	9.0	8.9	9.0	None observed
SB-13	10.0	8.0	Not encountered	Slight to strong petroleum odor noted from 4.0 to 7.5 feet bgs
SB-14	11.0	4.5	Not encountered	Sulfurous, anaerobic decay odor throughout
SB-15	3.1	1.0	3.1	Fill material throughout, consisting of black cinder or ash
SB-16	6.5	4.0	6.5	Petroleum odor noted from 1.1 to 6.1 feet bgs
SB-17	11.5	6.3	Not encountered	Petroleum odor noted from 4.0 to 6.3 feet bgs
SB-18	13.5	8.0	Not encountered	Old gasoline odor throughout, free-phase petroleum product on groundwater
SB-19	8.0	Not encountered	8.0	Petroleum odor and staining noted from 0.0 to 5.2 feet bgs
SB-20	3.0	Not encountered	Not encountered	None observed
SB-21	3.0	Not encountered	Not encountered	None observed
SB-22	3.0	Not encountered	Not encountered	None observed
SB-23	3.0	Not encountered	Not encountered	None observed
SB-24	2.0	Not encountered	2.0	Petroleum odor and staining noted at 2.0 feet bgs
SB-25	3.0	Not encountered	Not encountered	None observed
SB-26	3.0	Not encountered	Not encountered	None observed
SB-27	3.0	Not encountered	Not encountered	None observed
SB-28	2.0	Not encountered	Not encountered	None observed
SB-29	1.0	Not encountered	Not encountered	None observed
SB-30	3.0	Not encountered	Not encountered	Petroleum odor and staining noted 0.0 to 1 feet bgs
SB-31	3.0	Not encountered	Not encountered	Petroleum odor and staining noted 0.0 to 1 feet bgs
SB-32	1.0	Wet throughout	Not encountered	Petroleum odor and staining noted 0.0 to 1 feet bgs
SB-33	1.0	Wet throughout	Not encountered	Petroleum odor and staining noted 0.0 to 1 feet bgs
SB-34	1.0	Wet throughout	Not encountered	Petroleum odor and staining noted 0.0 to 1 feet bgs
SB-35	3.0	Not encountered	Not encountered	Strong petroleum odor from 0 to 3 feet bgs
SB-36	9.0	6.5	Not encountered	Slight petroleum odor noted from 0 to 1 feet bgs
SB-37	9.0	6.5	Not encountered	None observed
SB-38	9.0	1.0	Not encountered	None observed
SB-39	9.0	1.0	Not encountered	None observed
SB-40	6.0	3.5	Not encountered	None observed
SB-41	6.0	2.5	Not encountered	None observed
SB-42	6.0	2.5	Not encountered	None observed
SB-43	9.0	6.5	Not encountered	None observed
SB-44	6.0	4.5	Not encountered	None observed
SB-45	9.0	1.0	Not encountered	None observed
SB-46	12.0	Not encountered	Not encountered	Strong petroleum odor and staining from 0.0 to 12.0 feet bgs

Key:
* - Boring was completed on April 27, 1998. Due to 4 inches of rainfall on April 26, the ground surface was saturated
bgs - Below ground surface

4 Nature and Extent of Spill Impact

The nature and extent of the spill impact at Wilcox refinery was assessed using field and analytical laboratory data. A summary of analytical results is discussed below by sampling media. Table 4-1 presents organic analytical results for sediment and subsurface soil samples, Table 4-2 presents inorganic analytical results for sediment and subsurface soil samples, and Table 4-3 presents analytical results for ground water samples. Analytical results for soil are reported as milligrams per kilogram (mg/kg), and all ground water data are presented in milligrams per liter (mg/L). The complete analytical data package from the sampling program at Wilcox is presented in Appendix I. The overall analytical data quality is assessed in Section 4.6 and summarized in Table 4-4. A preliminary estimate of the waste quantity on site based on a spatial evaluation of the analytical data is presented in Section 4.7, and summarized in Table 4-5.

The soil, ground water, surface water, and sediment analytical data were reviewed and qualified under U.S. EPA data validation guidelines (U.S. EPA 1994a, 1994b). Data qualifiers are assigned in the data tables when necessary, to indicate that caution should be exercised when using these results. The significance of detected analyte concentrations for each medium is evaluated in Section 4.6, based on comparison with selected chemical-specific regulatory criteria. For data presentation purposes, only site data greater than regulatory screening levels to be considered (TBC) materials for any organic sample (Table 5-1) or '20 times' toxicity characteristic leaching procedure (TCLP) inorganic criteria (Table 5-2), are presented. Further discussion of organic and inorganic TBCs can be found in Section 5.

4.1 Soil Analytical Results

A total of 55 soil samples were collected from 46 soil borings and analyzed for BTEX compounds, TPH, and PAHs (organics); and for metals and pH (inorganics). The soil sampling results are presented below for each type of analysis.

4.1.1 Organics

Twenty-five organic compounds were detected in site soil, including all four BTEX compounds: benzene, toluene, ethylbenzene, and xylenes (Table 4-2). Of these compounds, xylenes (total) was detected most frequently (12 of 55 samples). Ethylbenzene and toluene were each detected in 11 of 55 samples, and benzene was detected in seven of 55 samples. The areal distribution of BTEX compounds in soil at concentrations greater than screening levels is shown in Figure 4-1. The maximum detected benzene concentration is 2.2 mg/kg from SB16 at 5 to 6 feet bgs. The maximum detected concentrations for ethylbenzene (670 mg/kg), toluene (410 mg/kg), and xylenes (2,700 mg/kg) were from SB01 at 0 to 0.5 feet bgs.

Seventeen of 18 PAHs analyzed for were detected, with acenaphthylene not detected. Phenanthrene was detected most frequently, it was present in 26 of 55 samples. Benzo(a)-anthracene was detected 23 times, and benzo(b)fluoranthene and detected 21 times (Table 4-1). The areal distribution of PAHs in soil at concentrations greater than screening levels is shown in Figure 4-1. The maximum concentrations for all PAHs detected occurred in SB15 at 0 to 1 foot bgs. Elevated concentrations of most PAHs were also noted in SB34 at 0 to 1 foot bgs.

Total petroleum hydrocarbons (TPH) were detected in 15 of 55 samples (Table 4-1). The areal distribution of TPH in soil at concentrations greater than screening levels is shown in Figure 4-1. The maximum detected TPH concentration is 280,000 mg/kg in SB15 at 0 to 1 foot bgs. Elevated concentrations of TPH were also noted at soil boring locations SB01, SB05, SB14, SB16, SB17, SB18, SB19, SB20, SB24, SB33, and SB34. Elevated BTEX and PAH results often occur significantly at locations with elevated TPH concentrations.

4.1.2 Inorganics

Metals are naturally occurring elements in soils. For screening the significance of results, metal concentrations detected in on-site soil samples were compared to a factor of "20 times TCLP criteria" based on the extraction methodology of the toxicity characteristic leaching procedure (TCLP) (40 CFR 261). For presentation purposes, metal concentrations exceeding the TCLP based screening factor are highlighted in Table 4-2, and presented spatially in Figure 4-2.

Twenty-one of the 23 metals analyzed were detected in site soil, four of which were detected in all 55 samples analyzed (aluminum, calcium, iron, and manganese). Barium, chromium, potassium, and zinc were each detected in 54 samples. Based on lead as the key indicator metal of concern at refinery sites, the maximum lead concentration is 15,200 mg/kg in sample SB35 at 0 to 3 feet bgs in Pond 2. Elevated lead concentrations are also present

throughout the Tributary 1 stream bed; however, the maximum concentration along this pathway, 1,960 mg/kg, occurs in the off-site, upstream sample at SB20, from 0 to 3 feet bgs. This indicates that upstream sources on the Ohio Oil refinery site and multiple on-site sources (Figure 2-4) may have contributed to documented lead impacts in the Tributary 1 stream channel on the Wilcox site (Figure 4-2).

Soil pH is a measure of acidity and an indicator of unnatural site conditions. Refinery wastes can be extremely acidic due to the presence of sulfur compounds, and oil field brines and drilling muds are typically caustic. A neutral pH is 7, with extreme acid conditions being less than 2, and elevated caustic conditions greater than 12. The results from pH testing of soil samples are presented in Table 4-2. A total of seven soil samples from different borings have a pH less than 4, with no pH results greater than 10. The two lowest values, 2.3 in SB08 at 1 to 2 feet bgs, and 2.8 in SB10 at 3 to 4 feet bgs, appear to be unnaturally acidic conditions. Potential sources exist upgradient at each location: the "Oily Waste Pit" near SB08, and backfilled ponds beneath and south of the (b) residence near SB10 (see Figures 2-4 and 3-1).

4.2 Ground Water Analytical Results

A total of eight ground water samples and one duplicate were collected where ground water was encountered in soil borings, and analyzed for BTEX compounds and TPH. The ground water sampling results are presented below for each type of analysis.

4.2.1 Benzene, Toluene, Ethylbenzene, and Xylenes

A summary of BTEX compounds detected in ground water samples at the Wilcox site is presented in Table 4-3, and the areal distribution of contamination is depicted in Figure 4-3. Ethylbenzene was detected most often, in five of eight samples. Xylenes are present in four samples, benzene was detected in two samples, and toluene was detected in one of the eight samples. The maximum detected concentrations of benzene (8.9 mg/L), ethylbenzene (3.3 mg/L), and xylenes (9.1 mg/L) were in sample GW5 from SB18 near the fenced Sun Oil Company property. Note that a thin petroleum product layer was observed in this sample vial.

4.2.2 Total Petroleum Hydrocarbons

A summary of TPH carbon ranges detected in ground water samples at the Wilcox site is presented in Table 4-3, and the areal distribution of contamination is depicted in Figure 4-3. TPH was not analyzed in sample GW8 due to the low sample volume present. TPH in both the gasoline carbon range (C6-C10) and kerosene/diesel/lube oil carbon range (C10-C28) was

detected in samples GW1, GW2, and GW5. The maximum detected concentrations of C6-C10 hydrocarbons (3,300 mg/L), and C10-C28 hydrocarbons (5,900 mg/L), were in sample GW5 from SB18, coinciding with the maximum detections of BTEX compounds. The elevated concentration of TPH in GW4 at SB17 is also significant because of its location in the fenced yard of the (b) (6) residence (Figure 4-3).

4.3 Surface Water Analytical Results

A total of four surface water samples that were most representative of upstream versus downstream conditions were collected from available locations in Tributaries 1 and 2. Due to low flow conditions, samples could only be obtained from (b) Pond on Tributary 1, and isolated pools in Tributary 2. Each sample was analyzed for BTEX compounds and TPH.

No BTEX compounds or TPH were detected in site surface water samples. Detection limits and the analytical data package are presented in Appendix I.

4.4 Sediment Analytical Results

Two sediment samples were collected to assess the potential for contaminant migration from Pond 2 to Sand Creek via the surface water runoff pathway. The sediment samples were analyzed for BTEX compounds, TPH, and PAHs (organics) and for metals and pH (inorganics). It should be noted that the subsurface soil samples identified as SB20 to SB34 were collected from the dry creek bed of Tributary 1, and should be considered along with all sediment data in the evaluation of site impacts to the surface water migration pathway, and waters of the United States. The sediment sampling results from samples SED11 and SED12 are presented below for each type of analysis.

4.4.1 Organics

No BTEX compounds or TPH were detected in site sediment samples. Detection limits are specified in Table 4-1 and in the analytical data package, presented in Appendix I.

Seven of 18 PAHs analyzed for were detected in site sediment. Benzo(a)anthracene, benzo(a)pyrene, and pyrene were detected in each sample; and benzo(b)flouranthene, chrysene, fluoranthene, and phenanthrene were each detected once (Table 4-1). The highest level of PAH detected was pyrene, which was detected in SED11 at 0.41 mg/kg and in SED12 at 0.12 mg/kg. No pattern in the concentration of PAHs in the upstream (SED12) versus the downstream (SED11) sample could be discerned.

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4.4.2 Inorganics

Metals are naturally occurring elements in sediment. Antimony, beryllium, cadmium, mercury, selenium, silver, and thallium were not detected in the site samples. The analytical results for metals detected in sediment samples are summarized in Table 4-2. Fifteen of the 23 metals analyzed for were detected in site sediment, 13 of which were detected in both samples analyzed. Based on lead as the key indicator metal of concern at refinery sites, the concentrations of lead in sediment are 32.4 mg/kg in SED11 at Sand Creek, and 16.7 mg/kg in SED12 at Pond 2. As a reference, these concentrations are significantly lower than the maximum lead concentration for the Wilcox site (15,200 mg/kg), which was collected upstream in Pond 2 soil at SB35 (see Section 4.1.2). The sediment samples from the Pond 2 flow path do not show elevated concentrations from Pond 2 metals contamination. There was no discernable pattern in the concentration of metals in the upstream (SED12) versus the downstream (SED11) sample.

The pH result of 7.1 for each sediment sample is neutral with respect to acidic or basic site conditions. By comparison, subsurface soil samples collected from Pond 2 have pH levels of 5.1 and 6.2.

4.5 HAZCAT Result

One sample of a solid waste from the unvegetated area on the (b) (6) property was subjected to HAZCAT field testing. No other waste sources were deemed appropriate for testing due to the oily nature of the matrices or adequate waste characterization from the ESI sampling program.

The following list indicates the qualitative HAZCAT test tube results for the waste sample:

- Sample Description: grey, granular, solid waste, fertilizer-type odor,
- Specific Gravity: >1,
- Water Reactivity: Negative,
- Solubility: Sparingly soluble,
- pH: 5.5,
- Presence of Oxidizers: Negative,
- Sulfide: Not Applicable if pH <7,
- Cyanide: Not Applicable if pH <7,

- Chlorinated Hydrocarbons - Copper Wire Test: Negative,
- Chlorinated Hydrocarbons - PCB Test Kit: Positive, greater than 50 ppm, and
- Flammability: Negative,

The only significant positive result from the HAZCAT testing was from the polychlorinated biphenyl (PCB) test kit. A previous sample taken from the unvegetated area during the ESI revealed non-detects for all EPA target analyte list (TAL) pesticides and PCBs. This positive HAZCAT test result for PCBs appears to be a false positive result due to the following possible interferences identified in the field test kit manufacturer's instructions: excess moisture, inorganic chlorides, or the presence of other chlorinated organic compounds (i.e., solvents, pesticides).

4.6 Data Quality Assessment

Data quality assessment is a qualitative and quantitative review performed on the analytical results generated from the site sampling program to establish the usability of the data. Initially, all START laboratory data were validated and qualified according to EPA data review procedures (U.S. EPA 1994a, 1994b). Data qualifiers are presented in the appropriate data tables in this section and explained in detail in the data validation reports in Appendix J. Quality of the validated data was assessed in terms of precision, accuracy, representativeness, comparability, and completeness (PARCC) parameters, in accordance with EPA guidance (U.S. EPA 1990). A summary of the methodology and results from the evaluation of each PARCC parameter is presented below, and summarized in Appendix J.

4.6.1 Precision

Precision is a quantitative measure of the variability between duplicate samples. Precision is expressed as the relative percent difference (RPD) in concentration between duplicate pairs of field duplicates, matrix spikes (MS), and laboratory duplicates.

Although some precision data results are outside QC criteria, the overall usability of the qualified data is not compromised. The instances where data precision did not meet QC criteria are attributable to interferents in the matrix, high concentrations of target compounds, or relatively few data points to determine correlations and conclusions.

4.6.2 Accuracy

Accuracy is a quantitative measure of the recoverability of known amounts ("spikes") of target compounds for each analytical method. Accuracy is reported as the percent recovery (%R) of the known spike concentration minus the original sample result for MS, surrogate recoveries, and laboratory control samples (LCS).

Data for five metals (antimony, beryllium, arsenic, cadmium, and cobalt) in 10 samples were unusable (R) due to poor recoveries in one MS sample. Post spike recoveries were acceptable, indicating a possible digestion problem in one batch of samples at the laboratory. Discretion should be used when evaluating the site impact of these target compounds. With the exception of the unusable metals data, the overall usability of the data is acceptable with respect to accuracy. Other instances where data fail to meet accuracy QC criteria are considered isolated and not indicative of overall poor method performance.

4.6.3 Representativeness

Representativeness is a qualitative evaluation of the extent to which the analytical data reflect actual site conditions. Acceptable representativeness is achieved by proper sampling and sample management procedures.

The overall usability of the data is acceptable with respect to representativeness. Limited qualifications were assigned to the data for calibration or preparation blank contaminants, exceedence of serial dilution criteria, and internal standard deficiencies. In instances where data qualifiers are applied, some discretion should be used when evaluating potential site impacts of the data.

4.6.4 Comparability

Comparability is a qualitative parameter that expresses the confidence with which one data set can be compared to another. Analytical comparability is considered acceptable for this investigation because:

- The investigation consistently utilized the same analytical laboratory, sample preparation routine, and analytical methods (within each phase of work);
- The analytical results for each analysis are reported with consistent detection limits and units of measure; and
- Soil/sediment results are reported on a dry weight basis, allowing for comparison between samples and with regulatory criteria.

4.6.5 Completeness

Completeness is a measure of the amount of usable data resulting from the analytical program at the site. Analytical completeness is defined as the percentage of acceptable data points. Only unusable data (qualified "R" during data validation) is excluded when assessing compliance with the completeness goal of 90% (U.S. EPA 1990). Completeness is calculated per analytical method, but is also evaluated by individual analyte per matrix in Table 4-4.

For the Wilcox refinery site assessment data set, the analytical completeness for BTEX and PAH testing is 100%. A total of 55 metals data points were determined to be unusable due to laboratory data quality problems, resulting in an overall acceptable completeness of 96%. However, antimony, arsenic, beryllium, cadmium, and cobalt in soil did not meet the completeness goal of 90% and care should be used when assessing the impact of these individual metals at the site (Table 4-4).

One TPH in water sample was proposed but not analyzed due to low sample volume, resulting in an overall method completeness of 98.5%. However, TPH in water did not meet the completeness goal of 90% and care should be taken when evaluating this data set.

A summary of the quantitative data quality assessment criteria used to evaluate site data (i.e., precision, accuracy, representativeness, and completeness) and a comparison with actual data quality achieved for the project is presented in Appendix J.

4.7 Waste Quantity

During planning of the sampling program for this investigation, a list of potential waste source areas was developed based on the results of the previous ESI, and from START visual observations during initial site visits. Then, from the analytical results in each source area, and with the interpretation of source-specific soil boring logs and reasonable assumptions, the volume of contaminated material in each source area was estimated. A summary list of waste sources and estimated waste quantities is presented in Table 4-5. At this time, it is estimated that a minimum of approximately 73,000 cubic yards of solid waste (contaminated soil, coking cinders waste, tarry waste, etc.), and 2,960 gallons of liquid waste (tank bottom sludge, oily liquid, and product in existing ASTs) exists at the Wilcox site.

The liquid waste volume referred to in the last Table 4-5 entry for the 'Lower reaches of Tributary 1,' is for a brown, degraded, oily liquid entering Tributary 1 via a buried pipeline from the (b) property. During the low flow conditions observed on August 5, 1998, the volume of flow was estimated at less than 1 gallon per minute. Historical effects from this and other sources have visibly stained the stream bed black for at least 250 feet downstream. During this

dry period, no flow from Tributary 1 entered Sand Creek, approximately 300 feet south of the pipeline source. Note that the source inventory may be incomplete, the estimated waste quantity at some identified potential source areas remains unknown, and the liquid waste quantity does not include known areas of contaminated, shallow ground water at the site.

Table 4-1

ORGANIC ANALYTICAL RESULTS IN SEDIMENT AND SOIL
WILCOX REFINERY, BRISTOW, OKLAHOMA

Sample Location Depth (ft)	SED11 0-1	SED12 0-1	SB01 0-0.5	SB01 10-11	SB02 1-2	SB03 1.5-2	SB04 4-5	SB05 1-2	SB05 4-5
Analyte									
Volatiles (BTEX) - mg/kg									
Benzene	<0.00075	<0.00074	<4.3	**0.017**	<0.0021	<0.0021	<0.0021	<0.0023	**0.040**
Ethylbenzene	<0.00088	<0.0011	**670**	**0.25**	<0.0021	<0.0021	<0.0021	<0.0023	**0.84**
Toluene	<0.0011	<0.00086	**410**	**0.23**	<0.0021	<0.0021	<0.0021	**0.034**	**0.018**
Xylene (total)	<0.0025	<0.0025	**2,600**	**0.76**	<0.0021	<0.0021	<0.0021	<0.0023	**1.1**
Semi-Volatiles (PAHs) - mg/kg									
Acenaphthene	<0.25	<0.25	<2.2	<0.24	<0.21	<0.21	<0.21	<1.1	<2.5
Acenaphthylene	<0.25	<0.25	<2.2	<0.24	<0.21	<0.21	<0.21	<1.1	<2.5
Anthracene	<0.025	<0.025	<0.22	<0.024	<0.021	<0.021	<0.021	<0.11	<0.25
Benzo(a)anthracene	**0.049**	**0.033**	**0.57**	<0.024	<0.021	<0.021	<0.021	**0.14**	**0.67**
Benzo(b)fluoranthene	<0.025	**0.095**	**1.1**	<0.024	<0.021	<0.021	<0.021	**0.080 JK**	**0.25**
Benzo(k)fluoranthene	<0.025	<0.025	**0.35**	<0.024	<0.021	<0.021	<0.021	**0.091 JK**	**0.17 JK**
Benzo(a)pyrene	**0.041**	**0.041**	**1.4**	<0.024	<0.021	<0.021	<0.021	**0.11**	**0.20 JK**
Benzo(ghi)perylene	<0.062	<0.062	<0.54	<0.060	<0.053	<0.053	<0.053	<0.28	<0.62
Chrysene	**0.064**	<0.025	**1.4**	<0.024	<0.021	<0.021	<0.021	<0.11	<0.25
Dibenzo(a,h)anthracene	<0.062	<0.062	<0.54	<0.060	<0.053	<0.053	<0.053	<0.28	<0.62
Fluoranthene	**0.089**	<0.062	**5.1**	**0.073**	<0.053	<0.053	<0.053	**0.35**	**2.5**
Fluorene	<0.025	<0.025	<0.22	<0.024	<0.021	<0.021	<0.021	<0.11	<0.25
Indeno(1,2,3-cd)pyrene	<0.025	<0.025	<0.22	<0.024	<0.021	<0.021	<0.021	<0.11	<0.25
1-Methylnaphthalene	<0.25	<0.25	<2.2	<0.24	<0.21	<0.21	<0.21	<1.1	**4.6**
2-Methylnaphthalene	<0.25	<0.25	**3.2**	**0.34**	<0.21	<0.21	<0.21	<1.1	**5.3**
Naphthalene	<0.25	<0.25	<2.2	<0.24	<0.21	<0.21	<0.21	<1.1	<2.5
Phenanthrene	**0.040**	<0.025	**1.9**	**0.052**	<0.021	<0.021	<0.021	<0.11	**1.2**
Pyrene	**0.410**	**0.12**	**7**	**0.14**	<0.053	<0.053	<0.053	<0.28	<0.62
TPH - mg/kg									
C6 - C10 Hydrocarbons	<31	<31	**2,600**	**370**	<53	<53	<53	<57	**700**
>C10 - C28 Hydrocarbons	<31	<31	**1,500**	**120**	<53	<53	<53	<57	**2,600**
TPH C6 - C28 Hydrocarbons	<62	<62	**4,100**	**490**	<53	<53	<53	<57	**3,400**

Key at end of table.

Table 4-1 (cont.)

ORGANIC ANALYTICAL RESULTS IN SEDIMENT AND SOIL
WILCOX REFINERY, BRISTOW, OKLAHOMA

Sample Location Depth (ft)	SB05 14-15	SB06 1-2	SB07 4-5	SB07D 4-5	SB08 1-2	SB09 1-2	SB10 3-4	SB11 2-3	SB12 1-2
Analyte									
Volatiles (BTEX) - mg/kg									
Benzene	**0.0043**	<0.0023	<0.0023	<0.0022	<0.0022	<0.0023	<0.0022	<0.0024	<0.0023
Ethylbenzene	**0.023**	<0.0023	<0.0023	<0.0022	<0.0022	<0.0023	<0.0022	<0.0024	<0.0023
Toluene	<0.0024	<0.0023	<0.0023	<0.0022	<0.0022	<0.0023	<0.0022	<0.0024	<0.0023
Xylene (total)	**0.078**	<0.0023	<0.0023	<0.0022	<0.0022	<0.0023	<0.0022	<0.0024	<0.0023
Semi-Volatiles (PAHs) - mg/kg									
Acenaphthene	<1.2	<0.23	<0.23	<0.22	<0.22	<0.23	<0.22	<0.24	<0.23
Acenaphthylene	<1.2	<0.23	<0.23	<0.22	<0.22	<0.23	<0.22	<0.24	<0.23
Anthracene	<0.12	<0.023	<0.023	<0.022	<0.022	<0.023	<0.022	<0.024	<0.023
Benzo(a)anthracene	**0.43**	**0.015 JK**	<0.023	**0.031**	<0.022	**0.039**	<0.022	**0.072**	<0.023
Benzo(b)fluoranthene	**0.15 JK**	**0.025**	<0.023	**0.064**	<0.022	**0.016 JK**	<0.022	**0.088**	<0.023
Benzo(k)fluoranthene	**0.12 JK**	<0.023	<0.023	**0.017 JK**	<0.022	**0.024**	<0.022	**0.059**	<0.023
Benzo(a)pyrene	**0.15**	**0.031**	<0.023	**0.07**	<0.022	**0.044**	<0.022	**0.11**	<0.023
Benzo(ghi)perylene	<0.30	**0.028 JK**	<0.057	<0.056	<0.054	<0.057	<0.056	**0.039 JK**	<0.057
Chrysene	**0.13 JK**	**0.025**	<0.023	<0.022	<0.022	**0.056**	<0.022	**0.12**	<0.023
Dibenzo(a,h)anthracene	<0.30	<0.057	<0.057	<0.056	<0.054	<0.057	<0.056	<0.059	<0.057
Fluoranthene	**1.5 JK**	**0.066**	<0.057	<0.056	<0.054	**0.061**	<0.056	**0.14**	<0.057
Fluorene	**0.12**	<0.023	<0.023	<0.022	<0.022	<0.023	<0.022	<0.024	<0.023
Indeno(1,2,3-cd)pyrene	<0.12	<0.023	<0.023	<0.022	<0.022	<0.023	<0.022	**0.028**	<0.023
1-Methylnaphthalene	**1.8**	<0.23	<0.23	<0.22	<0.22	<0.23	<0.22	<0.24	<0.23
2-Methylnaphthalene	**2.3**	<0.23	<0.23	<0.22	<0.22	<0.23	<0.22	<0.24	<0.23
Naphthalene	<1.2	<0.23	<0.23	<0.22	<0.22	<0.23	<0.22	<0.24	<0.23
Phenanthrene	**0.74**	**0.031**	<0.023	<0.022	<0.022	**0.068**	<0.022	**0.042**	<0.023
Pyrene	<0.30	<0.057	<0.057	**0.084**	<0.054	<0.057	<0.056	**0.12**	<0.057
TPH - mg/kg									
C6 - C10 Hydrocarbons	**260**	<57	<57	<56	<54	<57	<56	<59	<57
>C10 - C28 Hydrocarbons	**730**	<57	<57	<56	<54	<57	<56	<59	<57
TPH C6 - C28 Hydrocarbons	**990**	<57	<57	<56	<54	<57	<56	<59	<57

Key at end of table.

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Table 4-1 (cont.)

ORGANIC ANALYTICAL RESULTS IN SEDIMENT AND SOIL
WILCOX REFINERY, BRISTOW, OKLAHOMA

Sample Location Depth (ft)	SB12 8-9	SB13 1-2	SB13 6.5-7.5	SB13D 6.5-7.5	SB14 1-2	SB14 5-6	SB15 0-1	SB16 5-6	SB17 1-2
Analyte									
Volatiles (BTEX) - mg/kg									
Benzene	<0.0023	<0.0022	<0.012	<0.011	<0.011	<0.09	**0.31**	**2.2 JH**	<0.0022
Ethylbenzene	<0.0023	<0.0022	<0.012	**0.023**	<0.011	<0.11	**0.95**	**1.6 JH**	<0.0022
Toluene	<0.0023	<0.0022	<0.012	<0.011	<0.011	**0.26**	**0.65**	**3.0 JH**	<0.0022
Xylene (total)	<0.0023	<0.0022	**0.013**	**0.091**	<0.011	<0.30	**9.8**	**3.5 JH**	<0.0022
Semi-Volatiles (PAHs) - mg/kg									
Acenaphthene	<0.23	<0.22	<0.23	<0.23	<0.23	<0.24	<2500	<12	<0.22
Acenaphthylene	<0.23	<0.22	<0.23	<0.23	<0.23	<0.24	<2500	<12	<0.22
Anthracene	<0.023	<0.022	<0.023	<0.023	<0.023	<0.024	**700**	**1.5**	<0.022
Benzo(a)anthracene	<0.023	**0.021 JK**	<0.023	<0.023	**0.10**	**0.012 JK**	**2,800**	**3.0**	**0.0049 JK**
Benzo(b)fluoranthene	<0.023	**0.056**	<0.023	<0.023	**0.0088 JK**	<0.024	**320**	**0.72 JK**	<0.022
Benzo(k)fluoranthene	<0.023	**0.018 JK**	<0.023	<0.023	<0.023	<0.024	**580**	**1.2 JK**	<0.022
Benzo(a)pyrene	<0.023	**0.074**	<0.023	<0.023	<0.023	<0.024	**920**	**2.0**	**0.037**
Benzo(ghi)perylene	<0.058	**0.04 JK**	<0.058	<0.057	<0.057	<0.06	<620	<3.0	<0.056
Chrysene	<0.023	**0.043**	<0.023	<0.023	<0.023	<0.024	**2,800**	<1.2	<0.022
Dibenzo(a,h)anthracene	<0.058	<0.056	<0.058	<0.057	<0.057	<0.06	<620	<3.0	<0.056
Fluoranthene	<0.058	**0.076**	<0.058	<0.057	**0.65**	<0.06	**4,000**	**16**	<0.056
Fluorene	<0.023	<0.022	<0.023	<0.023	<0.023	<0.024	**540**	**3.5**	<0.022
Indeno(1,2,3-cd)pyrene	<0.023	**0.027**	<0.023	<0.023	<0.023	<0.024	<250	<1.2	<0.022
1-Methylnaphthalene	<0.23	<0.22	<0.23	<0.23	<0.23	**0.24**	<2,500	**17**	<0.22
2-Methylnaphthalene	<0.23	<0.22	<0.23	<0.23	**2.3**	<0.24	**7,000**	**28**	<0.22
Naphthalene	<0.23	<0.22	<0.23	<0.23	<0.23	<0.24	<2500	<12	<0.22
Phenanthrene	<0.023	**0.038**	<0.023	<0.023	**0.092**	<0.072	**11,000**	**12**	<0.067
Pyrene	<0.058	<0.056	<0.058	<0.057	<0.057	<0.06	**2,500**	**3.6**	<0.056
TPH - mg/kg									
C6 - C10 Hydrocarbons	<58	<56	<58	<57	<57	<60	**8,600**	**350**	<56
>C10 - C28 Hydrocarbons	<58	<56	<58	<57	**100**	**170**	**270,000**	**2,100**	<56
TPH C6 - C28 Hydrocarbons	<58	<56	<58	<57	**100**	**170**	**280,000**	**2,400**	<56

Key at end of table.

Table 4-1 (cont.)

ORGANIC ANALYTICAL RESULTS IN SEDIMENT AND SOIL
WILCOX REFINERY, BRISTOW, OKLAHOMA

Sample Location Depth (ft)	SB17D 1-2	SB17 5.5-6.5	SB18 1-2	SB18 7-8	SB19 1-2	SB19 7-8	SB20 0-3	SB21 0-3	SB22 0-3
Analyte									
Volatiles (BTEX) - mg/kg									
Benzene	<0.0022	0.13	<0.086	0.36	<0.0022	<0.0023	<0.0054 JL	<0.0051	<0.0053
Ethylbenzene	<0.0022	4.0	1.4	7.9	0.017 JH	<0.0023	<0.0054 JL	<0.0051	<0.0053
Toluene	<0.0022	2.8	0.24	0.39	0.0093 JH	<0.0023	<0.0054 JL	<0.0051	<0.0053
Xylene (total)	<0.0022	15	0.89	8.9	0.061 JH	<0.0023	<0.0054 JL	<0.0051	<0.0053
Semi-Volatiles (PAHs) - mg/kg									
Acenaphthene	<0.22	0.78	<0.23	<4.7	<22	<0.23	<0.36	<0.34	<0.35
Acenaphthylene	<0.22	<0.23	<0.23	<4.7	<22	<0.23	<0.36	<0.34	<0.35
Anthracene	<0.022	<0.023	<0.023	0.54	<2.2	<0.023	<0.36	<0.34	<0.35
Benzo(a)anthracene	<0.022	0.049	0.033	0.45 JK	2.8	0.012 JK	<0.36	<0.34	<0.35
Benzo(b)fluoranthene	<0.022	<0.023	0.0066 JK	<0.47	0.73 JK	<0.023	<0.36	<0.34	<0.35
Benzo(k)fluoranthene	<0.022	<0.023	<0.023	<0.47	<2.2	<0.023	<0.36	<0.34	<0.35
Benzo(a)pyrene	<0.022	<0.023	0.026	<0.47	1.2 JK	<0.023	<0.36	<0.34	<0.35
Benzo(ghi)perylene	<0.056	<0.057	<0.057	<1.2	<5.6	<0.057	<0.36	<0.34	<0.35
Chrysene	<0.022	<0.023	<0.023	<0.47	<2.2	<0.023	<0.36	<0.34	<0.35
Dibenzo(a,h)anthracene	<0.056	<0.057	<0.057	<1.2	<5.6	<0.057	<0.36	<0.34	<0.35
Fluoranthene	<0.056	0.11	0.28	5.4	<5.6	<0.057	<0.36	<0.34	<0.35
Fluorene	<0.022	0.048	0.044	1.4	<2.2	<0.023	<0.36	<0.34	<0.35
Indeno(1,2,3-cd)pyrene	<0.022	<0.023	<0.023	<0.47	<2.2	<0.023	<0.36	<0.34	<0.35
1-Methylnaphthalene	<0.22	0.52	<0.23	13	<22	<0.23	NA	NA	NA
2-Methylnaphthalene	<0.22	0.69	0.41	16	<22	<0.23	NA	NA	NA
Naphthalene	<0.22	0.59	<0.23	<4.7	<22	<0.23	<0.36 JK	<0.34 JK	<0.35 JK
Phenanthrene	<0.067	0.074	0.18	4.4	<6.7	<0.068	<0.36	<0.34	<0.35
Pyrene	<0.056	<0.057	0.13	2.2	<5.6	<0.057	<0.36	<0.34	<0.35
TPH - mg/kg									
C6 - C10 Hydrocarbons	<56	750	<57	550	200	<57	<54.3	<51.1	<52.8
>C10 - C28 Hydrocarbons	<56	310	<57	440	3,400	<57	70.2	<51.1	<52.8
TPH C6 - C28 Hydrocarbons	<56	1,100	<57	990	3,700	<57	NR	NR	NR

Key at end of table.

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Table 4-1 (cont.)

ORGANIC ANALYTICAL RESULTS IN SEDIMENT AND SOIL
WILCOX REFINERY, BRISTOW, OKLAHOMA

Sample Location Depth (ft)	SB23 0-3	SB24 0-2	SB25 0-3	SB26 0-2	SB27 0-3	SB28 0-2	SB29 0-1	SB30 0-3	SB31 0-3
Analyte									
Volatiles (BTEX) - mg/kg									
Benzene	<0.0051 JL	<0.0058 JL	<0.0051 JL	<0.0051 JL	<0.0052	<0.0052 JL	<0.0051	<0.0056	<0.0059
Ethylbenzene	<0.0051 JL	<0.0058 JL	<0.0051 JL	<0.0051 JL	<0.0052	<0.0052 JL	<0.0051	<0.0056	<0.0059
Toluene	<0.0051 JL	<0.0058 JL	<0.0051 JL	<0.0051 JL	<0.0052	<0.0052 JL	<0.0051	<0.0056	<0.0059
Xylene (total)	<0.0051 JL	<0.0058 JL	<0.0051 JL	<0.0051 JL	<0.0052	<0.0052 JL	<0.0051	<0.0056	<0.0059
Semi-Volatiles (PAHs) - mg/kg									
Acenaphthene	<0.34	<0.39	<0.34	<0.34	<3.5 JK	<3.5 JK	<3.4 JK	<3.7 JK	<4.0 JK
Acenaphthylene	<0.34	<0.39	<0.34	<0.34	<3.5 JK	<3.5 JK	<3.4 JK	<3.7 JK	<4.0 JK
Anthracene	<0.34	<0.39	<0.34	<0.34	<3.5	**4.9**	<3.4	<3.7	<4.0
Benzo(a)anthracene	**0.38**	**0.61**	**0.61**	**0.30**	<3.5 JL	<3.5 JL	<3.4 JL	<3.7 JL	<4.0 JL
Benzo(b)fluoranthene	**0.26**	<0.39	**0.52**	**0.26**	**0.50 JH**	**1.5 JH**	**0.40 JH**	<3.7 JK	<4.0 JK
Benzo(k)fluoranthene	<0.34	<0.39	<0.34	<0.34	<3.5	<3.5 JK	**0.48 JH**	<3.7 JK	<4.0 JK
Benzo(a)pyrene	**0.34**	<0.39	**0.41**	**0.23**	**0.57 JH**	**2.9 JH**	**0.75 JH**	<3.7JK	<4.0 JK
Benzo(ghi)perylene	**0.57**	<0.39	**0.27**	**0.30**	**0.54 JH**	**1.1 JH**	<3.4 JK	<3.7 JK	<4.0 JK
Chrysene	**0.85 JH**	<0.39	**0.81 JH**	**0.65 JH**	**1.7 JH**	**5.4**	**1.2**	<3.7	**0.77**
Dibenzo(a,h)anthracene	<0.34	<0.39	<0.34	<0.34	<3.5 JK	**0.53 JH**	<3.4	<3.7 JK	<4.0 JK
Fluoranthene	<0.34	<0.39	**0.85 JH**	<0.34	**0.40 JH**	**1.5**	**0.34**	<3.7	<4.0
Fluorene	<0.34	<0.39	<0.34	<0.34	<3.5 JK	<3.5 JK	<3.4	<3.7 JK	<4.0 JK
Indeno(1,2,3-cd)pyrene	<0.34	<0.39	**0.21**	<0.34	<3.5 JK	**0.51 JH**	**0.36 JH**	<3.7 JK	<4.0 JK
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	**0.18 JH**	<0.39	<0.34 JK	<0.34 JK	<3.5 JK	**0.37 JH**	<3.4	<3.7 JK	<4.0 JK
Phenanthrene	**1.5**	**0.76**	**1.3**	**1.1**	**1.7 JH**	**4.8**	**1.5**	<3.7	**0.70**
Pyrene	**1.2**	**1.5**	**1.2**	**0.72**	**1.9 JH**	**6.6**	**1.3**	<3.7	**0.70**
TPH - mg/kg									
C6 - C10 Hydrocarbons	<51.1	<58.4	<50.9	<51.4	<52.6	<52.3	<51.2	<56.1	<59.4
>C10 - C28 Hydrocarbons	<51.1	1,140	<50.9	<51.4	<52.6	<52.3	<51.2	<56.1	<59.4
TPH C6 - C28 Hydrocarbons	NR	NR	NR	NR	NR	NR	NR	NR	NR

Key at end of table.

Table 4-1 (cont.)

ORGANIC ANALYTICAL RESULTS IN SEDIMENT AND SOIL
WILCOX REFINERY, BRISTOW, OKLAHOMA

Sample Location Depth (ft)	SB32 0-1	SB32D 0-1	SB33 0-1	SB34 0-1	SB35 0-3	SB36 6-7	SB37 6-7	SB38 0-1	SB39 3-4
Analyte									
Volatiles (BTEX) - mg/kg									
Benzene	<0.0087	<0.0086	<0.0064	<0.0064	<0.0057	<0.0051 JL	<0.0054 JL	<0.0060 JL	<0.0060
Ethylbenzene	<0.0087	<0.0086	<0.0064	**0.14**	<0.0057	<0.0051 JL	<0.0054 JL	<0.0060 JL	<0.0060
Toluene	<0.0087	<0.0086	<0.0064	<0.0064	<0.0057	<0.0051 JL	<0.0054 JL	<0.0060 JL	<0.0060
Xylene (total)	<0.0087	<0.0086	**0.082**	<0.0064	<0.0057	<0.0051 JL	<0.0054 JL	<0.0060 JL	<0.0060
Semi-Volatiles (PAHs) - mg/kg									
Acenaphthene	<0.58	<0.58	<0.43	**2.3**	<0.38	<0.37	<0.36	<0.40	<0.39
Acenaphthylene	<0.58	<0.58	<0.43	<4.0	<0.38	<0.37	<0.36	<0.40	<0.39
Anthracene	<0.58	<0.58	<0.43	**19**	<0.38	<0.37	<0.36	<0.40	<0.39
Benzo(a)anthracene	<0.58 JL	<0.58 JL	**0.35 JL**	<4.0 JL	<0.38 JL	<0.37	<0.36	<0.40	<0.39 JL
Benzo(b)fluoranthene	<0.58	<0.58	**0.29**	**27 JH**	<0.38 JK	<0.37	<0.36	<0.40	<0.39
Benzo(k)fluoranthene	<0.58	<0.58	<0.43	<4.0 JK	<0.38 JK	<0.37	<0.36	<0.40	<0.39
Benzo(a)pyrene	<0.58	<0.58	<0.43	**44 JH**	<0.38	<0.37	<0.36	<0.40	<0.39
Benzo(ghi)perylene	<0.58	<0.58	**0.24**	**12 JH**	<0.38 JK	<0.37	<0.36	<0.40	<0.39
Chrysene	<0.58	<0.58	**1.0**	**120 JH**	<0.38 JK	<0.37	<0.36	<0.40	<0.39
Dibenzo(a,h)anthracene	<0.58	<0.58	<0.43	**5.4 JH**	<0.38 JK	<0.37	<0.36	<0.40	<0.39
Fluoranthene	<0.58	<0.58	<0.43	**34**	<0.38	<0.37	<0.36	<0.40	<0.39
Fluorene	<0.58	<0.58	<0.43	**24**	<0.38	<0.37	<0.36	<0.40	<0.39
Indeno(1,2,3-cd)pyrene	<0.58	<0.58	<0.43	**11 JH**	<0.38 JK	<0.37	<0.36	<0.40	<0.39
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	<0.58	<0.58	<0.43	**2.4 JH**	<0.38	<0.37 JK	<0.36 JK	<0.40 JK	<0.39 JK
Phenanthrene	<0.58	**0.31**	**0.97**	**220 JK**	<0.38	<0.37	<0.36	<0.40	<0.39
Pyrene	<0.58	**0.29**	**1.1**	**240 JH**	**0.36 JH**	<0.37	<0.36	<0.40	<0.39
TPH - mg/kg									
C6 - C10 Hydrocarbons	<87.3	<86.3	<64.3	<64.6	<57.1	<51.3	<53.6	<59.7	<60.0
>C10 - C28 Hydrocarbons	<87.3	<86.3	**125**	**1,370**	<57.1	<51.3	<53.6	<59.7	<60.0
TPH C6 - C28 Hydrocarbons	NR	NR	NR	NR	NR	NR	NR	NR	NR

Key at end of table.

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Table 4-1 (cont.)

ORGANIC ANALYTICAL RESULTS IN SEDIMENT AND SOIL
WILCOX REFINERY, BRISTOW, OKLAHOMA

Sample Location Depth (ft)	SB40 3-4	SB41 2-3	SB41D 2-3	SB42 2-3	SB43 6-7	SB44 4-5	SB45 0-1	SB46 6-12	SB46D 6-12
Analyte									
Volatiles (BTEX) - mg/kg									
Benzene	<0.0059	<0.0061	<0.0056	<0.0059	<0.0054	<0.0056	<0.0063	<0.0059	<0.0057
Ethylbenzene	<0.0059	<0.0061	<0.0056	<0.0059	<0.0054	<0.0056	<0.0063	<0.0059	<0.0057
Toluene	<0.0059	<0.0061	<0.0056	<0.0059	<0.0054	<0.0056	<0.0063	<0.0059	<0.0057
Xylene (total)	<0.0059	<0.0061	<0.0056	<0.0059	<0.0054	<0.0056	<0.0063	<0.0059	<0.0057
Semi-Volatiles (PAHs) - mg/kg									
Acenaphthene	<0.39 JK	<0.41	<0.37	<0.39	<0.36	<0.37	<0.42	<0.39 JK	<0.38 JK
Acenaphthylene	<0.39 JK	<0.41	<0.37	<0.39	<0.36	<0.37	<0.42	<0.39 JK	<0.38 JK
Anthracene	<0.39	<0.41	<0.37	<0.39	<0.36	<0.37	<0.42	<0.39	<0.38
Benzo(a)anthracene	<0.39 JL	<0.41 JL	<0.37 JL	<0.39 JL	<0.36 JL	<0.37 JL	<0.42 JL	<0.39 JL	<0.38 JL
Benzo(b)fluoranthene	<0.39	<0.41	<0.37	<0.39	<0.36	<0.37	<0.42	<0.39	<0.38
Benzo(k)fluoranthene	<0.39	<0.41	<0.37	<0.39	<0.36	<0.37	<0.42	<0.39	<0.38
Benzo(a)pyrene	<0.39	<0.41	<0.37	<0.39	<0.36	<0.37	<0.42	<0.39	<0.38
Benzo(ghi)perylene	<0.39	<0.41	<0.37	<0.39	<0.36	<0.37	<0.42	<0.39	<0.38
Chrysene	<0.39	<0.41	<0.37	<0.39	<0.36	<0.37	<0.42	<0.39	<0.38
Dibenzo(a,h)anthracene	<0.39	<0.41	<0.37	<0.39	<0.36	<0.37	<0.42	<0.39	<0.38
Fluoranthene	<0.39	<0.41	<0.37	<0.39	<0.36	<0.37	<0.42	<0.39	<0.38
Fluorene	<0.39 JK	<0.41	<0.37	<0.39	<0.36	<0.37	<0.42	<0.39 JK	<0.38 JK
Indeno(1,2,3-cd)pyrene	<0.39	<0.41	<0.37	<0.39	<0.36 JK	<0.37	<0.42	<0.39	<0.38
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	<0.39 JK	<0.41 JK	<0.37 JK	<0.39 JK	<0.36	<0.37 JK	<0.42	<0.39 JK	<0.38 JK
Phenanthrene	**0.49 JH**	<0.41	<0.37	<0.39	<0.36	<0.37	<0.42	<0.39	<0.38
Pyrene	**0.20 JH**	<0.41	<0.37	<0.39	<0.36	<0.37	<0.42	<0.39	<0.38
TPH - mg/kg									
C6 - C10 Hydrocarbons	<58.9	<60.7	<55.7	<58.7	<54.2	<55.1	<62.8	<58.8	<56.8
>C10 - C28 Hydrocarbons	<58.9	<60.7	<55.7	<58.7	<54.2	<55.1	<62.8	<58.8	<56.8
TPH C6 - C28 Hydrocarbons	NR	NR	NR	NR	NR	NR	NR	NR	NR

Key at end of table.

Table 4-1 (cont.)

ORGANIC ANALYTICAL RESULTS IN SEDIMENT AND SOIL
WILCOX REFINERY, BRISTOW, OKLAHOMA

Key:

Analytical results are reported in milligrams per kilogram (mg/kg)
Results in **bold** exceed laboratory reporting limits
BTEX - Benzene, toluene, ethylbenzene, and xylenes
D - Duplicate sample
H - The bias in the estimated value is high
J - Concentration is estimated
Shaded results exceed one or more example regulatory criteria in Table 11
K - The bias in the estimated value is unknown
L - The bias in the estimated value is low
NA - Not analyzed
NR - Not reported
PAHs - Polycyclic aromatic hydrocarbons
SB - Soil boring sample
SED - Sediment sample
TPH - Total petroleum hydrocarbons
< - Not detected at the laboratory reporting limit
>C10-C28 - Number of carbon atoms in the range of totaled hydrocarbon concentrations

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Table 4-2

INORGANIC ANALYTICAL RESULTS IN SEDIMENT AND SOIL
WILCOX REFINERY, BRISTOW, OKLAHOMA

Sample Location Depth (ft)	SED11 0-1	SED12 0-1	SB01 0-0.5	SB01 10-11	SB02 1-2	SB03 1.5-2	SB04 4-5	SB05 1-2	SB05 4-5	SB05 14-15	SB06 1-2	SB07 4-5	SB07D 4-5	SB08 1-2
Metals - mg/kg														
Aluminum	1,210 JL	960 JL	727 JL	3,620 JL	1,140	911	1,230	1,740	1,930	3,000	2,590	4,760	3,780	1,250
Antimony	<7.5 JK	<7.2 JK	<6.3 JK	<6.9 JK	<1.0	<1.0	<1.0	<1.1	<1.2	<1.2	<1.1	<1.2	<1.1	<1.1
Arsenic	1.4 JH	1.6 JH	1.0 JH	2.8 JH	0.99	0.68	0.97	2.4	1.1	4.0	2.1	4.1	3.4	1.8
Barium	20.2	22.1	19.1	72.7	10.2	7.5	7.3	23.8	51	89.8	28.8	31.9	26.9	20
Beryllium	<0.62	<0.60	<0.53	<0.57	<0.51	<0.52	<0.52	<0.56	<0.62	<0.58	<0.56	<0.58	<0.55	<0.53
Cadmium	<0.62 JK	<0.60 JK	5.1 JK	1.6 JK	<0.51	<0.52	<0.52	0.81	<0.62	1.9	0.75	1.2	1.2	0.53
Calcium	561 JK	373 JK	2,550 JK	888 JK	167 JH	160 JH	169 JH	363 JH	631JH	351 JH	380 JH	745 JH	531 JH	189 JH
Chromium	3.7	4.0	13.6	6.7	2.4	1.7	2.1	5.3	5.4	12.2	5.8 JK	13.2 JK	11.6 JK	3.6 JK
Cobalt	<2.5	<2.4	2.8	5.6	2.4	<2.1	<2.1	2.3	3.6	7.7	<2.3	2.7	2.6	<2.1
Copper	2.7 JK	2.7 JK	78.1 JK	6.3 JK	<2.0	<2.1	<2.1	<2.3	<2.5	<2.3	<2.3	3.3	3.7	<2.1
Iron	3,520 JK	4,050 JK	37,300 JK	13,000 JK	2,790	1,840	2,470	5,290	3,500	13,400	5,130	8,400	7,870	3,430
Lead	32.4 JK	16.7 JK	4,980 DJK	6.5 JK	1.1	0.83	1.1	7.0	3.7	4.9	3.0 JK	6.1 JK	17.9 JK	10.5 JK
Magnesium	311 JK	226 JK	246 JK	565 JK	52.8	<52.0	77.9	185	305	285	210	378	289	110
Manganese	104 JK	142 JK	182 JK	426 JK	164 JK	49.9 JK	12.8 JK	207 JK	26.8 JK	231 JK	112 JK	47.5 JK	87.1 JK	134 JK
Mercury	<0.02	<0.02	0.06	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	0.06	0.07	0.06
Nickel	2.6 JK	<2.4	4.0 JH	14.5 JH	<2.0	<2.1	<2.1	<2.3	3.9	5.4	<2.3	2.7	<2.2	<2.1
Potassium	253	221	126	386	425	648	507	400	408	609	412	601	529	264
Selenium	<0.62	<0.60	1.1	0.65 JH	<1.0	<1.0	<1.0	<0.56	<1.2	<1.2	<1.1	<1.2	<1.1	<1.1
Silver	<1.2 JL	<1.2 JL	<1.1 JL	<1.1 JL	<1.0	<1.0	<1.0	<1.1	<1.2	<1.2	<1.1	<1.2	<1.1	<1.1
Sodium	<62.1	68.6 JH	268 JH	2,620 JH	121	<110	219	<110	143	81.2	<114	123	164	<108
Thallium	<0.62	<0.60	<0.53	<0.57	<0.51	<0.52	<0.52	<0.56	<0.62	<0.58	<0.56	<0.58	<0.55	<0.53
Vanadium	5.4	7.5	<2.1	11	3.9	3.1	4.0	7.6	9.7	13.8	9.2	14.4	13.2	5.9
Zinc	9.8 JK	5.3 JK	43.3 JK	7.4 JK	3.4	1.7	1.6	11.8	6.4	12.6	5.0 JK	7.6 JK	10.2 JK	5.0 JK
pH	7.1	7.1	8	8.8	6.1	5.5	6.6	6.7	6.4	6.6	3.2	3.1	3.3	2.3

Key:

Metals reported in milligrams per kilogram (mg/kg)
Results in bold exceed laboratory reporting limits
Shaded results exceed 20 times RCRA TCLP criteria in Table 5-2
pH results in bold are <5 or >9
pH reported in standard pH units
B - Analyte detected in associated blank
D - Duplicate sample
H - The bias in the estimated value is high
J - Concentration is estimated
K - The bias in the estimated value is unknown
L - The bias in the estimated value is low
NA - Not analyzed
NR - Not reported
SB - Soil boring sample
SED - Sediment sample
< - Not detected at the laboratory reporting limit

Table 4-2 (cont.)

INORGANIC ANALYTICAL RESULTS IN SEDIMENT AND SOIL
WILCOX REFINERY, BRISTOW, OKLAHOMA

Sample Location Depth (ft)	SB09 1-2	SB10 3-4	SB11 2-3	SB12 1-2	SB12 8-9	SB13 1-2	SB13 6.5-7.5	SB13D 6.5-7.5	SB14 1-2	SB14 5-6	SB15 0-1	SB16 5-6	SB17 1-2
Metals - mg/kg													
Aluminum	3,540	2,110	3,600	4,480	1,600	3,600	3,160	2,290	1,700	9,190	24.8	3,370	9,700
Antimony	<1.1	<1.1	<1.2	<1.1	<1.1	<1.1	<1.1	<1.2	<1.1	1.4	<1.2	<1.2	<1.1
Arsenic	2.8	1.3	2.3	3.0	0.88	4.5	3.9	2.4	0.95	5.4	<0.62	1.9	2.7
Barium	27.4	15.1	54.8	77	16.5	23.2	45.4	39.3	23.5	107	<2.5	21.3	60.5
Beryllium	<0.56	<0.53	<0.59	<0.56	<0.56	<0.54	<0.57	<0.58	<0.55	0.81	<0.62	<0.58	<0.54
Cadmium	1.1	0.59	0.99	1.4	<0.56	1.4	1.8	1.1	0.58	2.8	<0.62	0.82	1.5
Calcium	646 JH	522 JH	798 JH	818 JH	512 JH	585 JH	1,010 JH	786 JH	264	445	87.3	334	1,470
Chromium	8.3 JK	6.5 JK	8.4 JK	8.6 JK	4.0 JK	7.8 JK	10.3 JK	7.5 JK	4.3	15.2	<1.2	6.8	11.2
Cobalt	<2.2	<2.1	2.8	4.1	<2.3	2.6	4.3	3.6	2.3	9.8	<2.5	2.3	2.9
Copper	<2.2	2.2	6.4	4.5	<2.3	2.9	4.7	3.2	<2.2	12.7	<2.5	3.9	6.1
Iron	7,820	4,270	6,770	9,530	1,870	9,930	12,700	8,040	3,810	18,100	262	5,490	10,100
Lead	5.0 JK	2.0 JK	20.9 JK	4.7 JK	1.7 JK	48 JK	5.5 JK	3.5 JK	114	7.4	2.5	2.6	10.3
Magnesium	318	431	582	634	337	414	763	615	241	1,510	<61.5	279	728
Manganese	103 JK	43.4 JK	59.9 JK	156 JK	24.0 JK	25.3 JK	76.7 JK	52.0 JK	86.2	103	3.0	44.2	56
Mercury	0.05	0.04	0.03	0.05	0.05	0.04	0.05	0.05	0.04	0.04	<0.02	0.04	0.04
Nickel	3.2	2.2	3.3	5.6	<2.3	3.2	8.1	6.8	3.1	13.1	<2.5	3.5	5.5
Potassium	466	340	487	562	299	568	506	500	412	1,040	<123	546	1,110
Selenium	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.2	<1.1	<1.2	<1.2	<1.2	<1.1
Silver	<1.1	<1.1	<1.2	<1.1	<1.1	<1.1	<1.1	<1.2	<1.1	<1.2	<1.2	<1.2	<1.1
Sodium	<111	232	<117	254	156	<112	<116	115	1,620 JK	4,690 JK	<123 JK	<115 JK	<108 JK
Thallium	<0.56	<0.53	<0.59	<0.56	<0.56	<0.54	<0.57	<0.58	<0.55	<0.60	<0.62	<0.58	0.54
Vanadium	12.6	7.0	12.8	14.5	3.5	13.7	21.4	12.1	5.1	27.7	<2.5	10.4	20
Zinc	5.6 JK	4.7 JK	13.3 JK	8.4 JK	4.0 JK	9.2 JK	10.5 JK	8.7 JK	5.8	18.7	<1.2	4.8	15.2
pH	3.0	2.8	4.7	3.8	5.9	3.9	6.0	5.9	9.5	9.4	8.1	6.6	7.4

Key:

Metals reported in milligrams per kilogram (mg/kg)
Results in **bold** exceed laboratory reporting limits
Shaded results exceed 20 times RCRA TCLP criteria i
pH results in bold are <5 or >9
pH reported in standard pH units
B - Analyte detected in associated blank
D - Duplicate sample
H - The bias in the estimated value is high
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L - The bias in the estimated value is low
NA - Not analyzed
NR - Not reported
SB - Soil boring sample
SED - Sediment sample
< - Not detected at the laboratory reporting limit

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Table 4-2 (cont.)

INORGANIC ANALYTICAL RESULTS IN SEDIMENT AND SOIL
WILCOX REFINERY, BRISTOW, OKLAHOMA

Sample Location Depth (ft)	SB17D 1-2	SB17 5.5-6.5	SB18 1-2	SB18 7-8	SB19 1-2	SB19 7-8	SB20 0-3	SB21 0-3	SB22 0-3	SB23 0-3	SB24 0-2	SB25 0-3	SB26 0-2
Metals - mg/kg													
Aluminum	7,840	4,110	2,510	5,300	1,570	4,110	1,770	1,260	4,290	1,350	1,140	1,280	3,010
Antimony	<1.1	<1.1	<1.1	<1.2	<1.1	<1.1	1.3 R	<0.50 R	1.00 R	<0.50 R	1.1 R	<0.50 R	<0.50 R
Arsenic	1.5	1.7	2.1	3.3	1.5	0.83	2.7 R	2.7 R	2.2 R	1.8 R	2.7 R	2.2 R	1.7 R
Barium	53.9	31.6	50.3	68.1	25.6	33.6	37.7	15.5	58.8	20.9	31.4	16.0	24.8
Beryllium	<0.54	<0.55	<0.56	<0.58	<0.53	<0.57	0.12 R	0.08 R	0.25 R	0.12 R	0.13 R	0.10 R	0.17 R
Cadmium	0.98	1.2	0.79	1.6	0.63	<0.57	0.14 R	0.07 R	0.10 R	0.17 R	0.25 R	0.44 R	0.11 R
Calcium	1,420	342	924	678	1,480	754	594	18,400	471	619	4,190	10,700	898
Chromium	10.5	6.8	6.8	9.4	5.8	8.6	6.1 JK	4.1 JK	6.2 JK	3.5 JK	5.2 JK	4.9 JK	5.4 JK
Cobalt	2.4	2.8	2.6	5.3	2.3	<2.3	1.0 R	1.0 R	3.2 R	1.4 R	2.3 R	1.3 R	1.8 R
Copper	4.9	5.3	6.3	6.1	3.5	3.5	15.7	3.6	7.9	8.4	122	12.9	4.9
Iron	6,400	7,910	5,010	10,300	3,750	2,930	4,800 JK	4,000 JK	5,120 JK	4,960JK	7,840 JK	6,140 JK	4,100 JK
Lead	6	3.7	24.8	10.7	14.7	1.9	1,960 JK	61.6 JK	4.2 JK	181 JK	724 JK	125 JK	72.2 JK
Magnesium	628	478	351	606	550	785	327	9,910	490	300	2,140	5,890	595
Manganese	37.5	130	128	111	138	34.5	27.1	424	165	127	223	208	99
Mercury	0.03	0.04	0.11	0.05	0.11	0.05	0.39	NR	<0.11	0.13	<0.12	<0.10	<0.10
Nickel	5.0	4.1	3.6	6.3	4.4	2.8	3.9	2.7	4.9	3.3	6.4	4.5	4.4
Potassium	932	552	388	504	286	500	356	475	679	339	256	342	595
Selenium	<1.1	<1.1	<1.1	<1.2	<1.1	<1.1	<0.49	<0.46	0.48	<0.46	<0.53	<0.46	<0.46
Silver	<1.1	<1.1	<1.1	<1.2	<1.1	<1.1	<1.2 B	<1.4 B	<0.99 B	<1.1 B	<1.3 B	<1.5 B	<1.0 B
Sodium	<108 JK	<109 JK	<113 JK	<115 JK	<106 JK	174 JK	67.8	97	57	70	154	192	119
Thallium	<0.54	<0.55	<0.56	<0.58	<0.53	<0.57	<0.27	<0.26	<0.26	<0.26	<0.29	<0.25	<0.26
Vanadium	17.4	10	10.1	16.2	6.6	3.8	6.6 JK	4.9 JK	9.2 JK	5.0 JK	5.7 JK	4.8 JK	6.8 JK
Zinc	10.2	8.4	16	8.2	25.6	3.1	15.4 JK	14.1 JK	6.2 JK	18.3 JK	61.9 JK	83.8 JK	14.3 JK
pH	7.3	5.6	7.7	6.1	7.4	6.3	5.9	7.7	6.2	6.2	7.1	6.9	7.2

Key:

Metals reported in milligrams per kilogram (mg/kg)
Results in bold exceed laboratory reporting limits
Shaded results exceed 20 times RCRA TCLP criteria i
pH results in bold are <5 or >9
pH reported in standard pH units
B - Analyte detected in associated blank
D - Duplicate sample
H - The bias in the estimated value is high
J - Concentration is estimated
K - The bias in the estimated value is unknown
L - The bias in the estimated value is low
NA - Not analyzed
NR - Not reported
SB - Soil boring sample
SED - Sediment sample
< - Not detected at the laboratory reporting limit

Table 4-2 (cont.)

INORGANIC ANALYTICAL RESULTS IN SEDIMENT AND SOIL
WILCOX REFINERY, BRISTOW, OKLAHOMA

Sample Location Depth (ft)	SB27 0-3	SB28 0-2	SB29 0-1	SB30 0-3	SB31 0-3	SB32 0-1	SB32D 0-1	SB33 0-1	SB34 0-1	SB35 0-3	SB36 6-7	SB37 6-7	SB38 0-1
Metals - mg/kg													
Aluminum	3220 JK	2,240 JK	1,460 JK	2,350 JK	2,190 JK	2,090 JK	1,870 JK	11,300 JK	3,410 JK	4,180 JK	1,290	915	44.6
Antimony	<0.51 JL	0.76 JL	0.80 JL	<0.55 JL	<0.58 JL	<0.86 JL	<0.85 JL	<0.63 JL	<0.63 JL	<0.56 JL	<0.50 R	<0.53 R	<0.01 R
Arsenic	2.3	3.0	1.4	1.2	0.73	8.3	11.4	4.0	3.5	1.0	1.0 R	0.45 R	0.01 R
Barium	51.8	42.6	21.9	32.7	28.7	84.6	104	171	53.0	36.7	10.9	9.4	0.28
Beryllium	0.21	0.28	0.11	0.19	0.15	0.12	0.14	0.73	0.23	0.20	0.09 R	0.05 R	0 R
Cadmium	0.19	0.20	0.10	0.12	0.07	0.15	0.25	0.13	0.08	0.24	<0.05 R	<0.05 R	<0 R
Calcium	3,460	951	1,560	828	321	1,370	1,630	1,110	717	6,590	211	148	3.9
Chromium	6.1	15.0	3.5	4.6	3.8	3.9	3.6	14.1	6.7	4.5	3.3 JK	1.6 JK	0.06 JK
Cobalt	2.5	3.0	1.6	2.2	2.0	3.8	3.0	5.1	3.9	1.3	1.1 R	0.29 R	<0.01 B R
Copper	8.1	7.3	4.5	4.5	19.0	4.0	3.8	5.8	11.7	8.9	2	<1.5 B	<0.03 B
Iron	5,310	8,630	2,690	3,920	3,180	25,300	31,500	14,600	8,990	4,260	2,330 JK	769 JK	31.7 JK
Lead	141	450	162	77.2	811	194	245	15.3	1,080	15,200	<3.2 BJK	<2.8 BJK	<0.04 BJK
Magnesium	1,890	443	796	401	271	392	421	1,580	628	2,120	201	151	6.7
Manganese	176 JL	213 JL	157 JL	338 JL	78.7 JL	921 JL	1,100 JL	179 JL	301 JL	87.4 JL	50.9	4.1	0.23
Mercury	<0.11	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.11	<0.12
Nickel	4.9	3.9	2.4	2.8	3.2	0.94	<0.52	10.7	5.1	3.1	18.3	1.9	<0.05 B
Potassium	704 JK	243 JK	168 JK	472 JK	588 JK	691 JK	218 JK	1,820 JK	764 JK	495 JK	350	360	9.1
Selenium	<0.47	<0.47	<0.46	<0.51	<0.53	<0.79	<0.78	<0.58	<0.58	<0.51	<0.46	<0.48	<0.01
Silver	0.59	<0.13	<0.12	0.20	0.35	2.3	2.0	<0.15	0.88	0.27	1.0	<1.7 B	<0.01 B
Sodium	142	90	71	86.6	98.5	202	112	190	159	143	53.2	55.6	<0.65 B
Thallium	<0.26	<0.26	<0.26	<0.28	<0.30	<0.44	<0.43	<0.32	<0.32	<0.29	<0.26	<0.27	NR
Vanadium	9.1	9.2	4.2	7.2	6.6	6.1	8.7	23.9	10.1	6.1	4.2	2.6 JK	<0.11 B JK
Zinc	29.6	29.6	13.7	22.3	12.2	7.7	8.0	19.4	14.7	7.6	4	0.75 JK	0.06 JK
pH	7.1	6.1	6.3	6.2	6.3	5.4	6.7	5.3	5.2	5.1	6.4	6.4	6.5

Key:

Metals reported in milligrams per kilogram (mg/kg)
Results in bold exceed laboratory reporting limits
Shaded results exceed 20 times RCRA TCLP criteria i
pH results in bold are <5 or >9
pH reported in standard pH units
B - Analyte detected in associated blank
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NR - Not reported
SB - Soil boring sample
SED - Sediment sample
< - Not detected at the laboratory reporting limit

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Table 4-2 (cont.)

INORGANIC ANALYTICAL RESULTS IN SEDIMENT AND SOIL
WILCOX REFINERY, BRISTOW, OKLAHOMA

Sample Location Depth (ft)	SB39 3-4	SB40 3-4	SB41 2-3	SB41D 2-3	SB42 2-3	SB43 6-7	SB44 4-5	SB45 0-1	SB46 6-12	SB46D 6-12
Metals - mg/kg										
Aluminum	4,570 JK	3,020 JK	2,760 JK	1,800 JK	2,280 JK	2,410 JK	1,420 JK	2,660 JK	5,640 JK	26.4 JK
Antimony	<0.59 JL	<0.58 JL	<0.60 JL	<0.55 JL	<0.58 JL	<0.53 JL	<0.54 JL	<0.62 JL	<0.58 JL	<0.01 JL
Arsenic	3	5.7	1.5	1.1	4.2	1.6	0.73	2.2	3	0.01
Barium	27.2	48.4	33.1	15.5	22.6	28.0	14.3	27.1	43.7	0.42
Beryllium	0.36	0.29	0.24	0.12	0.25	0.21	0.11	0.19	0.39	NR
Cadmium	<0.06	0.06	<0.06	<0.06	<0.06	0.07	<0.06	<0.06	0.06	NR
Calcium	606	528	536	324	333	292	199	289	463	2.3
Chromium	8.4	5.6	4.6	3.7	6.4	5.4	3	4.5	7.6	0.04
Cobalt	3.2	3.2	2.7	1.3	2.4	2.1	0.95	2	3	0.02
Copper	3.1	2.2	3.3	2.1	2.7	2	4.1	3.8	5.7	<0.03 B
Iron	8,820	10,400	5,250	3,260	8,180	5,990	2,430	5,830	9,260	26.3
Lead	3.6	3.2	6.6	3.8	4.4	2.2	<1.6 B	38.9	142	<1.8 B
Magnesium	653	483	476	271	370	369	215	402	688	3.6
Manganese	60.9 JL	312 JL	40.0 JL	45.1 JL	114 JL	84.4 JL	32.4 JL	39.5 JL	95.7 JL	0.16 JL
Mercury	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	6.9	4.3	5.6	3.2	3.9	12.5	7.8	4.5	9.1	0.05
Potassium	917 JK	514 JK	501 JK	569 JK	547 JK	387 JK	311 JK	700 JK	894 JK	5.9 JK
Selenium	<0.54	<0.53	<0.55	<0.5	<0.53	<0.49	<0.5	<0.57	<0.53	<0.01
Silver	0.19	0.47	0.35	0.71	0.91	0.13	0.5	0.82	0.67	<0.01 B
Sodium	63.3	60.9	76.1	105	129	41.1	61.7	123	573	4.3
Thallium	<0.3	<0.29	<0.3	<0.28	<0.29	<0.27	<0.28	<0.31	<0.29	NR
Vanadium	13.6	10.3	8.5	5.5	11.3	8.5	4	7.2	16.2	0.05
Zinc	6.2	4.2	5.8	4	4	4.1	3.4	8	6.7	0.04 B
pH	5.7	5.3	4.9	4.6	4.8	5.2	5.1	4.4	6.2	6.0

Key:

Metals reported in milligrams per kilogram (mg/kg)
Results in bold exceed laboratory reporting limits
Shaded results exceed 20 times RCRA TCLP criteria i
pH results in bold are <5 or >9
pH reported in standard pH units
B - Analyte detected in associated blank
D - Duplicate sample
H - The bias in the estimated value is high
J - Concentration is estimated
K - The bias in the estimated value is unknown
L - The bias in the estimated value is low
NA - Not analyzed
NR - Not reported
SB - Soil boring sample
SED - Sediment sample
< - Not detected at the laboratory reporting limit

Table 4-3

ORGANIC ANALYTICAL RESULTS IN GROUND WATER
WILCOX REFINERY, BRISTOW, OKLAHOMA

Sample ID/Location	GW1(SB05)	GW2(SB13)	GW3(SB15)	GW3D(SB15)	GW4(SB17)	GW5(SB18)	GW6(SB40)	GW7(SB42)	GW8(SB37)
Analyte									
Volatiles (BTEX) - mg/L									
Benzene	<2.0	<0.05	**0.049 JL**	**0.012**	<0.05	**8.9**	<0.005	<0.005	<0.005
Toluene	<2.0	<0.05	**0.034 JL**	**0.0087**	<0.05	< 2.0	<0.005	<0.005	<0.005
Ethylbenzene	**0.19**	**0.21**	**0.011 JL**	**0.0083**	**0.49**	**3.3**	<0.005	<0.005	<0.005
Xylene (total)	**0.035**	<0.05	**0.064 JL**	**0.018**	**0.14**	**9.1**	<0.005	<0.005	<0.005
TPH - mg/L									
C6 - C10 Hydrocarbons	**100**	**140**	<5.0	<5.0	**1,400**	**3,300**	<5.0	<5.0	NA
>C10 - C28 Hydrocarbons	**20**	**530**	**10**	**13**	<100	**5,900**	<5.0	<5.0	NA
TPH C6 - C28 Hydrocarbons	**120**	**680**	**10**	**13**	**1,800**	**9,200**	NR	NR	NA

Key:

Analytical results are reported in milligrams per liter
Results in **bold** exceed laboratory reporting limits
Shaded results exceed one or more example regulatory criteria in Table 5-1
BTEX - Benzene, toluene, ethylbenzene, and xylenes
D - Duplicate sample
GW(SB) - Ground water sample number (Soil boring location)
J - Concentration is estimated
L - The bias in the estimated value is low
NA - Not analyzed
NR - Not reported
>C10 - C28 - Number of carbon atoms in the range of totaled hydrocarbons
< - Not detected at the laboratory reporting limit

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Table 4-4

SUMMARY OF DATA COMPLETENESS
WILCOX REFINERY, BRISTOW, OKLAHOMA

Control Limits	Data Assessment	
Analyte >90%	**TPH in water**	**87.5%**
	Antimony	**82.5%**
	Arsenic	**82.5%**
	Beryllium	**81%**
	Cadmium	**81%**
	Cobalt	**82.5%**
	Mercury	98%
	Thallium	96.5%
Analytical Method >90%	BTEX	100%
	PAHs	100%
	TPH	98.5%
	Metals	96%

Key:

Completeness results in **bold** for individual analytes fail analytical method completeness goals.

BTEX - Benzene, toluene, ethylbenzene, and xylenes.
PAHs - Polycyclic aromatic hydrocarbons.
TPH - Total petroleum hydrocarbons.

Table 4-5

SOURCE INVENTORY AND PRELIMINARY ESTIMATES OF WASTE QUANTITY
WILCOX REFINERY, BRISTOW, OKLAHOMA

Source	Concern/Status	Level of Threat to Waters	Capacity/ Dimension	Source Area (ft^2)	Estimated Thickness of Contamination (ft or inches)	Estimated Waste Volume (yd^3)	COCs (ESI and EPA START)*
Pond 1	Oily sludge/backfilled	Low	250 ft x 100 ft 3 cells	25,000	3 ft of oily waste and soil (Avg. of SB02, 03, 04)	2,780	Pyrene, toluene, xylenes, TPH
Pond 2	Runoff sediment from pit area 1 cell breached, 1 cell ponded	High	225 ft x 150 ft 1 of 2 cells	33,750	12 ft of soil and sediment	15,000	Copper, lead, TPH
Oily Waste Pit	Oily sludge/ berm breached, backfilled	Medium	300 ft diameter	70,686	3 ft of oily waste and soil (Avg. of SB07, 08, 09)	7,854	Acetone, 2-methyl-naphthalene, phenanathrene, xylenes, arsenic, copper, TPH
(b) Pond	Stained sediment/ *stock watering pond*	High	100 ft x 60 ft	6,000	3 ft of sediment	667	Chromium, copper, *lead*
Ten Former Tank Farm Large ASTs	Tank bottom sludge/tank steel salvaged prior to 1967	Medium to low	55,000 bbl ea. 125 ft dia. x 25 ft.	12,272 each	2 inches of semi-solid TBS	76 ea. 760 total	Pyrene, cyanide, manganese, selenium, silver, zinc, TPH
(b) Residence Soil	Surface and subsurface soil/on-site residents	Low	200 ft x 175 ft lot (-25% for house and shed)	26,250	5 ft average depth to ground water (SB17)	4,860	Lead, mercury, zinc, benzo(g,h,i)perylene chrysene, phenanthrene, pyrene
Unvegetated Area (South end of (b) Property)	Bare, stained surface soil, odor/unchanged	High	200 ft x 150 ft	30,000	5 ft average depth to ground water (SB14)	5,556	Copper, lead, acidity

Key at end of table.

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Table 4-5 (Cont.)

SOURCE INVENTORY AND PRELIMINARY ESTIMATES OF WASTE QUANTITY
WILCOX REFINERY, BRISTOW, OKLAHOMA

Source	Concern/Status	Level of Threat to Waters	Capacity/ Dimension	Source Area (ft^2)	Estimated Thickness of Contamination (ft or inches)	Estimated Waste Volume (yd^3)	COCs (ESI or EPA START)*
(b) Residence Former Ponds	Subsurface soil/backfilled, on-site residents	Medium	150 ft x 100 ft (house pond) 300 ft x 100 ft (South pond)	15,000 30,000	8 ft to ground water (SB13)	4,444 8,889 Total 13,333	Acetone, TPH
Former Pond (b) Property at SB01)	Bare cinders at surface/oily subsurface soil	High	125 ft x 100 ft	12,500	10 ft average to rock (SB01)	4,630	BTEX, TPH, lead
Former Pumping Station Soil	Subsurface soil/ No surface sampling to date	Medium	250 ft x 200 ft (fenced area) [25% impacted]	12,500	8 ft average depth to ground water (SB18)	3,704	Benzene, TPH
Former Refinery Area Soil	Surface soil/ No sampling to date	Medium	Unknown	Unknown	Unknown	Unknown	Suspected BTEX, PAHs, metals, TPH
Large ASTs (b) Property)	Minor TBS, Stained soil/Existing ASTs	Low	3,400 bbl each 144,000 gal 35 ft dia. X 20 ft	1,000 (Soil) plus 962 (TBS)	8 ft to rock (SB19) plus 2 inches of TBS in 1 tank	300 plus 1,200 gal	TPH
Small AST (b) Property)	Diesel/Fuel Oil/ Existing AST	Medium	560 bbl 23,500 gal 20 ft dia. X 10 ft	10,000 (Soil) plus 314 (TBS)	4 ft to ground water (SB16), 9 inches of TBS	1,480 plus 1,760 gal	TPH
Rail Tanker	Minor spills of fuel oil/active AST	Medium	20,000 gal	100	3 inches of stained soil	1	Fuel oil
South Central Tank Berm Area	Stained soil/ Backfilled former AST berm area	Medium	300 ft dia. (25% impacted)	17,670	15 ft to ground water (SB05)	9,817	TPH
(b) Tank Berm Area	Oily near surface soil/berm breached, backfilled	Medium	300 ft dia. (25% impacted)	17,670	3 ft to rock (SB11)	1,963	Benzo(a)pyrene, TPH

Key at end of table.

Table 4-5 (Cont.)

SOURCE INVENTORY AND PRELIMINARY ESTIMATES OF WASTE QUANTITY
WILCOX REFINERY, BRISTOW, OKLAHOMA

Source	Concern/Status	Level of Threat to Waters	Capacity/ Dimension	Source Area (ft^2)	Estimated Thickness of Contamination (ft or inches)	Estimated Waste Volume (yd^3)	COCs (ESI or EPA START)*
Former o/w Separator [(b)] Property)	Oily soil, tarry waste/separator breached	High	33 ft x 15 ft (Soil) 30 ft x 10 ft (Tar)	500 300	1 ft to ground water (SB15) 6 inches average of tar	18.5 5.5 Total 24	Benzo(a)pyrene, PAHs, TPH
Upper reaches of Tributary 1	Stream bed soil/sed	High	800 ft of impacted stream bed	2,400	1 ft soil/sed (SB20 to SB29)	89	Lead, TPH
Lower reaches of Tributary 1	Oily liquid flowing into stream	High	250 ft of impacted stream bed	Unknown (pipe from [(b)] property)	2 ft soil/sed (SB33, 34)	167 soil/sed plus unknown gal/min	PAHs, lead, TPH
					Total	72,985 yd^3 plus >2,960 gal	Solid Waste Liquid Waste

Key:

*Expanded Site Inspection (ESI) report (Roy F. Weston, March 1997) and the U.S. Environmental Protection Agency Superfund Technical Assistance and Response Team (START) site sampling events (Ecology and Environment, Inc., April, June, August, 1998).

AST - Aboveground storage tank
bbl - Barrel
BTEX - Benzene, toluene, ethylbenzene, and xylenes
COCs - Contaminants of concern
dia. - Diameter
ft - Feet
ft^2 - Square feet
gal - Gallons
> - Greater than
min - Minute
O/W - Oil/water
PAHs - Polycyclic aromatic hydrocarbons
sed - Sediment
SB - Soil boring sample
TBS - Tank bottom sludge
TPH - Total petroleum hydrocarbons
yd^3 - Cubic yard

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5 ARARs and TBCs

The NCP spill response program addresses only imminent and substantial threats to navigable waters of the United States. Risk assessment and long-term human health or ecological risks from documented site contamination are beyond the scope of this program. Threat to navigable waters at the Wilcox refinery site is determined by comparing site chemical data with Applicable or Relevant and Appropriate Requirements (ARARs) and To Be Considered materials (TBCs).

ARARs refer to federal or state laws and environmental protection requirements that are legally applicable to the investigation site. TBCs are non-promulgated advisories or guidance for the protection of human health and the environment that are generally not enforceable. The potential regulatory requirements for the site include federal environmental laws administered by the U.S. EPA and other federal agencies, and laws administered by the State of Oklahoma. ARARs and TBCs are typically categorized as chemical-, location-, or action-specific criteria. Chemical-specific criteria are usually health- or risk-based values that establish the acceptable concentration of a chemical for each medium. Location-specific requirements are restrictions placed upon the presence of a hazardous substance or the conduct of activities based solely on site location. Action-specific requirements are technology- or activity-based restrictions placed on remedial actions. Only chemical-specific ARARs and TBCs are discussed below due to the preliminary nature of this investigation.

This section presents a qualitative evaluation of the significance of site data by comparing numerical criteria from chemical-specific ARARs and TBCs identified for the site to maximum detected concentrations in the media tested at the Wilcox site.

5.1 Regulatory Criteria

To date, no ARARs have been identified for the site. The TBCs identified for the site are from the Resource Conservation and Recovery Act (RCRA) hazardous waste characteristics in the Code of Federal Regulations (CFR) Title 40, Part 261 (40 CFR 261); RCRA Land Disposal Restrictions (LDRs) (40 CFR 268); Oklahoma Corporation Commission (OCC) Underground Storage Tank (UST) Program; and TNRCC Risk Reduction Standards (RRS) in the Texas Administrative Code (TAC), Chapter 35, Subchapter S, Section 335. Site-specific analytical data for all analytes detected in site media were compared to the identified TBCs as applicable for each medium. TBCs for organic compounds are listed in Table 5-1 and TBCs for inorganic analytes are in Table 5-2.

According to RCRA in 40 CFR 261, Subpart C, four characteristics can be used to determine if a waste is hazardous: ignitability, corrosivity, reactivity, and toxicity. The characteristics most applicable for the evaluation of site data at Wilcox are toxicity for metals data and corrosivity for pH data. Toxicity is determined by analysis for hazardous constituents in an extract or leachate of the waste using the toxicity characteristic leaching procedure (TCLP) (40 CFR 261, Subpart C, Appendix II). The concentration of detected total metals results in site samples that can be compared to 20 times their respective TCLP criteria for an evaluation of hazard. The factor of "20 times TCLP criteria" is based on the extraction methodology of the TCLP. The weight of extract fluid used is 20 times the weight of sample. If it is assumed that the metal of concern can be completely extracted from the waste sample, an extremely conservative assumption, the metal concentration in the leachate cannot be greater than one-twentieth the metal concentration in the solid sample. Thus, total metals data can be classified as not of concern if it is less than the TBC factor of 20 times TCLP criteria (Table 5-2). RCRA hazardous corrosivity criteria are exceeded if pH is less than or equal to 2, or greater than or equal to 12.5 (Table 5-2).

RCRA LDRs are treatment standards for the allowable land disposal of restricted wastes. The listed constituent concentrations may not be exceeded in the waste or treatment residuals. RCRA LDRs are considered TBCs at Wilcox refinery for an initial evaluation of on-site treatment requirements (Table 5-1). The State of Oklahoma OCC UST Program has levels of chemical constituent concentrations that confirm a release to native soils and/or ground water. The OCC UST program release concentrations and corrective action levels are considered TBCs at Wilcox for BTEX compounds and TPH (Table 5-1).

Several TNRCC RRSs are identified as TBCs: the soil/air and ingestion standard for residential use (SAI-Res), the ground water protection standard for residential use (GWP-Res), and ground water standards.

- SAI-Res is the concentration in residential soil that is protective of human health considering cross-media contamination of air, and human ingestion and inhalation pathways from contaminated surface and subsurface soil;
- GWP-Res is the concentration in residential soil assumed protective of ground water considering cross-media contamination of ground water from contaminated subsurface soil; and
- Ground water standards are the allowable concentrations of a contaminant in ground water for residential exposure conditions.

As required by the RRS, the Federal Primary Drinking Water Regulations, Code of Federal Regulations (CFR) 141, Maximum Contaminant Levels (MCLs) should be used to evaluate ground water contamination. For the constituents detected at this site, the ground water standards are the same as the MCLs. Additionally, as allowed by the RRSs, other criteria can be used to evaluate constituents that may present an objectionable characteristic (e.g., bad taste and odor) or can make a natural resource unfit for use.

The following sections discuss the site-specific analytical data and TBCs for 1) oily waste and surface soil (less than 1 foot bgs) from the ESI, and 2) subsurface soil (more than 1 foot bgs), ground water, and surface water from the START field investigation. The maximum concentrations detected at Wilcox refinery are compared to the identified chemical-specific TBCs.

5.1.1 Oily Waste and Surface Soil

Analyte concentrations detected in oily waste and surface soil samples collected during the ESI (Table 2-2) were compared to RCRA LDRs or a factor of 20 times TCLP criteria; Oklahoma UST action and cleanup levels, and the TNRCC GWP-Res and SAI-Res standards (Tables 5-1 and 5-2). TBC values were available for six of the eight organic analytes detected significantly above background concentrations in oily waste or surface soil. Phenanthrene, pyrene, and TPH were detected in oily waste at concentrations exceeding one or more of their respective TBC values (Table 2-2). No organic analytes detected in surface soil exceed any of their respective TBC values.

TBC values were available for eight of the 16 metals and cyanide detected significantly above background concentrations in oily waste and surface soil: antimony, arsenic, barium, beryllium, lead, mercury, selenium, and silver. Unlike metals such as magnesium and iron,

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which are essential nutrients at low levels, these eight metals can be toxic at low levels. Of the heavy metals, antimony, arsenic, beryllium, and lead were detected in oily waste at concentrations exceeding one or more of their respective TBC values. Lead was detected in surface soil at concentrations exceeding one or more identified TBC values (Table 2-2).

5.1.2 Subsurface Soil

Analyte concentrations detected in subsurface soil samples collected by START for this investigation were compared to RCRA LDRs, Oklahoma UST action and cleanup levels, and the TNRCC GWP-Res and SAI-Res standards (Table 5-1).

Wastes related to the petroleum refining industry have land disposal restriction TBCs for treatment residuals with specific constituents. RCRA LDRs exist for 11 of the 22 organic analytes detected, including TPH. The following nine compounds exceeded RCRA LDRs for refinery waste: ethylbenzene, toluene, xylenes, anthracene, benzo(a)anthracene, benzo(a)pyrene, chrysene, phenanthrene, and pyrene.

The OCC has action and cleanup levels for BTEX compounds and TPH in soil at UST sites. Maximum site concentrations of all BTEX and TPH constituents at Wilcox refinery exceed one or both OCC standards.

Pre-calculated GWP-Res and SAI-Res values exist for 11 of the 22 organic analytes detected, not including TPH (Table 5-1). Of these 11 compounds, only benzene was detected in subsurface soil at a concentration exceeding both RRSs. Ethylbenzene, toluene, xylenes, fluoranthene, fluorene, and pyrene were detected at concentrations exceeding their GWP-Res values.

RCRA TCLP criteria exist for seven of the 21 metals detected in subsurface soil at Wilcox refinery. Potentially hazardous concentrations exceeding 20 times TCLP criteria were only detected for lead. For presentation purposes, exceedances of any TBC and total metals results that exceed 20 times TCLP criteria are highlighted in Table 5-2.

Pre-calculated GWP-Res and SAI-Res standards exist for 11 of the 23 metals detected in subsurface soil samples: antimony, arsenic, barium, beryllium, cadmium, chromium, lead, mercury, nickel, selenium, and silver (Table 5-2). Three of these metals (arsenic, beryllium, and lead) were detected at concentrations exceeding both RRSs. In summary, the contaminants in subsurface soil include all BTEX compounds and TPH, eight PAHs (anthracene, benzo(a)anthracene, benzo(a)pyrene, chrysene, fluoranthene, fluorene, phenanthrene, and pyrene), and eight metals but most significantly lead.

5.1.3 Ground Water

Organic analyte concentrations detected in ground water samples were compared to Texas RRSs, maximum concentrations in ground water for residential exposure, and soil TBCs (Table 5-1). Texas RRSs for ground water only exist for benzene, ethylbenzene, and toluene, and maximum site concentrations for benzene and toluene exceed these TBCs. The maximum benzene concentration in ground water also exceeds most soil TBCs. Metals were not analyzed in water samples at Wilcox refinery.

5.2 Contaminants of Concern

Based on their presence at concentrations exceeding one or more identified TBCs, the contaminants of concern (COCs) associated with various media at the Wilcox refinery site are:

- ESI oily waste: phenanthrene, pyrene, TPH, antimony, arsenic, beryllium, and lead (Weston 1997);
- ESI surface soil: lead (Weston 1997);
- Sediment: none;
- Subsurface soil: benzene, ethylbenzene, toluene, xylenes, anthracene, benzo(a)-anthracene, benzo(a)pyrene, chrysene, fluoranthene, fluorene, phenanthrene, pyrene, gasoline, TPH, antimony, arsenic, beryllium, cadmium, chromium, lead, mercury, and nickel;
- Ground water: benzene and toluene, and in addition TPH presents an objectionable taste and odor making shallow ground water at the site unfit for use; and
- Surface Water: none.

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Table 5-1

**EXAMPLE REGULATORY CRITERIA
TO BE CONSIDERED MATERIALS, ORGANICS
WILCOX REFINERY, BRISTOW, OKLAHOMA**

Analyte	Site Max.[1] Soil (mg/kg)	Site Max.[1] Water (mg/L)	RCRA[2] LDRs (mg/kg)	Oklahoma UST[3] Action Level (ppm)	Oklahoma UST[4] Cleanup Level 2 (ppm)	Texas RRSs[5] GWP-Res (mg/kg)	Texas RRSs[6] SAI-Res (mg/kg)
Volatiles							
Benzene	**2.2 JH**	**8.9 (0.005)[7]**	14	0.5	5	0.5	1.33
Ethylbenzene	**670**	0.087 (0.7)[7]	14	15	150	70	11,400
Toluene	**410**	3.3 (1.0)[7]	14	40	400	100	3,580
Xylenes	**2,600**	9.1 (--)[7]	22	200	1,000	1,000	54,700
Semi-Volatiles							
Acenaphthene	0.78	--	--	--	--	219	13,400
Acenaphthylene	<2,500	--	--	--	--	--	--
Anthracene	**700**	--	28	--	--	1,100	59,100
Benzo(a)anthracene	**2,800**	--	20	--	--	--	--
Benzo(b)fluoranthene	320	--	--	--	--	--	--
Benzo(k)fluoranthene	580	--	--	--	--	--	--
Benzo(a)pyrene	**920**	--	12	--	--	--	--
Benzo(ghi)perylene	<620	--	--	--	--	--	--
Chrysene	**2,800**	--	15	--	--	--	--
Dibenz(ah)anthracene	<620	--	--	--	--	--	--

Key at end of table.

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Table 5-1 (Cont.)

EXAMPLE REGULATORY CRITERIA
TO BE CONSIDERED MATERIALS, ORGANICS
WILCOX REFINERY, BRISTOW, OKLAHOMA

Analyte	Site Max.[1] Soil (mg/kg)	Site Max.[1] Water (mg/L)	RCRA[2] LDRs (mg/kg)	Oklahoma UST[3] Action Level (ppm)	Oklahoma UST[4] Cleanup Level 2 (ppm)	Texas RRSs[5] GWP-Res. (mg/kg)	Texas RRSs[6] SAI-Res. (mg/kg)
Semi-Volatiles (Cont'd)							
Fluoranthene	4,000	--	--	--	--	146	11,000
Fluorene	540	--	--	--	--	146	9,600
Indeno(1,2,3-cd)pyrene	<250	--	--	--	--	--	--
1-Methylnaphthalene	17	--	--	--	--	--	--
2-Methylnapththalene	7,000	--	--	--	--	--	--
Naphthalene	<2,500	--	42	--	--	146	4,910
Phenanthrene	11,000	--	34	--	--	--	--
Pyrene	2,500	--	36	--	--	110	8,020
Hydrocarbons							
Gasoline (C6-C10)	8,600	3,300 (--)[7]	--	--	250[8]	--	--
TPH (C6-C28)	280,000	9,200 (--)[7]	--	50	500	--	--

Key at end of table.

Table 5-1 (Cont.)

Key:
Blank spaces denote no data or no standards available

Shaded and **bold** results exceed one or more TBCs

1 - Maximum site concentration in soil and water
2 - Resource Conservation and Recovery Act (RCRA) land disposal restrictions (LDRs), 40 CFR 268.43
3 - Oklahoma Corporation Commission (OCC), Underground Storage Tank (UST) Program
4 - OCC UST Cleanup Level 2
5 - Texas Risk Reduction Standard (RRS), Ground Water Protection (GWP) for Residential Use
6 - Texas RRS Soil/Air and Ingestion (SAI) Standard for Residential Use, TAC 335.568
7 - Texas RRS Ground Water (GW), maximum concentration in GW for residential exposure conditions
8 - State of Washington, Class 3 soil suitable for disposal on site

mg/kg - Milligrams per kilogram
mg/L - Milligrams per liter
ppm - Parts per million
TPH - Total petroleum hydrocarbons

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Table 5-2

EXAMPLE REGULATORY CRITERIA
TO BE CONSIDERED MATERIALS, INORGANICS
WILCOX REFINERY, BRISTOW, OKLAHOMA

Analyte	Site Max.[1] Soil (mg/kg)	RCRA[2] 20 x TCLP (ppm)	Texas RRSs[3] GWP-Res (mg/kg)	Texas RRSs[4] SAI-Res (mg/kg)
Metals				
Aluminum	11,300			
Antimony	1.4		0.6	110
Arsenic	11.4	100	5	0.366
Barium	171		200	19,100
Beryllium	0.81		0.4	0.149
Cadmium	2.8	20	0.5	137
Calcium	18,400			
Chromium	15.2	100	10	391
Cobalt	9.8			
Copper	122			
Iron	37,300 JK			
Lead	15,200	100	1.5	500
Magnesium	9,910			
Manganese	1,100 JL			
Mercury	0.39	4.0	0.2	82.3
Nickel	18.3		10	1,560
Potassium	1,820 JK			
Selenium	1.1	20	5	1,370
Silver	2.3	100	18.3	1,370
Sodium	4,690 JK			
Thallium	0.54			
Vanadium	27.7			
Zinc	83.8 JK			
pH	2.3 to 9.5	<2 or >12[5]		

Key on next page.

Table 5-2 (Cont.)

Key:

Results that are shaded and **bold** exceed one or more TBCs
Blank spaces denote no data or no standards available

1 - Maximum site concentration in soil
2 - Derived criteria for solid waste from 20 times RCRA Toxicity Characteristic Leaching Procedure (TCLP), 40 CFR 261.24
3 - Texas Risk Reduction Standard (RRS), Groundwater Protection for Residential Use, TAC 335.568
4 - Texas RRS, Soil/Air and Ingestion (SAI) Standard for Residential Use, TAC 335.568
5 - RCRA hazardous waste criteria for corrosivity, 40 CFR 261.22

mg/kg - Milligrams per kilogram
ppm - Parts per million

6 Findings

The objectives of the site assessment under the NCP were to document the extent of spill impacts, determine threat to navigable waters of the United States, and evaluate the necessity for removal action. The following findings are based on site activities conducted by START in 1998, and on the evaluation of analytical data from this investigation and from the previous ESI (Weston 1997).

1. The Wilcox refinery site is a former oil refinery and tank farm of approximately 98 acres located to the northeast of Bristow, in Creek County, Oklahoma. The refinery and associated tank farm operated from the 1920s until the 1960s, when the site was abandoned and most steel structures were salvaged and removed. The site is also bordered to the northwest and west by former refinery and tank farm sites. Currently, the site has four owners: (b) (6) (79-acre tank farm), (b) and (b) (18-acre former refinery) (b) (6) (3.6-acre lot), and Sun Oil Company (1.1-acre active pipeline ROW and former pumping station area).

2. The Wilcox site has a number of refinery waste source areas of concern including: a backfilled oily waste pond (Pond 1); a breached settlement pond (Pond 2); a backfilled "oily waste pit"; an unvegetated former pond apparently backfilled with solid refinery waste; two backfilled ponds on the (b property; ten former large aboveground storage tank bermed areas affected by minor tank bottom sludge; numerous areas of affected soil on the refinery area and former pumping station; and solid and liquid tarry waste that has directly affected the lower reaches of Tributary 1.

3. EPA completed a Site Identification form on June 7, 1994, and ODEQ completed a PA for the Wilcox site and the adjacent refinery and tank farm sites on December 15, 1994. An ESI was completed by Weston for the ODEQ in March 1997. Field work for the NCP site assessment was conducted by START from April to August 1998.

4. ESI results indicated high concentrations of TPH, lead, and some PAHs in oily waste at numerous locations on site, and high concentrations of lead in the unvegetated area soil, so these waste sources were not sampled further by START for this NCP site assessment.

5. Subsurface geologic conditions at the site generally consist of a thin (0 to 10 feet) brown, silty sand layer above weathered red sandstone. Seasonal perched water is present in thin lenses above the sandstone, but the shallowest saturated sandstone aquifer on site is estimated at 45 to 60 feet bgs. Rainfall runoff and shallow subsurface ground water flow follow the topography south and east or west toward Tributaries 1 and 2 on site, and toward Sand Creek to the south.

6. START collected 55 subsurface soil samples, eight ground water samples, four surface water samples, two sediment samples, and 12 field QC samples. Samples were submitted for laboratory analysis of volatile BTEX compounds, semi-volatile PAHs, TPH, metals, and pH.

   - Subsurface soil sample results confirm the presence of significant concentrations of all BTEX compounds, eight PAH compounds including benzo(a)pyrene, seven metals but most significantly lead, and TPH. All these contaminants of concern appear to be related to the disposal and abandonment of refinery waste on site.

   - Sediment sampling results and shallow subsurface soil sampling results in the dry stream bed of Tributary 1 and Pond 2 confirm the presence of elevated concentrations of four PAH compounds including benzo(a)pyrene, as well as lead, and TPH. Attribution of metals contamination in the Tributary 1 stream bed is problematic due to significant upstream sources of lead contamination. However, lead in Pond 2 sediment, and PAHs and TPH in the lower reaches of Tributary 1 are significant sources of potential surface water contaminant migration on site.

   - Ground water sampling results for organic compounds detected elevated concentrations of BTEX compounds and TPH at several distinct locations on site. Attempts to define plume boundaries proved unsuccessful and the potential shallow ground water to surface water migration pathway at sample sites GW1, GW2, GW4, and GW5, appear insignificant. The GW3 water sample was from shallow saturated soil adjacent to Tributary 1 and is indicative of contaminated soil pore space water in contact with surface water.

   - BTEX compounds and TPH were not detected in surface water samples. Samples were collected during dry conditions with no flow in Tributaries 1 and 2. START observed visible sheens on on-site runoff after a storm event in April 1998; however, no release to surface water was recorded.

   - The laboratory data package was evaluated using standard EPA validation procedures. Numerous data were qualified as estimated and a total of 55 metals data points were rejected mainly due to poor spike recoveries. Further evaluation of data quality was performed using PARCC parameters, with the overall usability of the data being acceptable and the analytical completeness ranging from 96% for metals to 100% for BTEX and PAHs.

7. Approximately 73,000 cubic yards of oily waste and contaminated soil, and 3,000 gallons of liquid waste was identified at 18 source areas on the Wilcox refinery site. This waste volume estimate does not include known areas of contaminated ground water on site, or the quantity of oily liquid observed entering the lower reaches of Tributary 1 from the (b) property via a buried pipeline. In addition, the volume of

contaminated soil on the former refinery site and pumping station area in particular are unknown, and can only be determined by a systematic and comprehensive drilling and sampling program.

8. A total of five people live on site, at the (b) residence (two adults), and (b) residence (two adults and one child). Based on limited surface and subsurface soil, and perched ground water sampling results, both residences are located on significantly contaminated waste source areas. The (b) residence is a former office at the main gate truck fuel loading facility and the (b) residence is built on a backfilled refinery pond surrounded by other waste sources. Relocation or removal action at both residences is warranted.

7 References

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(b) (6) Personal Communications with START during the field investigation, April, June, August.

Appendix A
Soil Boring Logs

DRILLING LOG OF WELL/BORING NO. SB-X

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Exploratory boring southeast of former sludge Pond 1.
Date Started/Finished: 27 April 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: GeoProbe - Direct Push

Total Depth of Hole (feet BGS): 6
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ 0.0 Final: ▼ ____
Geologist: Paul D. James, P.G.

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL / BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.							
			ground surface (gs)					
0	*Hydrated Bentonite Seal.*		0.4 SP - Uniformly brown silty fine-medium SAND, subangular, moderate sorting, clast supported (feldspar, quartz, and trace rock fragments), wet. Noted trace rootlets throughout.					No analytical samples were collected at this exploratory boring.
1			SW - Mottled orange-red-brown fine-medium SAND with trace fines, subangular, well sorted, clast supported (feldspar & quartz), moist. Noted trace natural organic staining at 2-feet bgs.		4.0			
2								
3								
4					2.0			
5			6.0 Refusal at 6-feet bgs. End of Boring.					Due to 4-inches of rainfall on 26 April 1998, ground surface was saturated with water.
6								
7								
8								
9								
10								

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WELL_LOG WILCOX.GPJ 7-6-98

DRILLING LOG OF WELL/BORING NO. SB-01

Project/Location: Wilcox Refinery / Bristow, Oklahoma

Boring Location: Boring located on (b) property, west of (b) Pond.

Date Started/Finished: 27 April 1998/

Drilling Contractor: Ecology & Environment, Inc.

Drill Method: GeoProbe - Direct Push

Total Depth of Hole (feet BGS): 11

Ground Elevation (feet above): Unknown

Inner Casing Elevation (TOC): N/A

Groundwater Depth (feet BGS):

First Encountered: ▽ 0.0 Final: ▼ ____

Geologist: Paul D. James, P.G.

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		ground surface (gs)						
1	Hydrated Bentonite Seal ▽		SP - Mottled to variable orange-brown-black fine to medium SAND with trace fines, subangular, well sorted, clast supported (feldspar & quartz), wet. Noted black staining with strong petroleum odor throughout.			4.0			Collected Sample SB01-06 (0-0.5 feet bgs).
4			4.0						
5			SP - Variably brown-red grading to red, fine-medium SAND with trace fines, subangular, well sorted, clast supported (feldspar & quartz), wet. Noted black staining with strong petroleum odor throughout.			3.0			
7			7.0						
8			SP - Variably brown-red-orange-black, fine-medium SAND with trace fines, subangular, well sorted, clast supported (feldspar & quartz), wet. Observed trace clay lenses throughout.			3.2			
10			10.0 Noted black staining with strong petroleum odor throughout. 10.2						Collected Sample SB01-1011 (10-11 feet bgs).
11			11.0 CH - Mottled light gray-red silty CLAY, high plasticity, firm cohesive strength, matrix supported, sharp upper contact, dry. Noted slight odor, no staining observed. No recovery. Refusal at 11-feet bgs. End of Boring.						Due to 4-inches of rainfall on 26 April 1998, ground surface was saturated with water. Petroleum sheen on water was noted in the vicinity of the boring. PID/FID readings were unreliable due to faulty equipment.
15									

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WELL_LOG WILCOX.GPJ 7-6-98

DRILLING LOG OF WELL/BORING NO. SB-02

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Southeast of Pond 1.
Date Started/Finished: 01 June 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: GeoProbe - Direct Push

Total Depth of Hole (feet BGS): 2.1
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ N/A Final: ▼ ____
Geologist: Paul D. James, P.G.

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
	Hydrated Bentonite Seal		SM - Uniformly brown SILTY SAND, subangular, moderately sorted, matrix supported (feldspar & quartz), moist.					0	
			0.9						
1			SP - Mottled orange-red SAND with trace fines, subangular, well sorted, clast supported (feldspar), moist.			2.1		0	Collected Sample SB02-12 (1-2 feet bgs).
2			2.1					0	
			Refusal at 2.1 feet. End of boring.						
3									
4									
5									

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WELL_LOG WILCOX.GPJ 7-6-98

DRILLING LOG OF WELL/BORING NO. SB-03

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: South of Pond 1.
Date Started/Finished: 01 June 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: GeoProbe - Direct Push

Total Depth of Hole (feet BGS): 1.5
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ N/A Final: ▼
Geologist: Paul D. James, P.G.

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY - (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
	Hydrated Bentonite Seal		SM - Uniformly brown SILTY SAND, fine, subangular, moderately sorted, matrix supported (quartz & organics), dry.					0	
			0.6 SP - Mottled orange-red SAND with trace fines, subangular, well sorted, clast supported (feldspar & quartz), moist.			1.5		0	
1			1.5 Refusal at 1.5 feet. End of boring.					0	Collected Sample SB03-01015 (1-1.5 feet bgs).
2									
3									
4									
5									

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WELL_LOG WILCOX.GPJ 7-6-98

DRILLING LOG OF WELL/BORING NO. SB-04

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Southwest of Pond 1.
Date Started/Finished: 01 June 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: GeoProbe - Direct Push

Total Depth of Hole (feet BGS): 5
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ N/A Final: ▼
Geologist: Paul D. James, P.G.

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
1	*Hydrated Bentonite Seal*		SM - Uniformly brown SILTY SAND, fine, angular, moderately sorted, matrix supported (quartz & organics), dry.					0	
1.8									
2			SP - Mottled orange-red SAND with trace fines, fine to medium, subangular, well sorted, matrix supported (feldspar & quartz), moist.			4.0		0	
3								0	
4									
4.0			SP - Mottled orange-red, fine to medium SAND with 20% fines, subangular, well sorted, matrix supported (feldspar & quartz), moist. Noted trace petroleum staining with slight petroleum odor at 4-feet bgs.			1.0		0.4	Collected Sample SB04-0405 (4.0 - 5.0 feet bgs).
5									
5.0			Refusal at 5.0 feet. End of boring.						
6									
7									
8									
9									
10									

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WELL_LOG WILCOX.GPJ 7-6-98

DRILLING LOG OF WELL/BORING NO. SB-05

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Southeast end of property.
Date Started/Finished: 01 June 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: GeoProbe - Direct Push

Total Depth of Hole (feet BGS): 20
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ 15.5 Final: ▼
Geologist: Paul D. James, P.G.

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.								
			ground surface (gs)						
1–2	*Hydrated Bentonite Seal*		SM - Uniformly brown SILTY SAND, fine, subangular, moderately sorted, matrix supported, moist.			3.0		40	Collected Sample SB05-0102 (1.0 - 2.0 feet bgs).
3			3.0 Noted trace black oil-like product throughout.						
4			4.0 No recovery.						
5–6			SW/SM - Uniformly gray-brown SILTY/CLAYEY SAND, fine, subangular, well sorted, low plasticity, firm cohesive strength, matrix supported, moist. Upper contact - gradational.			4.0		20	Collected Sample SB05-0405 (4.0 - 5.0 feet bgs).
7–8			8.0 Noted slight staining throughout with petroleum odor.						
9–11			MLS - Mottled orange gray SANDY SILT with some CLAY (~25%), low plasticity, soft cohesive strength, moist.			4.0		5	
12			12.0 Noted strong petroleum odor throughout.						
13–14			MLS - Mottled orange gray fine SANDY SILT with some CLAY (~25%), low plasticity, soft cohesive strength, moist grading wet. First water encountered at 15.5 feet bgs.			3.0		5	Collected Sample SB05-1415 (14 - 15 feet bgs).
15	▽		Noted sheen in water with slight						
16			16.0 petroleum odor throughout.						
16–17			No recovery.						
17–18			MLS - Mottled orange gray fine SANDY SILT with some CLAY (~25%), low plasticity, soft cohesive strength, saturated.			2.0		300	
18			18.0 Noted sheen and strong petroleum						
19–20			odor throughout.						
20			20.0 No recovery.						
21–22			End of boring at 20 feet bgs.						

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WELL_LOG WILCOX.GPJ 7-6-98

DRILLING LOG OF WELL/BORING NO. SB-06

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: South-central tank berm area.
Date Started/Finished: 02 June 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: GeoProbe - Direct Push

Total Depth of Hole (feet BGS): 2.2
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ N/A Final: ▼ ____
Geologist: Paul D. James, P.G.

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
0	*Hydrated Bentonite Seal*		ML - Uniformly brown-red, fine SANDY SILT, medium plasticity, loose cohesive strength, matrix supported, moist.					0	
1						2.2			Collected Sample SB06-0102 (1.0 - 2.0 feet bgs).
								0	
2			2.0						
			2.2 SP - Mottled orange-red SAND with trace fines, subangular, well sorted, clast supported (feldspar & quartz), moist.						
3			Refusal at 2.2 feet bgs. Noted weathered arkosic sandstone in foot of macro-sampler. End of boring.						
4									
5									

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WELL_LOG WILCOX.GPJ 7-6-98

DRILLING LOG OF WELL/BORING NO. SB-07

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: West of oily waste 'Pit'.
Date Started/Finished: 02 June 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: GeoProbe - Direct Push

Total Depth of Hole (feet BGS): 5
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ N/A Final: ▼
Geologist: Paul D. James, P.G.

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.								
	Hydrated Bentonite Seal		*ground surface (gs)* SM - Uniformly brown SILTY SAND, fine, subangular, moderately sorted, matrix supported, moist.			4.0		0	
			3.0 SP - Mottled orange-red SAND with trace fines, subangular, well sorted, clast supported (feldspar & quartz), moist. Upper contact - sharp.						
			4.0 SC - Mottled orange-gray-brown CLAYEY fine SAND, subangular, moderately sorted, medium plasticity, soft cohesive strength, clast supported, moist.			1.0		0	Collected Sample SB07-0405 and duplicate SB07D-0405 (4.0 - 5.0 feet bgs).
			5.0 Refusal at 5.0 feet bgs. End of boring.						

1 2 3 4 5 6 7 8 9 10

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WELL_LOG WILCOX.GPJ 7-6-98

DRILLING LOG OF WELL/BORING NO. SB-08

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Southwest of oily waste 'Pit'.
Date Started/Finished: 02 June 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: GeoProbe - Direct Push

Total Depth of Hole (feet BGS): 2
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ N/A Final: ▼
Geologist: Paul D. James, P.G.

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
0	*Hydrated Bentonite Seal*		SP - Mottled orange-brown SAND with trace fines, subangular, well sorted, clast supported (feldspar & quartz), dry grading to moist.			2.0		0	Collected Sample SB08-0102 (1.0 - 2.0 feet bgs).
2			2.0 Refusal at 2.0 feet bgs. End of boring.						
3									
4									
5									

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WELL_LOG WILCOX.GPJ 7-6-98

DRILLING LOG OF WELL/BORING NO. SB-09

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: South of oily waste 'Pit'.
Date Started/Finished: 02 June 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: GeoProbe - Direct Push

Total Depth of Hole (feet BGS): 2.2
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ N/A Final: ▼
Geologist: Paul D. James, P.G.

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
	Hydrated Bentonite Seal		SM - Mottled brown-orange SILTY SAND, fine, subangular, moderately sorted, matrix supported, moist.						Noted hard black asphalt material adjacent to boring location.
1						2.2		0	Collected Sample SB09-0102 (1.0 - 2.0 feet bgs).
2			2.0 WR - Uniformly red-brown weathered arkosic SANDSTONE. 2.2 Refusal at 2.2 feet bgs. End of boring.						
3									
4									
5									

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WELL_LOG WILCOX.GPJ 7-6-98

DRILLING LOG OF WELL/BORING NO. SB-10

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: West of (b) residence.
Date Started/Finished: 02 June 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: GeoProbe - Direct Push

Total Depth of Hole (feet BGS): 4.3
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ N/A Final: ▼
Geologist: Paul D. James, P.G.

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.								
			ground surface (gs)						
0	*Hydrated Bentonite Seal*		SM - Uniformly brown SILTY SAND, fine, subangular, moderately sorted, matrix supported, moist.			4.0		0	
1									
2									
3									Collected Sample SB10-0304 (3.0 - 4.0 feet bgs).
4			4.0 WR - Uniformly red weathered arkosic SANDSTONE.			0.3		0	
5			4.3 Refusal at 4.3 feet bgs. End of boring.						

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WELL_LOG WILCOX.GPJ 7-6-98

DRILLING LOG OF WELL/BORING NO. SB-11

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: ~120-ft. north of (b) residence.
Date Started/Finished: 02 June 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: GeoProbe - Direct Push

Total Depth of Hole (feet BGS): 3
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ N/A Final: ▼
Geologist: Paul D. James, P.G.

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.								
			ground surface (gs)						
1	*Hydrated Bentonite Seal*		SM - Uniformly brown SILTY SAND, fine, subangular, moderately sorted, matrix supported, moist.			3.0		0	
2								0	Collected Sample SB11-0203 (2.0 - 3.0 feet bgs).
3			2.8 3.0 SW - Uniformly tan, fine to medium SAND with trace fine GRAVEL, subangular, well sorted, matrix supported, moist. Upper contact - sharp. Refusal at 3.0 feet bgs. End of boring.						
4									
5									

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WELL_LOG WILCOX.GPJ 7-6-98

DRILLING LOG OF WELL/BORING NO. SB-12

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Southwest corner of Site.
Date Started/Finished: 02 June 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: GeoProbe - Direct Push

Total Depth of Hole (feet BGS): 9
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ 8.9 Final: ▼
Geologist: Paul D. James, P.G.

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
1	*Hydrated Bentonite Seal*		MLS - Uniformly brown-red SANDY SILT with trace CLAY (~10%), medium plasticity, soft cohesive strength, moist.					0	Collected Sample SB12-0102 (1.0 - 2.0 feet bgs).
2						3.0		0	
3			3.0 No recovery.						
4			4.0 SP - Mottled gray-orange-tan, fine SAND with trace fines, subangular, well sorted, clast supported , moist grading to wet.					0	
5									
6						4.0			
7								0	
8						1.0		0	Collected Sample SB12-0809 (8.0 - 9.0 feet bgs).
9	▽		9.0 Refusal at 9.0 feet bgs. End of Boring.						
10									

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WELL_LOG WILCOX.GPJ 7-6-98

DRILLING LOG OF WELL/BORING NO. SB-13

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Former pond, South of (b) residence.
Date Started/Finished: 02 June 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: GeoProbe - Direct Push

Total Depth of Hole (feet BGS): 10
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ 8.0 Final: ▼ ___
Geologist: Paul D. James, P.G.

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
0	*Hydrated Bentonite Seal*		SP - Mottled brown-red SAND with trace fines, subangular, well sorted, clast supported, moist.			3.3		0	Collected Sample SB13-0102 (1.0 - 2.0 feet bgs).
3.3			No recovery.						
4.0			SP - Mottled orange-brown SAND with trace fines, subangular, well sorted, clast supported, moist. Noted slight petroleum odor.			3.5		0 0	
6.5			SM - Uniformly brown SILTY fine SAND with trace CLAY (~5%), subangular, moderately sorted, matrix supported, moist grading to wet. Noted strong petroleum odor throughout.					50	Collected Sample SB13-6575 (6.5 - 7.5 feet bgs).
7.5			No recovery.			2.0		60	
8.0 ▽									
10.0			SM - Uniformly brown SILTY fine SAND with trace CLAY (~5%), subangular, moderately sorted, matrix supported, saturated. End of boring at 10.0 feet bgs.						

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WELL_LOG WILCOX.GPJ 7-6-98

DRILLING LOG OF WELL/BORING NO. SB-14

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: South of (b) unvegetated area.
Date Started/Finished: 03 June 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: GeoProbe - Direct Push

Total Depth of Hole (feet BGS): 11
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ 4.5 Final: ▼
Geologist: Paul D. James, P.G.

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
1	*Hydrated Bentonite Seal*		SM - Uniformly brown SILTY fine SAND, subangular, moderately sorted, matrix supported, dry. Noted anaerobic decay odor.			3.5		3	Collected Sample SB14-0102 (1.0 - 2.0 feet bgs).
2									
3									
			3.5						
4			4.0 No recovery.						
5		▽	SC - Mottled brown-red CLAYEY SAND grading to CLAY, moderate sorting, matrix supported, moist with wet zone at 4.5 feet bgs. Noted strong anaerobic decay odor.			4.0		20	Collected Sample SB14-0506 (5.0 - 6.0 feet bgs).
6									
7									
			8.0						
8			CH - Mottled orange-tan CLAY with trace SILT and fine SAND, high plasticity, firm cohesive strength, moist. Noted slight anaerobic decay odor.			3.0		4	
9									
10									
			11.0						
11			End of boring at 11 feet bgs.						
12									
13									
14									
15									

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WELL_LOG WILCOX.GPJ 7-6-98

DRILLING LOG OF WELL/BORING NO. SB-15

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: ~450-ft. south of (b) residence.
Date Started/Finished: 03 June 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: GeoProbe - Direct Push

Total Depth of Hole (feet BGS): 3.1
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ 1.0 Final: ▼
Geologist: Paul D. James, P.G.

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
0	*Hydrated Bentonite Seal*		FILL - Uniformly black CINDER or ASH with SANDY GRAVEL texture, poorly sorted, clast supported, moist grading to wet at 1 foot bgs. Noted slight petroleum odor.			3.1		40	Collected Sample SB15-0001 (0.0 - 1.0 feet bgs).
3			3.1 Refusal at 3.1 feet bgs. End of boring. Noted weathered sandstone in foot of macro-sampler.						

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WELL_LOG WILCOX.GPJ 7-6-98

DRILLING LOG OF WELL/BORING NO. SB-16

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Northwest of (b) small AST.
Date Started/Finished: 03 June 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: GeoProbe - Direct Push

Total Depth of Hole (feet BGS): 6.5
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ 4.0 Final: ▼
Geologist: Paul D. James, P.G.

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
0	*Hydrated Bentonite Seal*		MLS - Uniformly brown fine SANDY SILT with trace organic matter (~5%), low plasticity, loose cohesive strength, moist.					0	
1			1.1 Noted trace plant matter throughout.					0	
2			SP - Mottled brown-orange, fine to medium SAND with trace fines, subangular, well sorted, clast supported, moist. Upper contact -			2.8			
3			2.8 sharp. Noted slight petroleum odor at 2.8 feet bgs. No recovery.						
4	▽		4.0 SM - Uniformly brown with black staining noted throughout, SILTY fine SAND with trace CLAY (~5%), subangular, moderately sorted,						
5			matrix supported, wet. Noted petroleum odor.			2.5		20	Collected Sample SB16-0506 (5.0 - 6.0 feet bgs).
6			6.1						
7			6.5 SP - Uniformly white, fine to coarse SAND with trace SILT and GRAVEL, angular to subangular, poorly sorted, clast supported, slight cementation, moist. Upper contact - sharp. Refusal at 6.5 feet bgs. End of boring. Noted weathered sandstone in foot of macro-sampler.						
8									
9									
10									

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WELL_LOG WILCOX.GPJ 7-6-98

DRILLING LOG OF WELL/BORING NO. SB-17

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: West of (b) residence.
Date Started/Finished: 03 June 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: GeoProbe - Direct Push

Total Depth of Hole (feet BGS): 11.5
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ 6.3 Final: ▼
Geologist: Paul D. James, P.G.

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
1–2	*Hydrated Bentonite Seal*		SM - Uniformly light brown, SILTY SAND, subangular, well sorted, clast supported (feldspar & quartz), dry.			4.0		1	Collected Sample SB17-0102 and duplicate SB17D-0102 (1.0 - 2.0 feet bgs).
4			4.0						
4–5			SP - Mottled brown-red fine SAND with trace fines, subangular, well sorted, clast supported, moist. Noted slight petroleum odor.					10	
5.8			5.8						
6		▽	6.3 SM - Stained black fine SILTY SAND, subangular, moderately sorted, moist. Upper contact - sharp.			4.0		180	Collected Sample SB17-5565 (5.5 - 6.5 feet bgs).
7			Noted strong petroleum odor throughout.					100	
8			8.0 SP - Mottled brown-red fine SAND with trace fines, subangular, well sorted, clast supported, wet.						
9–10			SM - Mottled brown-orange SILTY SAND, subangular, moderately sorted, wet. Upper contact - gradational.			3.5		6	
11			11.5						
11–12			End of boring at 11.5 feet bgs.						
13–15									

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WELL_LOG WILCOX.GPJ 7-6-98

DRILLING LOG OF WELL/BORING NO. SB-18

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: West of pumping station fence.
Date Started/Finished: 03 June 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: GeoProbe - Direct Push

Total Depth of Hole (feet BGS): 13.5
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ 8.0 Final: ▼ ____
Geologist: Paul D. James, P.G.

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
0	*Hydrated Bentonite Seal*		SP - Mottled orange-brown fine SAND with trace fines, subangular, well sorted, clast supported, moist. Noted strong old-gasoline odor.			3.0		95	Collected Sample SB18-0102 (1.0 - 2.0 feet bgs).
3.0			No recovery.						
4.0			SP - Uniformly brown fine SAND with trace fines, subangular, well sorted, clast supported, moist grading wet. Noted strong old-gasoline odor.			4.0		100	
8.0 ▽			SP - Mottled brown-red fine SAND with trace fines, subangular, well sorted, clast supported, wet. Noted strong old-gasoline odor throughout.			3.0		120	Collected Sample SB18-0708 (7.0 - 8.0 feet bgs).
11.0			SM - Mottled brown-tan SILTY fine SAND, subangular, moderately sorted, clast supported, saturated. Noted free-phase gasoline on water.			2.5		82	
13.5			End of boring at 13.5 feet bgs.						

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WELL_LOG WILCOX.GPJ 7-6-98

001207

DRILLING LOG OF WELL/BORING NO. SB-19

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Adjacent to northwest corner ASTs.
Date Started/Finished: 04 June 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: GeoProbe - Direct Push

Total Depth of Hole (feet BGS): 8
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ N/A Final: ▼
Geologist: Paul D. James, P.G.

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
1	*Hydrated Bentonite Seal*		SW - Stained black-brown SAND with trace fines and fine gravel, angular to subangular, poorly sorted, matrix supported, moist. Noted petroleum odor and staining.					25	Collected Sample SB19-0102 (1.0 - 2.0 feet bgs).
2						3.5			
2.5			SP - Stained black-brown, fine SAND with trace fines, subangular, well sorted, clast supported, moist. Upper contact - sharp. Noted petroleum odor and staining throughout.					40	
3.5									
4			No recovery.					60	
4.0			SM - Stained black with varible brown-orange, SILTY fine SAND with trace CLAY, subangular, well sorted, matrix supported, moist. Upper contact - gradational. Noted petroleum odor and staining throughout.						
5.2						4.0			
6			SM - Mottled brown-black- orange, SILTY fine SAND with little CLAY (~25%), subangular, poorly sorted, matrix supported, moist. Upper contact - sharp.					10	
7									Collected Sample SB19-0708 (7.0 - 8.0 feet bgs).
8.0			End of boring at 8.0 feet bgs. Noted weathered sandstone in foot of macro-sampler.						
8									
9									
10									

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WELL_LOG WILCOX.GPJ 7-6-98

DRILLING LOG OF WELL/BORING NO. SB-20

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Tributary 1, See Site Map
Date Started/Finished: 04 August 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: Slam Bar - Direct Push, 1 in. dia. hole

Total Depth of Hole (feet BGS): 3
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ N/A Final: ▼
Geologist: L. Williams

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.								
			ground surface (gs)						
1			Silty Sand (SW-SM) - mottled reddish brown - brown (10YR 3/2), fine grained, subangular, moderately sorted with silt 10% and dryed petroleum fragments < 1% (< 3 mm dia), interbedded with a grey to light brown silty sand stringer @ approx. 0.5 ft. (1 in. thick)			1.8			Sample taken from center of dry stream bed
2									
3			3.0 Total Depth = 3 ft.						
4									
5									
6									
7									
8									
9									
10									

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WELL_LOG WILCOX.GPJ 9-29-98

DRILLING LOG OF WELL/BORING NO. SB-21

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Tributary 1, See Site Map
Date Started/Finished: 04 August 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: Slam Bar - Direct Push, 1 in. dia. hole

Total Depth of Hole (feet BGS): 3
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ N/A Final: ▼
Geologist: L. Williams

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
0			Silty Sand (SW-SM) - mottled reddish brown - brown (10YR 3/2), fine grained, subangular, moderately sorted with silt 10% and dryed petroleum fragments < 1% (< 3 mm dia.)			1.8			Sample taken from center of dry stream bed
3.0			Total Depth = 3 ft.						

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WELL_LOG WILCOX.GPJ 9-29-98

DRILLING LOG OF WELL/BORING NO. SB-22

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Tributary 1, See Site Map
Date Started/Finished: 04 August 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: Slam Bar - Direct Push, 1 in. dia. hole

Total Depth of Hole (feet BGS): 3
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ N/A Final: ▼
Geologist: L. Williams

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
1			Silty Sand (SW-SM) - mottled reddish brown - brown (10YR 3/2), fine grained, subangular, moderately sorted with silt 10% and dryed petroleum fragments < 1% (< 3 mm dia)			1.8			Sample taken from center of dry stream bed
2									
3			3.0 Total Depth = 3 ft.						
4									
5									
6									
7									
8									
9									
10									

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WELL_LOG WILCOX.GPJ 9-29-98

DRILLING LOG OF WELL/BORING NO. SB-23

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Tributary 1, See Site Map
Date Started/Finished: 04 August 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: Slam Bar - Direct Push, 1 in. dia. hole

Total Depth of Hole (feet BGS): 3
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ N/A Final: ▼
Geologist: L. Williams

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
0			Silty Sand (SW-SM) - mottled reddish brown - brown (10YR 3/2), fine grained, subangular, moderately sorted with silt 10% and dryed petroleum fragments < 1% (< 3 mm dia)			1.8			Sample taken from center of dry stream bed
3.0			Total Depth = 3 ft.						

1 2 3 4 5 6 7 8 9 10

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WELL_LOG WILCOX.GPJ 9-29-98

DRILLING LOG OF WELL/BORING NO. SB-24

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Tributary 1, See Site Map
Date Started/Finished: 04 August 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: Slam Bar - Direct Push, 1 in. dia. hole

Total Depth of Hole (feet BGS): 2
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ N/A Final: ▼
Geologist: L. Williams

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.								
			ground surface (gs)						
1			Silty Sand (SW-SM) - mottled reddish brown - brown (0-0.5 ft.) and hydrocarbon stained (dark brown - green), fine grained, subangular, moderately sorted with silt - 40% , rounded fine gravel - 10% and dryed petroleum fragments - < 1% (< 3 mm dia),			1.0			Sample taken from center of dry stream bed
2			2.0 Refusal @ 2 ft. Sandstone - reddish brown to tan, well sorted, compacted and poorly cemented						Sandstone outcrops can be seen on both banks of stream.
3			Total Depth = 2 ft.						
4									
5									
6									
7									
8									
9									
10									

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WELL_LOG WILCOX.GPJ 9-29-98

DRILLING LOG OF WELL/BORING NO. SB-25

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Tributary 1, See Site Map
Date Started/Finished: 04 August 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: Slam Bar - Direct Push, 1 in. dia. hole

Total Depth of Hole (feet BGS): 3
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ N/A Final: ▼
Geologist: L. Williams

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
1			Silty Sand (SW-SM) - mottled reddish brown - brown (10YR 3/2), fine grained, subangular, moderately sorted with silt 10% and dryed petroleum fragments - < 1% (< 3 mm dia.)			1.8			Sample taken from center of dry stream bed
2									
3			3.0 Total Depth = 3 ft.						
4									
5									
6									
7									
8									
9									
10									

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WELL_LOG WILCOX.GPJ 9-29-98

DRILLING LOG OF WELL/BORING NO. SB-26

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Tributary 1, See Site Map
Date Started/Finished: 04 August 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: Slam Bar - Direct Push, 1 in. dia. hole

Total Depth of Hole (feet BGS): 3
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ N/A Final: ▼
Geologist: L. Williams

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.								
			ground surface (gs)						
1			Silty Sand (SW-SM) - mottled reddish brown - brown (10YR 3/4), fine grained, subangular, moderately sorted with silt 10% and dryed petroleum fragments < 1% (< 3 mm dia)			1.8			Sample taken from center of dry stream bed
2									
3			3.0 Total Depth = 3 ft.						
4									
5									
6									
7									
8									
9									
10									

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WELL_LOG WILCOX.GPJ 9-29-98

DRILLING LOG OF WELL/BORING NO. SB-27

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Tributary 1, See Site Map
Date Started/Finished: 05 August 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: Slam Bar - Direct Push, 1 in. dia. hole

Total Depth of Hole (feet BGS): 3
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ N/A Final: ▼
Geologist: L. Williams

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
1			Silty Sand (SW-SM) - mottled reddish brown - brown (10YR 3/6), fine grained, subangular, moderately sorted with silt 49% and dryed petroleum fragments < 1% (< 3 mm dia)			1.8			Sample taken from center of dry stream bed
2									
3			3.0 Total Depth = 3 ft.						
4									
5									
6									
7									
8									
9									
10									

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WELL_LOG WILCOX.GPJ 9-29-98

DRILLING LOG OF WELL/BORING NO. SB-28

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Tributary 1, See Site Map
Date Started/Finished: 05 August 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: Slam Bar - Direct Push, 1 in. dia. hole

Total Depth of Hole (feet BGS): 2
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ N/A Final: ▼
Geologist: L. Williams

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
0			Silty Sand (SW-SM) - mottled reddish brown - brown (7.5YR 3/4) and, fine grained, subangular, moderately sorted with silt - 50% , rounded fine gravel - 49% and dryed petroleum fragments < 1% (< 3 mm dia), Refusal @ 2 ft.			1.8			Sample taken from center of dry stream bed
2.0			Total Depth = 2 ft.						

1 2 3 4 5 6 7 8 9 10

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WELL_LOG WILCOX.GPJ 9-29-98

DRILLING LOG OF WELL/BORING NO. SB-29

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Tributary 1, See Site Map
Date Started/Finished: 05 August 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: Slam Bar - Direct Push, 1 in. dia. hole

Total Depth of Hole (feet BGS): 1
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ N/A Final: ▼
Geologist: L. Williams

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.								
			ground surface (gs)						
1			Silty Sand (SW-SM) - mottled reddish brown - brown (7.5YR 3/4), fine grained, subangular, moderately sorted with silt 24% and dryed petroleum fragments < 1% (< 3 mm dia), Refusal @ 1 ft. Total Depth = 1 foot			0.8			Sample taken from center of dry stream bed
2									
3									
4									
5									
6									
7									
8									
9									
10									

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WELL_LOG WILCOX.GPJ 9-29-98

DRILLING LOG OF WELL/BORING NO. SB-30

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Tributary 1, See Site Map
Date Started/Finished: 05 August 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: Slam Bar - Direct Push, 1 in. dia. hole

Total Depth of Hole (feet BGS): 3
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ N/A Final: ▼
Geologist: L. Williams

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
0			Silty Sand (SW-SM) - mottled reddish brown - brown (10YR 3/6), fine grained, subangular, moderately sorted with silt 10%			1.8			Sample taken from east bank of pond. (b)
3.0			Total Depth = 3 ft.						

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WELL_LOG WILCOX.GPJ 9-29-98

DRILLING LOG OF WELL/BORING NO. SB-31

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Tributary 1, See Site Map
Date Started/Finished: 05 August 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: Slam Bar - Direct Push, 1 in. dia. hole

Total Depth of Hole (feet BGS): 3
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ N/A Final: ▼
Geologist: L. Williams

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
0			Clayey/Silty Sand (SW-SM) - mottled reddish brown - brown (5YR 4/3), fine grained, subangular, moderately sorted with clay/silt 50%			1.5			Sample taken from west edge of pond (b)
3.0			Total Depth = 3 ft.						

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WELL_LOG WILCOX.GPJ 9-29-98

DRILLING LOG OF WELL/BORING NO. SB-32

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Tributary 1, See Site Map
Date Started/Finished: 05 August 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: Slam Bar - Direct Push, 1 in. dia. hole

Total Depth of Hole (feet BGS): 1
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ N/A Final: ▼
Geologist: L. Williams

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
1			Clayey/Silty Sand (SW-OH) - Hydrocarbon stained brownish green to black, fine grained, subangular, poorly sorted with clay/silt 25%, and decayed plant leaves, strong hydrocarbon odor Total Depth = 1 ft.			1.0			Sample taken from the center of West stream bank
2									
3									
4									
5									
6									
7									
8									
9									
10									

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WELL_LOG WILCOX.GPJ 9-29-98

DRILLING LOG OF WELL/BORING NO. SB-33

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Tributary 1, See Site Map
Date Started/Finished: 05 August 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: Slam Bar - Direct Push, 1 in. dia. hole

Total Depth of Hole (feet BGS): 1
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ N/A Final: ▼
Geologist: L. Williams

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.								
			ground surface (gs)						
1			Clayey/Silty Sand and Gravel (SG-OH) - *Hydrocarbon stained* brownish green to black, fine grained, subangular, poorly sorted with clay/silt 20%, decayed plant leaves and fine to medium grained gravel - 30 %, strong hydrocarbon odor. 1.0			1.0			Sample taken from the center of wet *stream bed*
2			Total Depth = 1 ft.						
3									
4									
5									
6									
7									
8									
9									
10									

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WELL_LOG WILCOX.GPJ 9-29-98

DRILLING LOG OF WELL/BORING NO. SB-34

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Tributary 1, See Site Map
Date Started/Finished: 05 August 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: Slam Bar - Direct Push, 1 in. dia. hole

Total Depth of Hole (feet BGS): 1
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ N/A Final: ▼
Geologist: L. Williams

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.								
			ground surface (gs)						
1			Clayey/Silty Sand and Gravel (SPG-OH) - Hydrocarbon stained brownish green to black, fine grained, subangular, poorly sorted with clay/silt - 25 %, decayed plant leaves and fine to medium grained gravel - 20 %, strong odor *Total Depth = 1 ft.*			1.0			Sample taken from the center of wet stream bed
2									
3									
4									
5									
6									
7									
8									
9									
10									

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WELL_LOG WILCOX.GPJ 9-29-98

DRILLING LOG OF WELL/BORING NO. SB-35

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Pond 2 southeast of (b) Residence, See Site Map
Date Started/Finished: 06 August 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: Slam Bar - Direct Push, 1 in. dia. hole

Total Depth of Hole (feet BGS): 3
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ N/A Final: ▼
Geologist: L. Williams

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
0			Silty Sand (Fill) - dark brown, strong hydrocarbon odor						Sample taken from southwest corner of Pond 2
1.0			Sand and silt (Fill) - grey to light brown, soft, strong hydrocarbon oder			1.8			
1.8			Silty Sand (Fill) - dark brown, strong hydrocarbon odor						
3.0			Total Depth = 3 ft.						

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WELL_LOG WILCOX.GPJ 9-29-98

001224

DRILLING LOG OF WELL/BORING NO. SB-36

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Tributary 2, See Site Map
Date Started/Finished: 04 August 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: JMC - Direct Push, 1 in. dia. hole

Total Depth of Hole (feet BGS): 9
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ 6.5 Final: ▼
Geologist: L. Williams

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.								
			ground surface (gs)						
1			Silty Sand (SW-SM) - mottled *reddish brown - brown* (5YR 5/8), fine grained, subangular, moderately sorted with silt 30%, groundwater @ 6-7 feet. Slight hydrocarbon odor			3.0			Sample taken from east bank of *Tributary 2*
2									
3									
4						3.0			
5									
6									Laboratory sample taken from 6 - 7 foot interval
7						2.5			
8									
9			9.0 Total Depth = 9 ft.						
10									

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WELL_LOG WILCOX.GPJ 9-29-98

DRILLING LOG OF WELL/BORING NO. SB-37

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Tributary 2, See Site Map
Date Started/Finished: 04 August 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: JMC - Direct Push, 1 in. dia. hole

Total Depth of Hole (feet BGS): 9
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ 6.5 Final: ▼
Geologist: L. Williams

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.								
			ground surface (gs)						
1			Silty Sand (SW-SM) - mottled reddish brown - brown (5YR 5/8), fine grained, subangular, moderately sorted with silt 30%, groundwater @ 6-7 feet.			3.0			Sample taken from east bank of Tributary 2
2									
3									
4						3.0			
5									
6		▽							Laboratory sample taken from 6 - 7 foot interval
7						3.0			
8									
9			9.0 Total Depth = 9 ft.						
10									

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WELL_LOG WILCOX.GPJ 9-29-98

DRILLING LOG OF WELL/BORING NO. SB-38

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Tributary 2, See Site Map
Date Started/Finished: 04 August 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: JMC - Direct Push, 1 in. dia. hole

Total Depth of Hole (feet BGS): 9
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ 1 Final: ▼
Geologist: L. Williams

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
1		▽	Silty Sand (SW-SM) - mottled reddish brown - brown (5YR 5/8), fine grained, subangular, moderately sorted with silt 30%. Moist soil at 1 ft.			3.0			Sample taken from east bank of Tributary 2 Laboratory sample taken from the 0-1 foot interval
2									
3									
4						3.0			
5									
6									
7						2.5			
8									
9			9.0 Total Depth = 9 ft.						
10									

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WELL_LOG WILCOX.GPJ 9-29-98

DRILLING LOG OF WELL/BORING NO. SB-39

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Tributary 2, See Site Map
Date Started/Finished: 05 August 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: JMC - Direct Push, 1 in. dia. hole

Total Depth of Hole (feet BGS): 9
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ 3.5 Final: ▼
Geologist: L. Williams

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
0			Silty Sand (SW-SM) - mottled reddish brown - brown (5YR 5/8), fine grained, subangular, moderately sorted with silt/ clay - 40%, groundwater @ 3 - 4 feet.			3.0			Sample taken from east bank of Tributary 2
3	▽								Laboratoty sample taken fro 3 - 4 foot interval
4						2.5			
6						3.0			
9			9.0 Total Depth = 9 ft.						

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DRILLING LOG OF WELL/BORING NO. SB-40

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Tributary 2, See Site Map
Date Started/Finished: 06 August 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: JMC - Direct Push, 1 in. dia. hole

Total Depth of Hole (feet BGS): 6
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ 3.5 Final: ▼
Geologist: L. Williams

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	*Monitoring well was not installed at this boring location.*		*ground surface (gs)*						
1			Silty Sand (SW-SM) - mottled reddish brown - brown (5YR 5/8), fine grained, subangular, moderately sorted with silt/ clay - 40%, groundwater @ 3 - 4 feet.			3.0			Sample taken from east bank of Tributary 2
2									
3		▽							Laboratory sample taken from the 3 - 4 ft. interval
4						3.0			
5									
6			6.0 Total Depth = 6 ft.						
7									
8									
9									
10									

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WELL_LOG WILCOX.GPJ 9-29-98

DRILLING LOG OF WELL/BORING NO. SB-41

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Tributary 2, See Site Map
Date Started/Finished: 06 August 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: JMC - Direct Push, 1 in. dia. hole

Total Depth of Hole (feet BGS): 6
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ 2.5 Final: ▼ ____
Geologist: L. Williams

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.								
			ground surface (gs)						
0			Silty Sand (SW-SM) - mottled reddish brown - brown (5YR 5/8), fine grained, subangular, moderately sorted with silt/ clay - 40%, groundwater @ 2 - 3 feet.			3.0			Sample taken from west bank of Tributary 2
3						3.0			Laboratory sample taken from the 3 - 4 ft. interval
6			6.0 Total Depth = 6 ft.						

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WELL_LOG WILCOX.GPJ 9-29-98

DRILLING LOG OF WELL/BORING NO. SB-42

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Tributary 2, See Site Map
Date Started/Finished: 06 August 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: JMC - Direct Push, 1 in. dia. hole

Total Depth of Hole (feet BGS): 6
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ 2.5 Final: ▼
Geologist: L. Williams

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
0			Silty Sand (SW-SM) - mottled reddish brown - brown (5YR 5/8), fine grained, subangular, moderately sorted with silt - 30% and petroleum globuals < 1% (< 3 cm dia), groundwater encountered @ 2 - 3 ft.			3.0			
3						3.0			Laboratory sample taken from the 2 - 3 ft. interval
6			6.0 Total Depth = 6 ft						

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WELL_LOG WILCOX.GPJ 9-29-98

DRILLING LOG OF WELL/BORING NO. SB-43

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Tributary 2, See Site Map
Date Started/Finished: 05 August 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: JMC - Direct Push, 1 in. dia. hole

Total Depth of Hole (feet BGS): 9
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ 6.5 Final: ▼
Geologist: L. Williams

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		ground surface (gs)						
1			Silty Sand (SW-SM) - mottled reddish brown - brown (5YR 5/8), fine grained, subangular, moderately sorted with silt/ clay - 30%, groundwater @ 6 - 7 feet.			3.0			Sample taken from west bank of Tributary 2
2									
3									
4						3.0			
5									
6		▽							Laboratory sample collected from 6 - 7 ft. interval
7						2.5			
8									
9			9.0 Total Depth = 9 ft.						
10									

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WELL_LOG WILCOX.GPJ 9-29-98

DRILLING LOG OF WELL/BORING NO. SB-44

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Tributary 2, See Site Map
Date Started/Finished: 05 August 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: JMC - Direct Push, 1 in. dia. hole

Total Depth of Hole (feet BGS): 6
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ 4.5 Final: ▼
Geologist: L. Williams

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
1			Silty Sand (SW-SM) - mottled reddish brown - brown (5YR 5/8), fine grained, subangular, moderately sorted with silt/ clay - 30%, groundwater @ 4 - 5 feet. Refusal @ 6 ft.			3.0			Sample taken from west bank of Tributary 2
2									
3									
4		▽				3.0			Laboratory sample collected from 4 - 5 ft. interval
5									
6			6.0 Total Depth = 6 ft.						
7									
8									
9									
10									

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WELL_LOG WILCOX.GPJ 9-29-98

DRILLING LOG OF WELL/BORING NO. SB-45

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Tributary 2, See Site Map
Date Started/Finished: 05 August 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: JMC - Direct Push, 1 in. dia. hole

Total Depth of Hole (feet BGS): 6
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ 1 Final: ▼
Geologist: L. Williams

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.								
			ground surface (gs)						
1			Silty Sand (SW-SM) - mottled reddish brown - brown (5YR 5/8), fine grained, subangular, moderately sorted with silt/ clay - 40%, groundwater @ 1 feet. Refusal @ 6 ft.			3.0			Sample taken from west bank of Tributary 2 Laboratory sample from 0 - 1 ft.
2									
3									
4						2.5			
5									
6			Total Depth - 6 ft.						
7						3.0			
8									
9			9.0						
10									

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WELL_LOG WILCOX.GPJ 9-29-98

DRILLING LOG OF WELL/BORING NO. SB-46

Project/Location: Wilcox Refinery / Bristow, Oklahoma
Boring Location: Pond 2 east of (b) Residence
Date Started/Finished: 06 August 1998/
Drilling Contractor: Ecology & Environment, Inc.
Drill Method: JMC - Direct Push, 1 in. dia. hole

Total Depth of Hole (feet BGS): 12
Ground Elevation (feet above): Unknown
Inner Casing Elevation (TOC): N/A
Groundwater Depth (feet BGS):
First Encountered: ▽ N/A Final: ▼
Geologist: L. Williams

ELEVATION / DEPTH (feet)	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (feet)	LEL (%)	PID [FID] (ppm)	COMMENTS
Ground Surface Elevation Unknown	Monitoring well was not installed at this boring location.		*ground surface (gs)*						
1			Clayey/Silty Sand (Fill) - dark brown, strong hydrocarbon odor						Sample taken near center of Pond 2
			1.0 Clayey/Silty Sand (Fill) - light brown - grey, strong hydrocarbon odor, soft			3.0			
2			2.0 Clayey/Silty Sand (Fill) - dark brown, strong hydrocarbon odor						
3									
4						3.0			
5									
6									Composite sample collected from 6 - 12 ft.
7									
8						3.0			
9									
10									
11						2.5			
12			12.0 Total Depth = 12 ft.						
13									
14									

ecology and environment, inc.

WELL_LOG WILCOX.GPJ 9-29-98

Appendix B
Records of Communication
(6 Pages)

Tom Beer
Print Originator's Name
Ecology and Environment, Inc.

RECORD OF COMMUNICATION

Conversation with:	Date 03 / 18 / 98 (Mo) (Day) (Year)
Name: (b)	Time: 11:00 AM
Address: [redacted]	[X] Originator Placed Call
Phone [redacted]	[] Originator Received Call
Subject: Site Access	

Discussion:

(b) is the owner of the 80-acre former tank farm area comprising most of the Wilcox Refinery site. (b) gave verbal approval for EPA and START to access the property for a site reconnaissance visit and will sign the formal Access Agreement upon receipt. The property is mostly fenced but the access gate from the north-central side of the site is not locked. (b) requested a copy of the ESI so I referred him to ODEQ and the EPA. Also, (b) is in the process of selling the property and has conducted some remediation at the site including bulldozing soil over oily waste at the surface within tank berms, at Pond 1, and on the oily waste "Pit". The heavy equipment and operators were apparently provided by Tenneco Oil Company.

Follow-Up-Action:

Mail site access consent agreement to (b).

Originator's Signature T. Beer

06:FORMS-ROC/WOMERGE-02/05/99-DI

Tom Beer
Print Originator's Name
Ecology and Environment, Inc.

RECORD OF COMMUNICATION

Conversation with:	Date 03 / 19 / 98 (Mo) (Day) (Year)
Name: (b) (6)	Time: 10:00 AM
Address: [redacted]	[X] Originator Placed Call
Phone: [redacted]	[] Originator Received Call
Subject: Site Access	

Discussion:

(b) (6) the co-owner of the 13 to 20-acre former refinery area comprising most of the western end of the Wilcox Refinery site. Mr. (b) gave verbal approval for EPA and START to access the property for a site reconnaissance visit but stated that his son, Mr. (b) (6) is the other co-owner of the property and would have to be contacted for signing the formal Access Agreement The property is fenced, and keys to the access gate at the north end of the property can be obtained from (b) (6) Mr. (b) would like to have a family member present during the site visit.

(b) (6) discussed a number of issues related to environmental assessment of the site:

- (b) acquired the property from (b) (6) in about 1969. The large tanks were mostly salvaged for scrap iron by (from 1965 to 1966. The tank bottom sludge (TBS) were burnt to reduce the liguid content prior to cutting the tank walls down to ground level. The tank base steel was mostly left in place;
- Three medium size above-ground storage tanks (ASTs) and one small AST remain on site. Two in the far northwest corner of the are mostly intact and have a thin layer of residual sludge and rain water in the base, one medium-size tank at the south end of the is just a shell, and the one-small, circular tank with a conical roof in the center of the property has a small, unknown quantity of sludge or 'burner fuel' in its base.
- A third property owner lives in a trailer on approximately 4 acres of land to the east of (b) property. (b) (6) (b) apparently have an unlisted phone number. The area around the (b) residence was sampled in 1996 during the ESI by Weston.

Follow-Up-Action:

Contact the remaining property owners on the Wilcox Refinery site: Mr. (b) (6) and Mr. and Mrs. (b) (b)
Mail site access consent agreement to (b) (6).

Originator's Signature T. Beer

06:FORMS-ROC/WOMERGE-02/05/99-D1

Tom Beer
Print Originator's Name
Ecology and Environment, Inc.

RECORD OF COMMUNICATION

Conversation with:	Date 03 / 19 / 98 (Mo) (Day) (Year)
Name: Mr. Hal Cantwell and Mr. Karën Khalafian	Time: 11:00 AM
Address: Oklahoma Department of Environmental Quality (ODEQ), Tulsa, OK	[X] Originator Placed Call
Phone: (405) 271-7158 and (405) 702-5115	[] Originator Received Call
Subject: ODEQ Involvement at Wilcox Refinery	

Discussion:

Mr. Cantwell is the supervisor of the Site Assessment Group at ODEQ in Tulsa. He confirmed ODEQ has knowledge and experience at the site, but that no site-specific investigation of the site is being conducted currently. Mr. Cantwell referred me to Mr. Khalafian who is currently conducting a site investigation at the adjacent Ohio Oil Refinery site to the north of Wilcox, that includes a regional groundwater study.

Mr. Khalafian (KK) was helpful in providing background information for the area and the status of current ODEQ activities. The original

Wilcox Refinery included the Ohio Oil Refinery site (north) and the Lorraine Refinery site (west) of the current EPA Wilcox project site. KK is sampling domestic and municipal wells in and around the project area and the City of Bristow, during the week of March 23. KK agreed to provide START with analytical results upon completion. KK provided the following aquifer information:

- a shallow aquifer occurs at about 30 ft. bgs and domestic wells are screened at 60 to 70 ft. bgs;
- shallow wells at the First Assembly Church (Lorraine Refinery) and [redacted] property have been closed recently due to hydrocarbon odor and taste;
- deeper wells for the City of Bristow are screened at about 200 ft. bgs and produce good water.

KK will provide copies of relevant aerial photos and Sanborn maps when we meet onsite next week or during subsequent field work.

Follow-Up-Action:

Originator's Signature T. Beer

Tom Beer
Print Originator's Name
Ecology and Environment, Inc.

RECORD OF COMMUNICATION

Conversation with:	Date 03 / 25 / 98 (Mo) (Day) (Year)
Name: (b) (6) (b)	Time: 16:55 PM
Address: [redacted]	[] Originator Placed Call
Phone: [redacted]	[] Originator Received Call
Subject: Site Access	

Discussion:

Meet Mr. (b) by chance at his driveway entrance during the START site reconnaissance visit on 3/25/98. Mr. (b) readily provided his unlisted phone number, address, and verbal permission to access his property. He stated that his security precautions and warning signs were mostly to keep out rowdy teenagers and prevent crank phone calls. Mr. (b) and his wife (b) have only owned the 3.6-acre lot since 1996, and don't know any site history. They have areas of oily waste at the surface surrounding their trailer home, mostly outside the inner fenceline. Gas and water utility lines follow south along the west side of the gravel access road and angle southwest toward the house from a point on the access road near the gas meter.

Follow-Up-Action:

Mail site access consent agreement to Mr. (b)

Originator's Signature J. Beer

06:FORMS-ROC/WOMERGE-02/05/99-D1

Tom Beer
Print Originator's Name
Ecology and Environment, Inc.

RECORD OF COMMUNICATION

Conversation with:	Date 04 / 08 / 98 (Mo) (Day) (Year)
Name: Mr. (b) (6)	Time: 10:30 AM
Address: (b) (6)	[] Originator Placed Call
Phone: (b) (6)	[] Originator Received Call
Subject: Site Access	

Discussion:

Meet (b) (6) at his business prior to the START site reconnaissance visit to (b) property on 3/25/98. Mr (b) gave verbal permission to access his property and arranged for his brother (b) who lives in the site residence, to open the gate and accompany us onsite. Mr (b) (6) provide a gate key to START for easier access during field work.

Follow-Up-Action:

Originator's Signature J. Beer

06:FORMS-ROC/WOMERGE-02/05/99-D1

Tom Beer
Print Originator's Name
Ecology and Environment, Inc.

RECORD OF COMMUNICATION

Conversation with:	Date 05 / 28 / 98 (Mo) (Day) (Year)
Name: Ms. Linda Tate	Time: 10:00 AM
Address: Administrator, City of Bristow, Bristow, OK 74010	[X] Originator Placed Call
Phone: (918) 367-6233	[] Originator Received Call
Subject: Informing the Mayor of EPA START Site Activity at Wilcox Refinery	

Discussion:

Initially START left a message with Ms. Tate on 4/27/98 to inform the Mayor of proposed field investigation activities to be performed at Wilcox Refinery. The first field sampling event was postponed due to heavy rain and muddy site conditions. Ms. Tate was contacted again prior to the second field mobilization to inform the City of Bristow of further site activities. Ms. Tate will inform the Mayor and alerted START that more rain fell in the area on Tuesday 5/26/98. Ms. Tate was also aware of the water well testing conducted by ODEQ in March, 1998.

Follow-Up-Action:

Originator's Signature T. Beer

06:FORMS-ROC/WOMERGE-02/05/99-D1

Appendix C
Sampling QA/QC Work Plan

001244

Sampling QA/QC Work Plan
WILCOX REFINERY
Bristow, Oklahoma

Prepared By:
Ecology and Environment, Inc.
1999 Bryan Street, Suite 2000
Dallas, Texas 75201

U.S.EPA Project No.: KJ6103
Contractor Project No.: 052601SFXX
U.S.EPA Contract No.: 68-W6-0013

Approvals

Ecology & Environment, Inc.

J. Beer 4/23/98
Tom Beer — Date
Project Manager

EPA

Donald L. Smith 4/23/98
Don Smith — Date
On-Scene Coordinator

B S Banipal 4/23/98
Ben Banipal — Date
Project Director

David Anderson 4/23/98
David Anderson — Date
QA Officer

1.0 SITE BACKGROUND

The site is located in the City of Bristow which is located in Creek County in the State of Oklahoma. The nearest residents are located on site. The site is an abandoned refinery site consisting of 98.0 acres. The refinery buildings and tank farm structures were abandoned by 1963.

The following remedial units are present at the site: contaminated soil, impoundments, lagoons, surface drainage, and a large tank farms.

The following types of materials were handled at the site: petroleum products.

The contaminants of concern are:

Contaminant	Concentration Range
Metals	Low
BTEX	Low
Polycyclic aromatic hydrocarbons (PAH)	Low
Total petroleum hydrocarbons (TPH)	High
pH	Low

The volumes of contaminated materials to be addressed are unknown at this time. The site assessment will determine the amount of surface and subsurface soil, and oily waste if any, that needs to be removed. The characteristics and amounts of the waste remaining in the ASTs will also be determined during this assessment. The suspected contamination is a result of the former refinery activities conducted on the site. The former refinery tanks, ponds, pits, and soil are suspected sources of contamination.

The physical/chemical threat to the population at risk includes direct contact with petroleum hydrocarbon or metal contaminated soil or sediment, as well as potential surface water and ground water contamination.

The following additional information is known about the site: An Environmental Site Investigation (ESI) conducted in 1996 indicated low concentrations of contaminants in the sediment and surface soil samples collected. High concentration oily waste was present on site in the form of pits and ponds. Several of the ponds and pits have been backfilled with site soil and graded. An area which had no vegetation was also noted during the ESI and was still present during the site visit conducted by E & E in March 1998. The lateral contaminant concentrations of the back-filled waste pits and the un-vegetated area need to be delineated. Levels of subsurface soil contamination near the potential waste source also need to be delineated.

The basis of the site information are the ESI Report prepared by Weston in October 1996, as well as the site discovery and two site visits conducted by E & E to determine the current site status. The purpose of the assessment at this time is to determine the threat to waters posed by the contamination and evaluate the need for possible removal actions.

2.0 DATA USE OBJECTIVES

The following data quality objectives will be applied to this project:

Program Area	Sampling Objective	Data
Removal	Determine migration pathways	D
Removal	Extent of contamination	D
Removal	Threat to environment	D

3.0 SAMPLING DESIGN

The following remedial units will be sampled as indicated.

Remedial Unit	Program Area/ Sampling Objective	Matrix	Parameter
contaminated soil	Removal/Extent of contamination	Soil	Metals
contaminated soil	Removal/Extent of contamination	Soil	PAHs
contaminated soil	Removal/Extent of contamination	Soil	BTEX
contaminated soil	Removal/Extent of contamination	Soil	Petroleum Hydrocarbons
contaminated soil	Removal/Extent of contamination	Soil	pH
surface drainage	Removal/Threat to environment	Sediment	Metals
surface drainage	Removal/Threat to environment	Sediment	PAHs
surface drainage	Removal/Threat to environment	Sediment	BTEX

Remedial Unit	Program Area/ Sampling Objective	Matrix	Parameter
surface drainage	Removal/Threat to environment	Sediment	Petroleum Hydrocarbons
surface drainage	Removal/Threat to environment	Sediment	pH
refinery and tank farm	Removal/Determine migration pathways	Ground Water	Petroleum Hydrocarbons
refinery and tank farm	Removal/Determine migration pathways	Ground Water	BTEX
refinery tank farm	Removal/Determine migration pathways	Ground Water	pH (field)

Sampling Designs:

1) Contaminated Soil, Removal/Extent of Contamination for Soil Samples, Metals Analysis

The Stratified Random sampling approach will be implemented. Sampling locations are presented on the attached map. The depth of the sample will be determined in the field, and will be no greater than 20 feet. Background locations have already been sampled. Composites of one foot of core samples will be placed in 8 oz. glass jars with teflon lined lids.

2) Contaminated Soil, Removal/Extent of Contamination for Soil Samples, PAHs Analysis

The Stratified Random sampling approach will be implemented. Sampling locations are presented on the attached map. The depth of the sample will be determined in the field, and will be no greater than 20 feet. Background locations have already been sampled. Composites of one foot of core samples will be placed in 8 oz. glass jars with teflon lined lids.

3) Contaminated Soil, Removal/Extent of Contamination for Soil Samples, BTEX Analysis

The Stratified Random sampling approach will be implemented. Sampling locations are presented on the attached map. The depth of the sample will be determined in the field, and will be no greater than 20 feet. Background locations have already been sampled. Composites of one foot of core samples will be placed in 8 oz. glass jars with teflon lined lids.

4) Contaminated Soil, Removal/Extent of Contamination for Soil Samples, TPH Analysis

The Stratified Random sampling approach will be implemented. Sampling locations are presented on the attached map. The depth of the sample will be determined in the field, and will be no greater than 20 feet. Background locations have already been sampled. Composites of one foot of core samples will be placed in 8 oz. glass jars with teflon lined lids.

5) Contaminated Soil, Removal/Extent of Contamination for Soil Samples, pH

The Stratified Random sampling approach will be implemented. Sampling locations are presented on the attached map. The depth of the sample will be determined in the field, and will be no greater than 25 feet. Background locations have already been sampled. Composites of one foot of core samples will be placed in 8 oz. glass jars with teflon lined lids.

6) Surface Drainage, Removal/Threat to Environment for Sediment Samples, Metals Analysis

The Judgmental sampling approach will be implemented. The location of sediment samples will be determined in the field. Background sediment concentrations have already been established. Sediment slurries will be collected in 8 oz. glass jars with teflon lined lids.

7) Surface Drainage, Removal/Threat to Environment for Sediment Samples, PAHs Analysis

The Judgmental sampling approach will be implemented. The location of sediment samples will be determined in the field. Background sediment concentrations have already been established. Sediment slurries will be collected in 8 oz. glass jars with teflon lined lids.

8) Surface Drainage, Removal/Threat to Environment for Sediment Samples, pH

The Judgmental sampling approach will be implemented. Sediment locations will be determined in the field. Sediment slurries will be collected in 8 oz. glass jars with teflon lined lids.

9) Surface Drainage, Removal/Threat to Environment for Sediment Samples, TPH Analysis

The Judgmental sampling approach will be implemented. The location of sediment samples will be determined in the field. Background sediment concentrations have already been established. Sediment slurries will be collected in 8 oz. glass jars with teflon lined lids.

10) Surface Drainage, Removal/Threat to Environment for Sediment Samples, BTEX Analysis

The Judgmental sampling approach will be implemented. The location of sediment samples will be determined in the field. Background sediment concentrations have already been established. Sediment slurries will be collected in 8 oz. glass jars with teflon lined lids.

11) Tank Farm, Removal/Determine Migration Pathways, for Ground Water Samples, TPH Analysis

The judgmental sampling approach will be implemented. Samples will be collected (if present) from each borehole location, as noted on the attached map. Samples will be collected in two 40 ml VOA vials with teflon

lined lids.

12) Refinery and Tank Farm, Removal/Determine Migration Pathways, for Ground Water Samples , BTEX Analysis

The judgmental sampling approach will be implemented. Samples will be collected (if present) from each borehole location, as noted on the attached map. Samples will be collected in two 40 ml VOA vials with teflon lined lids.

13) Refinery and Tank Farm, Removal/Determine Migration Pathways, for Ground Water Samples, pH

The judgmental sampling approach will be implemented. Samples will be collected from each borehole location, as noted on the attached map. The pH will be measured in the field for screening.

Additionally, the judgmental sampling approach will be implemented for samples collected from selected waste source areas as noted on the attached map. These samples will be categorized for hazard characteristics in the field.

Table 1: Sampling Summaries (attached), identify the number of field samples and QA/QC samples to be collected.

4.0 SAMPLING AND ANALYSIS

Table 2: Sampling Requirements Summary (attached), contains information on the sample container types and the quantity to be collected at each sampling location, the preservation method to be used, and the sample holding times (based on the parameter being analyzed for and the matrix).

The following sampling equipment/media will be used to obtain environmental samples from the respective matrix:

Parameter/Matrix	Equipment/Media	Fabrication	Dedicated
Metals/Soil	Geoprobe	acetate	Y
PAHs/Soil	Geoprobe	acetate	Y
BTEX/Soil	Geoprobe	acetate	Y
TPH/Soil	Geoprobe	acetate	Y
pH/Soil	Geoprobe	acetate	Y
Metals/Sediment	Scoop	stainless steel	N*

Parameter/Matrix	Equipment/Media	Fabrication	Dedicated
PAHs/Sediment	Scoop	stainless steel	N*
BTEX/Sediment	Scoop	stainless steel	N*
TPH/Sediment	Scoop	stainless steel	N*
pH/Sediment	Scoop	stainless steel	N*

*Decontamination Steps
1. Non-phosphate detergent wash
2. Distilled/deionized water rinse

BTEX/Ground Water	Bladder Pump	plastic/ polyethylene	Y
TPH/Ground Water	Bladder Pump	plastic/ polyethylene	Y
pH/Ground Water	Bladder Pump	plastic	Y

Table 3.1, Analytical Summary (attached), contains the action levels, required detection limits, analytical method/instrument references, and the associated required data type designation. Table 3.2, Performance Requirements (attached), lists the method-specific performance requirements.

5.0 STANDARD OPERATING PROCEDURES

5.1 Sampling SOPs

The following sampling SOPs will be implemented for this project. These are typically applicable procedures which may be varied or changed as required, dependent upon site conditions, equipment limitations imposed by the procedure. In all instances, the ultimate procedures employed will be documented and associated with the final project deliverables.

General Field Sampling Guidelines (#2001)
Sampling is the selection of a representative portion of a larger population, universe, or body. Through examination of a sample, the characteristics of the larger body from which the sample was drawn can be

inferred. In this manner, sampling can be a valuable tool for determining the presence, type, and extent of contamination by hazardous substances in the environment.

The primary objective of all sampling activities is to characterize a waste site accurately so that its impact on human health and the environment can be properly evaluated. It is only through sampling and analysis that site hazards can be measured and the job of cleanup and restoration can be accomplished effectively with minimal risk. The sampling itself must be conducted so that every sample collected retains its original physical form and chemical composition. In this way, sample integrity is insured, quality assurance standards are maintained, and the sample can accurately represent the larger body of material under investigation.

The extent to which valid inferences can be drawn from a sample depends on the degree to which the sampling effort conforms to the project's objectives. For example, as few as one sample may produce adequate, technically valid data to address the project's objectives. Meeting the project's objectives requires thorough planning of sampling activities, and implementation of the most appropriate sampling and analytical procedures.

Sample Storage, Preservation, and Handling (#2003)
Samples should be collected using equipment and procedures appropriate to the matrix, parameters and sampling objective. The volume of the sample collected must be sufficient to perform the analysis requested. Samples must be stored in the proper types of containers and preserved in a manner appropriate to the analysis to be performed.

All samples must be cooled to 4C from the time of collection until analysis. When a preservative other than cooling is used, the preservative is generally added after the sample is collected, unless the sample container has been pre-preserved by the laboratory. If necessary, the pH must be adjusted to the appropriate level and checked with pH paper in a manner which will not contaminate the sample.

Quality Assurance/Quality Control Samples (#2005)
QA samples are used as an assessment tool to determine if environmental data meet the quality criteria established for a specific application. QC samples are generally used to establish intra-laboratory or analyst-specific precision and bias or to assess the performance of all or a portion of the measurement system. The goal of including QA/QC samples with any sampling or analytical event is to be able to identify, measure and control the sources of error that may be introduced from the time of sample bottle preparation through analysis.

Analytical results for these samples can be used to assess accuracy as well as cross contamination. Accuracy refers to the correctness of the concentration value and the qualitative certainty that the analyte is present. It is a combination of both bias (systematic error) and precision (random error). Bias is defined as the deviation of a measured value from a reference value or known spiked amount, and is determined by calculating percent recovery. Precision is a measure of the closeness of agreement among individual measurements. Precision is determined by coefficient of variation calculations.

Sampling Equipment Decontamination (#2006)
Removing or neutralizing contaminants from equipment minimizes the likelihood of sample cross contamination, reduces or eliminates transfer of contaminants to clean areas, and prevents the mixing of

incompatible substances.

The first step, a soap and water wash, removes all visible particulate matter and residual oils and grease. This may be preceded by a steam or high pressure water wash to facilitate residuals removal. The second step involves a tap water rinse and a distilled/deionized water rinse to remove the detergent. An acid rinse provides a low pH media for trace metals removal and is included in the decontamination process if metal samples are to be collected. It is followed by another distilled/deionized water rinse. If sample analysis does not include metals, the acid rinse step can be omitted. Next, a high purity solvent rinse is performed for trace organics removal if organics are a concern at the site. Typical solvents used for removal of organic contaminants include acetone, hexane, or water. Acetone is typically chosen because it is an excellent solvent, miscible in water, and not a target analyte on the Priority Pollutant List. If acetone is known to be a contaminant of concern at a given site or if Target Compound List analysis (which includes acetone) is to be performed, another solvent may be substituted. The solvent must be allowed to evaporate completely and then a final distilled/deionized water rinse is performed. This rinse removes any residual traces of the solvent.

Soil and Dry Sediment Sampling (#2012)
Soil samples may be collected using a variety of methods and equipment. The methods and equipment used are dependent on the depth of the desired sample, the type of sample required (disturbed vs. undisturbed), and the soil type. Near-surface soils may be easily sampled using a spade, trowel, or scoop. Sampling at greater depths may be performed using a hand auger, continuous flight auger, a trier, a split-spoon, or, if required, a backhoe.

Photoionization Detector (PID) HNU (#2056)
The PID is a useful general survey instrument at hazardous waste sites. A PID is capable of detecting and measuring real-time concentrations of many organic and inorganic vapors in air. A PID is similar to a flame ionization detector (FID) in application; however, the PID has somewhat broader capabilities in that it can detect certain inorganic vapors. Conversely, the PID is unable to respond to certain low molecular weight hydrocarbons, such as methane and ethane, that are readily detected by FID instruments.

The PID employs the principle of photoionization. The analyzer will respond to most vapors that have an ionization potential less than or equal to that supplied by the ionization source, which is an ultraviolet (UV) lamp. Three probes, each containing a different UV light source, are available for use with the HNU. Energies are 9.5, 10.2, and 11.7 eV. All three detect many aromatic and large molecular hydrocarbons. The 10.2 eV and 11.7 eV probes, in addition, detect some smaller organic molecules and some halogenated hydrocarbons. The 10.2 eV probe is the most useful for environmental response work, as it is more durable than the 11.7 eV probe and detects more compounds than the 9.5 eV probe.

Gases with ionization potentials near to or less than that of the lamp will be ionized. These gases will thus be detected and measured by the analyzer. Gases with ionization potentials higher than that of the lamp will not be detected. The ionization potential of the major components of air, oxygen, nitrogen, and carbon dioxide, range from about 12.0 eV to about 15.6 eV and are not ionized by any of the three lamps.

Sediment Sampling (E&E PCBTECH 7.8)
This document describes the procedures for the collection of representative sediment samples. Analysis of sediment samples may determine whether concentrations of specific pollutants exceed established threshold

action levels, or if the concentrations of pollutants present a risk to public health, welfare, or environment.

Included in this discussion are procedures for obtaining representative samples, quality assurance measures, proper documentation of sampling activities, and recommendations for personnel safety.

Sediment samples may be recovered using a variety of methods and equipment. These are dependent on the depth of the desired sample, and the type of sample required (disturbed or undisturbed).

Near-surface sediment samples may be easily sampled using a scoop or spoon if near shore or in shallow water, and spring loaded sediment dredge or benthic sampler if in deeper waters. To obtain other than surficial sediment samples, core samples or split spoon samples are required.

Borehole Sampling (E&E GEOTECH 5.9A)
Most subsurface investigations require the drilling of boreholes for one or more purposes: collection of soil samples for lithologic logging and laboratory testing, lithologic and hydrogeologic characterization using borehole geophysical logging; and installation of piezometers or monitoring wells. Drilling methods are selected based on: availability and cost; suitability for the type of geologic materials at a site (unconsolidated or consolidated); and potential effects on sample integrity (influence by drilling fluids and potential for cross contamination between aquifers).

A wide variety of drilling method have been developed that could be suitable for one or more of the purposes described above. Information on 19 methods is summarized. The hollow-stem auger is by far the most commonly used method for well installation in unconsolidated formations. Air rotary is probably the most commonly used method for well installation in consolidated formations.

Surface soil samples are collected from boreholes for chemical and physical analysis, and to aid in the definition and tracking of contaminants in the soil. The subsurface soil samples may be either composite or discrete, and either disturbed or undisturbed. The type of sample to be collected depends on the drilling technique and the purpose of the investigation.

Logging and Describing Soil & Rock Samples (E&E GEOTECH 5.1)
This document establishes a standard system and standard format for describing and classifying soil and rock samples. The use of a standard format will help assure the validity, accuracy, and applicability of geologic data.

Soil Sampling (E&E GEOTECH 5.17A)
This document describes the procedures for the collection of representative soil samples. Representative sampling ensures the accurate characterization of site conditions. Analysis of soil samples may determine pollutant concentrations and its risk to public health, welfare, or the environment; extent of contamination; and confirmation of remediation standards.

This procedure includes discussions of procedures for obtaining representative samples, quality assurance/quality control measures, proper documentation of sampling activities, and recommendations for personnel safety.

Soil samples may be recovered using a variety of methods and equipment. These are dependent on the depth of the desired sample, the type of sample required (disturbed vs. undisturbed, and the soil type.

Near-surface soils may be easily sampled using a spade, trowel, or scoop. Sampling at greater depths may be performed using a hand auger, a power auger, or, if a test pit is required, a backhoe.

5.2 Sample Documentation

All sample documents will be completed legibly and in ink. Any corrections or revisions will be made by lining through the original entry and initialing the change. The following sample documentation will be maintained:

Field Logbook

The field logbook is a descriptive notebook detailing site activities and observations so that an accurate, factual account of field procedures may be reconstructed. All entries will be signed by the individuals making them. Entries should include at least the following:

- site name and project number
- names of personnel on site
- dates and times of all entries
- descriptions of all site activities, including site entry and exit times
- noteworthy events and discussions
- weather conditions
- site observations
- identification and description of samples and locations
- subcontractor information and names of on-site personnel
- dates and times of sample collections and chain of custody information
- records of photographs
- site sketches

Field Data Sheets and Sample Labels

Field data sheets and corresponding sample labels are used to identify samples and document field sampling conditions and activities. Field data sheets should be completed at the time of sample collection and should include the following information:

- site name
- samplers
- sample location and sample number
- date and time the sample was collected
- type of sample collected
- brief description of the site
- weather parameters
- analyses to be performed

- sample container, preservation, and storage information

Sample labels will be securely affixed to the sample container. They will clearly identify the particular sample, and should include the following information:

- site name and project number
- date and time the sample was collected
- sample preservation method
- analysis requested
- sampling location

Chain of Custody Record

A Chain of Custody Record will be maintained from the time of sample collection until final disposition. Every transfer of custody will be noted and signed for and a copy of the record will be kept be each individual who has signed it. The Chain of Custody Record should include at least the following information:

- sample identification
- sample location
- sample collection date
- sample information, i.e., matrix, number of bottles collected, etc.
- names and signatures of samplers
- signatures of all individuals who have had custody of the samples

When samples are not under direct control of the individual currently responsible for them, they will be stored in a locked container which has been sealed with a Custody Seal.

Custody Seal

Custody Seals demonstrate that a sample container has not been opened or tampered with. The individual who has custody of the samples will sign and date the seal and affix it to the container in such a manner that it cannot be opened without breaking the seal.

5.3 Sample Handling and Shipment

Each of the sample bottles will be sealed and caps will be secured with custody seals. Sample bottles will be labeled as described above. Sealed bottles will be placed in the appropriate transport containers and the containers will be packed with an appropriate absorbent material such as vermiculite. All sample documents will be affixed to the underside of each transport container lid. The lid will be sealed and custody seals will be affixed to the transport container.

Regulations for packaging, marking/labeling, and shipping of hazardous materials and wastes are promulgated by the U.S. Department of Transportation (U.S. DOT). Air carriers which transport hazardous materials, in particular Federal Express, require compliance with the current edition of the International Air Transport Association (IATA) Dangerous Goods Regulations, which applies to shipment and transportation of

hazardous materials by air carrier. Following current IATA regulations will ensure compliance with U.S. DOT.

6.0 QUALITY ASSURANCE REQUIREMENTS

The following QA requirements will be implemented on this project:

Definitive Data
Definitive data are generated using rigorous analytical methods, such as approved EPA reference methods. Data are analyte-specific, with confirmation of analyte identity and concentration. Methods produce tangible raw data (e.g., chromatograms, spectra, digital values) in the form of paper printouts or computer-generated electronic files. Data may be generated at the site or at an off-site location, as long as the QA/QC requirements are satisfied. For data to be definitive, either analytical or total measurement error must be determined.

Definitive Data QA/QC Elements

Sample documentation (location, date and time collected, batch, etc.)

Chain of custody (when appropriate)

Sampling design approach (systematic, simple or stratified random, judgmental, etc.)

Initial and continuing calibration. Determination and documentation of detection limits

Analyte(s) identification

Analyte(s) quantification

QC blanks (trip, method, rinsate)

Matrix spike recoveries

Performance Evaluation (PE) samples (when specified)

Analytical error determination (measures overall precision of analytical method): An appropriate number of replicate aliquots, as specified in this document, are taken from at least one thoroughly homogenized sample, the replicate aliquots are analyzed, and standard laboratory QC parameters(such as variance, mean, and coefficient of variation) are calculated and compared to performance requirements specified in this document.

Total measurement error determination (measures overall precision of measurement system, from sample acquisition through analysis): An appropriate number of co-located samples as determined in this document are independently collected from the same location and analyzed following standard operating procedures.

Based on the analytical results, standard laboratory QC parameters such as variance, mean, and coefficient of variation should be calculated and compared to measurement error goals defined in this document. This procedure may be required for each matrix under investigation, and may be repeated for a given matrix at more than one location.

7.0 DATA VALIDATION

Data generated for this project will be validated as follows:

Definitive Data
This objective, requires that at least 10% of the samples in the lab data package be evaluated for all of the elements listed in Section 6.0 of this QA/QC Sampling Plan. Of the remaining samples, holding times, blank contamination, precision, accuracy, error determination, detection limits, and confirmed identification will be reviewed. This objective also requires review of all elements for all samples in each analyte category (i.e. metals, PAHs, BTEX, TPH and soil pH) in every tenth data package received from an individual lab.

8.0 DELIVERABLES

The Task Manager, Tom Beer, will maintain contact with the EPA On-Scene Coordinator/Remedial Project Manager, Don Smith, to provide information regarding the technical and financial progress of the project. This communication began when the project was assigned. Activities under this project will be documented and reported in the deliverables described below.

Analysis
This sampling event requires analytical services. Documentation of lab selection, raw data, or results will be provided in the analytical report.

Analytical Report
An analytical report will be prepared for samples analyzed under this plan. Information regarding the analytical methods or procedures employed, sample results, QA/QC results, chain of custody documentation, laboratory correspondence, and raw data will be provided within this deliverable.

Data Review
A review of the data generated under this plan will be undertaken. The assessment of data acceptability or usability will be provided separately, or as part of the analytical report.

Final Report
A (draft) final report will be prepared to correlate available background information with data generated under this sampling event and identify supportable conclusions and recommendations which satisfy the objectives of this sampling QA/QC plan.

Maps/Figures
The following illustrations will be provided in the final report; Site Map and Sample Location Map. Drawings of the soil boring logs will also be included in the final report.

The following illustrations will be provided in the final report; Site Map and Sample Location Map. Drawings of the soil boring logs will also be included in the final report.

9.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

9.1 Personnel Information

The EPA On-Scene Coordinator/Remedial Project Manager, Don Smith, will provide overall direction to the staff concerning project objectives, sampling needs, and schedule.

The Task Leader Tom Beer and Task Manager Ben Banipal, are the primary points of contact with the EPA On-Scene Coordinator/Remedial Project Manager. The Task Leader/Manager is responsible for the development and completion of the Sampling QA/QC Plan, project team organization, and supervision of all project tasks.

The following personnel will also work on this project:

Name	Responsibility
Sharon Moore	Health and Safety Officer
Carol Koch	Sampler
Paul James	Geologist

9.2 Laboratory Information

The following laboratories will be providing the following analyses:

Lab Name/Location	Lab Type	Parameter
Ecology And Environment, Inc. Lancaster, NY	Analytical	all parameters

10.0 SCHEDULE OF ACTIVITIES

Activity	Start Date	End Date
Site Assessment-Field Work	04/27/98	05/02/98
Report Preparation	05/05/98	06/12/98

11.0 ATTACHMENTS

The following are attachments to this Sampling QA/QC Plan:

Table 1
Table 2
Table 3.1
Table 3.2
Site Map
Soil Location Map
Target Analyte List - Inorganics
Target Compound List - Semivolatiles
Target Compound List - Volatiles

INORGANIC TARGET ANALYTE LIST (TAL)

Analyte	Detection Limit (ug/L -- water (1))
Aluminum	200
Antimony	60
Arsenic	10
Barium	200
Beryllium	5
Cadmium	5
Calcium	5000
Chromium	10
Cobalt	50
Copper	25
Iron	100
Lead	3
Magnesium	5000
Manganese	15
Mercury	0.2
Nickel	40
Potassium	5000
Selenium	5
Silver	10
Sodium	5000
Thallium	10
Vanadium	50
Zinc	20
Cyanide	10

(1) Soil/Sediment detection limit 200x water (ug/kg -- soil/sediment).

Based on the Contract Laboratory Program Statement of Work, ILMO3.0 (9/93).

TARGET COMPOUND LIST (TCL) AND
QUANTITATION LIMITS (QL) (1)

Semivolatiles		CAS Number	Quantitation Limits(2) Water Low ug/L	Soil/Sediment(3) ug/Kg
1.	Naphthalene	91-20-3	10	330
2.	2-Methylnaphthalene	91-57-6	10	330
3.	2-Chloronaphthalene	91-58-7	10	330
4.	Acenaphthylene	208-96-8	10	330
5.	Acenaphthene	83-32-9	10	330
6.	Phenanthrene	85-01-8	10	330
7.	Anthracene	120-12-7	10	330
8.	Carbazole	86-74-8	10	330
9.	Fluoranthene	206-44-0	10	330
10.	Pyrene	129-00-0	10	330
11.	Benzo(a)anthracene	56-55-3	10	330
12.	Chrysene	218-01-9	10	330
13.	Benzo(b)fluoranthene	205-99-2	10	330
14.	Benzo(k)fluoranthene	207-08-9	10	330
15.	Benzo(a)pyrene	50-32-8	10	330
16.	Indeno(1,2,3-cd)pyrene	193-39-5	10	330
17.	Dibenz(a,h)anthracene	53-70-3	10	330
18.	Benzo(g,h,i)perylene	191-24-2	10	330

(1) Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

(2) Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment on dry weight basis will be higher.

(3) Medium Soil/Sediment Quantitation Limits (QL) for Semivolatile TCL.

Compounds are 30 times the individual Low Soil/Sediment QL.

Based on Contract Laboratory Program Statement of Work, OLM03.1 (8/94).

TARGET COMPOUND LIST (TCL) AND
QUANTITATION LIMITS (QL) (1)

Volatiles		CAS Number	Quantitation Limits (2) Water Low ug/L	Soil/Sediment (3) ug/Kg
1.	Benzene	71-43-2	10	10
2.	Toluene	108-88-3	10	10
3.	Ethyl Benzene	100-41-4	10	10
4.	Xylenes (total)	1330-20-7	10	10

(1) Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

(2) Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment on dry weight basis will be higher.

(3) Medium Soil/Sediment Quantitation Limits (QL) for Volatile TCL.

Compounds are 120 times the individual Low Soil/Sediment QL.

Based on the Contract Laboratory Program Statement of Work, OLM03.1 (8/94).

Table 1a. Field Sampling Summary Date: 04/15/98
Remedial Unit: Contaminated Soil
Program Area: Removal
Sampling Objective: Extent of contamination

Matrix	Parameter	Background Samples	Field Samples	Trip Blanks	Field Blanks	Rinsate Blanks	Matrix Spikes	PE Samples	Replicate Aliquots	Co-Located Samples	Total Samples
Soil	Metals	0	36	0	0	0	3	0	3	4	46
Soil	PAHs	0	36	0	0	0	3	0	3	4	46
Soil	BTEX	0	36	6	0	0	3	0	3	4	52
Soil	TPH	0	36	0	0	0	3	0	3	4	46
Soil	pH	0	36	0	0	0	3	0	3	4	46

Table 1b. Field Sampling Summary Date:04/15/98
Remedial Unit: Surface Drainage
Program Area: Removal
Sampling Objective: Threat to Environment

Matrix	Parameter	Background Samples	Field Samples	Trip Blanks	Field Blanks	Rinsate Blanks	Matrix Spikes	PE Samples	Replicate Aliquots	Co-Located Samples	Total Samples
Sediment	Metals	0	2	0	0	0	1	0	1	1	5
Sediment	PAHs	0	2	0	0	0	1	0	1	1	5
Sediment	BTEX	0	2	0	0	0	1	0	1	1	5
Sediment	TPH	0	2	0	0	0	1	0	1	1	5
Sediment	pH	0	2	0	0	0	1	0	1	1	5

Table 1c. Field Sampling Summary Date: 04/15/98
Remedial Unit: Tank Farm
Program Area: Removal
Sampling Objective: Determine Migration Pathways

Matrix	Parameter	Background Samples	Field Samples	Trip Blanks	Field Blanks	Rinsate Blanks	Matrix Spikes	PE Samples	Replicate Aliquots	Co-Located Samples	Total Samples
Ground Water	TPH	0	18	0	1	0	2	0	2	2	25
Ground Water	BTEX	0	18	6	1	0	2	0	2	2	31
Ground Water	pH	0	18	0	0	0	0	0	0	0	18

Table 2. Sampling Requirements Summary

Date: 04/15/98
Page: 1

Remedial Unit	Program Area/Sampling Objective	Sample Container Matrix	Sample Parameter	Sample Holding (Number)	Preservation	Time
Contaminated Soil	Removal/Extent of Contamination	Soil (1)	Metals	8 oz glass (1)	4C	6 Months
Contaminated Soil	Removal/Extent of Contamination	Soil	PAHs	8 oz glass (1)	4C	7/40 days
Contaminated Soil	Removal/Extent of Contamination	Soil	BTEX	40 oz glass vial (2)	4C	7 days
Contaminated Soil	Removal/Extent of Contamination	Soil	TPH	8 oz glass (1)	4C	7 days
Contaminated Soil	Removal/Extent of Contamination	Soil	pH	8 oz glass (1)	4C	NA
Surface Drainage	Removal/Threat to Environment	Sediment	Metals	8 oz glass (1)	4C	6 Months
Surface Drainage	Removal/Threat to Environment	Sediment	PAHs	8 oz glass (1)	4C	7/40 days
Surface Drainage	Removal/Threat to Environment	Sediment	pH	8 oz glass (1)	4C	NA
Surface Drainage	Removal/Threat to Environment	Sediment	TPH	8 oz glass (1)	4C	7 days
Surface Drainage	Removal/Threat to Environment	Sediment	BTEX	8 oz glass (2)	4C	7 days
Refinery/ Tank Farm	Removal/Determine Migration Pathways	Ground Water	BTEX	40 ml glass vial (2)	4C	7 days
Refinery/ Tank Farm	Removal/Determine Migration Pathways	Ground Water	TPH	40 ml glass vial (2)	4C	7 days
Refinery/ Tank Farm	Removal/Determine Migration Pathways	Ground Water	pH	4 oz. glass (1)	NA	NA

Table 3.1. Analytical Summary

Date: 04/15/98
Page: 1

Remedial Unit	Program Area/Sampling Objective	Matrix	Parameter	Action Level	Required Detection Limit	Analytical Method/ Instrument	Required Data Type
Contaminated Soil	Removal/Extent of Contamination	Soil	Metals	N/A	10 mg/kg	SW846 Method 6010B/ICP	D
Contaminated Soil	Removal/Extent of Contamination	Soil	PAHs	N/A	0.1 mg/kg	SW846 Method 8310/HPLC	D
Contaminated Soil	Removal/Extent of Contamination	Soil	BTEX	N/A	1 mg/kg	SW846 Method 8021B Mod/GC	D
Contaminated Soil	Removal/Extent of Contamination	Soil	TPH	N/A	10 mg/kg	TNRCC Method 1005/GC	D
Contaminated Soil	Removal/Extent of Contamination	Soil	pH	N/A	N/A	SW846 Method 9045/electro	D
Surface Drainage	Removal/Threat to Environment	Sediment	Metals	N/A	10 mg/kg	SW846 Method 6010B/ICP	D
Surface Drainage	Removal/Threat to Environment	Sediment	PAHs	N/A	0.1 mg/kg	SW846 Method 8310/HPLC	D
Surface Drainage	Removal/Threat to Environment	Sediment	BTEX	N/A	N/A	SW846 Method 8021B Mod/GC	D
Surface Drainage	Removal/Threat to Environment	Sediment	TPH	N/A	10 mg/kg	TNRCC Method 1005/GC	D
Surface Drainage	Removal/Threat to Environment	Sediment	pH	N/A	1 mg/kg	SW846 Method 9045/electro	D
Refinery/ Tank Farm	Removal/Determine Migration Pathways	Ground Water	TPH	N/A	1 mg/l	TNRCC Method 1005/GC	D
Refinery/ Tank Farm	Removal/Determine Migration Pathways	Ground Water	BTEX	N/A	0.01 mg/l	SW846 Method 8021B Mod/GC	D
Tank Farm	Removal/Determine migration Pathways	Ground Water	Hazard Categorization	N/A	N/A	N/A	S

Table 3.2. Performance Requirements

Date: 04/15/98
Page: 1

Remedial Unit	Program Area/Sampling Objective	Matrix	Parameter	Performance Requirements
Contaminated Soil	Removal/Extent of Contamination	Soil	Metals	The ICP will be used. Performance requirements per E & E SOWs included in bid specifications.
Contaminated Soil	Removal/Extent of Contamination	Soil	PAHs	High performance liquid chromatography (HPLC) will be used. Performance requirements per E & E SOWs included in bid specifications.
Contaminated Soil	Removal/Extent of Contamination	Soil	BTEX	The gas chromatograph will be used. Performance requirements per E & E SOWs included in bid specifications.
Contaminated Soil	Removal/Extent of Contamination	Soil	TPH	The gas chromatograph will be used. Performance requirements per E & E SOWs included in bid specifications.
Contaminated Soil	Removal/Extent of Contamination	Soil	pH	Performance requirements per E & E SOWs included in bid specifications.
Surface Drainage	Removal/Threat to Environment	Sediment	Metals	The ICP will be used. Performance requirements per E & E SOWs included in bid specifications.
Surface Drainage	Removal/Threat to Environment	Sediment	PAHs	HPLC will be used. Performance requirements per E & E SOWs included in bid specifications.
Surface Drainage	Removal/Threat to Environment	Sediment	pH	Performance requirements per E & E SOWs included in bid specifications.
Surface Drainage	Removal/Threat to Environment	Sediment	TPH	The gas chromatograph will be used. Performance requirements per E & E SOWs included in bid specifications.
Surface Drainage	Removal/Threat to Environment	Sediment	BTEX	The gas chromatograph will be used. Performance requirements per E & E SOWs included in bid specifications.
Tank Farm	Removal/Determine Migration Pathways	Ground Water	TPH	The gas chromatograph will be used. The performance requirements per E & E SOWs included in bid specifications.
Tank Farm	Removal/Determine Migration Pathways	Ground Water	BTEX	The gas chromatograph will be used. Performance requirements per E & E SOWs included in bid specifications.
Tank Farm	Removal/Determine Migration Pathways	Ground Water	pH	Field screening for pH.

DATA QUALITY OBJECTIVES SUMMARY (Soil and Water Matrices)

Remedial Unit: contaminated soil
Program Area/Sampling Objective: Removal/Extent of contamination
Required Data Quality Type: D
Parameter: Metals
Matrix: Soil

Sampling Design

Approach: Stratified Random
Number of Samples: 36
Sampling Location, Depths and Areas: Sampling locations are presented on the attached map. The depth will be determined in the field, and will
be no greater than 20 feet.
Compositing Scheme: Composites of one foot of core samples will be placed in 8 oz. glass jars with teflon lined lids.
Number of Background Samples: 0
Background Sampling Locations: Background locations have already been sampled.

Sampling and Analytical Information

Sample Container Type, Volume (number per location): 8 oz glass (1)
Sample Preservation: 4C
Sample Holding Time: 6 Months
Analytical Method/Instrument: SW846, Method 6010B (metals)/ICP
Action Level: 0
Detection Limit: 10 mg/kg
Performance Requirements: The ICP will be used. Performance requirements will be per E & E SOWs included in bid specifications.
Number replicate aliquots for analytical error: 3
Number co-located samples for total error: 4
Number of Trip Blanks: 0 Number of Rinsate Blanks: 0
Number of Field Blanks: 0 Number of PE Samples: 0
Number of Matrix Spikes: 3

QA Deliverables for Definitive Data

1. Sample Documentation
2. Chain of custody
3. Sampling design approach
4. Initial and continuing calibration
5. Determination and documentation of detection limits.
6. Analyte(s) identification
7. Analyte(s) quantification
8. QC blanks (trip, method, rinsate)
9. Matrix spike recoveries
10. PE samples (when specified)
11. Analytical error or total measurement error determination

DATA QUALITY OBJECTIVES SUMMARY (Soil and Water Matrices)

Remedial Unit: contaminated soil
Program Area/Sampling Objective: Removal/Extent of contamination
Required Data Quality Type: D
Parameter: PAHs
Matrix: Soil

Sampling Design

Approach: Stratified Random
Number of Samples: 36
Sampling Location, Depths and Areas: Sampling locations are presented on the attached map. The depth will be determined in the field, and will be no greater than 20 feet.
Compositing Scheme:
Number of Background Samples: 0
Background Sampling Locations: Background locations have already been sampled.

Sampling and Analytical Information

Sample Container Type, Volume (number per location): 8 oz glass (1)
Sample Preservation: 4C
Sample Holding Time: 7/40 days
Analytical Method/Instrument: SW846 Method 8310/HPLC
Action Level: 0
Detection Limit: 0.1 mg/kg
Performance Requirements: High performance liquid chromatography (HPLC) will be used. Performance requirements will be per E & E SOWs included in bid specifications.
Number replicate aliquots for analytical error: 3
Number co-located samples for total error: 4
Number of Trip Blanks: 0 Number of Rinsate Blanks: 0
Number of Field Blanks: 0 Number of PE Samples: 0
Number of Matrix Spikes: 3

QA Deliverables for Definitive Data

1. Sample Documentation
2. Chain of custody
3. Sampling design approach
4. Initial and continuing calibration
5. Determination and documentation of detection limits.
6. Analyte(s) identification
7. Analyte(s) quantification
8. QC blanks (trip, method, rinsate)
9. Matrix spike recoveries
10. PE samples(when specified)
11. Analytical error or total measurement error determination

DATA QUALITY OBJECTIVES SUMMARY (Soil and Water Matrices)

Remedial Unit: contaminated soil
Program Area/Sampling Objective: Removal/Extent of contamination
Required Data Quality Type: D
Parameter: BTEX
Matrix: Soil

Sampling Design

Approach: Stratified Random
Number of Samples: 36
Sampling Location, Depths and Areas: Sampling locations are presented on the attached map. The depth will be determined in the field, and will be no greater than 20 feet.
Compositing Scheme:
Number of Background Samples: 0
Background Sampling Locations: Background locations have already been sampled.

Sampling and Analytical Information

Sample Container Type, Volume (number per location): 40 ml glass vial (2)
Sample Preservation: 4C
Sample Holding Time: 7 days
Analytical Method/Instrument: SW846 Method 8021B/GC
Action Level: 0
Detection Limit: 1 mg/kg
Performance Requirements: The gas chromatograph will be used. Performance requirements will be per E & E SOWs included in bid specifications.
Number replicate aliquots for analytical error: 0
Number co-located samples for total error: 4
Number of Trip Blanks: 6 Number of Rinsate Blanks: 0
Number of Field Blanks: 0 Number of PE Samples: 0
Number of Matrix Spikes: 3

QA Deliverables for Definitive Data

1. Sample Documentation
2. Chain of custody
3. Sampling design approach
4. Initial and continuing calibration
5. Determination and documentation of detection limits.
6. Analyte(s) identification
7. Analyte(s) quantification
8. QC blanks (trip, method, rinsate)
9. Matrix spike recoveries
10. PE samples (when specified)
11. Analytical error or total measurement error determination

DATA QUALITY OBJECTIVES SUMMARY (Soil and Water Matrices)

Remedial Unit: contaminated soil
Program Area/Sampling Objective: Removal/Extent of contamination
Required Data Quality Type: D
Parameter: Total Petroleum Hydrocarbons (TPH)
Matrix: Soil

Sampling Design

Approach: Stratified Random
Number of Samples: 36
Sampling Location, Depths and Areas: Sampling locations are presented on the attached map. The depth will be determined in the field, and will be no greater than 20 feet.
Compositing Scheme:
Number of Background Samples: 0
Background Sampling Locations: Background locations have already been sampled.

Sampling and Analytical Information

Sample Container Type, Volume (number per location): 8 oz. glass (1)
Sample Preservation: 4C
Sample Holding Time: 7 days
Analytical Method/Instrument: TNRCC Method 1005/GC
Action Level: 0
Detection Limit: 10 mg/kg
Performance Requirements: The gas chromatograph will be used. Performance requirements will be per E & E SOWs included in bid specifications.
Number replicate aliquots for analytical error: 3
Number co-located samples for total error: 4
Number of Trip Blanks: 0 Number of Rinsate Blanks: 0
Number of Field Blanks: 0 Number of PE Samples: 0
Number of Matrix Spikes: 3

QA Deliverables for Definitive Data

1. Sample Documentation
2. Chain of custody
3. Sampling design approach
4. Initial and continuing calibration
5. Determination and documentation of detection limits.
6. Analyte(s) identification
7. Analyte(s) quantification
8. QC blanks (trip, method, rinsate)
9. Matrix spike recoveries
10. PE samples (when specified)
11. Analytical error or total measurement error determination

DATA QUALITY OBJECTIVES SUMMARY (Soil and Water Matrices)

Remedial Unit: contaminated soil
Program Area/Sampling Objective: Removal/Extent of contamination
Required Data Quality Type: D
Parameter: pH
Matrix: Soil

Sampling Design

Approach: Stratified Random
Number of Samples: 36
Sampling Location, Depths and Areas: Sampling locations are presented on the attached map. The depth will be determined in the field, and will be no greater than 20 feet.
Compositing Scheme: Soil samples will be analyzed for pH.
Number of Background Samples: 0
Background Sampling Locations: Background locations have already been sampled.

Sampling and Analytical Information

Sample Container Type, Volume(number per location): 8 oz glass (1)
Sample Preservation: 4C
Sample Holding Time: NA
Analytical Method/Instrument: SW Method 9045/electro
Action Level: 0
Detection Limit:
Performance Requirements: Performance requirements will be per E & E SOWs included in bid specifications.
Number replicate aliquots for analytical error: 3
Number co-located samples for total error: 4
Number of Trip Blanks: 0 Number of Rinsate Blanks: 0
Number of Field Blanks: 0 Number of PE Samples: 0
Number of Matrix Spikes: 3

QA Deliverables for Definitive Data

1. Sample Documentation
2. Chain of custody
3. Sampling design approach
4. Initial and continuing calibration
5. Determination and documentation of detection limits.
6. Analyte(s) identification
7. Analyte(s) quantification
8. QC blanks (trip, method, rinsate)
9. Matrix spike recoveries
10. PE samples (when specified)
11. Analytical error or total measurement error determination

DATA QUALITY OBJECTIVES SUMMARY (Soil and Water Matrices)

Remedial Unit: surface drainage
Program Area/Sampling Objective: Removal/Threat to environment
Required Data Quality Type: D
Parameter: Metals
Matrix: Sediment

Sampling Design

Approach: Judgmental
Number of Samples: 2
Sampling Location, Depths and Areas: Sampling locations are presented on the attached map.
Compositing Scheme: Sediment slurries will be collected in 8 oz. glass jars with teflon lined lids.
Number of Background Samples: 0
Background Sampling Locations: Background sediment concentrations have already been established.

Sampling and Analytical Information

Sample Container Type, Volume (number per location): 8 oz glass (1)
Sample Preservation: 4C
Sample Holding Time: 6 Months
Analytical Method/Instrument: SW846 Method 6010B
Action Level: 0
Detection Limit: 10 mg/kg
Performance Requirements: The ICP will be used. Performance requirements will be per E & E SOWs included in bid specifications.
Number replicate aliquots for analytical error: 1
Number co-located samples for total error: 1
Number of Trip Blanks: 0 Number of Rinsate Blanks: 0
Number of Field Blanks: 0 Number of PE Samples: 0
Number of Matrix Spikes: 1

QA Deliverables for Definitive Data

1. Sample Documentation
2. Chain of custody
3. Sampling design approach
4. Initial and continuing calibration
5. Determination and documentation of detection limits.
6. Analyte(s) identification
7. Analyte(s) quantification
8. QC blanks (trip, method, rinsate)
9. Matrix spike recoveries
10. PE samples (when specified)
11. Analytical error or total measurement error determination

DATA QUALITY OBJECTIVES SUMMARY (Soil and Water Matrices)

Remedial Unit: surface drainage
Program Area/Sampling Objective: Removal/Threat to environment
Required Data Quality Type: D
Parameter: PAHs
Matrix: Sediment

Sampling Design

Approach: Judgmental
Number of Samples: 2
Sampling Location, Depths and Areas: Sampling locations are presented on the attached map.
Compositing Scheme:
Number of Background Samples: 0
Background Sampling Locations: Background locations have been sampled.

Sampling and Analytical Information

Sample Container Type, Volume(number per location): 8 oz glass (1)
Sample Preservation: 4C
Sample Holding Time: 7/40 days
Analytical Method/Instrument: SW846 Method 8310/HPLC
Action Level: 0
Detection Limit: 0.1 mg/kg
Performance Requirements: HPLC will be used. Performance requirements will be per E & E SOWs included in bid specifications.
Number replicate aliquots for analytical error: 1
Number co-located samples for total error: 1
Number of Trip Blanks: 0 Number of Rinsate Blanks: 0
Number of Field Blanks: 0 Number of PE Samples: 0
Number of Matrix Spikes: 1

QA Deliverables for Definitive Data

1. Sample Documentation

2. Chain of custody
3. Sampling design approach
4. Initial and continuing calibration
5. Determination and documentation of detection limits.
6. Analyte(s) identification
7. Analyte(s) quantification
8. QC blanks (trip, method, rinsate)
9. Matrix spike recoveries
10. PE samples (when specified)
11. Analytical error or total measurement error determination

DATA QUALITY OBJECTIVES SUMMARY (Soil and Water Matrices)

Remedial Unit: surface drainage
Program Area/Sampling Objective: Removal/Threat to environment
Required Data Quality Type: D
Parameter: pH
Matrix: Sediment

Sampling Design

Approach: Judgmental
Number of Samples: 2
Sampling Location, Depths and Areas: Sampling locations are presented on the attached map.
Compositing Scheme: Sediment samples will be analyzed for pH level.
Number of Background Samples: 0
Background Sampling Locations: Background locations have been sampled.

Sampling and Analytical Information

Sample Container Type, Volume (number per location): 8 oz glass (1)
Sample Preservation: 4C
Sample Holding Time: NA
Analytical Method/Instrument: SW846 Method 9045/electro
Action Level: 0
Detection Limit:
Performance Requirements: Performance requirements will be per E & E SOWs included in bid specifications.
Number replicate aliquots for analytical error: 1
Number co-located samples for total error: 1
Number of Trip Blanks: 0 Number of Rinsate Blanks: 0
Number of Field Blanks: 0 Number of PE Samples: 0
Number of Matrix Spikes: 1

QA Deliverables for Definitive Data

1. Sample Documentation
2. Chain of custody
3. Sampling design approach
4. Initial and continuing calibration
5. Determination and documentation of detection limits.
6. Analyte(s) identification
7. Analyte(s) quantification
8. QC blanks (trip, method, rinsate)
9. Matrix spike recoveries
10. PE samples (when specified)
11. Analytical error or total measurement error determination

DATA QUALITY OBJECTIVES SUMMARY (Soil and Water Matrices)

Remedial Unit: surface drainage
Program Area/Sampling Objective: Removal/Threat to environment
Required Data Quality Type: D

Parameter: TPH
Matrix: Sediment

Sampling Design

Approach: Judgmental
Number of Samples: 2
Sampling Location, Depths and Areas: Sampling locations are presented on the attached map.
Compositing Scheme:
Number of Background Samples: 0
Background Sampling Locations: Background locations have been sampled.

Sampling and Analytical Information

Sample Container Type, Volume(number per location): 8 oz glass (1)
Sample Preservation: 4C
Sample Holding Time: 7 days
Analytical Method/Instrument: TNRCC Method 1005/GC
Action Level: 0
Detection Limit: 10 mg/kg
Performance Requirements: The gas chromatograph will be used. Performance requirements will be per E & E SOWs included in bid specifications.
Number replicate aliquots for analytical error: 1
Number co-located samples for total error: 1
Number of Trip Blanks: 0 Number of Rinsate Blanks: 0
Number of Field Blanks: 0 Number of PE Samples: 0
Number of Matrix Spikes: 1

QA Deliverables for Definitive Data

1. Sample Documentation
2. Chain of custody
3. Sampling design approach
4. Initial and continuing calibration
5. Determination and documentation of detection limits.
6. Analyte(s) identification
7. Analyte(s) quantification
8. QC blanks (trip, method, rinsate)
9. Matrix spike recoveries
10. PE samples (when specified)
11. Analytical error or total measurement error determination

DATA QUALITY OBJECTIVES SUMMARY (Soil and Water Matrices)

Remedial Unit: surface drainage
Program Area/Sampling Objective: Removal/Threat to environment
Required Data Quality Type: D
Parameter: BTEX
Matrix: Sediment

Sampling Design

Approach: Judgmental
Number of Samples: 2
Sampling Location, Depths and Areas: Sampling locations are presented on the attached map.
Compositing Scheme:
Number of Background Samples: 0
Background Sampling Locations: Background locations have been sampled.

Sampling and Analytical Information

Sample Container Type, Volume (number per location): 40 ml glass vial (2)
Sample Preservation: 4C
Sample Holding Time: 7 days

Analytical Method/Instrument: SW846
Action Level: 0
Detection Limit: 1 mg/kg
Performance Requirements: The gas chromatograph will be used. Performance requirements will be per E & E SOWs included in bid specifications.
Number replicate aliquots for analytical error: 1
Number co-located samples for total error: 1
Number of Trip Blanks: 0 Number of Rinsate Blanks: 0
Number of Field Blanks: 0 Number of PE Samples: 0
Number of Matrix Spikes: 1

QA Deliverables for Definitive Data

1. Sample Documentation
2. Chain of custody
3. Sampling design approach
4. Initial and continuing calibration
5. Determination and documentation of detection limits.
6. Analyte(s) identification
7. Analyte(s) quantification
8. QC blanks (trip, method, rinsate)
9. Matrix spike recoveries
10. PE samples (when specified)
11. Analytical error or total measurement error determination

DATA QUALITY OBJECTIVES SUMMARY (Soil and Water Matrices)

Remedial Unit: refinery and tank farm
Program Area/Sampling Objective: Removal/Determine migration pathways
Required Data Quality Type: D
Parameter: TPH
Matrix: Ground Water

Sampling Design

Approach: Judgmental
Number of Samples: 18
Sampling Location, Depths and Areas: Sampling locations are presented on the attached map.
Compositing Scheme:
Number of Background Samples: 0
Background Sampling Locations:

Sampling and Analytical Information

Sample Container Type, Volume(number per location): 40 oz. glass vials (2)
Sample Preservation: 4C
Sample Holding Time: 7 days
Analytical Method/Instrument: TNRCC Method 1005/GC
Action Level: 0
Detection Limit: 1 mg/l
Performance Requirements: The gas chromatograph will be used. Performance requirements will be per E & E SOWs included in bid specifications.
Number replicate aliquots for analytical error: 2
Number co-located samples for total error: 2
Number of Trip Blanks: 0 Number of Rinsate Blanks: 0
Number of Field Blanks: 1 Number of PE Samples: 0
Number of Matrix Spikes: 2

QA Deliverables for Definitive Data

1. Sample Documentation
2. Chain of custody
3. Sampling design approach
4. Initial and continuing calibration
5. Determination and documentation of detection limits.

6. Analyte(s) identification
7. Analyte(s) quantification
8. QC blanks (trip, method, rinsate)
9. Matrix spike recoveries
10. PE samples (when specified)
11. Analytical error or total measurement error determination

DATA QUALITY OBJECTIVES SUMMARY (Soil and Water Matrices)

Remedial Unit: refinery and tank farm
Program Area/Sampling Objective: Removal/Determine migration pathways
Required Data Quality Type: D
Parameter: BTEX
Matrix: Ground Water

Sampling Design

Approach: Judgmental
Number of Samples: 18
Sampling Location, Depths and Areas: Sampling locations are presented on the attached map.
Compositing Scheme:
Number of Background Samples: 0
Background Sampling Locations:

Sampling and Analytical Information

Sample Container Type, Volume (number per location): 40 ml vial (3)
Sample Preservation: 4C
Sample Holding Time: 7 days
Analytical Method/Instrument: SW846 Method 8021B/GC
Action Level: 0
Detection Limit: 0.01 mg/l
Performance Requirements: The gas chromatograph will be used. Performance requirements will be per E & E SOWs included in bid specifications.
Number replicate aliquots for analytical error: 2
Number co-located samples for total error: 2
Number of Trip Blanks: 6
Number of Rinsate Blanks: 0
Number of Field Blanks: 1 Number of PE Samples: 0
Number of Matrix Spikes: 2

QA Deliverables for Definitive Data

1. Sample Documentation
2. Chain of custody
3. Sampling design approach
4. Initial and continuing calibration
5. Determination and documentation of detection limits.
6. Analyte(s) identification
7. Analyte(s) quantification
8. QC blanks (trip, method, rinsate)
9. Matrix spike recoveries
10. PE samples (when specified)
11. Analytical error or total measurement error determination

DATA QUALITY OBJECTIVES SUMMARY (Soil and Water Matrices)

Remedial Unit: refinery and tank farm
Program Area/Sampling Objective: Removal/Determine migration pathways
Required Data Quality Type: S
Parameter: pH (field screening)
Matrix: Ground Water

Sampling Design

Approach: Judgmental
Number of Samples: 18
Sampling Location, Depths and Areas: Sampling locations are presented on the attached map.
Compositing Scheme: Ground water samples will be analyzed for pH.
Number of Background Samples: 0
Background Sampling Locations:

SECTION 01100

SUMMARY OF WORK

PART 1 - GENERAL

1.01 SUMMARY

Section Includes

A. Overview of Work covered by Contract Documents.

B. CONTRACTOR use of premises.

C. Occupancy requirements.

1.02 DESCRIPTION

A. The following Summary of Work is provided for CONTRACTOR's convenience only and is not meant to be a comprehensive scope of work, or a reflection of the sequence of work. The CONTRACTOR is directed to the complete set of Contract Documents for details of the Work.

B. Work for this project includes furnishing labor, material and equipment for the following:

1. General

   a. Determine, obtain and pay for all permits and certifications required from state, county, municipal, and federal agencies.

   b. Secure subcontractors.

   c. Coordinate with ENGINEER and TNRCC, including attendance at project meetings.

   d. Provide all documentation required by the specifications including preparation/collection and submittal of the following items:

      (1) Project schedule and updates

      (2) Waste management plan

      (3) Proposed materials

   e. Mobilization/demobilization. Provide and employ equipment and personnel for setup of site support, decontamination and health and safety activities, and Exclusion zones, transition zones, contaminant reduction zones and support zones.

2. Specific

   a. Provide construction surveying to layout and control the work.

   b. Provide, maintain and employ storm water run-on/run-off control measures.

   c. Provide and employ dust suppression equipment and techniques to control fugitive dust emissions during work to comply with air quality action levels.

   d. Decontaminate equipment and vehicles. Collect, contain, and dispose of decontamination water.

   e. Collect, contain, and discharge on site pond water. Treat contaminated water prior to discharge on site utilizing temporary treatment system.

   f. For personal protective equipment utilized for the work with consolidated waste, dispose on site. For personal protective equipment utilized for the work conducted after waste consolidation, dispose off site.

   g. Demolish the process building superstructure. Place the construction debris at the bottom of the consolidated waste area.

   h. Establish temporary facilities and containment structures, including temporary power temporary sanitary facilities.

   i. Excavate potentially affected soils and sediments throughout the site as specified.

   j. Blend the affected soils, sediment, trees, shrubs, roots and debris (e.g. battery chips, battery casings, construction debris, and IDW drums), place and compact in the consolidation area, and cap the consolidated material.

   k. Disassemble fencing located north of the maintenance building for reuse after construction.

   l. Provide necessary shoring and structural support to protect the high-pressure buried natural gas pipe line and any notification as required by the gas company for all work within the easement of the gas lines.

   m. Provide equipment and qualified personnel to hand dig excavation areas within pipeline easements. Prevent run-on and control run-off stormwater.

   n. Abandon monitoring wells designated to be abandoned and place debris in the consolidation waste area.

   o. Install new monitoring wells. Collect, contain and dispose of well development water. May treat and discharge on site as specified for pond water. (See Item e).

   p. Grade excavated areas to establish contours.

q. Install new fencing in the locations.

r. Reseed excavated areas and cap to establish vegetated cover as specified.

s. Protect buildings, structures, and utilities from damage from construction traffic, excavation activities, and other CONTRACTOR operations

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.01 CONTRACTOR Use of Premises

A. Access to Site shall be limited to existing site gates on County Highway 2415 to the west and to the south, except where approved otherwise by the ENGINEER.

B. CONTRACTOR shall sequence and conduct work on JCS property to minimize impact to the adjacent property owners, and in accordance with Section 01370 - Other Special Procedures.

C. CONTRACTOR shall limit use of site to storage and activities related to execution of this work.

D. CONTRACTOR shall assume full responsibility for site security and health and safety during operations for the duration of the work.

E. CONTRACTOR shall obtain and pay for use of any additional storage or work areas needed for operations under this Contract, which are not within the designated site or construction easements. All health and safety requirements in this contract shall apply at such other areas, if any.

* End of Section *

Sampling QA/QC Work Plan
WILCOX REFINERY (Phase 2)
Bristow, Oklahoma

Prepared By:
Ecology and Environment, Inc.
1999 Bryan Street, Suite 2000
Dallas, Texas 75201

U.S.EPA Project No.: KJ6103
Contractor Project No.: 052601SFXX
U.S.EPA Contract No.: 68-W6-0013

Approvals

Ecology & Environment, Inc.

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Tom Beer — Date
Project Manager

EPA

Donald R. Smith 7/31/98
Don Smith — Date
On-Scene Coordinator

B S Banipal 7/29/98
Ben Banipal — Date
Project Director

David Anderson 7/29/98
David Anderson — Date
QA Officer

1.0 SITE BACKGROUND

The site is located in the City of Bristow which is located in Creek County in the State of Oklahoma. The nearest residents are located on site. The site is an abandoned refinery site consisting of 98.0 acres. The refinery buildings and tank farm structures were abandoned by 1963.

The following remedial units are present at the site: contaminated soil, impoundments, lagoons, surface drainage, and a large tank farm.

The following types of materials were handled at the site: petroleum products.

The contaminants of concern are:

Contaminant	Concentration Range
Metals	Low
BTEX	Low
Polycyclic aromatic hydrocarbons (PAH)	Low
Total petroleum hydrocarbons (TPH)	High
pH	Low

The volumes of contaminated materials to be addressed are unknown at this time. The site assessment will determine the amount of surface and subsurface soil, and oily waste if any, that needs to be removed. The characteristics and amounts of the waste remaining in the ASTs will also be determined during this assessment. The suspected contamination is a result of the former refinery activities conducted on the site. The former refinery tanks, ponds, pits, and soil are suspected sources of contamination.

The physical/chemical threat to the population at risk includes direct contact with petroleum hydrocarbon or metal contaminated soil or sediment, as well as potential surface water and ground water contamination.

The following additional information is known about the site: An Environmental Site Investigation (ESI) conducted in 1996 indicated low concentrations of contaminants in the sediment and surface soil samples collected. High concentration oily waste was present on site in the form of pits and ponds. Several of the ponds and pits have been backfilled with site soil and graded. An area which had no vegetation was also noted during the ESI and was still present during the site visit conducted by E & E in March 1998. Several subsurface source areas were detected during the first phase of investigation completed by E & E in June 1998. The threat to surface water via subsurface contaminant migration will be assessed during this phase 2 sampling event.

The basis of the site information are the ESI Report prepared by Weston in October 1996, as well as the previous site visits and sampling conducted by E & E to determine the current site status. The purpose of the assessment at this time is to determine the threat to waters posed by the contamination and evaluate the need for possible removal actions.

2.0 DATA USE OBJECTIVES

The following data quality objectives will be applied to this project:

Program Area	Sampling Objective	Data
Removal	Determine migration pathways	D
Removal	Extent of contamination	D

3.0 SAMPLING DESIGN

The following remedial units will be sampled as indicated.

Remedial Unit	Program Area/ Sampling Objective	Matrix	Parameter
contaminated soil	Removal/Extent of contamination	Soil	Metals
contaminated soil	Removal/Extent of contamination	Soil	PAHs
contaminated soil	Removal/Extent of contamination	Soil	BTEX
contaminated soil	Removal/Extent of contamination	Soil	Petroleum Hydrocarbons
contaminated soil	Removal/Extent of contamination	Soil	pH
refinery and tank farm	Removal/Determine migration pathways	Ground Water	Petroleum Hydrocarbons
refinery and tank farm	Removal/Determine migration pathways	Ground Water	BTEX

Sampling Designs:

1) Contaminated Soil, Removal/Extent of Contamination for Soil Samples, Metals Analysis

The Stratified Random sampling approach will be implemented. Sampling locations are presented on the attached map. The depth of the sample will be determined in the field, and will be no greater than 20 feet. Background locations have already been sampled. Composites of one foot of core samples will be placed in 8 oz. glass jars with teflon lined lids.

2) Contaminated Soil, Removal/Extent of Contamination for Soil Samples, PAHs Analysis

The Stratified Random sampling approach will be implemented. Sampling locations are presented on the attached map. The depth of the sample will be determined in the field, and will be no greater than 20 feet. Background locations have already been sampled. Composites of one foot of core samples will be placed in 8 oz. glass jars with teflon lined lids.

3) Contaminated Soil, Removal/Extent of Contamination for Soil Samples, BTEX Analysis

The Stratified Random sampling approach will be implemented. Sampling locations are presented on the attached map. The depth of the sample will be determined in the field, and will be no greater than 20 feet. Background locations have already been sampled. Composites of one foot of core samples will be placed in two 40 ml VOA vials with teflon lined lids.

4) Contaminated Soil, Removal/Extent of Contamination for Soil Samples, TPH Analysis

The Stratified Random sampling approach will be implemented. Sampling locations are presented on the attached map. The depth of the sample will be determined in the field, and will be no greater than 20 feet. Background locations have already been sampled. Composites of one foot of core samples will be placed in 8 oz. glass jars with teflon lined lids.

5) Contaminated Soil, Removal/Extent of Contamination for Soil Samples, pH

The Stratified Random sampling approach will be implemented. Sampling locations are presented on the attached map. The depth of the sample will be determined in the field, and will be no greater than 25 feet. Background locations have already been sampled. Composites of one foot of core samples will be placed in 8 oz. glass jars with teflon lined lids.

6) Tank Farm, Removal/Determine Migration Pathways, for Ground Water Samples, TPH Analysis

The judgmental sampling approach will be implemented. Samples will be collected (if present) from each borehole location, as noted on the attached map. Samples will be collected in two 40 ml VOA vials with teflon lined lids.

7) Refinery and Tank Farm, Removal/Determine Migration Pathways, for Ground Water Samples , BTEX Analysis

The judgmental sampling approach will be implemented. Samples will be collected (if present) from each borehole location, as noted on the attached map. Samples will be collected in two 40 ml VOA vials with teflon lined lids.

Table 1: Sampling Summaries (attached), identify the number of field samples and QA/QC samples to be collected.

4.0 SAMPLING AND ANALYSIS

Table 2: Sampling Requirements Summary (attached), contains information on the sample container types and the quantity to be collected at each sampling location, the preservation method to be used, and the sample holding times (based on the parameter being analyzed for and the matrix).

The following sampling equipment/media will be used to obtain environmental samples from the respective matrix:

Parameter/Matrix	Equipment/Media	Fabrication	Dedicated
Metals/Soil	Geoprobe	acetate	Y
PAHs/Soil	Geoprobe	acetate	Y
BTEX/Soil	Geoprobe	acetate	Y
TPH/Soil	Geoprobe	acetate	Y
pH/Soil	Geoprobe	acetate	Y
BTEX/Ground Water	Bladder Pump	plastic/ polyethylene	Y
TPH/Ground Water	Bladder Pump	plastic/ polyethylene	Y

Table 3.1, Analytical Summary (attached), contains the action levels, required detection limits, analytical method/instrument references, and the associated required data type designation. Table 3.2, Performance Requirements (attached), lists the method-specific performance requirements.

5.0 STANDARD OPERATING PROCEDURES

5.1 Sampling SOPs

The following sampling SOPs will be implemented for this project. These are typically applicable procedures

which may be varied or changed as required, dependent upon site conditions, equipment limitations imposed by the procedure. In all instances, the ultimate procedures employed will be documented and associated with the final project deliverables.

General Field Sampling Guidelines (#2001)

Sampling is the selection of a representative portion of a larger population, universe, or body. Through examination of a sample, the characteristics of the larger body from which the sample was drawn can be inferred. In this manner, sampling can be a valuable tool for determining the presence, type, and extent of contamination by hazardous substances in the environment.

The primary objective of all sampling activities is to characterize a waste site accurately so that its impact on human health and the environment can be properly evaluated. It is only through sampling and analysis that site hazards can be measured and the job of cleanup and restoration can be accomplished effectively with minimal risk. The sampling itself must be conducted so that every sample collected retains its original physical form and chemical composition. In this way, sample integrity is insured, quality assurance standards are maintained, and the sample can accurately represent the larger body of material under investigation.

The extent to which valid inferences can be drawn from a sample depends on the degree to which the sampling effort conforms to the project's objectives. For example, as few as one sample may produce adequate, technically valid data to address the project's objectives. Meeting the project's objectives requires thorough planning of sampling activities, and implementation of the most appropriate sampling and analytical procedures.

Sample Storage, Preservation, and Handling (#2003)

Samples should be collected using equipment and procedures appropriate to the matrix, parameters and sampling objective. The volume of the sample collected must be sufficient to perform the analysis requested. Samples must be stored in the proper types of containers and preserved in a manner appropriate to the analysis to be performed.

All samples must be cooled to 4C from the time of collection until analysis. When a preservative other than cooling is used, the preservative is generally added after the sample is collected, unless the sample container has been pre-preserved by the laboratory. If necessary, the pH must be adjusted to the appropriate level and checked with pH paper in a manner which will not contaminate the sample.

Quality Assurance/Quality Control Samples (#2005)

QA samples are used as an assessment tool to determine if environmental data meet the quality criteria established for a specific application. QC samples are generally used to establish intra-laboratory or analyst-specific precision and bias or to assess the performance of all or a portion of the measurement system. The goal of including QA/QC samples with any sampling or analytical event is to identify, measure and control the sources of error that may be introduced from the time of sample bottle preparation through analysis.

Analytical results for these samples can be used to assess accuracy as well as cross contamination. Accuracy refers to the correctness of the concentration value and the qualitative certainty that the analyte is present. It is a combination of both bias (systematic error) and precision (random error). Bias is defined as the deviation of a measured value from a reference value or known spiked amount, and is determined by calculating percent

recovery. Precision is a measure of the closeness of agreement among individual measurements. Precision is determined by coefficient of variation calculations.

Sampling Equipment Decontamination (#2006)
Removing or neutralizing contaminants from equipment minimizes the likelihood of sample cross contamination, reduces or eliminates transfer of contaminants to clean areas, and prevents the mixing of incompatible substances.

The first step, a soap and water wash, removes all visible particulate matter and residual oils and grease. This may be preceded by a steam or high pressure water wash to facilitate residuals removal. The second step involves a tap water rinse and a distilled/deionized water rinse to remove the detergent. An acid rinse provides a low pH media for trace metals removal and is included in the decontamination process if metal samples are to be collected. It is followed by another distilled/deionized water rinse. If sample analysis does not include metals, the acid rinse step can be omitted. Next, a high purity solvent rinse is performed for trace organics removal if organics are a concern at the site. Typical solvents used for removal of organic contaminants include acetone, hexane, or water. Acetone is typically chosen because it is an excellent solvent, miscible in water, and not a target analyte on the Priority Pollutant List. If acetone is known to be a contaminant of concern at a given site or if Target Compound List analysis (which includes acetone) is to be performed, another solvent may be substituted. The solvent must be allowed to evaporate completely and then a final distilled/deionized water rinse is performed. This rinse removes any residual traces of the solvent.

Soil and Dry Sediment Sampling (#2012)
Soil samples may be collected using a variety of methods and equipment. The methods and equipment used are dependent on the depth of the desired sample, the type of sample required (disturbed vs. undisturbed), and the soil type. Near-surface soils may be easily sampled using a spade, trowel, or scoop. Sampling at greater depths may be performed using a hand auger, continuous flight auger, a trier, a split-spoon, or, if required, a backhoe.

Photoionization Detector (PID) HNU (#2056)
The PID is a useful general survey instrument at hazardous waste sites. A PID is capable of detecting and measuring real-time concentrations of many organic and inorganic vapors in air. A PID is similar to a flame ionization detector (FID) in application; however, the PID has somewhat broader capabilities in that it can detect certain inorganic vapors. Conversely, the PID is unable to respond to certain low molecular weight hydrocarbons, such as methane and ethane, that are readily detected by FID instruments.

The PID employs the principle of photoionization. The analyzer will respond to most vapors that have an ionization potential less than or equal to that supplied by the ionization source, which is an ultraviolet (UV) lamp. Three probes, each containing a different UV light source, are available for use with the HNU. Energies are 9.5, 10.2, and 11.7 eV. All three detect many aromatic and large molecular hydrocarbons. The 10.2 eV and 11.7 eV probes, in addition, detect some smaller organic molecules and some halogenated hydrocarbons. The 10.2 eV probe is the most useful for environmental response work, as it is more durable than the 11.7 eV probe and detects more compounds than the 9.5 eV probe.

Gases with ionization potentials near to or less than that of the lamp will be ionized. These gases will thus be

detected and measured by the analyzer. Gases with ionization potentials higher than that of the lamp will not be detected. The ionization potential of the major components of air, oxygen, nitrogen, and carbon dioxide, range from about 12.0 eV to about 15.6 eV and are not ionized by any of the three lamps.

Sediment Sampling (E&E PCBTECH 7.8)
This document describes the procedures for the collection of representative sediment samples. Analysis of sediment samples may determine whether concentrations of specific pollutants exceed established threshold action levels, or if the concentrations of pollutants present a risk to public health, welfare, or environment.

Included in this discussion are procedures for obtaining representative samples, quality assurance measures, proper documentation of sampling activities, and recommendations for personnel safety.

Sediment samples may be recovered using a variety of methods and equipment. These are dependent on the depth of the desired sample, and the type of sample required (disturbed or undisturbed).

Near-surface sediment samples may be easily sampled using a scoop or spoon if near shore or in shallow water, and spring loaded sediment dredge or benthic sampler if in deeper waters. To obtain other than surficial sediment samples, core samples or split spoon samples are required.

Borehole Sampling (E&E GEOTECH 5.9A)
Most subsurface investigations require the drilling of boreholes for one or more purposes: collection of soil samples for lithologic logging and laboratory testing, lithologic and hydrogeologic characterization using borehole geophysical logging; and installation of piezometers or monitoring wells. Drilling methods are selected based on: availability and cost; suitability for the type of geologic materials at a site (unconsolidated or consolidated); and potential effects on sample integrity (influence by drilling fluids and potential for cross contamination between aquifers).

A wide variety of drilling method have been developed that could be suitable for one or more of the purposes described above. Information on 19 methods is summarized. The hollow-stem auger is by far the most commonly used method for well installation in unconsolidated formations. Air rotary is probably the most commonly used method for well installation in consolidated formations.

Surface soil samples are collected from boreholes for chemical and physical analysis, and to aid in the definition and tracking of contaminants in the soil. The subsurface soil samples may be either composite or discrete, and either disturbed or undisturbed. The type of sample to be collected depends on the drilling technique and the purpose of the investigation.

Logging and Describing Soil & Rock Samples (E&E GEOTECH 5.1)
This document establishes a standard system and standard format for describing and classifying soil and rock samples. The use of a standard format will help assure the validity, accuracy, and applicability of geologic data.

Soil Sampling (E&E GEOTECH 5.17A)
This document describes the procedures for the collection of representative soil samples. Representative sampling ensures the accurate characterization of site conditions. Analysis of soil samples may determine

pollutant concentrations and its risk to public health, welfare, or the environment; extent of contamination; and confirmation of remediation standards.

This procedure includes discussions of procedures for obtaining representative samples, quality assurance/quality control measures, proper documentation of sampling activities, and recommendations for personnel safety.

Soil samples may be recovered using a variety of methods and equipment. These are dependent on the depth of the desired sample, the type of sample required (disturbed vs. undisturbed), and the soil type.

Near-surface soils may be easily sampled using a spade, trowel, or scoop. Sampling at greater depths may be performed using a hand auger, a power auger, or, if a test pit is required, a backhoe.

5.2 Sample Documentation

All sample documents will be completed legibly and in ink. Any corrections or revisions will be made by lining through the original entry and initialing the change. The following sample documentation will be maintained:

Field Logbook

The field logbook is a descriptive notebook detailing site activities and observations so that an accurate, factual account of field procedures may be reconstructed. All entries will be signed by the individuals making them. Entries should include at least the following:

- site name and project number
- names of personnel on site
- dates and times of all entries
- descriptions of all site activities, including site entry and exit times
- noteworthy events and discussions
- weather conditions
- site observations
- identification and description of samples and locations
- subcontractor information and names of on-site personnel
- dates and times of sample collections and chain of custody information
- records of photographs
- site sketches

Field Data Sheets and Sample Labels

Field data sheets and corresponding sample labels are used to identify samples and document field sampling conditions and activities. Field data sheets should be completed at the time of sample collection and should include the following information:

- site name

- samplers
- sample location and sample number
- date and time the sample was collected
- type of sample collected
- brief description of the site
- weather parameters
- analyses to be performed
- sample container, preservation, and storage information

Sample labels will be securely affixed to the sample container. They will clearly identify the particular sample, and should include the following information:

- site name and project number
- date and time the sample was collected
- sample preservation method
- analysis requested
- sampling location

Chain of Custody Record

A Chain of Custody Record will be maintained from the time of sample collection until final disposition. Every transfer of custody will be noted and signed for and a copy of the record will be kept be each individual who has signed it. The Chain of Custody Record should include at least the following information:

- sample identification
- sample location
- sample collection date
- sample information, i.e., matrix, number of bottles collected, etc.
- names and signatures of samplers
- signatures of all individuals who have had custody of the samples

When samples are not under direct control of the individual currently responsible for them, they will be stored in a locked container which has been sealed with a Custody Seal.

Custody Seal

Custody Seals demonstrate that a sample container has not been opened or tampered with. The individual who has custody of the samples will sign and date the seal and affix it to the container in such a manner that it cannot be opened without breaking the seal.

5.3 Sample Handling and Shipment

Each of the sample bottles will be sealed and caps will be secured with custody seals. Sample bottles will be labeled as described above. Sealed bottles will be placed in the appropriate transport containers and the

containers will be packed with an appropriate absorbent material such as vermiculite. All sample documents will be affixed to the underside of each transport container lid. The lid will be sealed and custody seals will be affixed to the transport container.

Regulations for packaging, marking/labeling, and shipping of hazardous materials and wastes are promulgated by the U.S. Department of Transportation (U.S. DOT). Air carriers which transport hazardous materials, in particular Federal Express, require compliance with the current edition of the International Air Transport Association (IATA) Dangerous Goods Regulations, which applies to shipment and transportation of hazardous materials by air carrier. Following current IATA regulations will ensure compliance with U.S. DOT.

6.0 QUALITY ASSURANCE REQUIREMENTS

The following QA requirements will be implemented on this project:

Definitive Data
Definitive data are generated using rigorous analytical methods, such as approved EPA reference methods. Data are analyte-specific, with confirmation of analyte identity and concentration. Methods produce tangible raw data (e.g., chromatograms, spectra, digital values) in the form of paper printouts or computer-generated electronic files. Data may be generated at the site or at an off-site location, as long as the QA/QC requirements are satisfied. For data to be definitive, either analytical or total measurement error must be determined.

Definitive Data QA/QC Elements

Sample documentation (location, date and time collected, batch, etc.)

Chain of custody (when appropriate)

Sampling design approach (systematic, simple or stratified random, judgmental, etc.)

Initial and continuing calibration. Determination and documentation of detection limits

Analyte(s) identification

Analyte(s) quantification

QC blanks (trip, method, rinsate)

Matrix spike recoveries

Performance Evaluation (PE) samples (when specified)

Analytical error determination (measures overall precision of analytical method): An appropriate number of replicate aliquots, as specified in this document, are taken from at least one thoroughly homogenized sample,

the replicate aliquots are analyzed, and standard laboratory QC parameters(such as variance, mean, and coefficient of variation) are calculated and compared to performance requirements specified in this document.

Total measurement error determination (measures overall precision of measurement system, from sample acquisition through analysis): An appropriate number of co-located samples as determined in this document are independently collected from the same location and analyzed following standard operating procedures. Based on the analytical results, standard laboratory QC parameters such as variance, mean, and coefficient of variation should be calculated and compared to measurement error goals defined in this document. This procedure may be required for each matrix under investigation, and may be repeated for a given matrix at more than one location.

7.0 DATA VALIDATION

Data generated for this project will be validated as follows:

Definitive Data
This objective, requires that at least 10% of the samples in the lab data package be evaluated for all of the elements listed in Section 6.0 of this QA/QC Sampling Plan. Of the remaining samples, holding times, blank contamination, precision, accuracy, error determination, detection limits, and confirmed identification will be reviewed. This objective also requires review of all elements for all samples in each analyte category (i.e. metals, PAHs, BTEX, TPH and soil pH) in every tenth data package received from an individual lab.

8.0 DELIVERABLES

The Task Manager, Tom Beer, will maintain contact with the EPA On-Scene Coordinator/Remedial Project Manager, Don Smith, to provide information regarding the technical and financial progress of the project. This communication began when the project was assigned. Activities under this project will be documented and reported in the deliverables described below.

Analysis
This sampling event requires analytical services. Documentation of lab selection, raw data, or results will be provided in the analytical report.

Analytical Report
An analytical report will be prepared for samples analyzed under this plan. Information regarding the analytical methods or procedures employed, sample results, QA/QC results, chain of custody documentation, laboratory correspondence, and raw data will be provided within this deliverable.

Data Review
A review of the data generated under this plan will be undertaken. The assessment of data acceptability or usability will be provided separately, or as part of the analytical report.

Final Report
A (draft) final report will be prepared to correlate available background information with data generated

under this sampling event and identify supportable conclusions and recommendations which satisfy the objectives of this sampling QA/QC plan.

Maps/Figures
The following illustrations will be provided in the final report; Site Map and Sample Location Map. Drawings of the soil boring logs will also be included in the final report.

9.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

9.1 Personnel Information

The EPA On-Scene Coordinator/Remedial Project Manager, Don Smith, will provide overall direction to the staff concerning project objectives, sampling needs, and schedule.

The Task Leader Tom Beer and Task Manager Ben Banipal, are the primary points of contact with the EPA On-Scene Coordinator/Remedial Project Manager. The Task Leader/Manager is responsible for the development and completion of the Sampling QA/QC Plan, project team organization, and supervision of all project tasks.

The following personnel will also work on this project:

Name	Responsibility
Ben Martich	Site Safety Officer
Smitty Bumgarner	Geologist
Laura Giebel	QC Officer
Chris Sansone	Sampler
Paul Perowicz	Sampler
Scott Stone	Surveyor

9.2 Laboratory Information

The following laboratories will be providing the listed analyses:

Lab Name/Location	Lab Type	Parameter
PDP Analytical Services The Woodlands, TX	Analytical	all parameters

10.0 SCHEDULE OF ACTIVITIES

Activity	Start Date	End Date
Site Assessment-Field Work	08/03/98	08/07/98
Report Preparation	08/10/98	09/30/98

11.0 ATTACHMENTS

The following are attachments to this Sampling QA/QC Plan:

Table 1
Table 2
Table 3.1
Table 3.2
Site Map
Proposed Sampling Location Map
Target Analyte List - Inorganics
Target Compound List - Semivolatiles
Target Compound List - Volatiles
Data Quality Objectives Summary (Soil and Water Matrices)

Table 1a. Field Sampling Summary Date: 07/28/98
Remedial Unit: Contaminated Soil
Program Area: Removal
Sampling Objective: Extent of contamination

Matrix	Parameter	Background Samples	Field Samples	Trip Blanks	Field Blanks	Rinsate Blanks	Matrix Spikes	PE Samples	Replicate Aliquots	Co-Located Samples	Total Samples
Soil	Metals	0	41	0	0	0	2	0	2	5	50
Soil	PAHs	0	41	0	0	0	2	0	2	5	50
Soil	BTEX	0	41	5	0	0	2	0	2	5	55
Soil	TPH	0	41	0	0	0	2	0	2	5	50
Soil	pH	0	41	0	0	0	2	0	2	5	50

Table 1b. Field Sampling Summary Date: 07/28/98
Remedial Unit: Tank Farm
Program Area: Removal
Sampling Objective: Determine Migration Pathways

Matrix	Parameter	Background Samples	Field Samples	Trip Blanks	Field Blanks	Rinsate Blanks	Matrix Spikes	PE Samples	Replicate Aliquots	Co-Located Samples	Total Samples
Ground Water	TPH	0	41	0	0	0	2	0	2	5	50
Ground Water	BTEX	0	41	0	0	0	2	0	2	5	50

Table 2. Sampling Requirements Summary

Date: 07/28/98
Page: 1

Remedial Unit	Program Area/Sampling Objective	Sample Container Matrix	Sample Parameter	Sample Holding (Number)	Preservation	Time
Contaminated Soil	Removal/Extent of Contamination	Soil (1)	Metals	8 oz glass (1)	4C	6 Months
Contaminated Soil	Removal/Extent of Contamination	Soil	PAHs	8 oz glass (1)	4C	7/40 days
Contaminated Soil	Removal/Extent of Contamination	Soil	BTEX	40 ml glass vial (2)	4C	7 days
Contaminated Soil	Removal/Extent of Contamination	Soil	TPH	8 oz glass (1)	4C	7 days
Contaminated Soil	Removal/Extent of Contamination	Soil	pH	8 oz glass (1)	4C	NA
Refinery/ Tank Farm	Removal/Determine Migration Pathways	Ground Water	BTEX	40 ml glass vial (2)	4C	7 days
Refinery/ Tank Farm	Removal/Determine Migration Pathways	Ground Water	TPH	40 ml glass vial (2)	4C	7 days

Table 3.1. Analytical Summary

Date: 07/14/98
Page: 1

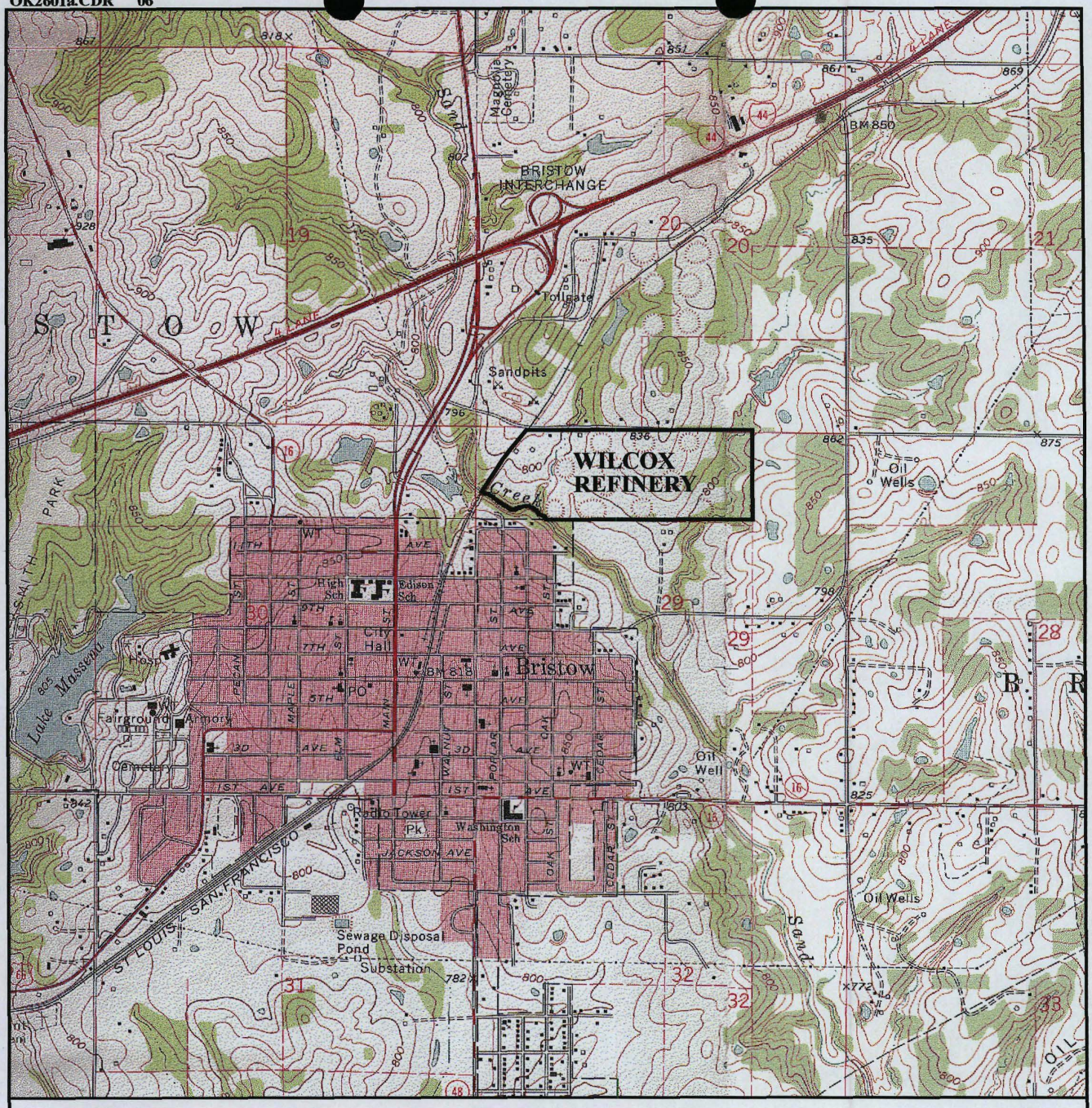
Remedial Unit	Program Area/Sampling Objective	Matrix	Parameter	Action Level	Required Detection Limit	Analytical Method/ Instrument	Required Data Type
Contaminated Soil	Removal/Extent of Contamination	Soil	Metals	N/A	10 mg/kg	SW846 Method 6010B/ICP	D
Contaminated Soil	Removal/Extent of Contamination	Soil	PAHs	N/A	0.1 mg/kg	SW846 Method 8310/HPLC	D
Contaminated Soil	Removal/Extent of Contamination	Soil	BTEX	N/A	1 mg/kg	SW846 Method 8021B Mod/GC	D
Contaminated Soil	Removal/Extent of Contamination	Soil	TPH	N/A	10 mg/kg	TNRCC Method 1005/GC	D
Contaminated Soil	Removal/Extent of Contamination	Soil	pH	N/A	N/A	SW846 Method 9045/electro	D
Refinery/ Tank Farm	Removal/Determine Migration Pathways	Ground Water	TPH	N/A	1 mg/l	TNRCC Method 1005/GC	D
Refinery/ Tank Farm	Removal/Determine Migration Pathways	Ground Water	BTEX	N/A	0.01 mg/l	SW846 Method 8021B Mod/GC	D

Table 3.2. Performance Requirements

Date: 07/28/98
Page: 1

Remedial Unit	Program Area/Sampling Objective	Matrix	Parameter	Performance Requirements
Contaminated Soil	Removal/Extent of Contamination	Soil	Metals	The ICP will be used. Performance requirements per E & E SOWs included in bid specifications.
Contaminated Soil	Removal/Extent of Contamination	Soil	PAHs	High performance liquid chromatography (HPLC) will be used. Performance requirements per E & E SOWs included in bid specifications.
Contaminated Soil	Removal/Extent of Contamination	Soil	BTEX	The gas chromatograph will be used. Performance requirements per E & E SOWs included in bid specifications.
Contaminated Soil	Removal/Extent of Contamination	Soil	TPH	The gas chromatograph will be used. Performance requirements per E & E SOWs included in bid specifications.
Contaminated Soil	Removal/Extent of Contamination	Soil	pH	Performance requirements per E & E SOWs included in bid specifications.
Tank Farm	Removal/Determine Migration Pathways	Ground Water	TPH	The gas chromatograph will be used. The performance requirements per E & E SOWs included in bid specifications.
Tank Farm	Removal/Determine Migration Pathways	Ground Water	BTEX	The gas chromatograph will be used. Performance requirements per E & E SOWs included in bid specifications.

OK2601a.CDR 06



N

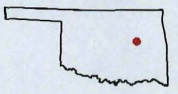
SCALE 1:24,000

1 0 1/2 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET



QUADRANGLE LOCATION

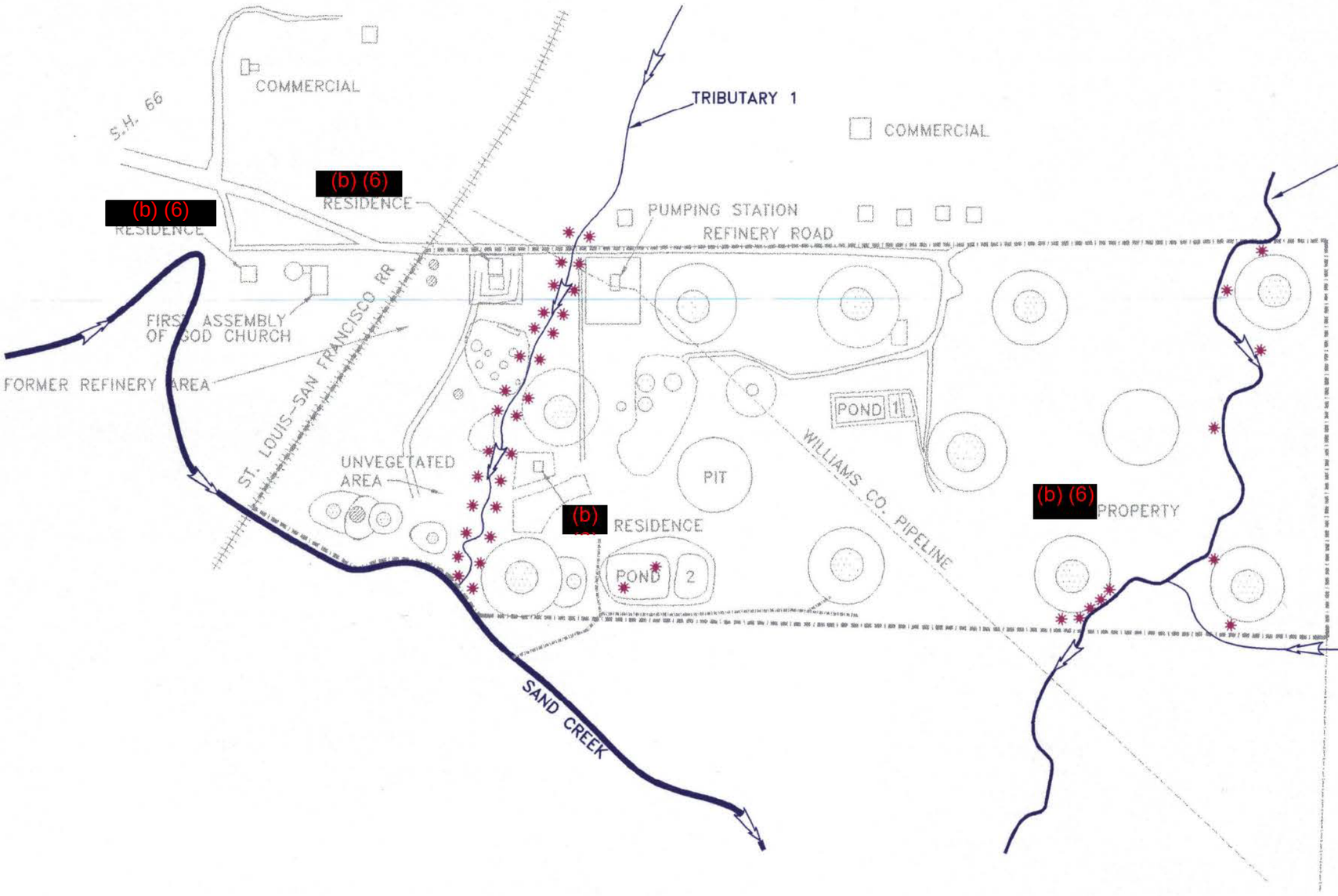
ecology and environment, inc.
Superfund Technical Assessment & Response Team - Region 6

CERCLIS/CASE#: OKD001010917 TDD#: S06-9803-0009

SOURCE: U.S.G.S. 7.5 MIN. TOPOGRAPHIC QUADRANGLES BRISTOW AND SLICK, OKLAHOMA

FIGURE 1 SITE LOCATION MAP
WILCOX REFINERY
BRISTOW, OKLAHOMA

OK2601f.DWG 06



LEGEND

- FORMER TANK LOCATION
- CUT/LEVELED BERM
- BERM
- RESIDENCE
- EXISTING TANKS
- SITE BOUNDARY
- POND
- PROPOSED SOIL BORING LOCATION
- DIRECTION OF FLOW

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Dallas, Texas
International Specialists in the Environment

FIGURE 2 SAMPLE LOCATION MAP (PHASE 2)
WILCOX REFINERY
BRISTOW, OKLAHOMA

TDD# S06-98-03-0009	Date: JULY 17, 1998
PAN# 052601SFXX	P.M.: T. BEER

BASE MAP SOURCE: ROY F. WESTON INC., ESI REPORT, MARCH, 1997, FROM ACE AERIAL PHOTO, 1966.

TARGET ANALYTE LIST (TAL) - INORGANICS

Analyte	Detection Limit (ug/L -- water (1))
Aluminum	200
Antimony	60
Arsenic	10
Barium	200
Beryllium	5
Cadmium	5
Calcium	5000
Chromium	10
Cobalt	50
Copper	25
Iron	100
Lead	3
Magnesium	5000
Manganese	15
Mercury	0.2
Nickel	40
Potassium	5000
Selenium	5
Silver	10
Sodium	5000
Thallium	10
Vanadium	50
Zinc	20
Cyanide	10

(1) Soil/Sediment detection limit 200x water (ug/kg -- soil/sediment).

Based on the Contract Laboratory Program Statement of Work, ILMO3.0 (9/93).

TARGET COMPOUND LIST (TCL) AND
QUANTITATION LIMITS (QL) (1)

Semivolatiles	CAS Number	Quantitation Limits(2) Water Low ug/L	Soil/Sediment(3) ug/Kg
1. Naphthalene	91-20-3	10	330
2. 2-Methylnaphthalene	91-57-6	10	330
3. 2-Chloronaphthalene	91-58-7	10	330
4. Acenaphthylene	208-96-8	10	330
5. Acenaphthene	83-32-9	10	330
6. Phenanthrene	85-01-8	10	330
7. Anthracene	120-12-7	10	330
8. Carbazole	86-74-8	10	330
9. Fluoranthene	206-44-0	10	330
10. Pyrene	129-00-0	10	330
11. Benzo(a)anthracene	56-55-3	10	330
12. Chrysene	218-01-9	10	330
13. Benzo(b)fluoranthene	205-99-2	10	330
14. Benzo(k)fluoranthene	207-08-9	10	330
15. Benzo(a)pyrene	50-32-8	10	330
16. Indeno(1,2,3-cd)pyrene	193-39-5	10	330
17. Dibenz(a,h)anthracene	53-70-3	10	330
18. Benzo(g,h,i)perylene	191-24-2	10	330

(1) Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

(2) Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment on dry weight basis will be higher.

(3) Medium Soil/Sediment Quantitation Limits (QL) for Semivolatile TCL. Compounds are 30 times the individual Low Soil/Sediment QL.

Based on Contract Laboratory Program Statement of Work, OLMO3.1 (8/94).

TARGET COMPOUND LIST (TCL) AND
QUANTITATION LIMITS (QL) (1)

Volatiles	CAS Number	Quantitation Limits (2) Water Low Soil/Sediment (3) ug/L	ug/Kg
1. Benzene	71-43-2	10	10
2. Toluene	108-88-3	10	10
3. Ethyl Benzene	100-41-4	10	10
4. Xylenes (total)	1330-20-7	10	10

(1) Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

(2) Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment on dry weight basis will be higher.

(3) Medium Soil/Sediment Quantitation Limits (QL) for Volatile TCL. Compounds are 120 times the individual Low Soil/Sediment QL.

Based on the Contract Laboratory Program Statement of Work, OLMO3.1 (8/94).

DATA QUALITY OBJECTIVES SUMMARY (Soil and Water Matrices)

Remedial Unit: contaminated soil
Program Area/Sampling Objective: Removal/Extent of contamination
Required Data Quality Type: D
Parameter: **Metals**
Matrix: Soil

Sampling Design

Approach: Stratified Random
Number of Samples: 41
Sampling Location, Depths and Areas: Sampling locations are presented on the attached map. The depth will be determined in the field, and will be no greater than 20 feet.
Compositing Scheme: Composites of one foot of core samples will be placed in 8 oz. glass jars with teflon lined lids.
Number of Background Samples: 0
Background Sampling Locations: Background locations have already been sampled.

Sampling and Analytical Information

Sample Container Type, Volume (number per location): 8 oz glass (1)
Sample Preservation: 4C
Sample Holding Time: 6 Months
Analytical Method/Instrument: SW846, Method 6010B (metals)/ICP
Action Level: 0
Detection Limit: 10 mg/kg
Performance Requirements: The ICP will be used. Performance requirements will be per E & E SOWs included in bid specifications.
Number replicate aliquots for analytical error: 0
Number co-located samples for total error: 5
Number of Trip Blanks: 0 Number of Rinsate Blanks: 0
Number of Field Blanks: 0 Number of PE Samples: 0
Number of Matrix Spikes: 2

QA Deliverables for Definitive Data

1. Sample Documentation
2. Chain of custody
3. Sampling design approach
4. Initial and continuing calibration
5. Determination and documentation of detection limits.
6. Analyte(s) identification
7. Analyte(s) quantification
8. QC blanks (trip, method, rinsate)
9. Matrix spike recoveries
10. PE samples (when specified)
11. Analytical error or total measurement error determination

DATA QUALITY OBJECTIVES SUMMARY (Soil and Water Matrices)

Remedial Unit: contaminated soil
Program Area/Sampling Objective: Removal/Extent of contamination
Required Data Quality Type: D
Parameter: **PAHs**
Matrix: Soil

Sampling Design

Approach: Stratified Random
Number of Samples: 41
Sampling Location, Depths and Areas: Sampling locations are presented on the attached map. The depth will be determined in the field, and will be no greater than 20 feet.
Compositing Scheme:
Number of Background Samples: 0
Background Sampling Locations: Background locations have already been sampled.

Sampling and Analytical Information

Sample Container Type, Volume (number per location): 8 oz glass (1)
Sample Preservation: 4C
Sample Holding Time: 7/40 days
Analytical Method/Instrument: SW846 Method 8310/HPLC
Action Level: 0
Detection Limit: 0.1 mg/kg
Performance Requirements: High performance liquid chromatography (HPLC) will be used. Performance requirements will be per E & E SOWs included in bid specifications.
Number replicate aliquots for analytical error: 0
Number co-located samples for total error: 5
Number of Trip Blanks: 0 Number of Rinsate Blanks: 0
Number of Field Blanks: 0 Number of PE Samples: 0
Number of Matrix Spikes: 2

QA Deliverables for Definitive Data

1. Sample Documentation
2. Chain of custody
3. Sampling design approach
4. Initial and continuing calibration
5. Determination and documentation of detection limits.
6. Analyte(s) identification
7. Analyte(s) quantification
8. QC blanks (trip, method, rinsate)
9. Matrix spike recoveries
10. PE samples(when specified)
11. Analytical error or total measurement error determination

DATA QUALITY OBJECTIVES SUMMARY (Soil and Water Matrices)

Remedial Unit: contaminated soil
Program Area/Sampling Objective: Removal/Extent of contamination
Required Data Quality Type: D
Parameter: **BTEX**
Matrix: Soil

Sampling Design

Approach: Stratified Random
Number of Samples: 41
Sampling Location, Depths and Areas: Sampling locations are presented on the attached map. The depth will be determined in the field, and will be no greater than 20 feet.
Compositing Scheme:
Number of Background Samples: 0
Background Sampling Locations: Background locations have already been sampled.

Sampling and Analytical Information

Sample Container Type, Volume (number per location): 40 ml glass vial (2)
Sample Preservation: 4C
Sample Holding Time: 7 days
Analytical Method/Instrument: SW846 Method 8021B/GC
Action Level: 0
Detection Limit: 1 mg/kg
Performance Requirements: The gas chromatograph will be used. Performance requirements will be per E & E SOWs included in bid specifications.
Number replicate aliquots for analytical error: 0
Number co-located samples for total error: 5
Number of Trip Blanks: 5 Number of Rinsate Blanks: 0
Number of Field Blanks: 0 Number of PE Samples: 0
Number of Matrix Spikes: 2

QA Deliverables for Definitive Data

1. Sample Documentation
2. Chain of custody
3. Sampling design approach
4. Initial and continuing calibration
5. Determination and documentation of detection limits.
6. Analyte(s) identification
7. Analyte(s) quantification
8. QC blanks (trip, method, rinsate)
9. Matrix spike recoveries
10. PE samples (when specified)
11. Analytical error or total measurement error determination

DATA QUALITY OBJECTIVES SUMMARY (Soil and Water Matrices)

Remedial Unit: contaminated soil
Program Area/Sampling Objective: Removal/Extent of contamination
Required Data Quality Type: D
Parameter: **Total Petroleum Hydrocarbons (TPH)**
Matrix: Soil

Sampling Design

Approach: Stratified Random
Number of Samples: 41
Sampling Location, Depths and Areas: Sampling locations are presented on the attached map. The depth will be determined in the field, and will be no greater than 20 feet.
Compositing Scheme:
Number of Background Samples: 0
Background Sampling Locations: Background locations have already been sampled.

Sampling and Analytical Information

Sample Container Type, Volume (number per location): 8 oz. glass (1)
Sample Preservation: 4C
Sample Holding Time: 7 days
Analytical Method/Instrument: TNRCC Method 1005/GC
Action Level: 0
Detection Limit: 10 mg/kg
Performance Requirements: The gas chromatograph will be used. Performance requirements will be per E & E SOWs included in bid specifications.
Number replicate aliquots for analytical error: 0
Number co-located samples for total error: 5
Number of Trip Blanks: 0 Number of Rinsate Blanks: 0
Number of Field Blanks: 0 Number of PE Samples: 0
Number of Matrix Spikes: 2

QA Deliverables for Definitive Data

1. Sample Documentation
2. Chain of custody
3. Sampling design approach
4. Initial and continuing calibration
5. Determination and documentation of detection limits.
6. Analyte(s) identification
7. Analyte(s) quantification
8. QC blanks (trip, method, rinsate)
9. Matrix spike recoveries
10. PE samples (when specified)
11. Analytical error or total measurement error determination

DATA QUALITY OBJECTIVES SUMMARY (Soil and Water Matrices)

Remedial Unit: contaminated soil
Program Area/Sampling Objective: Removal/Extent of contamination
Required Data Quality Type: D
Parameter: **pH**
Matrix: Soil

Sampling Design

Approach: Stratified Random
Number of Samples: 41
Sampling Location, Depths and Areas: Sampling locations are presented on the attached map. The depth will be determined in the field, and will be no greater than 20 feet.
Compositing Scheme: Soil samples will be analyzed for pH.
Number of Background Samples: 0
Background Sampling Locations: Background locations have already been sampled.

Sampling and Analytical Information

Sample Container Type, Volume(number per location): 8 oz glass (1)
Sample Preservation: 4C
Sample Holding Time: NA
Analytical Method/Instrument: SW Method 9045/electro
Action Level: 0
Detection Limit:
Performance Requirements: Performance requirements will be per E & E SOWs included in bid specifications.
Number replicate aliquots for analytical error: 0
Number co-located samples for total error: 5
Number of Trip Blanks: 0 Number of Rinsate Blanks: 0
Number of Field Blanks: 0 Number of PE Samples: 0
Number of Matrix Spikes: 2

QA Deliverables for Definitive Data

1. Sample Documentation
2. Chain of custody
3. Sampling design approach
4. Initial and continuing calibration
5. Determination and documentation of detection limits.
6. Analyte(s) identification
7. Analyte(s) quantification
8. QC blanks (trip, method, rinsate)
9. Matrix spike recoveries
10. PE samples (when specified)
11. Analytical error or total measurement error determination

DATA QUALITY OBJECTIVES SUMMARY (Soil and Water Matrices)

Remedial Unit: refinery and tank farm
Program Area/Sampling Objective: Removal/Determine migration pathways
Required Data Quality Type: D
Parameter: **BTEX**
Matrix: Ground Water

Sampling Design

Approach: Judgmental
Number of Samples: 41
Sampling Location, Depths and Areas: Sampling locations are presented on the attached map.
Compositing Scheme:
Number of Background Samples: 0
Background Sampling Locations:

Sampling and Analytical Information

Sample Container Type, Volume (number per location): 40 ml vial (2)
Sample Preservation: 4C
Sample Holding Time: 7 days
Analytical Method/Instrument: SW846 Method 8021B/GC
Action Level: 0
Detection Limit: 0.01 mg/l
Performance Requirements: The gas chromatograph will be used. Performance requirements will be per E & E SOWs included in bid specifications.
Number replicate aliquots for analytical error: 0
Number co-located samples for total error: 5
Number of Trip Blanks: 0 (see BTEX in soil)
Number of Rinsate Blanks: 0
Number of Field Blanks: 0 Number of PE Samples: 0
Number of Matrix Spikes: 2

QA Deliverables for Definitive Data

1. Sample Documentation
2. Chain of custody
3. Sampling design approach
4. Initial and continuing calibration
5. Determination and documentation of detection limits.
6. Analyte(s) identification
7. Analyte(s) quantification
8. QC blanks (trip, method, rinsate)
9. Matrix spike recoveries
10. PE samples (when specified)
11. Analytical error or total measurement error determination

DATA QUALITY OBJECTIVES SUMMARY (Soil and Water Matrices)

Remedial Unit: refinery and tank farm
Program Area/Sampling Objective: Removal/Determine migration pathways
Required Data Quality Type: D
Parameter: **Total petroleum hydrocarbons (TPH)**
Matrix: Ground Water

Sampling Design

Approach: Judgmental
Number of Samples: 41
Sampling Location, Depths and Areas: Sampling locations are presented on the attached map.
Compositing Scheme:
Number of Background Samples: 0
Background Sampling Locations:

Sampling and Analytical Information

Sample Container Type, Volume (number per location): 40 ml vial (2)
Sample Preservation: 4C
Sample Holding Time: 7 days
Analytical Method/Instrument: TNRCC Method 1005/GC
Action Level: 0
Detection Limit: 0.1 mg/l
Performance Requirements: The gas chromatograph will be used. Performance requirements will be per E & E SOWs included in bid specifications.
Number replicate aliquots for analytical error: 0
Number co-located samples for total error: 5
Number of Trip Blanks: 0 (see BTEX in soil)
Number of Rinsate Blanks: 0
Number of Field Blanks: 0 Number of PE Samples: 0
Number of Matrix Spikes: 2

QA Deliverables for Definitive Data

1. Sample Documentation
2. Chain of custody
3. Sampling design approach
4. Initial and continuing calibration
5. Determination and documentation of detection limits.
6. Analyte(s) identification
7. Analyte(s) quantification
8. QC blanks (trip, method, rinsate)
9. Matrix spike recoveries
10. PE samples (when specified)
11. Analytical error or total measurement error determination

Appendix D
Health and Safety Plan

ecology and environment, inc.

EXISTING SITE SAFETY PLAN ADDENDUM FORM

Site Name: Wilcox Refinery

TDD/Pan/Project Number: S06-98-03-0009
PAN 05260ISFXX

Date of original SSP: 4/22/98

Date of amendment: 7/29/98

Date of proposed new work: 8/3/98

Added activities and hazard evaluations: 1) Soil sampling with slam bars - Work carefully, especially with the slam bar insertion + removal 2) Surveying with a total station Objective - to evaluate threat to waters. Other tasks from original SSP to be performed: Logbook + photographic documentation (#1), Geoprobe sampling (task #2), Ground water sampling (#3), GPS/Magnetometer survey work (#6).

Added monitoring activities: Monitor for heat stress, take frequent breaks and drink excess fluids

Level of protection: ____ A ____ B ____ C ✓ D

Reason for up/downgrading:

PPE: Total station survey: Safety glasses, leather safety boots, TLD
Slam bar sampling: Safety glasses, leather safety boots, TLD, cotton work gloves, latex for sampling

Decon: See QASP + original SSP.

Team Members	Responsibility
Lauren Williams / Paul Perovich	Samplers, Slam bar / JMC
Tom Beer	Project Manager
Ben Martich	Site Safety Officer, Sampler
Smitty Bumgarner / Chris Sansone	Geoprobe / Helper
Ben Baripal / Scott Stone	Surveyors

Equipment	Quantity	Equipment	Quantity
Slambars / JMC soil probe	2ea.		
Total station	1		

THE TERMS OF THE ORIGINAL SSP SHALL BE IN EFFECT EXCEPT AS NOTED ON THIS FORM.

Prepared by: J. Beer Date: 7/30/98

Reviewed by: Marina Karpinski Date: 7/30/98

INSTRUCTIONS: This form to be approved through normal channels and attached to original plan. Form SSP-A

Revision: 0
June 1997

ecology and environment, inc.

SITE-SPECIFIC
HEALTH AND SAFETY PLAN

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Lawn
Dev

Project: Wiley Depriest

Project No.: KJ6103

TDD/PAN No.: 06-9803-00009/052601SFXX

Project Location: Bristow, Creek County, OK

Proposed Date of Field Activities: 04/27/98 - 05/04/98

Project Director: Julian Myers / Ben Barnard

Project Manager: Tom Greer

Site Safety Officer: Sharon Moore

Prepared by: Sharon Moore Date Prepared: 4/17/98

Approved by: Maxine Fabrini Date Approved: 4/22/98

1. INTRODUCTION

1.1 POLICY

It is E & E's policy to ensure the health and safety of its employees, the public, and the environment during the performance of work it conducts. This site-specific health and safety plan (SHASP) establishes the procedures and requirements to ensure the health and safety of E & E employees for the above-named project. E & E's overall safety and health program is described in *Corporate Health and Safety Program for Toxic and Hazardous Substances* (CHSP). After reading this plan, applicable E & E employees shall read and sign E & E's Site-Specific Health and Safety Plan Acceptance form.

This SHASP has been developed for the sole use of E & E employees and is not intended for use by firms not participating in E & E's training and health and safety programs. Subcontractors are responsible for developing and providing their own safety plans.

This SHASP has been prepared to meet the following applicable regulatory requirements and guidance:

Applicable Regulation/Guidance
29 CFR 1910.120, Hazardous Waste Operations and Emergency Response (HAZWOPER)
Other: Oil pollution Act of 1990 40 CFR

1.2 SCOPE OF WORK

Description of Work: Tank & waters and removal site assessment. Subsurface soil and groundwater sampling. Documentation of work

Equipment/Supplies: Required groundwater and soil sampling supplies.

The following is a description of each numbered task:

Task Number	Task Description
1	Written and Photographic Documentation
2	Subsurface soil sampling (4 locations).
3	Ground water Sampling @
4	Hazard interrogation (12 samples).
5	Collect soil Sample - unvegetated area

6. Boring location magnetometer GPS

1.3 SITE DESCRIPTION

Site Map: See attached

Site History/Description (see project work plan for detailed description): Former oil refinery. Most structures removed by 1966. Oily waste ponds, pits and tank bottoms still present. Pits and ponds have been filled in with sand. One tank present.

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Is the site currently in operation? ☐ Yes ☑ No

Locations of Contaminants/Wastes: Former pits and ponds filled in with sand. Tanks possibly.

Types and Characteristics of Contaminants/Wastes:

☑ Liquid	☑ Solid	☑ Sludge	☑ Gas/Vapor
☑ Flammable/Ignitable	☐ Volatile	☑ Corrosive	☐ Acutely Toxic
☐ Explosive	☐ Reactive	☑ Carcinogenic	☐ Radioactive
☐ Medical/Pathogenic	Other: Haz and Characterization - unknown characteristics (Hazards due to chemicals in kit)		

2. ORGANIZATION AND RESPONSIBILITIES

E & E team personnel shall have on-site responsibilities as described in E & E's standard operating procedure (SOP) for Site Inspection. The project team, including qualified alternates, is identified below.

Name	Site Role/Responsibility
Tom Beer	Project/Task Manager - Hazard categorization
Shawn Novak / Carol Koch	Site Safety Officer - Hazard categorization
Paul James	Geologist/geoprobe operator

3. TRAINING

Prior to work, E & E team personnel shall have received training as indicated below. As applicable, personnel shall have read the project work plan, sampling and analysis plan, and/or quality assurance project plan prior to project work.

Training	Required
40-Hour OSHA HAZWOPER Initial Training and Annual Refresher (29 CFR 1910.120)	✓
Annual First Aid/CPR	✓
Hazard Communication (29 CFR 1910.1200)	✓
40-Hour Radiation Protection Procedures and Investigative Methods	

Training	Required
8-Hour General Radiation Health and Safety	
Radiation Refresher	
DOT and Biannual Refresher	✓

4. MEDICAL SURVEILLANCE

4.1 MEDICAL SURVEILLANCE PROGRAM

E & E field personnel shall actively participate in E & E's medical surveillance program as described in the CHSP and shall have received, within the past year, an appropriate physical examination and health rating.

E & E's health and safety record (HSR) form will be maintained on site by each E & E employee for the duration of his or her work. E & E employees should inform the site safety officer (SSO) of any allergies, medical conditions, or similar situations that are relevant to the safe conduct of the work to which this SHASP applies.

4.2 RADIATION EXPOSURE

4.2.1 External Dosimetry

Thermoluminescent Dosimeter (TLD) Badges: TLD badges are required to be worn by all E & E field personnel on all E & E sites.

Pocket Dosimeters: No radiation anticipated. RAM 4 Readings = Background during previous recon visits. JB 4/2

Other:

4.2.2 Internal Dosimetry

☐ Whole body count ☐ Bioassay ☐ Other

Requirements:

4.2.3 Radiation Dose

Dose Limits: E & E's radiation dose limits are stated in the CHSP. Implementation of these dose limits may be designated on a site specific basis.

Site-Specific Dose Limits:

ALARA Policy: Radiation doses to E & E personnel shall be maintained as low as reasonably achievable (ALARA), taking into account the work objective, state of technology available, economics of improvements in dose reduction with respect to overall health and safety, and other societal and socioeconomic considerations.

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5. SITE CONTROL

5.1 SITE LAYOUT AND WORK ZONES

Site Work Zones: Refer to the map or site sketch, attached at the end of this plan, for designated work zones.

Site Access Requirements and Special Considerations: The property is open. Some areas are fenced and locked. Have keys from offsite owner. Access has been granted.

Illumination Requirements: Work will be conducted during daylight hours.

Sanitary Facilities (e.g., toilet, shower, potable water): Local sanitary facilities will be used. Porta potty will be on site.

On-Site Communications: Verbal, cell phone, radios.

Other Site-Control Requirements: None

5.2 SAFE WORK PRACTICES

Daily Safety Meeting: A daily safety meeting will be conducted for all E & E personnel and documented on the Daily Safety Meeting Record form or in the field logbook. The information and data obtained from applicable site characterization and analysis will be addressed in the safety meetings and also used to update this SHASP, as necessary.

Work Limitations: Work shall be limited to a maximum of 12 hours per day. If 12 consecutive days are worked, at least one day off shall be provided before work is resumed. Work will be conducted in daylight hours unless prior approval is obtained and the illumination requirements in 29 CFR 1910.120(m) are satisfied.

Weather Limitations: Work shall not be conducted during electrical storms. Work conducted in other inclement weather (e.g., rain, snow) will be approved by project management and the regional safety coordinator or designee.

Other Work Limitations: Check ground stability before setting up Geoprobe

Buddy System: Field work will be conducted in pairs of team members according to the buddy system.

Line of Sight: Each field team member shall remain in the line of sight and within verbal communication of at least one other team member.

Eating, Drinking, and Smoking: Eating, drinking, smoking, and the use of tobacco products shall be prohibited in the exclusion and contamination reduction areas, at a minimum, and shall only be permitted in designated areas.

Contamination Avoidance: Field personnel shall avoid unnecessary contamination of personnel, equipment, and materials to the extent practicable.

Sample Handling: Protective gloves of a type designated in Section 7 will be worn when containerized samples are handled for labeling, packaging, transportation, and other purposes.

Vermiculite Handling: Respiratory protection (i.e., high-efficiency particulate air filtration) is recommended when vermiculite is used to package samples into shipping containers (some vermiculite contains low concentrations of asbestos).

Other Safe Work Practices: Strict drums will be provided

6. HAZARD EVALUATION AND CONTROL

6.1 PHYSICAL HAZARD EVALUATION AND CONTROL

Potential physical hazards and their applicable control measures are described in the following table for each task.

Hazard	Task Number	Hazard Control Measures
Biological (flora, fauna, etc.)	1, 2, 3, 4, 5 6	• Potential hazard: Poison ivy, snakes. fire ants, mosquitos, ticks • Establish site-specific procedures for working around identified hazards. • Other: use insect repellant, sunscreen.
Cold Stress	1–6 (cool weather)	• Provide warm break area and adequate breaks. • Provide warm noncaffeinated beverages. • Promote cold stress awareness. • See *Cold Stress Prevention and Treatment* (attached at the end of this plan if cold stress is a potential hazard).
Compressed Gas Cylinders		• Use caution when moving or storing cylinders. • A cylinder is a projectile hazard if it is damaged or its neck is broken. • Store cylinders upright and secure them by chains or other means. • Other:
Confined Space		• Ensure compliance with 29 CFR 1910.146. • See SOP for Confined Space Entry. Additional documentation is required. • Other: See GHSP, Section 8.5
~~Drilling~~ Geoprobe Sampling	2	• ~~See SOP for Health and Safety on Drilling Rig Operations. Additional Documentation may be required.~~ n/a • Other: Geoprobe only. Hazard Evaluation to be carried out by trained operator. Use carefully; be aware of hazards, • Other:
Drums and Containers	4 n/a	• Ensure compliance with 29 CFR 1910.120(j). • Consider unlabeled drums or containers to contain hazardous substances and handle accordingly until the contents are identified. • Inspect drums or containers and assure integrity prior to handling. • Move drums or containers only as necessary; use caution and warn nearby personnel of potential hazards. • Open, sample, and/or move drums or containers in accordance with established procedures; use approved drum/container-handling equipment. • Other: ~~Sampling tank contents for haz. cat. see haz. cat. specific attachment.~~ Not being done n/a

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Hazard	Task Number	Hazard Control Measures
Electrical	2, 6	• ~~Ensure compliance with 29 CFR 1910 Subparts J and S.~~ NA • Locate and mark energized lines. • De-energize lines as necessary. • Ground all electrical circuits. • Guard or isolate temporary wiring to prevent accidental contact. • Evaluate potential areas of high moisture or standing water and define special electrical needs. • Other: Mark location of utilities, Have them
Excavation and Trenching		• Ensure that excavations comply with and personnel are informed of the requirements of 29 CFR 1926 Subpart P. • Ensure that any required sloping or shoring systems are approved as per 29 CFR 1926 Subpart P. • Identify special personal protective equipment (PPE) (see Section 7) and monitoring (see Section 8) needs if personnel are required to enter approved excavated areas or trenches. • Maintain line of sight between equipment operators and personnel in excavations/trenches. Such personnel are prohibited from working in close proximity to operating machinery. • Suspend or shut down operations at signs of cave in, excessive water, defective shoring, changing weather, or unacceptable monitoring results. • Other: • Other:
Fire and Explosion		• Inform personnel of the location(s) of potential fire/explosion hazards. • Establish site-specific procedures for working around flammables. • Ensure that appropriate fire suppression equipment and systems are available and in good working order. • Define requirements for intrinsically safe equipment. • Identify special monitoring needs (see Section 8). • Remove ignition sources from flammable atmospheres. • Coordinate with local fire-fighting groups regarding potential fire/explosion situations. • Establish contingency plans and review daily with team members. • Other:
Heat Stress	1, 2, 3, 4, 5, 6	• Provide cool break area and adequate breaks. • Provide cool noncaffeinated beverages. • Promote heat stress awareness. • ~~Use active cooling devices (e.g., cooling vests) where specified.~~ • See *Heat Stress Prevention and Treatment* (attached at the end of this plan if heat stress is a potential hazard).
Heavy Equipment Operation		• Define equipment routes, traffic patterns, and site-specific safety measures. • Ensure that operators are properly trained and equipment has been properly inspected and maintained. Verify back-up alarms. • Ensure that ground spotters are assigned and informed of proper hand signals and communication protocols. • Identify special PPE (Section 7) and monitoring (Section 8) needs.

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Hazard	Task Number	Hazard Control Measures
Heavy Equipment Operation (Cont'd)		• Ensure that field personnel do not work in close proximity to operating equipment. • Ensure that lifting capacities, load limits, etc., are not exceeded. • Other:
Heights (Scaffolding, Ladders, etc.)	~~4 (previous)~~ MZ	• Ensure compliance with applicable subparts of 29 CFR 1910. • Identify special PPE needs (e.g., lanyards, safety nets, etc.) • Other:
Noise	2	• Establish noise level standards for on-site equipment/operations. • Inform personnel of hearing protection requirements (Section 7). • Define site-specific requirements for noise monitoring (Section 8). • Other:
Overhead Obstructions	2, 6	• Wear hard hat. • Other:
Power Tools		• Ensure compliance with 29 CFR 1910 Subpart P. • Other:
Sunburn	1, 2, 3, 4, 5, 6	• Apply sunscreen. • Wear hats/caps and long sleeves. • Other:
Utility Lines	2, 6	• Identify/locate existing utilities prior to work. • Ensure that overhead, underground, and nearby utility lines are at least 25 feet away from project activities. • Contact utilities to confirm locations, as necessary. • Other: Geoprobe driller to perform.
Weather Extremes	1, 2, 3, 4, 5, 6	• Potential hazards: • Establish site-specific contingencies for severe weather situations. • Provide for frequent weather broadcasts. • Weatherize safety gear, as necessary (e.g., ensure eye wash units cannot freeze, etc.). • Identify special PPE (Section 7) needs. • Discontinue work during severe weather. • Other:
Other: Flammable iso-propyl alcohol for decon of equipment (Sleeves)	2	• No smoking or ignition source near decon area. May also use disposable sleeves.
Other: Slip, trip, and fall due to site work and terrain	1, 2, 3, 4	• Walk carefully, beware of uneven terrain, • Sit debris, etc.
Other: ~~Ergonomic topics, applications~~	~~1, 2~~ MZ	• ~~Use~~ • ~~Lifting~~
Hazard Categorization	4	• Be aware of hazards of chemicals in kit used to sample. Trained person. Fire hazard due to flammable gas cylinder for flammability test. See attached hazard evaluation.

6.2 CHEMICAL HAZARD EVALUATION AND CONTROL

6.2.1 Chemical Hazard Evaluation

Potential chemical hazards are described by task number in Table 6-1. Hazard Evaluation Sheets for major known contaminants are attached at the end of this plan.

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Table 6-1

CHEMICAL HAZARD EVALUATION

Task Number	Compound	Exposure Limits (TWA)			Dermal Hazard (Y/N)	Route(s) of Exposure	Acute Symptoms	Odor Threshold/ Description	FID/PID	
		PEL	REL	TLV					Relative Response	Ioniz. Poten. (eV)
1-4, 5,6	Crude oil	—	—	—	Y	Inh, Ing, dermal	Skin, eye irritation	acrid,	?	?
2-4, 5	#2 Fuel oil	—	—	—	Y	Inh, Ing, dermal	eye and skin irritation, nausea, vomiting, headache, dizziness	diesel fuel	?	?
1-4, 5,6	Lead, inorganic	0.05 mg/m³	0.1 mg/m³	0.15 mg/m³	N	Inh, Ing.	weak, in severe cases, anemia	N/A odorless	N/A	N/A
1-4, 5,6	gasoline	900 mg/m³	—	300 mg/m³	Y	Inh, Ing, dermal	irritation eyes, dermatitis, vision, dizziness, mucous membrane	gasoline/ fuel oil	—	—
1-4, 5,6	Kerosene	—	100 mg/m³	100 mg/m³ (skin)	Y	inh, Ing, Inh, contact	irritate eyes, skin, nausea, throat, burning, vomiting, dizziness	fuel oil	—	—
1-4, 5,6	Tetra ethyl Lead	0.075 mg/m³	0.075 mg/m³	0.1 mg/m³	Y	dermal, inh, ing, liver.	Spasticity, [illegible]	fruity, sweet, musty.	?	11.10

Note: Use an asterisk (*) to indicate known or suspected carcinogens.

6.2.2 Chemical Hazard Control

An appropriate combination of engineering/administrative controls, work practices, and PPE shall be used to reduce and maintain employee exposures to a level at or below published exposure levels (see Section 6.2.1).

Applicable Engineering/Administrative Control Measures: Safe work and sampling practices.

PPE: See Section 7.

6.3 RADIOLOGICAL HAZARD EVALUATION AND CONTROL

6.3.1 Radiological Hazard Evaluation

Potential radiological hazards are described below by task number. Hazard Evaluation Sheets for major known contaminants are attached at the end of this plan.

Not Applicable

Task Number	Radionuclide	DAC (μCi/ml)	Route(s) of Exposure	Major Radiation(s)	Energy(s) (MeV)	Half-Life

6.3.2 Radiological Hazard Control

Engineering/administrative controls and work practices shall be instituted to reduce and maintain employee exposures to a level at or below the permissible exposure/dose limits (see sections 4.2.3 and 6.3.1). Whenever engineering/administrative controls and work practices are not feasible or effective, any reasonable combination of engineering/administrative controls, work practices, and PPE shall be used to reduce and maintain employee exposures to a level at or below permissible exposure/dose limits.

Applicable Engineering/Administrative Control Measures: N/A

PPE: See Section 7.

7. LEVEL OF PROTECTION AND PERSONAL PROTECTIVE EQUIPMENT

7.1 LEVEL OF PROTECTION

The following levels of protection (LOPs) have been selected for each work task based on an evaluation of the potential or known hazards, the routes of potential hazard, and the performance specifications of the PPE. On-site monitoring results and other information obtained from on-site activities will be used to modify these LOPs and the PPE, as necessary, to ensure sufficient personnel protection. The authorized LOP and PPE shall only be changed with the approval of the regional safety coordinator or designee. Level A is not included below because Level A activities, which are performed infrequently, will require special planning and addenda to this SHASP.

Task Number	B	C	D	Modifications Allowed
1			X	
2			X	Wear PAPR when possible
3			X	"
4		X		
5		X	(X)	Dep. in conditions; outside of near contaminat area
6			X	

Note: Use "X" for initial levels of protection. Use "(X)" to indicate levels of protection that may be used as site conditions warrant.

7.2 PERSONAL PROTECTIVE EQUIPMENT

The PPE selected for each task is indicated below. E & E's PPE program complies with 29 CFR 1910.120 and 29 CFR 1910 Subpart I and is described in detail in the CHSP. Refer to 29 CFR 1910 for the minimum PPE required for each LOP.

PPE	Task Number/LOP					
	1	2	3	4	5	6
Full-face APR		(X)		X		
PAPR						
Cartridges:						
H ✓		(X)		X		
GMC-H		(X)		X		
GMA-H						
Other:						
Positive-pressure, full-face SCBA						
Spare air tanks (Grade D air)						
Positive-pressure, full-face, supplied-air system						
Cascade system (Grade D air)						
Manifold system						
5-Minute escape mask						
Safety glasses	X	X	X	X	X	X
Monogoggles						
Coveralls/clothing	X	X	X	X	X	X

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PPE	Task Number/LOP					
	1	2	3	4	5	6
Protective clothing:						
Tyvek						
Saranex				X		
Other:						
Splash apron						
Inner gloves:						
Cotton						
Nitrile			X	X	X	
Latex			X	X	X	
Other:						
Outer gloves:						
Viton						
Rubber						
Neoprene						
Nitrile			X	X	X as needed	
Other:						
Work gloves - cotton or leather		X				
Safety boots (leather) (as per ANSI Z41)	X	X	X	X	X	X
Neoprene safety boots (as per ANSI Z41) for muddy areas						
Boot covers (type:)						
Hearing protection (type: plug)		X				
Hard hat		X				
Face shield						
Other:						
Other:						

8. HEALTH AND SAFETY MONITORING

Health and safety monitoring will be conducted to ensure proper selection of engineering/administrative controls, work practices, and/or PPE so that employees are not exposed to hazardous substances at levels that exceed permissible exposure/dose limits or published exposure levels. Health and safety monitoring will be conducted using the instruments, frequency, and action levels described in Table 8-1. Health and safety monitoring instruments shall have been appropriately calibrated and/or performance-checked prior to use.

Table 8-1

HEALTH AND SAFETY MONITORING

Instrument	Task Number	Contaminant(s)	Monitoring Location	Monitoring Frequency	Action Levels[a]	
☒ ~~PID~~ (e.g., HNu IS-101) ☐ FID (e.g., OVA 128-GC)	2; 4	VOCs, SVOCs (organic vapors)	each work; ~~Auto-Boom~~ work-	as needed	**Unknown Vapors** Background to 1 ppm: Level D 1 to 5 ppm above background: Level C 5 to 500 ppm above background: Level B >500 ppm above background: Level A	**Contaminant-Specific**
Oxygen Meter/Explosimeter					**Oxygen** <19.5% or >25.0%: Evacuate area; eliminate ignition sources; reassess conditions. 19.5 to 25.0%: Continue work in accordance with action levels for other instruments.	**Explosivity** ≤10% LEL: Continue work in accordance with action levels for other instruments; monitor continuously for combustible atmospheres. >10% LEL: Evacuate area; eliminate ignition sources; reassess conditions.
Radiation Alert Monitor (Rad-mini or RAM-4)					<0.1 mR/hr: Continue work in accordance with action levels for other instruments. ≥0.1 mR/hr: Evacuate area; reassess work plan and contact radiation safety specialist.	
Mini-Ram Particulate Monitor					**General/Unknown** Evaluate health and safety measures when dust levels exceed 2.5 milligrams per cubic meter.	**Contaminant-Specific**
HCN/H_2S (Monitox)					≥4 ppm: Leave area and consult with SSO.	
Draeger Colorimetric Tubes					**Tube** **Action Level** **Action**	

Table 8-1

HEALTH AND SAFETY MONITORING

Instrument	Task Number	Contaminant(s)	Monitoring Location	Monitoring Frequency	Action Levels[a]	
Air Monitor/Sampler Type:_____ Sampling medium: _____					**Action Level**	**Action**
Personal Sampling Pump Type:_____ Sampling medium: _____					**Action Level**	**Action**
Micro R Meter					<2 mR/hr: Continue work in accordance with action levels for other instruments. 2 to 5 mR/hr: In conjunction with a radiation safety specialist, continue work and perform stay-time calculations to ensure compliance with dose limits and ALARA policy. >5 mR/hr: Evacuate area to reassess work plan and evaluate options to maintain personnel exposures ALARA and within dose limits.	
Ion Chamber					See micro R meter action levels above.	
Radiation Survey Ratemeter/Scaler with External Detector(s)					**Detector** **Action Level** **Action**	
Noise Dosimeter (Sound Level Meter)					≤85 decibels as measured using the A-weighed network (dBa): Use hearing protection if exposure will be sustained throughout work shift. >85 dBA: Use hearing protection. >120 dBA: Leave area and consult with safety personnel.	
Other:						
Other:						

[a] Unless stated otherwise, airborne contaminant concentrations are measured as a time-weighted average in the worker's breathing zone. Acceptable concentrations for known airborne contaminants will be determined based on OSHA/NIOSH/ACGIH and/or NRC exposure limits.

9. DECONTAMINATION PROCEDURES

All equipment, materials, and personnel will be evaluated for contamination upon leaving the exclusion area. Equipment and materials will be decontaminated and/or disposed and personnel will be decontaminated, as necessary! Decontamination will be performed in the contamination reduction area or any designated area such that the exposure of uncontaminated employees, equipment, and materials will be minimized. Specific procedures are described below.

Equipment/Material Decontamination Procedures (specified by work plan): See SOP for sampling equipment decontamination. See ~~decontamination SOP, and~~ QASP for details

Ventilation: all work to be conducted outdoors

Personnel Decontamination Procedures: Dry decon: disposable PPE will double bagged, sealed, and disposed of per OSC instructions.

PPE Requirements for Personnel Performing Decontamination: Each person doing own decontamination; removing PPE, wash respirator w/ sanitizer.

Personnel Decontamination in General: Following appropriate decontamination procedures, all field personnell will wash their hands and face w/ soap and potable water. Personnell should shower after each work shift.

Disposition of Disposable PPE: as instructed by OSC.

Disposition of Decontamination Wastes (e.g., dry wastes, decontamination fluids, etc.): Geoprobe cuttings will be stored in plastic for on-site bioremediation, including hazcat. samples.

10. EMERGENCY RESPONSE

This section contains additional information pertaining to on-site emergency response and does not duplicate pertinent emergency response information contained in earlier sections of this plan (e.g., site layout, monitoring equipment, etc.). Emergency response procedures will be rehearsed regularly, as applicable, during project activities.

10.1 EMERGENCY RESPONSIBILITIES

All Personnel: All personnel shall be alert to the possibility of an on-site emergency; report potential or actual emergency situations to the team leader and SSO; and notify appropriate emergency resources, as necessary.

Team Leader: The team leader will determine the emergency actions to be performed by E & E personnel and will direct these actions. The team leader also will ensure that applicable incidents are reported to appropriate E & E and client project personnel and government agencies.

SSO: _____

Other: _____

10.2 LOCAL AND SITE RESOURCES (including phone numbers)

Ambulance: 911

Hospital: 911, (918) 367-2215

Directions to Hospital (map attached at the end of this plan): From site: west on unnamed road to 66 (48) south. 48 south is Main st. Hospital is on the ~~left~~ by right at 7th. ~~1st~~ Braston Memorial Hospital is located on the intersection of Spruce and 7th.

Poison Control: 911

Police Department: 911

Fire Department: 911

Client Contact: EPA-OSC (214) 665-6489

Site Contact: [redacted] (b) (6) Residents on the site.

On-Site Telephone Number: _____

Cellular Telephone Number: _____

Radios Available: _____

Other: Police Department non emergency (918) 367-2251 Creek County Sheriff - ~~(918) 227~~ (SM) (SM) 224-4964/6024 1-800-522-0206

10.3 E & E EMERGENCY CONTACTS

E & E Emergency Response Center (24 Hours):	716/684-8940
Corporate Health and Safety Director, Dr. Paul Jonmaire:	716/684-8060 (office) 716/655-1260 (home)
Assistant Corporate Safety Officer, Tom Siener:	716/684-8060 (office) 716/662-4740 (home)
Regional Safety Officer: Maxine LaPierre (beeper # 1-800-946-4646) PIN #1172735	214/220-0318 (office) 214/987-4410 (home)
Other: Chris Quina, STARTL (beeper # 1-800-946-4646) PIN # 1822497	972/530-7024 (home)
Curtis Franklin, ASTARTL (beeper # 1-800-946-4646) PIN # 1091070	817/355-1825 (home)
Frances Verhalen, Corporate Contact	972/563-6643 (home)

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10.4 OTHER EMERGENCY RESPONSE PROCEDURES

On-Site Evacuation Signal/Alarm (must be audible and perceptible above ambient noise and light levels): Car horn

On-Site Assembly Area: North west corner of site near pumping station off refinery road.

Emergency Egress Route to Get Off Site: Two gates. Use refinery road to get off site

Off-Site Assembly Area: To be determined by OSC before we go to site.

Preferred Means of Reporting Emergencies: On-site: verbal: off-site: telephone

Site Security and Control: In an emergency situation, personnel will attempt to secure the affected area and control site access.

Spill Control: Appropriate absorbent will be kept on site for use as a sorbent material for liquid spills.

Emergency Decontamination Procedures: Place equipment on plastic sheeting in the decontamination area as is needed personnel decontamination is necessary.

PPE: Personnel will don appropriate PPE when responding to an emergency situation. The SSO and Section 7 of this plan will provide guidance regarding appropriate PPE.

Emergency Equipment: Appropriate emergency equipment is listed on pages 19-22. Adequate supplies of this equipment shall be maintained in the support area or other approved work location.

Incident Reporting Procedures: Injuries, exposures: Follow usual E & E procedures. Notify RSO or H/S Coordinator in office. Call Buffalo (Marv Wdowka) in Personnel during business hours immediately; also contact H/S there. Non-business hours: Call Buffalo's 24-hour telephone number immediately. Both procedures will notify Buffalo H/S. Complete Form IR as soon as possible. Vehicle incidents: follow procedures attached to safety plan.

EQUIPMENT CHECKLIST
REGION 6

PROTECTIVE GEAR

Level A	No.
SCBA	
SPARE AIR TANKS	
ENCAPSULATING SUIT (Type _____)	
SURGICAL GLOVES	
SAFETY BOOTS (__NEOPRENE, __LEATHER)	
BOOTIES (Type _____)	
GLOVES (Type _____)	
OUTER WORK GLOVES	
HARD HAT	
CASCADE SYSTEM	
5-MINUTE ESCAPE MASK	
COOLING VEST	
Level C	
ULTRA-TWIN RESPIRATOR	✓
POWER AIR PURIFYING RESPIRATOR	
CARTRIDGES (Type GMC-H)	✓
5-MINUTE ESCAPE MASK	
PROTECTIVE COVERALL (Type Saranex)	✓
RAIN SUIT	
BUTYL APRON	
SURGICAL GLOVES (Type latex/nitrile)	✓
OUTER GLOVES (Type Cotton)	✓
OUTER WORK GLOVES (Type Leather/cotton)	✓
SAFETY BOOTS (__NEOPRENE; ✓LEATHER)	✓
HARD HAT (__FACE SHIELD; __LINER)	
BOOTIES (Type _____)	
COTTON CLOTHING	
COOLING VEST	
LIFE JACKET/VEST	
INSULATED: (__COVERALLS; __BOOTS)	
HEARING PROTECTION	✓

Level B	No.
SCBA	
SPARE AIR TANKS	
PROTECTIVE COVERALL (Type _____)	
BUTYL APRON	
SURGICAL GLOVES (Type _____)	
OUTER GLOVES (Type _____)	
OUTER WORK GLOVES (Type _____)	
SAFETY BOOTS (__NEOPRENE; __LEATHER)	
BOOTIES (Type _____)	
HARD HAT (__FACE SHIELD; __LINER)	
CASCADE SYSTEM; __MANIFOLD SYSTEM	
SCBA/AIR-LINE SYSTEM	
HIP AIR SYSTEM	
COTTON CLOTHING	
COOLING VEST	
HEARING PROTECTION	
Level D	
ULTRA-TWIN RESPIRATOR (Available)	✓
CARTRIDGES (Type GMC-H)	✓
5-MINUTE ESCAPE MASK (Available)	
PROTECTIVE COVERALL (Type _____)	
RAIN SUIT	✓
SAFETY BOOTS (__NEOPRENE; ✓LEATHER)	✓
BOOTIES (Type _____)	
WORK GLOVES (Type cotton, leather)	✓
SURGICAL GLOVES (Type latex, nitrile)	✓
HARD HAT (__FACE SHIELD; __LINER)	✓
SAFETY GLASSES	✓
COTTON CLOTHING	✓
JACKET (✓LIGHT; __HEAVY) as needed	✓
LIFE JACKET/VEST	
INSULATED; (__COVERALLS; __BOOTS)	
HEARING PROTECTION (available) for Geoprobe work	✓

recycled paper

ecology and environment

INSTRUMENTATION	No.	INSTRUMENTATION (Continued)	No.
OVA WITH CALIBRATION GAS		CHARGERS FOR EQUIPMENT	✓
HNu (Probe PID) WITH CAL. GAS	✓	EQUIPMENT LOG BOOKS	✓
TVA		GPS unit	✓
PASSPORT		Magnetometer	✓
O_2/EXPLOSIMETER WITH CAL. KIT			
MONITOX: __PHOSGENE: __HCN: __H_2S			
DRAEGER PUMP, TUBES _____			
ACCURO PUMP, TUBES _____			
RAM-1 REAL TIME AEROSOL MONITOR			
MINIRAM: __DATALOGGER		**RADIATION EQUIPMENT**	
AIM		TLD BADGE	✓
XRF		RADIATION ALERT MONITOR 4 (RAM-4)	
HAZARD CATEGORIZATION KIT, WITH GAS		POCKET DOSIMETERS WITH CHARGER	
PHOTOVAC		DOCUMENTATION FORMS	
MIRAN		PORTABLE RATEMETER:	
INFRARED PYROMETER		Bicron Surveyor M with Probes	
GROUND PENETRATING RADAR		Victoreen Model Thyac III	
MAGNETOMETER	✓	MICRO R METER:	
MAGNETIC CABLE LOCATOR		LUDLUM Model 19	
GROUND CONDUCTIVITY METER		SCALER/RATEMETER:	
TERRAIN RESISTIVITY METER WITH ACC's		NaI PROBE	
__EM-31 __EM-34		ZnS PROBE	
SEISMOGRAPH		GM PANCAKE PROBE	
WEATHER STATION: __DATALOGGER		GM SIDE WINDOW PROBE	
NOISE MONITOR		ION CHAMBER	
HEAT STRESS MONITOR		Victoreen 450P	
WIND GAUGE, HAND HELD			
pH: __PAPER: __PEN: ✓METER	✓		
CONDUCTIVITY PROBE /PEN			
HORIBA U-10 WATER QUALITY TESTER		**FIRST AID EQUIPMENT**	✓
DISSOLVED OXYGEN METER	✓	FIRST AID KIT	✓
RELATIVE HUMIDITY: __PROBE: __PEN		PORTABLE EYE WASH	
H_2S TEST STRIPS		BLOOD PRESSURE MONITOR	
SPILFYTER TEST STRIPS		PORTABLE SHOWER	
ANEMOMETER		FIRE EXTINGUISHER	✓
SLING PSYCHROMETER		FIRE BLANKET	
INTERSCAN __SO_2 __H_2S			
LIGHT METER			
CHLOR-N-OIL KIT			
CHLOR-N-SOIL KIT			
BATTERIES FOR EQUIPMENT	✓		

001330

SAMPLING EQUIPMENT	No.	SAMPLING EQUIPMENT (Continued)	No.
GLASS BOTTLES (Sizes _____)		PERSONAL AIR SAMPLING PUMPS WITH CALIBRATOR, CHARGERS, SUPPLIES	
GLASS BOTTLES, WIDE MOUTH (_____)			
VOA BOTTLES (40 ml)	54	BIOS AIR-FLOW CALIBRATOR	
POLYETHYLENE BOTTLES (Size _____)		GENERATOR(S), PORTABLE	
SAMPLE PRESERVATIVES: ___ HNO_3, ___ NaOH, ✓ H_2SO_4 ___ HCL	1 L	HIGH-VOLUME AIR SAMPLERS WITH CALIBRATORS: ___ PM-10; ___ PS-1	
HAND BAILERS	20	HIGH-FLOW AIR SAMPLER	
STRING AND/OR ROPE	✓	ANALYTICAL BALANCE	
WATER LEVEL INDICATOR	✓	Glass jars, 8 oz	55
WELL PUMP			
CAT HEAD/MOTOR/PULLEY			
SAMPLING PLATFORM (BOAT)			
KEMMERER WATER SAMPLER			
ECKMAN DREDGE			
TROWELS AND/OR SPOONS		**DECON EQUIPMENT**	
SHOVEL AND/OR POST HOLE DIGGER		WASH TUBS	✓
MIXING PLATES AND/OR BOWLS		BUCKETS	
SIEVES		SCRUB BRUSHES	✓
HAND AUGER (Size _____)		PRESSURIZED SPRAYER	
SLEEVES/CAPS/EXTENSIONS		DETERGENT (Type Alconox)	✓
SPLIT SPOON SAMPLER		SOLVENT (Type _____)	
GEOPROBE	✓	DISTILLED WATER	
MINUTEMAN DRILL WITH ACCESSORIES		DEIONIZED WATER	
SOIL GAS TILE PROBE WITH ACCESSORIES		DISPOSABLE FACEPIECE SANITIZER WIPES	
SLAM BAR (Size _____)		FACE MASK SANITIZER POWDER	
EXTENSIONS/SLEEVES/CAPS		WIRE BRUSH	✓
JMC SOIL PROBE		SPRAY BOTTLE	✓
KNIVES AND/OR SCISSORS		BANNER/BARRIER TAPE	
BANNER TAPE		PLASTIC SHEETING	✓
PLASTIC SHEETING	✓	TARPS AND POLES	
SURVEYING: ___FLAGS; ___TAPE		TRASH BAGS	✓
AUTO LEVEL: ___TRIPOD		TRASH CANS	
FIELD TRANSIT: ___TRIPOD		MASKING TAPE	
BRUNTON COMPASS: ___ROD, 25 FT.		DUCT TAPE	
CHAIN OR TAPE (200 FT.) AND/OR ROLATAPE		PAPER TOWELS	✓
PATHFINDER GPS		FOLDING CHAIRS	✓
TRIMBLE GPS		STEP LADDERS	
NON-SPARKING TOOLS		5-GALLON WATER JUGS	
THIEVING RODS WITH BULBS		TABLES	1
COLIWASA SAMPLERS WITH TUBES		STEAM CLEANER WITH GENERATOR	✓
SLUDGE JUDGE			
SPRAY PAINT/MARKER			

VAN EQUIPMENT		MISCELLANEOUS	No.
TOOL KIT		35-mm CAMERA, FILM, BATTERIES	✓
HYDRAULIC JACK		VIDEO CAMERA, TAPE, BATTERIES	
LUG WRENCH		LOG BOOK (✓ LARGE, __SMALL)	
TOW CHAIN		LOG BOOK STAMPS	✓
VAN CHECK OUT		CHEMICAL REFERENCES	
Gas		MSDS'S REQUIRED	
Oil		QASP IF REQUIRED	✓
Antifreeze		BINOCULARS	
Battery		MEGAPHONE: __AIR HORN; __BULL HORN	
Windshield Wash		INTRINSICALLY SAFE FLASHLIGHTS	
Tire Pressure		WITH BATTERIES	
Lights		WEATHER RADIO	
WELLS CARGO TRAILER		2-WAY RADIOS WITH CHARGERS	
		CELLULAR TELEPHONE WITH CHARGER	✓
		SATELLITE TELEPHONE	
SHIPPING EQUIPMENT		COMPUTER WITH PRINTER, BATTERIES	
COOLERS	6	COMPUTER DISKS, PAPER, CORDS	
PAINT CANS WITH LIDS, 7 CLIPS EACH SIZE _____		MODEM: __TELECOUPLER	
		EXTENSION CORDS: __OUTLET STRIP	
VERMICULITE	✓	REGULAR HAND TOOLS	
BUBBLE WRAP	✓	BOLT CUTTERS: __KEYS, __ PADLOCKS	
FEDERAL EXPRESS AIRBILLS	✓	MAPS	✓
ADDRESS LABELS		COMPASS	
DOT LABELS: "DANGER"		TAPE MEASURE	✓
"THIS SIDE UP"	✓	PERMANENT MARKERS; PENS, PENCILS	
"INSIDE CONTAINER COMPLIES..."		SCISSORS: 4 KNIVES	
OTHER HAZARD GROUP(S)		WATER COOLER: __STRESS DRINKS	
BAGGIES; GARBAGE BAGS	✓	APR FOG PRUF, NOSECUP (Cold Weather)	
CUSTODY SEALS	✓	SNAKE LEGGINGS	
CHAIN-OF-CUSTODY FORMS	✓	WADERS (__HIP, __CHEST)	
SAMPLE TAGS	✓	INSECT REPELLENT	✓
SAMPLE LABELS	✓	SUNSCREEN	
CLP FORMS/STICKERS		HEARING PROTECTION	✓
CLEAR PACKING TAPE	✓	FALL PROTECTION SAFETY BELT W/LANYARD	
STRAPPING TAPE		SAFETY PLAN	✓
DUCT TAPE	✓		
PERMANENT MARKERS	✓		
SHARPIE PENS	✓		
BALLPOINT PENS	✓		

HEAT STRESS PREVENTION AND TREATMENT

Elevated temperatures are potentially hazardous, especially when work is conducted without appropriate precautions. The following sections describe heat stress prevention and the recognition and treatment of heat emergencies.

Effects of Heat

A predictable amount of heat is generated as a result of normal oxidation processes within the body. If heat is liberated rapidly, the body cools to a point at which the production of heat is accelerated, and the excess heat brings the body temperature back to normal.

Interference with the elimination of heat leads to its accumulation and to the elevation of body temperature. This condition produces a vicious cycle in which certain body processes accelerate and generate additional heat. Afterward, the body must eliminate not only the heat that is normally generated but also the additional quantities of heat.

Most body heat is brought to the surface by the bloodstream and escapes to cooler surroundings by conduction and radiation. If moving air or a breeze strikes the body, additional heat is lost by convection. When the temperature of the surrounding air becomes equal to or rises above the body temperature, all the heat must be lost by vaporization of the moisture or sweat from skin surfaces. As the air becomes more humid (contains more moisture), vaporization from the skin decreases. Weather conditions including high temperatures (90 to 100 degrees F), high humidity, and little or no breeze cause the retention of body heat. Such conditions or a succession of such days (a heat wave) increase the chances of a medical emergency due to heat.

Preventing Emergencies Due to Heat

When working in situations where the ambient temperatures and humidity are high, and especially in situations where protection levels A, B, or C are required, the site safety officer should:

- Ensure that all employees drink plenty of fluids (Gatorade or its equivalent);
- Ensure that frequent breaks are scheduled so overheating does not occur; and
- Revise work schedules, when necessary, to take advantage of the cooler parts of the day (i.e., 5:00 a.m. to 11:00 a.m. and 6:00 p.m. to nightfall).

When protective clothing is required, the suggested guidelines correlating ambient temperature and maximum wearing time per excursion are:

Ambient Temperature	Maximum Wearing Time per Excursion
Above 90 degrees F	15 minutes
85 to 90 degrees F	30 minutes
80 to 85 degrees F	60 minutes
70 to 80 degrees F	90 minutes

60 to 70 degrees F	120 minutes
50 to 60 degrees F	180 minutes

One method of measuring the effectiveness of an employee's rest-recovery regime is by monitoring the heart rate. The "Brouha guideline" is one such method and is performed as follows:

- Count the pulse rate for the **last** 30 seconds of the first minute of a 3-minute period, the **last** 30 seconds of the second minute, and the **last** 30 seconds of the third minute; and
- Double each result to yield beats per minute.

If the recovery pulse rate during the last 30 seconds of the first minute is 110 beats/minute or less, and the deceleration between the first, second, and third minutes is **at least** 10 beats/minute, then the work-recovery regime is acceptable. If the employee's rate is above the rate specified, a longer rest period will be required, accompanied by an increased intake of fluids.

Heat Emergencies

Heat Cramps. Heat cramps usually affect people who work in hot environments and perspire a great deal. Loss of salt from the body causes very painful cramps in leg and abdominal muscles. Heat cramps may also result from drinking iced water or other drinks either too quickly or in too large a quantity. The symptoms of heat cramps are:

- Painful muscle cramps in legs and abdomen;
- Faintness; and
- Profuse perspiration.

To provide emergency care for heat cramps, move the patient to a cool place. Give him or her sips of liquids such as Gatorade or its equivalent. Apply manual pressure to the cramped muscle. Move the patient to a hospital if there is any indication of a more serious problem.

Heat Exhaustion. Heat exhaustion also may occur in individuals working in hot environments and may be associated with heat cramps. Heat exhaustion is caused by the pooling of blood in the vessels of the skin. The heat is transported from the interior of the body to the surface by the blood. The skin vessels become dilated and a large amount of blood is pooled in the skin. This condition, plus the blood that is pooled in the lower extremities when in an upright position, may lead to an inadequate return of blood to the heart and eventual physical collapse. The symptoms of heat exhaustion are:

- Weak pulse;
- Rapid and usually shallow breathing;
- Generalized weakness;
- Pale, clammy skin;

- Profuse perspiration;
- Dizziness/faintness; and
- Unconsciousness.

To provide emergency care for heat exhaustion, move the patient to a cool place and remove as much clothing as possible. Have the patient drink cool water, Gatorade, or its equivalent. If possible, fan the patient continually to remove heat by convection, but do not allow chilling or overcooling. Treat the patient for shock and move him or her to a medical facility if there is any indication of a more serious problem.

Heat Stroke. Heat stroke is a profound disturbance of the heat-regulating mechanism and is associated with high fever and collapse. It is a serious threat to life and carries a 20% mortality rate. Sometimes this condition results in convulsions, unconsciousness, and even death. Direct exposure to sun, poor air circulation, poor physical condition, and advanced age (over 40) increase the chance of heat stroke. Alcoholics are extremely susceptible. The symptoms of heat stroke are:

- Sudden onset;
- Dry, hot, and flushed skin;
- Dilated pupils;
- Early loss of consciousness;
- Full and fast pulse;
- Deep breathing at first, followed by shallow or faint breathing;
- Muscle twitching, growing into convulsions; and
- Body temperature reaching 105 to 106 degrees F or higher.

When providing emergency care for heat stroke, remember that it is a life-threatening emergency. Transportation to a medical facility should not be delayed. Move the patient to a cool environment, if possible, and remove as much clothing as possible. Ensure an open airway. Reduce body temperature promptly by dousing the body with water or, preferably, by wrapping the patient in a wet sheet. If cold packs are available, place them under the arms, around the neck, at the ankles, or any place where blood vessels that lie close to the skin can be cooled. Protect the patient from injury during convulsions.

COLD STRESS PREVENTION AND TREATMENT

Cold temperatures are potentially hazardous, especially when work is conducted without appropriate precautions. The following sections describe cold stress prevention and the recognition and treatment of cold stress emergencies.

Preventing Emergencies Due to Cold Stress

When working in situations where the ambient temperature is low, especially if low temperatures are accompanied by windy conditions, personnel should use the following cold-stress prevention measures:

- Wear warm, dry, loose-fitting clothing that is preferably worn in layers. Outer clothing should be waterproof and windproof. Inner clothing should be capable of retaining warmth even when it is wet (e.g., wool or polypropylene) or have wicking capabilities (to draw moisture and perspiration away from the skin).
- Wear lined and insulated footwear and warm gloves or mittens.
- Alternately remove and don clothing layers as necessary to regulate body temperature and reduce excess perspiration.
- Drink warm fluids as often as desired.
- Take frequent breaks to provide for cold stress monitoring.

Cold Stress Emergencies

Hypothermia. Exposure to cold can cause the body's internal temperature to drop to a dangerously low level. Hypothermia occurs when a person's body loses heat faster than it can be produced. The body's normal deep-body temperature is approximately 98.6 degrees Fahrenheit. If body temperature drops to 95 degrees Fahrenheit, uncontrollable shivering may occur. If cooling continues, these other symptoms may occur:

- Vague, slow, slurred speech;
- Forgetfulness, memory lapses;
- Inability to use hands;
- Frequent stumbling;
- Drowsiness;
- Exhaustion, collapse;
- Unconsciousness; and
- Death.

Hypothermia impairs the judgment of the victim. Hypothermia is possible even in temperatures above freezing and can be prevented by remaining warm and dry and avoiding overexposure to the cold.

If a person shows symptoms of hypothermia, perform the following:

- Remove the victim from exposure to wet and cold weather.
- Remove wet clothing.
- If the victim is only mildly affected, provide warm drinks and dry clothing.
- If the victim is more seriously affected (clumsy, confused, unable to shiver), begin safe-warming procedures such as hugging, wrapping in dry blankets, and the use of warm objects such as hot water bottles or heat packs, and arrange for evacuation. Do not give the victim warm drinks until he or she exhibits a clear level of consciousness and appears to be warming up.

Frostbite. Frostbite occurs when body tissue freezes. Severe frostbite can lead to reduced circulation and the possible need for amputation. To prevent frostbite, maintain good circulation and keep extremities warm and dry. In extreme cold, it is important to prevent heat loss from as many areas of the body as possible. Exposed limbs and the head are major areas of heat loss.

Tall, thin people; those in poor physical condition; people with chronic diseases; heavy smokers; children; the elderly; and those who have been drinking alcohol are more susceptible to frostbite than other people due to poor circulation, poor production of body heat, or both.

There may be no pain or numbness experienced with gradual freezing of body tissues. While in the cold, it is important to test extremities for sensation and ensure that clothing is loose-fitting and warm. Exposed parts of the body should be inspected routinely. Just before freezing, skin becomes bright red. As freezing continues, small white patches will appear and the skin will become less elastic, often remaining pitted after it is touched or squeezed.

Serious freezing is most common in the feet because people are less aware of them, circulation and sensation are poorer, and warm footwear is difficult to obtain. Hands are usually the next to freeze. Exposed parts of the head will freeze less rapidly because they are conditioned to exposure and have a better blood supply.

In very cold weather, avoid touching cold metal with bare body parts. In the event that this happens, release the skin gently using heat, warm water, or urine. Avoid handling gasoline, kerosene, or similar liquids which, when handled in cold weather, can cause immediate frostbite.

If a person shows symptoms of frostbite, consult a medical professional, if possible, and perform the following:

- Initiate rewarming only if subsequent refreezing is not a possibility (thawing and refreezing should always be avoided because this is very injurious to tissue). Rewarm body parts in water that is approximately 100 to 105

degrees Fahrenheit. Do not try to thaw the body parts using cold water, snow, or intense heat from fires or stoves. The whole body may be immersed in warm water if necessary.

- If a large portion of an extremity is frozen when rewarming is initiated, the deep body temperature may drop as cooled blood begins to circulate throughout the body. Provide warm liquids to alleviate this situation.

- Move the afflicted part gently and voluntarily during rewarming.

- Use pain medication if it is available. Rewarming can be acutely painful. After thawing is completed, a deep pain may persist for several days, depending on the severity of the frostbite. Pain may be a good sign as it indicates that nerve function is present.

- A dull purple color, swelling, or blisters indicate serious injury and the need for medical attention. Consult a medical professional.

VEHICLE ACCIDENTS, PROPERTY LOSS, THEFT, ETC.

When an accident does occur, it is very important to notify HQ and Regional Office as soon as possible! We have designed a form that covers all the required information for the company and our insurance carrier (see attached). The importance of timely notification of detailed information to HQ cannot be stressed enough.

Call/fax the form to HQ as soon as possible with accident information. Include how and when we can reach you with further instructions or questions.

Here are some pertinent steps that should be followed:

INJURIES
-Notify E & E Personnel Department of Emergency Response Center

RENTAL CAR
- Call police if accident involves another vehicle or injuries
- Exchange license and registration information
- Call car rental agency and inform them of the accident. Give them HQ address, phone number and Administrative Services Department (716/684-8060, Ext. 2802) for future contact
- If car is not drivable, inform rental agency to provide towing
- Complete rental agency's accident report form and send copy to HQ along with copy of rental agreement (both sides).

CORPORATE VEHICLE
- Call police if accident involves another vehicle or injuries
- Exchange license and registration information
- Notify Headquarters or Region to receive instructions
- Complete E & E's "Notice of Loss" report and sent to Headquarters/Region
- If appropriate, send at least three estimates and P.R., etc. to Headquarters/Region

GOVERNMENT EQUIPMENT
The local police need to be summoned regardless of the extent of damage.

All capital equipment items that are missing, stolen, or damaged need to be reported to the ZPMO so the appropriate documentation (see attached Report of Theft/Loss, etc.) and reporting to EPA can be conducted. Timely reporting will also facilitate replacement or repair to the item.

Attached to this form should be any police reports, photographs, estimates for replacement or repair and logbook entries related to the condition of the equipment. If appropriate, include PRs and 7-point justification documents for quick replacement. Equipment that is missing, stolen or damaged should be reported to the ZPMO within 5 working days of the incident.

PERSONAL VEHICLE
Personal vehicles used for work are not insured by the company. Though the company pays for mileage, coverage for damage to your car, personal injury or other involved property is your own responsibility. Moving violations and traffic tickets received while on the job are entirely the responsibility of the employee.

**Remember - if you are involved in an accident, give only the facts, do not admit fault.

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COLOGY AND ENVIRONMENT, IN
368 Pleasantview Drive
Lancaster, NY 14086
(716)684-8060/(716)684-0844

NOTICE OF LOSS REPORT
Call/Fax to HQ ASAP

FX _____
Claim Number _____

TYPE OF LOSS
☐ Automobile ☐ Other Liability ☐ Fire ☐ Theft

OWNERSHIP OF VEHICLE
☐ Rental ☐ Government ☐ E & E

Date and Time of Loss: _____

Police or Fire Department to whom reported: _____

Location of Accident or Loss: _____

Road Conditions: _____

Description: _____

_____

_____

Vehicle Information: _____
(Year, Make, Model, License Plate #, VIN #, Rental Agreement #)

Driver Information: _____
(Name, Address, License #, Date of Birth)

_____

Other Vehicle and Driver Information: _____
(Year, Make, Model, License Plate #, Name, Address, License #, Phone, Alternate Phone #)

_____

Damage to your vehicle: _____

_____

Damage to other vehicle: _____

_____

Other vehicle or property insured? _____ If yes, Name of Insurance Company, Address and Policy Number: _____

_____

Injured: _____
(Name, Address, Age, Extent of Injuries, Hospital)

_____

Witnesses: _____
(Name, Address, Phone Numbers)

Additional Information or Remarks: _____

_____

*Please attach the following information: Police Report, Photographs, Copy of Rental Agreement (both sides), and Rental Accident Report. If applicable, send Estimates, Repair Bills, PR, etc. as soon as possible.

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TAT - Zone II

REPORT OF THEFT/LOSS/DAMAGE OF GOVERNMENT-OWNED PROPERTY

Instructions: This report is to be completed to the fullest extent possible, as soon as possible. In the event of positive discovery of theft or loss, the appropriate Regional and Zone Program Management Office program and equipment managers must be notified, immediately. The ZPMO representative will then notify the EPA-HQ Program Contract Officer and Property Administrator.

EPA Program: _____ EPA Region: _____

1. Event currently being reported (circle one):

   (a) THEFT ... Notify ZPMO by telephone, immediately, and follow up with police report and employee statement describing related details, to include summary of corrective action taken to prevent future thefts.

   (b) LOSS.... Provide ZPMO with employee statement describing related details and attempts made to locate lost items(s). This type of report should be made after exhausting hope of locating item(s).

   (c) DAMAGE .. In the event of damage beyond economical repair, provide ZPMO with statement describing how item(s) became damaged.

2. Inventory information for item(s) now being reported:

   (a) Item Description: (1) _____
   (2) _____
   (3) _____

   (b) Serial Number: (1) _____
   (2) _____
   (3) _____

   (c) EPA Decal Number: (1) _____
   (2) _____
   (3) _____

3. Details (as appropriate):

   (a) Status/location of item(s) at time of event: _____

   _____

   (b) Date/time of event: _____

   (c) Person in charge of item(s), if signed out: _____

   (d) Other individuals on job (for signed-out item(s): _____

   _____

   (e) Individual who discovered event: _____

(f) Date/time of discovery of event: _____

(g) Date/time/location of last sighting of item(s): _____

(h) Person last sighting item(s): _____

(i) Other details: _____

_____

_____

_____

(j) Actions taken to locate item(s): _____

_____

(k) Authorities notified/reports filed: _____

_____

(l) Measures taken to prevent repeat of event: _____

_____

(m) Estimated cost of repair, for damaged items: _____

4. Name of individual filing report: _____

Signature/Date: _____

5. Name of regional equipment coordinator: _____

Attachments: police report _____
log book entry _____
estimate for replacement/repair _____
other (specify)

ZPMO use:

1. Report filed with EPA-HQ:

(a) Date: _____
(b) To attention of: _____
(c) Filed by/signature: _____
(attach copy of report)

2. Other follow up action taken: _____

_____

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SITE-SPECIFIC HEALTH AND SAFETY PLAN ACCEPTANCE

Project: ~~E5610~~ Wilcox Refinery

Project No.: E5610.3 | TDD/PAN No.: 05760ISFXX

Project Location: Bristow, OK

Project Manager: TOM BEER | Project Director: Ben Barnhart

The undersigned acknowledge that they have read and understood and agree to abide by the health and safety plan.

Name (Printed)	Name (Signature)	Date
Sharon Moore	Sharon E Moore	4/22/98
Tom Beer	T. Beer	4/22/98
PAUL JAMES		4/23/98
Carol Koch		4-24-98
Courtney Campa		4-1-98
CHRIS SANSONE		7/31/98
G.S. Bumgarner Jr		7/31/98
Ben Marich		8/3/98
PAUL PERCWICZ		8/3/98
Loren Williams		8/3/98
6		

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DAILY SAFETY MEETING RECORD

GENERAL INFORMATION

Project: Wilcox Refinery Oil Spill Response

Project No: KJ6103 0526C1SFXX | TDD/PAN No.: 68-W6-0013

Project Location: Bristow, OK

Date: Time: Weather:

Specific Location:

Planned Activities:

SAFETY TOPICS PRESENTED

Chemical Hazards Update: Petroleum hydrocarbons, metals

Physical Hazards Update: Slips, trips, falls, chiggers, poison oak/ivy, heat stress

Radiation Hazards Update: Not detected previously.

Review of Previous Monitoring Results: Generally low level HNu hits, non-detects in breathing zone

Protective Clothing/Equipment Modifications: Level D PPE, hard hat around geoprobe, hearing protection for JMC and geoprobe,

Special Equipment/Procedures:

Drilling Safety Issues (including testing the operation of drill rig emergency stop switches): Review Geoprobe switches daily.

Emergency Procedures: Bristow Memorial Hospital at 7th and Spruce St in Bristow (918)367-2215
West on access road, Left (south) at T-junction with Main St. (Hwy 66), Right on 7th Street, Hospital due west 6 blocks.

Additional Topics/Observations:

Team Members' Comments/Suggestions:

DAILY SAFETY MEETING RECORD

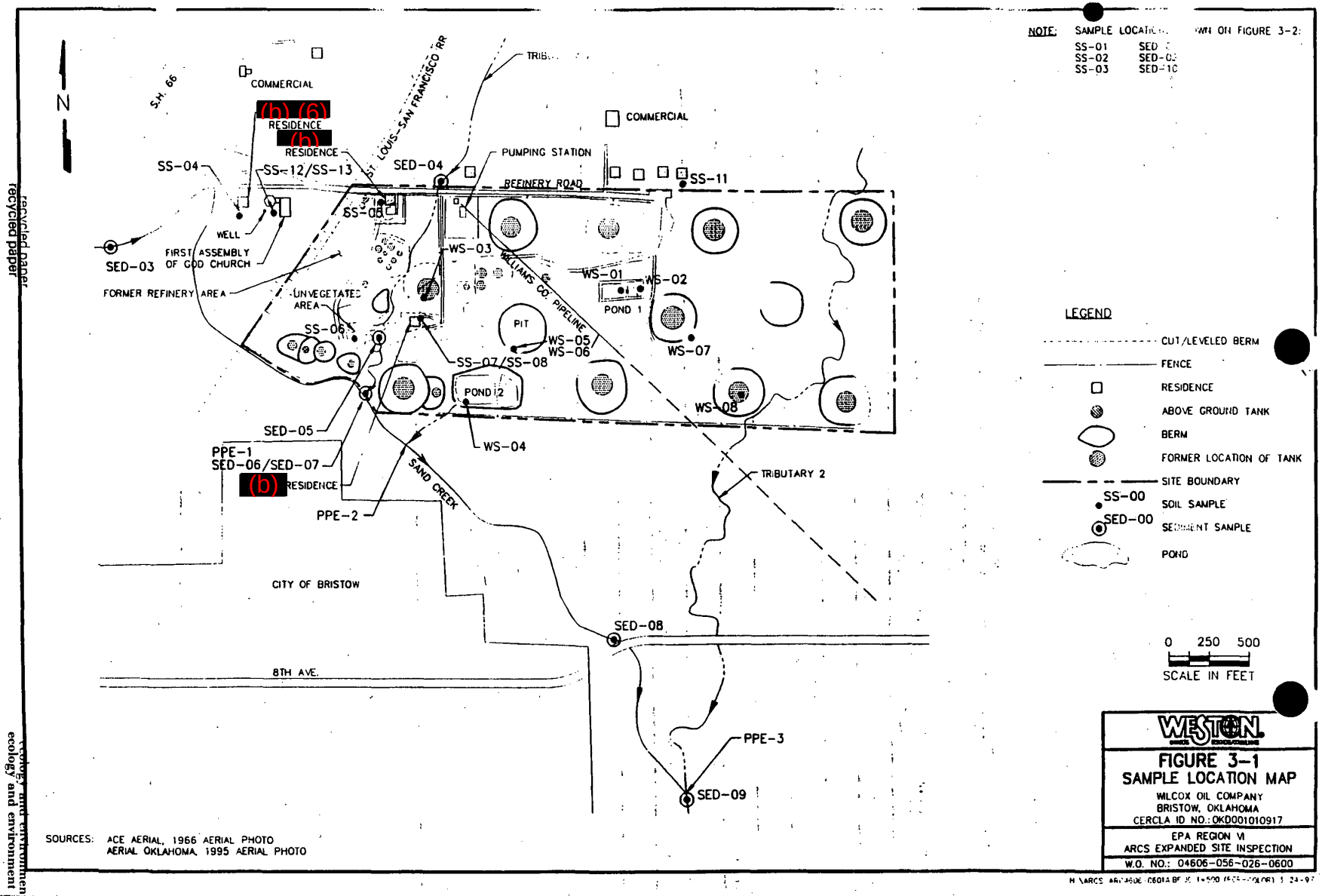
INITIAL PROJECT SAFETY CHECKLIST

1. Emergency information reviewed? √ and made familiar to all team members? √
2. Route to nearest hospital driven? ___ and its location known to all team members? √
3. Health and safety plan readily available and its location known to all team members? √
4. E & E Drilling SOP on site? ___ and available for team member review? ___

ATTENDEES

Meeting shall be attended by all personnel who will be working within the exclusion area. Daily informal update meetings will be held prior to work and when site tasks and/or conditions change.

Name (Printed)	Name (Signature)	Date	Representing (Company/Agency)
T. Beer			E & E
B. Martich			"
C. Sansone			"
G. Bumgarner			"
L. Williams			"
P. Perwicz			"
			√
Meeting Conducted By: T. Beer			



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DRAFT DRAFT

HAZARDOUS CATEGORIZATION KIT
SAFETY ATTACHMENT

1. Introduction

Hazardous categorization (HAC) procedures are used to determine basic chemical and physical parameters of unknown compounds. These parameters include: pH, flammability, reactivity, incompatability, solubility, and chlorine ion presence.

During the procedures, small aliquots of material are tested using color indicating strips, limited quantities of liquid reagents, and a flame provided by a propane torch. HAC is designed to test for most serious hazards first to reduce potential dangers of the procedure.

Fire hazards emanating from the open propane torch represent the most serious hazard of HAC. Other physical and chemical hazards are presented in Sections 3 and 4.

2. HAC Safety Guidelines

a. General
- HAC will be performed by trained personnel
- area surrounding work station will be cleared of fire hazards including: brush, wood, rags, etc
- area beneath work station will be lined with visquene
- sample jars will be closed after removing each aliquot to reduce vapor levels in HAC area
- sample containers will be removed from work surface when finished with HAC for that sample
- samples will be stored a minimum of 3 feet behind work station to reduce potential fire hazards and spills
- person performing HAC should be made aware of any labels or marks indicating potential sample composition prior to testing sample
- any 'known' materials should be researched for physical and chemical characteristics prior to testing sample
- splash protection will be worn during HAC
- appropriate glove protection will be worn
- only essential persons should be in the work station.
- a buddy should be stationed near by to observe and assist with any potential problems
- a fire extinguisher must be stationed in the work area

b. If a fume hood is not used
- perform HAC outside in an open area downwind of the support zone
- a minimum of Level C should be worn

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c. Fume hood is used
   - HAC may be performed inside
     - minimum of Level C should be worn
     - radio must be present in work station
   - HAC performed outside
     - Level C is recommended

3. Chemical Hazards

a. Unknown compounds are being analyzed
   - be aware of potential chemicals being tested
   - incompatabilities with HAC may be present
   - be alert to potential reactions; noxious gases may emanate during reactions

b. Reagents used during HAC
   - MSDS for reagents should be included in SSP and reviewed by team members
   - Reagent containers should be decontaminated and resealed prior to departing site and after end of each work period
   - Care must be taken to prevent contamination of reagents
   - list of reagents:
     acetone
     hydrochloric acid
     sodium hydroxide
     nitric acid
     buffer solution pH10
     buffer solution pH7

4. Physical Hazards

a. Open propane torch is a fire hazard

b. Cold/heat stress is possible from exposure to outside environment

c. Uneven terrain may cause an unstable table and work area

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REGION 6 START

HAZARD EVALUATION
GEOPROBE OPERATION

OPERATION HAZARDS:

1. Loud noise
2. Pinch hazard to fingers
3. Drop of heavy tools, equipment
4. Underground/overhead utilities
5. Accidental shifting of vehicle while in operation
6. Fire hazard
7. Foot trap by lowering probe foot
8. Lift rear tires of vehicle off ground

Safe operation of the Geoprobe requires the use of the following safety equipment. Tire blocks (wheel chocks) must be placed under the rear wheels of the parked vehicle. Geoprobe operators should don hearing protection, steel-toed boots, hard hats, and safety glasses. The Geoprobe vehicle should be equipped with a first aid kit and a fire extinguisher. The buddy system should always be followed during Geoprobe operation. Usually, one person is designated as the operator and the other serves as the assistant operator. The primary operator controls the hydraulics, and the assistant puts together the rod and sampling apparatus.

SAFETY CAUTIONS:

1. Always set the vehicle parking brake before starting probing operations.

2. If the vehicle is parked on a loose or soft surface, do not fully raise the rear of the vehicle with the probe foot lever, as vehicle may fall or move, causing injury or damage to the equipment.

3. Always extend the probe unit out from the vehicle and deploy the foot to clear vehicle roof line before folding the probe unit completely out.

4. Operators should wear steel-toed boots meeting ANSI standards and keep feet clear of probe foot.

5. Never place hands on top of the rod while it is under the probe drive.

6. Turn off the hydraulic system while changing rods, inserting the hammer anvil, or attaching accessories.

7. Operator must stand to the control side of the Geoprobe machine, clear of probe foot and mast, while operating the controls.

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8. Wear safety glasses meeting OSHA standards at all times when operating this machine.

9. Never exert down pressure on the probe so as to lift the Geoprobe foot over six inches off the ground.

10. Never exert down pressure so as to lift the rear tires of the vehicle off the ground.

11. Always remove the hammer anvil or other tool from the machine before folding the machine to the horizontal position.

12. The vehicle catalytic converter is hot and may present a fire hazard when operating over dry grass or combustibles. A fire extinguisher must be stationed near a vehicle door on the Geoprobe vehicle.

13. Geoprobe operators must wear ear protection meeting ANSI standards for sound levels exceeding 85 dBA.

14. The location of underground utilities and services must be known before starting to drill or probe.

15. Shut down the hydraulic system and stop the vehicle engine before attempting to clean or service the equipment.

16. Accidental engagement of this machine may cause injury.

17. Only trained personnel should be allowed to operate the Geoprobe.

18. For best results and safety purposes, a minimum of two people should be working on every Geoprobe operation.

19. The Geoprobe sample node must be located at least fifteen feet from any overhead or underground utility lines. In some cases, a geophysical survey may be necessary to locate underground structure or utilities;

20. The Site Safety Plan (SSP) must be posted in an easily accessible location;

21. The location of the ignition shut off switches must be reiterated to all site personnel;

22. A first aid kit and eyewash kit must be readily available on site;

23. A site history must be obtained for verification of the possible location of buried drums, tanks, or other obstacles;

24. Each of the personnel's responsibilities must be known;

25. Planned investigative and potential hazards must be identified;

26. Emergency scenario plans must be discussed, including kill switches and hospital routes;

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27. Heat and cold stress hazards must be identified and discussed.

28. Tools will be used only for their intended purposes.

29. Refueling of the vehicle will not be permitted when the vehicle is running.

30. Geoprobe equipment will be kept in an orderly manner.

31. The hydraulic system will be shut off while not actively inserting or removing probe.

32. Nearby personnel will not distract the operator unless there is an emergency.

33. The geoprobe will be inspected prior to use by the operator to verify that it is ready for safe operation.

GENERAL:

Additionally, utility clearance must be gained by the client or project manager before any Geoprobe field activities begin. All utility locations must be documented in the field logbook. It is also the responsibility of the operator to make sure these utilities are located to his satisfaction.

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HAZARD EVALUATION OF CHEMICALS

Chemical Name Crude Oil **Date**

DOT Name/U.N. No. UN 1267 **Job No.**

CAS Number Data Not Available
Dark yellow to brown or greenish black, oily liquid

References Consulted (circle):

Merck Index **CHRIS (Vol. II)** **Other:** Condensed Chemical Dictionary

NFPA Fire Protection Guide on Hazardous Materials

Chemical Properties: (Synonyms: Petroleum)

Chemical Formula Mixture of Hydrocarbons **Molecular Weight** Mixture

Physical State Liquid **Solubility (H_2O)** Insoluble **Boiling Point** 90-750°F

Flash Point 20-90°F, C.C. **Vapor Pressure/Density** 0.10 psia/ Data Not Available **Freezing Point** N/A

Specific Gravity 0.70-0.98 at 59°F **Odor Characteristic** Acrid **Flammable Limits** Data Not Available

Incompatabilities Nitric Acid

Biological Properties:
TLV-TWA None **PEL** None **Odor/Odor Threshold** Offensive, tarry/ Not Available

IDLH Not Available **Human** Data Not Available **Aquatic** 3 ppm/fresh water fish **Rat/Mouse** - -

Route of Exposure Inhalation, ingestion, dermal contact

Carcinogen May contain carcinogenic components **Teratogen** **Mutagen**

Handling Recommendations: (Personal protective measures)
CHRIS: Wear goggles or face shield; rubber gloves and boots. Avoid contact. Fire hazard: Flammable; no nearby ignition sources; evacuate area of spill. NFPA rating: 1-3-0

Monitoring Recommendations:
OVA; HNu, TVA; Hydrogen sulfide Monitox. Drager pump with Petroleum Hydrocarbon tube.

Disposal/Waste Treatment:
Stop discharge if possible; mechanical containment. Do not discharge into water.

Health Hazards and First Aid:
Flush eyes with water for at least 15 minutes. Wipe off skin and wash with soap and water. Remove contaminated clothing and shoes.

Symptoms: **Acute:** Irritation of eyes and skin. Toxic by ingestion.

Chronic:

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HAZARD EVALUATION OF CHEMICALS

Chemical Name Diesel Oils — Date

DOT Name/U.N. No. UN 1270 — Job No.

CAS Number Not Available

References Consulted (circle):
Condensed Chemical Dictionary — CHRIS (Vol. II)
NFPA Fire Protection Guide on Hazardous Materials

Chemical Properties: (Synonyms: Mixture of Fuel Oil 1-D and Fuel Oil 2-D
Mixture of Light Diesel Oil and Medium Diesel Oil)

Chemical Formula Mixture of hydrocarbons — Molecular Weight Mixture-not pertinent

Physical State Liquid-yellow brown — Solubility (H_2O) Essentially insoluble; floats on water — Boiling Point 1-D: 380-560°F; 2-D: 540-640°F

Flash Point 1-D: 100°F min.; 2-D: 125°F min. — Vapor Pressure/Density V.P. at 70°F: 1-D=0.04 psi; 2-D=0.5 psi — Freezing Point 1-D: -30°F; 2-D: 0°F

Specific Gravity (liquid) 0.841 @ 16°C (60.3°F) — Odor Characteristic lube or fuel oil odor; odor threshold - 1-D = 0.7 ppm — Flammable Limits 1.3 to 6.0% (Vol)

Incompatibilities Strong oxidizing materials

Biological Properties:
TLV-TWA None — PEL None — Odor/Odor Threshold Not available

IDLH Not Available — LD_{50} Human 3-15g/kg (by ingestion) — Aquatic 1) 204 mg/l for 24 hr young Amer. shad in salt water; 2) 20 mg/kg LD_{50} for Mallards — Rat/Mouse

Route of Exposure Ingestion, dermal contact

Carcinogen — Teratogen — Mutagen

Handling Recommendations: (Personal protective measures)
Level C (CHRIS: protective gloves, goggles or face shield). Combustible. NFPA ratings: 1-D = 0-2-0; 2-D = 1-2-0.

Monitoring Recommendations:
HNu, OVA, TVA, O_2/Explosimeter, Draeger pump with tube-Petroleum Hydrocarbons. (Non-specific & variable responses - diesel a mixture). Because of low volatility, not good monitoring with OVA, etc.

Disposal/Waste Treatment:
Do not discharge into water or onto land. Collect disposable PPE, sampling equipment, etc. & dispose of as designated by client.

Health Hazards and First Aid:
Immediate medical attention if ingested, inhaled or aspirated. Do not induce vomiting if ingested. If conscious, give milk or water. Dermal: wash with soap and water; remove contaminated clothing. Eyes: hold open and flush with plenty of water.

Symptoms: Acute: Eye and skin irritation. If ingested, increased frequency of bowel movements, nausea, vomiting. Inhalation: headache, giddiness. Aspiration: severe lung irritation, cough, shortness of breath.

TS:1522-07/25/95

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HAZARD EVALUATION OF CHEMICALS

Chemical Name Gasoline, automotive unleaded* Date

DOT Name/U.N. No. UN 1203 Job No.

CAS Number 8006-61-9

*Less than 4.23 g lead/gallon acc. to CHRIS: lead-free gasoline: less than 0.05g/gal acc. to Cond. Chem. Dict.

References Consulted (circle):

Merck Index ACGIH TLVs CHRIS (Vol. II) Condensed Chemical Dictionary
AAR Bureau of Explosives Emergency Action Guides
NFPA Fire Protection Guide on Hazardous Materials, 9th Edition

Chemical Properties: (Synonyms: Petrol; Motor spirit; motor fuel)

Chemical Formula Mixture of hydrocarbons Molecular Weight Mixture

Physical State Liquid Solubility (H_2O) Insoluble Boiling Point 100-390°F

Flash Point -38 to -50°F Vapor Pressure/Density 190 mm at 68°F V. Density: 3-4 Freezing Point -131 to -140°F

Specific Gravity 0.72-0.8 Odor Characteristic Gasoline Odor threshold = 0.25 ppm Flammable Limits 1.3 to 7.6%

Incompatabilities Oxidizing materials

Biological Properties:

TLV-TWA 300 ppm PEL 300 ppm Odor/Odor Threshold Gasoline/0.25 ppm

IDLH Not Available Human/Oral LD_{50} 0.5-5 g/kg Aquatic 91 mg/l for 24 hrs for Young Amer. shad in salt water Rat/Mouse

Route of Exposure Inhalation, ingestion and dermal contact

Carcinogen May contain carcinogenic components Teratogen Mutagen

Handling Recommendations: (Personal protective measures)
Level C with air monitoring. Flammable. Serious fire hazard. Evacuate area. No ignition sources nearby. Prepared, if not already wearing, Level B. Avoid contact. NFPA Rating = 1-3-0.

Monitoring Recommendations:
HNu, OVA, TVA, O_2/Explosimeter. Monitor low-lying areas because of heavy vapors. Use intrinsically safe equipment.

Disposal/Waste Treatment:
Do not discharge into water or on land. Remove ignition sources.

Health Hazards and First Aid:
Immediate medical attention if ingested, inhaled, or aspirated. Do not induce vomiting if ingested. Move to fresh air. Remove contaminated clothing. Flush affected areas with plenty of water. Maintain respiration.

Symptoms: Acute: Irritation to eyes, nose, throat, respiratory tract and skin. If inhaled: dizziness, headache, difficult breathing, or unconsciousness. Ingestion: nausea, vomiting.

Chronic: Skin: repeated/prolonged contact: cracked, dry skin. Inhalation: damage to respiratory tract and possibly pancreas, liver, kidneys, and spleen.

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HAZARD EVALUATION OF CHEMICALS

Chemical Name Gasoline, automotive leaded* Date

DOT Name/U.N. No. UN 1203 Job No.

CAS Number Not Available

*Dyed to distinguish from unleaded gasoline)

References Consulted (circle):

Condensed Chemical Dictionary Merck Index
AAR Bureau of Explosives Emergency Action Guides ACGIH TLVs

Chemical Properties: (Synonyms:)

Chemical Formula Mixture of hydrocarbons Molecular Weight Mixture

Physical State Liquid Solubility (H_2O) Insoluble Boiling Point 140-390°F

Flash Point -38 to -50°F Vapor Pressure/Density 190 mm at 68°F V. Density: 3-4 Freezing Point -131 to -140°F

Specific Gravity 0.72-0.8 Odor Characteristic Gasoline Flammable Limits 1.2 to 7.6%

Incompatabilities Oxidizing materials

Biological Properties:

TLV-TWA 300 ppm (unleaded) PEL 300 ppm Odor/Odor Threshold 0.25 ppm

IDLH Human Aquatic Rat/Mouse

Route of Exposure Inhalation, ingestion and dermal contact

Carcinogen May contain carcinogenic components Teratogen Mutagen

Handling Recommendations: (Personal protective measures)
Level C with air monitoring. Prepared for Level B. Flammable. Serious fire hazard. Evacuate area of spill. No nearby ignition sources. Avoid contact. NFPA Rating = 1-3-0.

Monitoring Recommendations:
HNu, OVA, FTA, O_2/Explosimeter (prolonged exposure to tetraethyl lead decreases sensitivity of explosimeter. Monitor low-lying areas because of heavy vapors. Use intrinsically safe equipment.

Disposal/Waste Treatment:
Do not discharge into water or on land. Remove ignition sources.

Health Hazards and First Aid:
Immediate medical attention if ingested, inhaled, or aspirated. Do not induce vomiting if ingested. Move to fresh air. Maintain respiration. Remove contaminated clothing. Flush affected areas with plenty of water.

Symptoms: Acute: Irritation to eyes, nose, respiratory tract and skin. Inhalation: dizziness, headache, difficult breathing, or unconsciousness. Ingestion: nausea, vomiting.

Chronic: Skin: cracked, dry skin. Inhalation: damage to respiratory tract and possibly pancreas, liver, kidneys and spleen.

TS:1622-07/25/95

KEROSENE

KRS

Common Synonyms	Watery liquid	Colorless	Fuel oil odor
Illuminating oil Kerosine Range oil Fuel oil No. 1 Jet Fuel: JP-1	Floats on water.		

Fire

Combustible.

Exposure

LIQUID
Irritating to skin and eyes.
Harmful if swallowed.

DO NOT INDUCE

Water Pollution

Dangerous to aquatic life in high concentrations.
Fouling to shoreline.
May be dangerous if it enters water intakes.

1. RESPONSE TO DISCHARGE

(See Response Methods Handbook)

Mechanical containment
Should be removed
Chemical and physical treatment

2. LABEL

2.1 Category: None
2.2 Class: Not pertinent

3. CHEMICAL DESIGNATIONS

3.1 CG Compatibility Class: Miscellaneous Hydrocarbon Mixtures
3.2 Formula:
3.3 IMO/UN Designation: 3.3/1223
3.4 DOT ID No.: 1223
3.5 CAS Registry No.: 8008-20-6

4. OBSERVABLE CHARACTERISTICS

4.1 Physical State (as shipped): Liquid
4.2 Color: Colorless to light brown
4.3 Odor: Characteristic

5. HEALTH HAZARDS

5.1 Personal Protective Equipment: Protective gloves; goggles or face shield.
5.2 Symptoms Following Exposure: Vapor causes slight irritation of eyes and nose. Liquid irritates stomach; if taken into lungs, causes coughing, distress, and rapidly developing pulmonary edema.
5.3 Treatment of Exposure: ASPIRATION: enforce bed rest; administer oxygen; call a doctor. INGESTION: do NOT induce vomiting; call a doctor. EYES: wash with plenty of water. SKIN: wipe off and wash with soap and water.
5.4 Threshold Limit Value: 200 ppm
5.5 Short Term Inhalation Limits: 2500 mg/m³ for 60 min
5.6 Toxicity by Ingestion: Grade 1; LD_{50} = 5 to 15 g/kg
5.7 Late Toxicity: Data not available
5.8 Vapor (Gas) Irritant Characteristics: Vapors cause a slight smarting of the eyes or respiratory system if present in high concentrations. The effect is temporary.
5.9 Liquid or Solid Irritant Characteristics: Minimum hazard. If spilled on clothing and allowed to remain, may cause smarting and reddening of the skin.
5.10 Odor Threshold: 1 ppm
5.11 IDLH Value: Data not available

6. FIRE HAZARDS

6.1 Flash Point: 100°F (min.) C.C.
6.2 Flammable Limits in Air: 0.7%-5%
6.3 Fire Extinguishing Agents: Foam, dry chemical, or carbon dioxide
6.4 Fire Extinguishing Agents Not to be Used: Water may be ineffective
6.5 Special Hazards of Combustion Products: Not pertinent
6.6 Behavior in Fire: Not pertinent
6.7 Ignition Temperature: 444°F
6.8 Electrical Hazard: Not pertinent
6.9 Burning Rate: 4 mm/min.
6.10 Adiabatic Flame Temperature: Data not available
6.11 *Stoichiometric* Air to Fuel Ratio: Data not available
6.12 Flame Temperature: Data not available

7. CHEMICAL REACTIVITY

7.1 Reactivity With Water: No reaction
7.2 Reactivity with Common Materials: No reaction
7.3 Stability During Transport: Stable
7.4 Neutralizing Agents for Acids and Caustics: Not pertinent
7.5 Polymerization: Not pertinent
7.6 Inhibitor of Polymerization: Not pertinent
7.7 Molar Ratio (Reactant to Product): Data not available
7.8 Reactivity Group: 33

8. WATER POLLUTION

8.1 Aquatic Toxicity: 2990 ppm/24 hr/bluegill/TL$_m$/fresh water
8.2 Waterfowl Toxicity: Data not available
8.3 Biological Oxygen Demand (BOD): 53%, 5 days
8.4 Food Chain Concentration Potential: None

9. SHIPPING INFORMATION

9.1 Grades of Purity: Light hydrocarbon distillate: 100%
9.2 Storage Temperature: Ambient
9.3 Inert Atmosphere: No requirement
9.4 Venting: Open (flame arrester)

10. HAZARD ASSESSMENT CODE

(See Hazard Assessment Handbook)

A-T-U

11. HAZARD CLASSIFICATIONS

11.1 Code of Federal Regulations: Combustible liquid
11.2 NAS Hazard Rating for Bulk Water — Transportation:

Category	Rating
Fire	2
Health	
Vapor Irritant	1
Liquid or Solid Irritant	1
Poisons	1
Water Pollution	
Human Toxicity	1
Aquatic Toxicity	1
Aesthetic Effect	3
Reactivity	
Other Chemicals	0
Water	0
Self Reaction	0

11.3 NFPA Hazard Classifications:

Category	Classification
Health Hazard (Blue)	0
Flammability (Red)	2
Reactivity (Yellow)	0

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 Physical State at 15°C and 1 atm: Liquid
12.2 Molecular Weight: Not pertinent
12.3 Boiling Point at 1 atm: 392-500°F = 200—260°C = 473—533°K
12.4 Freezing Point: —50°F = —45.6°C = 227.6°K
12.5 Critical Temperature: Not pertinent
12.6 Critical Pressure: Not pertinent
12.7 Specific Gravity: 0.80 at 15°C (liquid)
12.8 Liquid Surface Tension: 23-32 dynes/cm = 0.023-0.032 N/m at 20°C
12.9 Liquid Water Interfacial Tension: 47-49 dynes/cm = 0.047-0.049 N/m at 20°C
12.10 Vapor (Gas) Specific Gravity: Not pertinent
12.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent
12.12 Latent Heat of Vaporization: 110 Btu/lb = 60 cal/g = 2.5 X 10⁵ J/kg
12.13 Heat of Combustion: —18,540 Btu/lb = —10,300 cal/g = —431.24 X 10⁵ J/kg
12.14 Heat of Decomposition: Not pertinent
12.15 Heat of Solution: Not pertinent
12.16 Heat of Polymerization: Not pertinent
12.25 Heat of Fusion: Data not available
12.26 Limiting Value: Data not available
12.27 Reid Vapor Pressure: 0.1 psia.

NOTES

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KRS	KEROSENE

12.17 SATURATED LIQUID DENSITY

Temperature (degrees F)	Pounds per cubic foot
34	50.810
36	50.740
38	50.670
40	50.600
42	50.530
44	50.460
46	50.390
48	50.320
50	50.250
52	50.180
54	50.110
56	50.040
58	49.970
60	49.900
62	49.830
64	49.760
66	49.700
68	49.630
70	49.560
72	49.490
74	49.420
76	49.350
78	49.280
80	49.210
82	49.140
84	49.070

12.18 LIQUID HEAT CAPACITY

Temperature (degrees F)	British thermal unit per pound-F
0	.434
10	.439
20	.444
30	.449
40	.454
50	.459
60	.464
70	.469
80	.474
90	.479
100	.484
110	.489
120	.494
130	.499
140	.504
150	.509
160	.514
170	.519
180	.524
190	.529
200	.534
210	.539

12.19 LIQUID THERMAL CONDUCTIVITY

Temperature (degrees F)	British thermal unit-inch per hour-square foot-F
0	.926
10	.924
20	.921
30	.919
40	.917
50	.915
60	.913
70	.911
80	.909
90	.907
100	.905
110	.903
120	.901
130	.899
140	.897
150	.895
160	.893
170	.891
180	.889
190	.887
200	.885
210	.883

12.20 LIQUID VISCOSITY

Temperature (degrees F)	Centipoise
—35	6.727
—30	6.065
—25	5.482
—20	4.965
—15	4.508
—10	4.101
—5	3.739
0	3.416
5	3.127
10	2.867
15	2.634
20	2.424
25	2.235
30	2.064
35	1.909
40	1.768
45	1.641
50	1.525
55	1.419
60	1.322
65	1.233
70	1.152
75	1.078

12.21 SOLUBILITY IN WATER

Temperature (degrees F)	Pounds per 100 pounds of water
	I
	N
	S
	O
	L
	U
	B
	L
	E

12.22 SATURATED VAPOR PRESSURE

Temperature (degrees F)	Pounds per square inch
70	.041
80	.056
90	.075
100	.099
110	.130
120	.168
130	.217
140	.277
150	.350
160	.440
170	.548
180	.679
190	.835
200	1.021
210	1.241
220	1.500
230	1.802
240	2.154
250	2.562
260	3.033
270	3.573
280	4.192
290	4.896
300	5.695

12.23 SATURATED VAPOR DENSITY

Temperature (degrees F)	Pounds per cubic foot
	N
	O
	T
	P
	E
	R
	T
	I
	N
	E
	N
	T

12.24 IDEAL GAS HEAT CAPACITY

Temperature (degrees F)	British thermal unit per pound-F
	D
	A
	T
	A
	N
	O
	T
	A
	V
	A
	I
	L
	A
	B
	L
	E

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Ecology and Environment
Region X - Seattle
Chemical Hazard Evaluation Form

Health - X Reactivity
Special Hazard --/ \

CAS # 0 Name: Lead Formula: Pb
Class: Synonyms: White lead, Plumbum, Inorganic Lead
Chemical Classification: Heavy Metal

CHEMICAL PROPERTIES

Physical State: S Ionization Potential: 0 ev
Molecular Weight: 207 Boiling Point: 3164 F Flash Point: F
Specific Gravity: 11.3 Melting Point: 620 F Lower Explosive Limit: 0 %
Vapor Pressure: 0 mmHG Freeze Point: 0 F Upper Explosive Limit: 0 %
Odor Threshold: 0 ppm Odor Descript: none

Incompat/React: strong oxidizers, peroxides, active metals
Solubility:

HEALTH HAZARD PROPERTIES

Permissible Exposure Limit:0 ppm Threshold Limit Value:.018 ppm
[or:.05 mg/M3] [or:.05 mg/M3]
Short Term Exposure Limit:0 ppm Immediate Danger to Life & Health:0 ppm
[or: mg/M3] [or: mg/M3]
Ceiling Designation: Skin Hazard Designation:
Other Properties: PEL - 50ug/m3

Carcin: indefinite
Mutagen: -
Inhalation Tox: - Aquatic Tox: -
Dermal Tox: - Repro Tox: exper teratogen
Oral Tox: rat TDLo: 790mg/kg
Other Tox: TARGT ORGNS: GI Trct,CNS,Kid,Bld,Gingival Tissue

Routes of Exposure: Ingest: X Eyes: X Dermal Absorption: Skin Contact: X Inhalation: X

SYMPTOMS

Acute: cumulative neurotoxin (prolong expos), stomach distress, vomtg, diarrhea, black stools, anemia, nervous system effects
Chronic: alimentary: abdm pain/discomf,constptn,diarrh neuromusc: musc weaknss,joint/musc pain,dizzy,insom, encephalic: brain involvment, stupor, coma,death-r

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PERSONAL PROTECTIVE MEASURES

Respirators: APR: dusty/windy condit or known high concent or >
Cartridge Type: GMC-H, AP3 (RACAL)
Clothing: Coverall: Saranex Gloves: Nitrile
Special Precautions:

FIRST AID

Eye/Skin: flush w/water 15 minutes, wash skin with soap/water, SEEK MEDICAL ATTENTION
Inhalation:
Ingestion: give water, induce vomiting, SEEK MEDICAL ATTENTION IMMEDIATELY

FIRES, RELEASES, SPILLS & DISPOSAL

Fire: 13 Leaks & Spills: 7,8,10 Disposal: P
Decomp Products: toxic fumes of lead

recycled paper
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NOT TO BE USED IN LIEU OF MSDS
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Ecology and Environment
Region X - Seattle
Chemical Hazard Evaluation Form

\0/ Fire
Health - 3 X Reactivity
Special Hazard --/No water

CAS # 7664939 Name: SULFURIC ACID Formula: H2SO4
Class: Synonyms: Battery Acid, Oil of Vitriol
Chemical Classification: Inorganic Acids

CHEMICAL PROPERTIES

Physical State:	L			Ionization Potential:	0		ev
Molecular Weight:	98.08	Boiling Point:	518 F	Flash Point:			F
Specific Gravity:	1.84	Melting Point:	37 F	Lower Explosive Limit:	0		%
Vapor Pressure:	0 mmHG	Freeze Point:	50 F	Upper Explosive Limit:	0		%
Odor Threshold:	.25 ppm	Odor Descript:	odorless				

Incompat/React: organics, metals, water, chlorates, carbides, fulm
Solubility: miscible but highly reactive

HEALTH HAZARD PROPERTIES

Permissible Exposure Limit:	.25 ppm [or:1 mg/M3]	Threshold Limit Value:	.25 ppm [or:1 mg/M3]
Short Term Exposure Limit:	0 ppm [or: mg/M3]	Immediate Danger to Life & Health:	19.984 ppm [or:80 mg/M3]
Ceiling Designation:		Skin Hazard Designation:	

Other Properties:

Carcin:
Mutagen:
Inhalation Tox: guinea: LC50: 18mg/m3
Aquatic Tox: 24.5ppm/24hr/blugil/lethal/fre
Dermal Tox:
Repro Tox:
Oral Tox: rat: LD50: 2140 mg/kg
Other Tox: TARGET ORGANS: Resp Sys, Eyes, Skin, Teeth

Routes of Exposure:	Ingest: X	Eyes:	Dermal Absorption: X	Skin Contact: X	Inhalation: X

SYMPTOMS

Acute: severe burns to skin,eyes,respir. tract, cough, diffic. breathing, headache, bluish face/lips, salivation, abdom cramps, naus/vomit, tongue changes
Chronic:

PERSONAL PROTECTIVE MEASURES

Respirators: APR: dusty/windy condit or known high concent or >
Cartridge Type: GMB or GMB-H, GMC
Clothing: Coverall: Saranex Gloves: Neoprene
Special Precautions: Sulfuric acid is a colorless oily liquid. It is used to make fertilizers & other chems, in petroleum refining, in iron & steel production, & for many

---

FIRST AID

Eye/Skin: Flush w/water for 15min, treat skin burns by applying dry, sterile dressing. SEEK MEDICAL ATTENTION
Inhalation:
Ingestion: Give milk or water in lg qty. DO NOT INDUCE VOMITING. SEEK MEDICAL ATTEN

FIRES, RELEASES, SPILLS & DISPOSAL

Fire: 2,12 Leaks & Spills: 1,4,6,9 Disposal: N
Decomp Products:

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HAZARD EVALUATION OF CHEMICALS

Chemical Name Tetraethyl lead Date

DOT Name/U.N. No. UN 1649 Job No.

CAS Number 78-00-2

Colorless liquid; usually dyed red or other distinctive color (ex. orange or blue)

References Consulted (circle):

NIOSH/OSHA Pocket Guide Verschueren Merck Index Hazardline Patty (Vol. II)

Toxic and Hazardous Safety Manual ACGIH TLV Book Other: NIOSH Guidelines to Chemical Hazards; NFPA Fire Protection Guidelines for Chemical Hazards

Chemical Properties: (Synonyms: Lead tetraethyl; TEL; motor fuel antiknock compound)

Chemical Formula $Pb(C_2H_5)_4$ Molecular Weight 323.44

Physical State Liquid Solubility (H$_2$O) Insoluble Boiling Point Decomposes above 212 °F

Flash Point 200°F Vapor Pressure/Density 0.2 mm Hg; V.Density: 8.6 Freezing Point -215 to -202 °F

Specific Gravity 1.6 Odor Characteristic Fruity, sweet; musty Flammable Limits Not available

Incompatabilities Rust, strong oxidizers

Biological Properties:

TLV-TWA 0.1 mg/m^3 (as Lead) PEL 0.075 mg/m^3 Odor/Odor Threshold

IDLH 40 mg/m^3 Human Aquatic 0.20 mg/l for 96 hrs for bluegill in fresh water. Rat/Mouse LD_{50} 12.3 mg/kg Oral, rat

Route of Exposure Dermal contact; ingestion; inhalation

Carcinogen Teratogen Mutagen

Handling Recommendations: (Personal protective measures)

Level B or Level C with air monitoring. Avoid contact. Dermal, inhalation, ingestion hazard.

Monitoring Recommendations:

HNu (Ionization Potential = 11.1 ev). Cl Explosimeter - oxides loses sensitivity with prolonged exposure. HNu mfr's info sheet: use 10.2 lamp

Disposal/Waste Treatment:

Proper disposal

Health Hazards and First Aid:

Absorbed through skin. Wash skin with kerosene/other petroleum products, then soap + water. Remove clothing (contaminated). Eyes - flush with water. Inh - move to fresh air; artificial respiration if needed. Ing - induce vomiting; victim drink water or milk. Medical attention immediately.

Symptoms: Acute: Inhalation or skin contact: insomnia, anxiety, spasms, delirium. Eye irritation. ingestion: spasms, slow heart rate

Chronic: central nervous system convulsions, tremors, slow heart rate

MATERIAL SAFETY DATA SHEET

MSA P/N 34337

≠ 034

SECTION I

PRODUCT NAME	MSA CLEANER-SANITIZER II
MANUFACTURER	Mine Safety Appliances Company P.O. Box 426 Pittsburgh PA 15230
EMERGENCY PHONE NO.	412- 967-3000

FORMULA CODE	8599-03
COMPLETED BY	L. P. Dewosky
TITLE	Mgr. Product Safety
DATE	December 1987

SECTION II - INGREDIENTS

	CAS NUMBER	WEIGHT, %
ACTIVE INGREDIENTS:		54.7
SODIUM CARBONATE	497-19-8	42.2
TRISODIUM PHOSPHATE	7601-54-9	10.0
ALKYL (C14, 50%; C12, 40%; C16, 10%) DIMETHYL BENZYL AMMONIUM CHLORIDES	139-08-2	2.5
INERT INGREDIENTS:		45.3
SODIUM TRIPOLYPHOSPHATE	7758-29-4	
SODIUM BICARBONATE	144-55-8	
WATER	7732-18-5	
ISOMERIC LINEAR ALCOHOLS (C11-C15) POLYETHOXY ETHANOLS	68131-40-8*	
ETHANOL	64-17-5	
ISOBORNYL ACETATE	125-12-2	

SECTION III - PHYSICAL DATA

BOILING POINT (° F.)	NA	SPECIFIC GRAVITY (H_2O = 1)	0.8
VAPOR PRESSURE (mm Hg)	NA	%VOLATILE BY VOLUME	NA
VAPOR DENSITY (AIR = 1)	NA	EVAPORATION RATE (_____ = 1)	NA
SOLUBILITY IN WATER	20%	pH 1% AQUEOUS SOLUTION	9.5 - 10.5
APPEARANCE AND ODOR	FRAGRANT BLEND OF WHITE POWDERS		

SECTION IV - FIRE AND EXPLOSION DATA

FL. POINT (Method used)	NO FLASH TO 240 F	FLAMMABLE LIMITS	Lel NA	Uel NA
EXTINGUISHING MEDIA	WATER SPRAY (FOG), FOAM, DRY CHEMICAL, CARBON DIOXIDE			
SPECIAL FIRE FIGHTING PROCEDURES	BLANKET FIRE WITH EXTINGUISHING MEDIUM			
UNUSUAL FIRE AND EXPLOSION HAZARDS	PRODUCT IS NONREACTIVE AND DOES NOT READILY SUPPORT			

IN CONTACT WITH POWDER MAY CAUSE BURNS. FLUSH AFFECTED AREA WITH CLEAN WATER.

E CONTACT WITH POWDER MAY CAUSE CORNEAL BURNS. AVOID RUBBING EYES CAUSE WATER INSOLUBLE PARTICLES MAY SCRATCH CORNEA. IMMEDIATELY FLUSH EYES WITH CLEAN WATER WHILE HOLDING EYELIDS APART. CONTINUE FLUSHING FOR AT LEAST 15 MINUTES OR UNTIL IRRITATION SUBSIDES. CONSULT PHYSICIAN AS SOON AS POSSIBLE.

INHALATION OF A LARGE ENOUGH QUANTITY TO POSE A SIGNIFICANT HEALTH HAZARD IS IMPROBABLE.

INGESTION OF POWDER IS HARMFUL OR FATAL. SHOULD INGESTION OCCUR, DRINK MILK, RAW EGG WHITE, OR GELATIN SOLUTION, OR LARGE QUANTITIES OF WATER. AVOID ALCOHOL. CONSULT PHYSICIAN AS SOON AS POSSIBLE.

SECTION VI - REACTIVITY DATA

UTY	UNSTABLE		CONDITIONS TO AVOID	NONE
	STABLE	X		
MODUS MERIZATION	MAY OCCUR		CONDITIONS TO AVOID	NONE
	WILL NOT OCCUR	X		
MODUS MPOSITION UCTS	UNDETERMINED			
PATIBILITY RIALS TO AVOID)	OXIDIZING AGENTS SOAP AND ANIONIC SURFACTANTS DEACTIVATE GERMICIDE			

SECTION VII - SPILL OR LEAK PROCEDURES

S TO BE TAKEN AS MATERIAL IL ID OR SPILLED	SWEEP UP
TE DISPOSAL HOD	REMOVE TO SANITARY LANDFILL AWAY FROM WATER SUPPLIES DESTROY EMPTY CONTAINERS

SECTION VIII - SPECIAL PROTECTION INFORMATION

IAL IRATORY TECTION	NOT REQUIRED
IAL TECTION	NOT REQUIRED
IAL TECTION	NOT REQUIRED

SECTION IX - SPECIAL PRECAUTIONS

IAL DLING CAUTIONS	NOT REQUIRED
IAL RAGE CAUTIONS	NOT REQUIRED.
ER IAL CAUTIONS	NOT REQUIRED

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MSDS = 170

MATERIAL SAFETY DATA SHEET

W. R. Grace & Co.
62 Whittemore Ave.
Cambridge, MA 02140

MSDS Number: Z-8304
Cancels: Z-801
Date Prepared: 10/02/86

Telephone Number for Information and Emergency Response
(617) 876-1400
X-3140 or 3897

SECTION I - PRODUCT IDENTIFICATION

Trade Names and Synonyms: Zonolite Vermiculite; Industrial Vermiculite

Chemical Name and Family: Expanded Vermiculite (Libby Montana Source): Magnesium-Aluminosilicate Mineral

Formula: $(Mg, Ca, K)\cdot(Al, Fe, Mg)\cdot(Si, Al)_4O_{10}\cdot OH_2\cdot H_2O$

CAS#: 1318-00-9

DOT Hazard Class/ID#/Label: Not Applicable

Reportable Quantity (RQ): None

Surface Freight Classification: Vermiculite, Other Than Crude

NPCA-HMIS Hazard Index:

- Health: 1
- Flammability: 0
- Reactivity: 0
- Personal Protection: E

SECTION II- HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

Ingredient (CAS#, Chemical & Common Names)	Percent by Weight	Exposure Limits OSHA	ACGIH	OTHER
Total Dust	Not Applicable	15mg/m^3	10mg/m^3	-
Respirable Dust	Not Applicable	5mg/m^3	5mg/m^3	-

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point Not Applicable

Specific Gravity (H_2O=1) 5-10 PCF (Bulk Density)

Vapor Pressure (mm Hg.) Same as water

% Volatiles 10-40% as water

Vapor Density (AIR = 1) Same as water

Evaporation Rate Same as water (Butyl Acetate = 1)

Solubility in Water Negligible

pH Not Applicable

Appearance and Odor Moist free flowing particles, brown to gray in color

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

Warning Statement:

CAUTION!

Product contains Vermiculite CAS #1318-00-9 premoistened with water to control dust.
Inhalation of dust may cause coughing or sneezing.
Eye contact may cause minor physical irritation.

Precautionary Measures:

Keep packages sealed to prevent drying.
Avoid creating dust.
Avoid contact with eyes.

Steps to be Taken in Case Material is Released or Spilled:

Clean spilled product quickly to minimize drying. Use methods to clean spill which avoid creating airborne dust. Remove for disposal.

Waste Disposal Method:

Discard empty packaging promptly. Avoid excessive handling of empty packaging, which may result in unnecessary release of airborne particulates.

Acccording to EPA (40 CFR § 261.3) waste of this product is not defined as hazardous. Dispose of all waste in accordance with federal, state, and local regulations.

SECTION VIII - CONTROL MEASURES

Respiratory Protection (Specify Type):

Not generally required. A NIOSH Type TC-21C-XXX dust respirator may be desirable if dust is created in handling. However, dust levels are expected to be minimal as long as product remains moist.

Ventilation

Local Exhaust:	Not generally required, but should be used where available.
Mechanical:	
Special:	None
Other:	None

Protective Gloves: Not generally required.

Eye Protection: Goggles recommended.

Other Protective Clothing or Equipment: Normal work clothes.

Work/Hygenic Practices: Observe precautions noted above.

Material Safety Data Sheet

Required under USDL Safety and Health Regulations for Shipyard Employment (29 CFR 1915)

U.S. Department of Labor

Occupational Safety and Health Administration

OMB No. 1218-0074
Expiration Date 05/31/86

PREPARED 1/10/86

Section I

Manufacturer's Name: ALCONOX, INC.

Emergency Telephone Number: (212) 473-1300

Address (Number, Street, City, State, and ZIP Code): 215 PARK AVENUE SOUTH
NEW YORK, N.Y. 10003

Chemical Name and Synonyms: N.A.

Trade Name and Synonyms: ALCONOX

C6300-1, C6301-1, C6301-2, -3, -4, -5

Chemical Family: ANIONIC DETERGENT

Formula: N.A.

D51-.502

Section II - Hazardous Ingredients

Paints, Preservatives, and Solvents	%	TLV (Units)	Alloys and Metallic Coatings	%	TLV (Units)
Pigments: NONE			Base Metal: NONE		
Catalyst: NONE			Alloys: NONE		
Vehicle: NONE			Metallic Coatings: NONE		
Solvents: NONE			Filler Metal Plus Coating or Core Flux: NONE		
Additives: NONE			Others: NONE		
Others: NONE					

Hazardous Mixtures of Other Liquids, Solids or Gases

	%	TLV (Units)
NONE		

Section III - Physical Data

Boiling Point (°F)	N.A.	Specific Gravity (H_2O=1)	N.A.
Vapor Pressure (mm Hg.)	N.A.	Percent Volatile by Volume (%)	N.A.
Vapor Density (AIR=1)	N.A.	Evaporation Rate (_____=1)	N.A.

Solubility in Water: APPRECIABLE

Appearance and Odor: WHITE POWDER INTERSPERSED WITH CREAM COLORED FLAKES - ODORLESS

Section IV - Fire and Explosion Hazard Data

Flash Point (Method Used)	NONE	Flammable Limits	N.A.	Lel N.A.	Uel N.A.

Extinguishing Media: WATER, CO_2, DRY CHEMICAL, FOAM, SAND/EARTH

Special Fire Fighting Procedures: FOR FIRES INVOLVING THIS MATERIAL, DO NOT ENTER WITHOUT PROTECTIVE EQUIPMENT AND SELF CONTAINED BREATHING APPARATUS

Unusual Fire and Explosion Hazards: NONE

001365

MSDS

EXXON CHEMICALS

MATERIAL SAFETY DATA SHEET

(Approved by U.S. Department of Labor as "essentially similar" to Form LSS-005-81)

EXXON CHEMICAL AMERICAS • P.O. BOX 3272, HOUSTON, TEXAS 77001
A division of EXXON CHEMICAL COMPANY, a division of EXXON CORPORATION

088

Isopro Alcono Anhydr

CHEMCENTRAL Atlanta

CHEMCENTRAL/Atlanta P.O. Box 47280 Atlanta, Georgia 30362
Alchemy Place Doraville, Georgia 30340 (404) 448-7123

PRODUCT

EMERGENCY TELEPHONE N

713 - 870-600

TRADE NAME: Isopropyl Alcohol Anhydrous; Isopropanol Anhydrous

CHEMICAL NAME: 2-propanol

CHEMICAL FAMILY: ATiphatic Alcohol

CHEMICAL FORMULA: $(CH_3)_2$ CHOH

SECTION II — HAZARDOUS COMPONENTS OF MIXTURES

The precise composition of this product is proprietary information. A more detailed disclosure will be provided by Exxon Medical or Indust personnel to qualified Medical or Industrial Hygiene personnel as privileged information upon request in case of need for specific treatment.

Not Applicable to High Purity Chemicals.

MSDS #088

SECTION III — TYPICAL PHYSICAL DATA

APPEARANCE	ODOR
Clear, colorless liquid.	Alcohol type odor.

BOILING POINT (°F/°C)	SPECIFIC GRAVITY/ @60°/60°F (15.5/15.5°C)
82°C (180°F)	0.79 at 15.5/15.5°C (60/60°F)

VAPOR PRESSURE (mm Hg @ 100°F/38°C)	PERCENT VOLATILE (BY VOLUME) COMPONENTS WITH B.P. EQUAL TO OR LESS THAN 212°F/100°C
90 mm Hg at 38°C (100°F)	100%

VAPOR DENSITY (AIR = 1)	EVAPORATION RATE (N-BUTYL ACETATE = 1)
2.1	2.4

SOLUBILITY IN WATER	
Completely	

SECTION IV — FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (°F/°C SETA CC - ASTM D3278)	FLAMMABLE LIMITS (PERCENT BY VOLUME)	LEL	UEL
Tag closed cup 12°C (53°F)		2.0	12.

FIRE EXTINGUISHING MEDIA
Dry chemical or alcohol-type foam. Waterspray may be ineffective.

SPECIAL FIRE FIGHTING PROCEDURES
Use waterspray to cool fire-exposed surfaces and to protect personnel.

UNUSUAL FIRE AND EXPLOSION HAZARDS
WARNING! This product is FLAMMABLE.
Respiratory protection required for fire fighting personnel. Stay upwind, if possible. exposed tanks with water.

HAZARDOUS PRODUCTS OF COMBUSTION
) unusal products of combustion.

This information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Such information is, to the best of our knowledge and belief, accurate and reliable as of the data compiled. However, no representation ... to its accuracy, reliability or completeness. It is the user's ity to satisfy himself as to the suitability and completer information for his own particular use. We do not accept any loss or damage that may occur from the use of this

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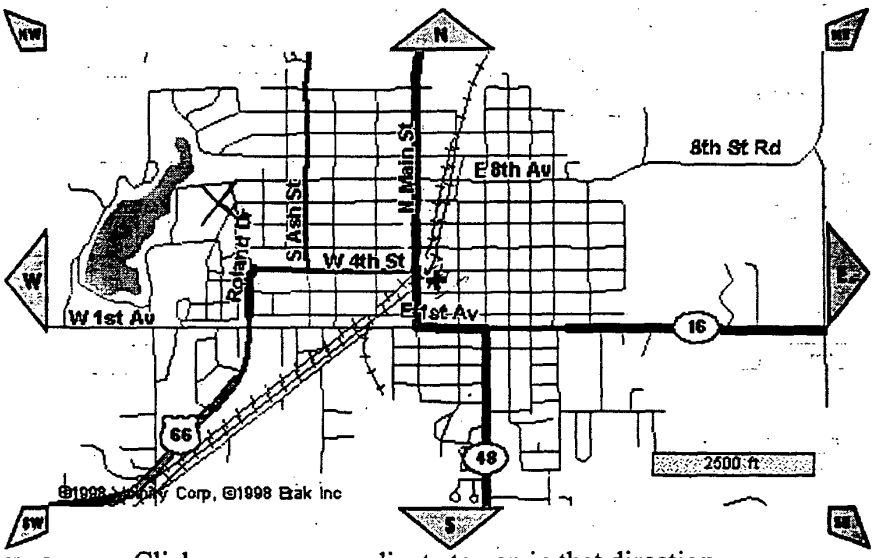
SEARCH RESULTS

Map Location

Bristow Memorial Hospital
7th & Spruce, Bristow, OK, 74010
(918) 367-2215



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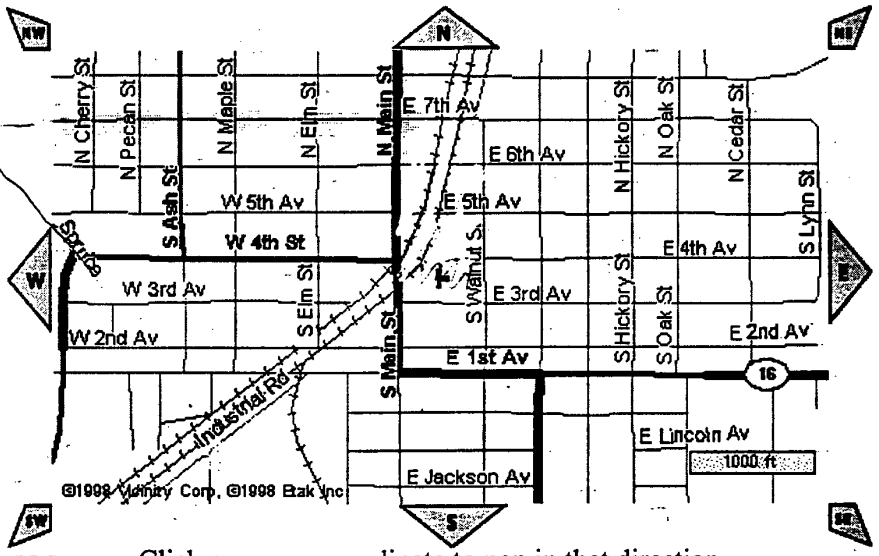
SEARCH RESULTS

Map Location

Bristow Memorial Hospital
7th & Spruce, Bristow, OK, 74010
(918) 367-2215



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DAILY SAFETY MEETING RECORD

GENERAL INFORMATION

Project: Wilcox Refinery Oil Spill Response

Project No: KJ6103 0526015FXX | TDD/PAN No.: 68-h/6-0013

Project Location: Bristow, OK

Date: 8/3/98 Time: 1430 Weather: Hazy Sunshine 90's

Specific Location:

Planned Activities:

SAFETY TOPICS PRESENTED

Chemical Hazards Update: Petroleum hydrocarbons, metals

Physical Hazards Update: Slips, trips, falls, chiggers, poison oak/ivy, heat stress.

Radiation Hazards Update: Not detected previously.

Review of Previous Monitoring Results: Generally low level HNu hits, non-detects in breathing zone

Protective Clothing/Equipment Modifications: Level D PPE, hard hat around geoprobe, hearing protection for JRC and geoprobe,

Special Equipment/Procedures:

Drilling Safety Issues (including testing the operation of drill rig emergency stop switches): Review Geoprobe switches daily.

Emergency Procedures: Bristow Memorial Hospital at 7th and Spruce St in Bristow (918)367-2215 West on access road, Left (south) at T-junction with Main St. (Hwy 66), Right on 7th Street, Hospital due west 6 blocks.

Additional Topics/Observations:

Team Members' Comments/Suggestions:

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DAILY SAFETY MEETING RECORD

INITIAL PROJECT SAFETY CHECKLIST

1. Emergency information reviewed? √ and made familiar to all team members? √
2. Route to nearest hospital driven? ___ and its location known to all team members? √
3. Health and safety plan readily available and its location known to all team members? √
4. E & E Drilling SOP on site? ___ and available for team member review? ___

ATTENDEES

Meeting shall be attended by all personnel who will be working within the exclusion area. Daily informal update meetings will be held prior to work and when site tasks and/or conditions change.

Name (Printed)	Name (Signature)	Date	Representing (Company/Agency)
T. Beer	J. Beer	8/3/98	E & E
B. Martich	[signature]		"
C. Sansone	[signature]		"
G. Burmgarner	[signature]		"
L. Williams	[signature]		"
P. Perowicz	[signature]	√	"
			↓
Meeting Conducted By: T. Beer, B. Martich	[signature]		

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DAILY SAFETY MEETING RECORD

GENERAL INFORMATION

Project: Wilcox Refinery Oil Spill Response

Project No: KJ6103 05261SFXX | TDD/PAN No.: 68-W6-0013

Project Location: Bristow, OK

Date: 5/4/95 Time: 0730 Weather: 90°

Specific Location: Wilcox Refinery entry gate

Planned Activities: slam-bar + JMC sampling

SAFETY TOPICS PRESENTED

Chemical Hazards Update: Petroleum hydrocarbons, metals

Physical Hazards Update: Slips, trips, falls, chiggers, poison oak/ivy, heat stress

Radiation Hazards Update: Not detected previously.

Review of Previous Monitoring Results: Generally low level HNu hits, non-detects in breathing zone

Protective Clothing/Equipment Modifications: Level D PPE, hard hat around geoprobe, hearing protection for JMC and geoprobe,

Special Equipment/Procedures:

Drilling Safety Issues (including testing the operation of drill rig emergency stop switches): Review Geoprobe switches daily.

Emergency Procedures: Bristow Memorial Hospital at 7th and Spruce St in Bristow (918) 367-2215
West on access road, Left (south) at T-junction with Main St. (Hwy 66), Right on 7th Street, Hospital due west 6 blocks.

Additional Topics/Observations:

Team Members' Comments/Suggestions:

DAILY SAFETY MEETING RECORD

INITIAL PROJECT SAFETY CHECKLIST

1. Emergency information reviewed? √ and made familiar to all team members? √
2. Route to nearest hospital driven? ___ and its location known to all team members? √
3. Health and safety plan readily available and its location known to all team members? √
4. E & E Drilling SOP on site? ___ and available for team member review? ___

ATTENDEES

Meeting shall be attended by all personnel who will be working within the exclusion area. Daily informal update meetings will be held prior to work and when site tasks and/or conditions change.

Name (Printed)	Name (Signature)	Date	Representing (Company/Agency)
T. Beer	T. Beer	8/4/98	E & E
B. Martich	B. Martich		
C. Sansone	C. Sansone		
G. Burnaurner	G. Burnaurner		
L. Williams	Loren Williams		
P. Perovich	Paul Perovich	√	
			√
Meeting Conducted By: T. Beer B. Martich	B. Martich		

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DAILY SAFETY MEETING RECORD

GENERAL INFORMATION

Project: Wilcox Refinery Oil Spill Response

Project No: KJ6103 0526015FXX | TDD/PAN No.: 68-h/6-0013

Project Location: Bristow, OK

Date: 8/5/98 Time: 0745 Weather: Partly cloudy, possible t'storm 90°

Specific Location:

Planned Activities: continue IRM and slurry-bar sampling. Site Surveying, EPA visit.

SAFETY TOPICS PRESENTED

Chemical Hazards Update: Petroleum hydrocarbons, metals

Physical Hazards Update: Slips, trips, falls, chiggars, poison oak/ivy, heat stress

Radiation Hazards Update: Not detected previously.

Review of Previous Monitoring Results: Generally low level HNu hits, non-detects in breathing zone

Protective Clothing/Equipment Modifications: Level D PPE, hard hat around geoprobe, hearing protection for IRM and geoprobe,

Special Equipment/Procedures:

Drilling Safety Issues (including testing the operation of drill rig emergency stop switches): Review Geoprobe sivitches daily.

Emergency Procedures: Bristow Memorial Hospital at 7th and Spruce St in Bristow (918)367-2215 West on access road, Left (south) at T-junction with Main St. (Hwy 66), Right on 7th Street, Hospital due west 6 blocks.

Additional Topics/Observations:

Team Members' Comments/Suggestions:

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DAILY SAFETY MEETING RECORD

INITIAL PROJECT SAFETY CHECKLIST

1. Emergency information reviewed? √ and made familiar to all team members? √
2. Route to nearest hospital driven? ___ and its location known to all team members? √
3. Health and safety plan readily available and its location known to all team members? √
4. E & E Drilling SOP on site? ___ and available for team member review? ___

ATTENDEES

Meeting shall be attended by all personnel who will be working within the exclusion area. Daily informal update meetings will be held prior to work and when site tasks and/or conditions change.

Name (Printed)	Name (Signature)	Date	Representing (Company/Agency)
T. Beer	T. Beer	8/5/98	E & E
B. Martich	B. Martich	8/5/98	"
C. Sansone	C. Sansone	"	"
G. Bumgarner		"	"
L. Williams	L. Williams	"	"
P. Perovich	Paul J. Perovich	"	"
		"	"
Meeting Conducted By: T. Beer B. Martich	B. Martich		

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DAILY SAFETY MEETING RECORD

GENERAL INFORMATION

Project: Wilcox Refinery Oil Spill Response

Project No: KJ6103 05260ISFXX | TDD/PAN No.: 68-W6-0013

Project Location: Bristow, OK

Date: 8/6/98 Time: 0800 Weather: Clear, hot, 90s

Specific Location: South side of [redacted] (b) (6)

Planned Activities: Finish soil sampling w/ JMC and slam-bar
GPS survey Photodocumentation

SAFETY TOPICS PRESENTED

Chemical Hazards Update: Petroleum hydrocarbons, metals

Physical Hazards Update: Slips, trips, falls, chiggers, poison oak/ivy, heat stress

Radiation Hazards Update: Not detected previously.

Review of Previous Monitoring Results: Generally low level HNu hits, non-detects in breathing zone

Protective Clothing/Equipment Modifications: Level D PPE, hard hat around geoprobe, hearing protection for JMC and geoprobe,

Special Equipment/Procedures:

Drilling Safety Issues (including testing the operation of drill rig emergency stop switches): Review Geoprobe sivitches daily.

Emergency Procedures: Bristow Memorial Hospital at 7th and Spruce St in Bristow (918) 367-2215
West on access road, Left (south) at T-junction with Main St. (Hwy 66), Right on 7th Street, Hospital due west 6 blocks.

Additional Topics/Observations:

Team Members' Comments/Suggestions:

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DAILY SAFETY MEETING RECORD

INITIAL PROJECT SAFETY CHECKLIST

1. Emergency information reviewed? √ and made familiar to all team members? √
2. Route to nearest hospital driven? ___ and its location known to all team members? √
3. Health and safety plan readily available and its location known to all team members? √
4. E & E Drilling SOP on site? ___ and available for team member review? ___

ATTENDEES

Meeting shall be attended by all personnel who will be working within the exclusion area. Daily informal update meetings will be held prior to work and when site tasks and/or conditions change.

Name (Printed)	Name (Signature)	Date	Representing (Company/Agency)
T. Beer	T. Beer	8/6/98	E & E
B. Martich	B. Martich	8/6/98	"
C. Sansone	C. Sansone	8/6/98	"
G. Bumgarner			"
L. Williams	Tony Williams	8/6/98	"
P. Perowicz	Paul Perowicz	8/6/98	"
			↓
Meeting Conducted By: T. Beer			

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EMERGENCY RESPONSE

SITE SAFETY PLAN

A. GENERAL INFORMATION

Job No: 53612.3 TDD: 68-98-00009 PAN: [illegible] Date: 3/23/98

Prepared by: Shawn Allen Office: Dallas

Incident Location Motor Supply, Groton, CT

Incident Description/History: Former oil reclaiming. Most structures removed by 1988. Oil, acid ponds, pits, and tank bottoms, and 4 wells, still present. PA and ESI have been conducted.

Work Objectives: Soil characterization to support RI/FS assessment work on 3/25/98

Hazard Summary:

Overall Chemical Hazard: ☐ Serious ☑ Moderate ☐ Low ☐ Unknown

Overall Physical Hazard: ☐ Serious ☐ Moderate ☑ Low ☐ Unknown

B. RESPONSE TEAM

Team Members*	Responsibilities
Tom Beer, Shawn Allen, Mr ~~Robert Schmidt~~, Julian Myers	Team Leader Tom Beer
	Site Safety Officer Tom Beer

*All entries into exclusion zone require Buddy System. All E & E field staff participate in a medical monitoring program and have completed applicable training per 29 CFR 1910.120. Respiratory protection program meets requirements of 29 CFR 1910.134.

C. CHEMICAL/SITE CHARACTERISTICS

Contaminant(s) of Concern: Crude oil, gasoline, fuel oil, and other possible petroleum related organics

Physical State: ☑ Liquid ☑ Solid ☑ Sludge ☑ Gas/Vapor

Contaminant Characteristics:

☑ Flammable ☐ Combustible ☑ Corrosive ☐ Poison ☐ Explosive ☐ Monomer

☐ Reactive ☐ Volatile ☐ Biological ☐ Radioactive ☑ Carcinogen ☐ Medical/Pathogenic

Other:

Physical Hazards of Site:

☐ Overhead ☐ Confined Space* ☐ Below Grade ☑ Trip/Fall ☐ Burn

☐ Puncture ☐ Cut ☐ Noise ☑ Splash ☑ Pit/Pond

☐ Traffic ☑ Heat Stress ☑ Cold Stress ☑ Drums/Tanks

☐ Deteriorated Buildings ☐ Heavy Equipment Operations

Other: Biological (flora, fauna), poison ivy, snakes, fire ants, mosquitoes, ticks, spiders, ~~poison~~ insect repellent, sunscreen

*E & E Confined Space Entry Form Required

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D: HAZARD EVALUATION

Physical Hazards:

No.	Task	Physical Hazards
1	Logbook documentation	slip, trip, face, hot/cold, fire/burn
2	Photodocumentation	slip, trip, face, hot/cold, fire/burn
3	Site access assessments	slip, trip, face, hot/cold, fire/burn
4	Air monitoring (PID-4-gas)	slip, trip, face, hot/cold, fire/burn
5	Measurements - GPS +	splash, slip, trip, face, hot/cold, fire/burn
	Soil & Tape	
		Sun burn for all tasks.

Chemical Hazard Evaluation: See attached Hazard Evaluation Sheets for data on individual chemicals.

Chemical Hazards:

No.	Task	Chemical Hazards	Level of Protection
1	Logbook documentation	Unknown crude fuel oil, benzene, xylene	level D
2	Photodocumentation	"	"
3	Site access assessments	"	"
4	Air monitoring (PID-4-gas)	"	"
5	Measurements - GPS +	"	"
	Soil & Tape		

Modification of Standard Levels of Protection:
Explain: None. Previous investigations by other parties have indicated no vapor threat to workers. All work to be done outdoors. No sampling to be performed, avoid contact with any chemicals, sludges, etc.

Special Precautions:
Be careful not to slip and fall into pond/pit. Be aware of terrain. Walk carefully. Use buddy system.

Current PPE Level	[redacted]ion Levels for Evacuation of Work Zo[redacted]nd[redacted] Reassessment of Conditions	
Level D	O_2 <19.5% or >22%: explosive atmosphere >10% LEL: organic vapors above background levels: particulates >_____ mg/m^3 other: _____	C
Level C	O_2 <19.5% or >22%: explosive atmosphere >10% LEL: unknown organic vapor (in breathing zone) >5 ppm: particulates >_____ mg/m^3: other: _____	B
Level B	O_2 <19.5% or >22%: explosive atmosphere >10% LEL; unknown organic vapors (in breathing zone) >500 ppm: particulates >_____ mg/m^3: other: _____	A

Air Monitoring				
Contaminants of Interest	Type of Sample (Area/ Personal)	Monitoring Equipment	Frequency of Sampling	Odor Threshold
radiation	air/ Near intermittent Area	RTM-4	intermittent in all portions of site	none N/A

Decontamination Procedures/Solutions:

Personnel: Personnel will conduct own decon. Wash after departing site.

Equipment: No PPE

Instruments: N/A RTM-4 for radiation monitoring

E. REGION 6 EQUIPMENT CHECKLIST

Self-contained breathing apparatus (SCBA)		Hard Hat, Shield	
Spare SCBA Tanks		Safety Glasses	✓
5-Minute Escape Tanks		Boots, Leather	✓
APR (GMC-H Cartridges unless otherwise noted) Other: _____	✓	Boots, Neoprene	
		Latex Boot Covers	✓
Coveralls: Clean-guard. ____Saranex ____Tyvek	✓	Hearing Protection	
		Rain Suit	✓
X Cotton Other _____		Insulated Clothing.	
Cotton Clothing	✓	Boots	
Gloves, Inner ( )		Duct Tape	✓
Gloves, Outer (Latex)	✓	Plastic Bags	✓
Facepiece sanitizer			
Other:			
35mm Camera, Film	✓	Safety Plan	✓
Video Camera, Tapes		Log Book, ~~Stamps~~	✓
Intrinsically Safe Flashlight, Batteries		TLDs	✓
Computer with Supplies		Binoculars	
Pathfinder global positioning system (GPS).	✓	Radios	
Other: Poli. Tape	✓	Mobile Telephone	
		Maps	✓
		Compass	
Draeger Pump, Tubes:			
		OVA	
		HNu	
		TVA	
Other:		OVM	
		Passport	
Monitoxes: ____H_2S ____HCN ____Phosgene Other: _____		AIM	
		RAM-4 (Radiation)	✓
Equipment Batteries	✓	MiniRam (Particulates)	
Equipment Chargers		Other:	
Sampling Supplies	✓	Hazcat Kit	
Decon Supplies	✓	pH Paper:	✓
Shipping Supplies	✓	Other:	
Stress Drink Supplies	✓		
First Aid Equipment	✓		

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F. EMERGENCY INFORMATION

E & E Emergency Operations Center (Buffalo)	716/684-8940 (Hotline)
E & E Headquarters	716/684-8060 (Business Hours)
Dr. Paul Jonmaire, Corp. Safety Director	(b) (6) (Home)
Asst. Corp. Safety Director Tom Siener	[redacted] (Home)

Incident Reporting Procedures:

Injuries, illness, exposures: Follow usual E & E procedures. Notify Regional Safety Officer (RSO) or Health and Safety (H/S) Coordinator in office. Call Buffalo (Mary Wdowka) in Personnel during business hours immediately; also contact H/S there. Non-business hours: Call Buffalo 24-Hr. phone number immediately. Both procedures will notify Buffalo H/S. Complete an Incident Report Form (Form IR) ASAP.

Vehicle incidents: Follow procedures attached to safety plan.

G. SITE RESOURCES

NOTE: To Be Completed Prior To Start of Field Work

	Name/Contact	Telephone Number
Ambulance	911	911
Hospital (Bristow, OK)	Bristow Memorial	(918) 367-2215
Poison Control Center	National Center	800/441-0040
Police	911	911
Fire Department	911	911
Client/EPA Contact	Don Smith, OSC	on-site
Site Contact - [illegible]	Shawn Hill (SFE)	(214) 220-0518
E & E Mobile Telephone	NT	NA
STARTL	Chris Quina	972/530-7024
Regional Safety Coordinator	Maxine LaPierre	214/987-4410
Dallas Corporate H/S Coordinator	Fran Verhalen	972/563-6643
Other		

Route to Hospital (Map Attached):

From site: West on unnamed road to 66/(48) south. 48 becomes Main St. in Bristow. ~~Turn left onto~~ right (west) on 7th Street. ~~Go 1 block to 3rd Street.~~ mx
Supposed to be at corner of Spruce and 7th. 7th St. dead ends at the hospital.

Reviewed by: Maxine LaPierre 3/24/98

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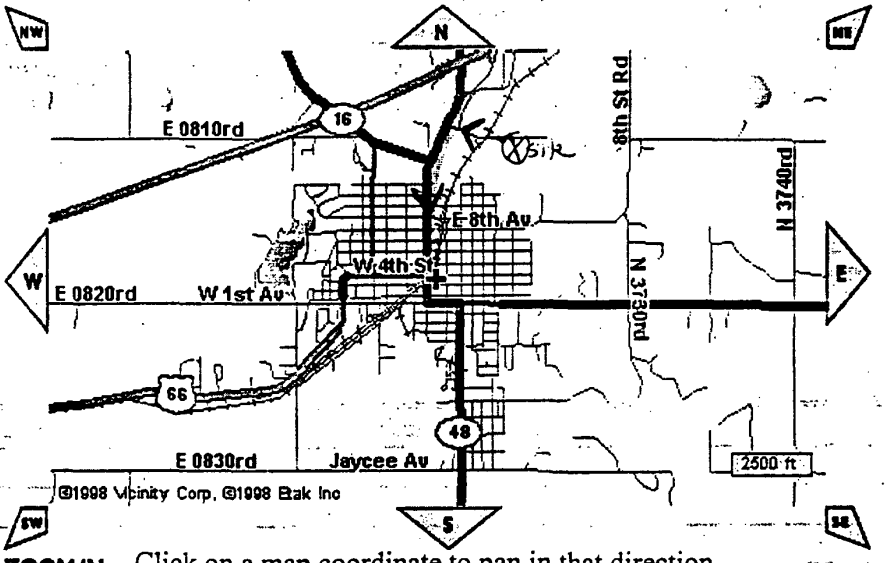
SEARCH RESULTS

Map Location

Bristow Memorial Hospital
7th & Spruce, Bristow, OK, 74010
(918) 367-2215



ZOOM IN Click on a map coordinate to pan in that direction.
ZOOM OUT Click on ZOOM IN and ZOOM OUT to change map magnification.

Hospital at 7th and Spruce
Bristow Memorial Hospital

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Map Location

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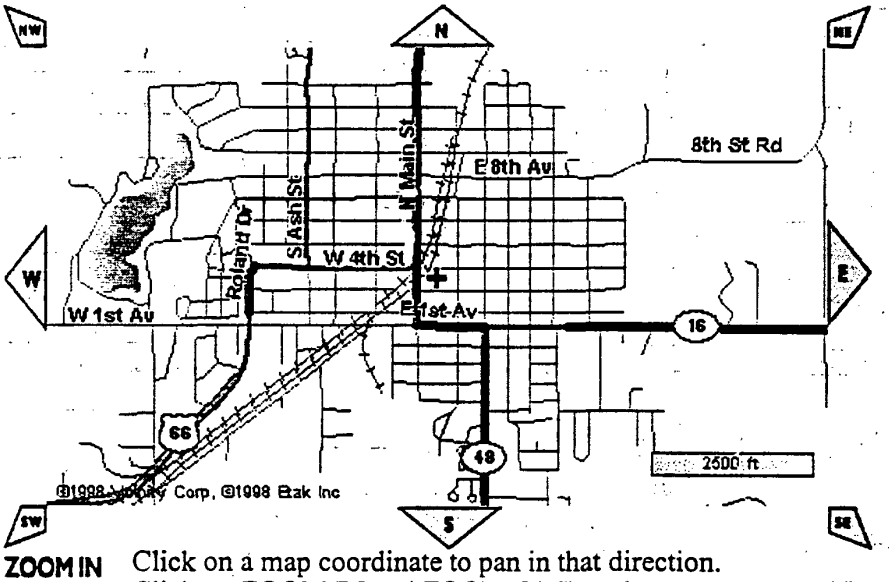

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SEARCH RESULTS

Map Location

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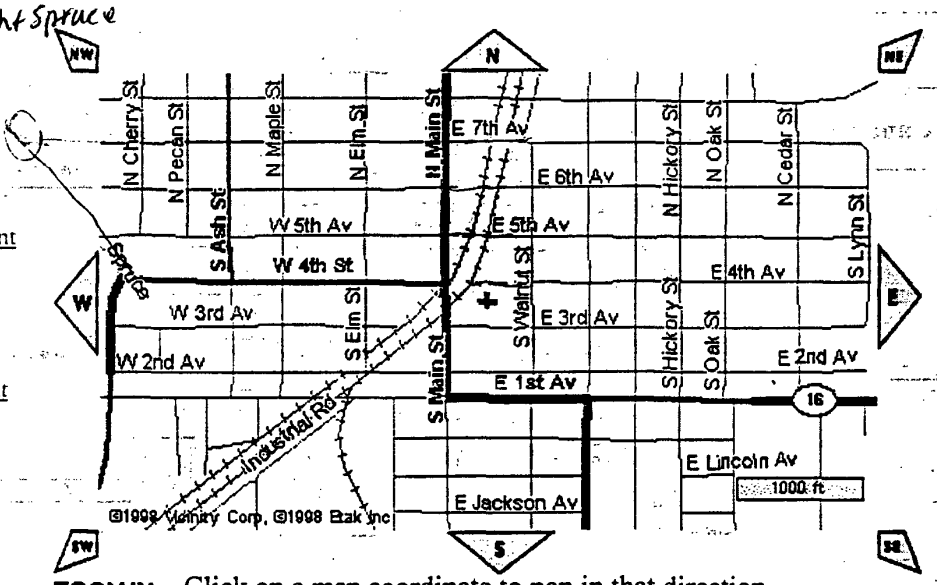
7th & Spruce, Bristow, OK, 74010
(918) 367-2215

7th Spruce



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COLD STRESS PREVENTION AND TREATMENT

Cold temperatures are potentially hazardous, especially when work is conducted without appropriate precautions. The following sections describe cold stress prevention and the recognition and treatment of cold stress emergencies.

Preventing Emergencies Due to Cold Stress

When working in situations where the ambient temperature is low, especially if low temperatures are accompanied by windy conditions, personnel should use the following cold-stress prevention measures:

- Wear warm, dry, loose-fitting clothing that is preferably worn in layers. Outer clothing should be waterproof and windproof. Inner clothing should be capable of retaining warmth even when it is wet (e.g., wool or polypropylene) or have wicking capabilities (to draw moisture and perspiration away from the skin).
- Wear lined and insulated footwear and warm gloves or mittens.
- Alternately remove and don clothing layers as necessary to regulate body temperature and reduce excess perspiration.
- Drink warm fluids as often as desired.
- Take frequent breaks to provide for cold stress monitoring.

Cold Stress Emergencies

Hypothermia. Exposure to cold can cause the body's internal temperature to drop to a dangerously low level. Hypothermia occurs when a person's body loses heat faster than it can be produced. The body's normal deep-body temperature is approximately 98.6 degrees Fahrenheit. If body temperature drops to 95 degrees Fahrenheit, uncontrollable shivering may occur. If cooling continues, these other symptoms may occur:

- Vague, slow, slurred speech;
- Forgetfulness, memory lapses;
- Inability to use hands;
- Frequent stumbling;
- Drowsiness;
- Exhaustion, collapse;
- Unconsciousness; and

- Death.

Hypothermia impairs the judgment of the victim. Hypothermia is possible even in temperatures above freezing and can be prevented by remaining warm and dry and avoiding overexposure to the cold.

If a person shows symptoms of hypothermia, perform the following:

- Remove the victim from exposure to wet and cold weather.
- Remove wet clothing.
- If the victim is only mildly affected, provide warm drinks and dry clothing.
- If the victim is more seriously affected (clumsy, confused, unable to shiver), begin safe-warming procedures such as hugging, wrapping in dry blankets, and the use of warm objects such as hot water bottles or heat packs, and arrange for evacuation. Do not give the victim warm drinks until he or she exhibits a clear level of consciousness and appears to be warming up.

Frostbite. Frostbite occurs when body tissue freezes. Severe frostbite can lead to reduced circulation and the possible need for amputation. To prevent frostbite, maintain good circulation and keep extremities warm and dry. In extreme cold, it is important to prevent heat loss from as many areas of the body as possible. Exposed limbs and the head are major areas of heat loss.

Tall, thin people; those in poor physical condition; people with chronic diseases; heavy smokers; children; the elderly; and those who have been drinking alcohol are more susceptible to frostbite than other people due to poor circulation, poor production of body heat, or both.

There may be no pain or numbness experienced with gradual freezing of body tissues. While in the cold, it is important to test extremities for sensation and ensure that clothing is loose-fitting and warm. Exposed parts of the body should be inspected routinely. Just before freezing, skin becomes bright red. As freezing continues, small white patches will appear and the skin will become less elastic, often remaining pitted after it is touched or squeezed.

Serious freezing is most common in the feet because people are less aware of them, circulation and sensation are poorer, and warm footwear is difficult to obtain. Hands are usually the next to freeze. Exposed parts of the head will freeze less rapidly because they are conditioned to exposure and have a better blood supply.

In very cold weather, avoid touching cold metal with bare body parts. In the event that this happens, release the skin gently using heat, warm water, or urine. Avoid handling gasoline, kerosene, or similar liquids which, when handled in cold weather, can cause immediate frostbite.

If a person shows symptoms of frostbite, consult a medical professional, if possible, and perform the following:

- Initiate rewarming only if subsequent refreezing is not a possibility (thawing and refreezing should always be avoided because this is very injurious to tissue).

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Rewarm body parts in water that is approximately 100 to 105 degrees Fahrenheit. Do not try to thaw the body parts using cold water, snow, or intense heat from fires or stoves. The whole body may be immersed in warm water if necessary.

- If a large portion of an extremity is frozen when rewarming is initiated, the deep body temperature may drop as cooled blood begins to circulate throughout the body. Provide warm liquids to alleviate this situation.

- Move the afflicted part gently and voluntarily during rewarming.

- Use pain medication if it is available. Rewarming can be acutely painful. After thawing is completed, a deep pain may persist for several days, depending on the severity of the frostbite. Pain may be a good sign as it indicates that nerve function is present.

- A dull purple color, swelling, or blisters indicate serious injury and the need for medical attention. Consult a medical professional.

HEAT STRESS PREVENTION AND TREATMENT

Elevated temperatures are potentially hazardous, especially when work is conducted without appropriate precautions. The following sections describe heat stress prevention and the recognition and treatment of heat emergencies.

Effects of Heat

A predictable amount of heat is generated as a result of normal oxidation processes within the body. If heat is liberated rapidly, the body cools to a point at which the production of heat is accelerated, and the excess heat brings the body temperature back to normal.

Interference with the elimination of heat leads to its accumulation and to the elevation of body temperature. This condition produces a vicious cycle in which certain body processes accelerate and generate additional heat. Afterward, the body must eliminate not only the heat that is normally generated but also the additional quantities of heat.

Most body heat is brought to the surface by the bloodstream and escapes to cooler surroundings by conduction and radiation. If moving air or a breeze strikes the body, additional heat is lost by convection. When the temperature of the surrounding air becomes equal to or rises above the body temperature, all the heat must be lost by vaporization of the moisture or sweat from skin surfaces. As the air becomes more humid (contains more moisture), vaporization from the skin decreases. Weather conditions including high temperatures (90 to 100 degrees F), high humidity, and little or no breeze cause the retention of body heat. Such conditions or a succession of such days (a heat wave) increase the chances of a medical emergency due to heat.

Preventing Emergencies Due to Heat

When working in situations where the ambient temperatures and humidity are high, and especially in situations where protection levels A, B, or C are required, the site safety officer should:

- Ensure that all employees drink plenty of fluids (Gatorade or its equivalent);
- Ensure that frequent breaks are scheduled so overheating does not occur; and
- Revise work schedules, when necessary, to take advantage of the cooler parts of the day (i.e., 5:00 a.m. to 11:00 a.m. and 6:00 p.m. to nightfall).

When protective clothing is required, the suggested guidelines correlating ambient temperature and maximum wearing time per excursion are:

Ambient Temperature	Maximum Wearing Time per Excursion
Above 90 degrees F	15 minutes
85 to 90 degrees F	30 minutes
80 to 85 degrees F	60 minutes
70 to 80 degrees F	90 minutes

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60 to 70 degrees F	120 minutes
50 to 60 degrees F	180 minutes

One method of measuring the effectiveness of an employee's rest-recovery regime is by monitoring the heart rate. The "Brouha guideline" is one such method and is performed as follows:

- Count the pulse rate for the **last** 30 seconds of the first minute of a 3-minute period. the **last** 30 seconds of the second minute. and the **last** 30 seconds of the **third** minute: and
- Double each result to yield beats per minute.

If the recovery pulse rate during the last 30 seconds of the first minute is 110 beats/minute or less, and the deceleration between the first. second. and third minutes is **at least** 10 beats/minute. then the work-recovery regime is acceptable. If the employee's rate is above the rate specified. a longer rest period will be required. accompanied by an increased intake of fluids.

Heat Emergencies

Heat Cramps. Heat cramps usually affect people who work in hot environments and perspire a great deal. Loss of salt from the body causes very painful cramps in leg and abdominal muscles. Heat cramps may also result from drinking iced water or other drinks either too quickly or in too large a quantity. The symptoms of heat cramps are:

- Painful muscle cramps in legs and abdomen:
- Faintness: and
- Profuse perspiration.

To provide emergency care for heat cramps. move the patient to a cool place. Give him or her sips of liquids such as Gatorade or its equivalent. Apply manual pressure to the cramped muscle. Move the patient to a hospital if there is any indication of a more serious problem.

Heat Exhaustion. Heat exhaustion also may occur in individuals working in hot environments and may be associated with heat cramps. Heat exhaustion is caused by the pooling of blood in the vessels of the skin. The heat is transported from the interior of the body to the surface by the blood. The skin vessels become dilated and a large amount of blood is pooled in the skin. This condition. plus the blood that is pooled in the lower extremities when in an upright position. may lead to an inadequate return of blood to the heart and eventual physical collapse. The symptoms of heat exhaustion are:

- Weak pulse:
- Rapid and usually shallow breathing:
- Generalized weakness:
- Pale. clammy skin:

- Profuse perspiration:
- Dizziness/faintness: and
- Unconsciousness.

To provide emergency care for heat exhaustion, move the patient to a cool place and remove as much clothing as possible. Have the patient drink cool water, Gatorade, or its equivalent. If possible, fan the patient continually to remove heat by convection, but do not allow chilling or overcooling. Treat the patient for shock and move him or her to a medical facility if there is any indication of a more serious problem.

Heat Stroke. Heat stroke is a profound disturbance of the heat-regulating mechanism and is associated with high fever and collapse. It is a serious threat to life and carries a 20% mortality rate. Sometimes this condition results in convulsions, unconsciousness, and even death. Direct exposure to sun, poor air circulation, poor physical condition, and advanced age (over 40) increase the chance of heat stroke. Alcoholics are extremely susceptible. The symptoms of heat stroke are:

- Sudden onset;
- Dry, hot, and flushed skin;
- Dilated pupils;
- Early loss of consciousness;
- Full and fast pulse;
- Deep breathing at first, followed by shallow or faint breathing;
- Muscle twitching, growing into convulsions; and
- Body temperature reaching 105 to 106 degrees F or higher.

When providing emergency care for heat stroke, remember that it is a life-threatening emergency. Transportation to a medical facility should not be delayed. Move the patient to a cool environment, if possible, and remove as much clothing as possible. Ensure an open airway. Reduce body temperature promptly by dousing the body with water or, preferably, by wrapping the patient in a wet sheet. If cold packs are available, place them under the arms, around the neck, at the ankles, or any place where blood vessels that lie close to the skin can be cooled. Protect the patient from injury during convulsions.

VEHICLE ACCIDENTS, PROPERTY LOSS, THEFT, ETC.

When an accident does occur, it is very important to notify HQ and Regional Office as soon as possible! We have designed a form that covers all the required information for the company and our insurance carrier (see attached). The importance of timely notification of detailed information to HQ cannot be stressed enough.

Call/fax the form to HQ as soon as possible with accident information. Include how and when we can reach you with further instructions or questions.

Here are some pertinent steps that should be followed:

INJURIES
- Notify E & E Personnel Department or Emergency Response Center

RENTAL CAR

- Call police if accident involves another vehicle or injuries.
- Exchange license and registration information.
- Call car rental agency and inform them of the accident. Give them HQ address, phone number, and Administrative Services Department (716/684-8060, Ext. 2802) for future contact.
- If car is not drivable, inform rental agency to provide towing.
- Complete rental agency's accident report form and send copy to HQ along with copy of rental agreement (both sides).

CORPORATE VEHICLE

- Call police if accident involves another vehicle or injuries.
- Exchange license and registration information.
- Notify Headquarters or Region to receive instructions.
- Complete E & E's "Notice of Loss" report and sent to HQ/Region.
- If appropriate, send at least three estimates and purchase requisition (PR), etc. to HQ/Region.

GOVERNMENT EQUIPMENT

The local police need to be summoned regardless of the extent of damage.

All capital equipment items that are missing, stolen, or damaged must be reported to the ZPMO so the appropriate documentation (see attached Report of Theft/Loss, etc.) And reporting to EPA can be conducted. Timely reporting will also facilitate replacement or repair to the item.

Attached to this form should be any police reports, photographs, estimates for replacement or repair, and logbook entries related to the condition of the equipment. If appropriate, include PRs and 7-point justification documents for quick replacement. Equipment that is missing, stolen, or damaged should be reported to the ZPMO within five working days of the incident.

PERSONAL VEHICLE

Personal vehicles used for work are not insured by the company. Though the company pays for mileage, coverage for damage to your car, personal injury, or other involved property is your own responsibility.

Moving violations and traffic tickets received while on the job are entirely the responsibility of the employee.

**Remember - if you are involved in an accident, give only the facts; do not admit fault.

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COLOGY AND ENVIRONMENT, IN
368 Pleasantview Drive
Lancaster, NY 14086
(716)684-8060/FAX: (716)684-0844

NOTICE OF LOSS REPORT
Call/Fax to HQ ASAP

FX _____
Claim Number _____

TYPE OF LOSS
☐ Automobile ☐ Other Liability ☐ Fire ☐ Theft

OWNERSHIP OF VEHICLE
☐ Rental ☐ Government ☐ E & E

Date and Time of Loss: _____

Police or Fire Department to whom reported: _____

Location of Accident or Loss: _____

Road Conditions: _____

Description: _____

_____

_____

Vehicle Information: _____
(Year, Make, Model, License Plate No., VIN No., Rental Agreement No.)

Driver Information: _____
(Name, Address, License No., Date of Birth)

_____

Other Vehicle and Driver Information: _____
(Year, Make, Model, License Plate No., Name, Address, License No., Phone, Alternate Phone No.)

_____

Damage to your vehicle: _____

_____

Damage to other vehicle: _____

_____

Other vehicle or property insured? _____ If yes, name of insurance company, address and policy no.: _____

_____

Injured: _____
(Name, Address, Age, Extent of Injuries, Hospital)

_____

Witnesses: _____
(Name, Address, Phone Numbers)

Additional Information or Remarks: _____

_____

Please attach the following information: Police report, photographs, copy of rental agreement (both sides), and rental accident report. If applicable, send estimates, repair bills, purchase requisition (PR), etc. as soon as possible.

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HAZARD EVALUATION OF CHEMICALS

Chemical Name Crude Oil **Date**

DOT Name/U.N. No. UN 1267 **Job No.**

CAS Number Data Not Available
Data yellow to brown or greenish black, oily liquid

References Consulted (circle):

Merck Index CHRIS (Vol. II) Other: Condensed Chemical Dictionary

NFPA Fire Protection Guide on Hazardous Materials

Chemical Properties: (Synonyms: Petroleum)

Chemical Formula Mixture of Hydrocarbons **Molecular Weight** Mixture

Physical State Liquid **Solubility (H_2O)** Insoluble **Boiling Point** 90-750°F

Flash Point 20-90°F, C.C. **Vapor Pressure/Density** 0.10 psia/ Data Not Available **Freezing Point** N/A

Specific Gravity 0.70-0.98 at 59°F **Odor Characteristic** Acrid **Flammable Limits** Data Not Available

Incompatabilities Nitric Acid

Biological Properties:
TLV-TWA None **PEL** None **Odor/Odor Threshold** Offensive, tarry/ Not Available

IDLH Not Available **Human** Data Not Available **Aquatic** 3 ppm/fresh water fish **Rat/Mouse** - -

Route of Exposure Inhalation, ingestion, dermal contact

Carcinogen May contain carcinogenic components **Teratogen** **Mutagen**

Handling Recommendations: (Personal protective measures)
CHRIS: Wear goggles or face shield; rubber gloves and boots. Avoid contact. Fire hazard: Flammable; no nearby ignition sources; evacuate area of spill. NFPA rating: 1-3-0

Monitoring Recommendations:
OVA: HNu, TVA; Hydrogen sulfide Monitox. Drager pump with Petroleum Hydrocarbon tube.

Disposal/Waste Treatment:
Stop discharge if possible; mechanical containment. Do not discharge into water.

Health Hazards and First Aid:
Flush eyes with water for at least 15 minutes. Wipe off skin and wash with soap and water. Remove contaminated clothing and shoes.

Symptoms: **Acute:** Irritation of eyes and skin. Toxic by ingestion.

Chronic:

TS:1622-07/26/95

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ecology and environment
ecology and environment

OILS: CRUDE

OIL

Common Synonyms	Oily liquid	Dark	Acrid odor
Petroleum	Floats on water. Flammable vapor may be produced.		

Stop discharge if possible. Keep people away
Call fire department.
Avoid contact with liquid.
Isolate and remove discharged material.
Notify local health and pollution control agencies.

Fire

Combustible
Extinguish with dry chemical, foam, or carbon dioxide
Water may be ineffective on fire
Cool exposed containers with water

Exposure

CALL FOR MEDICAL AID

VAPOR
Not irritating to eyes, nose, or throat.

LIQUID
Irritating to skin and eyes.
Remove contaminated clothing and shoes
Flush affected areas with plenty of water.
FOR EYES: Hold eyelids open and flush with plenty of water

Water Pollution

HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS.
Fouling to shoreline.
May be dangerous if it enters water intakes.

Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. RESPONSE TO DISCHARGE

(See Response Methods Handbook)

Mechanical containment
Should be removed
Chemical and physical treatment

2. LABEL

2.1 Category: Flammable liquid
2.2 Class: 3

3. CHEMICAL DESIGNATIONS

3.1 CG Compatibility Class: Miscellaneous Hydrocarbon Mixtures
3.2 Formula: Not applicable
3.3 IMO/UN Designation: 3.1/1267
3.4 DOT ID No.: 1267
3.5 CAS Registry No.: Data not available

4. OBSERVABLE CHARACTERISTICS

4.1 Physical State (as shipped): Liquid
4.2 Color: Dark
4.3 Odor: Offensive; tarry

5. HEALTH HAZARDS

5.1 Personal Protective Equipment: Goggles or face shield; rubber gloves and boots.
5.2 Symptoms Following Exposure: May irritate eyes and skin.
5.3 Treatment of Exposure: EYES: flush with water for at least 15 min. SKIN: wipe off and wash with soap and water.
5.4 Threshold Limit Value: Data not available
5.5 Short Term Inhalation Limits: Data not available
5.6 Toxicity by Ingestion: Data not available
5.7 Late Toxicity: Data not available
5.8 Vapor (Gas) Irritant Characteristics: Vapors are nonirritating to the eyes and throat.
5.9 Liquid or Solid Irritant Characteristics: Minimum hazard. If soiled on clothing and allowed to remain, may cause smarting and reddening of the skin.
5.10 Odor Threshold: Data not available
5.11 IDLH Value: Data not available

6. FIRE HAZARDS

6.1 Flash Point: 20-90°F C.C.
6.2 Flammable Limits in Air: Data not available
6.3 Fire Extinguishing Agents: Dry chemical, foam, or carbon dioxide
6.4 Fire Extinguishing Agents Not to be Used: Water may be ineffective
6.5 Special Hazards of Combustion Products: Not pertinent
6.6 Behavior in Fire: Not pertinent
6.7 Ignition Temperature: Data not available
6.8 Electrical Hazard: Not pertinent
6.9 Burning Rate: 4 mm/min.
6.10 Adiabatic Flame Temperature: Data not available
6.11 Stoichiometric Air to Fuel Ratio: Data not available
6.12 Flame Temperature: Data not available

7. CHEMICAL REACTIVITY

7.1 Reactivity With Water: No reaction
7.2 Reactivity with Common Materials: No reaction
7.3 Stability During Transport: Stable
7.4 Neutralizing Agents for Acids and Caustics: Not pertinent
7.5 Polymerization: Not pertinent
7.6 Inhibitor of Polymerization: Not pertinent
7.7 Molar Ratio (Reactant to Product): Data not available
7.8 Reactivity Group: 33

8. WATER POLLUTION

8.1 Aquatic Toxicity:
3 ppm/*/fresh water fish/toxic/fresh water
200 ppm/24 hr/corals: portes/ 20-90% normal response/salt water
*Time period not specified.
8.2 Waterfowl Toxicity: Data not available
8.3 Biological Oxygen Demand (BOD): Data not available
8.4 Food Chain Concentration Potential: None

9. SHIPPING INFORMATION

9.1 Grades of Purity: Wide variety, depending on oil field where produced.
9.2 Storage Temperature: Ambient
9.3 Inert Atmosphere: No requirement
9.4 Venting: Open (flame arrester)

10. HAZARD ASSESSMENT CODE

(See Hazard Assessment Handbook)

A-T-U

11. HAZARD CLASSIFICATIONS

11.1 Code of Federal Regulations: Flammable liquid
11.2 NAS Hazard Rating for Bulk Water Transportation:

Category	Rating
Fire	1-3
Health	
Vapor Irritant	0
Liquid or Solid Irritant	1
Poisons	1
Water Pollution	
Human Toxicity	1
Aquatic Toxicity	2
Aesthetic Effect	4
Reactivity	
Other Chemicals	0
Water	0
Self Reaction	0

11.3 NFPA Hazard Classification:

Category	Class
Health Hazard (Blue)	1
Flammability (Red)	3
Reactivity (Yellow)	0

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 Physical State at 15°C and 1 atm: Liquid
12.2 Molecular Weight: Not pertinent
12.3 Boiling Point at 1 atm: 90—>750°F = 32—>400°C = 305—>673°K
12.4 Freezing Point: Not pertinent
12.5 Critical Temperature: Not pertinent
12.6 Critical Pressure: Not pertinent
12.7 Specific Gravity: 0.70 0.98 at 15°C (liquid)
12.8 Liquid Surface Tension: 24-38 dynes/cm = 0.024—0.038 N/m at 20°C
12.9 Liquid Water Interfacial Tension: Data not available
12.10 Vapor (Gas) Specific Gravity: Not pertinent
12.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent
12.12 Latent Heat of Vaporization: 140—150 Btu/lb = 78—86 cal/g = 3.2—3.6 X 10^5 J/kg
12.13 Heat of Combustion: —18,252 Btu/lb = —10,140 cal/g = —424.54 X 10^5 J/kg
12.14 Heat of Decomposition: Not pertinent
12.15 Heat of Solution: Not pertinent
12.16 Heat of Polymerization: Not pertinent
12.25 Heat of Fusion: Data not available
12.26 Limiting Value: Data not available
12.27 Reid Vapor Pressure: 0.10 psia

NOTES

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OILS: CRUDE

12.17 SATURATED LIQUID DENSITY		12.18 LIQUID HEAT CAPACITY		12.19 LIQUID THERMAL CONDUCTIVITY		12.20 LIQUID VISCOSITY	
Temperature (degrees F)	Pounds per cubic foot (estimate)	Temperature (degrees F)	British thermal unit per pound-F (estimate)	Temperature (degrees F)	British thermal unit-inch per hour-square foot-F (estimate)	Temperature (degrees F)	Centipoise (estimate)
50	43.700	50	.460	35	.920	50	9.343
52	43.700	52	.461	40	.919	52	8.841
54	43.700	54	.462	45	.918	54	8.370
56	43.700	56	.463	50	.917	56	7.927
58	43.700	58	.464	55	.916	58	7.511
60	43.700	60	.465	60	.915	60	7.119
62	43.700	62	.466	65	.914	62	6.751
64	43.700	64	.467	70	.913	64	6.404
66	43.700	66	.468	75	.912	66	6.078
68	43.700	68	.469	80	.911	68	5.770
70	43.700	70	.470	85	.910	70	5.481
72	43.700	72	.471	90	.909	72	5.207
74	43.700	74	.472			74	4.950
76	43.700	76	.473			76	4.707
78	43.700	78	.474			78	4.477
80	43.700	80	.475			80	4.260
82	43.700	82	.476			82	4.056
84	43.700	84	.477			84	3.862
		86	.478				
		88	.479				
		90	.480				

12.21 SOLUBILITY IN WATER		12.22 SATURATED VAPOR PRESSURE		12.23 SATURATED VAPOR DENSITY		12.24 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch (estimate)	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F
	I	70	.042		N		N
	N	75	.049		O		O
	S	80	.057		T		T
	O	85	.065				
	L	90	.076		P		P
	U	95	.087		E		E
	B	100	.100		R		R
	L	105	.114		T		T
	E	110	.131		I		I
		115	.149		N		N
		120	.170		E		E
		125	.193		N		N
		130	.218		T		T
		135	.247				
		140	.279				
		145	.314				
		150	.352				
		155	.395				
		160	.443				
		165	.495				
		170	.552				
		175	.615				
		180	.683				
		185	.758				
		190	.841				
		195	.930				

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KEROSENE

KRS

Common Synonyms	Watery liquid	Colorless	Fuel oil odor
Illuminating oil Kerosine Range oil Fuel oil No. 1 Jet Fuel: JP-1	Floats on water.		

Stop discharge if possible.
Call fire department.
Avoid contact with liquid.
Isolate and remove discharged material.
Notify local health and pollution control agencies

Fire

Combustible.
Extinguish with dry chemical, foam, or carbon dioxide.
Water may be ineffective on fire.
Cool exposed containers with water.

Exposure

CALL FOR MEDICAL AID.

LIQUID
Irritating to skin and eyes.
Harmful if swallowed.
Remove contaminated clothing and shoes.
Flush affected areas with plenty of water.
IF IN EYES, hold eyelids open and flush with plenty of water.
IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk.
DO NOT INDUCE VOMITING.

Water Pollution

Dangerous to aquatic life in high concentrations.
Fouling to shoreline.
May be dangerous if it enters water intakes.

Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. RESPONSE TO DISCHARGE

(See Response Methods Handbook)

Mechanical containment
Should be removed
Chemical and physical treatment

2. LABEL

2.1 **Category:** None
2.2 **Class:** Not pertinent

3. CHEMICAL DESIGNATIONS

3.1 **CG Compatibility Class:** Miscellaneous Hydrocarbon Mixtures
3.2 **Formula:** C_nH_{2n+2}
3.3 **IMO/UN Designation:** 3.3/1223
3.4 **DOT ID No.:** 1223
3.5 **CAS Registry No.:** 8008-20-6

4. OBSERVABLE CHARACTERISTICS

4.1 **Physical State (as shipped):** Liquid
4.2 **Color:** Colorless to light brown
4.3 **Odor:** Characteristic

5. HEALTH HAZARDS

5.1 **Personal Protective Equipment:** Protective gloves; goggles or face shield.
5.2 **Symptoms Following Exposure:** Vapor causes slight irritation of eyes and nose. Liquid irritates stomach; if taken into lungs, causes coughing, distress, and rapidly developing pulmonary edema.
5.3 **Treatment of Exposure:** ASPIRATION: enforce bed rest; administer oxygen; call a doctor. INGESTION: do NOT induce vomiting; call a doctor. EYES: wash with plenty of water. SKIN: wipe off and wash with soap and water.
5.4 **Threshold Limit Value:** 200 ppm
5.5 **Short Term Inhalation Limits:** 2500 mg/m³ for 60 min.
5.6 **Toxicity by Ingestion:** Grade 1; LD_{50} = 5 to 15 g/kg
5.7 **Late Toxicity:** Data not available
5.8 **Vapor (Gas) Irritant Characteristics:** Vapors cause a slight smarting of the eyes or respiratory system if present in high concentrations. The effect is temporary.
5.9 **Liquid or Solid Irritant Characteristics:** Minimum hazard, if spilled on clothing and allowed to remain, may cause smarting and reddening of the skin.
5.10 **Odor Threshold:** 1 ppm
5.11 **IDLH Value:** Data not available

6. FIRE HAZARDS

6.1 **Flash Point:** 100°F (min.)C.C.
6.2 **Flammable Limits in Air:** 0.7%-5%
6.3 **Fire Extinguishing Agents:** Foam, dry chemical, or carbon dioxide
6.4 **Fire Extinguishing Agents Not to be Used:** Water may be ineffective
6.5 **Special Hazards of Combustion Products:** Not pertinent
6.6 **Behavior in Fire:** Not pertinent
6.7 **Ignition Temperature:** 444°F
6.8 **Electrical Hazard:** Not pertinent
6.9 **Burning Rate:** 4 mm/min.
6.10 **Adiabatic Flame Temperature:** Data not available
6.11 **Stoichiometric Air to Fuel Ratio:** Data not available
6.12 **Flame Temperature:** Data not available

7. CHEMICAL REACTIVITY

7.1 **Reactivity With Water:** No reaction
7.2 **Reactivity with Common Materials:** No reaction
7.3 **Stability During Transport:** Stable
7.4 **Neutralizing Agents for Acids and Caustics:** Not pertinent
7.5 **Polymerization:** Not pertinent
7.6 **Inhibitor of Polymerization:** Not pertinent
7.7 **Molar Ratio (Reactant to Product):** Data not available
7.8 **Reactivity Group:** 33

8. WATER POLLUTION

8.1 **Aquatic Toxicity:** 2990 ppm/24 hr/bluegill/TL_m/fresh water
8.2 **Waterfowl Toxicity:** Data not available
8.3 **Biological Oxygen Demand (BOD):** 53%, 5 days
8.4 **Food Chain Concentration Potential:** None

9. SHIPPING INFORMATION

9.1 **Grades of Purity:** Light hydrocarbon distillate: 100%
9.2 **Storage Temperature:** Ambient
9.3 **Inert Atmosphere:** No requirement
9.4 **Venting:** Open (flame arrester)

10. HAZARD ASSESSMENT CODE

(See Hazard Assessment Handbook)

A-T-U

11. HAZARD CLASSIFICATIONS

11.1 **Code of Federal Regulations:** Combustible liquid
11.2 **NAS Hazard Rating for Bulk Water Transportation:**

Category	Rating
Fire	2
Health	
Vapor irritant	1
Liquid or Solid Irritant	1
Poisons	1
Water Pollution	
Human Toxicity	1
Aquatic Toxicity	1
Aesthetic Effect	3
Reactivity	
Other Chemicals	0
Water	0
Self Reaction	0

11.3 **NFPA Hazard Classification:**

Category	Classification
Health Hazard (Blue)	0
Flammability (Red)	2
Reactivity (Yellow)	0

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 **Physical State at 15°C and 1 atm:** Liquid
12.2 **Molecular Weight:** Not pertinent
12.3 **Boiling Point at 1 atm:** 392-500°F = 200—260°C = 473—533°K
12.4 **Freezing Point:** —50°F = —45.6°C = 227.6°K
12.5 **Critical Temperature:** Not pertinent
12.6 **Critical Pressure:** Not pertinent
12.7 **Specific Gravity:** 0.80 at 15°C (liquid)
12.8 **Liquid Surface Tension:** 23-32 dynes/cm = 0.023-0.032 N/m at 20°C
12.9 **Liquid Water Interfacial Tension:** 47-49 dynes/cm = 0.047-0.049 N/m at 20°C
12.10 **Vapor (Gas) Specific Gravity:** Not pertinent
12.11 **Ratio of Specific Heats of Vapor (Gas):** Not pertinent
12.12 **Latent Heat of Vaporization:** 110 Btu/lb = 60 cal/g = 2.5×10^5 J/kg
12.13 **Heat of Combustion:** —18,540 Btu/lb = —10,300 cal/g = —431.24 $\times 10^5$ J/kg
12.14 **Heat of Decomposition:** Not pertinent
12.15 **Heat of Solution:** Not pertinent
12.16 **Heat of Polymerization:** Not pertinent
12.25 **Heat of Fusion:** Data not available
12.26 **Limiting Value:** Data not available
12.27 **Reid Vapor Pressure:** 0.1 psia

NOTES

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KRS

KEROSENE

12.17 SATURATED LIQUID DENSITY

Temperature (degrees F)	Pounds per cubic foot
34	50.810
36	50.740
38	50.670
40	50.600
42	50.530
44	50.460
46	50.390
48	50.320
50	50.250
52	50.180
54	50.110
56	50.040
58	49.970
60	49.900
62	49.830
64	49.760
66	49.700
68	49.630
70	49.560
72	49.490
74	49.420
76	49.350
78	49.280
80	49.210
82	49.140
84	49.070

12.18 LIQUID HEAT CAPACITY

Temperature (degrees F)	British thermal unit per pound-F
0	.434
10	.439
20	.444
30	.449
40	.454
50	.459
60	.464
70	.469
80	.474
90	.479
100	.484
110	.489
120	.494
130	.499
140	.504
150	.509
160	.514
170	.519
180	.524
190	.529
200	.534
210	.539

12.19 LIQUID THERMAL CONDUCTIVITY

Temperature (degrees F)	British thermal unit-inch per hour-square foot-F
0	.926
10	.924
20	.921
30	.919
40	.917
50	.915
60	.913
70	.911
80	.909
90	.907
100	.905
110	.903
120	.901
130	.899
140	.897
150	.895
160	.893
170	.891
180	.889
190	.887
200	.885
210	.883

12.20 LIQUID VISCOSITY

Temperature (degrees F)	Centipoise
—35	6.727
—30	6.065
—25	5.482
—20	4.965
—15	4.508
—10	4.101
—5	3.739
0	3.416
5	3.127
10	2.867
15	2.634
20	2.424
25	2.235
30	2.064
35	1.909
40	1.768
45	1.641
50	1.525
55	1.419
60	1.322
65	1.233
70	1.152
75	1.078

12.21 SOLUBILITY IN WATER

Temperature (degrees F)	Pounds per 100 pounds of water
	I
	N
	S
	O
	L
	U
	B
	L
	E

12.22 SATURATED VAPOR PRESSURE

Temperature (degrees F)	Pounds per square inch
70	.041
80	.056
90	.075
100	.099
110	.130
120	.168
130	.217
140	.277
150	.350
160	.440
170	.548
180	.679
190	.835
200	1.021
210	1.241
220	1.500
230	1.802
240	2.154
250	2.562
260	3.033
270	3.573
280	4.192
290	4.896
300	5.695

12.23 SATURATED VAPOR DENSITY

Temperature (degrees F)	Pounds per cubic foot
	N
	O
	T
	P
	E
	R
	T
	I
	N
	E
	N
	T

12.24 IDEAL GAS HEAT CAPACITY

Temperature (degrees F)	British thermal unit per pound-F
	D
	A
	T
	A
	N
	O
	T
	A
	V
	A
	I
	L
	A
	B
	L
	E

recycled paper
recycled paper
ecology and environment
ecology and environment

ecology and environment, inc.

HAZARD EVALUATION OF CHEMICALS

Chemical Name Diesel Oils — Date

DOT Name/U.N. No. UN 1270 — Job No.

CAS Number Not Available

References Consulted (circle):
Condensed Chemical Dictionary — CHRIS (Vol. II)
NFPA Fire Protection Guide on Hazardous Materials

Chemical Properties: (Synonyms: Mixture of Fuel Oil 1-D and Fuel Oil 2-D; Mixture of Light Diesel Oil and Medium Diesel Oil)

Chemical Formula: Mixture of hydrocarbons — Molecular Weight: Mixture-not pertinent

Physical State: Liquid-yellow brown — Solubility (H_2O): Essentially Insoluble; floats on water — Boiling Point: 1-D: 380-560°F; 2-D: 540-640°F

Flash Point: 1-D: 100°F min.; 2-D: 125°F min. — Vapor Pressure/Density: V.P. at 70°F; 1-D=0.04 psi; 2-D=0.5 psi — Freezing Point: 1-D: -30°F; 2-D: 0°F

Specific Gravity (liquid): 0.841 @ 16°C (60.8°F) — Odor Characteristic: lube or fuel oil odor; odor threshold - 1-D = 0.7 ppm — Flammable Limits: 1.3 to 6.0% (Vol)

Incompatibilities: Strong oxidizing materials

Biological Properties:

TLV-TWA: None — PEL: None — Odor/Odor Threshold: Not available

IDLH: Not Available — Human: LD_{50} 5-15g/kg (by ingestion) — Aquatic: 1) 204 mg/l for 24 hr young Amer. shad in salt water; 2) 20 mg/kg LD_{50} for Mallards — Rat/Mouse:

Route of Exposure: Ingestion, dermal contact

Carcinogen — Teratogen — Mutagen

Handling Recommendations: (Personal protective measures)
Level C (CHRIS: protective gloves, goggles or face shield). Combustible. NFPA ratings: 1-D = 0-2-0; 2-D = 0-2-0.

Monitoring Recommendations:
HNu, OVA, TVA, O_2/Explosimeter, Draeger pump with tube-Petroleum Hydrocarbons. (Non-specific & variable responses - diesel a mixture). Because of low volatility, not good monitoring with OVA, etc.

Disposal/Waste Treatment:
Do not discharge into water or onto land. Collect disposable PPE, sampling equipment, etc. & dispose of as designated by client.

Health Hazards and First Aid:
Immediate medical attention if ingested, inhaled or aspirated. Do not induce vomiting if ingested. If conscious, give milk or water. Dermal: wash with soap and water; remove contaminated clothing. Eyes: hold open and flush with plenty of water.

Symptoms: Acute: Eye and skin irritation. If ingested, increased frequency of bowel movements, nausea, vomiting. Inhalation: headache, giddiness. Aspiration: severe lung irritation, cough, shortness of breath.

TS:1622-07/26/95

OILS, FUEL: 2-D

OTD

Common Synonyms			
Diesel oil, medium	Oily liquid	Yellow-brown	Lube or fuel oil odor
	Floats on water.		

Stop discharge if possible.
Call fire department.
Avoid contact with liquid.
Isolate and remove discharged material.
Notify local health and pollution control agencies.

Fire

Combustible.
Extinguish with dry chemical, foam, carbon dioxide.
Water may be ineffective on fire.
Cool exposed containers with water.

Exposure

CALL FOR MEDICAL AID.

LIQUID
Irritating to skin and eyes.
Harmful if swallowed.
Remove contaminated clothing and shoes.
Flush affected areas with plenty of water.
IF IN EYES, hold eyelids open and flush with plenty of water.
IF SWALLOWED, and victim is CONSCIOUS, have victim drink water or milk.
DO NOT INDUCE VOMITING.

Water Pollution

Dangerous to aquatic life in high concentrations.
Fouling to shoreline.
May be dangerous if it enters water intakes.

Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. RESPONSE TO DISCHARGE

(See Response Methods Handbook)

Mechanical containment
Should be removed
Chemical and physical treatment

2. LABEL

2.1 Category: None
2.2 Class: Not pertinent

3. CHEMICAL DESIGNATIONS

3.1 CG Compatibility Class: Miscellaneous Hydrocarbon Mixtures
3.2 Formula: Not applicable
3.3 IMO/UN Designation: 3.1/1270
3.4 DOT ID No.: 1270
3.5 CAS Registry No.: Data not available

4. OBSERVABLE CHARACTERISTICS

4.1 Physical State (as shipped): Liquid
4.2 Color: Light brown
4.3 Odor: Characteristic

5. HEALTH HAZARDS

5.1 Personal Protective Equipment: Protective gloves; goggles or face shield.
5.2 Symptoms Following Exposure: INGESTION causes nausea, vomiting, and cramping; depression of central nervous system ranging from mild headache to anesthesia, coma, and death; pulmonary irritation secondary to exhalation of solvent; signs of kidney and liver damage may be delayed. ASPIRATION causes severe lung irritation with coughing, gagging, dyspnea, substernal distress, and rapidly developing pulmonary edema; later, signs of bronchopneumonia and pneumonitis; acute onset of central nervous system excitement followed by depression.
5.3 Treatment of Exposure: INGESTION: do NOT induce vomiting. ASPIRATION: enforce bed rest; administer oxygen; seek medical attention. EYES: wash with copious quantity of water. SKIN: remove solvent by wiping and wash with soap and water.
5.4 Threshold Limit Value: No single TLV applicable.
5.5 Short Term Inhalation Limits: Data not available
5.6 Toxicity by Ingestion: Grade 1: LD_{50} = 5-15 g/kg
5.7 Late Toxicity: Data not available
5.8 Vapor (Gas) Irritant Characteristics: Slight smarting of eyes or respiratory system if present in high concentrations. The effect is temporary.
5.9 Liquid or Solid Irritant Characteristics: Minimum hazard. If spilled on clothing and allowed to remain, may cause smarting and reddening of skin.
5.10 Odor Threshold: Data not available
5.11 IDLH Value: Data not available

6. FIRE HAZARDS

6.1 Flash Point: 125°F C.C.
6.2 Flammable Limits in Air: 1.3%-6.0%
6.3 Fire Extinguishing Agents: Dry chemical, foam, or carbon dioxide
6.4 Fire Extinguishing Agents Not to be Used: Water may be ineffective
6.5 Special Hazards of Combustion Products: Not pertinent
6.6 Behavior in Fire: Not pertinent
6.7 Ignition Temperature: 490—545°F
6.8 Electrical Hazard: Not pertinent
6.9 Burning Rate: 4 mm/min.
6.10 Adiabatic Flame Temperature: Data not available
6.11 Stoichiometric Air to Fuel Ratio: Data not available
6.12 Flame Temperature: Data not available

7. CHEMICAL REACTIVITY

7.1 Reactivity With Water: No reaction
7.2 Reactivity with Common Materials: No reaction
7.3 Stability During Transport: Stable
7.4 Neutralizing Agents for Acids and Caustics: Not pertinent
7.5 Polymerization: Not pertinent
7.6 Inhibitor of Polymerization: Not pertinent
7.7 Molar Ratio (Reactant to Product): Data not available
7.8 Reactivity Group: 33

8. WATER POLLUTION

8.1 Aquatic Toxicity: 204 mg/l/24 hr/juvenile American shad/TL_m/salt water
8.2 Waterfowl Toxicity: Data not available
8.3 Biological Oxygen Demand (BOD): Data not available
8.4 Food Chain Concentration Potential: None

9. SHIPPING INFORMATION

9.1 Grades of Purity: Diesel fuel 2-D (ASTM)
9.2 Storage Temperature: Ambient
9.3 Inert Atmosphere: No requirement
9.4 Venting: Open (flame arrester)

10. HAZARD ASSESSMENT CODE

(See Hazard Assessment Handbook)

A-T-U

11. HAZARD CLASSIFICATIONS

11.1 Code of Federal Regulations: Combustible liquid
11.2 NAS Hazard Rating for Bulk Water Transportation: Not listed
11.3 NFPA Hazard Classification:

Category	Classification
Health Hazard (Blue)	0
Flammability (Red)	2
Reactivity (Yellow)	0

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 Physical State at 15°C and 1 atm: Liquid
12.2 Molecular Weight: Not pertinent
12.3 Boiling Point at 1 atm: 540—640°F = 282—338°C = 555—611°K
12.4 Freezing Point: 0°F = -18°C = 255°K
12.5 Critical Temperature: Not pertinent
12.6 Critical Pressure: Not pertinent
12.7 Specific Gravity: 0.87—0.90 at 20°C (liquid)
12.8 Liquid Surface Tension: Data not available
12.9 Liquid Water Interfacial Tension: Data not available
12.10 Vapor (Gas) Specific Gravity: Not pertinent
12.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent
12.12 Latent Heat of Vaporization: Not pertinent
12.13 Heat of Combustion: —19,440 Btu/lb = —10,800 cal/g = —452.17 X 10^3 J/kg
12.14 Heat of Decomposition: Not pertinent
12.15 Heat of Solution: Not pertinent
12.16 Heat of Polymerization: Not pertinent
12.25 Heat of Fusion: Data not available
12.26 Limiting Value: Data not available
12.27 Reid Vapor Pressure: Data not available

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OILS, FUEL: 2-D

12.17 SATURATED LIQUID DENSITY

Temperature (degrees F)	Pounds per cubic foot (estimate)
50	54.310
52	54.310
54	54.310
56	54.310
58	54.310
60	54.310
62	54.310
64	54.310
66	54.310
68	54.310
70	54.310
72	54.310
74	54.310
76	54.310
78	54.310
80	54.310
82	54.310
84	54.310

12.18 LIQUID HEAT CAPACITY

Temperature (degrees F)	British thermal unit per pound-F
0	.414
5	.416
10	.419
15	.421
20	.424
25	.426
30	.428
35	.431
40	.433
45	.436
50	.438
55	.440
60	.443
65	.445
70	.448
75	.450
80	.452
85	.455
90	.457
95	.460
100	.462

12.19 LIQUID THERMAL CONDUCTIVITY

Temperature (degrees F)	British thermal unit-inch per hour-square foot-F
35	.908
40	.908
45	.908
50	.908
55	.908
60	.908
65	.908
70	.908
75	.908
80	.908
85	.908
90	.908
95	.908
100	.908
105	.908
110	.908
115	.908
120	.908
125	.908

12.20 LIQUID VISCOSITY

Temperature (degrees F)	Centipoise
0	3.773
10	3.397
20	3.071
30	2.788
40	2.541
50	2.324
60	2.134
70	1.965
80	1.815
90	1.681
100	1.561
110	1.454
120	1.358
130	1.270
140	1.191
150	1.120
160	1.054
170	.995
180	.940
190	.890
200	.844
210	.802

12.21 SOLUBILITY IN WATER

Temperature (degrees F)	Pounds per 100 pounds of water
	I
	N
	S
	O
	L
	U
	B
	L
	E

12.22 SATURATED VAPOR PRESSURE

Temperature (degrees F)	Pounds per square inch
55	.456
60	.474
65	.492
70	.510
75	.529
80	.548
85	.567
90	.587
95	.607
100	.627
105	.647
110	.668
115	.689
120	.711
125	.732
130	.754

12.23 SATURATED VAPOR DENSITY

Temperature (degrees F)	Pounds per cubic foot
	N
	O
	T
	P
	E
	R
	T
	I
	N
	E
	N
	T

12.24 IDEAL GAS HEAT CAPACITY

Temperature (degrees F)	British thermal unit per pound-F
	N
	O
	T
	P
	E
	R
	T
	I
	N
	E
	N
	T

NAPHTHA: COAL TAR

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Common Synonyms	Watery liquid	Colorless to pale yellow	Gasoline-like odor
Mixture of benzene, toluene, xylenes	Floats on water. Irritating vapor is produced.		

Stop discharge if possible. Keep people away.
Call fire department.
Avoid contact with liquid and vapor.
Stay upwind and use water spray to "knock down" vapor.
Isolate and remove discharged material.
Notify local health and pollution control agencies.

Fire

Combustible.
Extinguish with foam, dry chemical or carbon dioxide.
Cool exposed containers with water.

Exposure

CALL FOR MEDICAL AID.

VAPOR
Irritating to eyes, nose and throat.
If inhaled, will cause dizziness, headache, difficult breathing or loss of consciousness.
Move to fresh air.
If breathing has stopped, give artificial respiration.
If breathing is difficult, give oxygen.

LIQUID
Irritating to skin and eyes.
If swallowed, will cause nausea or vomiting.
Remove contaminated clothing and shoes.
Flush affected areas with plenty of water.
IF IN EYES, hold eyelids open and flush with plenty of water.
IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk.
DO NOT INDUCE VOMITING.

Water Pollution

Effect of low concentrations on aquatic life is unknown.
Fouling to shoreline.
May be dangerous if it enters water intakes.

Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. RESPONSE TO DISCHARGE

(See Response Methods Handbook)

Mechanical containment
Should be removed
Chemical and physical treatment

2. LABEL

2.1 Category: None
2.2 Class: Not pertinent

3. CHEMICAL DESIGNATIONS

3.1 CG Compatibility Class: Miscellaneous Hydrocarbon Mixtures
3.2 Formula: Data not available
3.3 IMO/UN Designation: 3.2/2553
3.4 DOT ID No.: 2553
3.5 CAS Registry No.: MX8030-31-7

4. OBSERVABLE CHARACTERISTICS

4.1 Physical State (as shipped): Liquid
4.2 Color: Colorless to pale yellow
4.3 Odor: Like benzene, toluene, and xylene

5. HEALTH HAZARDS

5.1 Personal Protective Equipment: Hydrocarbon vapor canister or air pack; plastic gloves; goggles or face shield.
5.2 Symptoms Following Exposure: Primarily a narcotic, causing unconsciousness in high concentrations. The symptoms of acute benzene poisoning are not likely, since the compound has components other than benzene.
5.3 Treatment of Exposure: Remove from exposure. Support respiration. Call physician.
5.4 Threshold Limit Value: 100 ppm
5.5 Short Term Inhalation Limits: 75 ppm for 30 min.
5.6 Toxicity by Ingestion: Grade 3; LD_{50} = 50 to 500 mg/kg
5.7 Late Toxicity: Leukemia
5.8 Vapor (Gas) Irritant Characteristics: Vapors cause a slight smarting of the eyes or respiratory system if present in high concentrations. The effect is temporary.
5.9 Liquid or Solid Irritant Characteristics: Minimum hazard. If spilled on clothing and allowed to remain, may cause a smarting and reddening of the skin.
5.10 Odor Threshold: 4.68 ppm
5.11 IDLH Value: 10,000 ppm

6. FIRE HAZARDS

6.1 Flash Point: 107°F C.C.
6.2 Flammable Limits in Air: Data not available
6.3 Fire Extinguishing Agents: Foam, carbon dioxide, or dry chemical
6.4 Fire Extinguishing Agents Not to be Used: Not pertinent
6.5 Special Hazards of Combustion Products: Not pertinent
6.6 Behavior in Fire: Not pertinent
6.7 Ignition Temperature: 900—950°F
6.8 Electrical Hazard: Class I, Group D
6.9 Burning Rate: 4 mm/min.
6.10 Adiabatic Flame Temperature: Data not available
6.11 Stoichiometric Air to Fuel Ratio: Data not available
6.12 Flame Temperature: Data not available

7. CHEMICAL REACTIVITY

7.1 Reactivity With Water: No reaction
7.2 Reactivity with Common Materials: No reaction
7.3 Stability During Transport: Stable
7.4 Neutralizing Agents for Acids and Caustics: Not pertinent
7.5 Polymerization: Not pertinent
7.6 Inhibitor of Polymerization: Not pertinent
7.7 Molar Ratio (Reactant to Product): Data not available
7.8 Reactivity Group: 33

8. WATER POLLUTION

8.1 Aquatic Toxicity: Data not available
8.2 Waterfowl Toxicity: Data not available
8.3 Biological Oxygen Demand (BOD): Data not available
8.4 Food Chain Concentration Potential: None

9. SHIPPING INFORMATION

9.1 Grades of Purity: Purity varies with coal used and distillation range taken.
9.2 Storage Temperature: Ambient
9.3 Inert Atmosphere: No requirement
9.4 Venting: Open (flame arrester)

10. HAZARD ASSESSMENT CODE

(See Hazard Assessment Handbook)

A-T-U-V-W

11. HAZARD CLASSIFICATIONS

11.1 Code of Federal Regulations: Combustible liquid
11.2 NAS Hazard Rating for Bulk Water Transportation: Not listed
11.3 NFPA Hazard Classification: Not listed

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 Physical State at 15°C and 1 atm: Liquid
12.2 Molecular Weight: Not pertinent
12.3 Boiling Point at 1 atm: 200—500°F = 93—260°C = 366-533°K
12.4 Freezing Point: Not pertinent
12.5 Critical Temperature: Not pertinent
12.6 Critical Pressure: Not pertinent
12.7 Specific Gravity: 0.86—0.88 at 20°C (liquid)
12.8 Liquid Surface Tension: (est.) 20 dynes/cm = 0.020 N/m at 20°C
12.9 Liquid Water Interfacial Tension: (est.) 45 dynes/cm = 0.045 N/m at 20°C
12.10 Vapor (Gas) Specific Gravity: Data not available
12.11 Ratio of Specific Heats of Vapor (Gas): (est.) 1.030
12.12 Latent Heat of Vaporization: (est.) 101 Btu/lb = 56.2 cal/g = 2.35 X 10^5 J/kg
12.13 Heat of Combustion: (est.) —18,200 Btu/lb = —10,100 cal/g = —424 X 10^5 J/kg
12.14 Heat of Decomposition: Not pertinent
12.15 Heat of Solution: Not pertinent
12.16 Heat of Polymerization: Not pertinent
12.25 Heat of Fusion: Data not available
12.26 Limiting Value: Data not available
12.27 Reid Vapor Pressure: 0.13 psia

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NAPHTHA: COAL TAR

12.17 SATURATED LIQUID DENSITY		12.18 LIQUID HEAT CAPACITY		12.19 LIQUID THERMAL CONDUCTIVITY		12.20 LIQUID VISCOSITY	
Temperature (degrees F)	Pounds per cubic foot (estimate)	Temperature (degrees F)	British thermal unit per pound-F (estimate)	Temperature (degrees F)	British thermal unit-inch per hour-square foot-F (estimate)	Temperature (degrees F)	Centipoise (estimate)
50	53.680	50	.478	50	1.040	50	9.343
52	53.680	52	.478	52	1.040	52	8.841
54	53.680	54	.478	54	1.040	54	8.370
56	53.680	56	.478	56	1.040	56	7.927
58	53.680	58	.478	58	1.040	58	7.511
60	53.680	60	.478	60	1.040	60	7.119
62	53.680	62	.478	62	1.040	62	6.751
64	53.680	64	.478	64	1.040	64	6.404
66	53.680	66	.478	66	1.040	66	6.078
68	53.680	68	.478	68	1.040	68	5.770
70	53.680	70	.478	70	1.040	70	5.481
72	53.680	72	.478	72	1.040	72	5.207
74	53.680	74	.478	74	1.040	74	4.950
76	53.680	76	.478	76	1.040	76	4.707
78	53.680	78	.478	78	1.040	78	4.477
80	53.680	80	.478	80	1.040	80	4.260
82	53.680	82	.478	82	1.040	82	4.056
84	53.680	84	.478	84	1.040	84	3.862
86	53.680	86	.478	86	1.040	86	3.679
88	53.680	88	.478	88	1.040	88	3.506
90	53.680	90	.478	90	1.040	90	3.342
92	53.680	92	.478	92	1.040	92	3.187
94	53.680	94	.478	94	1.040	94	3.040
96	53.680	96	.478	96	1.040	96	2.901
98	53.680	98	.478	98	1.040	98	2.770
100	53.680	100	.478	100	1.040	100	2.645

12.21 SOLUBILITY IN WATER		12.22 SATURATED VAPOR PRESSURE		12.23 SATURATED VAPOR DENSITY		12.24 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch (estimate)	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F
	I	90	.094		N		D
	N	100	.124		O		A
	S	110	.163		T		T
	O	120	.211				A
	L	130	.272		P		
	U	140	.347		E		N
	B	150	.440		R		O
	L	160	.553		T		T
	E	170	.691		I		
		180	.856		N		A
		190	1.054		E		V
		200	1.290		N		A
		210	1.569		T		I
		220	1.897				L
		230	2.281				A
		240	2.728				B
		250	3.247				L
		260	3.846				E
		270	4.535				
		280	5.323				
		290	6.221				
		300	7.241				
		310	8.394				
		320	9.695				
		330	11.160				
		340	12.790				

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HAZARD EVALUATION OF CHEMICALS

Chemical Name Tetraethyl lead **Date**

DOT Name/U.N. No. UN 1649 **Job No.**

CAS Number 78-00-2

Colorless liquid; usually dyed red or other distinctive color (ex. orange or blue)

References Consulted (circle):

NIOSH/OSHA Pocket Guide Merck Index CHRIS (Vol. II)

ACGIH TLV Book **Other:** NIOSH Guidelines to Chemical Hazards

NFPA Fire Protection Guide on Hazardous Materials

Chemical Properties: (Synonyms: Lead tetraethyl; TEL; motor fuel antiknock compound)

Chemical Formula $Pb(C_2H_5)_4$ **Molecular Weight** 323.44

Physical State Liquid **Solubility (H_2O)** Insoluble **Boiling Point** Decomposes above 212°F

Flash Point 200°F **Vapor Pressure/Density** 0.2 mm Hg Vapor density: 8.6 **Freezing Point** -215 to -202°F

Specific Gravity 1.6 at 20°C (68°F) **Odor Characteristic** Fruity; sweet; musty **Flammable Limits** UEL = ? LEL = 1.8%

Incompatabilities Rust, strong oxidizers, some metals

Biological Properties:

TLV-TWA 0.1 mg/m³ (as lead) **PEL** 0.075 mg/m³ **Odor/Odor Threshold** Not Available

IDLH 40 mg/m³ **Human** **Aquatic** 0.20 mg/L for 96 hrs for for bluegill in fresh water **Rat/Mouse** LD_{50} 12.3 mg/kg; Oral, Rat

Route of Exposure Dermal contact; ingestion; inhalation

Carcinogen **Teratogen** **Mutagen**

Handling Recommendations: (Personal protective measures)

CHRIS: Level B: With rubber boots, gloves, etc. Or Level C with air monitoring. Avoid contact. Keep people away. Stay upwind. Poisonous. NFPA Rating: 3-2-3. Combustible.

Monitoring Recommendations:

HNu, PPA (ionization potential = 11.1 eV). O_2/Explosimeter-esplos. loses sensitivity with prolonged exposure. HNu mfr's info sheet: use 10.2 lamp.

Disposal/Waste Treatment:

Proper disposal. Do not discharge into water or on land. Stop discharge if possible.

Health Hazards and First Aid:

Medical attention immediately. Absorbed through skin. Wash skin with kerosene/other petroleum products, then soap and water. Remove contaminated clothing. Eyes-flush with water. Inh.-move to fresh air; artificial respiration if needed. Ing-induce vommiting; victim drink water or milk.

Symptoms: **Acute:** Inhalation or skin contact: insomnia, anxiety, spasms, delirium. Eye irritation. Ingestion: spasms, slow heart rate. Increased lead in urine.

Chronic: Central nervous system, convulsions, tremors, slow heart rate. Lead poisoning.

TETRAETHYL LEAD

TEL

Common Synonyms	Oily liquid	Colorless, but generally dyed red	Fruity odor
TEL Lead tetraethyl	Sinks in water. Poisonous, flammable vapor is produced.		

AVOID CONTACT WITH LIQUID AND VAPOR. Keep people away.
Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves).
Stop discharge if possible.
Call fire department.
Stay upwind and use water spray to knock down vapor.
Isolate and remove discharged material.
Notify local health and pollution control agencies.

Fire

Combustible.
POISONOUS GASES ARE PRODUCED IN FIRE.
Containers may explode in fire.
Vapor may explode if ignited in an enclosed area.
Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves).
Combat fire from behind barrier or protected location.
Flood discharge area with water.
Extinguish with water, dry chemical, foam, or carbon dioxide.
Cool exposed containers with water.

Exposure

CALL FOR MEDICAL AID.

VAPOR
POISONOUS IF INHALED OR IF SKIN IS EXPOSED.
Irritating to eyes.
Move to fresh air.
If breathing has stopped, give artificial respiration.
If breathing is difficult, give oxygen.

LIQUID
POISONOUS IF SWALLOWED OR IF SKIN IS EXPOSED.
Will burn eyes.
Remove contaminated clothing and shoes.
Flush affected areas with plenty of water.
IF IN EYES, hold eyelids open and flush with plenty of water.
IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk and have victim induce vomiting.
IF SWALLOWED and victim is UNCONSCIOUS OR HAVING CONVULSIONS, do nothing except keep victim warm.

Water Pollution

HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS.
May be dangerous if it enters water intakes.

Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. RESPONSE TO DISCHARGE

(See Response Methods Handbook)

Issue warning-poison, water contaminant
Restrict access
Should be removed
Chemical and physical treatment

2. LABEL

2.1 Category: Poison
2.2 Class: 6

3. CHEMICAL DESIGNATIONS

3.1 CG Compatibility Class: Not listed
3.2 Formula: $Pb(C_2H_5)_4$
3.3 IMO/UN Designation: 6.1/1649
3.4 DOT ID No.: 1649
3.5 CAS Registry No.: 78-00-2

4. OBSERVABLE CHARACTERISTICS

4.1 Physical State (as shipped): Liquid
4.2 Color: Dyed red or other distinctive color.
4.3 Odor: Sweet

5. HEALTH HAZARDS

5.1 Personal Protective Equipment: Organic vapor type canister face mask for short periods; air line type for longer periods; neoprene-coated, liquid-proof gloves; protective goggles or face shield; white or light-colored clothing; rubber shoes or boots.
5.2 Symptoms Following Exposure: Increased urinary output of lead. If a large degree of absorption from inhalation or skin contact, may cause insomnia, excitability, delirium, coma and death. Do not confuse with inorganic lead.
5.3 Treatment of Exposure: Remove victim from contaminated area and consult physician immediately. *INGESTION: induce vomiting. SKIN: wash immediately with kerosene or similar* petroleum distillate followed by soap and water.
5.4 Threshold Limit Value: 0.1 mg/m³
5.5 Short Term Inhalation Limits: 0.15 mg Pb/m³ for 30 min.
5.6 Toxicity by Ingestion: Oral rat LD_{Lo} = 17 mg/kg
5.7 Late Toxicity: Lead poisoning
5.8 Vapor (Gas) Irritant Characteristics: Vapors cause a slight smarting of the eyes or respiratory system if present in high concentrations. The effect is temporary.
5.9 Liquid or Solid Irritant Characteristics: Causes smarting of the skin and first-degree burns on short exposure; may cause secondary burns on long exposure.
5.10 Odor Threshold: Data not available
5.11 IDLH Value: 40 mg/m³

6. FIRE HAZARDS

6.1 Flash Point: 200°F C.C.; 185°F O.C.
6.2 Flammable Limits in Air: Data not available
6.3 Fire Extinguishing Agents: Water, foam, dry chemical, or carbon dioxide
6.4 Fire Extinguishing Agents Not to be Used: Not pertinent
6.5 Special Hazards of Combustion Products: Toxic gases are generated in fire.
6.6 Behavior in Fire: May explode in fire.
6.7 Ignition Temperature: Decomposes above 230°F
6.8 Electrical Hazard: Not pertinent
6.9 Burning Rate: Data not available
6.10 Adiabatic Flame Temperature: Data not available

(Continued)

7. CHEMICAL REACTIVITY

7.1 Reactivity With Water: No reaction
7.2 Reactivity with Common Materials: Rust and some metals cause decomposition.
7.3 Stability During Transport: Stable below 230°F. At higher temperatures, may detonate or explode when confined.
7.4 Neutralizing Agents for Acids and Caustics: Not pertinent
7.5 Polymerization: Not pertinent
7.6 Inhibitor of Polymerization: Not pertinent
7.7 Molar Ratio (Reactant to Product): Data not available
7.8 Reactivity Group: Data not available

8. WATER POLLUTION

8.1 Aquatic Toxicity: 0.20 mg/l/96 hr/bluegill/TL_m/fresh water
8.2 Waterfowl Toxicity: Data not available
8.3 Biological Oxygen Demand (BOD): Data not available
8.4 Food Chain Concentration Potential: Data not available

9. SHIPPING INFORMATION

9.1 Grades of Purity: Technical
9.2 Storage Temperature: Ambient
9.3 Inert Atmosphere: No requirement
9.4 Venting: Pressure-vacuum

10. HAZARD ASSESSMENT CODE

(See Hazard Assessment Handbook)

A-X-Y

11. HAZARD CLASSIFICATIONS

11.1 Code of Federal Regulations: Poison, B
11.2 NAS Hazard Rating for Bulk Water Transportation: Not listed
11.3 NFPA Hazard Classification:

Category	Classification
Health Hazard (Blue)	3
Flammability (Red)	2
Reactivity (Yellow)	3

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 Physical State at 15°C and 1 atm: Liquid
12.2 Molecular Weight: 323.44
12.3 Boiling Point at 1 atm: Decomposes
12.4 Freezing Point: —215°F = —137°C = 136°K
12.5 Critical Temperature: Not pertinent
12.6 Critical Pressure: Not pertinent
12.7 Specific Gravity: 1.633 at 20°C (liquid)
12.8 Liquid Surface Tension: 29.5 dynes/cm = 0.0295 N/m at (est.) 25°C
12.9 Liquid Water Interfacial Tension: (est.) 40 dynes/cm = 0.04 N/m at 20°C
12.10 Vapor (Gas) Specific Gravity: Not pertinent
12.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent
12.12 Latent Heat of Vaporization: Not pertinent
12.13 Heat of Combustion: (est.) —7,870 Btu/lb = —4,380 cal/g = —183 X 10^3 J/kg
12.14 Heat of Decomposition: Not pertinent
12.15 Heat of Solution: Not pertinent
12.16 Heat of Polymerization: Not pertinent
12.25 Heat of Fusion: Data not available
12.26 Limiting Value: Data not available
12.27 Reid Vapor Pressure: Data not available

5. FIRE HAZARDS (Continued)

5.11 Stoichiometric Air to Fuel Ratio: Data not available
5.12 Flame Temperature: Data not available

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TEL

TETRAETHYL LEAD

12.17 SATURATED LIQUID DENSITY	
Temperature (degrees F)	Pounds per cubic foot
46	103.400
48	103.200
50	103.099
52	102.900
54	102.799
56	102.599
58	102.500
60	102.299
62	102.200
64	102.000
66	101.900
68	101.700
70	101.599
72	101.400
74	101.299
76	101.099
78	101.000
80	100.799
82	100.700
84	100.500
86	100.400
88	100.200
90	100.099
92	99.929
94	99.780
96	99.629

12.18 LIQUID HEAT CAPACITY	
Temperature (degrees F)	British thermal unit per pound-F (estimate)
50	.597
52	.597
54	.597
56	.597
58	.597
60	.597
62	.597
64	.597
66	.597
68	.597
70	.597
72	.597
74	.597
76	.597
78	.597
80	.597
82	.597
84	.597
86	.597
88	.597
90	.597
92	.597
94	.597
96	.597
98	.597
100	.597

12.19 LIQUID THERMAL CONDUCTIVITY	
Temperature (degrees F)	British thermal unit-inch per hour-square foot-F
	N
	O
	T
	P
	E
	R
	T
	I
	N
	E
	N
	T

12.20 LIQUID VISCOSITY	
Temperature (degrees F)	Centipoise (estimate)
28	1.247
30	1.222
32	1.199
34	1.175
36	1.153
38	1.131
40	1.109
42	1.088
44	1.068
46	1.048
48	1.029
50	1.010
52	.992
54	.974
56	.957
58	.940
60	.924
62	.908
64	.892
66	.877
68	.862
70	.847
72	.833
74	.819
76	.806
78	.793

12.21 SOLUBILITY IN WATER	
Temperature (degrees F)	Pounds per 100 pounds of water
	I
	N
	S
	O
	L
	U
	B
	L
	E

12.22 SATURATED VAPOR PRESSURE	
Temperature (degrees F)	Pounds per square inch
35	.001
40	.001
45	.002
50	.002
55	.003
60	.003
65	.004
70	.005
75	.007
80	.008
85	.010
90	.012
95	.015
100	.018
105	.022
110	.027
115	.032
120	.039
125	.047
130	.056
135	.066
140	.079
145	.093
150	.110
155	.129

12.23 SATURATED VAPOR DENSITY	
Temperature (degrees F)	Pounds per cubic foot (estimate)
35	.00000
40	.00001
45	.00001
50	.00001
55	.00001
60	.00001
65	.00002
70	.00002
75	.00003
80	.00003
85	.00004
90	.00005
95	.00006
100	.00007
105	.00009
110	.00010
115	.00012
120	.00015
125	.00017
130	.00021
135	.00024
140	.00029
145	.00034
150	.00039
155	.00046

12.24 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	British thermal unit per pound-F
	N
	O
	T
	P
	E
	R
	T
	I
	N
	E
	N
	T

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DAILY SAFETY MEETING RECORD

GENERAL INFORMATION

Project: WILCOX REFINERY

Project No: KJ6103 | TDD/PAN No.: 05260 1SFXX

Project Location: Bristow OK

Date: 3/25/98 Time: 3:00 pm Weather: 80° windy

Specific Location:

Planned Activities: SITE RECONNAISSANCE

SAFETY TOPICS PRESENTED

Chemical Hazards Update: petroleum h/c, metals, PAHs

Physical Hazards Update: Ponds, pits, lagoons, oily waste, metal debris, snakes

Radiation Hazards Update: Unknown, using RAM-4

Review of Previous Monitoring Results: Weston ESI showed 0 in breathing zone for organics PID (non-sampl

Protective Clothing/Equipment Modifications: Boots, safety glasses, hat

Special Equipment/Procedures: GPS
digital camera
RAM-4

Drilling Safety Issues (including testing the operation of drill rig emergency stop switches): NA

Emergency Procedures: Route to hospital reviewed.

Additional Topics/Observations:

Team Members' Comments/Suggestions:

001407

DAILY SAFETY MEETING RECORD

INITIAL PROJECT SAFETY CHECKLIST

1. Emergency information reviewed? √ and made familiar to all team members? √
2. Route to nearest hospital driven? √ and its location known to all team members? √
3. Health and safety plan readily available and its location known to all team members? √
4. E & E Drilling SOP on site? NA and available for team member review? ___

ATTENDEES

Meeting shall be attended by all personnel who will be working within the exclusion area. Daily informal update meetings will be held prior to work and when site tasks and/or conditions change.

Name (Printed)	Name (Signature)	Date	Representing (Company/Agency)
Tom Beer	T. Beer	3/25/98	E&E
Anwar Hammad	Hammad	"	"
Julian Myers	Myers	"	"
Meeting Conducted By: T. Beer			

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DAILY SAFETY MEETING RECORD

GENERAL INFORMATION

Project: WILCOX REFINERY

Project No: KJ6103 | TDD/PAN No.: 052601SFXX

Project Location: Bristow OK

Date: 4/8/98 Time: 1045 Weather: Warm, sunny, 60's°

Specific Location: (b) (6) Residence

Planned Activities: SITE RECONNAISSANCE

SAFETY TOPICS PRESENTED

Chemical Hazards Update: petroleum h/c, metals, PAHs

Physical Hazards Update: ponds, pits, oily waste, metal debris, snakes, poison oak/ivy, ticks

Radiation Hazards Update: Not detected with RAM-4 on previous visit.

Review of Previous Monitoring Results: Weston ESI showed ND in breathing zone for organics by PID. (non-sampling) 12/96

Protective Clothing/Equipment Modifications:
Boots, safety glasses, hat.

Special Equipment/Procedures: GPS
digital camera

Drilling Safety Issues (including testing the operation of drill rig emergency stop switches): NA

Emergency Procedures: Route to Hospital Reviewed.

Additional Topics/Observations:

Team Members' Comments/Suggestions:

DAILY SAFETY MEETING RECORD

INITIAL PROJECT SAFETY CHECKLIST

1. Emergency information reviewed? ___ and made familiar to all team members? √
2. Route to nearest hospital driven? ___ and its location known to all team members? √
3. Health and safety plan readily available and its location known to all team members? √
4. E & E Drilling SOP on site? NA and available for team member review? ___

ATTENDEES

Meeting shall be attended by all personnel who will be working within the exclusion area. Daily informal update meetings will be held prior to work and when site tasks and/or conditions change.

Name (Printed)	Name (Signature)	Date	Representing (Company/Agency)
Tom Beer	T. Beer	4/8/98	E & E
Anan Hammad	Hammad Anan	"	"
Meeting Conducted By: T. Beer			

Appendix E
Copy of Logbooks
(56 Pages)

1 of 2

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International Specialists in the Environment

Job Number KJ6103 05260ISFXX

WILCOX REFINERY
Bristow, OK, Creek County

OPA Oil Spill Response

EPA

Don Smith (Task Monitor) (214) 665-6489 ✓

Brenda Cook (HRS Coord.) 665-7436 ✓

Steve Mason 665-

Philip Ofosu 665-3178

OK DEQ

Hal Cantwell (Site Assessment Super.) (b) (6)

(b) (6)

(b) (6)

Rita Kottke (Superfund, Waste Mgmnt.)

ODEQ Bristow

Robert Huber (b) (6)

Thomas Dennis

Rick Forbes

Monty Elder (SPCC Tier II) (405) 271-

(b) (6)

(b) (6)

tx -3069

Karen Khalafian (Ohio Oil PM)

JB

General/ Waste Mgmnt

Site Owners

(b) (6)

City of Bristow

JB ~~(918) 224-7355~~

Linda Tate - City Admin. W. of Main, 7th 367-6233

Creek County

Assessors

Robin Hall Aerials

Doug Hart

(b) (6)

TRS

START #: 68-W6-0013

E & E Job Number KJ6103 052601SFXX

Telephone Code Number 80531 / Copy Code 80531

Site Name WILCOX REFINERY

City/State Bristow, OK 74010

TDD S06-98-03-0009

PAN 052601SFXX

SSID FPN 088079

CERCLA ID: OKD001010917 S29-T16N-R9E

Start / Finish Date 3/11/98 3/4/08

RRXING Lat. 35° 50' 35" N Long. 96° 23' 05" W

Book 1 of 2

E & E Emergency Response Center: (716) 684-8940
E & E Corporate Center: (716) 684-8060
MEDTOX Hotline: (501) 370-8263
E & E Safety Director (Home): (716) 655-1260

[redacted] (b) (6)

Phase 2 (214) 755-9959

2 052601SFXX

3/11/98

05

1400 Kick-off Meeting

B. Bahupal (PD), Julian Myers (PD), T. Beer (PM - Wilcox), C. Schmidt (PM - Hudson), M Lin (APM - Sun).

JB

Wilcox SOW from TDD — JB

Oil Spill Response — JB

Coordinate with Federal (EPA VI - D. Smith, B. Cook - K. McCormack, K.)

State (ODEQ - H. Cantwell, R. Kolthe, M Elder QCC?)

Local (City of Bristow Mayor Local Emergency Planning Committee) — JB

E&E (Site Discovery, ESI - David Crow START - M. Rutledge, - B. Martich) — JB

Document Area & Extent of Spill Impact — JB

Identify and Document Cause / Probable Cause — JB

Maintain Site Logbook — JB

Prepare Maps & Sketches — JB

Prepare Waste Assessment (HAZCAT) — JB

Provide Print Photo Documentation — JB

IAW V3 AWP (medium): according to work plan — JB

Also: ① Conduct site assessment for potential removal action, NPL for OPA
② Determine threat to waters.
③ Coordinate w/ Task Monitor J. Beer 3/11/98

3/11/98 OS2601 SFXX 3/11/98

Wilcox Action Items

JB

① Gain Site Access by coordination w/ ODEQ, City of Bristow & Wilcox Refinery property owner.
② Gather site info from EeE, EPA, ODEQ etc
③ Prepare Site Visit Documentation ① HASP ② Analytical Objectives ③ QASPER ③A Scope of Work (3 page + map).
④ Site Recon. Visit w/ EPA, ODEQ, PDs ~ 3/25/98
⑤ Finalize QASPER.
⑥ Conduct Sampling Field Work in mid-late April
⑦ Prepare Report May 98
⑧ Estimated completion date 6/12/98

JB

Issues of Concern at Wilcox Refinery

Ⓐ Establish site boundaries and ownership.
Ⓑ Determine OPA versus CERCLA waste.
Ⓒ Waste Quantity and potential remedial options.
Ⓓ Assess threat to surface- and ground-waters

JB

Sampling Issues

JB

Ⓟ Groundwater Sampling? - yes, no
Ⓠ Pit/Pond Sampling? - shore, raft spillway
Ⓡ Pre-Sampling Geophysical Survey? - pipelines, pits, drums
Ⓢ Waste Extraction Testing - TCLP, SPLP
Ⓣ Random v.s Biased vs Grid Sampling - surface soil, subsurface soil
Ⓤ Analyses? - BTEX, TPH(o,g,d,R), Metals, PAHs,
- Organic Pb, pH

JB

Remedial Options

JB

JB

Ⓔ Removal, offsite landfill disposal.
Ⓕ Onsite bio-treatment, landfarming
Ⓖ Excavation, Containment and Capping Onsite.
Ⓗ Excavate, Incinerate Onsite Disposal

J. Beer 3/12/98

Beer (PM - in (APM - Sun)
JB
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B. Cook
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Kolthe, M Elder
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- Davia Crow
B. Martich
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4 3/17/98 052601SFXX 05-

1031

1600 Meet with Brenda Cook (EPA NPL Coordinator) to obtain EST backup documentation. Discuss potential to score site on NPL. BC says precedent would have to be set to list a refinery site on NPL. Obtain copy of draft Prescore package Total = 50.93. However, the site may not finally score due to the lack of surface and ground water targets.

3/18/98

1400 Contacted Mr [(b) (6)], owner of approx. 80 acres of the tank farm area in the Eastern 3/4 of the site. [(b) (6)] gave verbal approval to access the property, which is unfenced and to hand deliver or mail the Access Form to:

[(b) (6)]

Bristow, OK 74010

[(b) (6)] also requested a copy of the ESI, I referred him to ODEQ or the EPA.

3/19/98

1000 Contacted [(b) (6)] owner of approx. 13 acres of the former refinery site area on the Western end of the site. [(b) (6)] gave verbal approval to enter the site for the recon. visit but stated his son [(b) (6)] is also a half-owner of the property and would have to be contacted for signing the Site Access Form and has keys to locked gates on the property.

J. Beer 3/19/98

2601SFXX 052601SFXX 3/19/98

1030 [redacted] can be visited at:

[redacted]

Bristow, OK

JB

[redacted] discussed a number of issues related to his anecdotal knowledge of the site:

- [redacted] acquired the property from [redacted] in © 1969. The large tanks were mostly salvaged by [redacted] and others from 1965-66. Tank bottoms were burnt to reduce liquid component. (ft³, bbl?! (TWB estimates 84,000 gal. 3/23/98)
- Four medium tanks (12,500 gal. capacity?) remain on his property. [redacted] says three are empty, after he lit up the tank bottoms. One tank in the central area of the property may have sludge or burner fuel remaining in the bottom.
- [redacted] is an ex-COE employee.
- [redacted] other son [redacted] live on-site.
- [redacted] live in a trailer home between the [redacted] property's. Estimated area is less than 4 acres. JW looked up a phone number for [redacted] in this area of town [redacted] which may be the site owner?
- [redacted] live next to an area where tarry sludge comes to the surface, especially in hot weather. [redacted] stated it is likely from tank bottom sludge from a nearby (h=23') → 50,000 bbl. tank demolished by a fly-by-night salvager in about 1967. Three to four feet of sludge was drained from the tank to a pit and covered w/ 4 to 5 feet of soil. TWB estimates the sludge volume as about 275,000 gal!!

JB

TB will contact [redacted] before entering the site.

JB

T. Beer 3/19/98

6

3/19/98 052601SFXX 052

JB

1100 Contacted Mr. Hal Cantwell of ODEQ (405) 271-7158 Confirmed he and ODEQ have knowledge and experience at the site. No specific site investigation at Wilcox is currently being conducted. HC referred and transferred me to Karen Khalafian (405) 271-7137, the PM for the adjacent (north), Ohio Oil Refinery site and for a regional groundwater study. JB

JB

1115 Karen K. (Armenian decent) was helpful in providing background area information and current ODEQ knowledge. No actual site investigation at Wilcox. ODEQ has split the original ESI scope site into Wilcox, Ohio Oil (north end) and Lorraine Refinery (west of the SL&SF RR). KK will be conducting groundwater sampling in and around the Ohio, Wilcox, and Lorraine properties on Tuesday and Wednesday next week (3/24 to 3/25/98). JB

KK current gw knowledge is that two aquifers occur in the area. First water is @ ~30' and shallow wells are screened at 60-70 bgs. Shallow onsite wells at the First Assembly Church (Lorraine site) and White property (Wilcox site) have been closed due to h/c odor/taste contamination. Deeper wells from 150 to 170 bgs in City of Bristow wells screened at about 200 bgs produce good water.

KK agreed to provide TWB with good copies of aerial photos and Sanborn maps of the Wilcox Refinery area. I agreed to meet with him on Wed. somewhere near the site.

JB

1300 Sharon M. preparing site files and drafting HASP. SM also reviewing site info preparing a site summary and assisting Anan H. with prep. of a standard OPA site access Form.

J. Beer 3/19/98

JB

052601SFXX

3/23/98

7

Action Items for Site Recon. (on 3/25/98)

Item	Complete
Finalize Consent Forms (4+)	✓ JB
Procure Equipment - GPS? (Hammad)	✓
- Digital Camera (Jaynes)	✓
- pH paper	✓
- TLD badge	✓
- Boots & booties	✓
- Pond sludge probe?	X
- RAM-4 (Hammad)	✓ JB
Site Recon. HASP (LaPierre)	✓ JB
Airline Ticket SWA Love Field - Tulsa RT. Hertz Auto Rental	✓ JB
Copy Useful Site Maps	✓ JB
Field Notebook / Case	✓ JB
Safety Boots, glasses	✓

JB 3/24/98

Beer

8

3/25/98 052601SFXX 0526

JB 1510

0630 Beer Meets Myers, Hammad at Love Field for SWA flight to Tulsa. Hammad had difficulty procuring rental car. Bampal unable to make the trip. Myers proposes to visit the Hudson Refinery site near Drumright? before trip to Sunray Oil in Allen and Wilcox Refinery in Bristow. JB (ESI)

0730 Flight delayed. Now ready for takeoff.

0830 Arrive Tulsa Airport. JB

Pick up Thrifty rental car off airport property. Proceed to Sunray Oil Company site in Allen, via Henryetta and Indian Turnpike. (ESI)

1100 Arrive at Sunray Oil site. Hammad is the PM. Refer to Sunray field notebook for details of site activities. Beer, Hammad and Myers tour facility with Scott Steele (an environmental engineering subcontractor to Sun Oil). Tasks included site walk through, photographic documentation, and field notes.

1300 Depart site and proceed to north to Bristow on SH 48. Stop for lunch at McDonalds on the Turnpike in Bristow, at the northern limit of the Ohio Oil site, adjacent to the north of Wilcox Refinery. JB

1500 Arrive at the Wilcox Refinery site. Proceed onto the 80-acre [redacted] property via gate and dirt access track at the East end of Refinery Rd. in the north central area of the site. Park car near former Tank 5 and Pond 1. JB (ESI)

JB

Conduct Health and Safety meeting to relay safety concerns to the recon team of Beer, Hammad and Myers. The main issues are covered pits, oily waste pits, tank bottom sludge, slip, trip, falls, ticks and snakes

JB

(b) (6)

XX 052601SFXX 3/25/98

JB flight ental car.

1510 Visit most former tank berms in the east end of facility in a clockwise direction from Pond 1. Field observations at each main site feature are summarized below and in the Photo Log on page 11.

ear Wilcox JB

(ESI) Pond 1 - area of pond/pit recently backfilled with site soil and graded. Viscous black tar observed at the surface over ½-acre.

JB

Proceed ryetta

(ESI) Tank 6 - berm intact and partially filled with water creating a temporary wetland. Evidence of weathered tank bottom sludge at former tank location. No sheen on H_2O.

PM. of site cility contractor photographic

(ESI) Tank 8 - Tributary 2 is adjacent to the berm of the former tank. Trib. 2 is a significant water course with steep sided banks, up to 10 feet deep, and the stream itself is currently 4 to 5 feet wide. Tank 8 area is surrounded by thick vegetation and currently flooded creating a temporary wetland. The berm is breached to the southwest with a deep erosional feature connecting directly to Trib. 2. Evidence of a dried tank bottom sludge (TBS) layer is visible on the eroded inner berm slope. Farm buildings are visible to the NE

JB JB

(ESI) Tank 9 - Tanks 8 and 9 are nearly 1000 ft apart, separated by moderately thick regrowth forest and access is made difficult by the steep banks and width of Trib. 2. The Tank 9 berm area is thickly vegetated with dryland grasses, shrubs and small trees. Ponded water at the west side appears ephemeral. No clear evidence of TBS. Nearby property to the south is cleared farmland with planted turf. A large mobile drill rig was observed about 500's from the site fence.

001422

10

052601SFXX 3/25/98

1540 Tank 7 - the southeast side of the berm descends steeply down to Trib 2 for about 20 ft. The former tank area was recently covered with soil and graded. Some ponded water from recent rains, no evidence of TBS, noted previously and sampled during the ESI. JB

1550 Tank 4 - Bare soil area with some evidence of recent grading and TBS at the surface. The southwest side of the berm was used as soil backfill. JB

1600 The Pump Station Area - On Refinery Road is overgrown and fenced with an open access gate to the south. May still be active for the Williams Co pipeline on site. JB

1620 Tank 2 - Berm area is completely revegetated with grasses and shrubs, with minor ponded water to the west. No evidence of TBS. JB

1630 The Pit - As previously described. Recently backfilled to grade. Some significant areas of TBS remain at the surface and in a flow area through a breach in the southwest side of the berm. No free liquid was observed, some erosion from recent rains. JB

JB

1640 Pond 2 - The west cell of the pond is mostly dry because of the breached berm at the west end. The east cell is still a bermed pond, with no evidence of waste disposal. In the past, some oily runoff from the breached Pit may have entered the west cell and eventually exited toward Sand Ck. JB

1655 Meet (b) (6) on the entrance drive to his property. Readily gave up his unlisted phone number and address. Remembers the bulldozing activity on the adjacent property as → over

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001423

5/98 052601SFXX PHOTO LOG 3/25/98

Frame Description Kodak Fun Saver Disposable Direction

JB

1 15:10 Pond 1, Closeup of soft oily waste, W
A recently covered by (b) (6)

2 15:25 Tributary 2, From west of Tank 8 S
B JB

3 15:28 Tank 8 berm area, wetland area many frogs E
C Adjacent berm in background, dried TBS at outlet to 2nd trib

4 15:34 Tank 9 berm wetland, no evidence of TBS E
D

Tank 7 berm area, recently graded, no TBS E

5 15:40 Tributary 2 to the right (S).
E JB

6 15:45 Williams Co petroleum pipeline markers, near T4 NW
F JB

7 15:50 Tank 4 berm area, recently graded, berm breached NE
G JB

8 16:15 Pump Station, looking along Williams Co line SE
H JB

a 16:25 Tank 2 berm area, fully vegetated E
JB

10 16:30 Pit area, recently graded, TBS apparent at NE
J the surface JB

11 16:35 From Pond 2 toward pit, note torry black TBS NE
K area of TBS flow from breach in the Pit berm.

12 16:43 Pond 2 from breach toward E cell of berm E
L Water is flowing. Ill background is toward Pit area

13 16:45 From Pond 2 (west cell) toward break in trees NE
M and former flow area from Pit breach.

14 16:50 Closeup of TBS in Pit breach area. No free liquid -
N JB

JB

Photographer: J. Beer

Witness: [illegible]

JB

001424

12
3/25/98 (cont) 052601SFXX 0526

1655 occurring in September or October 1997. Also stated 1050
that most of his security precautions and warning signs
were to keep rowdy teenagers away and stop crank calls.
OL hunts for deer on the 80-acre (b) (6) property. Sometimes
his dog still gets bogged down in city waste areas on site.
Did not have much info about site history or the (b) (6)
property. His address: (b) (6)

JB

1705 OPA team of Beer, Hammad and Myers leave site
for Tulsa.

1400

J. Beer 3/25/98

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X 052601SFXX 3/31/98

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1050 ODEQ (Karen Khalafian) sampled regional ground water wells around the Wilcox Refinery area last week (3/24 - 3/25), and they had to ship samples before we could meet on Wednesday. KK will mail the Sanborns and aerial photos directly to E&E Dallas. KK is expecting the gw results on about a month and I can call back for details. (b) (6) apparently told KK that Texaco was responsible for the backfilling and grading activities on the Wilcox site last spring. JB

1400 Meet with Don Smith (EPA TM) to discuss the START site visit, field observations, and recommendations for the proposed scope of field work. Also present, Richard Franklin EPA, Ben Banipal E&E, Julian Myers E&E JB

Beer gave DS a summary of findings to date using site visit photographs and a site map. DS approved a geoprobe investigation from selected source areas to assess the potential for contaminant migration to surface waters. JB

DS was also agreeable to another site visit by START to the White property to assess the remaining large tanks on site and observe the former refinery site for potential sources. JB

3/31/98
Bell

14 052601SFXX 4/7/98

Prepare for site recon. visit to the [redacted] property and [redacted] 0655
property (verbal access granted by phone). Proposed field
Team of Beer and Hammad. Procure field equipment: 0800

Portable GPS unit	✓
Digital Camera	✓ 0920
Disposable Camera	✓
TLD badges	✓
Boots and glasses	✓
pH paper	✓
HASP + daily record	✓
Site Maps	✓ 101
Field Notebook	✓ 103
Consent Forms for Sample Collection	✓
Business Cards	✓
Airline Ticket (SWA)	✓
Avis Car Rental (Standard Size)	✓ 1045

1050

J. Beer 4/7/98

98 052601SFXX 4/8/98

Lee 0655 Beer meets Hammad at Love Field for 7:10 flight to Tulsa. JB

Id 0800 Arrive Tulsa. Pick up Avis rental car. Proceed to Overholt Trucking site near Drumright.

unt: 0920 Arrive Overholt Trucking. Meet Dennis (USCG) and Carol Koch (E&E). Hammad receives debriefing regarding stained soil located at 6 to 8 ft. bgs. in isolated pockets to the east of the main facility. Dennis and Koch take some digital photos of the stains to e-mail to Ky Nichols (EPA) PM in Chicago. JB

1015 Beer and Hammad leave site (Overholt), heading for Bristow.

1030 Arrive at [redacted] (b) (6) at the SW corner of 5th Ave and Main St in Bristow. Meet with [redacted] (b) (6) who arranges for his brother [redacted] (b) (6) to meet us onsite and give site access via locked gates.

1045 Meet [redacted] (b) (6) at his residence on-site near the [redacted] (b) (6)

Weather is warm, mid-80s F, mostly sunny with cool wind from the NNW at 5-10 mph.

Beer operating disposable camera, conducting walking interviews with [redacted] (b) (6) and collecting field notes.

Hammad operating digital camera and GPS unit.

Conduct health and safety meeting, complete daily form.

1050 Visit the main structures, features and potential contaminant source areas on the [redacted] (b) (6) property in an anti-clockwise direction beginning with the two large tanks in the far northwest corner of the site. Field observation at each main site feature are summarized below and in the Photo Log on page 17.

J. Beer 4/8/98

16 052601SFXX 4/8/98 052

1100 Tank 20 - North-westernmost AST of the 4 remaining on site. Frame
(OPA) Tank dimensions approx 20' h. x 35' dia. (i.e. 144,000 gal.) Roll 2
Tank is open on the side. Floor of tank is dry. Some visible evidence of dried TBS and spills outside tank in area of fill/drain pipes on SE side. 1 O 2 P

JB

Tank 21 - Adjacent to T20 in NW corner of site. Same dimensions 3 Q
(OPA) as T20. Through opening in side, up to 2" of oily sludge and rain water (from openings in roof) is visible. Similar evidence of TBS and product spills outside tank, as T20. R

JB

1105 View abandoned refinery buildings in west central area of property. 5 S
One building used as a hay barn. Possible asbestos pipe cladding in another pumphouse building. Numerous large concrete structures foundations and sumps. Bulky metal debris and brickwork. 6 T 7 U

JB

1110 Numerous subsurface pipelines remain onsite. No evidence 8 V
of spills or leaks. Some are visible at the surface along the railroad grade at west end of site. 9

JB

Tank 23 - Large AST of similar dimensions to T20 and T21, in 10 X
(OPA) the south central edge of the [redacted] The tank berm area is flooded as a temporary wetland and the water flows freely through the tank via cutouts in the tank walls. No evidence of TBS or sheens on the water.

JB

1130 Unvegetated Area - Circular area denuded of vegetation in south 15
east area of property to the west of [redacted] pond. Appears to be waste dump of unknown material. Tan color, w/ white salt-like residue, sandy-gravel texture, noticeable phosphate(?)/fertilizer-type odor. Surface flow path through area directly to [redacted] pond and Tributary 1. Area is approx. 100 dia.

JB

J. Beyer 4/8/98

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001429

052601 SFXX PHOTO LOG 4/8/98

Frame Description (Camera: Kodak Fun Saver-Disposable) Direction

Roll 2:

1 O 10:55 (b) (6) Property. Closeup of tank base at far north west corner of the site. Note, dried TBS and fill pipes. SW

2 P 11:00 Closeup through opening in the southerly AST in the far north west corner of the site. Note, 1" to 2" of rain water and oily waste. N

3 Q 11:10 Closeup of old oil pipelines along the railroad grade at the west, central boundary of the site. W

4 R 11:20 Closeup inside flooded tank at south end of (b) (6) property. The berm area is a temporary wetland. No evidence of TBS NE

5 S 11:30 Closeup of the unvegetated area in the south east sector of the (b) (6) Property. Note, salt-like deposits and gravelly texture. W

6 T 11:35 Former refinery water supply pond(?) from the (b) (6) Property looking to the (b) (6) residence. E

7 U 11:38 Closeup of dried sludge and under waste, near drainage channel toward (b) (6) pond SE

8 V 11:42 Small tank (10'h x 20'd) in the east central area of the (b) (6) Property. Note, dried sludge within tank berm. E

9 W 11:50 Tributary 1 to Sand Creek flowing south along the east boundary of (b) (6) Property. S

10 X 11:55 Active diesel tank in the north central area of the (b) (6) Property. Some evidence of minor spills at the spigot. NE

~~11 12:10~~ JB

Photographer: J. Beer

Witness:

~~12~~ JB

~~13~~ JB

~~14~~ JB

~~15~~ JB

4/8/98

J. Beer

4/8/98 052601SFXX

11:35 (b) (6) Pond - Forms part of the property boundary between the (b) (6) property. The pond is a dam of Trib. 1, probably for process or fire water at the former refinery. Numerous rusty metal pipelines and structures dot the banks. No visible sheen on the water. Numerous drainage paths flow from potential source areas on the (b) (6) properties into the pond.

JB

11:40 A significant area of dried TBS and cinder-like waste material is located north of (b) (6) pond, on (b) (6) property. Surface water flows over the waste to enter (b) (6) pond. No evidence of water sheens or liquid waste.

JB

11:45 Tank 22 - The last of four remaining ASTs viewed on-site. (OPA) Visual evidence of dried TBS and leaks from the tank fill area inside the tank berm. Contents could not be determined. TBS or diesel/fuel oil product may remain. Dimensions approx. 10'h x 20' dia. (i.e. 23,500 gal.)

JB

11:55 Active Diesel Tank - Former rail car tank labelled 'Cal Company' elevated on concrete blocks and used for fuel oil storage by the (b) (6) Capacity approx. 20,000 gal. Evidence of minor spills from spigot at east end of tank. The tank is located about 100 ft south of the (b) (6) residence on site.

JB

12:00 Evidence of sewage from overflowing septic system bubbling to the surface, south of the fence around the (b) (6) residence. Waste is drained away toward Trib. 1. Assorted metal junk and debris, and former refinery structures were observed in the north-east corner of the (b) (6) property. Hammad completes brief GPS survey of boundary features.

Beer 4/8/98

12:30 Leave (b) (6) property after thanking (b) (6) for the property tour. (b) (6) was not available for an interview.

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12:15 Beer and Hammad visit the [redacted] property [redacted] provided a quick tour of the property to visit areas where black sludge is visible at the surface. The residence and driveway appears to be built on the north cell of a former impoundment. The south fence around the house is built on the former berm between impoundments. Mrs [redacted] says black tar comes to the surface in summer in the former south cell area. No current evidence

To the north of the house, dried TBS is visible at various locations across a flat field which is the location of a former large tank and berm. The berm is leveled and not visible. JB

A 6" thick layer of dried sludge is visible in a drainage pathway where it enters [redacted] pond to the west of the house. No evidence of current liquid flows or water sheens were observed. JB

2:30 START leave the project site and return to Tulsa.

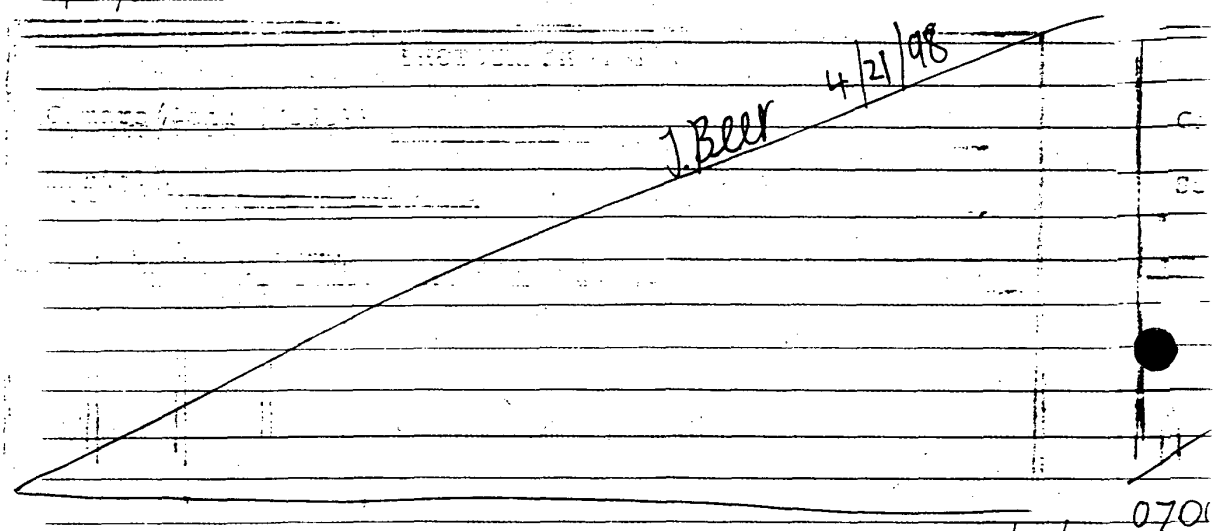
J. Beer 4/8/98

001432

20

4/21/98

05260/SFXX



4/21/98

0900 Spoke with (b) (6) concerning access to his tank farm property & confirmed his address. He agreed to sign the form and have it available for me to pick up next week.

0920 Contacted (b) (6) to confirm his address:

(b) (6)

(b) (6) stated that his son (b) (6) the co-owner of the property would sign the same form and they would have it available for pickup at the Service Station on 5th and Main Street.

0945 Contacted (b) (6) to confirm their address:

(b) (6)

(b) (6) stated that access would not be a problem and that I could pick-up the signed access agreement upon arrival.

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PHOTOGRAPH LOG

J. Beer

0700 START. Team of Beer, James, Moore & Koch assemble at the E & E warehouse.

0730 Load personal gear in support van and begin drive of geoprobe truck to Bristow OK via Hwy 35 to OK City and the OK Turnpike Hwy 44 to Bristow.

1400 Arrive at the site. Discover very sloppy conditions after approx. 4" of rain fell overnight. Pick up access agreement from (b) (6) and (b) (6) mailed back the signed copy.

1600 Decide to do a preliminary boring to the SE of Pond 1 to determine general subsurface geological conditions. Review Geoprobe drilling H&S procedures and site hazards.

Participants:
Sharon Moore Sharon Moore
Carol Koch Carol Koch
JAMES
J. Beer J. Beer

Mtg. conducted by J. Beer

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address:

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4/27/05 SOG-9803-0009 052601SFXX

1615 Begin exploratory boring near Pond I listed as SB-X. No samples collected. Core samples to 6' TD saved for logging class by J. James. No NC odor or visible staining at location adjacent to the access track

1650 Enter (b) (6) property with key obtained from Jack Pate moved to proposed boring location in E central area of (b) (6) property. (b) (6) in area of slack water under waste at the surface approximately 25 yards N of (b) (6) area. Strong NC odor from near surface to TD at 11' bgs. Dark stained soil from 2 to 8'. GPS unit and TVA have low batteries no readings were taken. TVA sample tube is cracked, needs time to repair.

Sample Summary Table

Location	Depth	Time	Tag #	Vol	Analysis
SB-[illegible]	[illegible]-6"	1754	006701	8oz	Metals, PAHs, TPH, H
SB-[illegible]	~~6"-6'~~ STET	1755	006702	2-40ml	BTEX
SB-01	10-11'	1823	006703	8oz	Metals, PAHs, TPH, H
SB-01	10-11'	1825	006704	2-40ml	BTEX

1830 Tag, seal, wrap and tape samples collected. James wrapping core samples

1900 START team leave site Lock gate behind Purchase ice for cooling samples overnight

J. Beer 4/27/05

Date
4/27
"
4/28
4/28
4/29
"

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001435

052601SFXX PHOTO LOG 4/27/98

Initial	Date	Time	Frame	Description	Direction
	4/27	1630	1	SB-X Preliminary Exploratory Boring	E
	"	1813	2	SB-01 Pouring bentonite pellets into borehole	W
	4/28	0830	3	SB-01 Ground water sampling	W
	4/28	0900	4	SB-01 Oily sheen oozing from the slope	-
		~~0900~~	~~4~~	~~SB~~	
			4B	upslope from SB-01	
	4/29	1010	5	Collection of sediment sample SED12	S
	4/29	1050	6	A mature plant on tree in site.	

001436

24 S06

4/28/98 S06-9803-0009 052601SFXX

1210

0800 Arrive onsite at the (b) (6) property. Conduct H&S briefing

Sharon Moore Sharon E. Moore
Carol Koch Carol Koch
Paul James
Conducted by T. Beer T Beer

1330

0830 Set up groundwater sampling probe near SB-01 in an area where surface flow won't enter the hole.

Sample Log

Location	Depth	Time	Tag #	Vol	Analysis
SED 12	surface	1006	6006705	~~8oz~~ 40ml(2)	BTEX
SED 12	"	1012	6006707	8 oz	TPH, metals, PAH, pH
SED 11	"	1040	6006708	40ml(2)	BTEX
SED 11	"	1040	6006709	8 oz	TPH, metals, PAH, pH

1030

stream flow

0850 Hazcat sample collected from the unvegetated area on (b) (6) property, South of SB-01

0945 Crew could not obtain ground water sample, and went to Pond 2 to collect sediment samples. T Beer went to town for errands

1005 START team James, Koch and Moore find location to collect sediment sample 12, collect samples.

1020 T. Beer arrives at Pond 2, Beer and James begin hike to area to collect sediment sample 11.

1040 Beer and James collect SED11 samples. START crew heads back to SB01 location to conduct decontamination of Geoprobe equipment.

1142 START completes field decontamination

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506-9803-0009

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XX 4/28/98

1210 START team leaves crowel site and returns access key to (b) (6)

1330 FedEx samples in one cooler to the E e E Buffalo Lab from an Oklahoma City drop-off office. Airbill # 805555000 3343.

5/28/98

1000 Spoke with Linda Tate (City of Bristow Administrator) to let her know of our presence at Wilcox next week. She will inform the Mayor. Linda is aware of the water well testing near the site by KK of ODEQ last month. LT said that more rain fell in the area on Tuesday, 5/26/98. She was not sure of the forecast. ph:(918) 367-6233.

1030 Called KK at ODEQ and the three property owners onsite (b) (6) to let them know we will be drilling onsite next week (b) (6) says her property is still wet from the rains this week. KK will meet us onsite during the week.

6/1/98

26 506-9803-0009

6/1/98

0645 START team of Beer Moore James and Campa meet at the warehouse for loading vehicles. JB

0715 Begun drive to OKC and Bristow OK JB

1030 Arrive at beginning of OK Turnpike after breakfast in Gainesville TX. Refuel and buy snacks.

1240 Arrive at Bristow WalMart. Geoprobe to the site. Moore and Beer purchase a cooler, stress drinks, ice and radio antenna for the van. JB

1250 Beer and Moore arrive at first drilling location near Pond 1 on the access track from the gravel County road.

1300 Onsite at Pond 1 on (b) (6) property, Wilcox Refinery site. Tailgate health and safety meeting was held to describe former refinery site hazards and chip trip fall issues. Hot, sunny, 100°F.

Attendees:

T. Beer	J Beer
S Moore	
J James	
C Campa	

1310

Set up geoprobe rig at SB02. Get refusal at 2ft. bgs. Move 5ft west. Get similar refusal at 2ft bgs. Decide to collect soil sample in topsoil layer 1-2 feet bgs.

1527 OVM reading (HNu) of area in SB05 and loaders of ~40 ppm. JB

This is in tank No 7 area, at ~ 3-4' interval. SE side of tank 7, adjacent to tributary 2.

1628 Water table in SB05 hit at 15' bgs. Field pH measurement is 6.5.

1630 Soil boring samples shown and

1700 START OVM injection sampling and assigns activities.

Begin decontamination and tear down drilling and equipment

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S06-9803-0009,696,714

98 ~~3856~~ Pentax Zoom PHOTO LOG 6/1/98

	Frame	Time	Description	Direction
	1	1312	Liquified tarry waste at Pond 1	N
	2	1315	Liquid tarry waste at Pond 1 looking back toward SB02.	E
	3	1345	Tarry waste on truck tire south of Pond 1	W
	4	1430	Sample core from SB03 0-4 feet and 4-5 feet.	—
	5	1531	Tarry waste inside berm of Tank 7, SE side.	W.
				6/2/98
	6	0811	SB06 with bentonite fill and flag for GPS purposes	N
	7	0915	[redacted] wide tractor towing out the Geoprobe	W
	8	0918	Back end of Geoprobe turned to the bumper	N
	9	1137	SB09 0-2.2' bas acetate sleeve soil sample	—
	10	1348	SB10 Location West of [redacted] residence in background	E
	11	1430	Tarry waste at the surface near SB11	—
	12	1530	Drain pipe through cut berm near SB12	SW
	13	1635	Location of SB13 south of [redacted] residence outside fence	N
				6/3/98
	14	0950	Metal tank bottom in bermed pond south of SB14 and unvegetated area.	SW
	15	1125	Oil/water separator with baffle cut looking	W
	16	1130	Detail of O/W separator	N
	17	1137	O/W separator looking E toward SB15 (Trib 1	E
	18	1340	Location of SB16 and small tank to the right inside rough cut berm covered w/ dried tarry waste	SE
				6/4/98
	19	0950	Geoprobe at SB19 near southwest large AST onsite	SW

6/4/98

J. Bell

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6/1/98

Sample Log

Location	Depth	Time	Tag #	Vol	Analysis
SB02	1-2'	1335	6-006630	8oz	TPH, Metals, PAH, pH
	1-2'	1335	6-006485	2x40ml	BTEX
SB03	1.5-2	1359	6-006487	8oz	TPH, metals, PAH, pH
SB03	1.5-2	1359	6-006486	2xVoa's	BTEX
SB04	4-5	1435	6-006489	8oz	TPH, Metals, PAH, pH
SB04	4-5	1435	6-006488	2x VOAs	BTEX
SB05	1-2	1555	6-006493	8oz	TPH, Metals, PAH, pH
SB05	1-2	1555	6-006492	2x VOA	BTEX
	4-5	1640	6-006491	8oz	TPH Metals, PAH, pH
	4-5	1640	6-006490	2x VOA	BTEX
	6in	1630	6-006494	2x VOA	BTEX
	6in	1630	6-006495	2x VOA	TPH ~~Metals~~ SB
	4-5	1650	6-006497	8oz	TPH, Metals, PAH, pH
SB05	4-5	1650	6-006496	2x VOAs	BTEX

TB

~~6-006515~~ TB

6/1/98

GPS LOG

Location	Northing	Westing	± ft.
SB05	35° 50.354 N	96° 22.571 W	20.0
SB02	35° 50.463 N	96° 22.719 W	32.4
SB03	35° 50.447 N	96° 22.725 W	32.2
SB04	35° 50.455 N	96° 22.776 W	32.3
		6/2/98	
SB06	35° 50.363 N	96° 22.797 W	34.4
SB07	35° 50.400 N	96° 22.876 W	32.1
SB08	35° 50.369 N	96° 22.855 W	40.3
SB09	35° 50.414 N	96° 22.856 W	37.3
SB10	35° 50.428 N	96° 23.034 W	43
SB11	35° 50.482 N	96° 22.991 W	41.3

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1/98

Digital Camera Photo Log

6/1/98

Disk 3 Frame No	Time	Description	Direction
1	1540	Geoprobe at SB05	N
2	1543	Geoprobe at SB05	N
3	1546	Black tarry liquid inside T7 berm	NW
4	1548	Black tarry liquid inside T7 berm	E
			6/2/98
5	1140	Oily waste and wet-land at Oily waste Pit	NE
6	1-5	View of flattened berm and surface tarry waste at oily waste Pit Toward SB09, SB08	S
7	1002	Trapped bird in oily waste at Pond 1	6/4/98
8	1005	Trapped blue-bird in " " " " 1	—
9	1008	Trapped turtle in oily waste at Pond 1	—

J. Beer 6/5/98

GPS Log (cont.)

6/2/98

Location	Northing	Westing	± ft.
SB01	35° 50.441 N	96° 23.067 W	35.8
SB12	35° 50.368 N	96° 22.987 W	54.2
SB13	35° 50.413 N	96° 22.976 W	40.2
			6/3/98
SB14	35° 50.415 N	96° 23.053 W	39.8
SB15	35° 50.486 N	96° 23.026 W	38.2
SB16	35° 50.496 N	96° 23.064 W	39.2
SB17	35° 50.553 N	96° 23.036 W	44.8
SB18	35° 50.596 N	96° 22.975 W	33.4 6/4/98
SB19	35° 50.552 N	96° 23.075 W	42.9
RBX	35° 50.584 N	96° 23.088 W	33.0
SE	35° 50.[illegible]	[illegible]	39.7
NE Corner	35° 50.593 N	96° 22.[illegible] W	38.2

30 SO6-0803-0009 SO6-98

6/1/98

1750 Packing and iceing all samples in the cooler at Barstow Wal-Mart for shipping to E2E Lab.
1820 Arrive and check in to Super 8 Motel, Sapulpa. Meet FedEx pickup truck at the east end of Motel. He has one of the last pickups between 1830 and 2300 hrs at the motel. He took the cooler at 1845 and would try to be at the same place and time all week.
18-5 6 soil samples and 1 water sample were collected and shipped under Airbill# 805550005313

6/2/98

0630 Leave motel in Sapulpa for the site. Moore to Wal-Mart for stress tanks ice & package.
0730 Tailgate health and safety meeting attended by
T. Beer J. Beer
S. Moore Sharon Moore
C. Campa
P. James
Expect hot, dusty air 100°F.
0815 SB06 only advanced to a max of 2.2 ft bgs from two locations. One sample collected.
0830 Geoprobe gets bogged up to the axels. Call (b) (6)
0915 Katie Khalafian with the State of Oklahoma arrives on site and confers with Tom Beer.
0935 (b) (6) arrives with tractor, pulls Geoprobe out of the soft sand
1030 Set up to the west of the Oily Pit at SB07 after walking a pathway for the Geoprobe. May have problems again with soft mud from seeps and sandy patches.
1110 Set up at SB08, south of the oily Pit and at the surface runoff point to the west cell of Pond 2.
1200 Complete SB09 to the south of the Pit and east of the oily waste flow. Break for lunch

Locat.
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SO6-9803-0009

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SAMPLE LOG

6/2/98

Location	Depth	Time	Tag#	Vol	Analysis
SB06	1-2'	0756	6-00 →6498	8oz	TPH, Metals, PAH, pH
SB06	1-2'	0756	6-006499	2xVOA	BTEX
SB07D	4-5'	1045	6-006500	8oz	TPH, Metals, PAH, pH
SB07D	4-5'	1045	6-006538	2xVOA	BTEX
SB07	4-5'	1045	6-009540	8oz	TPH, Metals, PAH, pH
SB07	4-5'	1045	6-009539	2x VOA	BTEX
SB08	1-2'	~~1140~~ 1125	6-009542	8oz	TPH, Metals, PAH, pH
SB08	1-2'	~~1140~~ 1125	6-009541	2x VOA	BTEX
SB09	1-2'	1140	6-009550	8oz	TPH, Metals, PAH, pH
SB09	1-2'	1140	6-009543	2xVOA	BTEX
SB10	3-4'	1355	6-009551	8oz	TPH, Metals, PAH, pH
SB10	3-4'	1355	6-009552	2xVOA	BTEX
SB11	2-3'	1440	6-009554	8oz	TPH, Metals, PAH, pH
SB11	2-3	1440	6-009553	2x VOA	BTEX
SB12	1-2'	1550	6-009556	8oz	TPH, Metals, PAH, pH
SB12	1-2	1550	6-009555	2-VOA	BTEX
SB12	8-9'	1557	6-009557	8oz	TPH, Metals, PAH, pH
SB12	8-9'	1557	6-009558	2xVOA	BTEX
SB13	GW2 TB	1650	6-009562	2x VOA	TPH, Metals, PAH, pH
SB13	GW2 TB	1650	6-009560	2x VOA	BTEX
SB13	6.5-7.5'	1708	6-009559	8oz	TPH, Metals, PAH, pH
SB13	6.5-7.5'	1708	6-009561	2x VOA	BTEX
SB13	6.5-7.5D	1710	6-009567	8oz	TPH, Metals, PAH, pH
SB13	6.5-7.5D	1710	6-009563	2x VOA	BTEX
SB13	1-2	1655	6-009568	8oz	TPH, Metals, PAH, pH
SB13	1-2	1655	6-009569	2x VOA	BTEX
TB	—	1705	6-009564	2x VOA	BTEX

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32

SO6-9803-0009 6/2/98

1300 Pick up access gate key from (b) (6) at downtown.

1330 Set up at SB10 to the west of the (b) (6) residence and 20 ft east of (b) (6) pond. Meet with (b) (6) (b) (6) father about utility locations on and near the (b) (6) residence.

1440 Complete SB11 to the north of (b) (6) residence. Hit consolidated rock at 3 feet bgs. Tarry waste noted at the surface across entire former tank berm area in liquid and solid form. Rock at the surface at numerous areas and surficial soil typically less than 1 foot deep.

1513 Set up at SB12 after moving through the tank berm bottom toward Sand Creek. Locate SB12 in likely drainage area from berm toward Sand Ck.

1540 Complete hole to 9 ft bgs. Rock at the bottom

1620 Set up at SB13 to the South of the (b) (6) residence.

1627 Call Wilgus Pipeline Arrange to meet Rick Cole onsite at the old Pump Station at the entrance road to Lees House 2pm Wednesday 6/3/98.

1640 At SB13 dark oily stain at 8' bgs. OVM reads 6 ppm at the bore headspace = 15 ppm Collect water sample from approx 7.5 feet bgs. Strong h/c odor in water bar.

1640 START team leaves the site to pack samples in ice for shipment to the lab.

1800 Leave Wal-Mart parking lot for motel and FedEx pickup.

1810 FedEx picks up cooler at motel with 10 soil samples, 2 duplicates, 1 rinsate sample and 1 trip blank under FedEx Airbill #. 805555003424.

6/2/98

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SO6
0700
0800
0810
0830
0950
1200
1315
1430
1520

S06-98C3-0004 6/3/08

0700 Leave motel for the site. Hot, clear. 100°F
0800 Set up at SB14 at the south end of [redacted] property, south of the unvegetated area and north of a small pond containing black stained and stressed vegetation.
0810 Conduct health and safety meeting before drilling to review site safety concerns, attended by
T Beer J. Beer
F Jones
C Lampa
S Moore
0830 Continue in SB14. HNu reading at the hole from 0-4 ft bgs. was 20ppm. Background reading was 0 ppm but there is an odor in the air possibly hydrocarbon in nature. Also the unvegetated area nearby has the noted fertilizer-type smell.
0950 Complete b/c to TD 18 ft bgs. Little perched water at 10' bgs, but not able to obtain water sample. Too silty/muddy. Cores rec from this hole are unidentifiable, organic material. No visible evidence for HNu.
1110 Set up at SB15 near Tributary 1, east of the small tank on [redacted] property. Hit silty water at 1.5 ft bgs. Boring located 12 ft. west of Tributary 1. OVM reading of 0-1 ft headspace sample is 40ppm.
1200 Break for Lunch. Moore reports minor traffic accident.
1315 Set up at SB16 near small tank in center of [redacted] property. SB16 located 27.5 ft. North of the tank. Tank contains 6" to 1 ft of ground water and oily sheen and temperature differential.
1430 Set up at SB17 to the west of [redacted] residence and east/downgrade from the two remaining large ASTs onsite. SB17 is located 40 feet west of [redacted] house. Borehole has oily sheen and no vapors.
1520 Last work task for the day. Moore to locate [redacted] sump and sump discharge area. Can't access inside fenced area due to terrain, ditch and pipe lines. Copy map.

34 SO6-9803-CDO9

SAMPLE LOG

6/3/98

Location	Depth	Time	Tag #	Vol	Analysis
SB14	1-2	0835	6-009566	8oz	Metals, TPH, BTEX, pH
SB14	1-2	0835	6-009549	2VOA	BTEX
SB14	5-6'	0915	6-009545	8oz	Metals, TPH, PAH, PH
SB14	5-6	0915	6-009546	2xVOA	BTEX
SB15	GW3	1130	6-009565	2x VOA	TPH
SB15	GW3	30	6-009544	2x VOA	BTEX
SB15D	GW3	45	6-009548	2x VOA	TPH
SB15D	GW3	145	6-009547	4x VOA D	BTEX
SB15	0-1	35	6-009570	1x8oz	Metals, TPH, BAH, pH
SB15	0-1	35	6-009571	2xVOA	BTEX
SB16	5-6	1740	6-009573	8oz	Metals, TPH, pH, pH
SB16	5-6	1800	6-009574	2 VOA	BTEX
SB17	1-2	1850	6-009575	8oz	Metals, TPH, PAH, pH
SB17	1-2	[illegible]	6-009576	2x VOA	BTEX
SB17	1-2	[illegible]	6-009578	8oz	Metals, TPH, PAH, pH
SB17D	1-2	[illegible]	6-009577	2x VOA	BTEX
SB17	GW4	[illegible]	6-009580	8oz	Metals, TPH, PAH, pH
SB17	GW4	[illegible]	6-009579	2xVOA	BTEX
SB17	5.5-6.5	[illegible]	6-009582	8oz	Metals, TPH, PAH, pH
SB17	5.5-6.5	[illegible]	6-009581	2xVOA	BTEX
SB18	1-2	[illegible]	6-009584	8oz	Metals, TPH, PAH, pH
SB18	1-2	[illegible]	6-009583	2xVOA	BTEX
SB18	GW5	[illegible]	6-009586	1x VOA	TPH
SB18	GW5	[illegible]	6-009587	1x VOA	BTEX
SB18	7-8	[illegible]	6-009588/81	8oz	Metals, TPH, PAH, pH
SB18	7-8	[illegible]	6-009588/89	2xVOA	BTEX
TB	—	[illegible]	6-009585	2xVOA	BTEX

6/3/98

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SO6-98

1530

1630

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1800

1850

SC6-9803-0009

35

6/3/98

1530 Headspace readings from soil sleeve from 4 to 8 ft bgs. spiked at 180 ppm. Collect sample in stained zone from 5.5 to 6.5 bgs. Care will be taken to avoid inhalation hazard at SB17. ——— JB

1630 Set up at SB18 on E side of [redacted] access road about 17 yards from the gravel County Road. SB18 is stained and has strong hydrocarbon odor with HNu at the hole of 120 ppm. Collect two stained soil samples but only one vial each for BTEX and TPH analysis due to lack of water. Free product observed in saturated zone. brown oily weathered gas / kerosene?

1740 Leave site to collect ice and bag / pack samples.

1800 Leave Bristow, to deliver samples to motel Fed Ex pickup.

1850 Fed Ex picked up samples under Airbill # 2055 5000 3354 for a total of 8 soils, 3 ground water, 1 soil duplicate, 1 groundwater duplicate and 1 trip blank. ——— JB

6/3/98

001448

36

6/4/98 SO6-9803-0009

0700 Repack van in parking lot of motel.
0730 Leave for the site. Weather is cooler, hazy, 85°F.
0800 START Team arrive at the site and set up at SB19 to the southeast of the two remaining large ASTs in the northwest corner of [redacted] property.
0820 Conduct daily site health and safety meeting to review chemical and physical hazards at Wilcox.
Attendees:
T. Beer — T Beer
S. Moore — Sharon Moore
P. James
C. Carra
0845 Drilling SB19. Hit rock at 8 ft bgs. Dark h/c stain from 0-4 bgs and OVA reading at 15 ppm. Total depth is 5' bgs to rock (see boring log for all the boring details!). No water in the hole. SB19 is located 17 feet east of south of two large ASTs.
0900 Leave hole correctly after packing two samples and returning to the site and vehicles. Proceed to GPS locations at the NE and SE corners of the site
1045 Talked to owner of property adjacent to SE Corner of site. He said he gave permission to use his property. Owner's name is Steve Sim.
Reach SE corner of site. T Beer takes GPS reading
1045 Depart SE corner
1049 Corner of site marked — the northeast corner is reached as is NE corner of property. T Beer takes GPS measurement of the location.
1104 Depart NE corner to meet Response crew to depart site for warehouse.
1330 Sample cooler dropped off at Fed Ex in Oklahoma City. A total of 2 soil samples were shipped under Airbill # 8855 1000 3365
1700 START Team departs E&E Dallas office

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SO6-9803-0009

37

SAMPLE LOG

6/4/98

Location	Depth	Time	Tag #	Vol	Analysis
SB19	1-2'	0850	6-009591	8oz	TPH, PAH, Metals, pH
SB19	1-2'	0850	6-009590	2x40ml VIA	BTEX
SB19	7-8'	0910	6-009592	JB 8oz	TPH, PAH, Metals, pH
SB19	7-8'	0910	6-009593	2x40ml VOA	BTEX

TOTAL SAMPLES COLLECTED

Date	Soil	S-Dup	GW	GW-Dup	TB	Sediment
4/27/98	2					
4/28/98						2
6/1/98	6		1			
6/2/98	10	2	1		1	
6/3/98	8	1	3	1	1	
6/4/98	2					
	28	3	5	1	2	2

J Bell 6/4/98

38 S06-9803-0009

1600 6/19/98

Receive faxed analytical results from Karen Wojewicz at the E&E Buffalo Lab for all samples collected during the recent sampling event at Wilcox. It appears that all results are present and submitted in a timely manner ie within 14 days of receipt.

7/7/98

1030

START meet w/ EPA TM to discuss threat to water at Wilcox Refinery. Attendees: T. Beer (START)
B. Banipal (START)
D. Smith (EPA)

Review preliminary site maps and data tables including: site location, potential sources, sampling locations, BTEX and TPH results, PAH results and metals results. D. Smith agreed with START that a threat to water has been established at the site. D. Smith requested that START proceed with the following Action Items:

① Prepare a scope of work and cost estimate for conducting further field investigation to determine the extent of contamination at the following locations:
- Adjacent to Tributary 1 at SB01, 10, 11, 13, 14, 15, and 18;
- Adjacent to Tributary 2 at SB05 and near the 3 easternmost tank berms; and
- At the dry cell of Pond 2.

② Contact Williams Pipeline Co. to assess the source of free-product contamination observed at SB18.

③ Conduct a total station survey at SB05 and selected areas along Tributaries 1 and 2.

④ Evaluate geophysical means for locating potential hydrocarbon plumes.

⑤ Evaluate the applicability of 3-D representation of contaminant plumes versus ground surface and bedrock.

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7/15/98 39

Action Items for Phase 2 Field Work (8/3 to 8/8/98)

	Item	Complete?
Paperwork	- Work Plan	✓
	- Lab Procurement	✓
	- Cost Estimate	✓
	- TDD Amendment	✓
	- HASP Addendum	✓
	- QASPER	✓
	- Contact ODEQ and City of Bristow	✓
	- Contact Site Owners	✓
	- Contact Williams Pipeline C°	✓
	- Contact Sun Oil	✓
Vehicles	- Geoprobe + Equipment (Soil and Water Samplers)	✓
	- Van	✓
	- 4WD Truck	✓
Equipment	- Sample Paperwork (COCs, Labels, Seals, Airbills)	✓
	- Sample Packing, bottles/jars	✓
	- Decon Station	✓
	- Portable Corer (JMC, Minute Man?)	✓
	- Electronics (GPS, HNu, Digital Camera, pipe locator)	✓
	- Total Station (Operator?)	✓
	- Tape Measures / Flagging	✓
	- PPE (Tyvek, gloves, cartridges)	✓
	- Personal Gear (Boots, H-hat, TLD badge, respirator)	✓
	- 35mm Camera	X

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SO6-9803-0009 7/17/98

1450 I contacted Karen Khalafian of ODEQ to discuss site status and proposed Phase 2 field schedule and activities. KK also referred me to Mary-Jane Calvey, Staff Epidemiologist to discuss analytical/regulatory screening criteria and/or cleanup standards for the State of Oklahoma. KK says the Ohio Oil site has an HQ = around 50.64 due to onsite fishing in contam. ponds.

1515 Contacted (b) (6) to let him know of the proposed field work schedule on his property from 8/3 to 8/7/98. (b) (6) is tilling, top-dressing and seeding Pond 1 and the only waste 'pit' for the purpose of selling to a buyer interested in raising cattle on the property. (b) (6) says he brought the land from (b) (6) in 1993. The previous owner to that was (b) (6) ??) The general dozer contractor doing the site work is A.D. Bean.

7/20/98

0900 Contacted M-J Silvey (405) 702-5168 to discuss OK regulatory criteria for evaluating soil data. To establish cleanup criteria for site remediation, ODEQ establishes site-specific goals based on site data and potential targets. OK does not have any criteria listed in the regs. For screening purposes M-J suggested use of EPA SSLs and MCLs as conservative criteria.

1145 Called Rick Cole of Williams Pipeline regarding the free-product in borings SB18 near Williams pipeline ROW. He knows of no leaks of the pipe in this area. The 8" product pipeline for gasoline and fuel oil flows north from Allan to Drumright. Pipe pressure is typically 300-400 psi with the previous booster station at Bearden. Pipe was laid in the early 50's. Leaks are checked by monitoring pressure drop-off during pumping shutdowns. The line was purchased from Sun Oil in 1993. RC referred me to Williams Environ. Mgr. Tom Daws (816) 805-4900 in Overland Park, Kansas.

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SO6-9803-0009

7/21/98

0900 Contacted Tom Davis at Williams Pipeline. Notified him of free product in SB18, near their pipeline. TD will print out a leak summary for the section of line at Bristow. Also stated that the easement is from 1929, with unknown width, typically 50' ROW. Requested I fax a copy of the proposed work plan to him. Sun Oil still owns the fenced area around the former 'Pump Station' and their regional Environmental Co-ord. was Scott Christianson in Tulsa.

7/28/98

1615 Contacted (b) (6) to let him know of the proposed field work on his property. He confirmed purchase of 3.6 acres from (b) (6) in Jan. 1995. He reported that someone was clearing brush within the fenced Sun Oil pump station area. Weather is still hot and dry with threat of t'storms.

7/30/98

1100 ~~Tom~~ Left a message for (b) (6) at work requesting to pick up a copy of his gate key on Monday afternoon.

1015 Contacted Linda Gale. Assistant to the Mayor of Bristow. Courtesy call to the City to let them know of proposed field work.

1030 Contacted Scott Christensen of Sun Pipe Line Co in Tulsa. They own the 1.5 acre enclosed pump station area. Williams owns the pipeline but only leases the ROW. So Sun is the RP in the area. Scott was not aware of a history of leaks or spills on the Sun property. He gave START his contact info. and said he would like to meet during the proposed field work next week. START referred him to ODEQ for a copy of the ESI report.

1130 Contact Super 8 Motel Sapulpa to confirm 6 rooms are reserved for 3 nights if necessary.

JB

Beer 7/30/98

7/31/98

SO6-

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0915 In a conference call between Charles Fisher (EPA) Ben Barnard (EeE) and Tom Beer (EeE) the possibility for re-combining the Ohio Oil, Lorraine, and Wilcox Refinery sites into one investigation was discussed. TB referred CF to an EST conducted by a contractor to ODEQ for the Ohio Oil site and the ODEQ site contact Mr. Karen Khalafar. CF and BB made plans to visit the site on Wednesday 8/5/98 during the proposed phase two field investigation at Wilcox. TB related to CF that ODEQ had scored the Ohio Oil site as a 54 under the HRS system (according to KK) and the high score was mostly attributable to site residents catching and eating fish from an onsite pond found to contain elevated levels of hydrocarbons and metals.

-TBeer 7/31/98

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SCG-9803-0009 8/3/98

0700 START Phase 2 sampling team of Beer, Sansone, Bumgarner, Martich, Perovich, and Williams assemble at the E&E warehouse. Pack equipment in van for drive to Bristow.

1330 Arrive at Bristow Wal-Mart. Buy ice and stress relief drinks, plus exercise. Drive route to hospital and review safety plan. Collect gate key from (b) (6)

+30 Martich conducts tailgate H&S meeting with all attendees covering (see daily log for) work vehicles inside (b) (6) property. Apply sunscreen, insect repellant and PPE. Tasks are to measure and locate all proposed sample locations.

1500 START divided into two teams, one to measure locations along Tributary 1 and the other to locate sample locations along Tributary 2. Trib 1 is mostly dry but the cobble is not suitable for recording the proposed locations near its banks. Therefore the crew leader determines that samples will be collected in the stream bed by manual means (JMC or Van Ler) and that the compass, tape and operator shall return to Dallas on the morning. Also, one location proposed along Trib 2 (SB 53) is deleted due to inaccessibility, the lack of probable source, and a 20' cliff face above the creek bed (similar to that for a JMC drawer box).

1630 Trib 1 team experience difficulty in placing markers in the main stream channel at locations [redacted] (b) (6) property, and in the ravine south of [redacted] Core. These locations may be re-measured during sampling.

1730 Pack up equipment and leave project site for check-in to hotel in Sapulpa, located approximately 17 miles northeast of the site.

Beer 8/3/98

8/4/98 SO6-9803-0009 SO6

0700 Leave hotel in Sapulpa for the 17 mile trip to Bristow.

0730 Minor miscommunication with [redacted] onsite [redacted] had not informed her of our site visit. Able to get her to contact [redacted] directly and trouble was averted. She requested we contact her each morning.

0800 Martich and Beer conduct daily health and safety meeting. See daily form for details. Stressed safe work practices, earplugs for the JMC, wear TLD badge, and drink lots of water in the 90° temps.

0830 Bumgarner takes Geoprobe truck for return drive to Dallas. Inform Myers and Anderson of the decision prior to departure. After initial problems with Dallas JMC, Martich and Perowne depart for sampling sites at east end of site near Trib 2. Sansone and Williams begin sampling along Trib 1 stream bed with slam bar, from north to south. JMC equipment is not usable with any type of efficiency. Have to settle for sediment type core samples from ~ to 3 feet bgs.

1000 First two locations along Trib 1 are dry at 3' with no adequate method for reaching deeper or locating groundwater. Also, bedrock outcrops are common and the rocky bottom makes slam-hammering problematic.

1100 Tributary 2 team get an acetate sleeve stuck trying to clean out their first hole (SB36) to retrieve a water sample. Takes approximately an hour to pry/push the sleeve out. The other JMC piece can't be used because the bit is jammed on the core barrel. Will buy some pipe wrenches at lunch.

1220 Break for lunch.

1300 Martich and Perowne return to Trib 2 JMC hole. Attempt to retrieve water sample fails, collect an upstream surface water sample (SW03).

1600 JMC can use to advance two more borings SB37 and SB38 near tie for northeast fork berm and one

SB2 SB2 SB2 SB3 SW0 SB2 SB2 SB2 SB3 16CC (cont) 1700 SB2 1945

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SC6-9803-0009 Sample Log 3/24/98

JB

Location	Depth	Time	Tag #	Vol	Analysis
SB20	0-3'	0910	6-097026/27	8oz	PAH, TPH, pH, Metals
			" 27	2x40ml	BTEX
SB21	0-3'	1010	6-097029	8oz	PAH, TPH, pH, Metals
			" 30	2x40ml	BTEX
SB22	0-3'	1040	6-097031	8oz	PAH, Metals, pH, TPH
			" 32	2x40ml	BTEX
SB36	0-7'	0945	6-097435	8oz	PAH, Metals, TPH, pH
			" 36	2x40ml	BTEX
SW03	Surface water	1425	6-097438	2x40ml	TPH
			37	2x40ml	BTEX
SB23	0-3	1145	6-097033	8oz	PAH, Metals, TPH, pH
			" 34	2x40ml	BTEX
SB24	0-2'	1430	6-097035	8oz	PAH, Metals, TPH, pH
	moist, oil stained, h/c odor		36	2x40ml	BTEX
SB25	0-3'	1505	6-097037	8oz	PAH, Metals, TPH, pH
	minor oil stain		38	2x40ml	BTEX
SB37	0-7'	1501	6-097434	8oz	PAH, Metals, TPH, pH
			" 32	2x40ml	BTEX
SB38	0-1'	1540	6-097449	8oz	PAH, Metals, TPH, pH
			" 33	2x40ml	BTEX

1600 Dark oil staining and odor were noted in SB37 from underground [illegible] pipes and also encountered by Fenning near this location.

1700 The Tribal team encountered extremely hard ground in the area-up creek bed and only advanced three borings including:

Attempt SB26 0-2' 1600 6-097049 8oz PAH, Metals, TPH, pH
050 2x40ml BTEX

1945 FedEx picked up the cooler w/ 10 soil samples, one surface water sample and one trip blank for shipment to the lab under Airbill # 805550004306.

GPS LOG

8/4/08

Location	Northing	Westing	± Feet	Item
RR XIII	35 50 576 N	96° 23 071 W	32.4	1
SB20	35 50 565 N	96 22 958 W	34.8	
SB45	35 50 371 N	96 22 621 W	53.7	2
SB44	35 50 354 N	96 22 592 W	42.3	
SB43	35° 50 324 N	96 22 581 W	43.6	3
SB42	35° 50 325 N	96 22 576 W	43.6	
SB41	35° 50 374 N	96 22 563 W	41.6	4
SB40	35° 50 346 N	96 22 498 W	42.4	
SB39	35° 50 365 N	96 22 483 W	47.5	5
SB36	35 50 378 N	96 22 476 W	44.1	
SB37	35 50 383 N	96 22 489 W	47.6	6
SB38	35 50 481 N	96 22 487 W	43.8	
SB28	35 50 458 N	96 23 018 W	37.6	7
SB29	35 50 463 N	96 23 047 W	37.0	
SB31	35 50 441 N	96 23 069 W	47.1	8
SB30	35 50 434 N	96 23 036 W	39.0	
SB21	35 50 568 N	96 22 995 W	51.3	9
SB22	35 50 526 N	96 23 008 W	52.8	
SB23	35 50 490 N	96 22 972 W	44.4	10
SB24	35 50 508 N	96 22 989 W	50.7	
SB25	35 50 486 N	96 22 994 W	46.1	
SB26	35 50 421 N	96 22 990 W	37.5	
SB27	35 50 464 N	96 23 020 W	41.0	
SB32	35 50 356 N	96 23 042 W	57.0	
~~SB 33~~	~~35 50 402 N~~	~~96 23 050 W~~	~~37.6~~	
SB33	35 50 443 N	96 22 049 W	51.2	
Trib 1@ Sand Creek	35 50 391 N	96 23 043 W	37.8	
SB34	35 50 374 N	96 22 946 W	35.1	
SB46	35 50 [illegible] N (345)	96 22 931 W	35.2	

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REFERENCES

Item	Title	Source	Date	File Copy
1	Preliminary Assessment	ODEQ	12/15/94	✓
2	Expanded Site Inspection	Weston	3/31/97	✓
3	Topographic Maps	Bristow Quad USGS	1973	✓
		Slick Quad USGS	1973	✓
4	Fire Insurance Maps	Sanborn C°	1915 1920 1923 1961	
5	Ownership Map	Creek C° Tax Assessor	?	
6	Potential Haz. Waste Site I.D. Form	EPA	1984	✓
7	Aerial Photos of S29, T16N, R9E	Ace Aerial Photo	41, 56, 66, 76, 85	
8	"	Aerial OK	1995	
9	Flood Hazard Map	FEMA	1981	✓
10	Soil Survey for Creek C°. OK	USDA	5/1959	✓

J. Beer 8/4/98

Super 8 Motel
1505 New Sapulpa Rd
Sapulpa OK 74066
(918) 227-3300

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Johnny on the Spot (b) (6)
Lisa
Utilities locator service 800 522-6543

Carolyn Inn
Hwy 64 north at I-44 exit
Barstow, OK 74010
(b) (6)

Fed Ex
1-800-GO FED EX

Kevin Bufford
E2E Analytical Services Center
4493 Baldwin Ave,
Lancaster, NY 14086
(b) (6)

Williams Pipeline
Rick Cole
(b) (6)
(b)

Alan Cates
mobile (b) (6)
(b) (6)

Tom Daws (Environ. Coord.) mobile (b) (6)
Overland Pk., KS (b) (6)

Mark Bourgeois
PDP Analytical Services
1680 Lake Front Circle, Suite B
The Woodlands TX 77380
(b) (6)

Sun Oil Pipe Line Co.
Scott Christensen (Env. Mgr) (b) (6)
PO Box 2039
907 Sth. Detroit St.
Tulsa OK 74102
(b) (6)

J. Scott Stelle
Contractor
(b) (6)

3365-~~4H~~

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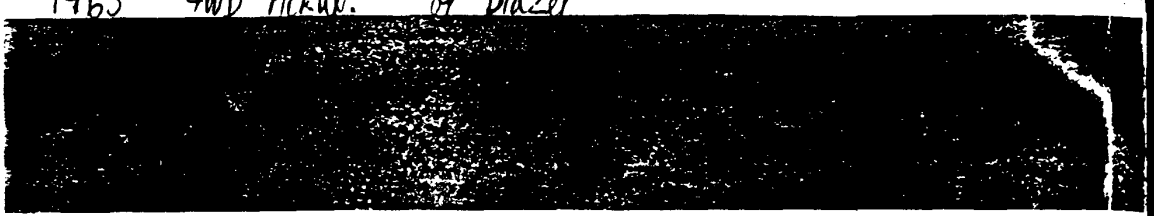
1465 4WD Pickup. or Blazer



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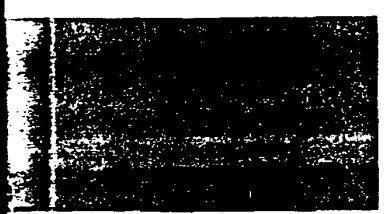

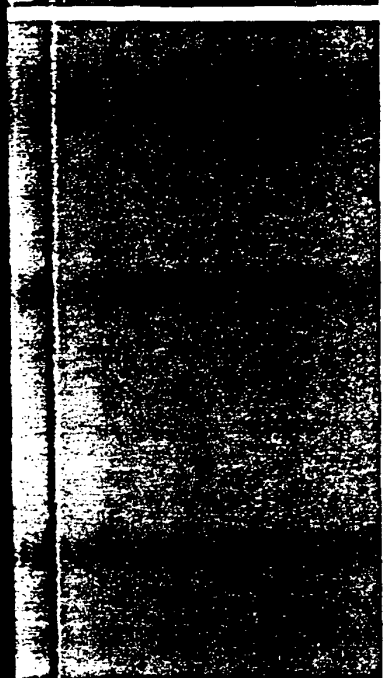

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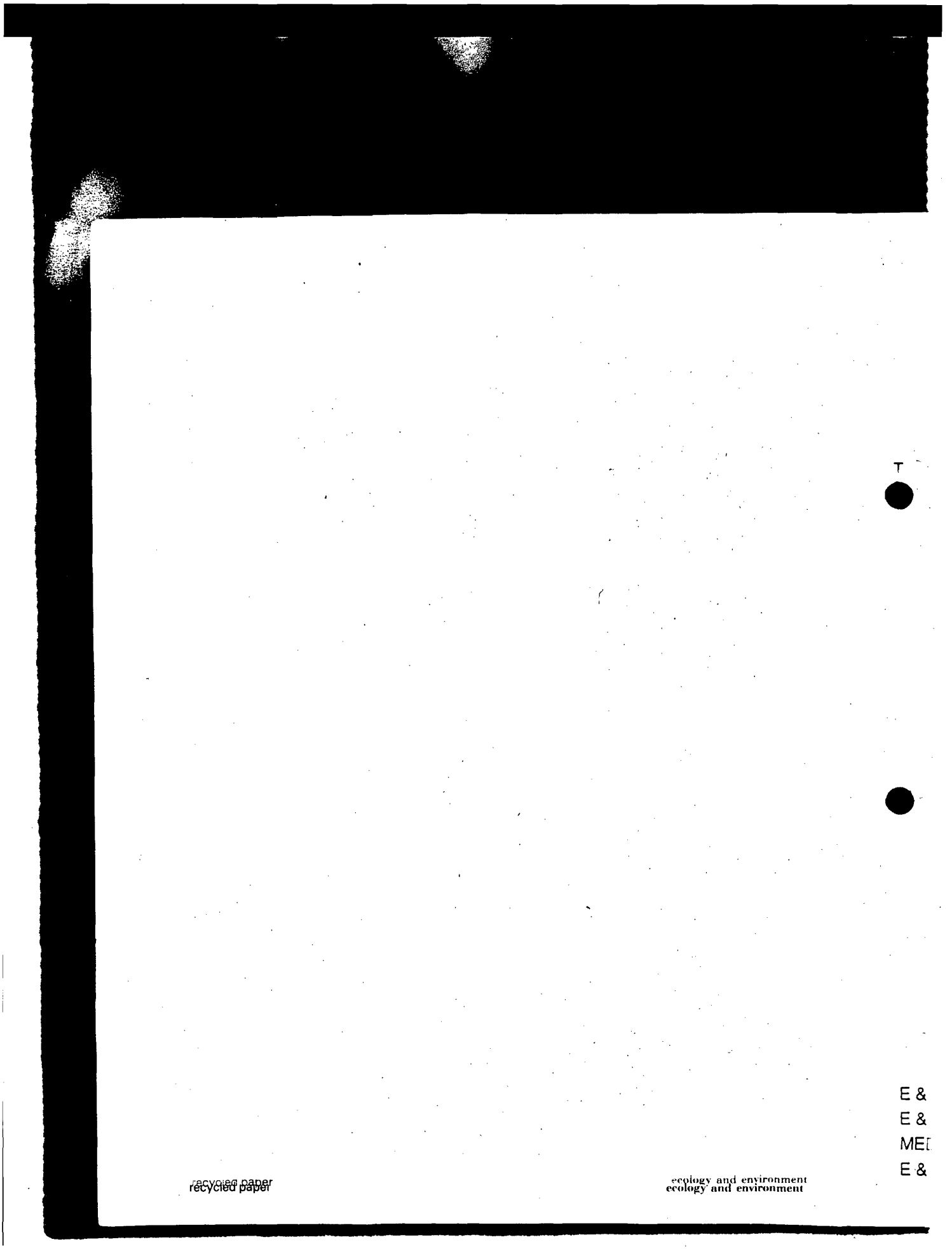
Job Number KJ6103 052601SFXX

WILCOX REFINERY
Bristow, OK Creek

OPA Oil Spill Response



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E & E Job Number KJ6103 052601SFXX

Telephone Code Number 80531/Copy 00531

Site Name WILCOX REFINERY

City/State Bristow OK 74010

TDD S06-98-03-0009

PAN 052601SFXX

SSID FPN:088079

CERCLIS ID: OKD001010917 S29-T16N-R9E

Start / Finish Date 8/5/98 / 8/10/98

Book 2 of 2

E & E Emergency Response Center: (716) 684-8940
E & E Corporate Center: (716) 684-8060
MEDTOX Hotline: (501) 370-8263
E & E Safety Director (Home): (716) 655-1260

2 SO6-9803-0009 8/5/98

0700 Leave hotel in Sapulpa for the site
0730 Set up base camp toward south end of (b) (6) property. Conduct health and safety meeting with all attendees signing separate daily form. Perodrick related amusing encounter the previous day with a hive of (b) (6) that required a rapid evacuation over boulders and up a cliff.
0800 Martich and Perodrick mobilize to TMC locations SB39 and SB40. Sansone and Williams continue slam-bar sampling down Trib 1 at SB27.
0840 Trib 1 team could not get through the cattle fence around (b) (6) property so base camp was moved to a shade tree near the (b) (6) dock road.
0930 Banipal, Stone and Fisher arrive at the site. Stone determines the total station batteries are low. Decide to recharge from Lee's house.
1000 Beer conducts drum inspection for Banipal and Fisher at the Lorraine, Ohio Oil and Wilcox Refinery sites. Very little physical evidence of contamination was encountered at Lorraine or Ohio Oil. Fisher was of the general impression that additional field work is not required. Banipal suggested at least a literature search and contact with ODEQ.
1200 Fisher and Banipal leave site for lunch and then flight to Tulsa.
1230 START team breaks for lunch. Sampling progressing steadily
1315 Beer to assist Stone survey from Benchmark location at RRXING to the tank farm area at SB05 and SB41 & 45 including a section of Trib 2. Sansone and Williams discover seep of oily waste entering Trib 1 near the base of (b) (6) (b) (6) (b) (6) pond dam from the (b) (6) property side. Entry point is below an exit pipe from Lee's Pond and up 20' below the water level of the (b) (6) property rear SB14. Beer will return to this location for photodocumentation. Soil and surface water samples SB32 and SW02 collected ASAP.

Location
SB27
SB28
SB29
SB30
SB31
SW01
SW02
SW02D
SB
SB32D
SB33
SB34
SB40
GW06 (SB40)
SB39
SB43
SB41

/98 — SAMPLE LOG — 8/5/98

Location	Depth	Time	Tag #	Vol	Analysis
SB27	0-3'	0830	6-097351	8oz	Metals, PAH, TPH, pH
			" 352	2x40ml	BTEX
SB28	0-2'	0945	6-097354	8oz	Metals etc.
			" 353	2x40ml	BTEX
SB29	0-1'	1020	6-097355	8oz	Metals etc
			" 356	2x40ml	BTEX
SB30	0-3'	1100	6-097358	8oz	Metals etc
			" 359	2x40ml	BTEX
SB31	0-3'	1145	6-097360	8oz	Metals etc
			" 361	2x40ml	BTEX
SW01	N. end of Lee's Pond	1045	6-097360	2x40ml	BTEX
			" 362	2x40ml	TPH
SW02	S. Base of Lee's Pond dam.	1415	6-097363	2x40ml	BTEX
			" 364	2x40ml	TPH
SW02D	"	1425	6-097365	2x40ml	BTEX
			" 366	2x40ml	TPH
SB32	0-1'	1440	6-097367/368	8oz/2x40ml	All
SB32D	0-1'	1440	" 369/370	8oz/2x40ml	All
SB33	0-1'	1515	6-097371	8oz	Metals etc
			" 372	2x40ml	BTEX
SB34	0-1'	1540	6-097373	8oz	Metals etc
			" 374	2x40ml	BTEX
SB40	3-4'	0911	6-097441	8oz	Metals etc
			" 440	2x40ml	BTEX
GW06 (SB40)	~6'	0855	6-097442	8oz	Metals etc
			" 443	2x40ml	BTEX
SB39	3-4'	1135	6-097444	8oz	Metals etc
			" 445	2x40ml	BTEX
SB43	6-7'	1449	6-097446	8oz	Metals etc
			" 447	2x40ml	BTEX

18 ~~Metals etc~~

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ntry point
below the
mill
surface

001468

8/5/98 SAMPLE LOG (cont.) SO6-9803-0009

Location	Depth	Time	Tag#	Vol	Analysis
SB44	4-5'	1625	Metals, PAH, TPH, pH	8oz	6-097048
			BTEX	2x40ml	" 039
SB45	0-1'	1650	Metals, PAH,	8oz	6-097040
			TPH, BTEX, PAH, pH	2x40ml	" 041

JB

1715 Beer and Stone complete survey of Tank 1 slope from Refinery Road to [redacted] Not enough time to survey the recently discovered old seep below [redacted] Carsone and Williams complete storage samplers along Trib 1. Marlish and Peterson complete soil sampling but only able to recover one groundwater sample. Generally holes are too dry, rock is encountered, or moisture is too sloppy/muddy to sample. JB

1735 Beer and Stone leave site for the Tulsa airport.

1750 Team leaves site for Dallas area.

Fed Ex pickup [illegible] apparently, pickup occurred at 1200 hrs. Decide to keep samples in ice and ship one large cooler of samples tomorrow.

8/5/98

1 Beer

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03-0004 SD6-9803-0009 8/6/98

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tomorrow.

0700 Leave motel for site after faxing crews time cards.
0730 Set up base to the south of (b) (6) residence (dog and rabbits). Beer and Marlin conduct daily health and safety meeting with attendees signing the daily form.
0800 Split into the usual two teams to complete JMC and slam bar sampling. Trib 1 team goes to Pond 2 and break two slam bars. Decide to get a deeper sample to estimate volume of oily waste encountered, with the JMC.
1000 Beer and Sarcone begin GPS and photographic survey of all sample locations. Williams to assist JMC crew.
1230 Break for lunch.
1345 Return to (b) (6) property. JMC crew extract corer stuck in Trib 1 at location SB24 and continue attempt at ground water samplers at SB38 and SB39. No clean sample was obtained.
1400 Beer and Sarcone investigate oily seeps into Trib. 1 below the bar for (b) (6) cond. A brown, iron-stained, oily liquid is flowing into Trib 1 from an old iron pipe half-way up the stream bank on the west side (b) (6) property edge). Extensive digital and analog photodocumentation was collected. Sampling point SB33 was collected near the outflow location and SB34 is located 100 ft downstream in the stream bed, with black-stained soil and rocks at the surface. It appears that this oily waste has been entering the stream for an extensive period of time, with the dark staining extending approximately 200 feet to Sand Creek. The water flow did not extend more than 50 feet before soaking into the stream bed.
1500 Sand Creek was not flowing after this 2-month dry period. Minor seeps of oily, brown-stained liquid, similar to SB33 were observed entering directly into Sand Creek at the base of the bank upstream from Trib 1 and from (b) (6) property on the north side.

6

8/6/98 PHOTO LOG SO6-9803-0009 SO6-98

Frame Roll 4	Time	Description	Direction TB	Photog/Init TB/CS	Locati
1	1024	Collecting SW04 from Trib 2 at SE property boundary	SW		SB35
2	1100	Trib 2 below berm area at SB05 and SB43	SW		SB41
3	1115	GW sampling at SB36. Not able to retrieve.	N		
4	1125	Potential h/c sheen and seepage on Trib 2 near SB38	S		SB41D
5	1154	Drainage from (b) (6) A (b) (6)	W		SB
6	1155	N. drainage from (b) (6) to (b) (6)	W		
7	1345	Dry bed of Trib 1 at SB21	N		GW07
8	1355	Trib 1 at SB24. Note pipeline above ck and h/c odor was noted in core at this location.	W		(SB42) SW04
9	1425	Brown oily liquid at base (south) of (b) (6) and	NW		
10	1430	Detail of oily seep/pipe at SB32. Pipe runs approximately SE from the unvegetated area on hillside	NW		GW08 (SB37)
11	1440	Detail of dried tarry waste above loose oil stained soil near SB33.	SE		SB46
12	1445	Stained soil and tarry waste along walls and floor of Trib 1. Staining and odor is extensive.	SW		SB47
13	1447	Stained soil continues down Trib 1.	S		TB
14	1452	Trib 1 entrance to Sand Creek	NE		
15	1500	Sand Creek upstream from Trib 1. (b) (6) to Right.	W		
16	1505	Surface h/c sheen on Sand Creek pool	SE		1600

J. Beer 8/6/98

1830

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9803-0009 SO6-9803-0009 SAMPLE LOG 8/6/98

tion	Photog/Init TB/CS	Location	Depth	Time	Tag#	Vol	Analysis
-JB							JB
		SB35	0-3'	0815	6-099460	8oz	Metals, PAH, TPH, pH
					" 461	2x40ml	BTEX
SW		SB41	2-3'	0840	6-097042	8oz	Metals, PAH, TPH, pH
ve. N					" 044	2x40ml	BTEX
S		SB41D	2-3'	0842	6-097043	8oz	Metals, PAH, TPH, pH
					" 045	2x40ml	BTEX
W		SB42	2-3'	0945	6-097048	8oz	Metals, PAH, TPH, pH
W					" 375	2x40ml	BTEX
N		GW07	~6'	0939	6-097046	2x40ml	BTEX
N		(SB42)			" 047	2x40ml	TPH
		SW04	-	1024	6-097376	2x40ml	BTEX
nd NW					" 377	2x40ml	TPH
rung NW		GW08	~8'	1145	6-097378	1 JB 2x40ml	BTEX
/hite.		(SB37)	Low sample volume			~~2x40ml~~	~~TPH~~ JB
SE		SB46	4-12	430	6-097380	8oz	Metals, PAH, TPH, pH
					" 381	2x40ml	BTEX
" and W		SB46D	4-12	435	6-097382	8oz	Metals, PAH, TPH, pH
ave.					" 383	2x40ml	BTEX
S		TB	-	1600	6-097379	2x40ml	BTEX
NE							
ight. W					(cont)		
SE		1600 START team preparing all samples collected after the IMI crew advanced boring SB46 to 12' bgs in the middle of Pond 2. The boring soils were stained with an oily layer from 4' to TD below a clear fill layer. An H/C odor is noticeable while walking around on Pond 2.					
		1830 A total of 17 soil samples, 6 water samples and one trip blank are stripped to the lab in one cooler under FedEx Airbill # 805550003398.					
		J. Bell 8/6/98					

001472

8

DIGITAL PHOTO LOG 8/10/98

Sony Digital EPA# 73206 All photos taken on 8/6/98

Frame	Time	Description	Direction	Photog/Wit.
				JB CS/TB 4/2
1	1425	Stained(?) frog near SB33.	W	(Ph
2	1426	Closeup of brown oily waste flow near SB33.	NW	—
3	1426	Trib 1 stream bed with stained outflow	W	Ph
4	1427	Repeat of Frame 3 subject	W	
5	1428	Oily flow path emerging from ~~iron pipe~~ stream bank TB	NW	
6	1428	Brown oil-stained stream bed	W	
7	1429	Vegetation cover at the outflow pipe area	W	Su
8	1430	Closeup of frog.	W	—
9	1432	Closeup of brown stained oily flow from iron pipe.	NW	To
10	1432	Repeat of Frame 9 subject.	NW	—
11	1434	Oily sheen on pooled water in Trib 1.	SW	—
12	1437	Dried tarry waste above oil stained soil, east bank Trib 1.	E	
13	1437	Closeup of tarry waste breaking off into Trib 1 pond.	E	
14	1439	Dried tarry waste flow and stained soil, Trib 1.	SE	
15	1440	Closeup shot of tarry waste in Trib 1 stream bed.	—	
16	1441	Dried tarry stained soil in Trib 1 stream bed	—	
17	1444	Oil stained stream bed at SB34.	S	
18	1444	Oil stained soil and dry tarry waste at SB34	E	
19	1446	Oil stained stream bed at SB34.	—	
20	1451	Sand Creek upstream from Trib 1 junction	NW JB	
21	1456	Sand Creek farther upstream w/ (b) (6) property on right	NW JB	
22	1502	Flow of brown oily seep upstream of Trib 1, northside of Sand Ck.	—	
23	1503	Flow of Sand Ck. bank oil seep and staining	N	
24	1504	Oily sheen on footprint pooled in Sand Ck, SE of Trib 1.	SE	
25	1506	Oily sheen on Sand Creek pool.	S	
26	1507	Oily sheen at edge of Sand Creek pool.	NW	
27	1511	Tarry waste and oil stains along Sand Creek	N	
28	1511	Black tarry waste and oil seeps along Sand Creek	N	

TB

JB

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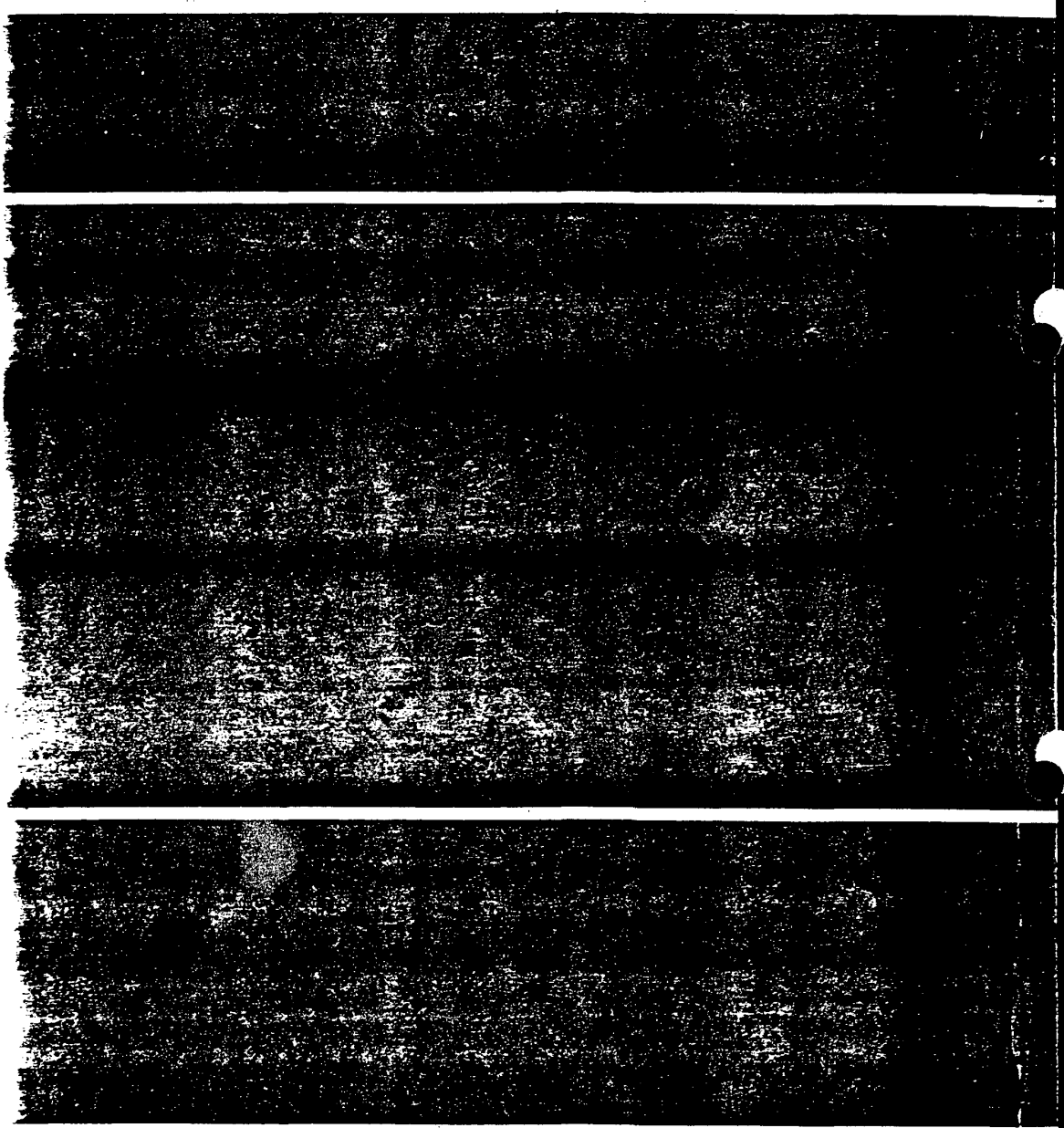
TOTAL SAMPLES COLLECTED

Date	Soil	S-Dup	GW	GW-Dup	SW	SW-Dup	TB	SED
4/27-6/4 (Phase 1)	28	3	5	1			2	2
Phase 2								
8/4	10				1		1	
8/5	13	1	1		2	1		
8/6	4	2	1		1		1	
Subtotal	27	3	3		4	1	2	
Total	55	6	8	1	4	1	4	2

1 Beer 8/10/98



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Appendix F
Photographs

PHOTOGRAPH TRACKING SYSTEM

START REGION 6

DATE	TIME	PHOTO	DIRECTION	COMMENTS	PHOTOGRAPHER\WITNESS
08/06/98	1024	401	SOUTHWEST	COLLECTING SW04 FROM TRIBUTARY 2 AT SOUTHEAST PROPERTY BOUNDARY	TOM BEER
08/06/98	1100	402	SOUTHWEST	TRIBUTARY 2 BELOW BERM AREA AT SB05 AND SB43	TOM BEER
08/06/98	1115	403	NORTH	GROUNDWATER SAMPLING AT SB36	TOM BEER
08/06/98	1125	404	SOUTH	POTENTIAL HYDROCARBON SHEEN AND SEEPAGE ON TRIBUTARY 2 NEAR SB38	TOM BEER
08/06/98	1154	405	WEST	DRAINAGE FROM [redacted] PROPERTY TO [redacted] POND	TOM BEER
08/06/98	1155	406	WEST	NORTH DRAINAGE FROM [redacted] PROPERTY TO [redacted] POND	TOM BEER
08/06/98	1345	407	NORTH	DRY BED OF TRIBUTARY 2 AT SB21	TOM BEER
08/06/98	1355	408	NORTH	TRIBUTARY 1 AT SB24; NOTE PIPELINE ABOVE CREEK	TOM BEER
08/06/98	1425	409	NORHTWEST	BROWN, OILY LIQUID AT BASE (SOUTH) OF [redacted] POND	TOM BEER
08/06/98	1430	410	NORTHWEST	DETAIL OF OILY SEEP AT SB32; PIPE RUNS APPROXIMATELY SOUTHEAST FROM THE UNREGULATED AREA ON [redacted] PROPERTY	TOM BEER
08/06/98	1440	411	SOUTHEAST	DETAIL OF DRIED, TARRY WASTE ABOVE LOOSE, OIL-STAINED SOIL NEAR SB33	TOM BEER
08/06/98	1445	412	SOUTHWEST	STAINED SOIL AND TARRY WASTE ALONG WALLS AND FLOOR OF TRIBUTARY 1	TOM BEER
08/06/98	1447	413	SOUTH	STAINED SOIL CONTINUES DOWN TRIBUTARY 1	TOM BEER
08/06/98	1452	414	NORTHEAST	TRIBUTARY 1 ENTRANCE TO SAND CREEK	TOM BEER
08/06/98	1500	415	WEST	SAND CREEK UPSTREAM FROM TRIBUTARY 1; [redacted] PROPERTY ON RIGHT (NORTH)	TOM BEER
08/06/98	1505	416	SOUTHEAST	SURFACE SHEEN ON SAND CREEK POOL	TOM BEER

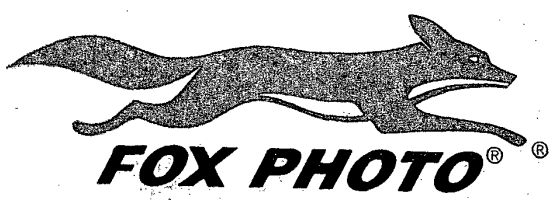
ATTACHMENT F

NEGATIVES and DISK PHOTOS

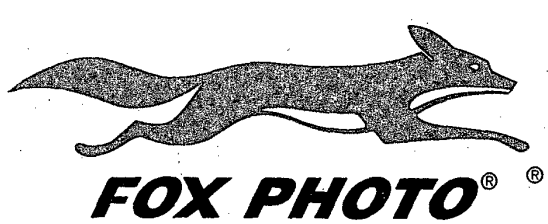
WILCOX REFINERY

Bristow, Creek Co., Oklahoma

TDD# S06-9803-0009



CPI Photo®



CPI Photo®

SITE NAME: Wilcox Refinery TDD#: S06-9606-026
PHOTO#: 101 PHOTOGRAPHER/WITNESS: Ben Martich/David Crow
DATE: 06/13/97 TIME: 0827 DIRECTION: Southwest
The [redacted] residence (on-site).

SITE NAME: Wilcox Refinery TDD#: S06-9606-026
PHOTO#: 102 PHOTOGRAPHER/WITNESS: David Crow/Ben Martich
DATE: 06/13/97 TIME: 0829 DIRECTION: West
The [redacted] residence (on-site) with abandoned oil storage tanks in the background.

SITE NAME: Wilcox Refinery TDD#: S06-9606-026
PHOTO#: 103 PHOTOGRAPHER/WITNESS: David Crow/Ben Martich
DATE: 06/13/97 TIME: 0901 DIRECTION: South
Abandoned oil storage tank located in the northwestern portion of the site.

SITE NAME: Wilcox Refinery TDD#: S06-9606-026
PHOTO#: 104 PHOTOGRAPHER/WITNESS: David Crow/Ben Martich
DATE: 06/13/97 TIME: 0945 DIRECTION: Southwest
1st Assembly Church of God located in the northwestern corner of the site.

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 101 PHOTOGRAPHER/WITNESS: T. Beer/J. Myers
DATE: 03/25/98 TIME: 1510 DIRECTION: W
Pond 1, closeup of soft, oily tank bottom sludge, with evidence of recent backfilling with soil.

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 102 PHOTOGRAPHER/WITNESS: T. Beer/J. Myers
DATE: 03/25/98 TIME: 1525 DIRECTION: S
Tributary 2 to Sand Creek, at the northeast corner of the site, west of former Tank 8.

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 103 PHOTOGRAPHER/WITNESS: T. Beer/J. Myers
DATE: 03/25/98 TIME: 1528 DIRECTION: E
Former Tank 8 berm area, standing water with dryland vegetation. Adjacent farm buildings to the east are visible in the background.

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 104 PHOTOGRAPHER/WITNESS: T. Beer/J. Myers
DATE: 03/25/98 TIME: 1534 DIRECTION: E
Former Tank 9 berm area with standing water after recent rains, mostly dryland vegetation.

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 105 PHOTOGRAPHER/WITNESS: T. Beer/J. Myers
DATE: 03/25/98 TIME: 1540 DIRECTION: E
Former Tank 7 berm area with evidence of recent grading. No visible tank bottom sludge. Tributary 2 to Sand Creek is beyond the berm to the right (south).

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 106 PHOTOGRAPHER/WITNESS: T. Beer/J. Myers
DATE: 03/25/98 TIME: 1545 DIRECTION: NW
Aboveground markers indicating the presence of a buried Williams Company petroleum pipeline. Photograph was taken east of former Tank 4.

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 107 PHOTOGRAPHER/WITNESS: T. Beer/J. Myers
DATE: 03/06/94 TIME: 1550 DIRECTION: NE
Former Tank 4 berm area with evidence of recent grading and backfilling using soil from the berm.

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 108 PHOTOGRAPHER/WITNESS: T. Beer/J. Myers
DATE: 03/25/98 TIME: 1615 DIRECTION: SE
Fenced, Fuel Pumping Station at Refinery Road, looking along direction of the buried Williams Company petroleum pipeline.

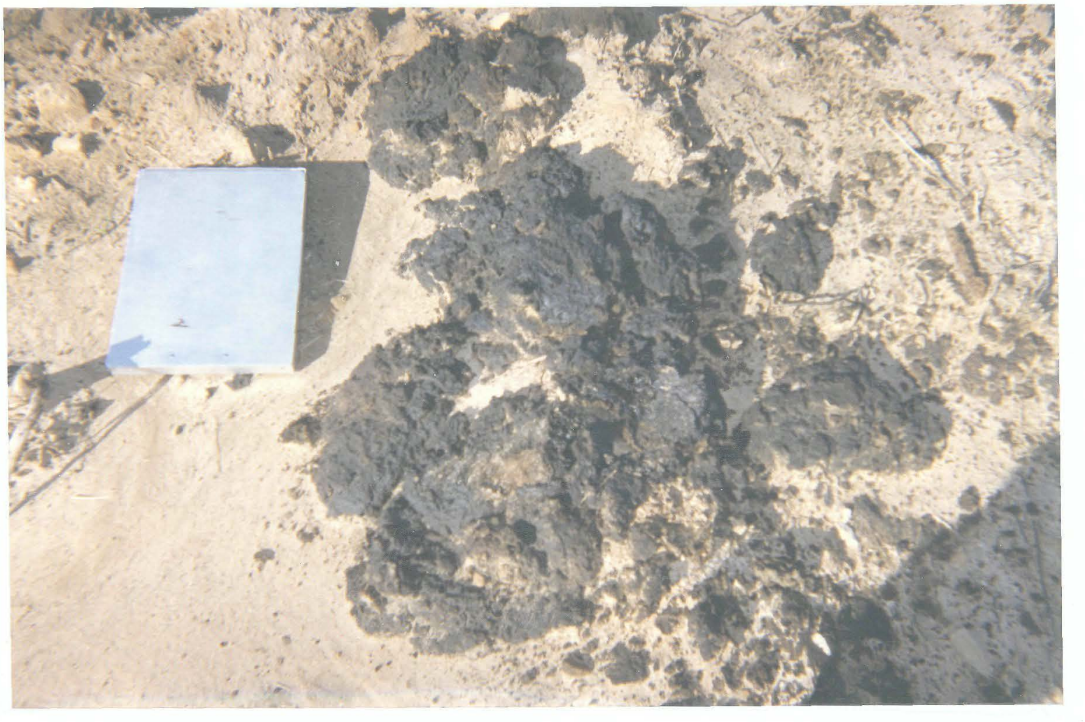
SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 109 PHOTOGRAPHER/WITNESS: T. Beer/J. Myers
DATE: 03/25/98 TIME: 1625 DIRECTION: E
Former Tank 2 berm area, fully vegetated with dryland grasses, with some ponded water on the left (west) side.

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 110 PHOTOGRAPHER/WITNESS: T. Beer/J. Myers
DATE: 03/25/98 TIME: 1630 DIRECTION: NE
Former oily waste "Pit" area, showing evidence of recent backfilling with soil. Black tank bottom sludge is visible at the surface.

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 111 PHOTOGRAPHER/WITNESS: T. Beer/J. Myers
DATE: 03/25/98 TIME: 1635 DIRECTION: NE
View from Pond 2 toward former oily waste "Pit". Note, black sludge at the surface in the area of a former breach in the "Pit" berm.

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 112 PHOTOGRAPHER/WITNESS: T. Beer/J. Myers
DATE: 03/25/98 TIME: 1643 DIRECTION: E
View of the west cell of Pond 2 from the site of the breach in the pond berm at the western end. The berm holding back the ponded east cell of Pond 2 is in the background.

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 113 PHOTOGRAPHER/WITNESS: T. Beer/J. Myers
DATE: 03/25/98 TIME: 1645 DIRECTION: NE
View from Pond 2 toward break in trees and area of the breach in the southwest side of the former oily waste "Pit".



SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 114 PHOTOGRAPHER/WITNESS: T. Beer/J. Myers
DATE: 03/25/98 TIME: 1650 DIRECTION: N
Closeup view of black, oily sludge in the former "flow" area from the berm breach at the oily waste "Pit". Note, no free liquid was observed, but the material is viscous.

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 115 PHOTOGRAPHER/WITNESS: T. Beer/J. Myers
DATE: 03/25/98 TIME: 1655 DIRECTION: S
Warning sign along the gravel access road to the [redacted] property, near Refinery Road, and opposite the Fuel Pumping Station.

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 114 PHOTOGRAPHER/WITNESS: T. Beer/J. Myers
DATE: 03/25/98 TIME: 1650 DIRECTION: N
Closeup view of black, oily sludge in the former "flow" area from the berm breach at the oily waste "Pit". Note, no free liquid was observed, but the material is viscous.

SITE NAME: WILCOX REFINERY TDD#: S06-9803-009
PHOTO#: 415 PHOTOGRAPHER/WITNESS: TOM BEER
DATE: 08/06/98 TIME: 1500 DIRECTION: WEST
SAND CREEK UPSTREAM FROM TRIBUTARY 1 [redacted] PROPERTY
ON RIGHT (NORTH)

SITE NAME: WILCOX REFINERY TDD#: S06-9803-009
PHOTO#: 416 PHOTOGRAPHER/WITNESS: TOM BEER
DATE: 08/06/98 TIME: 1505 DIRECTION: SOUTHEAST
SURFACE SHEEN ON SAND CREEK POOL

SITE NAME: WILCOX REFINERY TDD#: S06-9803-009
PHOTO#: 413 PHOTOGRAPHER/WITNESS: TOM BEER
DATE: 08/06/98 TIME: 1447 DIRECTION: SOUTH
STAINED SOIL CONTINUES DOWN TRIBUTARY 1

SITE NAME: WILCOX REFINERY TDD#: S06-9803-009
PHOTO#: 414 PHOTOGRAPHER/WITNESS: TOM BEER
DATE: 08/06/98 TIME: 1452 DIRECTION: NORTHEAST
TRIBUTARY 1 ENTRANCE TO SAND CREEK

SITE NAME: WILCOX REFINERY TDD#: S06-9803-009
PHOTO#: 411 PHOTOGRAPHER/WITNESS: TOM BEER
DATE: 08/06/98 TIME: 1440 DIRECTION: SOUTHEAST
DETAIL OF DRIED, TARRY WASTE ABOVE LOOSE, OIL-STAINED SOIL NEAR SB33

SITE NAME: WILCOX REFINERY TDD#: S06-9803-009
PHOTO#: 412 PHOTOGRAPHER/WITNESS: TOM BEER
DATE: 08/06/98 TIME: 1445 DIRECTION: SOUTHWEST
STAINED SOIL AND TARRY WASTE ALONG WALLS AND FLOOR OF TRIBUTARY 1

SITE NAME: WILCOX REFINERY TDD#: S06-9803-009
PHOTO#: 409 PHOTOGRAPHER/WITNESS: TOM BEER
DATE: 08/06/98 TIME: 1425 DIRECTION: NORHTWEST
BROWN, OILY LIQUID AT BASE (SOUTH) OF (b) POND

SITE NAME: WILCOX REFINERY TDD#: S06-9803-009
PHOTO#: 410 PHOTOGRAPHER/WITNESS: TOM BEER
DATE: 08/06/98 TIME: 1430 DIRECTION: NORTHWEST
DETAIL OF OILY SEEP AT SB32; PIPE RUNS APPROXIMATELY
SOUTHEAST FROM THE UNREGULATED AREA ON (b)
PROPERTY

SITE NAME: WILCOX REFINERY TDD#: S06-9803-009
PHOTO#: 407 PHOTOGRAPHER/WITNESS: TOM BEER
DATE: 08/06/98 TIME: 1345 DIRECTION: NORTH
DRY BED OF TRIBUTARY 2 AT SB21

SITE NAME: WILCOX REFINERY TDD#: S06-9803-009
PHOTO#: 408 PHOTOGRAPHER/WITNESS: TOM BEER
DATE: 08/06/98 TIME: 1355 DIRECTION: NORTH
TRIBUTARY 1 AT SB24; NOTE PIPELINE ABOVE CREEK

SITE NAME: WILCOX REFINERY TDD#: S06-9803-009
PHOTO#: 405 PHOTOGRAPHER/WITNESS: TOM BEER
DATE: 08/06/98 TIME: 1154 DIRECTION: WEST
DRAINAGE FROM [redacted] PROPERTY TO [redacted] POND

SITE NAME: WILCOX REFINERY TDD#: S06-9803-009
PHOTO#: 406 PHOTOGRAPHER/WITNESS: TOM BEER
DATE: 08/06/98 TIME: 1155 DIRECTION: WEST
NORTH DRAINAGE FROM [redacted] PROPERTY TO [redacted] POND

SITE NAME: WILCOX REFINERY TDD#: S06-9803-009
PHOTO#: 403 PHOTOGRAPHER/WITNESS: TOM BEER
DATE: 08/06/98 TIME: 1115 DIRECTION: NORTH
GROUNDWATER SAMPLING AT SB36

SITE NAME: WILCOX REFINERY TDD#: S06-9803-009
PHOTO#: 404 PHOTOGRAPHER/WITNESS: TOM BEER
DATE: 08/06/98 TIME: 1125 DIRECTION: SOUTH
POTENTIAL HYDROCARBON SHEEN AND SEEPAGE ON TRIBUTARY 2 NEAR SB38

SITE NAME: WILCOX REFINERY TDD#: S06-9803-009
PHOTO#: 401 PHOTOGRAPHER/WITNESS: TOM BEER
DATE: 08/06/98 TIME: 1024 DIRECTION: SOUTHWEST
COLLECTING SW04 FROM TRIBUTARY 2 AT SOUTHEAST PROPERTY BOUNDARY

SITE NAME: WILCOX REFINERY TDD#: S06-9803-009
PHOTO#: 402 PHOTOGRAPHER/WITNESS: TOM BEER
DATE: 08/06/98 TIME: 1100 DIRECTION: SOUTHWEST
TRIBUTARY 2 BELOW BERM AREA AT SB05 AND SB43

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION - 6 EMERGENCY RESPONSE AND PREPAREDNESS
CONTRACT NO. 68-W6-0013

SITE NAME: Wilcox Refinery **TDD NO. S06-9803-0009**

PHOTO NO. 27

DATE: 8/6/98

TIME: 1511

DIRECTION: N

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Tree roots along Sand Creek

PHOTO NO. 28

DATE: 8/6/98

TIME: 1511

DIRECTION: N

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Black tree roots along Sand Creek

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION - 6 EMERGENCY RESPONSE AND PREPAREDNESS
CONTRACT NO. 68-W6-0013

SITE NAME: Wilcox Refinery **TDD NO. S06-9803-0009**

PHOTO NO. 25

DATE: 8/6/98

TIME: 1506

DIRECTION: S

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Oily sheen on Sand Creek pool

PHOTO NO. 26

DATE: 8/6/98

TIME: 1507

DIRECTION: NW

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Oily sheen at edge of Sand Creek pool

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION - 6 EMERGENCY RESPONSE AND PREPAREDNESS
CONTRACT NO. 68-W6-0013

SITE NAME: Wilcox Refinery **TDD NO. S06-9803-0009**

PHOTO NO. 23

DATE: 8/6/98

TIME: 1503

DIRECTION: N

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Detail of Sand Creek bank oil seep and staining

PHOTO NO. 24

DATE: 8/6/98

TIME: 1504

DIRECTION: SE

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Oily sheen in footprint in bed of Sand Creek; SE of trib. 1

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION - 6 EMERGENCY RESPONSE AND PREPAREDNESS
CONTRACT NO. 68-W6-0013

SITE NAME: Wilcox Refinery **TDD NO. S06-9803-0009**

PHOTO NO. 21

DATE: 8/6/98

TIME: 1456

DIRECTION: NW

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Sand Creek further upstream with (b) property on right

PHOTO NO. 22

DATE: 8/6/98

TIME: 1502

DIRECTION: NW

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Detail of brown, oily seep; upstream of trib. 1; north side of Sand Creek

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION - 6 EMERGENCY RESPONSE AND PREPAREDNESS
CONTRACT NO. 68-W6-0013

SITE NAME: Wilcox Refinery **TDD NO. S06-9803-0009**

PHOTO NO. 19

DATE: 8/6/98

TIME: 1446

DIRECTION: E

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Oil-stained stream bed at SB34

PHOTO NO. 20

DATE: 8/6/98

TIME: 1451

DIRECTION: NW

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Sand Creek upstream from trib. 1 junction

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION - 6 EMERGENCY RESPONSE AND PREPAREDNESS
CONTRACT NO. 68-W6-0013

SITE NAME: Wilcox Refinery **TDD NO. S06-9803-0009**

PHOTO NO. 17

DATE: 8/6/98

TIME: 1444

DIRECTION: S

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Oil-stained stream bed below SB34

PHOTO NO. 18

DATE: 8/6/98

TIME: 1444

DIRECTION: E

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Oil-stained soil and dry tar waste at SB34

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION - 6 EMERGENCY RESPONSE AND PREPAREDNESS
CONTRACT NO. 68-W6-0013

SITE NAME: Wilcox Refinery **TDD NO. S06-9803-0009**

PHOTO NO. 15

DATE: 8/6/98

TIME: 1440

DIRECTION: SE

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Raccoon prints in trib. 1 stream bed

PHOTO NO. 16

DATE: 8/6/98

TIME: 1441

DIRECTION: SE

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Black, oil-stained soil in trib. 1 stream bed

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION - 6 EMERGENCY RESPONSE AND PREPAREDNESS
CONTRACT NO. 68-W6-0013

SITE NAME: Wilcox Refinery **TDD NO. S06-9803-0009**

PHOTO NO. 13

DATE: 8/6/98

TIME: 1437

DIRECTION: E

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Closeup of tarry waste breaking off into trib. 1 pond

PHOTO NO. 14

DATE: 8/6/98

TIME: 1439

DIRECTION: SE

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Dried tarry waste flow and stained soil; trib. 1

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION - 6 EMERGENCY RESPONSE AND PREPAREDNESS
CONTRACT NO. 68-W6-0013

SITE NAME: Wilcox Refinery **TDD NO. S06-9803-0009**

PHOTO NO. 11

DATE: 8/6/98

TIME: 1434

DIRECTION: SW

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Oily sheen on pooled water in trib. 1

PHOTO NO. 12

DATE: 8/6/98

TIME: 1437

DIRECTION: E

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Dried tarry waste above oil-stained soil; east bank trib. 1

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION - 6 EMERGENCY RESPONSE AND PREPAREDNESS
CONTRACT NO. 68-W6-0013

SITE NAME: Wilcox Refinery **TDD NO. S06-9803-0009**

PHOTO NO. 9

DATE: 8/6/98

TIME: 1432

DIRECTION: NW

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Closeup of brown oily flow from iron pipe

PHOTO NO. 10

DATE: 8/6/98

TIME: 1432

DIRECTION: NW

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Repeat of photo 9 subject

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION - 6 EMERGENCY RESPONSE AND PREPAREDNESS
CONTRACT NO. 68-W6-0013

SITE NAME: Wilcox Refinery **TDD NO. S06-9803-0009**

PHOTO NO. 7

DATE: 8/6/98

TIME: 1429

DIRECTION: W

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Vegetation cover at the outflow pipe area

PHOTO NO. 8

DATE: 8/6/98

TIME: 1430

DIRECTION: W

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Closeup of frog

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION - 6 EMERGENCY RESPONSE AND PREPAREDNESS
CONTRACT NO. 68-W6-0013

SITE NAME: Wilcox Refinery **TDD NO. S06-9803-0009**

PHOTO NO. 5

DATE: 8/6/98

TIME: 1428

DIRECTION: NW

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Oil flow path emerging from stream bank

PHOTO NO. 6

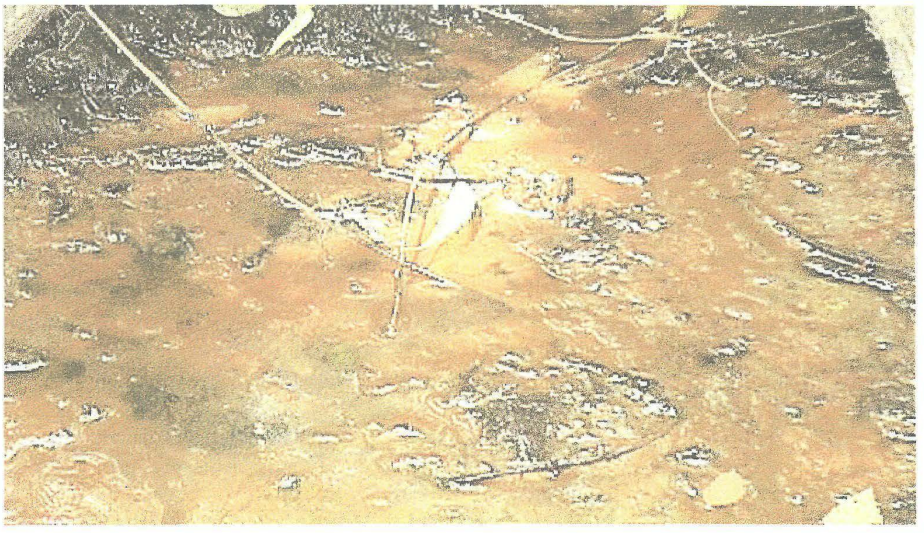
DATE: 8/6/98

TIME: 1428

DIRECTION: W

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Brown, oil-stained stream bed



U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION - 6 EMERGENCY RESPONSE AND PREPAREDNESS
CONTRACT NO. 68-W6-0013

SITE NAME: Wilcox Refinery **TDD NO. S06-9803-0009**

PHOTO NO. 3

DATE: 8/6/98

TIME: 1426

DIRECTION: W

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Trib 1 stream bed with stained outflow

PHOTO NO. 4

DATE: 8/6/98

TIME: 1427

DIRECTION: W

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Repeat of frame 3 subject

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION - 6 EMERGENCY RESPONSE AND PREPAREDNESS
CONTRACT NO. 68-W6-0013

SITE NAME: Wilcox Refinery **TDD NO. S06-9803-0009**

PHOTO NO. 1

DATE: 8/6/98

TIME: 1425

DIRECTION: W

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Frog near SB33

PHOTO NO. 2

DATE: 8/6/98

TIME: 1426

DIRECTION: NW

PHOTOGRAPHER: C.Sansone

DESCRIPTION: Closeup of brown oily waste flow near SB33

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 319 PHOTOGRAPHER/WITNESS: T. Beer/P. James
DATE: 06/04/98 TIME: 0900 DIRECTION: Southwest
Geoprobe at SB19 near south-most large AST in northwest corner of site

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 317 PHOTOGRAPHER/WITNESS: T. Beer/P. James
DATE: 06/03/98 TIME: 1137 DIRECTION: East
Oil/water separator looking downgrade toward SB15 and Tributary 1

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 318 PHOTOGRAPHER/WITNESS: T. Beer/P. James
DATE: 06/03/98 TIME: 1340 DIRECTION: Southeast
Location of SB16 and small AST to the right. Inside rough cut berm composed of dried, tarry waste

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 315 PHOTOGRAPHER/WITNESS: T. Beer/P. James
DATE: 06/03/98 TIME: 1125 DIRECTION: West
Oil/water separator with baffle cut, looking upgrade

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 316 PHOTOGRAPHER/WITNESS: T. Beer/P. James
DATE: 06/03/98 TIME: 1130 DIRECTION: North
Detail of the north wall of the oil/water separator

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 313 PHOTOGRAPHER/WITNESS: T. Beer/P. James
DATE: 06/02/98 TIME: 1635 DIRECTION: North
Location of SB13, south of (b) Residence, outside fence

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 314 PHOTOGRAPHER/WITNESS: T. Beer/P James
DATE: 06/03/98 TIME: 0950 DIRECTION: Southwest
Metal tank bottom in bermed pond south of SB14 and adjacent to the unvegetated area

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 311 PHOTOGRAPHER/WITNESS: T. Beer/P. James
DATE: 06/02/98 TIME: 1430 DIRECTION: NA
Tarry waste at the surface near SB11

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 312 PHOTOGRAPHER/WITNESS: T. Beer/P. James
DATE: 06/02/98 TIME: 1530 DIRECTION: Southwest
Drain pipe through cut berm near SB12

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 309 PHOTOGRAPHER/WITNESS: T. Beer/P. James
DATE: 06/02/98 TIME: 1137 DIRECTION: NA
Photo of SB09 core in acetate sleeve; 0-2.2 feet below ground surface

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 310 PHOTOGRAPHER/WITNESS: T. Beer/P. James
DATE: 06/02/98 TIME: 1348 DIRECTION: East
Location of SB10, west of the (b) Residence (in background)

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 307 PHOTOGRAPHER/WITNESS: T. Beer/P. James
DATE: 06/02/98 TIME: 0915 DIRECTION: West
Mr [redacted](b) tractor extricating the Geoprobe from a muddy area

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 308 PHOTOGRAPHER/WITNESS: T. Beer/P. James
DATE: 06/02/98 TIME: 0918 DIRECTION: North
Back end of the Geoprobe buried in the muddy area

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 305 PHOTOGRAPHER/WITNESS: T. Beer/P. James
DATE: 06/01/98 TIME: 1531 DIRECTION: West
Tarry waste inside berm of Tank 7, southeast side

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 306 PHOTOGRAPHER/WITNESS: T. Beer/P. James
DATE: 06/02/98 TIME: 0811 DIRECTION: North
SB06 with bentonite fill and flag for identifying GPS location

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 303 PHOTOGRAPHER/WITNESS: T. Beer/P. James
DATE: 06/01/98 TIME: 1345 DIRECTION: West
Tarry waste on truck tire south of Pond 1

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 304 PHOTOGRAPHER/WITNESS: T. Beer/P. James
DATE: 06/01/98 TIME: 1430 DIRECTION: NA
Sample core from SB03; 0-4 feet and 4-5 feet

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 301 PHOTOGRAPHER/WITNESS: T. Beer/P. James
DATE: 06/01/98 TIME: 1312 DIRECTION: North
Liquified, tarry waste at Pond 1

SITE NAME: Wilcox Refinery TDD#: S06-9803-009
PHOTO#: 302 PHOTOGRAPHER/WITNESS: T. Beer/P. James
DATE: 06/01/98 TIME: 1315 DIRECTION: East
Liquified, tarry waste at Pond 1, looking toward SB02

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 6 - EMERGENCY RESPONSE AND PREPAREDNESS
CONTRACT No. 68-W6-0013

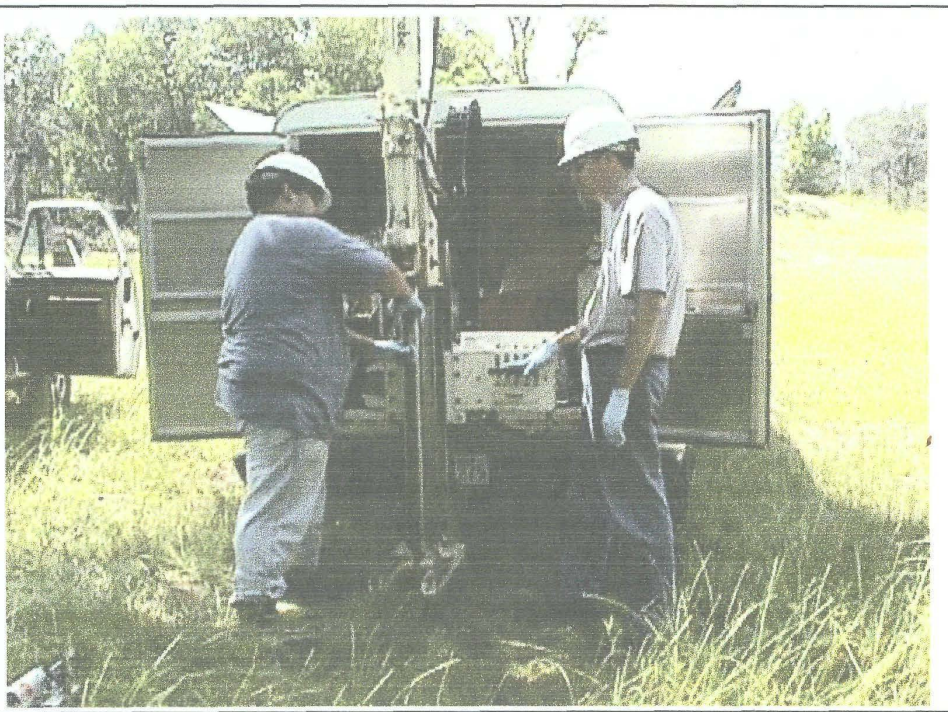
Site Name: Wilcox Refinery TDD No. S06-9803-0009

Photo No. 1
Date: 6/1/98
Time: 1540
Direction: N
Photographer:
T. Beer
Description:

Geoprobe drilling at SB05

Photo No. 2
Date: 6/1/98
Time: 1543
Direction: N
Photographer:
T. Beer
Description:

Geoprobe drilling at SB05



U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 6 - EMERGENCY RESPONSE AND PREPAREDNESS
CONTRACT No. 68-W6-0013

Site Name: Wilcox Refinery TDD No. S06-9803-0009

Photo No. 3
Date: 6/1/98
Time: 1546
Direction: NW
Photographer:
T. Beer
Description:
Black, tarry
liquid within
Tank 7 berm
area near SB05

Photo No. 4
Date: 6/1/98
Time: 1548
Direction: E
Photographer:
T. Beer
Description:
Black, tarry
liquid within
Tank 7 berm
area near SB05

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 6 - EMERGENCY RESPONSE AND PREPAREDNESS
CONTRACT No. 68-W6-0013

te Name: Wilcox Refinery TDD No. S06-9803-0009

Photo No. 5
Date: 6/2/98
Time: 1140
Direction: NE
Photographer:
T. Beer
Description:

Dried tarry waste and wet land at former oily waste "Pit"

Photo No. 6
Date: 6/2/98
Time: 1145
Direction: S
Photographer:
T. Beer
Description:
View of oily waste "flow" area from the oily waste "Pit"

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 6 - EMERGENCY RESPONSE AND PREPAREDNESS
CONTRACT No. 68-W6-0013

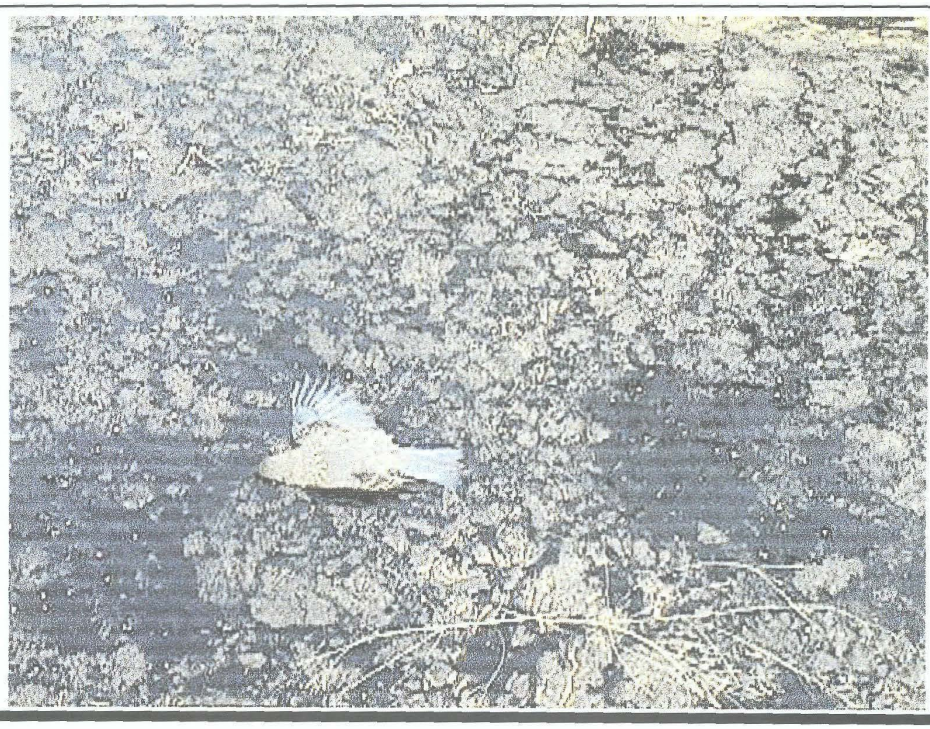
ite Name: Wilcox Refinery TDD No. S06-9803-0009

Photo No. 7
Date: 6/4/98
Time: 1002
Direction: -
Photographer:
T. Beer
Description:

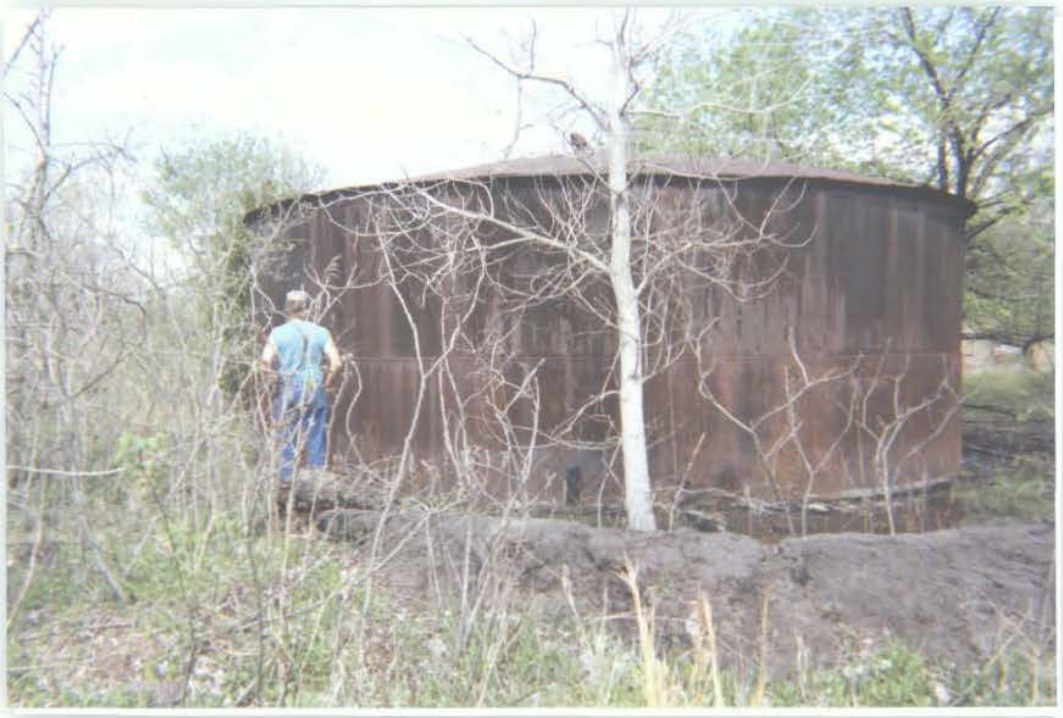
Trapped bird in oily waste at Pond 1

Photo No. 8
Date: 6/4/98
Time: 1005
Direction: -
Photographer:
T. Beer
Description:

Trapped blue-bird in oily waste at



SITE NAME: WILCOX REFINERY TDD#: S06-9803-009
PHOTO#: 207 PHOTOGRAPHER/WITNESS: TOM BEER
DATE: 04/08/98 TIME: 1138 DIRECTION: SOUTHEAST
Closeup of dried sludge and under waste located near the drainage channel toward (b) Pond.

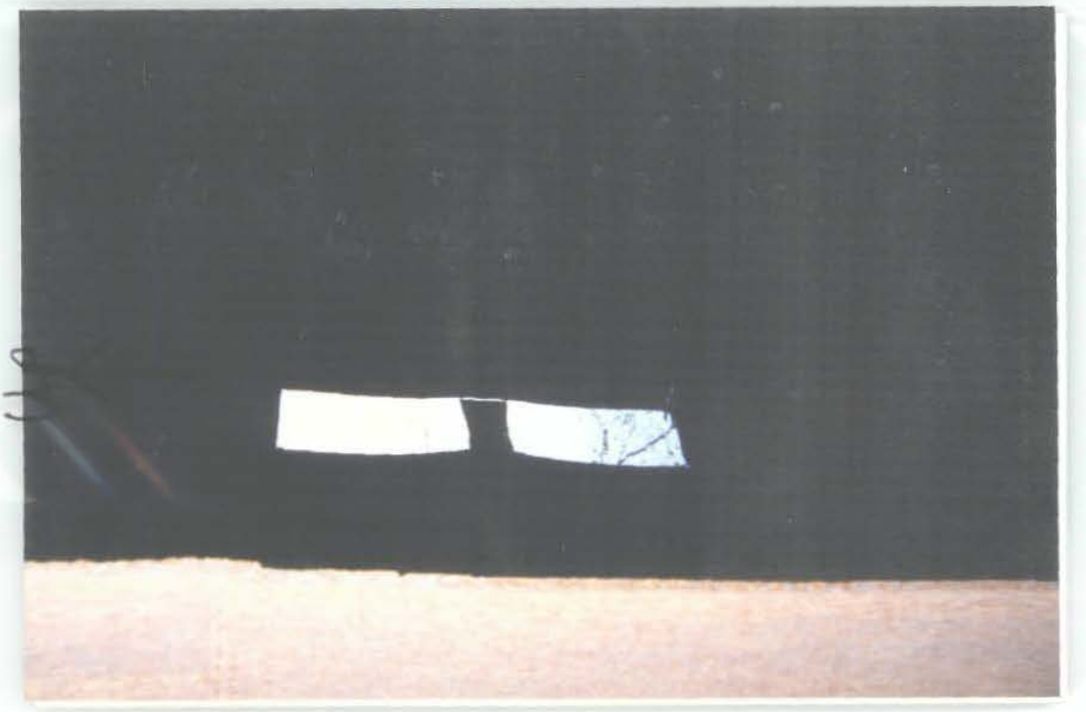


SITE NAME: WILCOX REFINERY TDD#: S06-9803-009
PHOTO#: 208 PHOTOGRAPHER/WITNESS: TOM BEER
DATE: 04/08/98 TIME: 1142 DIRECTION: EAST
View of a small tank (10' h X 20' d) located in the east central area of the (b) property. Note the dried sludge within the tank berm.

SITE NAME: WILCOX REFINERY TDD#: S06-9803-009
PHOTO#: 205 PHOTOGRAPHER/WITNESS: TOM BEER
DATE: 04/08/98 TIME: 1130 DIRECTION: WEST
Closeup of the un-vegetated area located in the southeast portion of the (b) property. Note the salt-like deposits and the gravelly texture.

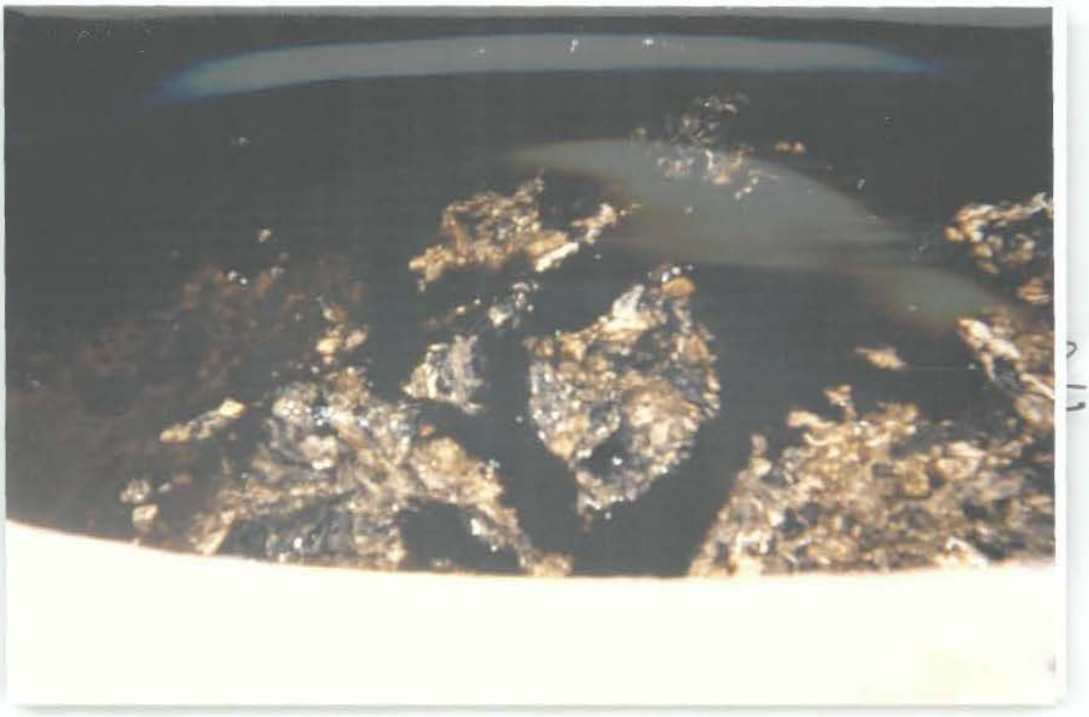
SITE NAME: WILCOX REFINERY TDD#: S06-9803-009
PHOTO#: 206 PHOTOGRAPHER/WITNESS: TOM BEER
DATE: 04/08/98 TIME: 1135 DIRECTION: EAST
View of the former refinery water supply. View is from the (b) property looking toward the (b) residence.

SITE NAME: WILCOX REFINERY TDD#: S06-9803-009
PHOTO#: 203 PHOTOGRAPHER/WITNESS: TOM BEER
DATE: 04/08/98 TIME: 1110 DIRECTION: WEST
Closeup of old oil pipelines along the railroad grade located at the west central boundary of the site.



SITE NAME: WILCOX REFINERY TDD#: S06-9803-009
PHOTO#: 204 PHOTOGRAPHER/WITNESS: TOM BEER
DATE: 04/08/98 TIME: 1120 DIRECTION: NORTHEAST
Closeup inside flooded tank located at the south end of the (b) roperty.
The berm area is a temporary wetland, no evidence of tank bottom sludge.

SITE NAME: WILCOX REFINERY TDD#: S06-9803-009
PHOTO#: 201 PHOTOGRAPHER/WITNESS: TOM BEER
DATE: 04/08/98 TIME: 1055 DIRECTION: SOUTHWEST
Closeup of the tank base at the far northwest corner of the site, located on the (b) property. Note the dried tank bottom sludge and fill pipes.



SITE NAME: WILCOX REFINERY TDD#: S06-9803-009
PHOTO#: 202 PHOTOGRAPHER/WITNESS: TOM BEER
DATE: 04/08/98 TIME: 1100 DIRECTION: NORTH
Closeup through an opening in the southerly AST in the far northwest corner of the site. Note 1" tot 2" of rain water and oily waste.

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 6 - EMERGENCY RESPONSE AND PREPAREDNESS
CONTRACT No. 68-W6-0013

'e Name: Wilcox Refinery **TDD No. S06-98-03-0009**

Photo No. D12
Date: 4/8/98
Time: 11:48
Direction: W
Photographer: T. Beer
Description: Former oil/water separator and a dried sludge area on the east side of the (b) Property, adjacent to Trib-utary 1.

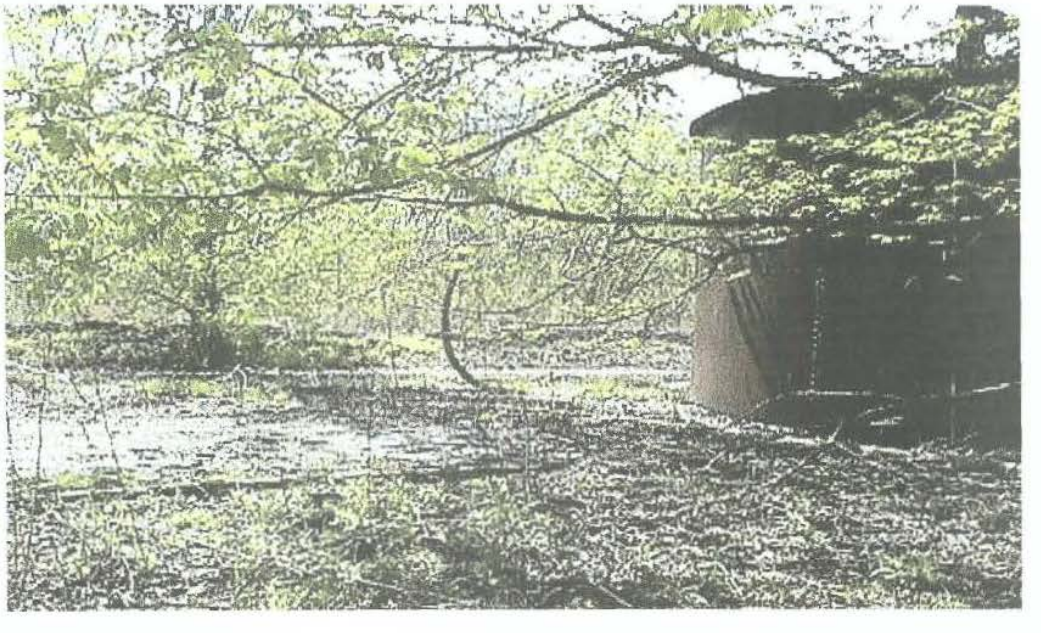
'hoto No. D13
Date: 4/8/98
Time: 11:56
Direction: NE
Photographer: T. Beer
Description: East end of a former rail car tank, currently used by the (b) (6) for fuel oil storage.

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 6 - EMERGENCY RESPONSE AND PREPAREDNESS
CONTRACT No. 68-W6-0013

Site Name: Wilcox Refinery TDD No. S06-98-03-0009

Photo No. D10
Date: 4/8/98
Time: 11:40
Direction: NW
Photographer: T. Beer
Description: Closeup of dried sludge and under waste on (b) Property, northwest of (b) pond.

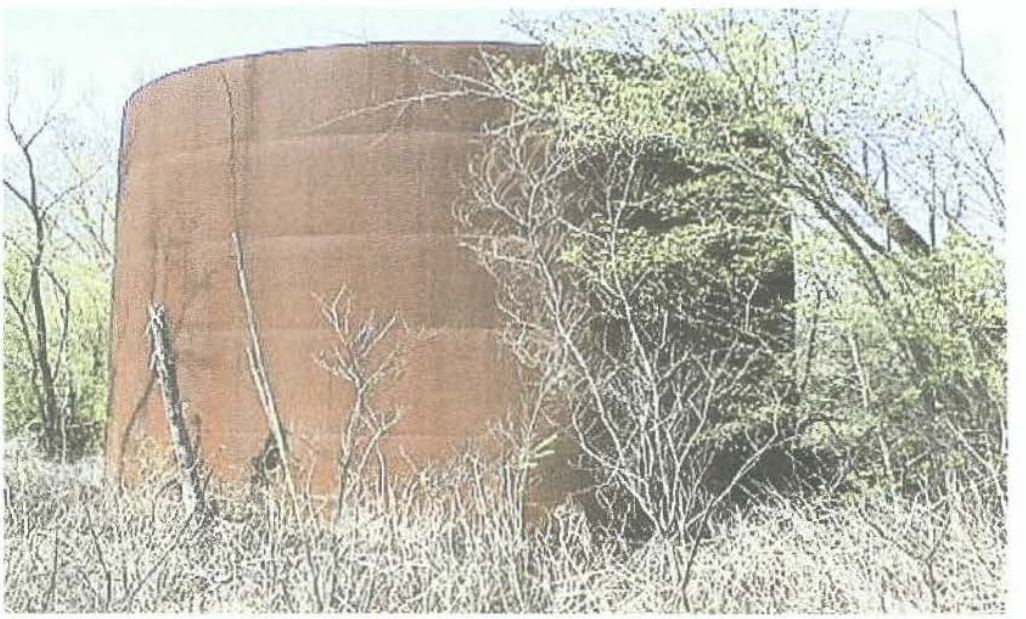
Photo No. D11
Date: 4/8/98
Time: 11:44
Direction:
Photographer:
Description: Small AST and berm area in east central section of (b) Property. Dried TBS is visible within the berm area.



U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 6 - EMERGENCY RESPONSE AND PREPAREDNESS
CONTRACT No. 68-W6-0013

'e Name: Wilcox Refinery **TDD No. S06-98-03-0009**

Photo No. D8
Date: 4/8/98
Time: 11:18
Direction: E
Photographer: T. Beer
Description: Inside of AST in south central area of the (b) Property. The surrounding berm area is overgrown and .emporarily flooded with recent rains.



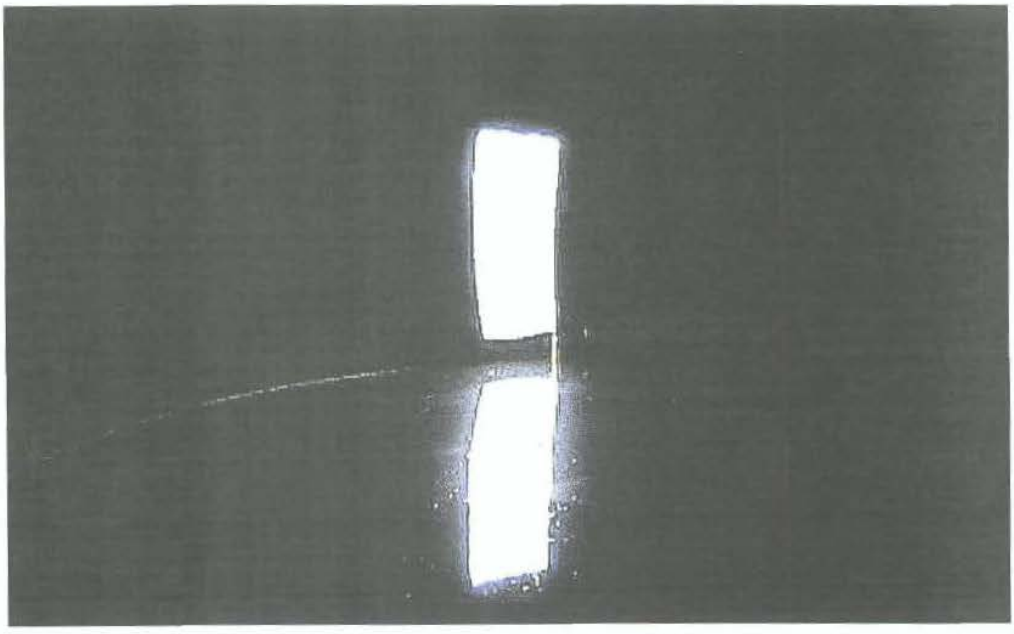
.'hoto No. D9
Date: 4/8/98
Time: 11:32
Direction: NW
Photographer: T. Beer
Description: Closeup view of waste material in unvegetated area on the (b) Property, west of (b) pond.

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 6 - EMERGENCY RESPONSE AND PREPAREDNESS
CONTRACT No. 68-W6-0013

'e Name: Wilcox Refinery TDD No. S06-93-03-0009

Photo No. D6
Date: 4/8/98
Time: 11:08
Direction: SE
Photographer:
A. Hammad
Description: Close-up of southern AST showing open entrance port and wooden debris.

Photo No. D7
Date: 4/8/98
Time: 11:18
Direction: E
Photographer: A. Hammad
Description: Inside of flooded AST in south central area of (b) Property. No visible sheen and no evidence of TBS.



U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 6 - EMERGENCY RESPONSE AND PREPAREDNESS
CONTRACT No. 68-W6-0013

'e Name: Wilcox Refinery

TDD No. S06-98-03-0009

Photo No. D4
Date: 3/25/98
Time: 15:42
Direction: E
Photographer: T. Beer
Description: Former Tank 7 berm area showing evidence of recent back-filing with soil, grading, and grass germination. No visible sign of tank bottom sludge.

Photo No. D5
Date: 4/8/98
Time: 11:05
Direction: NW
Photographer:
A. Hammad
Description: Two large former fuel ASTs in far north west corner o[redacted] Property. Tanks are empty.

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 6 - EMERGENCY RESPONSE AND PREPAREDNESS
CONTRACT No. 68-W6-0013

te Name: Wilcox Refinery **TDD No. S06-98-03-0009**

Photo No. D2
Date: 3/25/98
Time: 15:20
Direction: SE
Photographer: A. Hammad
Description: Typical scrubby oak woods and grassland between former Tank 6 and Tank 8 berm areas.

Photo No. D3
Date: 3/25/98
Time: 15:30
Direction: N
Photographer: A. Hammad
Description: Fuel pipeline crossing Tributary 2 to Sand Creek, to the west of former Tank 8.

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 6 - EMERGENCY RESPONSE AND PREPAREDNESS
CONTRACT No. 68-W6-0013

te Name: Wilcox Refinery **TDD No.** S06-98-03-0009

Photo No. D1
Date: 3/25/98
Time: 15:15
Direction: W
Photographer: A. Hammad
Description: Former Pond 1 area, recently backfilled with soil and graded. Note, areas of black, viscous, oily waste at the surface.

Photo No. D1A
Date:
Time: 15:16
Direction: W
Photographer: A. Hammad
Description: Negative of D1.

Appendix G
Access Agreements

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

CONSENT FOR ACCESS TO PROPERTY
WILCOX REFINERY SITE
BRISTOW, CREEK COUNTY, OKLAHOMA
FEDERAL PROJECT NUMBER (FPN):088079

DESCRIPTION OF PROPERTY: [redacted] (b) (6)

I CONSENT FOR THE OFFICERS, EMPLOYEES, AND AUTHORIZED REPRESENTATIVES OF THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (EPA) TO ENTER AND HAVE CONTINUED ACCESS TO THE ABOVE DESCRIBED PROPERTY FOR THE FOLLOWING PURPOSES:

THE COLLECTION OF SUCH SOIL, WATER, AIR, OR OTHER ENVIRONMENTAL SAMPLES AS MAY BE NECESSARY;

THE IMPLEMENTATION OF OTHER ACTIONS RELATED TO THE INVESTIGATIONS OF SURFACE OR SUBSURFACE SOILS CONDITIONS;

THE IMPLEMENTATION OF RESPONSE ACTION NECESSARY TO MITIGATE ANY THREAT TO HUMAN HEALTH AND THE ENVIRONMENT.

I REALIZE THAT THESE ACTIONS BY EPA ARE UNDERTAKEN PURSUANT TO ITS RESPONSE AND ENFORCEMENT RESPONSIBILITIES UNDER THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (**CERCLA-SUPERFUND**), 42 U.S.C. SECTION 9601 et seq. AND THE OIL POLLUTION ACT OF 1990 (**OPA**), 33 U.S.C. 2701 et seq.

AS OWNER OF THE PROPERTY OR AS AN INDIVIDUAL WITH AUTHORITY TO GRANT ACCESS, THIS WRITTEN PERMISSION IS GIVEN BY ME VOLUNTARILY WITH KNOWLEDGE OF MY RIGHT TO REFUSE ACCESS AND WITHOUT THREATS OR PROMISES OF ANY KIND.

DATE: 4-26-98 OWNER SIGNATURE: [redacted] (b) (6)

DATE: _____ RENTER SIGNATURE: _____

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

CONSENT FOR ACCESS TO PROPERTY
WILCOX REFINERY SITE
BRISTOW, CREEK COUNTY, OKLAHOMA
FEDERAL PROJECT NUMBER (FPN):088079

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THE COLLECTION OF SUCH SOIL, WATER, AIR, OR OTHER ENVIRONMENTAL SAMPLES AS MAY BE NECESSARY;

THE IMPLEMENTATION OF OTHER ACTIONS RELATED TO THE INVESTIGATIONS OF SURFACE OR SUBSURFACE SOILS CONDITIONS;

THE IMPLEMENTATION OF RESPONSE ACTION NECESSARY TO MITIGATE ANY THREAT TO HUMAN HEALTH AND THE ENVIRONMENT.

I REALIZE THAT THESE ACTIONS BY EPA ARE UNDERTAKEN PURSUANT TO ITS RESPONSE AND ENFORCEMENT RESPONSIBILITIES UNDER THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (**CERCLA-SUPERFUND**), 42 U.S.C. SECTION 9601 et seq. AND THE OIL POLLUTION ACT OF 1990 (**OPA**), 33 U.S.C. 2701 et seq.

AS OWNER OF THE PROPERTY OR AS AN INDIVIDUAL WITH AUTHORITY TO GRANT ACCESS, THIS WRITTEN PERMISSION IS GIVEN BY ME VOLUNTARILY WITH KNOWLEDGE OF MY RIGHT TO REFUSE ACCESS AND WITHOUT THREATS OR PROMISES OF ANY KIND.

DATE: 27 April 1998 OWNER SIGNATURE: [redacted] (b) (6)

DATE: _____ RENTER SIGNATURE: _____

Recycled/Recyclable • Printed with Vegetable Oil Based Inks on 100% Recycled Paper (40% Postconsumer)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

CONSENT FOR ACCESS TO PROPERTY
WILCOX REFINERY SITE
BRISTOW, CREEK COUNTY, OKLAHOMA
FEDERAL PROJECT NUMBER (FPN):088079

DESCRIPTION OF PROPERTY: [redacted] (b) (6)

I CONSENT FOR THE OFFICERS, EMPLOYEES, AND AUTHORIZED REPRESENTATIVES OF THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (EPA) TO ENTER AND HAVE CONTINUED ACCESS TO THE ABOVE DESCRIBED PROPERTY FOR THE FOLLOWING PURPOSES:

THE COLLECTION OF SUCH SOIL, WATER, AIR, OR OTHER ENVIRONMENTAL SAMPLES AS MAY BE NECESSARY;

THE IMPLEMENTATION OF OTHER ACTIONS RELATED TO THE INVESTIGATIONS OF SURFACE OR SUBSURFACE SOILS CONDITIONS;

THE IMPLEMENTATION OF RESPONSE ACTION NECESSARY TO MITIGATE ANY THREAT TO HUMAN HEALTH AND THE ENVIRONMENT.

I REALIZE THAT THESE ACTIONS BY EPA ARE UNDERTAKEN PURSUANT TO ITS RESPONSE AND ENFORCEMENT RESPONSIBILITIES UNDER THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (**CERCLA-SUPERFUND**), 42 U.S.C. SECTION 9601 et seq. AND THE OIL POLLUTION ACT OF 1990 (**OPA**), 33 U.S.C. 2701 et seq.

AS OWNER OF THE PROPERTY OR AS AN INDIVIDUAL WITH AUTHORITY TO GRANT ACCESS, THIS WRITTEN PERMISSION IS GIVEN BY ME VOLUNTARILY WITH KNOWLEDGE OF MY RIGHT TO REFUSE ACCESS AND WITHOUT THREATS OR PROMISES OF ANY KIND.

DATE: 4-23-98 OWNER SIGNATURE: [redacted] (b) (6)

DATE: _____ RENTER SIGNATURE: _____

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Appendix H
Sample Location Descriptions and Rationale

SAMPLE LOCATION DESCRIPTIONS AND RATIONALE

WILCOX REFINERY, BRISTOW, OKLAHOMA

Sample Location	Location Description	Location Rationale	Sample Depth Rationale
Sediment			
SED11	50 feet southwest of pond 2 at Sand Creek	To assess contaminant migration from pond 2 to Sand Creek	0 to 0.5 feet bgs, sediment sample
SED12	Southwest corner of pond 2	To assess contaminant migration from pond 2	0 to 0.5 feet bgs, sediment sample
Soil			
SBX	By track, southeast of pond 1	Exploratory boring to investigate geologic conditions	No sample collected
SB01	Former pond northwest of (b) residence	Aerial photograph and ESI indicate former pond as potential source	0 to 0.5 feet bgs, black staining, strong odor 10 to 11 feet bgs, bottom of boring odor
SB02	Southeast of pond 1	To assess downgradient extent of contamination from pond 1	1 to 2 feet bgs, bottom of boring
SB03	South of pond 1	To assess downgradient extent of contamination from pond 1	1.5 to 2 feet bgs, bottom of boring
SB04	Southwest of pond 1	To assess downgradient extent of contamination from pond 1	4 to 5 feet bgs, staining, bottom of boring
SB05	Southeast end of property	To document vertical extent of contamination within impacted berm	1 to 2 feet bgs, oily product 4 to 5 feet bgs, slight staining 14 to 15 feet bgs, odor, water at 16 feet bgs

Key at end of table.

SAMPLE LOCATION DESCRIPTIONS AND RATIONALE

WILCOX REFINERY, BRISTOW, OKLAHOMA

Sample Location	Location Description	Location Rationale	Sample Depth Rationale
Soil (Continued)			
SB06	South-central tank berm area	To assess potential contaminant migration from a typical tank berm	1 to 2 feet bgs, bottom of boring
SB07	West of oily waste pit	To delineate downgradient contamination from the pit source area	4 to 5 feet bgs, bottom of boring
SB07D			4 to 5 feet bgs, duplicate sample
SB08	Southwest of oily waste pit	To delineate downgradient contamination from the pit source area	1 to 2 feet bgs, shallow subsurface
SB09	South of oily waste pit	To delineate downgradient contamination from the pit source area	1 to 2 feet bgs, shallow subsurface
SB10	West of (b) residence	To assess potential subsurface migration pathway toward (b) pond	3 to 4 feet bgs, bottom of boring
SB11	Approximately 120 feet north of (b) residence	Determine extent of contamination in impacted berm near (b) residence	2 to 3 feet bgs, bottom of boring
SB12	Southwest corner of site	Assess potential subsurface migration path from the site to Sand Creek	1 to 2 feet bgs, shallow subsurface
SB13	Former pond, south of (b) residence	Aerial photograph and ESI indicate former pond as potential source	1 to 2 feet bgs, shallow subsurface
			6.5 to 7.5 feet bgs, odor, water at 7.5 feet bgs
SB13D			6.5 to 7.5 feet bgs, duplicate sample

Key at end of table.

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SAMPLE LOCATION DESCRIPTIONS AND RATIONALE

WILCOX REFINERY, BRISTOW, OKLAHOMA

Sample Location	Location Description	Location Rationale	Sample Depth Rationale
Soil (Continued)			
SB14	South of (b) unvegetated area	To document downgradient contamination from the unvegetated area	1 to 2 feet bgs, strong organic decay odor 5 to 6 feet bgs, bottom of boring, strong odor
SB15	Approximately 450 feet south of (b) (6) residence	To document migration path from oil/water separator source to Tributary 1	0 to 1 feet bgs, shallow subsurface
SB16	Northwest of (b) small AST	To assess subsurface contamination within existing tank berm area	5 to 6 feet bgs, petroleum odor, staining
SB17	West of (b) residence	To determine vertical extent of contamination from ESI surface soil data	1 to 2 feet bgs, slight odor 1 to 2 feet bgs, duplicate sample 5 to 6.5 feet bgs, black staining, water at 6.5 feet bgs
SB18	West of pumping station fence	To document migration from potential pipeline and pump station sources	1 to 2 feet bgs, old gasoline odor 7 to 8 feet bgs, odor, water at 8 feet bgs

Key at end of table.

SAMPLE LOCATION DESCRIPTIONS AND RATIONALE WILCOX REFINERY, BRISTOW, OKLAHOMA			
Sample Location	**Location Description**	**Location Rationale**	**Sample Depth Rationale**
Soil (continued)			
SB19	Adjacent to northwest corner AST	To assess subsurface impact from potential source area	1 to 2 feet bgs, petroleum odor, staining 7 to 8 feet bgs, bottom of boring
SB20	Tributary 1, upstream from site	To establish upstream/off-site contaminant concentrations in Tributary 1 soil	0 to 3 feet bgs, shallow subsurface
SB21	Tributary 1, west of former pump station	To document potential impact to stream soil from nearby sources	0 to 3 feet bgs, shallow subsurface
SB22	Tributary 1, east of (b) residence	To document potential impact to stream soil from nearby sources	0 to 3 feet bgs, shallow subsurface
SB23	Tributary 1, southeast of (b) residence	To document potential impact to stream soil from nearby sources	0 to 3 feet bgs, shallow subsurface
SB24	Tributary 1, east of (b) oil tank car	To document potential impact to stream soil from nearby sources	0 to 2 feet bgs, bottom of boring
SB25	Tributary 1, east of former small tank pads	To document potential impact to stream soil from nearby sources	0 to 3 feet bgs, shallow subsurface
SB26	Tributary 1, northeast of former O/W separator	To document potential impact to stream soil from nearby sources	0 to 2 feet bgs, shallow subsurface
SB27	Tributary 1, (b) (6) property southeast of small existing AST	To document potential impact to stream soil from nearby sources	0 to 3 feet bgs, shallow subsurface
SB28	Tributary 1, northwest of (b) residence	To document potential impact to stream soil from nearby sources	0 to 2 feet bgs, shallow subsurface

Key at end of table.

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ecology and environment

SAMPLE LOCATION DESCRIPTIONS AND RATIONALE

WILCOX REFINERY, BRISTOW, OKLAHOMA

Sample Location	Location Description	Location Rationale	Sample Depth Rationale
Soil (continued)			
SB29	Tributary 1, north of (b) pond	To document potential impact to stream soil from nearby sources	0 to 1 feet bgs, bottom of boring
SB30	Tributary 1, east of (b) pond	To document potential impact to stream soil from nearby sources	0 to 3 feet bgs, shallow subsurface
SB31	Tributary 1, west of (b) pond	To document potential impact to stream soil from nearby sources	0 to 3 feet bgs, shallow subsurface
SB32	Tributary 1, south of (b) s pond dam	To document potential impact to stream soil from nearby sources	0 to 1 feet bgs, no deeper recovery
SB32D			Duplicate sample
SB33	Tributary 1, east of southernmost tank on (b) property	To document potential impact to stream soil from nearby sources	0 to 1 feet bgs, no deeper recovery
SB34	Tributary 1, near confluence with Sand Creek	To document potential impact to stream soil from nearby sources	0 to 1 feet bgs, no deeper recovery
SB35	Pond 2, southwest corner of west cell	Confirm shallow subsurface contamination of pond sediment	0 to 3 feet bgs, shallow subsurface
SB36	Tributary 2, upstream from site activities	Assess subsurface migration path from potential source	6 to 7 feet bgs, water at 7 feet bgs
SB37	Tributary 2, southwest of northeasternmost tank berm	Assess subsurface migration path from potential source	6 to 7 feet bgs, water at 7 feet bgs
SB38	Tributary 2, south of northeasternmost tank berm	Assess subsurface migration path from potential source	0 to 1 feet bgs, water at 1 foot bgs
SB39	Tributary 2, northwest of southeasternmost tank berm	Assess subsurface migration path from potential source	3 to 4 feet bgs, water at 4 feet bgs

Key at end of table.

SAMPLE LOCATION DESCRIPTIONS AND RATIONALE

WILCOX REFINERY, BRISTOW, OKLAHOMA

Sample Location	Location Description	Location Rationale	Sample Depth Rationale
Soil (continued)			
SB40	Tributary 2, west of southeasternmost tank berm	Assess subsurface migration path from potential source	3 to 4 feet bgs, water at 4 feet bgs
SB41	Tributary 2, west bank near stream exit from site	To assess potential contaminant migration from impacted berm area	2 to 3 feet bgs, water at 3 feet bgs
SB41D		To assess potential contaminant migration from impacted berm area	2 to 3 feet bgs, duplicate sample
SB42	Tributary 2, west bank near stream exit from site	To assess potential contaminant migration from impacted berm area	2 to 3 feet bgs, moist at 3 feet bgs
SB43	Tributary 2, west bank near stream exit from site	To assess potential contaminant migration from impacted berm area	6 to 7 feet bgs, bottom of boring
SB44	Tributary 2, west bank near stream exit from site	To assess potential contaminant migration from impacted berm area	4 to 5 feet bgs, bottom of boring
SB45	Tributary 2, west bank near stream exit from site	To assess potential contaminant migration from impacted berm area	0 to 1 feet bgs, bottom of boring
SB46	Pond 2, center of west cell	To document vertical extent of contamination in impacted pond sediments	6 to 12 feet bgs, bottom of boring
SB46D			6 to 12 feet bgs, bottom of boring duplicate sample

Key at end of table.

SAMPLE LOCATION DESCRIPTIONS AND RATIONALE

WILCOX REFINERY, BRISTOW, OKLAHOMA

Sample Location	Location Description	Location Rationale	Sample Depth Rationale
Ground Water			
GW1 (SB05)	Southeast end of property	To assess potential ground water to Tributary 2 contaminant pathway	16 feet bgs, water present, odor
GW2 (SB13)	Former pond, south of (b) residence	To document impact to shallow ground water near (b) residence	7.5 feet bgs, water present, odor
GW3 (SB15)	Approximately 450 feet south of (b) residence	To document impact to shallow ground water adjacent to Tributary 1	1 foot bgs, water present, odor
GW3D (SB15)			1 foot bgs, duplicate sample
GW4 (SB17)	West of (b) residence	To document impact to shallow ground water beneath (b) residence	6.5 feet bgs, water present
GW5 (SB18)	West of former pump station fence	To assess potential ground water to Tributary 1 contaminant pathway	8 feet bgs, water and free product present
GW6 (SB40)	Tributary 2, west of southeasternmost tank berm	To assess potential ground water to Tributary 2 contaminant migration pathway	6 feet bgs, water present
GW7 (SB42)	Tributary 2, west bank near stream exit from site	To assess potential ground water to Tributary 2 contaminant migration pathway	6 feet bgs, water present
GW8 (SB37)	Tributary 2, southwest of northeastern-most tank berm	To assess potential ground water to Tributary 2 contaminant migration pathway	8 feet bgs, water present
Surface Water			
SW01	Tributary 1, north end of (b) pond	Farthest upstream location with water	shallow surface
SW02	Tributary 1, pool south of dam for (b) pond	Assess impacts from oily waste entering stream nearby	shallow surface
SW02D			duplicate

SAMPLE LOCATION DESCRIPTIONS AND RATIONALE WILCOX REFINERY, BRISTOW, OKLAHOMA			
Sample Location	**Location Description**	**Location Rationale**	**Sample Depth Rationale**
Surface Water			
SW03	Tributary 2, pool at northern extent of stream	To establish upstream surface water conditions	shallow surface
SW04	Tributary 2, pool at southern exit from site	To assess potential site impacts to surface water	shallow surface

Key:

AST - aboveground storage tank
bgs - below ground surface
O/W - oil/water
D - duplicate sample

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Appendix I
Laboratory Analytical Results

BTEX
CASE: ECOLOGY & ENVIRONMENT
SDG: 4798/4802

COMPLETE SAMPLE DATA PACKAGE

PAGE 1 TO 546

File Copy
Wilcox Refinery
Case #
SDG # 4798 / 4802

PDP ANALYTICAL SERVICES
1680 LAKE FRONT CIRCLE, SUITE B, THE WOODLANDS TX 77380

PDP ANALYTICAL SERVICES

1680 Lake Front Circle, Suite B • The Woodlands, TX 77380 • Phone (281)363-2233

Contract No.	Case No. E&E	SDG No. 4798/4802 (BTEX)

SDG NARRATIVE

SAMPLE RECEIPT :

08/05/98 and 08/07/98 - Received soil and water sample for BTEX analysis.

BTEX:

All soils samples were analyzed using 5 grams sample weight and all water sample were analyzed using 5 ml sample volume. All samples were analyzed on a HP 5890 using a PID detector. Some soil samples had low surrogate recovery and were reanalyzed. The reanalysis gave similar results. Matrix effect is suspected to have caused these low recoveries. All method blanks and laboratory control samples had acceptable surrogate and spike recovery.

Manual integration's were performed for some calibration standards samples for the compounds listed against them. These manual integration's were necessary because the software failed to accurately integrate the entire peak. In all the above instances, the quantitation reports are flagged with "m". A hard copy printout of the manual integration's along with the scan ranges and initials of the operator is included in the data package .

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the laboratory manager or his designee, as verified by the following signature:

Sunil Chadkar / Project Manager — Signature and Title

SK 8/24/98 — Date of Signature

Z:\NETDATA\QA\FORMS\CLP\NARR1296.DOC

OFFICIAL CHAIN OF CUSTODY RECORD

PROJ. NO. KJ6103 052601SFXX | PROJECT NAME: WILCOX REFINERY

SAMPLERS: (Signature) J.Beer B. Mankat

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Metals (6010B)	PAHs (8310)	TPH (TNRCC 1005)	pH	BTEX (8021B Mod)	REMARKS: EPA Sample Tag # 4798.00
SB20-0030	8/4	0910		✓	SB20-(0'-3')	3	✓	✓	✓	✓	✓	6-097026 / 6-097027 / 6-097028 (J)
SB21-0030		1010		✓	~~SB20~~ SB21-0030	3	✓	✓	✓	✓	✓	6-097029 / 6-097030 4798.002
SB22-0030		1040		✓	SB22 (0'-3')	3	✓	✓	✓	✓	✓	6-097031 / 6-097032 .003
SB23-0030		1145		✓	SB23 (0'-3')	3	✓	✓	✓	✓	✓	6-097033 / 6-097034 .004
SB24-0030		1430		✓	SB24 (0'-3')	3	✓	✓	✓	✓	✓	6-097035 / 6-097036 .005
SB25-0030		1505		✓	SB25 (0'-3')	3	✓	✓	✓	✓	✓	6-097037 / 6097038 .006
SB26-0020	↓	1600		✓	SB26 (0'-2')	3	✓	✓	✓	✓	✓	6-097049 / 6097050 .007
SB36-6070		0940		✓	SB36 (6-7')	3	✓	✓	✓	✓	✓	6-097435 / 6-097436 .008
SB37-6070		1501		✓	SB37 (6-7')	3	✓	✓	✓	✓	✓	6-097432 / 6-097434 .009
SB38-0010		1540		✓	SB38 (0-1')	3	✓	✓	✓	✓	✓	6-097433 / 6-097449 .010
SW03		1425		✓	SW03 (Background)	4			✓		✓	6-097437 / 6-097438 .011
TB0804	↓	1655		✓	Trip Blank	2					✓	6-097439 / 6-097 JB .012

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
B. Mankat	8/4/98 1800				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
		[signature]	[signature]	8/5/98 10:30	
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks: Fed Ex Airbill # 8055500043006	
Shipped by:		Airbill Number:			

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Returns with Warrant

EPA 7500-53 (11/96)

6- 00252

CHAIN OF CUSTODY RECORD

PROJ. NO. KJ6105 0526015FXX

PROJECT NAME: WILCOX REFINERY

SAMPLERS: (Signature) Loren Williams

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	METALS (6010B)	PAH (8310)	TPH (TNRCC 1005)	PH	BTEX (8021B M)	REMARKS
												EPA TAG #
SB27-0030	4/5/98	0830		X	SB27-(0'-3')	3	✓	✓	✓	✓	✓	6-097351 / 6-097352 4802-001
SB28-0020		0945		X	SB28 (0'-2')	3	✓	✓	✓	✓	✓	6-097354 / 6-097353 -002
SB29-0010		1020		X	SB29 (0'-1')	3	✓	✓	✓	✓	✓	6-097355 / 6-097356 -003
~~SW01~~		~~1045~~			~~SW01~~ CSS 4/5/98							
SB30 0030		1100		X	SB30 (0'-3')	3	✓	✓	✓	✓	✓	6-097358 / 6-097359 4802-004
SW01		1045		X	SW01	4			✓		✓	6097360 / 6097357 -005
~~SB31 0030~~ ~~SB31 0030~~		1145		X	SB31 (0'-3')	3	✓	✓	✓	✓	✓	6097361 / 6097362 -006
SW02		1416		X	SW02	4			✓		✓	6097363 / 6097364 -007
SW02D		1425		X	SW02D	4			✓		✓	6097365 / 6097366 -008
SB32 0010		1440		X	SB32 (0'-1')	3	✓	✓	✓	✓	✓	~~6097355~~ 6097367 / 6-097368 ~~-005~~
SB32 0010D		1440		X	SB32 (0'-1') d	3	✓	✓	✓	✓	✓	6-097369 / 6-097370 -010 ~~-009~~
SB33 0010		1515		X	SB33 (0'-1')	3	✓	✓	✓	✓	✓	6097371 / 6-097372 -011 ~~-010~~
SB34 0010		1540		X	SB34 (0'-1')	3	✓	✓	✓	✓	✓	6097373 / 6-097374 -012 ~~-011~~

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	4/5/98 1800				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		[signature]	4/7/98 9:45		
Shipped by:		Airbill Number:			

FedEx AirBill #
~~805550003387~~ BM 4/14/98
805550003398

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Returns with Warrant

EPA 7500-53 (11/96)

6-09263

001554

CHAIN OF CUSTODY RECORD

PROJ. NO.: KJ6103 052601SFXY
PROJECT NAME: WILCOX REFINERY
SAMPLERS: (Signature) Christopher Somma / Paul Reinwald / B Mundt

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Metals (6010B)	PAH (8310)	TPH (TNRCC 1005)	pH	BTEX (8020/8 M)	REMARKS
												EPA TAG #
SB40 3040	8/5/98	0911		X	SB40 (3'-4')	2	✓	✓	✓	✓	✓	6-097441 / 6-097440
SB40 6W06		0855		X	SB40-6W06	4			✓		✓	6097442 / 6-097443
SB39 3040		1135		X	SB39 (3'-4')	3	✓	✓	✓	✓	✓	6097444 / 6097445
SB43 6070		1449		X	SB43 (6'-7')	3	✓	✓	✓	✓	✓	6097446 / 6097447
SB44 4050		1625		X	SB44 (4'-5')	3	✓	✓	✓	✓	✓	6097448 / 6097039
SB45 0010	↓	1650		X	SB45 (0'-1')	3	✓	✓	✓	✓	✓	6097040 / 6097041
TB-0805	8/5/98			X	TB 0805	1					✓	B Mundt

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
B Mundt	8/5/98 1800				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		[illegible]	8/7/98 0945	FedEx Airbill # 806555003387 8x 8/6/98 806555003398	
Shipped by:		Airbill Number:			

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files;
Green to Report; Yellow Returns with Warrant

EPA 7500-53
(11/96)

6- 09264

001555

CHAIN OF CUSTODY RECORD

PROJ. NO. KJ6103 052604SFXX | PROJECT NAME: WILCOX REFINERY

SAMPLERS: (Signature) Christopher Simpson / Ben Martinez

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	METALS (6010 B)	PAH (8310)	TPH (TNRCC 1005)	PH	BTEX (8021B-M)	REMARKS / EPA TAG #
SB35-0030	8/6/98	0815		X	SB35 (0'-3')	3	✓	✓	✓	✓	✓	6-099460 / 6-099461 4802 ~~01~~
SB41-2030	8/6/98	0840		X	SB41 (2'-3')	3	✓	✓	✓	✓	✓	6-097042 / 6-097044 ~~02~~
SB41-2030-D	8/6/98	0842		X	SB41-D (2'-3')	3	✓	✓	✓	✓	✓	6-097043 / 6-097045 .021 ~~021~~
SB42-GW07	8/6/98	0939		X	SB42-GW07	4			✓		✓	6-097046 / 6-097047 .022 ~~02~~
SB42-2030	8/6/98	0945		X	SB42 (2'-3')	3	✓	✓	✓	✓	✓	6-097048 / 6-097375 .023 ~~02~~
SW04	8/6/98	1024		X	SW04	4			✓		✓	6-097376 / 6-097377 .024 ~~02~~
SB37-GW08	8/6/98	1145		X	SB37-GW08	1					✓	6-097378 .025 ~~02~~
SB46-6012	8/6/98	1430		X	SB46 (6'-12')	3	✓	✓	✓	✓	✓	6-097380 / 6-097381 .026 ~~02~~
SB46-6012-D	8/6/98	1435		X	SB46-D (6'-12')	3	✓	✓	✓	✓	✓	6-097382 / 6-097383 .027 ~~02~~
TB-0806	8/6/98	1600		X	TB-0806	1					✓	6-097379 .028 ~~02~~

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Ben Martinez	8/6/98 1800				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
			8/7/98 0945	FedEx AirBill # 805550003398	
Shipped by:		Airbill Number:			

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Returns with Warrant

EPA 7500-53 (11/96)

6- 09279

001556

900000

PDP Analytical Services

1680 Lake Front Circle, Suite B, The Woodlands TX 77380

Sample Log-In Report

Logged By: AFG **Report Date:** 8/6/98 17:40:08

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/06/98
ClientProject #: **Date Received:** 08/05/98
P.O. No.: **Time Received:** 10:30
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
4798.001	SB20-0030	3	SOIL	08/04/98	09:10	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH100S						08/19/98	
4798.002	SB21-0030	3	SOIL	08/04/98	10:10	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH100S						08/19/98	
4798.003	SB22-0030	3	SOIL	08/04/98	10:40	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH100S						08/19/98	
4798.004	SB23-0030	3	SOIL	08/04/98	11:45	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH100S						08/19/98	
4798.005	SB24-0020	3	SOIL	08/04/98	14:30	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH100S						08/19/98	
4798.006	SB25-0030	3	SOIL	08/04/98	15:05	6-09262		
	Tests Required							

SVB 8/6/98

Lab Approval

Client Approval

001557

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-in Report

Logged By: AFG **Report Date:** 8/6/98 17:40:11

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/06/98
ClientProject #: **Date Received:** 08/05/98
P.O. No.: **Time Received:** 10:30
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH100S						08/19/98	
4798.007	SB26-0020	3	SOIL	08/04/98	16:00	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH100S						08/19/98	
4798.008	SB36-6070	3	SOIL	08/04/98	09:40	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH100S						08/19/98	
4798.009	SB37-6070	3	SOIL	08/04/98	15:01	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH100S						08/19/98	
4798.010	SB38-0010	3	SOIL	08/04/98	15:40	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH100S						08/19/98	
4798.011	SW03	4	WATER	08/04/98	14:25	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- TPH100S						08/19/98	

SV 8/6/98

Lab Approval

Client Approval

001558

PDP Analytical Services

1680 Lake Front Circle, Suite B, The Woodlands TX 77380

Sample Log-In Report

Logged By: AFG **Report Date:** 8/6/98 17:40:12

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/06/98
ClientProject #: **Date Received:** 08/05/98
P.O. No.: **Time Received:** 10:30
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
4798.012	TB0804	2	WATER	08/04/98	16:55	6-09262		
	Tests Required							
	- BTEX80213						08/19/98	
	- TPH1005						08/19/98	

Instructions To Lab:

CLP LIKE DATA PACKAGE
FAX DUE: 14 DAYS
HARD COPY: 21 DAYS
USE E&E SOW

8/8/98

Lab Approval

Client Approval

000005

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AEG **Report Date:** 8/24/98 9:16:48

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
4802.001	SB27-0030	3	SOIL	08/05/98	08:30	6- 09263		
	Tests Required							
	- BTEX80213						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH100S						08/21/98	
4802.002	SB28-0020	3	SOIL	08/05/98	09:45	6- 09263		
	Tests Required							
	- BTEX80213						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH100S						08/21/98	
4802.003	SB29-0010	3	SOIL	08/05/98	10:20	6- 09263		
	Tests Required							
	- BTEX80213						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH100S						08/21/98	
4802.004	SB30-0030	3	SOIL	08/05/98	11:00	6- 09263		
	Tests Required							
	- BTEX80213						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH100S						08/21/98	
4802.005	SW01	4	WATER	08/05/98	10:45	6- 09263		
	Tests Required							
	- BTEX80213						08/21/98	
	- TPH100S						08/21/98	
4802.006	SB31-0030	3	SOIL	08/05/98	11:45	6- 09263		
	Tests Required							
	- BTEX80213						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	

Sep 8/24/98

Lab Approval

Client Approval

000009

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/24/98 9:16:50

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.007	SW02	4	WATER	08/05/98	14:15	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.008	SW02D	4	WATER	08/05/98	14:25	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.009	SB32-0010	3	SOIL	08/05/98	14:40	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.010	SB32-0010D	3	SOIL	08/05/98	14:40	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.011	SB33-0010	3	SOIL	08/05/98	15:15	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.012	SB34-0010	3	SOIL	08/05/98	15:40	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	

Sup 8/24/98

Lab Approval **Client Approval**

000010

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/24/98 9:16:52

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- TPH1005						08/21/98	
4802.013	SB40-3040	3	SOIL	08/05/98	09:11	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.014	SB40-GW06	4	WATER	08/05/98	08:55	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.015	SB39-3040	3	SOIL	08/05/98	11:35	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.016	SB43-6070	3	SOIL	08/05/98	14:49	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.017	SB44-4050	3	SOIL	08/05/98	16:25	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.018	SB45-0010	3	SOIL	08/05/98	16:50	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	

SE 8/24/98

Lab Approval

Client Approval

000011

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/24/98 9:16:52

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.019	SB35-0030	3	SOIL	08/06/98	08:15	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.020	SB41-2030	3	SOIL	08/06/98	08:40	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.021	SB41-2030D	3	SOIL	08/06/98	08:42	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.022	SB42-GW07	4	WATER	08/06/98	09:39	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.023	SB42-2030	3	SOIL	08/06/98	09:45	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.024	SW04	4	WATER	08/06/98	10:24	6- 09279		
	Tests Required							

8/24/98

Lab Approval

Client Approval

001563

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/24/98 9:16:53

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.025	SB37-GW08	1	WATER	08/06/98	11:45	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
4802.026	SB46-0612	3	SOIL	08/06/98	14:30	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.027	SB46-0612D	3	SOIL	08/06/98	14:35	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.028	TB-0806	1	WATER	08/06/98	16:00	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	

Instructions To Lab:

CLP LIKE DATA PACKAGE
FAX DUE: 14 DAYS
HARD COPY: 21 DAYS
USE E&E SOW

*MS/MSD REQUIRED ON E&E SAMPLES.

Lab Approval **Client Approval**

001564

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LCS/LCSD SUMMARY REPORT

BTEX BY GC/PID

CLIENT NAME :
PROJECT NAME :
PROJECT NUMBER :

DATE RECEIVED :
PRINTED ON : 8/21/98

SAMPLE MATRIX : SOLID
METHOD REFERENCE : SW846-8021B

LAB CONTROL SAMPLE
LCS SAMPLE ID : BTXL044
CLIENT SAMPLE ID :
DATE ANALYZED : 8/6/98
INSTRUMENT FILE : B06045

LAB CONTROL SAMPLE DUPLICATE
LCSD SAMPLE ID :
CLIENT SAMPLE ID :
DATE ANALYZED :
INSTRUMENT FILE :

PARAMETER	UNITS	LCS TRUE VALUE	LCSD TRUE VALUE	LCS FOUND VALUE	LCSD FOUND VALUE	LCS RECOVERY (%)	LCSD RECOVERY (%)	RPD	RPD LIMIT	QC LIMITS REC.
Benzene	UG/KG	50.0		47.3		95			30	70 - 130
Ethylbenzene	UG/KG	50.0		45.4		91			30	70 - 130
Toluene	UG/KG	50.0		46.0		92			30	70 - 130
Xylene (total)	UG/KG	150		137		91			30	70 - 130

* Indicate values outside of QC limits

RPD : 0 out of 0 outside limits
Spike Recovery : 0 out of 4 outside limits

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LCS/LCSD SUMMARY REPORT

BTEX BY GC/PID

CLIENT NAME :
PROJECT NAME :
PROJECT NUMBER :

DATE RECEIVED :
PRINTED ON : 8/24/98

SAMPLE MATRIX : LIQUID
METHOD REFERENCE : SW846-8021B

LAB CONTROL SAMPLE

LCS SAMPLE ID : BTXL045
CLIENT SAMPLE ID :
DATE ANALYZED : 8/14/98
INSTRUMENT FILE : B06072

LAB CONTROL SAMPLE DUPLICATE

LCSD SAMPLE ID :
CLIENT SAMPLE ID :
DATE ANALYZED :
INSTRUMENT FILE :

PARAMETER	UNITS	LCS TRUE VALUE	LCSD TRUE VALUE	LCS FOUND VALUE	LCSD FOUND VALUE	LCS RECOVERY (%)	LCSD RECOVERY (%)	RPD	RPD LIMIT	QC LIMITS REC.
Benzene	UG/L	50.0		55.2		110			25	75 - 125
Ethyl benzene	UG/L	50.0		56.2		112			25	75 - 125
Toluene	UG/L	50.0		58.1		116			25	75 - 125
Xylene (total)	UG/L	150		170		113			25	75 - 125

* Indicate values outside of QC limits

RPD : 0 out of 0 outside limits
Spike Recovery : 0 out of 4 outside limits

000015

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LCS/LCSD SUMMARY REPORT

BTEX BY GC/PID

CLIENT NAME :
PROJECT NAME :
PROJECT NUMBER :

DATE RECEIVED :
PRINTED ON : 8/21/98

SAMPLE MATRIX : SOLID
METHOD REFERENCE : SW846-8021B

LAB CONTROL SAMPLE
LCS SAMPLE ID : BTXL047
CLIENT SAMPLE ID :
DATE ANALYZED : 8/16/98
INSTRUMENT FILE : B06110

LAB CONTROL SAMPLE DUPLICATE
LCSD SAMPLE ID :
CLIENT SAMPLE ID :
DATE ANALYZED :
INSTRUMENT FILE :

PARAMETER	UNITS	LCS TRUE VALUE	LCSD TRUE VALUE	LCS FOUND VALUE	LCSD FOUND VALUE	LCS RECOVERY (%)	LCSD RECOVERY (%)	RPD	RPD LIMIT	QC LIMITS REC.
Benzene	UG/KG	50.0		54.6		109			30	70 - 130
Ethylbenzene	UG/KG	50.0		55.5		111			30	70 - 130
Toluene	UG/KG	50.0		57.4		115			30	70 - 130
Xylene (total)	UG/KG	150		168		112			30	70 - 130

* Indicate values outside of QC limits

RPD : 0 out of 0 outside limits
Spike Recovery : 0 out of 4 outside limits

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LCS/LCSD SUMMARY REPORT

BTEX BY GC/PID

CLIENT NAME :
PROJECT NAME :
PROJECT NUMBER :

DATE RECEIVED :
PRINTED ON : 8/21/98

SAMPLE MATRIX : SOLID
METHOD REFERENCE : SW846-8021B

LAB CONTROL SAMPLE
LCS SAMPLE ID : BTXL049
CLIENT SAMPLE ID :
DATE ANALYZED : 8/17/98
INSTRUMENT FILE : B06128

LAB CONTROL SAMPLE DUPLICATE
LCSD SAMPLE ID :
CLIENT SAMPLE ID :
DATE ANALYZED :
INSTRUMENT FILE :

PARAMETER	UNITS	LCS TRUE VALUE	LCSD TRUE VALUE	LCS FOUND VALUE	LCSD FOUND VALUE	LCS RECOVERY (%)	LCSD RECOVERY (%)	RPD	RPD LIMIT	QC LIMITS REC.
Benzene	UG/KG	50.0		52.3		105			30	70 - 130
Ethylbenzene	UG/KG	50.0		53.4		107			30	70 - 130
Toluene	UG/KG	50.0		53.9		108			30	70 - 130
Xylene (total)	UG/KG	150		161		107			30	70 - 130

* Indicate values outside of QC limits

RPD : 0 out of 0 outside limits
Spike Recovery : 0 out of 4 outside limits

001568

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

MS/MSD SUMMARY REPORT

BTEX BY GC/PID

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC.
PROJECT NAME : E&E- WILCOX REFINERY
PROJECT NUMBER :

DATE RECEIVED : 8/5/98
PRINTED ON : 8/21/98

SAMPLE MATRIX : SOIL

METHOD REFERENCE : SW846-8021B

SAMPLE	MATRIX SPIKE	MATRIX SPIKE DUPLICATE
SAMPLE ID : 4798.002	MS SAMPLE ID : 4798.002MS	MSD SAMPLE ID : 4798.002MSD
CLIENT SAMPLE ID : SB21-0030	CLIENT SAMPLE ID : SB21-0030MS	CLIENT SAMPLE ID : SB21-0030MSD
DATE ANALYZED : 8/6/98	DATE ANALYZED : 8/6/98	DATE ANALYZED : 8/6/98
INSTRUMENT FILE : B06050	INSTRUMENT FILE : B06057	INSTRUMENT FILE : B06058

PARAMETER	UNITS	MS SPIKE ADDED	MSD SPIKE ADDED	SAMPL CONC.	MS CONC.	MSD CONC.	MS RECOVERY (%)	MSD RECOVERY (%)	RPD	RPD LIMIT	QC LIMIT REC.
Benzene	UG/KG	51.1	51.1	0	45.5	45.7	89	89	0.0	30	70 - 130
Ethylbenzene	UG/KG	51.1	51.1	0	34.7	35.7	68 *	70	2.9	30	70 - 130
Toluene	UG/KG	51.1	51.1	0	39.7	40.5	78	79	1.3	30	70 - 130
Xylene (total)	UG/KG	153	153	0	106	109	69 *	71	2.9	30	70 - 130

* Indicate values outside of QC limits

RPD : 0 out of 4 outside limits
Spike Recovery : 2 out of 8 outside limits

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PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

MS/MSD SUMMARY REPORT

BTEX BY GC/PID

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC.
PROJECT NAME : E&E- WILCOX REFINERY
PROJECT NUMBER :

DATE RECEIVED : 8/5/98
PRINTED ON : 8/21/98

SAMPLE MATRIX : SOIL

METHOD REFERENCE : SW846-8021B

SAMPLE	MATRIX SPIKE	MATRIX SPIKE DUPLICATE
SAMPLE ID : 4798.010	MS SAMPLE ID : 4798.010MS	MSD SAMPLE ID : 4798.010MSD
CLIENT SAMPLE ID : SB38-0010	CLIENT SAMPLE ID : SB38-0010MS	CLIENT SAMPLE ID : SB38-0010MSD
DATE ANALYZED : 8/17/98	DATE ANALYZED : 8/17/98	DATE ANALYZED : 8/17/98
INSTRUMENT FILE : B06129	INSTRUMENT FILE : B06130	INSTRUMENT FILE : B06131

PARAMETER	UNITS	MS SPIKE ADDED	MSD SPIKE ADDED	SAMPL CONC.	MS CONC.	MSD CONC.	MS RECOVERY (%)	MSD RECOVERY (%)	RPD	RPD LIMIT	QC LIMIT REC.
Benzene	UG/KG	59.7	59.7	0	58.3	58.6	98	98	0.0	30	70 - 130
Ethylbenzene	UG/KG	59.7	59.7	0	59.6	59.8	100	100	0.0	30	70 - 130
Toluene	UG/KG	59.7	59.7	0	59.6	59.8	100	100	0.0	30	70 - 130
Xylene (total)	UG/KG	179	179	0	178	180	99	101	2.0	30	70 - 130

* Indicate values outside of QC limits

RPD : 0 out of 4 outside limits
Spike Recovery : 0 out of 8 outside limits

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

MS/MSD SUMMARY REPORT

BTEX BY GC/PID

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC.
PROJECT NAME : E&E- WILCOX REFINERY
PROJECT NUMBER :

DATE RECEIVED : 8/5/98
PRINTED ON : 8/21/98

SAMPLE MATRIX : WATER

METHOD REFERENCE : SW846-8021B

SAMPLE	MATRIX SPIKE	MATRIX SPIKE DUPLICATE
SAMPLE ID : 4798.011	MS SAMPLE ID : 4798.011MS	MSD SAMPLE ID : 4798.011MSD
CLIENT SAMPLE ID : SW03	CLIENT SAMPLE ID : SW03MS	CLIENT SAMPLE ID : SW03MSD
DATE ANALYZED : 8/14/98	DATE ANALYZED : 8/14/98	DATE ANALYZED : 8/14/98
INSTRUMENT FILE : B06073	INSTRUMENT FILE : B06084	INSTRUMENT FILE : B06085

PARAMETER	UNITS	MS SPIKE ADDED	MSD SPIKE ADDED	SAMPL CONC.	MS CONC.	MSD CONC.	MS RECOVERY (%)	MSD RECOVERY (%)	RPD	RPD LIMIT	QC LIMIT REC.
Benzene	UG/L	50.0	50.0	0	53.5	52.6	107	105	1.9	25	75 - 125
Ethyl benzene	UG/L	50.0	50.0	0	54.4	53.3	109	107	1.9	25	75 - 125
Toluene	UG/L	50.0	50.0	0	55.8	54.8	112	110	1.8	25	75 - 125
Xylene (total)	UG/L	150	150	0	163	161	109	107	1.9	25	75 - 125

* Indicate values outside of QC limits

RPD : 0 out of 4 outside limits
Spike Recovery : 0 out of 8 outside limits

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1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

MS/MSD SUMMARY REPORT

BTEX BY GC/PID

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC.
PROJECT NAME : E&E- WILCOX REFINERY
PROJECT NUMBER :

DATE RECEIVED : 8/7/98
PRINTED ON : 8/21/98

SAMPLE MATRIX : SOIL

METHOD REFERENCE : SW846-8021B

SAMPLE	MATRIX SPIKE	MATRIX SPIKE DUPLICATE
SAMPLE ID : 4802.026	MS SAMPLE ID : 4802.026MS	MSD SAMPLE ID : 4802.026MSD
CLIENT SAMPLE ID : SB46-0612	CLIENT SAMPLE ID : SB46-0612MS	CLIENT SAMPLE ID : SB46-0612MSD
DATE ANALYZED : 8/16/98	DATE ANALYZED : 8/16/98	DATE ANALYZED : 8/16/98
INSTRUMENT FILE : B06116	INSTRUMENT FILE : B06123	INSTRUMENT FILE : B06124

PARAMETER	UNITS	MS SPIKE ADDED	MSD SPIKE ADDED	SAMPL CONC.	MS CONC.	MSD CONC.	MS RECOVERY (%)	MSD RECOVERY (%)	RPD	RPD LIMIT	QC LIMIT REC.
Benzene	UG/KG	58.8	58.8	0	57.9	60.1	98	102	4.0	30	70 - 130
Ethylbenzene	UG/KG	58.8	58.8	0	61.3	62.1	104	106	1.9	30	70 - 130
Toluene	UG/KG	58.8	58.8	0	58.2	59.9	99	102	3.0	30	70 - 130
Xylene (total)	UG/KG	176	176	0	186	191	106	109	2.8	30	70 - 130

* Indicate values outside of QC limits

RPD : 0 out of 4 outside limits
Spike Recovery : 0 out of 8 outside limits

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

MS/MSD SUMMARY REPORT

BTEX BY GC/PID

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC.
PROJECT NAME : E&E- WILCOX REFINERY
PROJECT NUMBER :

DATE RECEIVED : 8/7/98
PRINTED ON : 8/21/98

SAMPLE MATRIX : SOIL

METHOD REFERENCE : SW846-8021B

SAMPLE	MATRIX SPIKE	MATRIX SPIKE DUPLICATE
SAMPLE ID : 4802.003	MS SAMPLE ID : 4802.003MS	MSD SAMPLE ID : 4802.003MSD
CLIENT SAMPLE ID : SB29-0010	CLIENT SAMPLE ID : SB29-0010MS	CLIENT SAMPLE ID : SB29-0010MSD
DATE ANALYZED : 8/15/98	DATE ANALYZED : 8/15/98	DATE ANALYZED : 8/15/98
INSTRUMENT FILE : B06092	INSTRUMENT FILE : B06105	INSTRUMENT FILE : B06106

PARAMETER	UNITS	MS SPIKE ADDED	MSD SPIKE ADDED	SAMPL CONC.	MS CONC.	MSD CONC.	MS RECOVERY (%)	MSD RECOVERY (%)	RPD	RPD LIMIT	QC LIMIT REC.
Benzene	UG/KG	51.2	51.2	0	59.1	60.8	115	119	3.4	30	70 - 130
Ethylbenzene	UG/KG	51.2	51.2	0	45.6	50.2	89	98	9.6	30	70 - 130
Toluene	UG/KG	51.2	51.2	0	55.3	59.6	108	116	7.1	30	70 - 130
Xylene (total)	UG/KG	154	154	0	135	151	88	98	10.8	30	70 - 130

* Indicate values outside of QC limits

RPD : 0 out of 4 outside limits
Spike Recovery : 0 out of 8 outside limits

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB20-0030
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4798.001
PROJECT NUMBER	:		METHOD REFERENCE	:	SW846-8021B
DATE SAMPLED	:	8/4/98	DATE RECEIVED	:	8/5/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 14:38

% MOISTURE	: 7.9	ANALYST	: BP
DATE ANALYZED	: 08/06/98	INSTRUMENT FILE	: B06049
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 14:03		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.4 UG/KG	ND UG/KG	
Ethylbenzene	5.4 UG/KG	ND UG/KG	
Toluene	5.4 UG/KG	ND UG/KG	
Xylene (total)	5.4 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	54.3 UG/KG	70 - 130	65

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB047A	PREP BLANK ID :BTXB047	LCS ID :BTXL044
MS ID :4798.002MS	MSD ID :4798.002MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB21-0030
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4798.002
PROJECT NUMBER	:		METHOD REFERENCE	:	SW846-8021B
DATE SAMPLED	:	8/4/98	DATE RECEIVED	:	8/5/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 14:38

% MOISTURE	: 2.2	ANALYST	: BP
DATE ANALYZED	: 08/06/98	INSTRUMENT FILE	: B06050
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 14:25		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.1 UG/KG	ND UG/KG	
Ethylbenzene	5.1 UG/KG	ND UG/KG	
Toluene	5.1 UG/KG	ND UG/KG	
Xylene (total)	5.1 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	51.1 UG/KG	70 - 130	70

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB047A	PREP BLANK ID :BTXB047	LCS ID :BTXL044
MS ID :4798.002MS	MSD ID :4798.002MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB22-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.003
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:38

% MOISTURE	: 5.4	ANALYST	: BP
DATE ANALYZED	: 08/06/98	INSTRUMENT FILE	: B06051
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 14:48		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.3 UG/KG	ND UG/KG	
Ethylbenzene	5.3 UG/KG	ND UG/KG	
Toluene	5.3 UG/KG	ND UG/KG	
Xylene (total)	5.3 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	52.8 UG/KG	70 - 130	70

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB047A	PREP BLANK ID :BTXB047	LCS ID :BTXL044
MS ID :4798.002MS	MSD ID :4798.002MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB23-0030
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.004
PROJECT NUMBER	:	METHOD REFERENCE	: SW846-8021B
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98 14:38

% MOISTURE	: 2.1	ANALYST	: BP
DATE ANALYZED	: 08/06/98	INSTRUMENT FILE	: 806052
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 15:10		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.1 UG/KG	ND UG/KG	
Ethylbenzene	5.1 UG/KG	ND UG/KG	
Toluene	5.1 UG/KG	ND UG/KG	
Xylene (total)	5.1 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	51.1 UG/KG	70 - 130	46

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB047A	PREP BLANK ID :BTXB047	LCS ID :BTXL044
MS ID :4798.002MS	MSD ID :4798.002MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB24-0020
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4798.005
PROJECT NUMBER	:		METHOD REFERENCE	:	SW846-8021B
DATE SAMPLED	:	8/4/98	DATE RECEIVED	:	8/5/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 14:39

% MOISTURE	: 14.4	ANALYST	: BP
DATE ANALYZED	: 08/17/98	INSTRUMENT FILE	: B06132
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 13:23		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.8 UG/KG	ND UG/KG	
Ethylbenzene	5.8 UG/KG	ND UG/KG	
Toluene	5.8 UG/KG	ND UG/KG	
Xylene (total)	5.8 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	58.4 UG/KG	70 - 130	47

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB051	PREP BLANK ID :BTXB051	LCS ID :BTXL049
MS ID :4798.010MS	MSD ID :4798.010MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB25-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.006
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:39

% MOISTURE	: 1.7	ANALYST	: BP
DATE ANALYZED	: 08/06/98	INSTRUMENT FILE	: B06053
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 15:32		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.1 UG/KG	ND UG/KG	
Ethylbenzene	5.1 UG/KG	ND UG/KG	
Toluene	5.1 UG/KG	ND UG/KG	
Xylene (total)	5.1 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50.9 UG/KG	70 - 130	46

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB047A	PREP BLANK ID :BTXB047	LCS ID :BTXL044
MS ID :4798.002MS	MSD ID :4798.002MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB26-0020
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4798.007
PROJECT NUMBER	:		METHOD REFERENCE	:	SW846-8021B
DATE SAMPLED	:	8/4/98	DATE RECEIVED	:	8/5/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 14:39

% MOISTURE	: 2.8	ANALYST	: BP
DATE ANALYZED	: 08/06/98	INSTRUMENT FILE	: B06054
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 15:55		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.1 UG/KG	ND UG/KG	
Ethylbenzene	5.1 UG/KG	ND UG/KG	
Toluene	5.1 UG/KG	ND UG/KG	
Xylene (total)	5.1 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	51.4 UG/KG	70 - 130	49

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB047A	PREP BLANK ID :BTXB047	LCS ID :BTXL044
MS ID :4798.002MS	MSD ID :4798.002MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB36-6070
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4798.008
PROJECT NUMBER	:		METHOD REFERENCE	:	SW846-8021B
DATE SAMPLED	:	8/4/98	DATE RECEIVED	:	8/5/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 14:39

% MOISTURE	: 2.5	ANALYST	: BP
DATE ANALYZED	: 08/06/98	INSTRUMENT FILE	: B06055
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 16:17		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.1 UG/KG	ND UG/KG	
Ethylbenzene	5.1 UG/KG	ND UG/KG	
Toluene	5.1 UG/KG	ND UG/KG	
Xylene (total)	5.1 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	51.3 UG/KG	70 - 130	68

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB047A	PREP BLANK ID :BTXB047	LCS ID :BTXL044
MS ID :4798.002MS	MSD ID :4798.002MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB37-6070		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.009		
PROJECT NUMBER	:	METHOD REFERENCE	: SW846-8021B		
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:39	

% MOISTURE	: 6.8	ANALYST	: BP
DATE ANALYZED	: 08/16/98	INSTRUMENT FILE	: B06122
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 15:36		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.4 UG/KG	ND UG/KG	
Ethylbenzene	5.4 UG/KG	ND UG/KG	
Toluene	5.4 UG/KG	ND UG/KG	
Xylene (total)	5.4 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	53.6 UG/KG	70 - 130	85

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB050	PREP BLANK ID :BTXB050	LCS ID :BTXL047
MS ID :4802.026MS	MSD ID :4802.026MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB38-0010
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4798.010
PROJECT NUMBER	:		METHOD REFERENCE	:	SW846-8021B
DATE SAMPLED	:	8/4/98	DATE RECEIVED	:	8/5/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 14:39

% MOISTURE	: 16.2	ANALYST	: BP
DATE ANALYZED	: 08/17/98	INSTRUMENT FILE	: B06129
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 12:02		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	6.0 UG/KG	ND UG/KG	
Ethylbenzene	6.0 UG/KG	ND UG/KG	
Toluene	6.0 UG/KG	ND UG/KG	
Xylene (total)	6.0 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	59.7 UG/KG	70 - 130	93

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB051	PREP BLANK ID :BTXB051	LCS ID :BTXL049
MS ID :4798.010MS	MSD ID :4798.010MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SW03		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.011		
PROJECT NUMBER	:	METHOD REFERENCE	: SW846-8021B		
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98		
SAMPLE MATRIX	: WATER	PRINTED ON	: 8/21/98	14:40	

ANALYST	: BP	DATE ANALYZED	: 08/14/98
DILUTION	: 1	INSTRUMENT FILE	: B06073
INSTRUMENT ID	: B-HP5890B	PURGE VOLUME	: 5 mL
TIME ANALYZED	: 09:47		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.00 UG/L	ND UG/L	
Ethyl benzene	5.00 UG/L	ND UG/L	
Toluene	5.00 UG/L	ND UG/L	
Xylene (total)	5.00 UG/L	ND UG/L	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/L	75 - 125	99

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB048	PREP BLANK ID :BTXB048	LCS ID :BTXL045
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	TB0804
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.012
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	WATER	PRINTED ON :	8/21/98 14:40

ANALYST	: BP	DATE ANALYZED	: 08/14/98
DILUTION	: 1	INSTRUMENT FILE	: B06074
INSTRUMENT ID	: B-HP5890B	PURGE VOLUME	: 5 mL
TIME ANALYZED	: 10:12		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.00 UG/L	ND UG/L	
Ethyl benzene	5.00 UG/L	ND UG/L	
Toluene	5.00 UG/L	ND UG/L	
Xylene (total)	5.00 UG/L	ND UG/L	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/L	75 - 125	101

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB048	PREP BLANK ID :BTXB048	LCS ID :BTXL045
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB27-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.001
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:49

% MOISTURE	: 4.8	ANALYST	: BP
DATE ANALYZED	: 08/16/98	INSTRUMENT FILE	: B06111
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 11:01		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.2 UG/KG	ND UG/KG	
Ethylbenzene	5.2 UG/KG	ND UG/KG	
Toluene	5.2 UG/KG	ND UG/KG	
Xylene (total)	5.2 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	52.6 UG/KG	70 - 130	73

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB050	PREP BLANK ID :BTXB050	LCS ID :BTXL047
MS ID :4802.026MS	MSD ID :4802.026MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB28-0020
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.002
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:49

% MOISTURE	: 4.5	ANALYST	: BP
DATE ANALYZED	: 08/15/98	INSTRUMENT FILE	: B06091
INSTRUMENT ID	: B-HP58908	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 14:13		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.2 UG/KG	ND UG/KG	
Ethylbenzene	5.2 UG/KG	ND UG/KG	
Toluene	5.2 UG/KG	ND UG/KG	
Xylene (total)	5.2 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	52.3 UG/KG	70 - 130	44

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB049	PREP BLANK ID :BTXB049	LCS ID :BTXL046
MS ID :4802.003MS	MSD ID :4802.003MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB29-0010
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.003
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:49

% MOISTURE	: 2.4	ANALYST	: BP
DATE ANALYZED	: 08/15/98	INSTRUMENT FILE	: B06092
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 14:38		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.1 UG/KG	ND UG/KG	
Ethylbenzene	5.1 UG/KG	ND UG/KG	
Toluene	5.1 UG/KG	ND UG/KG	
Xylene (total)	5.1 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	51.2 UG/KG	70 - 130	71

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB049	PREP BLANK ID :BTXB049	LCS ID :BTXL046
MS ID :4802.003MS	MSD ID :4802.003MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB30-0030
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.004
PROJECT NUMBER	:	METHOD REFERENCE	: SW846-8021B
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98 14:49

% MOISTURE	: 10.9	ANALYST	: BP
DATE ANALYZED	: 08/15/98	INSTRUMENT FILE	: B06093
INSTRUMENT ID	: B-HP58908	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 15:03		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.6 UG/KG	ND UG/KG	
Ethylbenzene	5.6 UG/KG	ND UG/KG	
Toluene	5.6 UG/KG	ND UG/KG	
Xylene (total)	5.6 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	56.1 UG/KG	70 - 130	81

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB049	PREP BLANK ID :BTXB049	LCS ID :BTXL046
MS ID :4802.003MS	MSD ID :4802.003MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SW01
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.005
PROJECT NUMBER	:		METHOD REFERENCE	:	SW846-8021B
DATE SAMPLED	:	8/5/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	WATER	PRINTED ON	:	8/21/98 14:49

ANALYST	: BP	DATE ANALYZED	: 08/14/98
DILUTION	: 1	INSTRUMENT FILE	: B06075
INSTRUMENT ID	: B-HP5890B	PURGE VOLUME	: 5 mL
TIME ANALYZED	: 10:37		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.00 UG/L	ND UG/L	
Ethyl benzene	5.00 UG/L	ND UG/L	
Toluene	5.00 UG/L	ND UG/L	
Xylene (total)	5.00 UG/L	ND UG/L	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/L	75 - 125	101

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB048	PREP BLANK ID :BTXB048	LCS ID :BTXL045
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB31-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.006
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:49

% MOISTURE	: 15.8	ANALYST	: BP
DATE ANALYZED	: 08/15/98	INSTRUMENT FILE	: B06099
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 17:33		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.9 UG/KG	ND UG/KG	
Ethylbenzene	5.9 UG/KG	ND UG/KG	
Toluene	5.9 UG/KG	ND UG/KG	
Xylene (total)	5.9 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	59.4 UG/KG	70 - 130	75

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB049	PREP BLANK ID :BTXB049	LCS ID :BTXL046
MS ID :4802.003MS	MSD ID :4802.003MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SW02
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.007
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	WATER	PRINTED ON :	8/21/98 14:50

ANALYST	: BP	DATE ANALYZED	: 08/14/98
DILUTION	: 1	INSTRUMENT FILE	: B06076
INSTRUMENT ID	: B-HP5890B	PURGE VOLUME	: 5 mL
TIME ANALYZED	: 11:02		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.00 UG/L	ND UG/L	
Ethyl benzene	5.00 UG/L	ND UG/L	
Toluene	5.00 UG/L	ND UG/L	
Xylene (total)	5.00 UG/L	ND UG/L	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/L	75 - 125	81

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB048	PREP BLANK ID :BTXB048	LCS ID :BTXL045
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SW02D
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.008
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	WATER	PRINTED ON :	8/21/98 14:50

ANALYST	: BP	DATE ANALYZED	: 08/14/98
DILUTION	: 1	INSTRUMENT FILE	: B06077
INSTRUMENT ID	: B-HP5890B	PURGE VOLUME	: 5 mL
TIME ANALYZED	: 11:27		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.00 UG/L	ND UG/L	
Ethyl benzene	5.00 UG/L	ND UG/L	
Toluene	5.00 UG/L	ND UG/L	
Xylene (total)	5.00 UG/L	ND UG/L	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/L	75 - 125	91

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB048	PREP BLANK ID :BTXB048	LCS ID :BTXL045
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB32-0010
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.009
PROJECT NUMBER	:		METHOD REFERENCE	:	SW846-8021B
DATE SAMPLED	:	8/5/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 14:50

% MOISTURE	: 42.7	ANALYST	: BP
DATE ANALYZED	: 08/15/98	INSTRUMENT FILE	: B06100
INSTRUMENT ID	: B-HP58908	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 17:58		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	8.7 UG/KG	ND UG/KG	
Ethylbenzene	8.7 UG/KG	ND UG/KG	
Toluene	8.7 UG/KG	ND UG/KG	
Xylene (total)	8.7 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	87.3 UG/KG	70 - 130	79

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB049	PREP BLANK ID :BTXB049	LCS ID :BTXL046
MS ID :4802.003MS	MSD ID :4802.003MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB32-0010D
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.010
PROJECT NUMBER	:		METHOD REFERENCE	:	SW846-8021B
DATE SAMPLED	:	8/5/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 14:50

% MOISTURE	: 42.1	ANALYST	: BP
DATE ANALYZED	: 08/15/98	INSTRUMENT FILE	: B06101
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 18:23		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	8.6 UG/KG	ND UG/KG	
Ethylbenzene	8.6 UG/KG	ND UG/KG	
Toluene	8.6 UG/KG	ND UG/KG	
Xylene (total)	8.6 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	86.3 UG/KG	70 - 130	76

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB049	PREP BLANK ID :BTXB049	LCS ID :BTXL046
MS ID :4802.003MS	MSD ID :4802.003MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB33-0010
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.011
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:50

% MOISTURE	: 22.2	ANALYST	: BP
DATE ANALYZED	: 08/16/98	INSTRUMENT FILE	: B06118
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 13:56		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	6.4 UG/KG	ND UG/KG	
Ethylbenzene	6.4 UG/KG	ND UG/KG	
Toluene	6.4 UG/KG	ND UG/KG	
Xylene (total)	6.4 UG/KG	82 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	64.3 UG/KG	70 - 130	123

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB050	PREP BLANK ID :BTXB050	LCS ID :BTXL047
MS ID :4802.026MS	MSD ID :4802.026MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB34-0010
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.012
PROJECT NUMBER	:		METHOD REFERENCE	:	SW846-8021B
DATE SAMPLED	:	8/5/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 14:50

% MOISTURE	: 22.6	ANALYST	: BP
DATE ANALYZED	: 08/16/98	INSTRUMENT FILE	: B06117
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 13:31		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	6.4 UG/KG	ND UG/KG	
Ethylbenzene	6.4 UG/KG	140 UG/KG	
Toluene	6.4 UG/KG	ND UG/KG	
Xylene (total)	6.4 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	64.6 UG/KG	70 - 130	77

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB050	PREP BLANK ID :BTXB050	LCS ID :BTXL047
MS ID :4802.026MS	MSD ID :4802.026MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB40-3040
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.013
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:50

% MOISTURE	: 15.1	ANALYST	: BP
DATE ANALYZED	: 08/15/98	INSTRUMENT FILE	: B06094
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 15:28		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.9 UG/KG	ND UG/KG	
Ethylbenzene	5.9 UG/KG	ND UG/KG	
Toluene	5.9 UG/KG	ND UG/KG	
Xylene (total)	5.9 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	58.9 UG/KG	70 - 130	72

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB049	PREP BLANK ID :BTXB049	LCS ID :BTXL046
MS ID :4802.003MS	MSD ID :4802.003MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB40-GW06
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.014
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	WATER	PRINTED ON :	8/21/98 14:50

ANALYST	: BP	DATE ANALYZED	: 08/14/98
DILUTION	: 1	INSTRUMENT FILE	: B06078
INSTRUMENT ID	: B-HP5890B	PURGE VOLUME	: 5 mL
TIME ANALYZED	: 11:52		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.00 UG/L	ND UG/L	
Ethyl benzene	5.00 UG/L	ND UG/L	
Toluene	5.00 UG/L	ND UG/L	
Xylene (total)	5.00 UG/L	ND UG/L	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/L	75 - 125	99

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB048	PREP BLANK ID :BTXB048	LCS ID :BTXL045
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB39-3040
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.015
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:50

% MOISTURE	: 16.7	ANALYST	: BP
DATE ANALYZED	: 08/15/98	INSTRUMENT FILE	: B06095
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 15:53		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	6.0 UG/KG	ND UG/KG	
Ethylbenzene	6.0 UG/KG	ND UG/KG	
Toluene	6.0 UG/KG	ND UG/KG	
Xylene (total)	6.0 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	60 UG/KG	70 - 130	77

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB049	PREP BLANK ID :BTXB049	LCS ID :BTXL046
MS ID :4802.003MS	MSD ID :4802.003MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB43-6070
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.016
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:50

% MOISTURE	: 7.8	ANALYST	: BP
DATE ANALYZED	: 08/16/98	INSTRUMENT FILE	: B06113
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 11:51		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.4 UG/KG	ND UG/KG	
Ethylbenzene	5.4 UG/KG	ND UG/KG	
Toluene	5.4 UG/KG	ND UG/KG	
Xylene (total)	5.4 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	54.2 UG/KG	70 - 130	77

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB050	PREP BLANK ID :BTXB050	LCS ID :BTXL047
MS ID :4802.026MS	MSD ID :4802.026MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB44-4050
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.017
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:50

% MOISTURE	: 9.3	ANALYST	: BP
DATE ANALYZED	: 08/15/98	INSTRUMENT FILE	: B06097
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 16:43		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.6 UG/KG	ND UG/KG	
Ethylbenzene	5.6 UG/KG	ND UG/KG	
Toluene	5.6 UG/KG	ND UG/KG	
Xylene (total)	5.6 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	55.1 UG/KG	70 - 130	70

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB049	PREP BLANK ID :BTXB049	LCS ID :BTXL046
MS ID :4802.003MS	MSD ID :4802.003MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB45-0010
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.018
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:50

% MOISTURE	: 20.4	ANALYST	: BP
DATE ANALYZED	: 08/15/98	INSTRUMENT FILE	: B06102
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 18:48		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	6.3 UG/KG	ND UG/KG	
Ethylbenzene	6.3 UG/KG	ND UG/KG	
Toluene	6.3 UG/KG	ND UG/KG	
Xylene (total)	6.3 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	62.8 UG/KG	70 - 130	83

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB049	PREP BLANK ID :BTXB049	LCS ID :BTXL046
MS ID :4802.003MS	MSD ID :4802.003MSD	

0002229

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB35-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.019
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:51

% MOISTURE	: 12.4	ANALYST	: BP
DATE ANALYZED	: 08/16/98	INSTRUMENT FILE	: B06114
INSTRUMENT ID	: B-HP58908	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 12:16		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.7 UG/KG	ND UG/KG	
Ethylbenzene	5.7 UG/KG	ND UG/KG	
Toluene	5.7 UG/KG	ND UG/KG	
Xylene (total)	5.7 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	57.1 UG/KG	70 - 130	92

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB050	PREP BLANK ID :BTXB050	LCS ID :BTXL047
MS ID :4802.026MS	MSD ID :4802.026MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB41-2030
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.020
PROJECT NUMBER	:		METHOD REFERENCE	:	SW846-8021B
DATE SAMPLED	:	8/6/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 14:51

% MOISTURE	: 17.7	ANALYST	: BP
DATE ANALYZED	: 08/15/98	INSTRUMENT FILE	: B06103
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 19:13		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	6.1 UG/KG	ND UG/KG	
Ethylbenzene	6.1 UG/KG	ND UG/KG	
Toluene	6.1 UG/KG	ND UG/KG	
Xylene (total)	6.1 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	60.7 UG/KG	70 - 130	70

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB049	PREP BLANK ID :BTXB049	LCS ID :BTXL046
MS ID :4802.003MS	MSD ID :4802.003MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB41-2030D
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.021
PROJECT NUMBER	:		METHOD REFERENCE	:	SW846-8021B
DATE SAMPLED	:	8/6/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 14:51

% MOISTURE	: 10.2	ANALYST	: BP
DATE ANALYZED	: 08/15/98	INSTRUMENT FILE	: B06104
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 19:38		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.6 UG/KG	ND UG/KG	
Ethylbenzene	5.6 UG/KG	ND UG/KG	
Toluene	5.6 UG/KG	ND UG/KG	
Xylene (total)	5.6 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	55.7 UG/KG	70 - 130	93

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB049	PREP BLANK ID :BTXB049	LCS ID :BTXL046
MS ID :4802.003MS	MSD ID :4802.003MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	S842-GW07
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.022
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	WATER	PRINTED ON :	8/21/98 14:51

ANALYST	: BP	DATE ANALYZED	: 08/14/98
DILUTION	: 1	INSTRUMENT FILE	: B06079
INSTRUMENT ID	: B-HP5890B	PURGE VOLUME	: 5 mL
TIME ANALYZED	: 12:17		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.00 UG/L	ND UG/L	
Ethyl benzene	5.00 UG/L	ND UG/L	
Toluene	5.00 UG/L	ND UG/L	
Xylene (total)	5.00 UG/L	ND UG/L	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/L	75 - 125	101

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB048	PREP BLANK ID :BTXB048	LCS ID :BTXL045
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB42-2030
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.023
PROJECT NUMBER	:		METHOD REFERENCE	:	SW846-8021B
DATE SAMPLED	:	8/6/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 14:51

% MOISTURE	: 14.9	ANALYST	: BP
DATE ANALYZED	: 08/16/98	INSTRUMENT FILE	: B06115
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 12:41		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.9 UG/KG	ND UG/KG	
Ethylbenzene	5.9 UG/KG	ND UG/KG	
Toluene	5.9 UG/KG	ND UG/KG	
Xylene (total)	5.9 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	58.7 UG/KG	70 - 130	106

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB050	PREP BLANK ID :BTXB050	LCS ID :BTXL047
MS ID :4802.026MS	MSD ID :4802.026MSD	

000259

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SW04
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.024
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	WATER	PRINTED ON :	8/21/98 14:51

ANALYST	: BP	DATE ANALYZED	: 08/14/98
DILUTION	: 1	INSTRUMENT FILE	: B06080
INSTRUMENT ID	: B-HP5890B	PURGE VOLUME	: 5 mL
TIME ANALYZED	: 12:42		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.00 UG/L	ND UG/L	
Ethyl benzene	5.00 UG/L	ND UG/L	
Toluene	5.00 UG/L	ND UG/L	
Xylene (total)	5.00 UG/L	ND UG/L	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/L	75 - 125	102

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB048	PREP BLANK ID :BTXB048	LCS ID :BTXL045
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB37-GW08
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.025
PROJECT NUMBER	:		METHOD REFERENCE	:	SW846-8021B
DATE SAMPLED	:	8/6/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	WATER	PRINTED ON	:	8/21/98 14:51

ANALYST	: BP	DATE ANALYZED	: 08/14/98
DILUTION	: 1	INSTRUMENT FILE	: B06082
INSTRUMENT ID	: B-HP5890B	PURGE VOLUME	: 5 mL
TIME ANALYZED	: 14:00		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.00 UG/L	ND UG/L	
Ethyl benzene	5.00 UG/L	ND UG/L	
Toluene	5.00 UG/L	ND UG/L	
Xylene (total)	5.00 UG/L	ND UG/L	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/L	75 - 125	99

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB048	PREP BLANK ID :BTXB048	LCS ID :BTXL045
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB46-0612
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.026
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:51

% MOISTURE	: 15	ANALYST	: BP
DATE ANALYZED	: 08/16/98	INSTRUMENT FILE	: B06116
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 13:06		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.9 UG/KG	ND UG/KG	
Ethylbenzene	5.9 UG/KG	ND UG/KG	
Toluene	5.9 UG/KG	ND UG/KG	
Xylene (total)	5.9 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	58.8 UG/KG	70 - 130	113

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB050	PREP BLANK ID :BTXB050	LCS ID :BTXL047
MS ID :4802.026MS	MSD ID :4802.026MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB46-0612D
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.027
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:51

% MOISTURE	: 12	ANALYST	: BP
DATE ANALYZED	: 08/16/98	INSTRUMENT FILE	: B06121
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 15:11		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.7 UG/KG	ND UG/KG	
Ethylbenzene	5.7 UG/KG	ND UG/KG	
Toluene	5.7 UG/KG	ND UG/KG	
Xylene (total)	5.7 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	56.8 UG/KG	70 - 130	124

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB050	PREP BLANK ID :BTXB050	LCS ID :BTXL047
MS ID :4802.026MS	MSD ID :4802.026MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	TB-0806
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.028
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	WATER	PRINTED ON :	8/21/98 14:51

ANALYST	: BP	DATE ANALYZED	: 08/14/98
DILUTION	: 1	INSTRUMENT FILE	: B06083
INSTRUMENT ID	: B-HP58908	PURGE VOLUME	: 5 mL
TIME ANALYZED	: 14:25		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.00 UG/L	ND UG/L	
Ethyl benzene	5.00 UG/L	ND UG/L	
Toluene	5.00 UG/L	ND UG/L	
Xylene (total)	5.00 UG/L	ND UG/L	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/L	75 - 125	96

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB048	PREP BLANK ID :BTXB048	LCS ID :BTXL045
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	:	CLIENT SAMPLE ID	: PREP BLANK
PROJECT NAME	:	LAB SAMPLE ID	: BTXB050
PROJECT NUMBER	:	METHOD REFERENCE	: SW846-8021B
DATE SAMPLED	:	DATE RECEIVED	:
SAMPLE MATRIX	: SOLID	PRINTED ON	: 8/21/98 14:41

% MOISTURE	:	ANALYST	: BP
DATE ANALYZED	: 08/16/98	INSTRUMENT FILE	: B06109
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 09:44		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.0 UG/KG	ND UG/KG	
Ethylbenzene	5.0 UG/KG	ND UG/KG	
Toluene	5.0 UG/KG	ND UG/KG	
Xylene (total)	5.0 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/KG	70 - 130	99

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB050 PREP BLANK ID :BTXB050

000295

Response Factor Report B-HP5890

Method : C:\HPCHEM\5\METHODS\BTB05835.M
Title : BTEX
Last Update : Fri Jul 03 12:15:22 1998
Response via : Initial Calibration

Calibration Files
low =B05840.D lowm =B05836.D mid =B05837.D
midh =B05838.D high =B05839.D

		Compound	low	lowm	mid	midh	high	Avg		%RSD
1)	S	a,a,a-Trifluorotoluen	56.9	61.3	59.2	58.4	61.9	59.5	E3	3.47
2)	T	Benzene	108.9	104.0	103.5	100.6	105.3	104.4	E3	2.89
3)	T	Toluene	109.9	101.7	101.4	99.6	104.0	103.3	E3	3.88
4)	T	Ethylbenzene	103.8	99.2	98.5	97.0	101.0	99.9	E3	2.61
5)	T	m/p-Xylene	107.7	100.8	100.0	98.1	102.1	101.8	E3	3.58
6)	T	o-Xylene	104.2	98.5	98.3	96.5	100.5	99.6	E3	2.94

Signal #2 Calibration Files
low =CONFIRM.D lowm =CONFIRM.D mid =CONFIRM.D
midh =CONFIRM.D high =CONFIRM.D

		Compound	low	lowm	mid	midh	high	Avg		%RSD
1)	S	a,a,a-Trifluorotoluen	593.3	641.5	608.4	571.3	553.5	593.6	E3	5.73
2)	T	Benzene	1.6	1.6	1.6	1.4	1.2	1.5	E6	11.08
3)	T	Toluene	909.3	1248.8	1368.7	1301.2	1187.3	1203.1	E3	14
4)	T	Ethylbenzene	746.8	1004.1	1135.9	1093.3	997.7	995.6	E3	15.1
5)	T	m/p-Xylene	927.3	1213.1	1303.7	1169.1	1056.3	1133.9	E3	12
6)	T	o-Xylene	774.2	990.0	1142.3	1136.1	1054.5	1019.4	E3	14.

000301

(#) = Out of Range

001615

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\5\DATA\B06043.D
Acq On : 08/06/98 08:30
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst #1: B-HP5890A
Multiplr: 1.00

Data File : C:\HPCHEM\5\DATA\B06043.D\CONFIRM.D
Acq On : 08/06/98 08:30
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst #2: B-HP5890B
Multiplr: 1.00

Method : C:\HPCHEM\5\METHODS\BTB05835.M
Title : BTEX
Last Update : Fri Jul 03 12:15:22 1998
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a,a-Trifluorotoluene (SUR	59.545	0.000	E3	100.0#	0#	-5.85#
2	T	Benzene	104.439	0.000	E3	100.0#	0#	-4.17#
3	T	Toluene	103.334	0.000	E3	100.0#	0#	-7.80#
4	T	Ethylbenzene	99.905	0.000	E3	100.0#	0#	-11.56#
5	T	m/p-Xylene	101.762	0.000	E3	100.0#	0#	-11.90#
6	T	o-Xylene	99.579	0.000	E3	100.0#	0#	-12.80#

Signal #2
Data File : C:\HPCHEM\5\DATA\B06043.D\CONFIRM.D
Acq On : 08/06/98 08:30
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst : B-HP5890A
Multiplr: 1.00

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a,a-Trifluorotoluene (S	593.596	542.661	E3	8.6	89	0.06
2	T	Benzene	1.483	1.418	E6	4.4	88	0.04
3	T	Toluene	1203.054	1127.640	E3	6.3	82	0.06
4	T	Ethylbenzene	995.553	927.491	E3	6.8	82	0.07
5	T	m/p-Xylene	1133.891	1082.393	E3	4.5	83	0.07
6	T	o-Xylene	1019.407	930.145	E3	8.8	81	0.04

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\5\DATA\B06056.D
Acq On : 08/06/98 16:39
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst #1: B-HP5890A
Multiplr: 1.00

Data File : C:\HPCHEM\5\DATA\B06056.D\CONFIRM.D
Acq On : 08/06/98 16:39
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst #2: B-HP5890B
Multiplr: 1.00

Method : C:\HPCHEM\5\METHODS\BTB05835.M
Title : BTEX
Last Update : Fri Jul 03 12:15:22 1998
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a,a-Trifluorotoluene (SUR	59.545	0.000	E3	100.0#	0#	-5.85#
2	T	Benzene	104.439	0.000	E3	100.0#	0#	-4.17#
3	T	Toluene	103.334	0.000	E3	100.0#	0#	-7.80#
4	T	Ethylbenzene	99.905	0.000	E3	100.0#	0#	-11.56#
5	T	m/p-Xylene	101.762	0.000	E3	100.0#	0#	-11.90#
6	T	o-Xylene	99.579	0.000	E3	100.0#	0#	-12.80#

Signal #2
Data File : C:\HPCHEM\5\DATA\B06056.D\CONFIRM.D
Acq On : 08/06/98 16:39
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst : B-HP5890A
Multiplr: 1.00

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a,a-Trifluorotoluene (S	593.596	516.677	E3	13.0	85	0.05
2	T	Benzene	1.483	1.356	E6	8.6	84	0.04
3	T	Toluene	1203.054	1047.610	E3	12.9	77	0.05
4	T	Ethylbenzene	995.553	857.440	E3	13.9	75	0.05
5	T	m/p-Xylene	1133.891	1008.026	E3	11.1	77	0.05
6	T	o-Xylene	1019.407	871.868	E3	14.5	76	0.03

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\5\DATA\B06064.D
Acq On : 08/06/98 19:38
Sample : CONT. CAL
Misc : 50 ug/ml

8/10/98

Vial: 100
Operator: BP
Inst #1: B-HP5890A
Multiplr: 1.00

Data File : C:\HPCHEM\5\DATA\B06064.D\CONFIRM.D
Acq On : 08/06/98 19:38
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst #2: B-HP5890B
Multiplr: 1.00

Method : C:\HPCHEM\5\METHODS\BTB05835.M
Title : BTEX
Last Update : Fri Jul 03 12:15:22 1998
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a,a-Trifluorotoluene (SUR	59.545	0.000	E3	100.0#	0#	-5.85#
2	T	Benzene	104.439	0.000	E3	100.0#	0#	-4.17#
3	T	Toluene	103.334	0.000	E3	100.0#	0#	-7.80#
4	T	Ethylbenzene	99.905	0.000	E3	100.0#	0#	-11.56#
5	T	m/p-Xylene	101.762	0.000	E3	100.0#	0#	-11.90#
6	T	o-Xylene	99.579	0.000	E3	100.0#	0#	-12.80#

Signal #2
Data File : C:\HPCHEM\5\DATA\B06064.D\CONFIRM.D
Acq On : 08/06/98 19:38
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst : B-HP5890A
Multiplr: 1.00

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a,a-Trifluorotoluene (S	593.596	518.248	E3	12.7	85	0.05
2	T	Benzene	1.483	1.517	E6	-2.3	94	0.04
3	T	Toluene	1203.054	1195.828	E3	0.6	87	0.05
4	T	Ethylbenzene	995.553	985.667	E3	1.0	87	0.06
5	T	m/p-Xylene	1133.891	1138.171	E3	-0.4	87	0.06
6	T	o-Xylene	1019.407	984.436	E3	3.4	86	0.03

(#) = Out of Range SPCC's out = 0 CCC's out = 0

000339

001618

Response Factor Report B-HP5890

8/20/98

Method : C:\HPCHEM\5\METHODS\BTB06065.M
Title : BTEX
Last Update : Thu Aug 13 15:12:45 1998
Response via : Initial Calibration

Calibration Files
low =B06065.D lowm =B06066.D mid =B06067.D
midh =B06068.D high =B06069.D

		Compound	low	lowm	mid	midh	high	Avg		%RSD
1)	S	a,a,a-Trifluorotoluen	41.1	46.8	41.9	41.7	42.5	42.8	E3	5.38
2)	T	Benzene	70.7	71.5	73.0	75.3	74.6	73.0	E3	2.68
3)	T	Toluene	68.0	70.0	71.9	74.6	74.0	71.7	E3	3.84
4)	T	Ethylbenzene	63.9	67.3	69.0	71.5	71.0	68.6	E3	4.51
5)	T	m/p-Xylene	71.2	67.8	69.2	71.5	70.9	70.1	E3	2.27
6)	T	o-Xylene	72.0	66.2	67.6	69.9	69.3	69.0	E3	3.23

Signal #2 Calibration Files
low =CONFIRM.D lowm =CONFIRM.D mid =CONFIRM.D
midh =CONFIRM.D high =CONFIRM.D

		Compound	low	lowm	mid	midh	high	Avg		%RSD
1)	S	a,a,a-Trifluorotoluen	623.2	816.8	723.3	678.3	645.5	697.4	E3	10.99
2)	T	Benzene	1.7	2.0	1.9	1.6	1.4	1.7	E6	13.42
3)	T	Toluene	1.0	1.6	1.6	1.5	1.3	1.4	E6	17.36
4)	T	Ethylbenzene	833.6	1196.8	1099.5	950.2	836.2	983.3	E3	16.42
5)	T	m/p-Xylene	1.2	1.7	1.5	1.3	1.2	1.4	E6	15.86
6)	T	o-Xylene	948.6	1414.2	1473.5	1364.5	1238.1	1287.8	E3	16

(#) = Out of Range

000345

001619

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\5\DATA\B06070.D
Acq On : 08/14/98 08:32
Sample : CONT. CAL
Misc : 50 ug/ml

8/20/98

Vial: 100
Operator: BP
Inst #1: B-HP5890A
Multiplr: 1.00

Data File : C:\HPCHEM\5\DATA\B06070.D\CONFIRM.D
Acq On : 08/14/98 08:32
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst #2: B-HP5890B
Multiplr: 1.00

Method : C:\HPCHEM\5\METHODS\BTB06065.M
Title : BTEX
Last Update : Thu Aug 13 15:12:45 1998
Response via : Multiple Level Calibration

Min. RF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RF Dev : 25% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a-Trifluorotoluene (SUR	42.789	40.518	E3	5.3	97	0.00
2	T	Benzene	73.033	66.313	E3	9.2	91	-0.01
3	T	Toluene	71.677	65.000	E3	9.3	90	0.00
4	T	Ethylbenzene	68.555	62.816	E3	8.4	91	0.00
5	T	p-Xylene	70.136	62.946	E3	10.3	91	-0.01
6	T	o-Xylene	69.021	61.581	E3	10.8	91	0.00

Signal #2
Data File : C:\HPCHEM\5\DATA\B06070.D\CONFIRM.D
Acq On : 08/14/98 08:32
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst : B-HP5890A
Multiplr: 1.00

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a-Trifluorotoluene (S	697.436	710.544	E3	-1.9	98	0.03
2	T	Benzene	1.703	1.748	E6	-2.6	94	0.03
3	T	Toluene	1.399	1.502	E6	-7.3	93	0.04
4	T	Ethylbenzene	983.273	1034.013	E3	-5.2	94	0.03
5	T	p-Xylene	1.381	1.447	E6	-4.7	94	0.02
6	T	o-Xylene	1287.777	1369.781	E3	-6.4	93	0.03

(#) = Out of Range SPCC's out = 0 CCC's out = 0

001620

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\5\DATA\B06081.D
Acq On : 08/14/98 13:07
Sample : CONT. CAL
Misc : 50 ug/ml

8/20/98

Vial: 100
Operator: BP
Inst #1: B-HP5890A
Multiplr: 1.00

Data File : C:\HPCHEM\5\DATA\B06081.D\CONFIRM.D
Acq On : 08/14/98 13:07
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst #2: B-HP5890B
Multiplr: 1.00

Method : C:\HPCHEM\5\METHODS\BTB06065.M
Title : BTEX
Last Update : Thu Aug 13 15:12:45 1998
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a,a-Trifluorotoluene (SUR	42.789	42.519	E3	0.6	101	-0.03
2	T	Benzene	73.033	67.423	E3	7.7	92	-0.02
3	T	Toluene	71.677	66.150	E3	7.7	92	-0.02
4	T	Ethylbenzene	68.555	63.227	E3	7.8	92	-0.02
5	T	m/p-Xylene	70.136	63.362	E3	9.7	92	-0.02
6	T	o-Xylene	69.021	62.026	E3	10.1	92	-0.02

Signal #2
Data File : C:\HPCHEM\5\DATA\B06081.D\CONFIRM.D
Acq On : 08/14/98 13:07
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst : B-HP5890A
Multiplr: 1.00

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a,a-Trifluorotoluene (S	697.436	733.588	E3	-5.2	101	0.04
2	T	Benzene	1.703	1.752	E6	-2.8	94	0.03
3	T	Toluene	1.399	1.499	E6	-7.1	93	0.05
4	T	Ethylbenzene	983.273	1034.033	E3	-5.2	94	0.04
5	T	m/p-Xylene	1.381	1.437	E6	-4.0	93	0.03
6	T	o-Xylene	1287.777	1363.869	E3	-5.9	93	0.04

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\5\DATA\B06086.D
Acq On : 08/14/98 15:40
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst #1: B-HP5890A
Multiplr: 1.00

Data File : C:\HPCHEM\5\DATA\B06086.D\CONFIRM.D
Acq On : 08/14/98 15:40
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst #2: B-HP5890B
Multiplr: 1.00

Method : C:\HPCHEM\5\METHODS\BTB06065.M
Title : BTEX
Last Update : Thu Aug 13 15:12:45 1998
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a,a-Trifluorotoluene (SUR	42.789	41.195	E3	3.7	98	0.00
2	T	Benzene	73.033	81.715	E3	-11.9	112	0.00
3	T	Toluene	71.677	63.325	E3	11.7	88	0.00
4	T	Ethylbenzene	68.555	60.609	E3	11.6	88	-0.01
5	T	m/p-Xylene	70.136	61.152	E3	12.8	88	-0.01
6	T	o-Xylene	69.021	60.275	E3	12.7	89	0.00

Signal #2
Data File : C:\HPCHEM\5\DATA\B06086.D\CONFIRM.D
Acq On : 08/14/98 15:40
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst : B-HP5890A
Multiplr: 1.00

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a,a-Trifluorotoluene (S	697.436	725.301	E3	-4.0	100	0.04
2	T	Benzene	1.703	1.715	E6	-0.7	92	0.04
3	T	Toluene	1.399	1.459	E6	-4.2	91	0.04
4	T	Ethylbenzene	983.273	1007.176	E3	-2.4	92	0.03
5	T	m/p-Xylene	1.381	1.410	E6	-2.1	92	0.03
6	T	o-Xylene	1287.777	1339.145	E3	-4.0	91	0.04

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\5\DATA\B06087.D
Acq On : 08/15/98 12:33
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst #1: B-HP5890A
Multiplr: 1.00

Data File : C:\HPCHEM\5\DATA\B06087.D\CONFIRM.D
Acq On : 08/15/98 12:33
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst #2: B-HP5890B
Multiplr: 1.00

Method : C:\HPCHEM\5\METHODS\BTB06065.M
Title : BTEX
Last Update : Thu Aug 13 15:12:45 1998
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a,a-Trifluorotoluene (SUR	42.789	41.794	E3	2.3	100	0.05
2	T	Benzene	73.033	65.096	E3	10.9	89	0.03
3	T	Toluene	71.677	64.126	E3	10.5	89	0.04
4	T	Ethylbenzene	68.555	61.724	E3	10.0	89	0.03
5	T	m/p-Xylene	70.136	62.018	E3	11.6	90	0.03
6	T	o-Xylene	69.021	60.644	E3	12.1	90	0.03

Signal #2
Data File : C:\HPCHEM\5\DATA\B06087.D\CONFIRM.D
Acq On : 08/15/98 12:33
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst : B-HP5890A
Multiplr: 1.00

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a,a-Trifluorotoluene (S	697.436	758.938	E3	-8.8	105	0.09
2	T	Benzene	1.703	1.768	E6	-3.8	95	0.08
3	T	Toluene	1.399	1.511	E6	-8.0	94	0.09
4	T	Ethylbenzene	983.273	1034.273	E3	-5.2	94	0.08
5	T	m/p-Xylene	1.381	1.452	E6	-5.1	94	0.06
6	T	o-Xylene	1287.777	1395.191	E3	-8.3	95	0.08

(#) = Out of Range SPCC's out = 0 CCC's out = 0

0003390

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\5\DATA\B06098.D
Acq On : 08/15/98 17:08
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst #1: B-HP5890A
Multiplr: 1.00

Data File : C:\HPCHEM\5\DATA\B06098.D\CONFIRM.D
Acq On : 08/15/98 17:08
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst #2: B-HP5890B
Multiplr: 1.00

Method : C:\HPCHEM\5\METHODS\BTB06065.M
Title : BTEX
Last Update : Thu Aug 13 15:12:45 1998
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a,a-Trifluorotoluene (SUR	42.789	41.216	E3	3.7	98	-0.01
2	T	Benzene	73.033	64.162	E3	12.1	88	-0.01
3	T	Toluene	71.677	62.630	E3	12.6	87	-0.01
4	T	Ethylbenzene	68.555	59.771	E3	12.8	87	-0.01
5	T	m/p-Xylene	70.136	59.823	E3	14.7	86	-0.02
6	T	o-Xylene	69.021	59.221	E3	14.2	88	-0.01

Signal #2
Data File : C:\HPCHEM\5\DATA\B06098.D\CONFIRM.D
Acq On : 08/15/98 17:08
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst : B-HP5890A
Multiplr: 1.00

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a,a-Trifluorotoluene (S	697.436	713.096	E3	-2.2	99	0.05
2	T	Benzene	1.703	1.688	E6	0.9	91	0.04
3	T	Toluene	1.399	1.424	E6	-1.7	89	0.05
4	T	Ethylbenzene	983.273	986.465	E3	-0.3	90	0.04
5	T	m/p-Xylene	1.381	1.367	E6	1.0	89	0.03
6	T	o-Xylene	1287.777	1302.168	E3	-1.1	88	0.05

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\5\DATA\B06107.D
Acq On : 08/15/98 20:53
Sample : CONT. CAL
Misc : 50 ug/ml

8/20/98

Vial: 100
Operator: BP
Inst #1: B-HP5890A
Multiplr: 1.00

Data File : C:\HPCHEM\5\DATA\B06107.D\CONFIRM.D
Acq On : 08/15/98 20:53
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst #2: B-HP5890B
Multiplr: 1.00

Method : C:\HPCHEM\5\METHODS\BTB06065.M
Title : BTEX
Last Update : Thu Aug 13 15:12:45 1998
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a,a-Trifluorotoluene (SUR	42.789	43.029	E3	-0.6	103	0.00
2	T	Benzene	73.033	65.874	E3	9.8	90	0.00
3	T	Toluene	71.677	64.793	E3	9.6	90	0.00
4	T	Ethylbenzene	68.555	61.842	E3	9.8	90	0.00
5	T	m/p-Xylene	70.136	61.929	E3	11.7	89	0.00
6	T	o-Xylene	69.021	60.900	E3	11.8	90	0.00

Signal #2
Data File : C:\HPCHEM\5\DATA\B06107.D\CONFIRM.D
Acq On : 08/15/98 20:53
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst : B-HP5890A
Multiplr: 1.00

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a,a-Trifluorotoluene (S	697.436	753.586	E3	-8.1	104	0.05
2	T	Benzene	1.703	1.735	E6	-1.8	93	0.05
3	T	Toluene	1.399	1.480	E6	-5.8	92	0.06
4	T	Ethylbenzene	983.273	1015.698	E3	-3.3	92	0.05
5	T	m/p-Xylene	1.381	1.417	E6	-2.6	92	0.04
6	T	o-Xylene	1287.777	1344.851	E3	-4.4	91	0.05

(#) = Out of Range SPCC's out = 0 CCC's out = 0

001625

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\5\DATA\B06108.D
Acq On : 08/16/98 09:19
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst #1: B-HP5890A
Multiplr: 1.00

Data File : C:\HPCHEM\5\DATA\B06108.D\CONFIRM.D
Acq On : 08/16/98 09:19
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst #2: B-HP5890B
Multiplr: 1.00

Method : C:\HPCHEM\5\METHODS\BTB06065.M
Title : BTEX
Last Update : Thu Aug 13 15:12:45 1998
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a,a-Trifluorotoluene (SUR	42.789	41.133	E3	3.9	98	0.00
2	T	Benzene	73.033	66.669	E3	8.7	91	0.00
3	T	Toluene	71.677	65.844	E3	8.1	92	0.00
4	T	Ethylbenzene	68.555	63.332	E3	7.6	92	0.00
5	T	m/p-Xylene	70.136	63.828	E3	9.0	92	0.00
6	T	o-Xylene	69.021	62.484	E3	9.5	92	0.00

Signal #2
Data File : C:\HPCHEM\5\DATA\B06108.D\CONFIRM.D
Acq On : 08/16/98 09:19
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst : B-HP5890A
Multiplr: 1.00

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a,a-Trifluorotoluene (S	697.436	739.667	E3	-6.1	102	0.09
2	T	Benzene	1.703	1.790	E6	-5.1	96	0.08
3	T	Toluene	1.399	1.533	E6	-9.5	95	0.10
4	T	Ethylbenzene	983.273	1052.459	E3	-7.0	96	0.08
5	T	m/p-Xylene	1.381	1.498	E6	-8.4	97	0.07
6	T	o-Xylene	1287.777	1415.487	E3	-9.9	96	0.08

(#) = Out of Range SPCC's out = 0 CCC's out = 0
CONFIRM.D BTB06065.M Thu Aug 20 08:37:29 1998 000405 Page 1

001626

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\5\DATA\B06120.D
Acq On : 08/16/98 14:46
Sample : CONT. CAL
Misc : 50 ug/ml

BF 8/20/98

Vial: 100
Operator: BP
Inst #1: B-HP5890A
Multiplr: 1.00

Data File : C:\HPCHEM\5\DATA\B06120.D\CONFIRM.D
Acq On : 08/16/98 14:46
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst #2: B-HP5890B
Multiplr: 1.00

Method : C:\HPCHEM\5\METHODS\BTB06065.M
Title : BTEX
Last Update : Thu Aug 13 15:12:45 1998
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a,a-Trifluorotoluene (SUR	42.789	40.916	E3	4.4	98	0.00
2	T	Benzene	73.033	66.301	E3	9.2	91	-0.01
3	T	Toluene	71.677	64.297	E3	10.3	89	0.00
4	T	Ethylbenzene	68.555	63.135	E3	7.9	91	0.00
5	T	m/p-Xylene	70.136	62.913	E3	10.3	91	0.00
6	T	o-Xylene	69.021	69.730	E3	-1.0	103	0.00

Signal #2
Data File : C:\HPCHEM\5\DATA\B06120.D\CONFIRM.D
Acq On : 08/16/98 14:46
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst : B-HP5890A
Multiplr: 1.00

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a,a-Trifluorotoluene (S	697.436	759.465	E3	-8.9	105	0.07
2	T	Benzene	1.703	1.587	E6	6.8	85	0.06
3	T	Toluene	1.399	1.515	E6	-8.3	94	0.07
4	T	Ethylbenzene	983.273	1094.674	E3	-11.3	100	0.06
5	T	m/p-Xylene	1.381	1.267	E6	8.3	82	0.05
6	T	o-Xylene	1287.777	1259.189	E3	2.2	85	0.06

(#) = Out of Range SPCC's out = 0 CCC's out = 0

001627

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\5\DATA\B06125.D
Acq On : 08/16/98 17:16
Sample : CONT. CAL
Misc : 50 ug/ml

BF 8/20/98

Vial: 100
Operator: BP
Inst #1: B-HP5890A
Multiplr: 1.00

Data File : C:\HPCHEM\5\DATA\B06125.D\CONFIRM.D
Acq On : 08/16/98 17:16
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst #2: B-HP5890B
Multiplr: 1.00

Method : C:\HPCHEM\5\METHODS\BTB06065.M
Title : BTEX
Last Update : Thu Aug 13 15:12:45 1998
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a,a-Trifluorotoluene (SUR	42.789	42.498	E3	0.7	101	-0.02
2	T	Benzene	73.033	66.403	E3	9.1	91	-0.02
3	T	Toluene	71.677	65.047	E3	9.2	91	-0.02
4	T	Ethylbenzene	68.555	61.977	E3	9.6	90	-0.02
5	T	m/p-Xylene	70.136	62.037	E3	11.5	90	-0.02
6	T	o-Xylene	69.021	62.312	E3	9.7	92	-0.02

Signal #2
Data File : C:\HPCHEM\5\DATA\B06125.D\CONFIRM.D
Acq On : 08/16/98 17:16
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst : B-HP5890A
Multiplr: 1.00

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a,a-Trifluorotoluene (S	697.436	758.056	E3	-8.7	105	0.06
2	T	Benzene	1.703	1.733	E6	-1.8	93	0.06
3	T	Toluene	1.399	1.456	E6	-4.0	90	0.07
4	T	Ethylbenzene	983.273	1073.865	E3	-9.2	98	0.06
5	T	m/p-Xylene	1.381	1.470	E6	-6.4	95	0.05
6	T	o-Xylene	1287.777	1476.548	E3	-14.7	100	0.06

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\5\DATA\B06126.D
Acq On : 08/17/98 10:09
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst #1: B-HP5890A
Multiplr: 1.00

Data File : C:\HPCHEM\5\DATA\B06126.D\CONFIRM.D
Acq On : 08/17/98 10:09
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst #2: B-HP5890B
Multiplr: 1.00

Method : C:\HPCHEM\5\METHODS\BTB06065.M
Title : BTEX
Last Update : Thu Aug 13 15:12:45 1998
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a,a-Trifluorotoluene (SUR	42.789	40.246	E3	5.9	96	0.00
2	T	Benzene	73.033	64.875	E3	11.2	89	0.00
3	T	Toluene	71.677	63.928	E3	10.8	89	0.00
4	T	Ethylbenzene	68.555	61.507	E3	10.3	89	0.00
5	T	m/p-Xylene	70.136	61.886	E3	11.8	89	0.00
6	T	o-Xylene	69.021	60.575	E3	12.2	90	0.00

Signal #2
Data File : C:\HPCHEM\5\DATA\B06126.D\CONFIRM.D
Acq On : 08/17/98 10:09
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst : B-HP5890A
Multiplr: 1.00

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a,a-Trifluorotoluene (S	697.436	721.968	E3	-3.5	100	0.10
2	T	Benzene	1.703	1.741	E6	-2.2	94	0.09
3	T	Toluene	1.399	1.477	E6	-5.5	92	0.10
4	T	Ethylbenzene	983.273	1033.838	E3	-5.1	94	0.09
5	T	m/p-Xylene	1.381	1.470	E6	-6.4	95	0.08
6	T	o-Xylene	1287.777	1443.758	E3	-12.1	98	0.09

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\5\DATA\B06134.D
Acq On : 08/17/98 15:17
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst #1: B-HP5890A
Multiplr: 1.00

Data File : C:\HPCHEM\5\DATA\B06134.D\CONFIRM.D
Acq On : 08/17/98 15:17
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst #2: B-HP5890B
Multiplr: 1.00

Method : C:\HPCHEM\5\METHODS\BTB06065.M
Title : BTEX
Last Update : Thu Aug 13 15:12:45 1998
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a,a-Trifluorotoluene (SUR	42.789	39.682	E3	7.3	95	-0.02
2	T	Benzene	73.033	66.326	E3	9.2	91	-0.02
3	T	Toluene	71.677	64.810	E3	9.6	90	-0.02
4	T	Ethylbenzene	68.555	61.871	E3	9.7	90	-0.02
5	T	m/p-Xylene	70.136	61.767	E3	11.9	89	-0.02
6	T	o-Xylene	69.021	60.991	E3	11.6	90	-0.02

Signal #2
Data File : C:\HPCHEM\5\DATA\B06134.D\CONFIRM.D
Acq On : 08/17/98 15:17
Sample : CONT. CAL
Misc : 50 ug/ml

Vial: 100
Operator: BP
Inst : B-HP5890A
Multiplr: 1.00

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	S	a,a,a-Trifluorotoluene (S	697.436	752.147	E3	-7.8	104	0.07
2	T	Benzene	1.703	1.633	E6	4.1	88	0.06
3	T	Toluene	1.399	1.552	E6	-10.9	97	0.07
4	T	Ethylbenzene	983.273	937.697	E3	4.6	85	0.06
5	T	m/p-Xylene	1.381	1.370	E6	0.8	89	0.05
6	T	o-Xylene	1287.777	1353.805	E3	-5.1	92	0.06

(#) = Out of Range SPCC's out = 0 CCC's out = 0
CONFIRM.D BTB06065.M Thu Aug 20 08:46:09 1998

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :		CLIENT SAMPLE ID :	PREP BLANK
PROJECT NAME :		LAB SAMPLE ID :	BTXB047
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :		DATE RECEIVED :	
SAMPLE MATRIX :	SOLID	PRINTED ON :	8/21/98 14:41

% MOISTURE :		ANALYST :	BP
DATE ANALYZED :	8/6/98	INSTRUMENT FILE :	B06044
INSTRUMENT ID :	B-HP5890	SAMPLE WEIGHT :	5 g
TIME ANALYZED :	09:01		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.0 UG/KG	ND UG/KG	
Ethylbenzene	5.0 UG/KG	ND UG/KG	
Toluene	5.0 UG/KG	ND UG/KG	
Xylene (total)	5.0 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/KG	70 - 130	90

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB047 PREP BLANK ID :BTXB047

PDP Analytical Services
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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	:	CLIENT SAMPLE ID	: PREP BLANK
PROJECT NAME	:	LAB SAMPLE ID	: BTXB048
PROJECT NUMBER	:	METHOD REFERENCE	: SW846-8021B
DATE SAMPLED	:	DATE RECEIVED	:
SAMPLE MATRIX	: LIQUID	PRINTED ON	: 8/21/98 14:41

ANALYST	: BP	DATE ANALYZED	: 08/14/98
DILUTION	: 1	INSTRUMENT FILE	: B06071
INSTRUMENT ID	: B-HP5890B	PURGE VOLUME	: 5 mL
TIME ANALYZED	: 08:57		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.00 UG/L	ND UG/L	
Ethyl benzene	5.00 UG/L	ND UG/L	
Toluene	5.00 UG/L	ND UG/L	
Xylene (total)	5.00 UG/L	ND UG/L	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/L	75 - 125	99

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB048 PREP BLANK ID :BTXB048

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :		CLIENT SAMPLE ID :	PREP BLANK
PROJECT NAME :		LAB SAMPLE ID :	BTXB049
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :		DATE RECEIVED :	
SAMPLE MATRIX :	SOLID	PRINTED ON :	8/21/98 14:52

% MOISTURE :		ANALYST :	BP
DATE ANALYZED :	08/15/98	INSTRUMENT FILE :	806088
INSTRUMENT ID :	B-HP5890B	SAMPLE WEIGHT :	5 g
TIME ANALYZED :	12:58		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.0 UG/KG	ND UG/KG	
Ethylbenzene	5.0 UG/KG	ND UG/KG	
Toluene	5.0 UG/KG	ND UG/KG	
Xylene (total)	5.0 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/KG	70 - 130	96

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB049 PREP BLANK ID :BTXB049

000450

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :		CLIENT SAMPLE ID :	PREP BLANK
PROJECT NAME :		LAB SAMPLE ID :	BTXB051
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :		DATE RECEIVED :	
SAMPLE MATRIX :	SOLID	PRINTED ON :	8/21/98 14:41

% MOISTURE :		ANALYST :	BP
DATE ANALYZED :	08/17/98	INSTRUMENT FILE :	B06127
INSTRUMENT ID :	B-HP5890B	SAMPLE WEIGHT :	5 g
TIME ANALYZED :	11:07		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.0 UG/KG	ND UG/KG	
Ethylbenzene	5.0 UG/KG	ND UG/KG	
Toluene	5.0 UG/KG	ND UG/KG	
Xylene (total)	5.0 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/KG	70 - 130	99

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB051 PREP BLANK ID :BTXB051

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :		CLIENT SAMPLE ID :	LAB CONTROL SAMPLE
PROJECT NAME :		LAB SAMPLE ID :	BTXL044
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :		DATE RECEIVED :	
SAMPLE MATRIX :	SOLID	PRINTED ON :	8/21/98 14:41

% MOISTURE :		ANALYST :	BP
DATE ANALYZED :	8/6/98	INSTRUMENT FILE :	B06045
INSTRUMENT ID :	B-HP5890	SAMPLE WEIGHT :	5 g
TIME ANALYZED :	09:23		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.0 UG/KG	47.3 UG/KG	
Ethylbenzene	5.0 UG/KG	45.4 UG/KG	
Toluene	5.0 UG/KG	46.0 UG/KG	
Xylene (total)	5.0 UG/KG	137 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/KG	70 - 130	91

BATCH QUALITY CONTROL SAMPLE IDs	
QC BATCH ID :BTXB047	PREP BLANK ID :BTXB047

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :		CLIENT SAMPLE ID :	LAB CONTROL SAMPLE
PROJECT NAME :		LAB SAMPLE ID :	BTXL045
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :		DATE RECEIVED :	
SAMPLE MATRIX :	LIQUID	PRINTED ON :	8/21/98 14:42

ANALYST	: BP	DATE ANALYZED	: 08/14/98
DILUTION	: 1	INSTRUMENT FILE	: 806072
INSTRUMENT ID	: 8-HP5890B	PURGE VOLUME	: 5 mL
TIME ANALYZED	: 09:22		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.00 UG/L	55.2 UG/L	
Ethyl benzene	5.00 UG/L	56.2 UG/L	
Toluene	5.00 UG/L	58.1 UG/L	
Xylene (total)	5.00 UG/L	170 UG/L	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/L	75 - 125	105

BATCH QUALITY CONTROL SAMPLE IDs	
QC BATCH ID :BTXB048	PREP BLANK ID :BTXB048

000468

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :		CLIENT SAMPLE ID :	LAB CONTROL SAMPLE
PROJECT NAME :		LAB SAMPLE ID :	BTXL047
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :		DATE RECEIVED :	
SAMPLE MATRIX :	SOLID	PRINTED ON :	8/21/98 14:42

% MOISTURE :		ANALYST :	BP
DATE ANALYZED :	08/16/98	INSTRUMENT FILE :	B06110
INSTRUMENT ID :	B-HP5890B	SAMPLE WEIGHT :	5 g
TIME ANALYZED :	10:09		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.0 UG/KG	54.6 UG/KG	
Ethylbenzene	5.0 UG/KG	55.5 UG/KG	
Toluene	5.0 UG/KG	57.4 UG/KG	
Xylene (total)	5.0 UG/KG	168 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/KG	70 - 130	102

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB050 PREP BLANK ID :BTXB050

000474

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :		CLIENT SAMPLE ID :	LAB CONTROL SAMPLE
PROJECT NAME :		LAB SAMPLE ID :	BTXL049
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :		DATE RECEIVED :	
SAMPLE MATRIX :	SOLID	PRINTED ON :	8/21/98 14:42

% MOISTURE :		ANALYST :	BP
DATE ANALYZED :	08/17/98	INSTRUMENT FILE :	806128
INSTRUMENT ID :	B-HP5890B	SAMPLE WEIGHT :	5 g
TIME ANALYZED :	11:32		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.0 UG/KG	52.3 UG/KG	
Ethylbenzene	5.0 UG/KG	53.4 UG/KG	
Toluene	5.0 UG/KG	53.9 UG/KG	
Xylene (total)	5.0 UG/KG	161 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/KG	70 - 130	99

BATCH QUALITY CONTROL SAMPLE IDs	
QC BATCH ID :BTXB051	PREP BLANK ID :BTXB051

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB21-0030MS
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4798.002MS
PROJECT NUMBER	:		METHOD REFERENCE	:	SW846-8021B
DATE SAMPLED	:	8/4/98	DATE RECEIVED	:	8/5/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 14:40

% MOISTURE	: 2.2	ANALYST	: BP
DATE ANALYZED	: 08/06/98	INSTRUMENT FILE	: B06057
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 17:02		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.1 UG/KG	45 UG/KG	
Ethylbenzene	5.1 UG/KG	35 UG/KG	
Toluene	5.1 UG/KG	40 UG/KG	
Xylene (total)	5.1 UG/KG	110 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	51.1 UG/KG	70 - 130	72

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB047A	PREP BLANK ID :BTXB047	LCS ID :BTXL044

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB21-0030MSD
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.002MSD
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:40

% MOISTURE	: 2.2	ANALYST	: BP
DATE ANALYZED	: 08/06/98	INSTRUMENT FILE	: B06058
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 17:24		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.1 UG/KG	46 UG/KG	
Ethylbenzene	5.1 UG/KG	36 UG/KG	
Toluene	5.1 UG/KG	40 UG/KG	
Xylene (total)	5.1 UG/KG	110 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	51.1 UG/KG	70 - 130	72

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB047A PREP BLANK ID :BTXB047 LCS ID :BTXL044
MS ID :4798.002MS

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB38-0010MS
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.010MS
PROJECT NUMBER	:	METHOD REFERENCE	: SW846-8021B
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98 14:40

% MOISTURE	: 16.2	ANALYST	: BP
DATE ANALYZED	: 08/17/98	INSTRUMENT FILE	: B06130
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 12:33		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	6.0 UG/KG	58 UG/KG	
Ethylbenzene	6.0 UG/KG	60 UG/KG	
Toluene	6.0 UG/KG	60 UG/KG	
Xylene (total)	6.0 UG/KG	180 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	59.7 UG/KG	70 - 130	100

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID	PREP BLANK ID	LCS ID
:BTXB051	:BTXB051	:BTXL049

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB38-0010MSD
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.010MSD
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:40

% MOISTURE	: 16.2	ANALYST	: BP
DATE ANALYZED	: 08/17/98	INSTRUMENT FILE	: B06131
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 12:58		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	6.0 UG/KG	59 UG/KG	
Ethylbenzene	6.0 UG/KG	60 UG/KG	
Toluene	6.0 UG/KG	60 UG/KG	
Xylene (total)	6.0 UG/KG	180 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	59.7 UG/KG	70 - 130	97

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB051 PREP BLANK ID :BTXB051 LCS ID :BTXL049
MS ID :4798.010MS

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SW03MS
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.011MS
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	WATER	PRINTED ON :	8/21/98 14:40

ANALYST	: BP	DATE ANALYZED	: 08/14/98
DILUTION	: 1	INSTRUMENT FILE	: B06084
INSTRUMENT ID	: B-HP5890B	PURGE VOLUME	: 5 mL
TIME ANALYZED	: 14:50		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.00 UG/L	53.5 UG/L	
Ethyl benzene	5.00 UG/L	54.4 UG/L	
Toluene	5.00 UG/L	55.8 UG/L	
Xylene (total)	5.00 UG/L	163 UG/L	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/L	75 - 125	106

BATCH QUALITY CONTROL SAMPLE IDs:

QC BATCH ID :BTXB048 PREP BLANK ID :BTXB048 LCS ID :BTXL045

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SW03MSD
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.011MSD
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	WATER	PRINTED ON :	8/21/98 14:41

ANALYST	: BP	DATE ANALYZED	: 08/14/98
DILUTION	: 1	INSTRUMENT FILE	: B06085
INSTRUMENT ID	: B-HP5890B	PURGE VOLUME	: 5 mL
TIME ANALYZED	: 15:15		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.00 UG/L	52.6 UG/L	
Ethyl benzene	5.00 UG/L	53.3 UG/L	
Toluene	5.00 UG/L	54.8 UG/L	
Xylene (total)	5.00 UG/L	161 UG/L	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/L	75 - 125	100

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTX8048 PREP BLANK ID :BTX8048 LCS ID :BTXL045
MS ID :4798.011MS

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB29-0010MS		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.003MS		
PROJECT NUMBER	:	METHOD REFERENCE	: SW846-8021B		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:52	

% MOISTURE	: 2.4	ANALYST	: BP
DATE ANALYZED	: 08/15/98	INSTRUMENT FILE	: B06105
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 20:03		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.1 UG/KG	59 UG/KG	
Ethylbenzene	5.1 UG/KG	46 UG/KG	
Toluene	5.1 UG/KG	55 UG/KG	
Xylene (total)	5.1 UG/KG	130 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	51.2 UG/KG	70 - 130	89

BATCH QUALITY CONTROL SAMPLE IDs		
QC BATCH ID :BTXB049	PREP BLANK ID :BTXB049	LCS ID :BTXL046

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB29-0010MSD
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.003MSD
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:52

% MOISTURE	: 2.4	ANALYST	: BP
DATE ANALYZED	: 08/15/98	INSTRUMENT FILE	: B06106
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 20:28		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.1 UG/KG	61 UG/KG	
Ethylbenzene	5.1 UG/KG	50 UG/KG	
Toluene	5.1 UG/KG	60 UG/KG	
Xylene (total)	5.1 UG/KG	150 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	51.2 UG/KG	70 - 130	95

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB049	PREP BLANK ID :BTXB049	LCS ID :BTXL046
MS ID :4802.003MS		

000529

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB46-0612MS
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.026MS
PROJECT NUMBER	:		METHOD REFERENCE	:	SW846-8021B
DATE SAMPLED	:	8/6/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 14:41

% MOISTURE	: 15	ANALYST	: BP
DATE ANALYZED	: 08/16/98	INSTRUMENT FILE	: B06123
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 16:26		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.9 UG/KG	58 UG/KG	
Ethylbenzene	5.9 UG/KG	61 UG/KG	
Toluene	5.9 UG/KG	58 UG/KG	
Xylene (total)	5.9 UG/KG	190 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	58.8 UG/KG	70 - 130	102

BATCH QUALITY CONTROL SAMPLE IDs		
QC BATCH ID :BTXB050	PREP BLANK ID :BTXB050	LCS ID :BTXL047

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB46-0612MSD
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.026MSD
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:41

% MOISTURE	: 15	ANALYST	: BP
DATE ANALYZED	: 08/16/98	INSTRUMENT FILE	: B06124
INSTRUMENT ID	: B-HP58908	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 16:51		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.9 UG/KG	60 UG/KG	
Ethylbenzene	5.9 UG/KG	62 UG/KG	
Toluene	5.9 UG/KG	60 UG/KG	
Xylene (total)	5.9 UG/KG	190 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	58.8 UG/KG	70 - 130	105

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB050	PREP BLANK ID :BTXB050	LCS ID :BTXL047
MS ID :4802.026MS		

000541

TPH1005
CASE: ECOLOGY & ENVIRONMENT
SDG: 4798/4802

COMPLETE SAMPLE DATA PACKAGE

PAGE 1 TO 225

PDP ANALYTICAL SERVICES
1680 LAKE FRONT CIRCLE, SUITE B, THE WOODLANDS TX 77380

PDP ANALYTICAL SERVICES

1680 Lake Front Circle, Suite B • The Woodlands, TX 77380 • Phone (281)363-2233

Contract No.	Case No. E&E	SDG No. 4798/4802 (TPH1005)

SDG NARRATIVE

SAMPLE RECEIPT :

08/05/98 and 08/07/98 - Received soil and water sample for TPH analysis.

TPH:

No problems encountered.

Manual integration's were performed for some calibration standards samples for the compounds listed against them. These manual integration's were necessary because the software failed to accurately integrate the entire peak. In all the above instances, the quantitation reports are flagged with "m". A hard copy printout of the manual integration's along with the scan ranges and initials of the operator is included in the data package .

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the laboratory manager or his designee, as verified by the following signature:

S Kudchadka / Project Mgr — Signature and Title

08/24/98 — Date of Signature

Z:\NETDATA\QA\FORMS\CLP\NARR1296.DOC

OFFICIAL
CHAIN OF CUSTODY RECORD

PROJ. NO.: KJ6103 05260ISFXX
PROJECT NAME: WILCOX REFINERY
SAMPLERS: (Signature) JBeer B. Martinez

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Metals (6010B)	PAHs (8310)	TPH (TNRCC 1005)	pH	BTEX (8021B Mod)	REMARKS
SB20-0030	8/4	0910		✓	SB20-(0'-3')	3	✓	✓	✓	✓	✓	EPA Sample Tag # 4798.001 6-097026 / 6-097027 / 6-097028 CJS
SB21-0030		1010		✓	~~SB21~~ - SB21-0030	3	✓	✓	✓	✓	✓	6-097029 / 6-097030 4798.002
SB22-0030		1040		✓	SB22 (0'-3')	3	✓	✓	✓	✓	✓	6-097031 / 6-097032 .003
SB23-0030		1145		✓	SB23 (0'-3')	3	✓	✓	✓	✓	✓	6-097033 / 6-097034 .004
SB24-0030		1430		✓	SB24 (0'-3')	3	✓	✓	✓	✓	✓	6-097035 / 6-097036 .005
SB25-0030		1505		✓	SB25 (0'-3')	3	✓	✓	✓	✓	✓	6-097037 / 6097038 .006
SB26-0020	↓	1600		✓	SB26 (0'-2')	3	✓	✓	✓	✓	✓	6-097049 / 6097050 .007
SB36-6070		0940		✓	SB36 (6-7')	3	✓	✓	✓	✓	✓	6-097435 / 6-097436 .008
SB37-6070		1501		✓	SB37 (6-7')	3	✓	✓	✓	✓	✓	6-097432 / 6-097434 .009
SB38-0010		1540		✓	SB38 (0-1')	3	✓	✓	✓	✓	✓	6-097433 / 6-097449 .010
SW03		1425		✓	SW03 (Background)	4			✓		✓	6-097437 / 6-097438 .011
TB0804	↓	1655		✓	Trip Blank	2					✓	6-097439 / 6-097 JB .012

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
B. Martinez	8/4/98 1800				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
		Francisco	Francisco	8/5/98 10:30	
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
				Fed Ex Airbill # 8055500043 06	
Shipped by:		Airbill Number:			

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Return with Warrant

EPA 7500-53 (11/96)

6- 09262

001651

OFFICIAL
CHAIN OF CUSTODY RECORD

000003

PROJ. NO.	PROJECT NAME
K)6103 052601SFXX	WILCOX REFINERY

SAMPLERS: (Signature) Loren Williams

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	METALS (6010B)	PAH (8310)	TPH (TNRCC 1005)	PH	BTEX (8021B M)	REMARKS / EPA TAG #
SB27-0030	4/5/98	0830		X	SB27-(0'-3')	3	✓	✓	✓	✓	✓	6-097351 / 6-097352 4802-001
SB28-0020		0945		X	SB28 (0'-2')	3	✓	✓	✓	✓	✓	6-097354 / 6-097353 -002
SB29-0010		1020		X	SB29 (0'-1')	3	✓	✓	✓	✓	✓	6-097355 / 6-097356 -003
~~SW01~~		~~1045~~			~~SW01~~ CS 8/5/98							
SB30-0030		1100		X	SB30 (0'-3')	3	✓	✓	✓	✓	✓	6-097358 / 6-097359 4802-00[illegible]
SW01		1045		X	SW01	4			✓		✓	6097360 / 6097357 -00[illegible]
~~SB31-0030~~		1145		X	SB31 (0'-3')	3	✓	✓	✓	✓	✓	6097361 / 6097362 -006
SW02		1415		X	SW02	4			✓		✓	6097363 / 6097364 -007
SW02D		1425		X	SW02D	4			✓		✓	6097365 / 6097366 -008
SB32-0010		1440		X	SB32 (0'-1')	3	✓	✓	✓	✓	✓	~~6097363~~ 6097367 / 6-097368 -009
SB32-0010D		1440		X	SB32 (0'-1') D	3	✓	✓	✓	✓	✓	6-097369 / 6-097370 010 -009
SB33-0010		1515		X	SB33 (0'-1')	3	✓	✓	✓	✓	✓	6097371 / 6-097372 -011 -009
SB34-0010		1540		X	SB34 (0'-1')	3	✓	✓	✓	✓	✓	6-097373 / 6-097374 -012 -009

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	4/5/98 1800				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature) [signature]	Date / Time 8/7/98 9:45	Remarks	
Shipped by:		Airbill Number:			

FedEx AirBill #
~~805550003387~~ TM 8/6/98
805550003398

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files;
Green to Report; Yellow Returns with Warrant

EPA 7500-53
(11/96)

6- 09263

001652

OFFICIAL

CHAIN OF CUSTODY RECORD

PROJ. NO. KJ6163 052601SFXY | PROJECT NAME: WILCOX REFINERY

SAMPLERS: (Signature) Christopher Sonne / Paul Perowsky / B Mundt

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Metals (6010B)	PAH (8310)	TPH (TNRCC 1005)	pH	BTEX (8021B/M)	REMARKS
SB40 3040	8/5/98	0911		X	SB40 (3'-4')	2	✓	✓	✓	✓	✓	EPA TAG # 13 6-097441 / 6-097440 4802.04
SB40 6WQ6		0855		X	SB40-6WQ6	4			✓		✓	6097442 / 6-097443 .014 ~~.044~~
SB39 3040		1135		X	SB39 (3'-4')	3	✓	✓	✓	✓	✓	6097444 / 6097445 .015 ~~.044~~
SB43 6070		1449		X	SB43 (6'-7')	3	✓	✓	✓	✓	✓	6097446 / 6097447 .016 ~~.044~~
SB44 4050		1625		X	SB44 (4'-5')	3	✓	✓	✓	✓	✓	6097448 / 6097039 .017 ~~.044~~
SB45 0010	↓	1650		X	SB45 (0'-1')	3	✓	✓	✓	✓	✓	6097040 / 6097041 .016 ~~.046~~
~~TB-0805~~	~~8/5/98~~			X	~~TB-0805~~	1					✓	~~B Mundt~~

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
B Mundt	8/5/98 1800				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		[illegible]	8/7/98 1345	FedEx Airbill # ~~8055500338~~ 7 Bx 8/6/98 8055500 3398	
Shipped by:		Airbill Number:			

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Returns with Warrant

EPA 7500-53 (11/96)

6- 09264

001653

OFFICIAL

CHAIN OF CUSTODY RECO[illegible]

PROJ. NO. KJ6103 052604SFXX

PROJECT NAME: WILCOX REFINERY

SAMPLERS: (Signature) Christopher Simpson / Bn Martinez

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	METALS (6010 B)	PAH (8310)	TPH (TNRCC 1005)	PH	BTEX (8021B-M)	REMARKS: EPA TAG #
SB35 0030	8/6/98	0815		X	SB35 (0'-3')	3	✓	✓	✓	✓		✓	6-099460 / 6-099461 4802 ~~01~~
SB41-2030	8/6/98	0840		X	SB41 (2'-3')	3	✓	✓	✓	✓		✓	6-097042 / 6-097044 ~~02~~
SB41-2030-D	8/6/98	0842		X	SB41-D (2'-3')	3	✓	✓	✓	✓		✓	6-097043 / 6-097045 .021 ~~02~~
SB42-GW07	8/6/98	0939		X	SB42-GW07	4			✓			✓	6-097046 / 6-097047 .022 ~~02~~
SB42-2030	8/6/98	0945		X	SB42 (2'-3')	3	✓	✓	✓	✓		✓	6-097048 / 6-097375 .023 ~~02~~
SW04	8/6/98	1024		X	SW04	4			✓			✓	6-097376 / 6-097377 .024 ~~02~~
SB37-GW08	8/6/98	1145		X	SB37-GW08	1						✓	6-097378 .025 ~~02~~
SB46-6012	8/6/98	1430		X	SB46 (6'-12')	3	✓	✓	✓	✓		✓	6-097380 / 6-097381 .026 ~~02~~
SB46-6012-D	8/6/98	1435		X	SB46-D (6'-12')	3	✓	✓	✓	✓		✓	6-097382 / 6-097383 .027 ~~02~~
TB-0806	8/6/98	1600		X	TB-0806	1						✓	6-097379 .028 ~~02~~

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Bn Martinez	8/6/98 1800				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
			8/7/98 1945	FedEx AirBill # 805550003398	
Shipped by:		Airbill Number:			

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Returns with Warrant

EPA 7500-53 (11/96)

6- 09279

001654

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/6/98 17:40:08

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/06/98
ClientProject #: **Date Received:** 08/05/98
P.O. No.: **Time Received:** 10:30
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
4798.001	SB20-0030	3	SOIL	08/04/98	09:10	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.002	SB21-0030	3	SOIL	08/04/98	10:10	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.003	SB22-0030	3	SOIL	08/04/98	10:40	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.004	SB23-0030	3	SOIL	08/04/98	11:45	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.005	SB24-0020	3	SOIL	08/04/98	14:30	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.006	SB25-0030	3	SOIL	08/04/98	15:05	6-09262		
	Tests Required							

8/6/98

Lab Approval **Client Approval**

000006

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/6/98 17:40:11

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/06/98
ClientProject #: **Date Received:** 08/05/98
P.O. No.: **Time Received:** 10:30
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.007	SB26-0020	3	SOIL	08/04/98	16:00	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.008	SB36-6070	3	SOIL	08/04/98	09:40	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.009	SB37-6070	3	SOIL	08/04/98	15:01	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.010	SB38-0010	3	SOIL	08/04/98	15:40	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.011	SW03	4	WATER	08/04/98	14:25	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- TPH1005						08/19/98	

SK 8/6/98

Lab Approval **Client Approval**

000007

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/6/98 17:40:12

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/06/98
ClientProject #: **Date Received:** 08/05/98
P.O. No.: **Time Received:** 10:30
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
4798.012	TB0804	2	WATER	08/04/98	16:55	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- TPH1005						08/19/98	

Instructions To Lab:

CLP LIKE DATA PACKAGE
FAX DUE: 14 DAYS
HARD COPY: 21 DAYS
USE E&E SOW

8/9/98
Lab Approval

Client Approval

000005

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/24/98 9:16:48

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
4802.001	SB27-0030	3	SOIL	08/05/98	08:30	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.002	SB28-0020	3	SOIL	08/05/98	09:45	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.003	SB29-0010	3	SOIL	08/05/98	10:20	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.004	SB30-0030	3	SOIL	08/05/98	11:00	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.005	SW01	4	WATER	08/05/98	10:45	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.006	SB31-0030	3	SOIL	08/05/98	11:45	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	

Sa 8/24/98
Lab Approval

Client Approval

000009

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/24/98 9:16:50

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.007	SW02	4	WATER	08/05/98	14:15	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.008	SW02D	4	WATER	08/05/98	14:25	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.009	SB32-0010	3	SOIL	08/05/98	14:40	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.010	SB32-0010D	3	SOIL	08/05/98	14:40	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.011	SB33-0010	3	SOIL	08/05/98	15:15	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.012	SB34-0010	3	SOIL	08/05/98	15:40	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	

SLP 8/24/98

Lab Approval **Client Approval**

000010

001659

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/24/98 9:16:52

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- TPH1005						08/21/98	
4802.013	SB40-3040	3	SOIL	08/05/98	09:11	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.014	SB40-GW06	4	WATER	08/05/98	08:55	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.015	SB39-3040	3	SOIL	08/05/98	11:35	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.016	SB43-6070	3	SOIL	08/05/98	14:49	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.017	SB44-4050	3	SOIL	08/05/98	16:25	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.018	SB45-0010	3	SOIL	08/05/98	16:50	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	

SK 8/24/98

Lab Approval **Client Approval**

000011

001660

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/24/98 9:16:52

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.019	SB35-0030	3	SOIL	08/06/98	08:15	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.020	SB41-2030	3	SOIL	08/06/98	08:40	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.021	SB41-2030D	3	SOIL	08/06/98	08:42	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.022	SB42-GW07	4	WATER	08/06/98	09:39	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.023	SB42-2030	3	SOIL	08/06/98	09:45	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.024	SW04	4	WATER	08/06/98	10:24	6- 09279		
	Tests Required							

Sup 8/24/98

Lab Approval **Client Approval**

000012

001661

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/24/98 9:16:53

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.025	SB37-GW08	1	WATER	08/06/98	11:45	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
4802.026	SB46-0612	3	SOIL	08/06/98	14:30	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.027	SB46-0612D	3	SOIL	08/06/98	14:35	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.028	TB-0806	1	WATER	08/06/98	16:00	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	

Instructions To Lab:

CLP LIKE DATA PACKAGE
FAX DUE: 14 DAYS
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*MS/MSD REQUIRED ON E&E SAMPLES.

8/24/98

Lab Approval **Client Approval**

000013

001662

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LCS/LCSD SUMMARY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :
PROJECT NAME :
PROJECT NUMBER :

DATE RECEIVED :
PRINTED ON : 8/21/98

SAMPLE MATRIX : SOLID
METHOD REFERENCE : TNRCC-1005

LAB CONTROL SAMPLE
LCS SAMPLE ID : TPHTL019
CLIENT SAMPLE ID :
DATE ANALYZED : 8/11/98
INSTRUMENT FILE : C03133

LAB CONTROL SAMPLE DUPLICATE
LCSD SAMPLE ID :
CLIENT SAMPLE ID :
DATE ANALYZED :
INSTRUMENT FILE :

PARAMETER	UNITS	LCS TRUE VALUE	LCSD TRUE VALUE	LCS FOUND VALUE	LCSD FOUND VALUE	LCS RECOVERY (%)	LCSD RECOVERY (%)	RPD	RPD LIMIT	QC LIMITS REC.
TPH-(>C10-C28)	MG/KG	500		501		100			30	70 - 130
TPH-(C6-C10)	MG/KG	500		499		100			30	70 - 130

* Indicate values outside of QC limits

RPD : 0 out of 0 outside limits
Spike Recovery : 0 out of 2 outside limits

000014

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LCS/LCSD SUMMARY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :
PROJECT NAME :
PROJECT NUMBER :

DATE RECEIVED :
PRINTED ON : 8/21/98

SAMPLE MATRIX : LIQUID
METHOD REFERENCE : TNRCC-1005

LAB CONTROL SAMPLE
LCS SAMPLE ID : TPHTL020
CLIENT SAMPLE ID :
DATE ANALYZED : 8/12/98
INSTRUMENT FILE : C03155

LAB CONTROL SAMPLE DUPLICATE
LCSD SAMPLE ID :
CLIENT SAMPLE ID :
DATE ANALYZED :
INSTRUMENT FILE :

PARAMETER	UNITS	LCS TRUE VALUE	LCSD TRUE VALUE	LCS FOUND VALUE	LCSD FOUND VALUE	LCS RECOVERY (%)	LCSD RECOVERY (%)	RPD	RPD LIMIT	QC LIMITS REC.
TPH-(>C10-C28)	MG/L	50.0		53.9		108			50	70 - 130
TPH-(C6-C10)	MG/L	50.0		50.3		101			50	70 - 130

* Indicate values outside of QC limits

RPD : 0 out of 0 outside limits
Spike Recovery : 0 out of 2 outside limits

000015

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LCS/LCSD SUMMARY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :
PROJECT NAME :
PROJECT NUMBER :

DATE RECEIVED :
PRINTED ON : 8/21/98

SAMPLE MATRIX : SOLID
METHOD REFERENCE : TNRCC-1005

LAB CONTROL SAMPLE
LCS SAMPLE ID : TPHTL021
CLIENT SAMPLE ID :
DATE ANALYZED : 8/12/98
INSTRUMENT FILE : C03167

LAB CONTROL SAMPLE DUPLICATE
LCSD SAMPLE ID :
CLIENT SAMPLE ID :
DATE ANALYZED :
INSTRUMENT FILE :

PARAMETER	UNITS	LCS TRUE VALUE	LCSD TRUE VALUE	LCS FOUND VALUE	LCSD FOUND VALUE	LCS RECOVERY (%)	LCSD RECOVERY (%)	RPD	RPD LIMIT	QC LIMITS REC.
TPH-(>C10-C28)	MG/KG	500		460		92			30	70 - 130
TPH-(C6-C10)	MG/KG	500		450		90			30	70 - 130

* Indicate values outside of QC limits

RPD : 0 out of 0 outside limits
Spike Recovery : 0 out of 2 outside limits

000016

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

MS/MSD SUMMARY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC.
PROJECT NAME : E&E- WILCOX REFINERY
PROJECT NUMBER :

DATE RECEIVED : 8/5/98
PRINTED ON : 8/21/98

SAMPLE MATRIX : SOIL

METHOD REFERENCE : TNRCC-1005

SAMPLE	MATRIX SPIKE	MATRIX SPIKE DUPLICATE
SAMPLE ID : 4798.003	MS SAMPLE ID : 4798.003MS	MSD SAMPLE ID : 4798.003MSD
CLIENT SAMPLE ID : SB22-0030	CLIENT SAMPLE ID : SB22-0030MS	CLIENT SAMPLE ID : SB22-0030MSD
DATE ANALYZED : 8/11/98	DATE ANALYZED : 8/11/98	DATE ANALYZED : 8/12/98
INSTRUMENT FILE : C03136	INSTRUMENT FILE : C03145	INSTRUMENT FILE : C03146

PARAMETER	UNITS	MS SPIKE ADDED	MSD SPIKE ADDED	SAMPL CONC.	MS CONC.	MSD CONC.	MS RECOVERY (%)	MSD RECOVERY (%)	RPD	RPD LIMIT	QC LIMIT REC.
TPH-(>C10-C28)	MG/KG	529	529	0	428	459	81	87	7.1	50	70 - 130
TPH-(C6-C10)	MG/KG	529	529	0	427	493	81	93	13.8	50	70 - 130

* Indicate values outside of QC limits

RPD : 0 out of 2 outside limits
Spike Recovery : 0 out of 4 outside limits

000017

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

MS/MSD SUMMARY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC.
PROJECT NAME : E&E- WILCOX REFINERY
PROJECT NUMBER :

DATE RECEIVED : 8/5/98
PRINTED ON : 8/21/98

SAMPLE MATRIX : WATER

METHOD REFERENCE : TNRCC-1005

SAMPLE	MATRIX SPIKE	MATRIX SPIKE DUPLICATE
SAMPLE ID : 4798.011	MS SAMPLE ID : 4798.011MS	MSD SAMPLE ID : 4798.011MSD
CLIENT SAMPLE ID : SW03	CLIENT SAMPLE ID : SW03MS	CLIENT SAMPLE ID : SW03MSD
DATE ANALYZED : 8/12/98	DATE ANALYZED : 8/12/98	DATE ANALYZED : 8/12/98
INSTRUMENT FILE : C03156	INSTRUMENT FILE : C03157	INSTRUMENT FILE : C03158

PARAMETER	UNITS	MS SPIKE ADDED	MSD SPIKE ADDED	SAMPL CONC.	MS CONC.	MSD CONC.	MS RECOVERY (%)	MSD RECOVERY (%)	RPD	RPD LIMIT	QC LIMIT REC.
TPH-(>C10-C28)	MG/L	50.0	50.0	0	53.7	62.3	107	125	15.5	50	70 - 130
TPH-(C6-C10)	MG/L	50.0	50.0	0	53.6	60.6	107	121	12.3	50	70 - 130

* Indicate values outside of QC limits

RPD : 0 out of 2 outside limits
Spike Recovery : 0 out of 4 outside limits

000015

001667

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

MS/MSD SUMMARY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC.
PROJECT NAME : E&E- WILCOX REFINERY
PROJECT NUMBER :

DATE RECEIVED : 8/7/98
PRINTED ON : 8/21/98

SAMPLE MATRIX : SOIL

METHOD REFERENCE : TNRCC-1005

SAMPLE	MATRIX SPIKE	MATRIX SPIKE DUPLICATE
SAMPLE ID : 4802.006	MS SAMPLE ID : 4802.006MS	MSD SAMPLE ID : 4802.006MSD
CLIENT SAMPLE ID : SB31-0030	CLIENT SAMPLE ID : SB31-0030MS	CLIENT SAMPLE ID : SB31-0030MSD
DATE ANALYZED : 8/12/98	DATE ANALYZED : 8/13/98	DATE ANALYZED : 8/13/98
INSTRUMENT FILE : C03168	INSTRUMENT FILE : C03182	INSTRUMENT FILE : C03183

PARAMETER	UNITS	MS SPIKE ADDED	MSD SPIKE ADDED	SAMPL CONC.	MS CONC.	MSD CONC.	MS RECOVERY (%)	MSD RECOVERY (%)	RPD	RPD LIMIT	QC LIMIT REC.
TPH-(>C10-C28)	MG/KG	594	594	0	661	629	111	106	4.6	50	70 - 130
TPH-(C6-C10)	MG/KG	594	594	0	653	600	110	101	8.5	50	70 - 130

* Indicate values outside of QC limits

RPD : 0 out of 2 outside limits
Spike Recovery : 0 out of 4 outside limits

000019

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB20-0030		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.001		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	15:02	

% MOISTURE	: 7.9	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03134
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 15:32		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	54.3 MG/KG	70.2 MG/KG	
TPH-(C6-C10)	54.3 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB21-0030		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.002		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	15:02	

% MOISTURE	: 2.2	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03135
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 16:16		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	51.1 MG/KG	ND MG/KG	
TPH-(C6-C10)	51.1 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB22-0030		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.003		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	15:02	

% MOISTURE	: 5.4	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03136
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 16:59		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	52.8 MG/KG	ND MG/KG	
TPH-(C6-C10)	52.8 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB23-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.004
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 15:02

% MOISTURE	: 2.1	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03137
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 17:43		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	51.1 MG/KG	ND MG/KG	
TPH-(C6-C10)	51.1 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB24-0020
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.005
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 15:03

% MOISTURE	: 14.4	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03141
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 20:36		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	58.4 MG/KG	1140 MG/KG	
TPH-(C6-C10)	58.4 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB25-0030		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.006		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	15:03	

% MOISTURE	: 1.7	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03138
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 18:26		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	50.9 MG/KG	ND MG/KG	
TPH-(C6-C10)	50.9 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB26-0020		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.007		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	15:03	

% MOISTURE	: 2.8	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03139
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 19:10		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	51.4 MG/KG	ND MG/KG	
TPH-(C6-C10)	51.4 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB36-6070
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4798.008
PROJECT NUMBER	:		METHOD REFERENCE	:	TNRCC-1005
DATE SAMPLED	:	8/4/98	DATE RECEIVED	:	8/5/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 15:03

% MOISTURE	: 2.5	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03140
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 19:53		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	51.3 MG/KG	ND MG/KG	
TPH-(C6-C10)	51.3 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB37-6070
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4798.009
PROJECT NUMBER	:		METHOD REFERENCE	:	TNRCC-1005
DATE SAMPLED	:	8/4/98	DATE RECEIVED	:	8/5/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 15:03

% MOISTURE	: 6.8	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03143
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 22:01		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	53.6 MG/KG	ND MG/KG	
TPH-(C6-C10)	53.6 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB38-0010		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.010		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	15:03	

% MOISTURE	: 16.2	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03144
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 22:44		

PARAMETER	QUANTITATION LIMIT	RESULTS		QUALIFIER
TPH-(>C10-C28)	59.7 MG/KG	ND	MG/KG	
TPH-(C6-C10)	59.7 MG/KG	ND	MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SW03
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4798.011
PROJECT NUMBER	:		METHOD REFERENCE	:	TNRCC-1005
DATE SAMPLED	:	8/4/98	DATE RECEIVED	:	8/5/98
SAMPLE MATRIX	:	WATER	PRINTED ON	:	8/21/98 15:03

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03156	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 08:58

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	ND MG/L	
TPH-(C6-C10)	5.0 MG/L	ND MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB020	PREP BLANK ID :TPHTB020	LCS ID :TPHTL020
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB27-0030		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.001		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:57	

% MOISTURE	: 4.8	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03147
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 00:52		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	52.6 MG/KG	ND MG/KG	
TPH-(C6-C10)	52.6 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB28-0020		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.002		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:57	

% MOISTURE	: 4.5	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03148
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 01:34		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	52.3 MG/KG	ND MG/KG	
TPH-(C6-C10)	52.3 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs:

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB29-0010
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.003
PROJECT NUMBER	:		METHOD REFERENCE	:	TNRCC-1005
DATE SAMPLED	:	8/5/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 14:57

% MOISTURE	: 2.4	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03149
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 02:16		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	51.2 MG/KG	ND MG/KG	
TPH-(C6-C10)	51.2 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB30-0030		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.004		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:57	

% MOISTURE	: 10.9	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03150
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 02:59		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	56.1 MG/KG	ND MG/KG	
TPH-(C6-C10)	56.1 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SW01		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.005		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: WATER	PRINTED ON	: 8/21/98	14:57	

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03159	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 11:05

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	ND MG/L	
TPH-(C6-C10)	5.0 MG/L	ND MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB020	PREP BLANK ID :TPHTB020	LCS ID :TPHTL020
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB31-0030		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.006		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:57	

% MOISTURE	: 15.8	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03168
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 17:37		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	59.4 MG/KG	ND MG/KG	
TPH-(C6-C10)	59.4 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs:

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SW02		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.007		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: WATER	PRINTED ON	: 8/21/98	14:57	

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03160	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 11:49

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	ND MG/L	
TPH-(C6-C10)	5.0 MG/L	ND MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs:

QC BATCH ID :TPHTB020	PREP BLANK ID :TPHTB020	LCS ID :TPHTL020
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SW02D
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.008
PROJECT NUMBER	:		METHOD REFERENCE	:	TNRCC-1005
DATE SAMPLED	:	8/5/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	WATER	PRINTED ON	:	8/21/98 14:58

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03161	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 12:32

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	ND MG/L	
TPH-(C6-C10)	5.0 MG/L	ND MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB020	PREP BLANK ID :TPHTB020	LCS ID :TPHTL020
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB32-0010		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.009		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:58	

% MOISTURE	: 42.7	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03169
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 18:21		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	87.3 MG/KG	ND MG/KG	
TPH-(C6-C10)	87.3 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB32-0010D
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.010
PROJECT NUMBER	:		METHOD REFERENCE	:	TNRCC-1005
DATE SAMPLED	:	8/5/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 14:58

% MOISTURE	: 42.1	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03170
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 19:05		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	86.3 MG/KG	ND MG/KG	
TPH-(C6-C10)	86.3 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB33-0010		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.011		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:58	

% MOISTURE	: 22.2	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03171
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 19:49		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	64.3 MG/KG	125 MG/KG	
TPH-(C6-C10)	64.3 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB34-0010		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.012		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:58	

% MOISTURE	: 22.6	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03172
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 20:32		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	64.6 MG/KG	1370 MG/KG	
TPH-(C6-C10)	64.6 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB40-3040		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.013		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:58	

% MOISTURE	: 15.1	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03151
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 03:41		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	58.9 MG/KG	ND MG/KG	
TPH-(C6-C10)	58.9 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB40-GW06		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.014		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: WATER	PRINTED ON	: 8/21/98	14:58	

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03164	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 14:43

PARAMETER	QUANTITATION LIMIT	RESULTS		QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	ND	MG/L	
TPH-(C6-C10)	5.0 MG/L	ND	MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB020	PREP BLANK ID :TPHTB020	LCS ID :TPHTL020
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB39-3040		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.015		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:58	

% MOISTURE	: 16.7	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03152
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 04:23		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	60.0 MG/KG	ND MG/KG	
TPH-(C6-C10)	60.0 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB43-6070
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.016
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:58

% MOISTURE	: 7.8	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03173
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 21:16		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	54.2 MG/KG	ND MG/KG	
TPH-(C6-C10)	54.2 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs:

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB44-4050		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.017		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:58	

% MOISTURE	: 9.3	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03174
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 21:58		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	55.1 MG/KG	ND MG/KG	
TPH-(C6-C10)	55.1 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB45-0010
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.018
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:58

% MOISTURE	: 20.4	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03175
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 22:41		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	62.8 MG/KG	ND MG/KG	
TPH-(C6-C10)	62.8 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB35-0030		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.019		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/6/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:58	

% MOISTURE	: 12.4	ANALYST	: BP
DATE ANALYZED	: 08/13/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03177
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 00:05		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	57.1 MG/KG	ND MG/KG	
TPH-(C6-C10)	57.1 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB41-2030		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.020		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/6/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:59	

% MOISTURE	: 17.7	ANALYST	: BP
DATE ANALYZED	: 08/13/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03178
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 00:47		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	60.7 MG/KG	ND MG/KG	
TPH-(C6-C10)	60.7 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB41-2030D		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.021		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/6/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:59	

% MOISTURE	: 10.2	ANALYST	: BP
DATE ANALYZED	: 08/13/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03179
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 01:29		

PARAMETER	QUANTITATION LIMIT	RESULTS		QUALIFIER
TPH-(>C10-C28)	55.7 MG/KG	ND	MG/KG	
TPH-(C6-C10)	55.7 MG/KG	ND	MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB42-GW07		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.022		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/6/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: WATER	PRINTED ON	: 8/21/98	14:59	

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03162	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 13:15

PARAMETER	QUANTITATION LIMIT	RESULTS		QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	ND	MG/L	
TPH-(C6-C10)	5.0 MG/L	ND	MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB020	PREP BLANK ID :TPHTB020	LCS ID :TPHTL020
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB42-2030		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.023		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/6/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:59	

% MOISTURE	: 14.9	ANALYST	: BP
DATE ANALYZED	: 08/13/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03180
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 02:12		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	58.7 MG/KG	ND MG/KG	
TPH-(C6-C10)	58.7 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SW04
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.024
PROJECT NUMBER	:		METHOD REFERENCE	:	TNRCC-1005
DATE SAMPLED	:	8/6/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	WATER	PRINTED ON	:	8/21/98 14:59

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03163	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 13:59

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	ND MG/L	
TPH-(C6-C10)	5.0 MG/L	ND MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB020	PREP BLANK ID :TPHTB020	LCS ID :TPHTL020
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB46-0612
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.026
PROJECT NUMBER	:		METHOD REFERENCE	:	TNRCC-1005
DATE SAMPLED	:	8/6/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 14:59

% MOISTURE	: 15	ANALYST	: BP
DATE ANALYZED	: 08/13/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03181
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 02:54		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	58.8 MG/KG	ND MG/KG	
TPH-(C6-C10)	58.8 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB46-0612D		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.027		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/6/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:59	

% MOISTURE	: 12	ANALYST	: BP
DATE ANALYZED	: 08/13/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03184
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 04:59		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	56.8 MG/KG	ND MG/KG	
TPH-(C6-C10)	56.8 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

Response Factor Report C-HP5890

Method : E:\HPCHEM\6\METHODS\TPH03046.M
Title : TPH-TNRCC1005
Last Update : Mon Jul 20 08:41:00 1998
Response via : Initial Calibration

Calibration Files
1 =C03046.D 2 =C03047.D 3 =C03048.D
4 =C03049.D 5 =C03050.D

	Compound	1	2	3	4	5	Avg	%RSD
1) H	TPH (C6-C10)	11.9	10.6	8.9	9.9	9.8	10.2 E3	11.10 ✓
2) H	TPH-(>C10-C28)	21.5	19.7	20.0	24.5	25.8	22.3 E3	12.25 ✓

000168

(#) = Out of Range

Evaluate Continuing Calibration Report

Data File : E:\HPCHEM\6\DATA\C03131.D
Acq On : 08/11/98 09:59
Sample : CONT. CAL
Misc : 500 ug/ml

Vial: 1
Operator: BP
Inst : C-HP5890A
Multiplr: 1.00

Method : E:\HPCHEM\6\METHODS\TPH03046.M
Title : TPH-TNRCC1005
Last Update : Mon Jul 20 08:41:00 1998
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	H	TPH (C6-C10)	10.219	9.233	E3	9.6	104	0.00
2	H	TPH-(>C10-C28)	22.304	23.319	E3	-4.5	117	0.00

(#) = Out of Range SPCC's out = 0 CCC's out = 0

001707

Evaluate Continuing Calibration Report

Data File : E:\HPCHEM\6\DATA\C03142.D
Acq On : 08/11/98 21:19
Sample : CONT. CAL
Misc : 500 ug/ml

Vial: 12
Operator: BP
Inst : C-HP5890A
Multiplr: 1.00

Method : E:\HPCHEM\6\METHODS\TPH03046.M
Title : TPH-TNRCC1005
Last Update : Mon Jul 20 08:41:00 1998
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	H	TPH (C6-C10)	10.219	9.643	E3	5.6	109	0.00
2	H	TPH-(>C10-C28)	22.304	20.237	E3	9.3	101	0.00

(#) = Out of Range SPCC's out = 0 CCC's out = 0

000188

001708

Evaluate Continuing Calibration Report

Data File : E:\HPCHEM\6\DATA\C03153.D
Acq On : 08/12/98 05:05
Sample : CONT. CAL
Misc : 500 ug/ml

Vial: 23
Operator: BP
Inst : C-HP5890A
Multiplr: 1.00

Method : E:\HPCHEM\6\METHODS\TPH03046.M
Title : TPH-TNRCC1005
Last Update : Mon Jul 20 08:41:00 1998
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	H	TPH (C6-C10)	10.219	10.530	E3	-3.0 ✓	119	0.00
2	H	TPH-(>C10-C28)	22.304	23.369	E3	-4.8 ✓	117	0.00

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Evaluate Continuing Calibration Report

Data File : E:\HPCHEM\6\DATA\C03165.D
Acq On : 08/12/98 15:27
Sample : CONT. CAL
Misc : 500 ug/ml

Vial: 11
Operator: BP
Inst : C-HP5890A
Multiplr: 1.00

Method : E:\HPCHEM\6\METHODS\TPH03046.M
Title : TPH-TNRCC1005
Last Update : Mon Jul 20 08:41:00 1998
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	H	TPH (C6-C10)	10.219	11.068	E3	-8.3	125	0.00
2	H	TPH-(>C10-C28)	22.304	21.610	E3	3.1	108	0.00

(#) = Out of Range SPCC's out = 0 CCC's out = 0
C03165.D TPH03046.M Fri Aug 21 16:06:10 1998 Page 1

000196

001710

Evaluate Continuing Calibration Report

Data File : E:\HPCHEM\6\DATA\C03176.D
Acq On : 08/12/98 23:23
Sample : CONT. CAL
Misc : 500 ug/ml

Vial: 22
Operator: BP
Inst : C-HP5890A
Multiplr: 1.00

Method : E:\HPCHEM\6\METHODS\TPH03046.M
Title : TPH-TNRCC1005
Last Update : Mon Jul 20 08:41:00 1998
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	H	TPH (C6-C10)	10.219	10.108	E3	1.1 ✓	114	0.00
2	H	TPH-(>C10-C28)	22.304	23.398	E3	-4.9 ✓	117	0.00

(#) = Out of Range SPCC's out = 0 CCC's out = 0

000200

001711

Evaluate Continuing Calibration Report

Data File : E:\HPCHEM\6\DATA\C03186.D
Acq On : 08/13/98 06:23
Sample : CONT. CAL
Misc : 500 ug/ml

Vial: 82
Operator: BP
Inst : C-HP5890A
Multiplr: 1.00

Method : E:\HPCHEM\6\METHODS\TPH03046.M
Title : TPH-TNRCC1005
Last Update : Mon Jul 20 08:41:00 1998
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		%Dev	Area%	Dev(Min)
1	H	TPH (C6-C10)	10.219	9.971	E3	2.4	112	0.00
2	H	TPH-(>C10-C28)	22.304	23.523	E3	-5.5	118	0.00

(#) = Out of Range SPCC's out = 0 CCC's out = 0

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	:	CLIENT SAMPLE ID	: PREP BLANK
PROJECT NAME	:	LAB SAMPLE ID	: TPHTB019
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005
DATE SAMPLED	:	DATE RECEIVED	:
SAMPLE MATRIX	: SOLID	PRINTED ON	: 8/21/98 15:04

% MOISTURE	:	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03132
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 10:41		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	50.0 MG/KG	ND MG/KG	
TPH-(C6-C10)	50.0 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019 PREP BLANK ID :TPHTB019

000205

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	:	CLIENT SAMPLE ID	: PREP BLANK
PROJECT NAME	:	LAB SAMPLE ID	: TPHTB020
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005
DATE SAMPLED	:	DATE RECEIVED	:
SAMPLE MATRIX	: LIQUID	PRINTED ON	: 8/21/98 15:04

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03154	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 05:48

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	ND MG/L	
TPH-(C6-C10)	5.0 MG/L	ND MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB020 PREP BLANK ID :TPHTB020

000212

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	:	CLIENT SAMPLE ID	: PREP BLANK
PROJECT NAME	:	LAB SAMPLE ID	: TPHTB021
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005
DATE SAMPLED	:	DATE RECEIVED	:
SAMPLE MATRIX	: SOLID	PRINTED ON	: 8/21/98 15:00

% MOISTURE	:	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03166
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 16:10		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	50.0 MG/KG	ND MG/KG	
TPH-(C6-C10)	50.0 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021 PREP BLANK ID :TPHTB021

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	:	CLIENT SAMPLE ID	: LAB CONTROL SAMPLE
PROJECT NAME	:	LAB SAMPLE ID	: TPHTL019
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005
DATE SAMPLED	:	DATE RECEIVED	:
SAMPLE MATRIX	: SOLID	PRINTED ON	: 8/21/98 15:04

% MOISTURE	:	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03133
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 11:24		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	50.0 MG/KG	501 MG/KG	
TPH-(C6-C10)	50.0 MG/KG	499 MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID : TPHTB019	PREP BLANK ID : TPHTB019

0002220

PDP Analytical Services

1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	:	CLIENT SAMPLE ID	: LAB CONTROL SAMPLE
PROJECT NAME	:	LAB SAMPLE ID	: TPHTL020
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005
DATE SAMPLED	:	DATE RECEIVED	:
SAMPLE MATRIX	: LIQUID	PRINTED ON	: 8/21/98 15:04

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03155	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 06:30

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	53.9 MG/L	
TPH-(C6-C10)	5.0 MG/L	50.3 MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB020 PREP BLANK ID :TPHTB020

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB22-0030MS
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.003MS
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98 15:03

% MOISTURE	: 5.4	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03145
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 23:27		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	52.8 MG/KG	428 MG/KG	
TPH-(C6-C10)	52.8 MG/KG	427 MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs:

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019

PDP Analytical Services

1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB22-0030MSD
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.003MSD
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98 15:03

% MOISTURE	: 5.4	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03146
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 00:09		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	52.8 MG/KG	459 MG/KG	
TPH-(C6-C10)	52.8 MG/KG	493 MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS		

000232

PDP Analytical Services

1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

TPH EXTRACTABLES BY GC/EID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SW03MS
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.011MS
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98
SAMPLE MATRIX	: WATER	PRINTED ON	: 8/21/98 15:03

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03157	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 09:40

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	54 MG/L	
TPH-(C6-C10)	5.0 MG/L	54 MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID	PREP BLANK ID	LCS ID
:TPHTB020	:TPHTB020	:TPHTL020

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SW03MSD
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.011MSD
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98
SAMPLE MATRIX	: WATER	PRINTED ON	: 8/21/98 15:04

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03158	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 10:23

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	62 MG/L	
TPH-(C6-C10)	5.0 MG/L	61 MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB020	PREP BLANK ID :TPHTB020	LCS ID :TPHTL020
MS ID :4798.011MS		

000240

001721

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB31-0030MS
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.006MS
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98 15:00

% MOISTURE	: 15.8	ANALYST	: BP
DATE ANALYZED	: 08/13/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03182
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 03:35		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	59.4 MG/KG	661 MG/KG	
TPH-(C6-C10)	59.4 MG/KG	653 MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021

000244

PDP Analytical Services

1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB31-0030MSD
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.006MSD
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98 15:00

% MOISTURE	: 15.8	ANALYST	: BP
DATE ANALYZED	: 08/13/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03183
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 04:17		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	59.4 MG/KG	629 MG/KG	
TPH-(C6-C10)	59.4 MG/KG	600 MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS		

PDP Analytical Services

1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :		CLIENT SAMPLE ID :	LAB CONTROL SAMPLE
PROJECT NAME :		LAB SAMPLE ID :	TPHTL021
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :		DATE RECEIVED :	
SAMPLE MATRIX :	SOLID	PRINTED ON :	8/21/98 15:01

% MOISTURE :		ANALYST :	BP
DATE ANALYZED :	08/12/98	DILUTION :	1
EXTRACT VOLUME :	10 ML	INSTRUMENT FILE :	C03167
INSTRUMENT ID :	C-HP5980	SAMPLE SIZE :	10 G
TIME ANALYZED :	16:54		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	50.0 MG/KG	460 MG/KG	
TPH-(C6-C10)	50.0 MG/KG	450 MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021 PREP BLANK ID :TPHTB021

0002552

PDP ANALYTICAL SERVICES

1680 Lake Front Circle, Suite B • The Woodlands, TX 77380 • Phone (281)363-2233

Contract No.	Case No. E&E	SDG No. 4798 (SVOA)

SDG NARRATIVE

SAMPLE RECEIPT :

08/05/98 - Received ten soil samples for PAH analysis:
No problems encountered during sample log-in.

08/07/98 - Received twenty soil samples for PAH analysis:
No problems encountered during sample log-in.

PAH:

All samples were analyzed on a HP 5970 GC/MS using a 30 meters long , 0.25mm ID DB-5MS column A 2uL injection was used. Due to high concentration of target and non target compounds in some samples, they were analyzed at dilution. Due to the dilutions performed, the surrogate recoveries could not be accurately quantified for these samples.

Manual integration's were performed for some calibration standards samples for the compounds listed against them. These manual integration's were necessary because the software failed to accurately integrate the entire peak. In all the above instances, the quantitation reports are flagged with "m". A hard copy printout of the manual integration's along with the scan ranges and initials of the operator is included in the data package .

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the laboratory manager or his designee, as verified by the following signature:

Signature and Title: Project Mgr

Date of Signature: 09/17/98

Z:\NETDATA\QA\FORMS\CLP\NARR1296.DOC

ENVIRONMENTAL PROTECTION AGENCY

OFFICIAL

CHAIN OF CUSTODY RECORD

PROJ. NO. KJ6103 052601SFXX | PROJECT NAME: WILCOX REFINERY

SAMPLERS: (Signature) JBeer B. Martinez

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Metals (6010B)	PAHs (8310)	TPH (TNRCC 1005)	pH	BTEX (8021B Mod)	REMARKS
												EPA Sample Tag # 4748.001
SB20-0030	8/4	0910		✓	SB20-(0'-3')	3	✓	✓	✓	✓	✓	6-097026 / 6-097027 / ~~6-097028~~ CJS
SB21-0030		1010		✓	~~SB20~~ SB21-0030	3	✓	✓	✓	✓	✓	6-097029 / 6-097030 4748.002
SB22-0030		1040		✓	SB22 (0'-3')	3	✓	✓	✓	✓	✓	6-097031 / 6-097032 .003
SB23-0030		1145		✓	SB23 (0'-3')	3	✓	✓	✓	✓	✓	6-097033 / 6-097034 .004
SB24-0030		1430		✓	SB24 (0'-2')	3	✓	✓	✓	✓	✓	6-097035 / 6-097036 .005
SB25-0030		1505		✓	SB25 (0'-3')	3	✓	✓	✓	✓	✓	6-097037 / 6097038 .006
SB26-0020	↓	1600		✓	SB26 (0'-2')	3	✓	✓	✓	✓	✓	6-097049 / 6097050 .007
SB36-6070		0940		✓	SB36 (6-7')	3	✓	✓	✓	✓	✓	6-097435 / 6-097436 .008
SB37-6070		1501		✓	SB37 (6-7')	3	✓	✓	✓	✓	✓	6-097432 / 6-097434 .009
SB38-0010		1540		✓	SB38 (0-1')	3	✓	✓	✓	✓	✓	6-097433 / 6-097449 JB .010
SW03		1425		✓	SW03 (Background)	4			✓		✓	6-097437 / 6-097438 .011
TB0804	↓	1655		✓	Trip Blank	2					✓	6-097439 / ~~6-097~~ JB .012

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
B. Martinez	8/4/98 1800				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
		Francisco Gil	Francisco Gil	8/5/98 10:30	
(Signature)	Date / Time	Received for Laboratory by:	Date / Time	Remarks	

001726

OFFICIAL CHAIN OF CUSTODY RECORD

PROJ. NO. K)6103 05266 SFXX

PROJECT NAME: WILCOX REFINERY

SAMPLERS: (Signature) Loren Williams

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	METALS (6010B)	PAH (8310)	TPH (TNRCC 1005)	PH	BTEX (8021B M)	REMARKS
												EPA TAG #
SB27-0030	4/5/98	0830		X	SB27-(0'-3')	3	✓	✓	✓	✓	✓	6-097351 / 6-097352
SB280020		0945		X	SB28 (0'-2')	3	✓	✓	✓	✓	✓	6-097354 / 6-097353
SB290010		1020		X	SB29 (0'-1')	3	✓	✓	✓	✓	✓	6-097355 / 6-097356
~~SW01~~		~~1045~~			~~SW01~~ COS 4/5/98							
SB30 0030		1100		X	SB30 (0'-3')	3	✓	✓	✓	✓	✓	6-097358 / 6-097359
SW01		1045		X	SW01	4			✓		✓	6097360 / 6097357
~~SB310030~~ SB31 0030		1145		X	SB31 (0'-3')	3	✓	✓	✓	✓	✓	6097361 / 6097362
SW02		1415		X	SW02	4			✓		✓	6097363 / 6097364
SW02D		1425		X	SW02D	4			✓		✓	6097365 / 6097366
SB32 0010		1440		X	SB32 (0'-1')	3	✓	✓	✓	✓	✓	~~6097363~~ COS 6097367 / 6-097368
SB32 0010d		1440		X	SB32 (0'-1') d	3	✓	✓	✓	✓	✓	6-097369 / 6-097370
SB33 0010		1515		X	SB33 (0'-1')	3	✓	✓	✓	✓	✓	6097371 / 6-097372
SB34 0010		1540		X	SB34 (0'-1')	3	✓	✓	✓	✓	✓	6097373 / 6-097374

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	4/5/98 1800				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
				FedEx Airbill # ~~805550003387~~ 805550003398	
Shipped by:		Airbill Number:			

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Returns with Warrant

EPA 7500-53 (11/96)

6-

001727

OFFICIAL CHAIN OF CUSTODY RECORD

PROJ. NO.: K1613 05260156XX
PROJECT NAME: WILCOX REFINERY
SAMPLERS: (Signature)

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	METALS (6010B)	PAH (8310)	TPH (TNRCC 1005)	pH	BTEX (8021B, M)	REMARKS
												EPA TAG #
SB40 3040	8/5/98	0911		X	SB40 (3'-4')	2	✓	✓	✓	✓	✓	6-097441 / 6-097440
SB40 6W06		0855		X	SB40-6W06	4			✓		✓	6097442 / 6-097443
SB39 3040		1135		X	SB39 (3'-4')	3	✓	✓	✓	✓	✓	6097444 / 6097445
SB43 6070		1449		X	SB43 (6'-7')	3	✓	✓	✓	✓	✓	6097446 / 6097447
SB44 4050		1625		X	SB44 (4'-5')	3	✓	✓	✓	✓	✓	6097448 / 6097039
SB45 0010	↓	1650		X	SB45 (0'-1')	3	✓	✓	✓	✓	✓	6097040 / 6097041
~~TB-0805~~	~~8/5/98~~			X	~~TB-0805~~	1					✓	X Matthes 8/6/98

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
B. Matthes	8/5/98 1800				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
			8/6/98	FedEx AirBill # ~~840555004338 7~~ 840555004339 8	
Shipped by:		Airbill Number:			

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Returns with Warrant

EPA 7500-53 (11/96)

6-097441

001728

OFFICIAL CHAIN OF CUSTODY RECORD

PROJ. NO. K06103 052G4012FXX

PROJECT NAME: WILCOX REFINERY

SAMPLERS: (Signature) Christy Sanzone / Ben Martin

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	CONTAINERS	METALS (6010 B)	PAH (8310)	TPH (TNRCC 1005)	PH	BTEX (8021B-M)	REMARKS
												EPA TAG #
SB35 0030	8/6/98	0815		X	SB35 (0'-3')	3	✓	✓	✓	✓	✓	6-099460 / 6-099461
SB41-2030	8/6/98	0840		X	SB41 (2'-3')	3	✓	✓	✓	✓	✓	6-097042 / 6-097044
SB41-2030-D	8/6/98	0842		X	SB41-D (2'-3')	3	✓	✓	✓	✓	✓	6-097043 / 6-097045
SB42-GW07	8/6/98	0939		X	SB42-GW07	4			✓		✓	6-097046 / 6-097047
SB42-2030	8/6/98	0945		X	SB42 (2'-3')	3	✓	✓	✓	✓	✓	6-097048 / 6-097375
SW04	8/6/98	1024		X	SW04	4			✓		✓	6-097376 / 6-097377
SB37-GW08	8/6/98	1145		X	SB37-GW08	1					✓	6-097378
SB46-6012	8/6/98	1430		X	SB46 (6'-12')	3	✓	✓	✓	✓	✓	6-097380 / 6-097381
SB46-6012-D	8/6/98	1435		X	SB46-D (6'-12')	3	✓	✓	✓	✓	✓	6-097382 / 6-097383
TB-0806	8/6/98	1600		X	TB-0806	1					✓	6-097379

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Ben Martin	8/6/98 1800				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	FedEx AirBill # 805550003398
Shipped by:		Airbill Number:			

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Returns with Warrant

EPA 7500-53 (11/96)

6-

001729

PDP Analytical Services

1680 Lake Front Circle, Suite B, The Woodlands TX 77380

Sample Log-In Report

Logged By: AFG **Report Date:** 8/6/98 17:40:08

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/06/98
ClientProject #: **Date Received:** 08/05/98
P.O. No.: **Time Received:** 10:30
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
4798.001	SB20-0030	3	SOIL	08/04/98	09:10	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.002	SB21-0030	3	SOIL	08/04/98	10:10	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.003	SB22-0030	3	SOIL	08/04/98	10:40	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.004	SB23-0030	3	SOIL	08/04/98	11:45	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.005	SB24-0020	3	SOIL	08/04/98	14:30	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.006	SB25-0030	3	SOIL	08/04/98	15:05	6-09262		
	Tests Required							

SW 8/6/98

Lab Approval **Client Approval**

000003

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/6/98 17:40:11

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/06/98
ClientProject #: **Date Received:** 08/05/98
P.O. No.: **Time Received:** 10:30
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.007	SB26-0020	3	SOIL	08/04/98	16:00	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.008	SB36-6070	3	SOIL	08/04/98	09:40	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.009	SB37-6070	3	SOIL	08/04/98	15:01	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.010	SB38-0010	3	SOIL	08/04/98	15:40	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.011	SW03	4	WATER	08/04/98	14:25	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- TPH1005						08/19/98	

SV 8/6/98

Lab Approval **Client Approval**

000007

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/6/98 17:40:12

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/06/98
ClientProject #: **Date Received:** 08/05/98
P.O. No.: **Time Received:** 10:30
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
4798.012	TB0804	2	WATER	08/04/98	16:55	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- TPH1005						08/19/98	

Instructions To Lab:

CLP LIKE DATA PACKAGE
FAX DUE: 14 DAYS
HARD COPY: 21 DAYS
USE E&E SOW

8/6/98
Lab Approval

Client Approval

000005

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/10/98 8:55:33

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
4802.001	SB27-0030	3	SOIL	08/05/98	08:30	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.002	SB28-0020	3	SOIL	08/05/98	09:45	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.003	SB29-0010	3	SOIL	08/05/98	10:20	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.004	SB30-0030	3	SOIL	08/05/98	11:00	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.005	SW01	4	WATER	08/05/98	10:45	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.006	SB31-0030	3	SOIL	08/05/98	11:45	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	

SW 8/10/98

Lab Approval **Client Approval**

000009

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/10/98 8:55:35

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.007	SW02	4	WATER	08/05/98	14:15	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.008	SW02D	4	WATER	08/05/98	14:25	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.009	SB32-0010	3	SOIL	08/05/98	14:40	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.010	SB32-0010D	3	SOIL	08/05/98	14:40	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.011	SB33-0010	3	SOIL	08/05/98	15:15	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.012	SB34-0010	3	SOIL	08/05/98	15:40	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	

SV 8/10/98

Lab Approval **Client Approval**

000020

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/10/98 8:55:36

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- TPH1005						08/21/98	
4802.013	SB40-3040	3	SOIL	08/05/98	09:11	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.014	SB40-6W06	4	SOIL	08/05/98	08:55	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.015	SB39-3040	3	SOIL	08/05/98	11:35	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.016	SB43-6070	3	SOIL	08/05/98	14:49	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.017	SB44-4050	3	SOIL	08/05/98	16:25	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.018	SB45-0010	3	SOIL	08/05/98	16:50	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	

8/10/98

Lab Approval **Client Approval**

000011

001735

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/10/98 8:55:36

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.019	SB35-0030	3	SOIL	08/06/98	08:15	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.020	SB41-2030	3	SOIL	08/06/98	08:40	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.021	SB41-2030D	3	SOIL	08/06/98	08:42	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.022	SB42-GW07	4	WATER	08/06/98	09:39	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.023	SB42-2030	3	SOIL	08/06/98	09:45	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.024	SW04	4	WATER	08/06/98	10:24	6- 09279		
	Tests Required							

SK 8/10/98
Lab Approval

Client Approval

000012

001736

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/10/98 8:55:38

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.025	SB37-GW08	1	WATER	08/06/98	11:45	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
4802.026	SB46-0612	3	SOIL	08/06/98	14:30	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.027	SB46-0612D	3	SOIL	08/06/98	14:35	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.028	TB-0806	1	WATER	08/06/98	16:00	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	

Instructions To Lab:

CLP LIKE DATA PACKAGE
FAX DUE: 14 DAYS
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USE E&E SOW

*MS/MSD REQUIRED ON E&E SAMPLES.

SK 8/10/98
Lab Approval

Client Approval

000013

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LCS/LCSD SUMMARY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :
PROJECT NAME :
PROJECT NUMBER :

DATE RECEIVED :
PRINTED ON : 9/16/98

SAMPLE MATRIX : SOLID
METHOD REFERENCE : SW846-8270C

LAB CONTROL SAMPLE
LCS SAMPLE ID : PAHL004
CLIENT SAMPLE ID :
DATE ANALYZED : 9/1/98
INSTRUMENT FILE : A4533.D

LAB CONTROL SAMPLE DUPLICATE
LCSD SAMPLE ID :
CLIENT SAMPLE ID :
DATE ANALYZED :
INSTRUMENT FILE :

PARAMETER	UNITS	LCS TRUE VALUE	LCSD TRUE VALUE	LCS FOUND VALUE	LCSD FOUND VALUE	LCS RECOVERY (%)	LCSD RECOVERY (%)	RPD	RPD LIMIT	QC LIMITS REC.
Acenaphthene	UG/KG	333		235		71			50	31 - 137
Acenaphthylene	UG/KG	333		219		66			50	31 - 137
Anthracene	UG/KG	333		181		54			50	31 - 137
Benzo(a)anthracene	UG/KG	333		0		0 *			50	31 - 137
Benzo(a)pyrene	UG/KG	333		250		75			50	31 - 137
Benzo(b)fluoranthene	UG/KG	333		229		69			50	31 - 137
Benzo(g,h,i)perylene	UG/KG	333		291		87			50	31 - 137
Benzo(k)fluoranthene	UG/KG	333		273		82			50	31 - 137
Chrysene	UG/KG	333		254		76			50	31 - 137
Dibenzo(a,h)anthracene	UG/KG	333		262		79			50	31 - 137
Fluoranthene	UG/KG	333		310		93			50	31 - 137
Fluorene	UG/KG	333		229		69			50	31 - 137
Indeno(1,2,3-c,d)pyrene	UG/KG	333		272		82			50	31 - 137
Naphthalene	UG/KG	333		243		73			50	31 - 137
Phenanthrene	UG/KG	333		248		74			50	31 - 137
Pyrene	UG/KG	333		284		85			50	35 - 142

* Indicate values outside of QC limits

RPD : 0 out of 0 outside limits
Spike Recovery : 1 out of 16 outside limits

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

MS/MSD SUMMARY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC.
PROJECT NAME : E&E- WILCOX REFINERY
PROJECT NUMBER :

DATE RECEIVED : 8/7/98
PRINTED ON : 9/16/98

SAMPLE MATRIX : SOIL

METHOD REFERENCE : SW846-8270C

SAMPLE	MATRIX SPIKE	MATRIX SPIKE DUPLICATE
SAMPLE ID : 4802.001	MS SAMPLE ID : 4802.001MS	MSD SAMPLE ID : 4802.001MSD
CLIENT SAMPLE ID : SB27-0030	CLIENT SAMPLE ID : SB27-0030MS	CLIENT SAMPLE ID : SB27-0030MSD
DATE ANALYZED : 9/1/98	DATE ANALYZED : 9/1/98	DATE ANALYZED : 9/1/98
INSTRUMENT FILE : A4534.D	INSTRUMENT FILE : A4535.D	INSTRUMENT FILE : A4536.D

PARAMETER	UNITS	MS SPIKE ADDED	MSD SPIKE ADDED	SAMPL CONC.	MS CONC.	MSD CONC.	MS RECOVERY (%)	MSD RECOVERY (%)	RPD	RPD LIMIT	QC LIMIT REC.
Acenaphthene	UG/KG	350	350	0	679	522	194 *	149 *	26.2	50	31 - 137
Acenaphthylene	UG/KG	350	350	0	599	494	171 *	141 *	19.2	50	31 - 137
Anthracene	UG/KG	350	350	0	546	585	156 *	167 *	6.8	50	31 - 137
Benzo(a)anthracene	UG/KG	350	350	0	0	0	0 *	0 *	0.0	50	31 - 137
Benzo(a)pyrene	UG/KG	350	350	570	2350	2870	509 *	657 *	25.4	50	31 - 137
Benzo(b)fluoranthene	UG/KG	350	350	500	1770	1780	363 *	366 *	0.8	50	31 - 137
Benzo(g,h,i)perylene	UG/KG	350	350	540	1390	2330	243 *	511 *	71.1 *	50	31 - 137
Benzo(k)fluoranthene	UG/KG	350	350	0	826	1110	236 *	317 *	29.3	50	31 - 137
Chrysene	UG/KG	350	350	1700	3910	4640	631 *	840 *	28.4	50	31 - 137
Dibenzo(a,h)anthracene	UG/KG	350	350	0	844	1480	241 *	423 *	54.8 *	50	31 - 137
Fluoranthene	UG/KG	350	350	400	1480	1820	309 *	406 *	27.1	50	31 - 137
Fluorene	UG/KG	350	350	0	606	637	173 *	182 *	5.1	50	31 - 137
Indeno(1,2,3-c,d)pyrene	UG/KG	350	350	0	868	1450	248 *	414 *	50.2 *	50	31 - 137
Naphthalene	UG/KG	350	350	0	578	574	165 *	164 *	0.6	50	31 - 137
Phenanthrene	UG/KG	350	350	1700	3580	3930	537 *	637 *	17.0	50	31 - 137
Pyrene	UG/KG	350	350	1900	4310	5630	689 *	1066 *	43.0	50	35 - 142

* Indicate values outside of QC limits

RPD : 3 out of 16 outside limits
Spike Recovery : 32 out of 32 outside limits

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB20-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.001
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/17/98 8:41

% MOISTURE	: 7.9	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/6/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4491.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 15:15

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	360 UG/KG	ND UG/KG	
Acenaphthylene	360 UG/KG	ND UG/KG	
Anthracene	360 UG/KG	ND UG/KG	
Benzo(a)anthracene	360 UG/KG	ND UG/KG	
Benzo(a)pyrene	360 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	360 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	360 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	360 UG/KG	ND UG/KG	
Chrysene	360 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	360 UG/KG	ND UG/KG	
Fluoranthene	360 UG/KG	ND UG/KG	
Fluorene	360 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	360 UG/KG	ND UG/KG	
Naphthalene	360 UG/KG	ND UG/KG	
Phenanthrene	360 UG/KG	ND UG/KG	
Pyrene	360 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	724 UG/KG	18 - 137	21

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB002	PREP BLANK ID :PAHB002	LCS ID :PAHL002
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB21-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.002
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/17/98 8:41

% MOISTURE	: 2.2	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/6/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4492.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 15:52

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	340 UG/KG	ND UG/KG	
Acenaphthylene	340 UG/KG	ND UG/KG	
Anthracene	340 UG/KG	ND UG/KG	
Benzo(a)anthracene	340 UG/KG	ND UG/KG	
Benzo(a)pyrene	340 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	340 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	340 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	340 UG/KG	ND UG/KG	
Chrysene	340 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	340 UG/KG	ND UG/KG	
Fluoranthene	340 UG/KG	ND UG/KG	
Fluorene	340 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	340 UG/KG	ND UG/KG	
Naphthalene	340 UG/KG	ND UG/KG	
Phenanthrene	340 UG/KG	ND UG/KG	
Pyrene	340 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	682 UG/KG	18 - 137	98

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB002	PREP BLANK ID :PAHB002	LCS ID :PAHL002
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB22-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.003
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/17/98 8:41

% MOISTURE	: 5.4	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/6/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4493.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 16:29

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	350 UG/KG	ND UG/KG	
Acenaphthylene	350 UG/KG	ND UG/KG	
Anthracene	350 UG/KG	ND UG/KG	
Benzo(a)anthracene	350 UG/KG	ND UG/KG	
Benzo(a)pyrene	350 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	350 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	350 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	350 UG/KG	ND UG/KG	
Chrysene	350 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	350 UG/KG	ND UG/KG	
Fluoranthene	350 UG/KG	ND UG/KG	
Fluorene	350 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	350 UG/KG	ND UG/KG	
Naphthalene	350 UG/KG	ND UG/KG	
Phenanthrene	350 UG/KG	ND UG/KG	
Pyrene	350 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	705 UG/KG	18 - 137	102

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB002 PREP BLANK ID :PAHB002 LCS ID :PAHL002
MS ID :4798.003MS MSD ID :4798.003MSD

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB23-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.004
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/17/98 8:41

% MOISTURE	: 2.1	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/6/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4489.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 14:02

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	340 UG/KG	ND UG/KG	
Acenaphthylene	340 UG/KG	ND UG/KG	
Anthracene	340 UG/KG	ND UG/KG	
Benzo(a)anthracene	340 UG/KG	380 UG/KG	
Benzo(a)pyrene	340 UG/KG	340 UG/KG	
Benzo(b)fluoranthene	340 UG/KG	260 UG/KG	
Benzo(g,h,i)perylene	340 UG/KG	570 UG/KG	
Benzo(k)fluoranthene	340 UG/KG	ND UG/KG	
Chrysene	340 UG/KG	850 UG/KG	
Dibenzo(a,h)anthracene	340 UG/KG	ND UG/KG	
Fluoranthene	340 UG/KG	ND UG/KG	
Fluorene	340 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	340 UG/KG	ND UG/KG	
Naphthalene	340 UG/KG	180 UG/KG	
Phenanthrene	340 UG/KG	1500 UG/KG	
Pyrene	340 UG/KG	1200 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	681 UG/KG	18 - 137	104

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB002 PREP BLANK ID :PAHB002 LCS ID :PAHL002
MS ID :4798.003MS MSD ID :4798.003MSD

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB24-0020
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.005
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/17/98 8:41

% MOISTURE	: 14.4	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/6/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4490.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 14:38

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	390 UG/KG	ND UG/KG	
Acenaphthylene	390 UG/KG	ND UG/KG	
Anthracene	390 UG/KG	ND UG/KG	
Benzo(a)anthracene	390 UG/KG	610 UG/KG	
Benzo(a)pyrene	390 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	390 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	390 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	390 UG/KG	ND UG/KG	
Chrysene	390 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	390 UG/KG	ND UG/KG	
Fluoranthene	390 UG/KG	ND UG/KG	
Fluorene	390 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	390 UG/KG	ND UG/KG	
Naphthalene	390 UG/KG	ND UG/KG	
Phenanthrene	390 UG/KG	760 UG/KG	
Pyrene	390 UG/KG	1500 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	779 UG/KG	18 - 137	76

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB002	PREP BLANK ID :PAHB002	LCS ID :PAHL002
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB25-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.006
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/17/98 8:41

% MOISTURE	: 1.7	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/6/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4487.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 12:13

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	340 UG/KG	ND UG/KG	
Acenaphthylene	340 UG/KG	ND UG/KG	
Anthracene	340 UG/KG	ND UG/KG	
Benzo(a)anthracene	340 UG/KG	610 UG/KG	
Benzo(a)pyrene	340 UG/KG	410 UG/KG	
Benzo(b)fluoranthene	340 UG/KG	520 UG/KG	
Benzo(g,h,i)perylene	340 UG/KG	270 UG/KG	
Benzo(k)fluoranthene	340 UG/KG	ND UG/KG	
Chrysene	340 UG/KG	810 UG/KG	
Dibenzo(a,h)anthracene	340 UG/KG	ND UG/KG	
Fluoranthene	340 UG/KG	850 UG/KG	
Fluorene	340 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	340 UG/KG	210 UG/KG	
Naphthalene	340 UG/KG	ND UG/KG	
Phenanthrene	340 UG/KG	1300 UG/KG	
Pyrene	340 UG/KG	1200 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	678 UG/KG	18 - 137	50

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB002	PREP BLANK ID :PAHB002	LCS ID :PAHL002
MS ID :4798.003MS	MSD ID :4798.003MSD	

000100

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB26-0020
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.007
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/17/98 8:41

% MOISTURE	: 2.8	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/6/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4488.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 13:25

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	340 UG/KG	ND UG/KG	
Acenaphthylene	340 UG/KG	ND UG/KG	
Anthracene	340 UG/KG	ND UG/KG	
Benzo(a)anthracene	340 UG/KG	300 UG/KG	
Benzo(a)pyrene	340 UG/KG	230 UG/KG	
Benzo(b)fluoranthene	340 UG/KG	260 UG/KG	
Benzo(g,h,i)perylene	340 UG/KG	300 UG/KG	
Benzo(k)fluoranthene	340 UG/KG	ND UG/KG	
Chrysene	340 UG/KG	650 UG/KG	
Dibenzo(a,h)anthracene	340 UG/KG	ND UG/KG	
Fluoranthene	340 UG/KG	ND UG/KG	
Fluorene	340 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	340 UG/KG	ND UG/KG	
Naphthalene	340 UG/KG	ND UG/KG	
Phenanthrene	340 UG/KG	1100 UG/KG	
Pyrene	340 UG/KG	720 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	686 UG/KG	18 - 137	114

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB002	PREP BLANK ID :PAHB002	LCS ID :PAHL002
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB36-6070
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.008
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/17/98 8:42

% MOISTURE	: 10.125	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/6/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4494.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 17:06

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	370 UG/KG	ND UG/KG	
Acenaphthylene	370 UG/KG	ND UG/KG	
Anthracene	370 UG/KG	ND UG/KG	
Benzo(a)anthracene	370 UG/KG	ND UG/KG	
Benzo(a)pyrene	370 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	370 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	370 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	370 UG/KG	ND UG/KG	
Chrysene	370 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	370 UG/KG	ND UG/KG	
Fluoranthene	370 UG/KG	ND UG/KG	
Fluorene	370 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	370 UG/KG	ND UG/KG	
Naphthalene	370 UG/KG	ND UG/KG	
Phenanthrene	370 UG/KG	ND UG/KG	
Pyrene	370 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	742 UG/KG	18 - 137	98

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB002	PREP BLANK ID :PAHB002	LCS ID :PAHL002
MS ID :4798.003MS	MSD ID :4798.003MSD	

PDP Analytical Services
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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB37-6070
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4798.009
PROJECT NUMBER	:		METHOD REFERENCE	:	SW846-8270C
DATE SAMPLED	:	8/4/98	DATE RECEIVED	:	8/5/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	9/17/98 8:42

% MOISTURE	: 6.8	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/6/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4495.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 17:43

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	360 UG/KG	ND UG/KG	
Acenaphthylene	360 UG/KG	ND UG/KG	
Anthracene	360 UG/KG	ND UG/KG	
Benzo(a)anthracene	360 UG/KG	ND UG/KG	
Benzo(a)pyrene	360 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	360 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	360 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	360 UG/KG	ND UG/KG	
Chrysene	360 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	360 UG/KG	ND UG/KG	
Fluoranthene	360 UG/KG	ND UG/KG	
Fluorene	360 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	360 UG/KG	ND UG/KG	
Naphthalene	360 UG/KG	ND UG/KG	
Phenanthrene	360 UG/KG	ND UG/KG	
Pyrene	360 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	715 UG/KG	18 - 137	45

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB002	PREP BLANK ID :PAHB002	LCS ID :PAHL002
MS ID :4798.003MS	MSD ID :4798.003MSD	

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PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB38-0010
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.010
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/17/98 8:42

% MOISTURE	: 16.2	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/6/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4496.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 18:20

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	400 UG/KG	ND UG/KG	
Acenaphthylene	400 UG/KG	ND UG/KG	
Anthracene	400 UG/KG	ND UG/KG	
Benzo(a)anthracene	400 UG/KG	ND UG/KG	
Benzo(a)pyrene	400 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	400 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	400 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	400 UG/KG	ND UG/KG	
Chrysene	400 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	400 UG/KG	ND UG/KG	
Fluoranthene	400 UG/KG	ND UG/KG	
Fluorene	400 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	400 UG/KG	ND UG/KG	
Naphthalene	400 UG/KG	ND UG/KG	
Phenanthrene	400 UG/KG	ND UG/KG	
Pyrene	400 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	796 UG/KG	18 - 137	98

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB002 PREP BLANK ID :PAHB002 LCS ID :PAHL002
MS ID :4798.003MS MSD ID :4798.003MSD

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB27-0030
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.001
PROJECT NUMBER	:		METHOD REFERENCE	:	SW846-8270C
DATE SAMPLED	:	8/5/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	9/16/98 18:40

% MOISTURE	: 4.8	ANALYST	: CW
DATE ANALYZED	: 9/1/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 10 mL
INSTRUMENT FILE	: A4534.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 14:53

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	3500 UG/KG	ND UG/KG	
Acenaphthylene	3500 UG/KG	ND UG/KG	
Anthracene	3500 UG/KG	ND UG/KG	
Benzo(a)anthracene	3500 UG/KG	ND UG/KG	
Benzo(a)pyrene	3500 UG/KG	570 UG/KG	
Benzo(b)fluoranthene	3500 UG/KG	500 UG/KG	
Benzo(g,h,i)perylene	3500 UG/KG	540 UG/KG	
Benzo(k)fluoranthene	3500 UG/KG	ND UG/KG	
Chrysene	3500 UG/KG	1700 UG/KG	
Dibenzo(a,h)anthracene	3500 UG/KG	ND UG/KG	
Fluoranthene	3500 UG/KG	400 UG/KG	
Fluorene	3500 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	3500 UG/KG	ND UG/KG	
Naphthalene	3500 UG/KG	ND UG/KG	
Phenanthrene	3500 UG/KG	1700 UG/KG	
Pyrene	3500 UG/KG	1900 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	700 UG/KG	18 - 137	94

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004	PREP BLANK ID :PAHB004	LCS ID :PAHL004
MS ID :4802.001MS	MSD ID :4802.001MSD	

000170

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1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB28-0020DL
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.002DL
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:40

% MOISTURE	: 4.8	ANALYST	: CW
DATE ANALYZED	: 9/1/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 10 mL
INSTRUMENT FILE	: A4537.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 16:44

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	3500 UG/KG	ND UG/KG	
Acenaphthylene	3500 UG/KG	ND UG/KG	
Anthracene	3500 UG/KG	4900 UG/KG	
Benzo(a)anthracene	3500 UG/KG	ND UG/KG	
Benzo(a)pyrene	3500 UG/KG	2900 UG/KG	
Benzo(b)fluoranthene	3500 UG/KG	1500 UG/KG	
Benzo(g,h,i)perylene	3500 UG/KG	1100 UG/KG	
Benzo(k)fluoranthene	3500 UG/KG	ND UG/KG	
Chrysene	3500 UG/KG	5400 UG/KG	
Dibenzo(a,h)anthracene	3500 UG/KG	530 UG/KG	
Fluoranthene	3500 UG/KG	1500 UG/KG	
Fluorene	3500 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	3500 UG/KG	510 UG/KG	
Naphthalene	3500 UG/KG	370 UG/KG	
Phenanthrene	3500 UG/KG	4800 UG/KG	
Pyrene	3500 UG/KG	6600 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	700 UG/KG	18 - 137	102

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004	PREP BLANK ID :PAHB004	LCS ID :PAHL004
MS ID :4802.001MS	MSD ID :4802.001MSD	

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB29-0010
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.003
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:41

% MOISTURE	: 2.4	ANALYST	: CW
DATE ANALYZED	: 9/1/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 10 mL
INSTRUMENT FILE	: A4538.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 17:21

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	3400 UG/KG	ND UG/KG	
Acenaphthylene	3400 UG/KG	ND UG/KG	
Anthracene	3400 UG/KG	ND UG/KG	
Benzo(a)anthracene	3400 UG/KG	ND UG/KG	
Benzo(a)pyrene	3400 UG/KG	750 UG/KG	
Benzo(b)fluoranthene	3400 UG/KG	400 UG/KG	
Benzo(g,h,i)perylene	3400 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	3400 UG/KG	480 UG/KG	
Chrysene	3400 UG/KG	1200 UG/KG	
Dibenzo(a,h)anthracene	3400 UG/KG	ND UG/KG	
Fluoranthene	3400 UG/KG	340 UG/KG	
Fluorene	3400 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	3400 UG/KG	360 UG/KG	
Naphthalene	3400 UG/KG	ND UG/KG	
Phenanthrene	3400 UG/KG	1500 UG/KG	
Pyrene	3400 UG/KG	1300 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	683 UG/KG	18 - 137	88

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004	PREP BLANK ID :PAHB004	LCS ID :PAHL004
MS ID :4802.001MS	MSD ID :4802.001MSD	

000191

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB30-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.004
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:41

% MOISTURE	: 10.9	ANALYST	: CW
DATE ANALYZED	: 9/1/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 10 mL
INSTRUMENT FILE	: A4539.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 17:59

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	3700 UG/KG	ND UG/KG	
Acenaphthylene	3700 UG/KG	ND UG/KG	
Anthracene	3700 UG/KG	ND UG/KG	
Benzo(a)anthracene	3700 UG/KG	ND UG/KG	
Benzo(a)pyrene	3700 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	3700 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	3700 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	3700 UG/KG	ND UG/KG	
Chrysene	3700 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	3700 UG/KG	ND UG/KG	
Fluoranthene	3700 UG/KG	ND UG/KG	
Fluorene	3700 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	3700 UG/KG	ND UG/KG	
Naphthalene	3700 UG/KG	ND UG/KG	
Phenanthrene	3700 UG/KG	ND UG/KG	
Pyrene	3700 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	748 UG/KG	18 - 137	101

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004 PREP BLANK ID :PAHB004 LCS ID :PAHL004
MS ID :4802.001MS MSD ID :4802.001MSD

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB31-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.006
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:41

% MOISTURE	: 15.8	ANALYST	: CW
DATE ANALYZED	: 9/1/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 10 mL
INSTRUMENT FILE	: A4540.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 18:36

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	4000 UG/KG	ND UG/KG	
Acenaphthylene	4000 UG/KG	ND UG/KG	
Anthracene	4000 UG/KG	ND UG/KG	
Benzo(a)anthracene	4000 UG/KG	ND UG/KG	
Benzo(a)pyrene	4000 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	4000 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	4000 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	4000 UG/KG	ND UG/KG	
Chrysene	4000 UG/KG	770 UG/KG	
Dibenzo(a,h)anthracene	4000 UG/KG	ND UG/KG	
Fluoranthene	4000 UG/KG	ND UG/KG	
Fluorene	4000 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	4000 UG/KG	ND UG/KG	
Naphthalene	4000 UG/KG	ND UG/KG	
Phenanthrene	4000 UG/KG	700 UG/KG	
Pyrene	4000 UG/KG	700 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	792 UG/KG	18 - 137	725

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004 PREP BLANK ID :PAHB004 LCS ID :PAHL004
MS ID :4802.001MS MSD ID :4802.001MSD

PDP Analytical Services
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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB32-0010
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.009
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:41

% MOISTURE	: 42.7	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4498.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g.	TIME ANALYZED	: 19:34

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	580 UG/KG	ND UG/KG	
Acenaphthylene	580 UG/KG	ND UG/KG	
Anthracene	580 UG/KG	ND UG/KG	
Benzo(a)anthracene	580 UG/KG	ND UG/KG	
Benzo(a)pyrene	580 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	580 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	580 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	580 UG/KG	ND UG/KG	
Chrysene	580 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	580 UG/KG	ND UG/KG	
Fluoranthene	580 UG/KG	ND UG/KG	
Fluorene	580 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	580 UG/KG	ND UG/KG	
Naphthalene	580 UG/KG	ND UG/KG	
Phenanthrene	580 UG/KG	ND UG/KG	
Pyrene	580 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	1160 UG/KG	18 - 137	113

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004 PREP BLANK ID :PAHB004 LCS ID :PAHL004
MS ID :4802.001MS MSD ID :4802.001MSD

PDP Analytical Services
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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB32-0010D
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.010
PROJECT NUMBER	:		METHOD REFERENCE	:	SW846-8270C
DATE SAMPLED	:	8/5/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	9/16/98 18:41

% MOISTURE	: 42.1	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4499.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 20:10

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	580 UG/KG	ND UG/KG	
Acenaphthylene	580 UG/KG	ND UG/KG	
Anthracene	580 UG/KG	ND UG/KG	
Benzo(a)anthracene	580 UG/KG	ND UG/KG	
Benzo(a)pyrene	580 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	580 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	580 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	580 UG/KG	ND UG/KG	
Chrysene	580 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	580 UG/KG	ND UG/KG	
Fluoranthene	580 UG/KG	ND UG/KG	
Fluorene	580 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	580 UG/KG	ND UG/KG	
Naphthalene	580 UG/KG	ND UG/KG	
Phenanthrene	580 UG/KG	310 UG/KG	
Pyrene	580 UG/KG	290 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	1150 UG/KG	18 - 137	123

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004 PREP BLANK ID :PAHB004 LCS ID :PAHL004
MS ID :4802.001MS MSD ID :4802.001MSD

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB33-0010
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.011
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:41

% MOISTURE	: 22.2	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4501.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 21:24

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	430 UG/KG	ND UG/KG	
Acenaphthylene	430 UG/KG	ND UG/KG	
Anthracene	430 UG/KG	ND UG/KG	
Benzo(a)anthracene	430 UG/KG	350 UG/KG	
Benzo(a)pyrene	430 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	430 UG/KG	290 UG/KG	
Benzo(g,h,i)perylene	430 UG/KG	240 UG/KG	
Benzo(k)fluoranthene	430 UG/KG	ND UG/KG	
Chrysene	430 UG/KG	1000 UG/KG	
Dibenzo(a,h)anthracene	430 UG/KG	ND UG/KG	
Fluoranthene	430 UG/KG	ND UG/KG	
Fluorene	430 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	430 UG/KG	ND UG/KG	
Naphthalene	430 UG/KG	ND UG/KG	
Phenanthrene	430 UG/KG	970 UG/KG	
Pyrene	430 UG/KG	1100 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	857 UG/KG	18 - 137	118

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004	PREP BLANK ID :PAHB004	LCS ID :PAHL004
MS ID :4802.001MS	MSD ID :4802.001MSD	

000257

001757

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB34-0010
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.012
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:41

% MOISTURE	: 15.8	ANALYST	: CW
DATE ANALYZED	: 9/1/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 10 mL
INSTRUMENT FILE	: A4541.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 19:13

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	4000 UG/KG	2300 UG/KG	
Acenaphthylene	4000 UG/KG	ND UG/KG	
Anthracene	4000 UG/KG	19000 UG/KG	
Benzo(a)anthracene	4000 UG/KG	ND UG/KG	
Benzo(a)pyrene	4000 UG/KG	44000 UG/KG	
Benzo(b)fluoranthene	4000 UG/KG	27000 UG/KG	
Benzo(g,h,i)perylene	4000 UG/KG	12000 UG/KG	
Benzo(k)fluoranthene	4000 UG/KG	ND UG/KG	
Chrysene	4000 UG/KG	120000 UG/KG	
Dibenzo(a,h)anthracene	4000 UG/KG	5400 UG/KG	
Fluoranthene	4000 UG/KG	34000 UG/KG	
Fluorene	4000 UG/KG	24000 UG/KG	
Indeno(1,2,3-c,d)pyrene	4000 UG/KG	11000 UG/KG	
Naphthalene	4000 UG/KG	2400 UG/KG	
Phenanthrene	4000 UG/KG	220000 UG/KG	
Pyrene	4000 UG/KG	240000 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	792 UG/KG	18 - 137	157

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004 PREP BLANK ID :PAHB004 LCS ID :PAHL004
MS ID :4802.001MS MSD ID :4802.001MSD

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB40-3040
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.013
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:41

% MOISTURE	: 15.1	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: D4465.D	INSTRUMENT ID	: D-HP5971A
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 18:18

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	390 UG/KG	ND UG/KG	
Acenaphthylene	390 UG/KG	ND UG/KG	
Anthracene	390 UG/KG	ND UG/KG	
Benzo(a)anthracene	390 UG/KG	ND UG/KG	
Benzo(a)pyrene	390 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	390 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	390 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	390 UG/KG	ND UG/KG	
Chrysene	390 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	390 UG/KG	ND UG/KG	
Fluoranthene	390 UG/KG	ND UG/KG	
Fluorene	390 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	390 UG/KG	ND UG/KG	
Naphthalene	390 UG/KG	ND UG/KG	
Phenanthrene	390 UG/KG	490 UG/KG	
Pyrene	390 UG/KG	200 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	785 UG/KG	18 - 137	163

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004	PREP BLANK ID :PAHB004	LCS ID :PAHL004
MS ID :4802.001MS	MSD ID :4802.001MSD	

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB39-3040
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.015
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:41

% MOISTURE	: 15.1	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: D4466.D	INSTRUMENT ID	: D-HP5971A
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 19:04

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	390 UG/KG	ND UG/KG	
Acenaphthylene	390 UG/KG	ND UG/KG	
Anthracene	390 UG/KG	ND UG/KG	
Benzo(a)anthracene	390 UG/KG	ND UG/KG	
Benzo(a)pyrene	390 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	390 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	390 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	390 UG/KG	ND UG/KG	
Chrysene	390 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	390 UG/KG	ND UG/KG	
Fluoranthene	390 UG/KG	ND UG/KG	
Fluorene	390 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	390 UG/KG	ND UG/KG	
Naphthalene	390 UG/KG	ND UG/KG	
Phenanthrene	390 UG/KG	ND UG/KG	
Pyrene	390 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	785 UG/KG	18 - 137	103

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004	PREP BLANK ID :PAHB004	LCS ID :PAHL004
MS ID :4802.001MS	MSD ID :4802.001MSD	

0003908

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB43-6070
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.016
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:41

% MOISTURE	: 7.8	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: D4467.D	INSTRUMENT ID	: D-HP5971A
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 19:50

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	360 UG/KG	ND UG/KG	
Acenaphthylene	360 UG/KG	ND UG/KG	
Anthracene	360 UG/KG	ND UG/KG	
Benzo(a)anthracene	360 UG/KG	ND UG/KG	
Benzo(a)pyrene	360 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	360 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	360 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	360 UG/KG	ND UG/KG	
Chrysene	360 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	360 UG/KG	ND UG/KG	
Fluoranthene	360 UG/KG	ND UG/KG	
Fluorene	360 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	360 UG/KG	ND UG/KG	
Naphthalene	360 UG/KG	ND UG/KG	
Phenanthrene	360 UG/KG	ND UG/KG	
Pyrene	360 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	723 UG/KG	18 - 137	146

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004	PREP BLANK ID :PAHB004	LCS ID :PAHL004
MS ID :4802.001MS	MSD ID :4802.001MSD	

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB44-4050
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.017
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:41

% MOISTURE	: 9.3	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: D4468.D	INSTRUMENT ID	: D-HP5971A
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 20:37

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	370 UG/KG	ND UG/KG	
Acenaphthylene	370 UG/KG	ND UG/KG	
Anthracene	370 UG/KG	ND UG/KG	
Benzo(a)anthracene	370 UG/KG	ND UG/KG	
Benzo(a)pyrene	370 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	370 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	370 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	370 UG/KG	ND UG/KG	
Chrysene	370 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	370 UG/KG	ND UG/KG	
Fluoranthene	370 UG/KG	ND UG/KG	
Fluorene	370 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	370 UG/KG	ND UG/KG	
Naphthalene	370 UG/KG	ND UG/KG	
Phenanthrene	370 UG/KG	ND UG/KG	
Pyrene	370 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	735 UG/KG	18 - 137	138

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004	PREP BLANK ID :PAHB004	LCS ID :PAHL004
MS ID :4802.001MS	MSD ID :4802.001MSD	

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB45-0010
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.018
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:42

% MOISTURE	: 20.4	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: D4469.D	INSTRUMENT ID	: D-HP5971A
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 21:23

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	420 UG/KG	ND UG/KG	
Acenaphthylene	420 UG/KG	ND UG/KG	
Anthracene	420 UG/KG	ND UG/KG	
Benzo(a)anthracene	420 UG/KG	ND UG/KG	
Benzo(a)pyrene	420 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	420 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	420 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	420 UG/KG	ND UG/KG	
Chrysene	420 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	420 UG/KG	ND UG/KG	
Fluoranthene	420 UG/KG	ND UG/KG	
Fluorene	420 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	420 UG/KG	ND UG/KG	
Naphthalene	420 UG/KG	ND UG/KG	
Phenanthrene	420 UG/KG	ND UG/KG	
Pyrene	420 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	838 UG/KG	18 - 137	117

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004	PREP BLANK ID :PAHB004	LCS ID :PAHL004
MS ID :4802.001MS	MSD ID :4802.001MSD	

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB35-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.019
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:42

% MOISTURE	: 12.4	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4502.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 22:01

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	380 UG/KG	ND UG/KG	
Acenaphthylene	380 UG/KG	ND UG/KG	
Anthracene	380 UG/KG	ND UG/KG	
Benzo(a)anthracene	380 UG/KG	ND UG/KG	
Benzo(a)pyrene	380 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	380 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	380 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	380 UG/KG	ND UG/KG	
Chrysene	380 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	380 UG/KG	ND UG/KG	
Fluoranthene	380 UG/KG	ND UG/KG	
Fluorene	380 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	380 UG/KG	ND UG/KG	
Naphthalene	380 UG/KG	ND UG/KG	
Phenanthrene	380 UG/KG	ND UG/KG	
Pyrene	380 UG/KG	360 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	761 UG/KG	18 - 137	141

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004	PREP BLANK ID :PAHB004	LCS ID :PAHL004
MS ID :4802.001MS	MSD ID :4802.001MSD	

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB41-2030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.020
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:42

% MOISTURE	: 17.7	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: D4470.D	INSTRUMENT ID	: D-HP5971A
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 22:10

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	410 UG/KG	ND UG/KG	
Acenaphthylene	410 UG/KG	ND UG/KG	
Anthracene	410 UG/KG	ND UG/KG	
Benzo(a)anthracene	410 UG/KG	ND UG/KG	
Benzo(a)pyrene	410 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	410 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	410 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	410 UG/KG	ND UG/KG	
Chrysene	410 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	410 UG/KG	ND UG/KG	
Fluoranthene	410 UG/KG	ND UG/KG	
Fluorene	410 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	410 UG/KG	ND UG/KG	
Naphthalene	410 UG/KG	ND UG/KG	
Phenanthrene	410 UG/KG	ND UG/KG	
Pyrene	410 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	810 UG/KG	18 - 137	112

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004 PREP BLANK ID :PAHB004 LCS ID :PAHL004
MS ID :4802.001MS MSD ID :4802.001MSD

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB41-2030D
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.021
PROJECT NUMBER	:		METHOD REFERENCE	:	SW846-8270C
DATE SAMPLED	:	8/6/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	9/16/98 18:42

% MOISTURE	: 10.2	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: D4471.D	INSTRUMENT ID	: D-HP5971A
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 22:57

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	370 UG/KG	ND UG/KG	
Acenaphthylene	370 UG/KG	ND UG/KG	
Anthracene	370 UG/KG	ND UG/KG	
Benzo(a)anthracene	370 UG/KG	ND UG/KG	
Benzo(a)pyrene	370 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	370 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	370 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	370 UG/KG	ND UG/KG	
Chrysene	370 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	370 UG/KG	ND UG/KG	
Fluoranthene	370 UG/KG	ND UG/KG	
Fluorene	370 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	370 UG/KG	ND UG/KG	
Naphthalene	370 UG/KG	ND UG/KG	
Phenanthrene	370 UG/KG	ND UG/KG	
Pyrene	370 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	742 UG/KG	18 - 137	181

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004	PREP BLANK ID :PAHB004	LCS ID :PAHL004
MS ID :4802.001MS	MSD ID :4802.001MSD	

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB42-2030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.023
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:42

% MOISTURE	: 14.9	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4497.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 18:57

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	390 UG/KG	ND UG/KG	
Acenaphthylene	390 UG/KG	ND UG/KG	
Anthracene	390 UG/KG	ND UG/KG	
Benzo(a)anthracene	390 UG/KG	ND UG/KG	
Benzo(a)pyrene	390 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	390 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	390 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	390 UG/KG	ND UG/KG	
Chrysene	390 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	390 UG/KG	ND UG/KG	
Fluoranthene	390 UG/KG	ND UG/KG	
Fluorene	390 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	390 UG/KG	ND UG/KG	
Naphthalene	390 UG/KG	ND UG/KG	
Phenanthrene	390 UG/KG	ND UG/KG	
Pyrene	390 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	783 UG/KG	18 - 137	98

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004 PREP BLANK ID :PAHB004 LCS ID :PAHL004
MS ID :4802.001MS MSD ID :4802.001MSD

000370

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB46-0612
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.026
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:42

% MOISTURE	: 15	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: D4472.D	INSTRUMENT ID	: D-HP5971A
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 23:43

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	390 UG/KG	ND UG/KG	
Acenaphthylene	390 UG/KG	ND UG/KG	
Anthracene	390 UG/KG	ND UG/KG	
Benzo(a)anthracene	390 UG/KG	ND UG/KG	
Benzo(a)pyrene	390 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	390 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	390 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	390 UG/KG	ND UG/KG	
Chrysene	390 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	390 UG/KG	ND UG/KG	
Fluoranthene	390 UG/KG	ND UG/KG	
Fluorene	390 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	390 UG/KG	ND UG/KG	
Naphthalene	390 UG/KG	ND UG/KG	
Phenanthrene	390 UG/KG	ND UG/KG	
Pyrene	390 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	784 UG/KG	18 - 137	172

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004	PREP BLANK ID :PAHB004	LCS ID :PAHL004
MS ID :4802.001MS	MSD ID :4802.001MSD	

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB46-0612D
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.027
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:42

% MOISTURE	: 12	ANALYST	: CW
DATE ANALYZED	: 8/31/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: D4473.D	INSTRUMENT ID	: D-HP5971A
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 00:30

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	380 UG/KG	ND UG/KG	
Acenaphthylene	380 UG/KG	ND UG/KG	
Anthracene	380 UG/KG	ND UG/KG	
Benzo(a)anthracene	380 UG/KG	ND UG/KG	
Benzo(a)pyrene	380 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	380 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	380 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	380 UG/KG	ND UG/KG	
Chrysene	380 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	380 UG/KG	ND UG/KG	
Fluoranthene	380 UG/KG	ND UG/KG	
Fluorene	380 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	380 UG/KG	ND UG/KG	
Naphthalene	380 UG/KG	ND UG/KG	
Phenanthrene	380 UG/KG	ND UG/KG	
Pyrene	380 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	758 UG/KG	18 - 137	136

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004	PREP BLANK ID :PAHB004	LCS ID :PAHL004
MS ID :4802.001MS	MSD ID :4802.001MSD	

Response Factor Report A-HP5970B

04/8/28/19

Method : C:\HPCHEM\1\METHODS\TRI4437.M
Title : Semivolatiles
Last Update : Fri Aug 28 08:30:41 1998
Response via : Initial Calibration

Calibration Files
1 =A4437.D 2 =A4438.D 3 =A4436.D
4 =A4439.D 5 =A4440.D 6 =A4441.D

		Compound	1	2	3	4	5	6	Avg	%RSD
1)	I	CI30 1,4-Dichlorobenzene-	ISTD							
2)	T	C310 N-Nitrosodimet	1.203	1.135	1.147	0.969	0.803	0.918	1.029	15.19
3)	T	C312 Pyridine	2.062	1.740	1.593	1.505	1.282	1.207	1.565	20.01
4)	S	CS50 2-Fluorophenol	1.379	1.506	1.433	1.321	1.391	1.433	1.411	4.42
5)	S	CS45 Phenol-d5	1.968	2.025	1.920	1.770	1.660	1.674	1.836	8.50
6)	MC	C315 Phenol	2.003	2.040	1.967	1.710	1.651	1.616	1.831	10.50
7)	T	C325 bis(2-chloroet	1.552	1.635	1.503	1.402	1.379	1.223	1.449	10.06
8)	S	CS70 2-Chlorophenol	1.414	1.514	1.391	1.353	1.357	1.378	1.401	4.28
9)	M	C330 2-Chlorophenol	1.542	1.609	1.517	1.426	1.423	1.377	1.482	5.94
10)	T	C335 1,3-Dichlorobe	1.605	1.704	1.540	1.479	1.495	1.545	1.562	5.30
11)	MC	C340 1,4-Dichlorobe	1.736	1.780	1.638	1.558	1.568	1.579	1.643	5.73
12)	S	CS75 1,2-Dichlorobe	0.912	0.946	0.882	0.836	0.868	0.860	0.884	4.46
13)	T	C350 1,2-Dichlorobe	1.634	1.672	1.549	1.475	1.467	1.410	1.534	6.68
14)	T	C345 Benzyl alcohol	1.002	1.151	1.053	1.050	1.050	1.093	1.066	4.75
15)	T	C355 2-Methylphenol	1.523	1.491	1.381	1.421	1.377	1.292	1.414	5.92
16)	T	C357 2,2`-oxybis(1-	3.146	3.284	3.081	2.806	2.799	2.707	2.970	7.78
17)	T	C365 4-Methylphenol	1.558	1.662	1.545	1.397	1.411	1.441	1.502	6.90
18)	MP	C370 N-Nitroso-di-n	1.275	1.320	1.263	1.178	1.161	1.313	1.252	5.39
19)	T	C375 Hexachloroetha	0.755	0.801	0.743	0.701	0.682	0.645	0.721	7.78
20)	I	CI40 Naphthalene-d8	ISTD							
21)	S	CS20 Nitrobenzene-d	0.350	0.364	0.353	0.328	0.332	0.320	0.341	4.93
22)	T	C410 Nitrobenzene	0.505	0.509	0.465	0.428	0.425	0.427	0.460	8.56
23)	T	C415 Isophorone	0.781	0.819	0.760	0.741	0.732	0.761	0.766	4.06
24)	C	C420 2-Nitrophenol	0.222	0.238	0.232	0.234	0.238	0.240	0.234	2.84
25)	T	C425 2,4-Dimethylph	0.400	0.410	0.387	0.380	0.380	0.383	0.390	3.19
26)	T	C435 Bis(2-chloroet	0.503	0.506	0.477	0.448	0.438		0.475	6.52
27)	T	C430 Benzoic acid	0.160	0.229	0.226	0.237	0.238	0.250	0.223	14.43
28)	C	C440 2,4-Dichloroph	0.290	0.298	0.280	0.267	0.257	0.223	0.269	10.02
29)	M	C445 1,2,4-Trichlor	0.295	0.298	0.275	0.274	0.273	0.270	0.281	4.46
30)	T	C450 Naphthalene	1.166	1.124	1.011	0.944	0.953	0.912	1.018	10.22
31)	T	C455 4-Chloroanilin	0.279	0.220	0.145	0.207	0.244		0.219	22.74
32)	C	C460 Hexachlorobuta	0.160	0.156	0.140	0.138	0.147	0.143	0.147	6.14
33)	MC	C465 4-Chloro-3-met	0.351	0.387	0.355	0.336	0.342	0.311	0.347	7.23
34)	T	C470 2-Methylnaphth	0.750	0.752	0.681	0.653	0.659	0.634	0.688	7.39
35)	I	CI50 Acenaphthene-d10	ISTD							
36)	P	C510 Hexachlorocycl	0.198	0.246	0.218	0.244	0.254	0.259	0.237	9.99
37)	C	C515 2,4,6-Trichlor	0.319	0.351	0.307	0.339	0.347	0.344	0.334	5.16
38)	T	C520 2,4,5-Trichlor	0.331	0.367	0.336	0.352	0.345	0.332	0.344	4.03
39)	S	CS25 2-Fluorobiphen	1.268	1.265	1.132	1.197	1.189	1.092	1.190	5.92
40)	T	C525 2-Chloronaphth	1.171	1.193	1.062	1.120	1.128	1.016	1.115	5.98
41)	T	C530 2-Nitroaniline	0.341	0.374	0.336	0.375	0.356	0.390	0.362	5.81

(#) = Out of Range

000201

001770

Response Factor Report A-HP5970B

Method : C:\HPCHEM\1\METHODS\TRI4437.M
Title : Semivolatiles
Last Update : Fri Aug 28 08:30:41 1998
Response via : Initial Calibration

Calibration Files
1 =A4437.D 2 =A4438.D 3 =A4436.D
4 =A4439.D 5 =A4440.D 6 =A4441.D

		Compound		1	2	3	4	5	6	Avg	%RSD
42)	T	C535	Dimethylphthal	1.480	1.507	1.391	1.411	1.420	1.372	1.430	3.67
43)	T	C543	2,6-Dinitrotol	0.327	0.400	0.358	0.380	0.389	0.353	0.368	7.33
44)	T	C540	Acenaphthylene	2.031	2.053	1.836	1.777	1.654	1.459	1.802	12.58
45)	T	C545	3-Nitroaniline	0.160	0.043	0.021	0.055	0.094		0.075	73.39
46)	MC	C550	Acenaphthene	1.324	1.362	1.215	1.188	1.234	1.092	1.236	7.84
47)	P	C555	2,4-Dinitrophe	0.049	0.128	0.136	0.167	0.179	0.186	0.141	36.07
48)	MP	C560	4-Nitrophenol	0.071	0.111	0.111	0.124	0.124	0.126	0.111	18.53
49)	M	C570	2,4-Dinitrotol	0.393	0.468	0.437	0.462	0.470	0.477	0.451	6.98
50)	T	C565	Dibenzofuran	1.676	1.696	1.601	1.593	1.562	1.483	1.602	4.84
51)			2,3,4,6-Tetrachloro	0.216	0.241	0.231	0.245	0.239	0.240	0.235	4.45
52)	T	C580	Diethylphthala	1.683	1.635	1.491	1.455	1.485	1.379	1.521	7.54
53)	T	C585	4-Chlorophenyl	0.594	0.604	0.547	0.552	0.565	0.566	0.571	4.04
54)	T	C590	Fluorene	1.332	1.456	1.289	1.262	1.306	1.224	1.312	6.09
55)	T	C595	4-Nitroaniline	0.124	0.079	0.068	0.058	0.045		0.075	40.10
56)	I	CI60	Phenanthrene-d10		----------ISTD----------						
57)	S	CS55	2,4,6-Tribromo	0.096	0.106	0.094	0.106	0.105	0.102	0.102	5.20
58)	T	C610	4,6-Dinitro-2-	0.117	0.167	0.154	0.179	0.175	0.188	0.163	15.57
59)	C	C615	N-nitrosodiphe	0.647	0.654	0.556	0.558	0.515	0.492	0.570	11.76
60)	T	C625	4-Bromophenyl	0.201	0.201	0.187	0.193	0.193	0.175	0.192	5.11
61)	T	C630	Hexachlorobenz	0.255	0.241	0.223	0.237	0.220	0.212	0.231	6.91
62)	MC	C635	Pentachlorophe	0.054	0.099	0.099	0.116	0.123	0.131	0.103	26.58
63)	T	C640	Phenanthrene	1.309	1.273	1.120	1.171	1.144	1.043	1.177	8.42
64)	T	C645	Anthracene	1.248	1.282	1.157	1.146	1.127	1.016	1.163	8.11
65)	T	C647	Carbazole	0.873	0.869	0.774	0.740	0.651	0.665	0.762	12.61
66)	T	C650	Di-n-butylphth	2.119	2.053	1.813	1.689	1.575		1.850	12.57
67)	C	C655	Fluoranthene	1.083	1.118	1.067	1.062	1.041	0.973	1.058	4.60
68)	I	CI70	Chrysene-d12		----------ISTD----------						
69)	M	C715	Pyrene	2.873	2.769	2.519	2.275	2.275	2.192	2.484	11.48
70)	S	CS30	Terphenyl-d14	1.654	1.672	1.551	1.515	1.554	1.539	1.581	4.14
71)	T	C720	Butylbenzylpht	1.664	1.647	1.525	1.420	1.439	1.324	1.503	8.93
72)	T	C745	bis(2-ethylhex	2.184	2.182	2.002	1.874	1.815	1.618	1.946	11.38
73)	T	C725	3,3`-Dichlorob		0.074	0.066	0.053	0.058	0.076	0.065	15.65
74)	T	C730	Benzo(a)anthra	1.438	1.372	1.372	1.351	1.358	1.396	1.381	2.31
75)	T	C740	Chrysene	1.377	1.357	1.281	1.298	1.289	1.267	1.312	3.39
76)	I	CI75	Perylene-d12		----------ISTD----------						
77)	C	C760	Di-n-octylphth	3.487	3.839	3.483	3.384	3.463	2.981	3.440	8.00
78)	T	C765	Benzo(b)fluora	1.328	1.316	1.370	1.349	1.342	1.608	1.385	7.98
79)	T	C770	Benzo(k)fluora	1.286	1.413	1.308	1.349	1.320	1.141	1.303	6.98
80)	C	C775	Benzo(a)pyrene	1.110	1.150	1.089	1.085	1.100	1.123	1.109	2.17
81)	T	C780	Indeno(1,2,3-c	0.683	0.731	0.704	0.728	0.709	0.675	0.705	3.25
82)	T	C785	Dibenzo(a,h)an	0.704	0.755	0.728	0.737	0.729	0.725	0.730	2.27

(#) = Out of Range

001771

Response Factor Report A-HP5970B

Method : C:\HPCHEM\1\METHODS\TRI4437.M
Title : Semivolatiles
Last Update : Fri Aug 28 08:30:41 1998
Response via : Initial Calibration

Calibration Files
1 =A4437.D 2 =A4438.D 3 =A4436.D
4 =A4439.D 5 =A4440.D 6 =A4441.D

Compound	1	2	3	4	5	6	Avg	%RSD
83) T C790 Benzo(g,h,i)pe	0.781	0.786	0.742	0.752	0.718	0.753	0.755	3.34

(#) = Out of Range

001772

Cw/9/3 of 8

Response Factor Report A-HP5970B

Method : G:\HPCHEM\1\METHODS\TRI4505.M
Title : Semivolatiles
Last Update : Wed Sep 02 14:37:51 1998
Response via : Initial Calibration

Calibration Files
1 =A4505.D 2 =A4506.D 3 =A4504.D
4 =A4507.D 5 =A4508.D 6 =A4509.D

			Compound	1	2	3	4	5	6	Avg	%RSD
1)	I	CI30	1,4-Dichlorobenzene-	ISTD							
2)	T	C310	N-Nitrosodimet	1.361	1.192	1.396	1.030	1.007	0.949	1.156	16.51
3)	T	C312	Pyridine	2.388	1.980	2.544	1.987	1.678	1.681	2.043	17.54
4)	S	CS50	2-Fluorophenol	1.467	1.523	1.477	1.405	1.423	1.401	1.449	3.31
5)	S	CS45	Phenol-d5	2.214	2.016	2.044	1.817	1.776	1.803	1.945	8.98
6)	MC	C315	Phenol	2.290	2.161	2.194	1.998	1.914	1.841	2.066	8.49
7)	T	C325	bis(2-chloroet	1.859	1.769	1.753	1.318	1.416	1.358	1.579	15.22
8)	S	CS70	2-Chlorophenol	1.533	1.483	1.494	1.411	1.424	1.414	1.460	3.46
9)	M	C330	2-Chlorophenol	1.612	1.575	1.585	1.483	1.468	1.442	1.528	4.68
10)	T	C335	1,3-Dichlorobe	1.721	1.616	1.600	1.516	1.553	1.530	1.589	4.74
11)	MC	C340	1,4-Dichlorobe	1.778	1.753	1.724	1.583	1.619	1.563	1.670	5.58
12)	S	CS75	1,2-Dichlorobe	0.963	0.934	0.936	0.863	0.888	0.861	0.908	4.71
13)	T	C350	1,2-Dichlorobe	1.720	1.643	1.634	1.481	1.472	1.432	1.564	7.47
14)	T	C345	Benzyl alcohol	1.061	1.127	1.129	1.083	1.084	1.078	1.094	2.54
15)	T	C355	2-Methylphenol	1.654	1.406	1.473	1.453	1.418	1.356	1.460	7.07
16)	T	C357	2,2`-oxybis(1-	3.708	3.498	3.538	3.156	3.057	2.932	3.315	9.30
17)	T	C365	4-Methylphenol	1.756	1.602	1.635	1.463	1.490	1.486	1.572	7.24
18)	MP	C370	N-Nitroso-di-n	1.470	1.404	1.452	1.526	1.439	1.389	1.447	3.39
19)	T	C375	Hexachloroetha	0.880	0.808	0.844	0.733	0.676	0.653	0.766	12.12
20)	I	CI40	Naphthalene-d8	ISTD							
21)	S	CS20	Nitrobenzene-d	0.387	0.380	0.398	0.374	0.374	0.350	0.377	4.30
22)	T	C410	Nitrobenzene	0.543	0.551	0.535	0.510	0.487	0.478	0.517	5.90
23)	T	C415	Isophorone	0.864	0.853	0.878	0.835	0.845	0.814	0.848	2.61
24)	C	C420	2-Nitrophenol	0.210	0.220	0.238	0.231	0.228	0.230	0.226	4.22
25)	T	C425	2,4-Dimethylph	0.417	0.414	0.414	0.395	0.403	0.390	0.406	2.75
26)	T	C435	Bis(2-chloroet	0.519	0.527	0.518	0.469	0.461	0.453	0.491	6.81
27)	T	C430	Benzoic acid	0.152	0.209	0.222	0.219	0.227	0.233	0.211	14.03
28)	C	C440	2,4-Dichloroph	0.274	0.280	0.280	0.255	0.251	0.236	0.263	6.86
29)	M	C445	1,2,4-Trichlor	0.287	0.289	0.296	0.264	0.270	0.265	0.278	4.96
30)	T	C450	Naphthalene	1.161	1.088	1.064	0.971	0.963	0.922	1.028	8.83
31)	T	C455	4-Chloroanilin	0.318	0.221	0.227	0.258		0.377	0.280	23.73
32)	C	C460	Hexachlorobuta	0.163	0.156	0.154	0.139	0.138	0.143	0.149	6.83
33)	MC	C465	4-Chloro-3-met	0.358	0.366	0.373	0.346	0.352	0.333	0.355	4.07
34)	T	C470	2-Methylnaphth	0.737	0.679	0.744	0.648	0.661	0.640	0.685	6.61
35)	I	CI50	Acenaphthene-d10	ISTD							
36)	P	C510	Hexachlorocycl	0.244	0.276	0.271	0.266	0.266	0.282	0.268	4.83
37)	C	C515	2,4,6-Trichlor	0.303	0.337	0.338	0.314	0.344	0.334	0.328	4.90
38)	T	C520	2,4,5-Trichlor	0.319	0.351	0.348	0.341	0.329	0.341	0.338	3.55
39)	S	CS25	2-Fluorobiphen	1.322	1.323	1.230	1.181	1.173	1.140	1.228	6.40
40)	T	C525	2-Chloronaphth	1.191	1.217	1.107	1.043	1.086	1.128	1.128	5.79
41)	T	C530	2-Nitroaniline	0.403	0.445	0.425	0.430	0.422	0.439	0.427	3.41

(#) = Out of Range

001773

Response Factor Report A-HP5970B

Method : G:\HPCHEM\1\METHODS\TRI4505.M
Title : Semivolatiles
Last Update : Wed Sep 02 14:37:51 1998
Response via : Initial Calibration

Calibration Files
1 =A4505.D 2 =A4506.D 3 =A4504.D
4 =A4507.D 5 =A4508.D 6 =A4509.D

			Compound	1	2	3	4	5	6	Avg	%RSD
42)	T	C535	Dimethylphthal	1.535	1.635	1.493	1.436	1.428	1.431	1.493	5.48
43)	T	C543	2,6-Dinitrotol	0.342	0.394	0.389	0.364	0.352	0.352	0.366	5.84
44)	T	C540	Acenaphthylene	2.046	2.130	1.944	1.710	1.691	1.646	1.861	11.05
45)	T	C545	3-Nitroaniline	0.233	0.079	0.076	0.124	0.215		0.145	51.03
46)	MC	C550	Acenaphthene	1.301	1.337	1.307	1.176	1.179	1.197	1.249	5.86
47)	P	C555	2,4-Dinitrophe	0.076	0.137	0.167	0.175	0.188	0.189	0.155	27.84
48)	MP	C560	4-Nitrophenol	0.118	0.140	0.136	0.149	0.153	0.161	0.143	10.49
49)	M	C570	2,4-Dinitrotol	0.419	0.465	0.457	0.470	0.449	0.480	0.457	4.69
50)	T	C565	Dibenzofuran	1.662	1.776	1.692	1.488	1.521	1.543	1.614	7.01
51)			2,3,4,6-Tetrachloro	0.222	0.240	0.236	0.241	0.238	0.247	0.237	3.48
52)	T	C580	Diethylphthala	1.705	1.760	1.653	1.537	1.555	1.532	1.624	5.95
53)	T	C585	4-Chlorophenyl	0.603	0.600	0.606	0.572	0.573	0.600	0.592	2.67
54)	T	C590	Fluorene	1.408	1.406	1.366	1.283	1.227	1.249	1.323	6.07
55)	T	C595	4-Nitroaniline	0.110	0.131	0.115	0.085	0.101	0.145	0.114	18.83
56)	I	CI60	Phenanthrene-d10	----------	ISTD	----------					
57)	S	CS55	2,4,6-Tribromo	0.111	0.126	0.116	0.127	0.128	0.129	0.123	6.30
58)	T	C610	4,6-Dinitro-2-	0.139	0.167	0.171	0.181	0.176	0.179	0.169	9.10
59)	C	C615	N-nitrosodiphe	0.697	0.643	0.600	0.567	0.539	0.506	0.592	11.84
60)	T	C625	4-Bromophenyl	0.221	0.216	0.210	0.204	0.200	0.192	0.207	5.14
61)	T	C630	Hexachlorobenz	0.276	0.267	0.261	0.259	0.253	0.251	0.261	3.57
62)	MC	C635	Pentachlorophe	0.092	0.125	0.129	0.135	0.147	0.149	0.129	16.19
63)	T	C640	Phenanthrene	1.318	1.251	1.207	1.127	1.137	1.106	1.191	6.94
64)	T	C645	Anthracene	1.294	1.299	1.235	1.159	1.082	1.069	1.190	8.57
65)	T	C647	Carbazole	1.036	0.964	0.864	0.696	0.593	0.586	0.790	24.37
66)	T	C650	Di-n-butylphth	2.182	2.157	1.958	1.770	1.505	1.411	1.830	17.82
67)	C	C655	Fluoranthene	1.249	1.237	1.181	1.087	1.122	1.087	1.161	6.27
68)	I	CI70	Chrysene-d12	----------	ISTD	----------					
69)	M	C715	Pyrene	1.757	1.771	1.748	1.731	1.620	1.686	1.719	3.29
70)	S	CS30	Terphenyl-d14	1.159	1.262	1.235	1.241	1.187	1.246	1.222	3.25
71)	T	C720	Butylbenzylpht	1.179	1.215	1.181	1.122	1.112	1.087	1.149	4.30
72)	T	C745	bis(2-ethylhex	1.813	1.796	1.623	1.526	1.467	1.441	1.611	10.08
73)	T	C725	3,3`-Dichlorob		0.101	0.096	0.113	0.127	0.130	0.113	13.26
74)	T	C730	Benzo(a)anthra	1.341	1.411	1.374	1.316	1.360	1.345	1.358	2.40
75)	T	C740	Chrysene	1.343	1.393	1.294	1.309	1.218	1.262	1.303	4.70
76)	I	CI75	Perylene-d12	----------	ISTD	----------					
77)	C	C760	Di-n-octylphth	2.604	2.576	2.609	2.484	2.234	2.451	2.493	5.72
78)	T	C765	Benzo(b)fluora	1.231	1.224	1.269	1.350	1.565	1.642	1.380	13.07
79)	T	C770	Benzo(k)fluora	1.199	1.278	1.298	1.087	0.910	1.021	1.132	13.51
80)	C	C775	Benzo(a)pyrene	1.043	1.075	1.084	1.042	1.045	1.115	1.067	2.77
81)	T	C780	Indeno(1,2,3-c	0.845	0.839	0.798	0.658	0.690	0.687	0.753	11.15
82)	T	C785	Dibenzo(a,h)an	0.884	0.848	0.834	0.701	0.723	0.770	0.793	9.27

(#) = Out of Range

001774

Response Factor Report A-HP5970B

Method : G:\HPCHEM\1\METHODS\TRI4505.M
Title : Semivolatiles
Last Update : Wed Sep 02 14:37:51 1998
Response via : Initial Calibration

Calibration Files
1 =A4505.D 2 =A4506.D 3 =A4504.D
4 =A4507.D 5 =A4508.D 6 =A4509.D

Compound	1	2	3	4	5	6	Avg	%RSD
83) T C790 Benzo(g,h,i)pe	0.918	0.879	0.813	0.662	0.681	0.713	0.778	13.87

000139

(#) = Out of Range

001775

Evaluate Continuing Calibration Report

Data File : H:\GCMS-A\A4486.D
Acq Time : 08/30/98 10:59 Operator: CW
Sample : SSTD040 Inst : A-HP5970B
Misc : SSTD040 Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\TRI4437.M
Title : Semivolatiles
Last Update : Fri Aug 28 14:52:10 1998
Response via : Multiple Level Calibration

Min. RRF : 0.010 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 200%

		Compound	AvgRRF	CCRRF	%Dev	Area%	Dev(Min)
1	I	CI30 1,4-Dichlorobenzene-d4	1.000	1.000	0.0	83	0.00
2	T	C310 N-Nitrosodimethylamine	1.029	1.410	-37.0#	102	0.00
3	T	C312 Pyridine	1.565	2.251	-43.9#	117	-0.01
4	S	CS50 2-Fluorophenol	1.411	1.580	-12.0	91	0.00
5	S	CS45 Phenol-d5	1.836	2.136	-16.3	92	0.00
6	MC	C315 Phenol	1.831	2.236	-22.1	94	0.00
7	T	C325 bis(2-chloroethyl)ethe	1.449	1.797	-24.0	99	0.01
8	S	CS70 2-Chlorophenol-d4	1.401	1.459	-4.2	87	0.00
9	M	C330 2-Chlorophenol	1.482	1.538	-3.7	84	0.01
10	T	C335 1,3-Dichlorobenzene	1.562	1.501	3.9	81	0.00
11	MC	C340 1,4-Dichlorobenzene	1.643	1.625	1.1	82	0.00
12	S	CS75 1,2-Dichlorobenzene-d4	0.884	0.872	1.3	82	0.01
13	T	C350 1,2-Dichlorobenzene	1.534	1.496	2.5	80	0.00
14	T	C345 Benzyl alcohol	1.066	1.103	-3.4	87	0.00
15	T	C355 2-Methylphenol	1.414	1.415	-0.0	85	0.01
16	T	C357 2,2`-oxybis(1-Chloropr	2.970	3.658	-23.2	98	0.00
17	T	C365 4-Methylphenol	1.502	1.693	-12.7	91	0.01
18	MP	C370 N-Nitroso-di-n-propyla	1.252	1.512	-20.8	99	0.00
19	T	C375 Hexachloroethane	0.721	0.804	-11.4	90	0.00
20	I	CI40 Naphthalene-d8	1.000	1.000	0.0	80	0.00
21	S	CS20 Nitrobenzene-d5	0.341	0.398	-16.7	91	0.01
22	T	C410 Nitrobenzene	0.460	0.564	-22.6	98	0.01
23	T	C415 Isophorone	0.766	0.896	-17.0	95	-0.01
24	C	C420 2-Nitrophenol	0.234	0.230	1.7	80	0.01
25	T	C425 2,4-Dimethylphenol	0.390	0.411	-5.3	85	0.01
26	T	C435 Bis(2-chloroethoxy)met	0.475	0.544	-14.7	92	0.00
27	T	C430 Benzoic acid	0.223	0.193	13.6	69	-0.01
28	C	C440 2,4-Dichlorophenol	0.269	0.262	2.6	75	0.00
29	M	C445 1,2,4-Trichlorobenzene	0.281	0.262	6.7	77	0.00
30	T	C450 Naphthalene	1.018	1.033	-1.4	82	0.00
31	T	C455 4-Chloroaniline	0.219	0.209	4.4	116	0.00
32	C	C460 Hexachlorobutadiene	0.147	0.138	6.2	79	0.00
33	MC	C465 4-Chloro-3-methylpheno	0.347	0.368	-6.0	83	0.01
34	T	C470 2-Methylnaphthalene	0.688	0.689	-0.2	81	0.00
35	I	CI50 Acenaphthene-d10	1.000	1.000	0.0	78	0.00
36	P	C510 Hexachlorocyclopentadi	0.237	0.207	12.5	74	0.00
37	C	C515 2,4,6-Trichlorophenol	0.334	0.310	7.2	79	0.01
38	T	C520 2,4,5-Trichlorophenol	0.344	0.329	4.2	77	0.01
39	S	CS25 2-Fluorobiphenyl	1.190	1.153	3.1	80	0.00
40	T	C525 2-Chloronaphthalene	1.115	1.084	2.8	80	0.01

(#) = Out of Range

000328

001776

Evaluate Continuing Calibration Report

Data File : H:\GCMS-A\A4486.D
Acq Time : 08/30/98 10:59
Sample : SSTD040
Misc : SSTD040

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\TRI4437.M
Title : Semivolatiles
Last Update : Fri Aug 28 14:52:10 1998
Response via : Multiple Level Calibration

Min. RRF : 0.010 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 200%

		Compound	AvgRRF	CCRRF	%Dev	Area%	Dev(Min)
41	T	C530 2-Nitroaniline	0.362	0.394	-8.7	91	0.01
42	T	C535 Dimethylphthalate	1.430	1.415	1.1	79	-0.01
43	T	C543 2,6-Dinitrotoluene	0.368	0.352	4.3	77	0.00
44	T	C540 Acenaphthylene	1.802	1.958	-8.7	83	0.00
45	T	C545 3-Nitroaniline	0.075	0.057	23.3	212#	0.04
46	MC	C550 Acenaphthene	1.236	1.268	-2.6	82	0.01
47	P	C555 2,4-Dinitrophenol	0.141	0.108	23.4	62	0.02
48	MP	C560 4-Nitrophenol	0.111	0.112	-0.3	78	0.04
49	M	C570 2,4-Dinitrotoluene	0.451	0.418	7.4	75	0.01
50	T	C565 Dibenzofuran	1.602	1.590	0.7	78	0.01
51		2,3,4,6-Tetrachlorophenol	0.235	0.233	1.1	79	0.00
52	T	C580 Diethylphthalate	1.521	1.539	-1.1	81	0.00
53	T	C585 4-Chlorophenyl phenyl	0.571	0.581	-1.6	83	0.01
54	T	C590 Fluorene	1.312	1.371	-4.5	83	0.00
55	T	C595 4-Nitroaniline	0.075	0.045	39.5#	52	0.04
56	I	CI60 Phenanthrene-d10	1.000	1.000	0.0	75	0.00
57	S	CS55 2,4,6-Tribromophenol	0.102	0.113	-11.3	90	0.00
58	T	C610 4,6-Dinitro-2-methylph	0.163	0.141	13.9	68	0.00
59	C	C615 N-nitrosodiphenylamine	0.570	0.580	-1.7	78	0.00
60	T	C625 4-Bromophenyl phenyl e	0.192	0.201	-4.8	80	0.00
61	T	C630 Hexachlorobenzene	0.231	0.244	-5.4	82	0.02
62	MC	C635 Pentachlorophenol	0.103	0.092	10.6	70	0.02
63	T	C640 Phenanthrene	1.177	1.189	-1.1	79	0.00
64	T	C645 Anthracene	1.163	1.195	-2.8	77	0.00
65	T	C647 Carbazole	0.762	0.701	8.0	68	-0.05
66	T	C650 Di-n-butylphthalate	1.850	1.963	-6.1	81	0.00
67	C	C655 Fluoranthene	1.058	0.994	6.0	70	0.00
68	I	CI70 Chrysene-d12	1.000	1.000	0.0	64	0.00
69	M	C715 Pyrene	2.484	2.711	-9.1	69	0.00
70	S	CS30 Terphenyl-d14	1.581	1.749	-10.7	72	0.00
71	T	C720 Butylbenzylphthalate	1.503	1.606	-6.8	67	0.00
72	T	C745 bis(2-ethylhexyl)phtha	1.946	2.277	-17.0	73	0.00
73	T	C725 3,3`-Dichlorobenzidine	0.065	0.105	-59.9#	101	0.02
74	T	C730 Benzo(a)anthracene	1.381	1.269	8.1	59	0.00
75	T	C740 Chrysene	1.312	1.322	-0.8	66	0.00
76	I	CI75 Perylene-d12	1.000	1.000	0.0	63	0.02
77	C	C760 Di-n-octylphthalate	3.440	3.489	-1.4	64	-0.01
78	T	C765 Benzo(b)fluoranthene	1.385	1.335	3.6	62	0.02
79	T	C770 Benzo(k)fluoranthene	1.303	1.195	8.3	58	0.00

(#) = Out of Range

001777

Evaluate Continuing Calibration Report

Data File : H:\GCMS-A A4486.D
Acq Time : 08/30/98 10:59
Sample : SSTD040
Misc : SSTD040

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\TRI4437.M
Title : Semivolatiles
Last Update : Fri Aug 28 14:52:10 1998
Response via : Multiple Level Calibration

Min. RRF : 0.010 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 200%

		Compound	AvgRRF	CCRRF	%Dev	Area%	Dev(Min)
80	C	C775 Benzo(a)pyrene	1.109	1.054	5.0	61	0.00
81	T	C780 Indeno(1,2,3-c,d)pyren	0.705	0.756	-7.3	68	0.02
82	T	C785 Dibenzo(a,h)anthracene	0.730	0.811	-11.2	71	0.00
83	T	C790 Benzo(g,h,i)perylene	0.755	0.813	-7.6	70	0.02

001778

Evaluate Continuing Calibration Report

Data File : H:\GCMS-A\A4531.D
Acq Time : 09/01/98 12:42 Operator: CW
Sample : SSTD040 Inst : A-HP5970B
Misc : SSTD040 Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\PAH4505.M
Title : Semivolatiles
Last Update : Tue Sep 15 14:24:35 1998
Response via : Multiple Level Calibration

Min. RRF : 0.010 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 200%

		Compound	AvgRRF	CCRRF	%Dev	Area%	Dev(Min)
1	I	CI30 1,4-Dichlorobenzene-d4	1.000	1.000	0.0	93	0.00
2	I	CI40 Naphthalene-d8	1.000	1.000	0.0	94	0.00
3	T	C450 Naphthalene	1.028	1.010	1.8	89	0.00
4	I	CI50 Acenaphthene-d10	1.000	1.000	0.0	89	0.00
5	T	C540 Acenaphthylene	1.861	1.879	-1.0	86	0.00
6	MC	C550 Acenaphthene	1.249	1.258	-0.7	85	0.00
7	T	C590 Fluorene	1.323	1.256	5.1	82	0.00
8	I	CI60 Phenanthrene-d10	1.000	1.000	0.0	81	0.00
9	T	C640 Phenanthrene	1.191	1.175	1.3	79	0.00
10	T	C645 Anthracene	1.190	1.194	-0.4	78	0.00
11	C	C655 Fluoranthene	1.161	1.093	5.9	75	0.00
12	I	CI70 Chrysene-d12	1.000	1.000	0.0	79	0.00
13	M	C715 Pyrene	1.719	1.614	6.1	73	0.00
14	S	CS30 Terphenyl-d14	1.222	1.179	3.5	76	0.00
15	T	C740 Chrysene	1.303	1.231	5.6	76	0.00
16	I	CI75 Perylene-d12	1.000	1.000	0.0	101	0.00
17	T	C765 Benzo(b)fluoranthene	1.380	1.046	24.2	83	0.00
18	T	C770 Benzo(k)fluoranthene	1.132	1.004	11.3	78	0.00
19	C	C775 Benzo(a)pyrene	1.067	0.957	10.4	89	0.00
20	T	C780 Indeno(1,2,3-c,d)pyren	0.753	0.848	-12.7	107	0.00
21	T	C785 Dibenzo(a,h)anthracene	0.793	0.891	-12.3	108	0.00
22	T	C790 Benzo(g,h,i)perylene	0.778	0.908	-16.7	113	0.00

000531

(#) = Out of Range SPCC's out = 0 CCC's out = 0
A4531.D PAH4505.M Thu Sep 17 11:26:15 1998 Page 1

001779

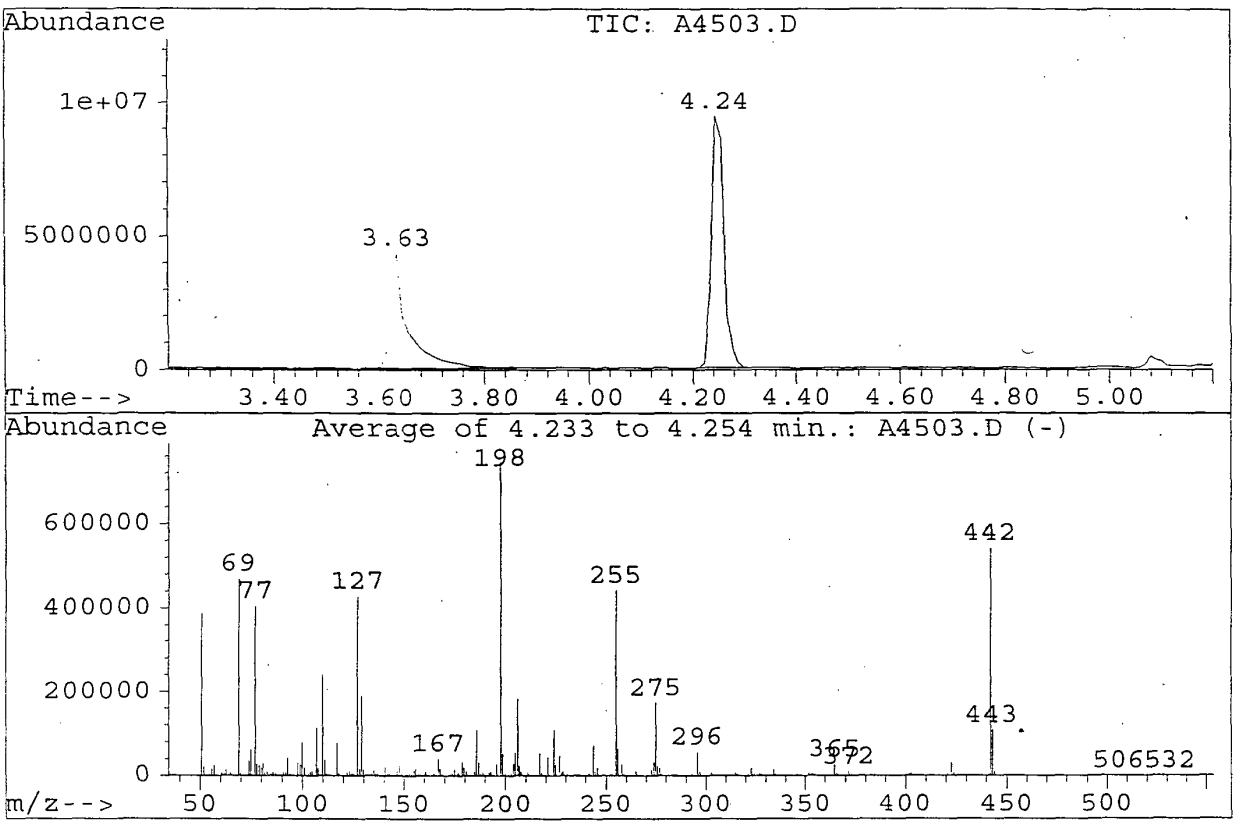
DFTPP-8270

CW 9/3/98

Data File : C:\HPCHEM\1\DATA\A4503.D
Acq Time : 08/31/98 13:52
Sample : DFTPP
Misc : DFTPP

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\DFTPPBNA.M
Title :



Peak Apex is scan: 158

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51	198	30	60	51.4	386908	PASS
68	69	0	2	0.0	0	PASS
69	198	0	99	62.3	469038	PASS
70	69	0	2	0.8	3652	PASS
127	198	40	60	56.8	427594	PASS
197	198	0	1	0.0	0	PASS
198	198	100	100	100.0	753024	PASS
199	198	5	9	6.9	52206	PASS
275	198	10	30	23.1	174062	PASS
365	198	1	99	3.5	26722	PASS
441	443	1	99	3.8	4107	PASS
442	198	41	99	71.8	540883	PASS
443	442	17	23	19.8	107343	PASS

A4503.D DFTPPBNA.M Mon Aug 31 17:32:08 1998

000522

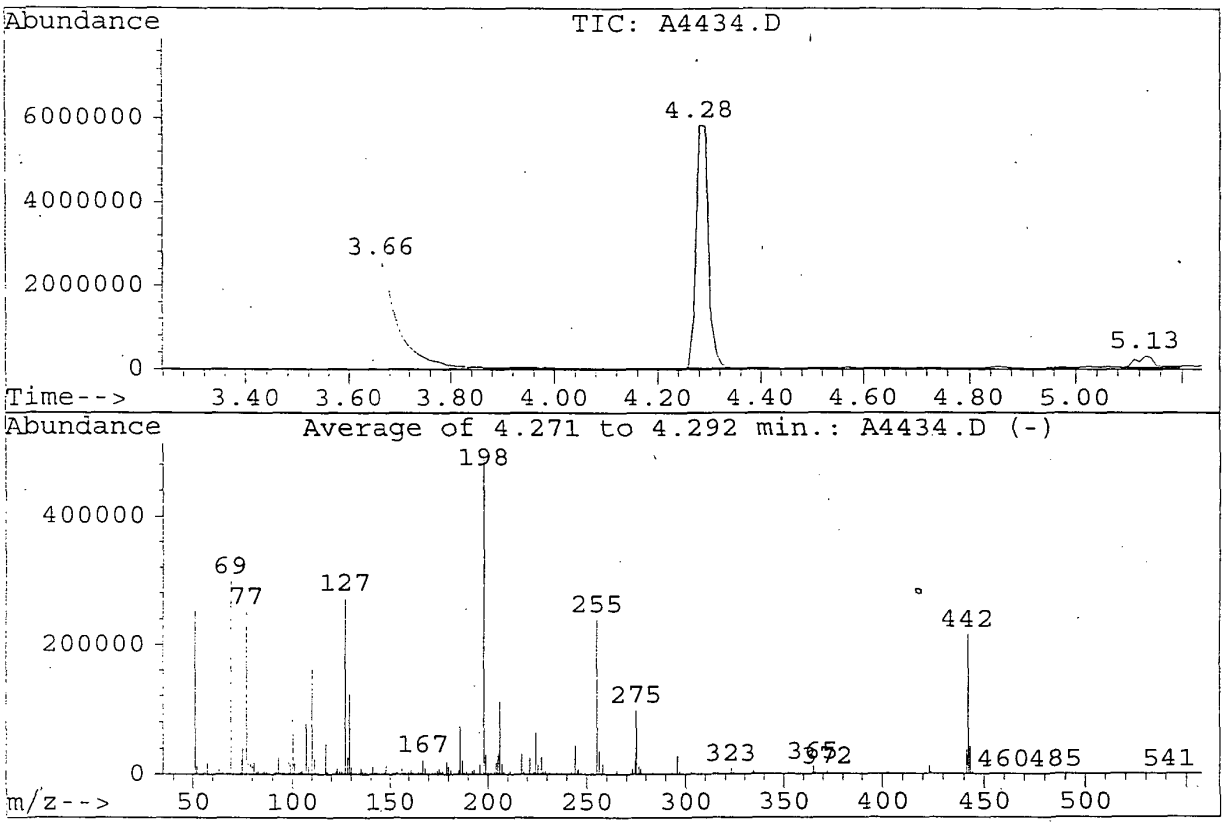
CW 8/28/98

DFTPP-8270

Data File : C:\HPCHEM\1\DATA\A4434.D
Acq Time : 08/27/98 13:19
Sample : DFTPP
Misc : DFTPP

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\DFTPPBNA.M
Title :



Peak Apex is scan: 163

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51	198	30	60	52.0	254316	PASS
68	69	0	2	0.0	0	PASS
69	198	0	99	61.0	298443	PASS
70	69	0	2	1.0	2937	PASS
127	198	40	60	55.7	272413	PASS
197	198	0	1	0.0	0	PASS
198	198	100	100	100.0	489245	PASS
199	198	5	9	6.4	31244	PASS
275	198	10	30	20.1	98380	PASS
365	198	1	99	2.3	11440	PASS
441	443	1	99	90.4	38025	PASS
442	198	41	99	44.2	216234	PASS
443	442	17	23	19.4	42047	PASS

A4434.D DFTPPBNA.M Fri Aug 28 08:32:13 1998

000533

001781

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :		CLIENT SAMPLE ID :	PREP BLANK
PROJECT NAME :		LAB SAMPLE ID :	PAHB004
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :		DATE RECEIVED :	
SAMPLE MATRIX :	SOLID	PRINTED ON :	9/16/98 18:42

% MOISTURE :		ANALYST :	CW
DATE ANALYZED :	9/1/98	DATE EXTRACTED :	8/17/98
DILUTION :	1	EXTRACT VOLUME :	1 mL
INSTRUMENT FILE :	A4532.D	INSTRUMENT ID :	A-HP5970B
SAMPLE WEIGHT :	30 g	TIME ANALYZED :	13:39

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	330 UG/KG	ND UG/KG	
Acenaphthylene	330 UG/KG	ND UG/KG	
Anthracene	330 UG/KG	ND UG/KG	
Benzo(a)anthracene	330 UG/KG	ND UG/KG	
Benzo(a)pyrene	330 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	330 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	330 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	330 UG/KG	ND UG/KG	
Chrysene	330 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	330 UG/KG	ND UG/KG	
Fluoranthene	330 UG/KG	ND UG/KG	
Fluorene	330 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	330 UG/KG	ND UG/KG	
Naphthalene	330 UG/KG	ND UG/KG	
Phenanthrene	330 UG/KG	ND UG/KG	
Pyrene	330 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	667 UG/KG	18 - 137	116

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004 PREP BLANK ID :PAHB004

000354

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :		CLIENT SAMPLE ID :	LAB CONTROL SAMPLE
PROJECT NAME :		LAB SAMPLE ID :	PAHL004
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :		DATE RECEIVED :	
SAMPLE MATRIX :	SOLID	PRINTED ON :	9/16/98 18:43

% MOISTURE :		ANALYST :	CW
DATE ANALYZED :	9/1/98	DATE EXTRACTED :	8/17/98
DILUTION :	1	EXTRACT VOLUME :	1 mL
INSTRUMENT FILE :	A4533.D	INSTRUMENT ID :	A-HP5970B
SAMPLE WEIGHT :	30 g	TIME ANALYZED :	14:16

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	330 UG/KG	240 UG/KG	
Acenaphthylene	330 UG/KG	220 UG/KG	
Anthracene	330 UG/KG	180 UG/KG	
Benzo(a)anthracene	330 UG/KG	ND UG/KG	
Benzo(a)pyrene	330 UG/KG	250 UG/KG	
Benzo(b)fluoranthene	330 UG/KG	230 UG/KG	
Benzo(g,h,i)perylene	330 UG/KG	290 UG/KG	
Benzo(k)fluoranthene	330 UG/KG	270 UG/KG	
Chrysene	330 UG/KG	250 UG/KG	
Dibenzo(a,h)anthracene	330 UG/KG	260 UG/KG	
Fluoranthene	330 UG/KG	310 UG/KG	
Fluorene	330 UG/KG	230 UG/KG	
Indeno(1,2,3-c,d)pyrene	330 UG/KG	270 UG/KG	
Naphthalene	330 UG/KG	240 UG/KG	
Phenanthrene	330 UG/KG	250 UG/KG	
Pyrene	330 UG/KG	280 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	667 UG/KG	18 - 137	77

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004 PREP BLANK ID :PAHB004

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB27-0030MS
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.001MS
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:42

% MOISTURE	: 4.8	ANALYST	: CW
DATE ANALYZED	: 9/1/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 10 mL
INSTRUMENT FILE	: A4535.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 15:30

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	3500 UG/KG	680 UG/KG	
Acenaphthylene	3500 UG/KG	600 UG/KG	
Anthracene	3500 UG/KG	550 UG/KG	
Benzo(a)anthracene	3500 UG/KG	ND UG/KG	
Benzo(a)pyrene	3500 UG/KG	2300 UG/KG	
Benzo(b)fluoranthene	3500 UG/KG	1800 UG/KG	
Benzo(g,h,i)perylene	3500 UG/KG	1400 UG/KG	
Benzo(k)fluoranthene	3500 UG/KG	830 UG/KG	
Chrysene	3500 UG/KG	3900 UG/KG	
Dibenzo(a,h)anthracene	3500 UG/KG	840 UG/KG	
Fluoranthene	3500 UG/KG	1500 UG/KG	
Fluorene	3500 UG/KG	610 UG/KG	
Indeno(1,2,3-c,d)pyrene	3500 UG/KG	870 UG/KG	
Naphthalene	3500 UG/KG	580 UG/KG	
Phenanthrene	3500 UG/KG	3600 UG/KG	
Pyrene	3500 UG/KG	4300 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	700 UG/KG	18 - 137	111

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004 PREP BLANK ID :PAHB004 LCS ID :PAHL004

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

pH

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC.
PROJECT NAME : E&E- WILCOX REFINERY
PROJECT NUMBER :
PRINTED ON : 9/17/98 19:16

PARAMETER: pH

CLIENT SAMPLE ID	SB20-0030	SB21-0030	SB22-0030	SB23-0030
SAMPLE ID	4798.001	4798.002	4798.003	4798.004
SAMPLE MATRIX	SOIL	SOIL	SOIL	SOIL
DATE SAMPLED	8/4/98	8/4/98	8/4/98	8/4/98
DATE RECEIVED	8/5/98	8/5/98	8/5/98	8/5/98
METHOD REFERENCE	SW846-9045C	SW846-9045C	SW846-9045C	SW846-9045C
QUANTITATION LIMIT	0	0	0	0
RESULTS	5.91	7.72	6.16	6.23
UNITS	UNITS	UNITS	UNITS	UNITS
QUALIFIER				
ANALYST	JG	JG	JG	JG
DATE ANALYZED	8/13/98	8/13/98	8/13/98	8/13/98
QC BATCH ID				
PRE-PREP BLANK ID				
PREP BLANK ID				
LCS ID				
LCSD ID				
MS ID				
MSD ID				
DUP ID				

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

pH

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC.
PROJECT NAME : E&E- WILCOX REFINERY
PROJECT NUMBER :
PRINTED ON : 9/17/98 19:19

PARAMETER: pH

CLIENT SAMPLE ID	SB24-0020	SB25-0030	SB26-0020	SB36-6070
SAMPLE ID	4798.005	4798.006	4798.007	4798.008
SAMPLE MATRIX	SOIL	SOIL	SOIL	SOIL
DATE SAMPLED	8/4/98	8/4/98	8/4/98	8/4/98
DATE RECEIVED	8/5/98	8/5/98	8/5/98	8/5/98
METHOD REFERENCE	SW846-9045C	SW846-9045C	SW846-9045C	SW846-9045C
QUANTITATION LIMIT	0	0	0	0
RESULTS	7.06	6.97	7.20	6.40
UNITS	UNITS	UNITS	UNITS	UNITS
QUALIFIER				
ANALYST	JG	JG	JG	JG
DATE ANALYZED	8/13/98	8/13/98	8/13/98	8/13/98
QC BATCH ID				
PRE-PREP BLANK ID				
PREP BLANK ID				
LCS ID				
LCSD ID				
MS ID				
MSD ID				
DUP ID				

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

pH

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC. PROJECT NUMBER :
PROJECT NAME : E&E- WILCOX REFINERY PRINTED ON : 9/17/98 19:31

PARAMETER: pH

CLIENT SAMPLE ID	SB37-6070	SB38-0010		
SAMPLE ID	4798.009	4798.010		
SAMPLE MATRIX	SOIL	SOIL		
DATE SAMPLED	8/4/98	8/4/98		
DATE RECEIVED	8/5/98	8/5/98		
METHOD REFERENCE	SW846-9045C	SW846-9045C		
QUANTITATION LIMIT	0	0		
RESULTS	6.36	6.49		
UNITS	UNITS	UNITS		
QUALIFIER				
ANALYST	JG	JG		
DATE ANALYZED	8/13/98	8/13/98		
QC BATCH ID				
PRE-PREP BLANK ID				
PREP BLANK ID				
LCS ID				
LCSD ID				
MS ID				
MSD ID				
DUP ID				

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

pH

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC.
PROJECT NAME : E&E- WILCOX REFINERY
PROJECT NUMBER :
PRINTED ON : 9/17/98 16:59

PARAMETER: pH

CLIENT SAMPLE ID	SB27-0030	SB28-0020	SB29-0010	SB30-0030
SAMPLE ID	4802.001	4802.002	4802.003	4802.004
SAMPLE MATRIX	SOIL	SOIL	SOIL	SOIL
DATE SAMPLED	8/5/98	8/5/98	8/5/98	8/5/98
DATE RECEIVED	8/7/98	8/7/98	8/7/98	8/7/98
METHOD REFERENCE	SW846-9045C	SW846-9045C	SW846-9045C	SW846-9045C
QUANTITATION LIMIT	0	0	0	0
RESULTS	7.08	6.07	6.30	6.24
UNITS	UNITS	UNITS	UNITS	UNITS
QUALIFIER				
ANALYST	JG	JG	JG	JG
DATE ANALYZED	8/18/98	8/18/98	8/18/98	8/18/98
QC BATCH ID				
PRE-PREP BLANK ID				
PREP BLANK ID				
LCS ID				
LCSD ID				
DUP ID				

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

pH

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC. PROJECT NUMBER :
PROJECT NAME : E&E- WILCOX REFINERY PRINTED ON : 9/17/98 16:59

PARAMETER: pH

CLIENT SAMPLE ID	SB31-0030	SB32-0010	SB32-0010D	SB33-0010
SAMPLE ID	4802.006	4802.009	4802.010	4802.011
SAMPLE MATRIX	SOIL	SOIL	SOIL	SOIL
DATE SAMPLED	8/5/98	8/5/98	8/5/98	8/5/98
DATE RECEIVED	8/7/98	8/7/98	8/7/98	8/7/98
METHOD REFERENCE	SW846-9045C	SW846-9045C	SW846-9045C	SW846-9045C
QUANTITATION LIMIT	0	0	0	0
RESULTS	6.33	5.36	6.66	5.25
UNITS	UNITS	UNITS	UNITS	UNITS
QUALIFIER				
ANALYST	JG	JG	JG	JG
DATE ANALYZED	8/18/98	8/18/98	8/18/98	8/18/98
QC BATCH ID				
PRE-PREP BLANK ID				
PREP BLANK ID				
LCS ID				
LCSD ID				
DUP ID				

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

pH

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC.
PROJECT NAME : E&E- WILCOX REFINERY
PROJECT NUMBER :
PRINTED ON : 9/17/98 17:00

PARAMETER: pH

CLIENT SAMPLE ID	SB34-0010	SB40-3040	SB39-3040	SB43-6070
SAMPLE ID	4802.012	4802.013	4802.015	4802.016
SAMPLE MATRIX	SOIL	SOIL	SOIL	SOIL
DATE SAMPLED	8/5/98	8/5/98	8/5/98	8/5/98
DATE RECEIVED	8/7/98	8/7/98	8/7/98	8/7/98
METHOD REFERENCE	SW846-9045C	SW846-9045C	SW846-9045C	SW846-9045C
QUANTITATION LIMIT	0	0	0	0
RESULTS	5.19	5.32	5.71	5.17
UNITS	UNITS	UNITS	UNITS	UNITS
QUALIFIER				
ANALYST	JG	JG	JG	JG
DATE ANALYZED	8/18/98	8/18/98	8/18/98	8/18/98
QC BATCH ID				
PRE-PREP BLANK ID				
PREP BLANK ID				
LCS ID				
LCSD ID				
DUP ID				

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

pH

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC. PROJECT NUMBER :
PROJECT NAME : E&E- WILCOX REFINERY PRINTED ON : 9/17/98 17:00

PARAMETER: pH

CLIENT SAMPLE ID	SB44-4050	SB45-0010	SB35-0030	SB41-2030
SAMPLE ID	4802.017	4802.018	4802.019	4802.020
SAMPLE MATRIX	SOIL	SOIL	SOIL	SOIL
DATE SAMPLED	8/5/98	8/5/98	8/6/98	8/6/98
DATE RECEIVED	8/7/98	8/7/98	8/7/98	8/7/98
METHOD REFERENCE	SW846-9045C	SW846-9045C	SW846-9045C	SW846-9045C
QUANTITATION LIMIT	0	0	0	0
RESULTS	5.08	4.39	5.06	4.92
UNITS	UNITS	UNITS	UNITS	UNITS
QUALIFIER				
ANALYST	JG	JG	JG	JG
DATE ANALYZED	8/18/98	8/18/98	8/20/98	8/20/98
QC BATCH ID				
PRE-PREP BLANK ID				
PREP BLANK ID				
LCS ID				
LCSD ID				
DUP ID				

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

pH

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC. PROJECT NUMBER :
PROJECT NAME : E&E- WILCOX REFINERY PRINTED ON : 9/17/98 17:00

PARAMETER: pH

CLIENT SAMPLE ID	SB41-2030D	SB42-2030	SB46-0612	SB46-0612D
SAMPLE ID	4802.021	4802.023	4802.026	4802.027
SAMPLE MATRIX	SOIL	SOIL	SOIL	SOIL
DATE SAMPLED	8/6/98	8/6/98	8/6/98	8/6/98
DATE RECEIVED	8/7/98	8/7/98	8/7/98	8/7/98
METHOD REFERENCE	SW846-9045C	SW846-9045C	SW846-9045C	SW846-9045C
QUANTITATION LIMIT	0	0	0	0
RESULTS	4.56	4.80	6.21	6.00
UNITS	UNITS	UNITS	UNITS	UNITS
QUALIFIER				
ANALYST	JG	JG	JG	JG
DATE ANALYZED	8/20/98	8/20/98	8/20/98	8/20/98
QC BATCH ID				
PRE-PREP BLANK ID				
PREP BLANK ID				
LCS ID				
LCSD ID				
DUP ID				

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

pH

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC.
PROJECT NAME : E&E- WILCOX REFINERY
PROJECT NUMBER :
PRINTED ON : 9/17/98 19:16

PARAMETER: pH

CLIENT SAMPLE ID	SB20-0030	SB21-0030	SB22-0030	SB23-0030
SAMPLE ID	4798.001	4798.002	4798.003	4798.004
SAMPLE MATRIX	SOIL	SOIL	SOIL	SOIL
DATE SAMPLED	8/4/98	8/4/98	8/4/98	8/4/98
DATE RECEIVED	8/5/98	8/5/98	8/5/98	8/5/98
METHOD REFERENCE	SW846-9045C	SW846-9045C	SW846-9045C	SW846-9045C
QUANTITATION LIMIT	0	0	0	0
RESULTS	5.91	7.72	6.16	6.23
UNITS	UNITS	UNITS	UNITS	UNITS
QUALIFIER				
ANALYST	JG	JG	JG	JG
DATE ANALYZED	8/13/98	8/13/98	8/13/98	8/13/98
QC BATCH ID				
PRE-PREP BLANK ID				
PREP BLANK ID				
LCS ID				
LCSD ID				
MS ID				
MSD ID				
DUP ID				

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

pH

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC. PROJECT NUMBER :
PROJECT NAME : E&E- WILCOX REFINERY PRINTED ON : 9/17/98 19:19

PARAMETER: pH

CLIENT SAMPLE ID	SB24-0020	SB25-0030	SB26-0020	SB36-6070
SAMPLE ID	4798.005	4798.006	4798.007	4798.008
SAMPLE MATRIX	SOIL	SOIL	SOIL	SOIL
DATE SAMPLED	8/4/98	8/4/98	8/4/98	8/4/98
DATE RECEIVED	8/5/98	8/5/98	8/5/98	8/5/98
METHOD REFERENCE	SW846-9045C	SW846-9045C	SW846-9045C	SW846-9045C
QUANTITATION LIMIT	0	0	0	0
RESULTS	7.06	6.97	7.20	6.40
UNITS	UNITS	UNITS	UNITS	UNITS
QUALIFIER				
ANALYST	JG	JG	JG	JG
DATE ANALYZED	8/13/98	8/13/98	8/13/98	8/13/98
QC BATCH ID				
PRE-PREP BLANK ID				
PREP BLANK ID				
LCS ID				
LCSD ID				
MS ID				
MSD ID				
DUP ID				

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

pH

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC. PROJECT NUMBER :
PROJECT NAME : E&E- WILCOX REFINERY PRINTED ON : 9/17/98 19:31

PARAMETER: pH

CLIENT SAMPLE ID	SB37-6070	SB38-0010		
SAMPLE ID	4798.009	4798.010		
SAMPLE MATRIX	SOIL	SOIL		
DATE SAMPLED	8/4/98	8/4/98		
DATE RECEIVED	8/5/98	8/5/98		
METHOD REFERENCE	SW846-9045C	SW846-9045C		
QUANTITATION LIMIT	0	0		
RESULTS	6.36	6.49		
UNITS	UNITS	UNITS		
QUALIFIER				
ANALYST	JG	JG		
DATE ANALYZED	8/13/98	8/13/98		
QC BATCH ID				
PRE-PREP BLANK ID				
PREP BLANK ID				
LCS ID				
LCSD ID				
MS ID				
MSD ID				
DUP ID				

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

pH

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC.
PROJECT NAME : E&E- WILCOX REFINERY
PROJECT NUMBER :
PRINTED ON : 9/17/98 16:59

PARAMETER: pH

CLIENT SAMPLE ID	SB27-0030	SB28-0020	SB29-0010	SB30-0030
SAMPLE ID	4802.001	4802.002	4802.003	4802.004
SAMPLE MATRIX	SOIL	SOIL	SOIL	SOIL
DATE SAMPLED	8/5/98	8/5/98	8/5/98	8/5/98
DATE RECEIVED	8/7/98	8/7/98	8/7/98	8/7/98
METHOD REFERENCE	SW846-9045C	SW846-9045C	SW846-9045C	SW846-9045C
QUANTITATION LIMIT	0	0	0	0
RESULTS	7.08	6.07	6.30	6.24
UNITS	UNITS	UNITS	UNITS	UNITS
QUALIFIER				
ANALYST	JG	JG	JG	JG
DATE ANALYZED	8/18/98	8/18/98	8/18/98	8/18/98
QC BATCH ID				
PRE-PREP BLANK ID				
PREP BLANK ID				
LCS ID				
LCSD ID				
DUP ID				

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

pH

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC. PROJECT NUMBER :
PROJECT NAME : E&E- WILCOX REFINERY PRINTED ON : 9/17/98 16:59

PARAMETER: pH

CLIENT SAMPLE ID	SB31-0030	SB32-0010	SB32-0010D	SB33-0010
SAMPLE ID	4802.006	4802.009	4802.010	4802.011
SAMPLE MATRIX	SOIL	SOIL	SOIL	SOIL
DATE SAMPLED	8/5/98	8/5/98	8/5/98	8/5/98
DATE RECEIVED	8/7/98	8/7/98	8/7/98	8/7/98
METHOD REFERENCE	SW846-9045C	SW846-9045C	SW846-9045C	SW846-9045C
QUANTITATION LIMIT	0	0	0	0
RESULTS	6.33	5.36	6.66	5.25
UNITS	UNITS	UNITS	UNITS	UNITS
QUALIFIER				
ANALYST	JG	JG	JG	JG
DATE ANALYZED	8/18/98	8/18/98	8/18/98	8/18/98
QC BATCH ID				
PRE-PREP BLANK ID				
PREP BLANK ID				
LCS ID				
LCSD ID				
DUP ID				

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

pH

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC.
PROJECT NAME : E&E- WILCOX REFINERY
PROJECT NUMBER :
PRINTED ON : 9/17/98 17:00

PARAMETER: pH

CLIENT SAMPLE ID	SB34-0010	SB40-3040	SB39-3040	SB43-6070
SAMPLE ID	4802.012	4802.013	4802.015	4802.016
SAMPLE MATRIX	SOIL	SOIL	SOIL	SOIL
DATE SAMPLED	8/5/98	8/5/98	8/5/98	8/5/98
DATE RECEIVED	8/7/98	8/7/98	8/7/98	8/7/98
METHOD REFERENCE	SW846-9045C	SW846-9045C	SW846-9045C	SW846-9045C
QUANTITATION LIMIT	0	0	0	0
RESULTS	5.19	5.32	5.71	5.17
UNITS	UNITS	UNITS	UNITS	UNITS
QUALIFIER				
ANALYST	JG	JG	JG	JG
DATE ANALYZED	8/18/98	8/18/98	8/18/98	8/18/98
QC BATCH ID				
PRE-PREP BLANK ID				
PREP BLANK ID				
LCS ID				
LCSD ID				
DUP ID				

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

pH

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC. PROJECT NUMBER :
PROJECT NAME : E&E- WILCOX REFINERY PRINTED ON : 9/17/98 17:00

PARAMETER: pH

CLIENT SAMPLE ID	SB44-4050	SB45-0010	SB35-0030	SB41-2030
SAMPLE ID	4802.017	4802.018	4802.019	4802.020
SAMPLE MATRIX	SOIL	SOIL	SOIL	SOIL
DATE SAMPLED	8/5/98	8/5/98	8/6/98	8/6/98
DATE RECEIVED	8/7/98	8/7/98	8/7/98	8/7/98
METHOD REFERENCE	SW846-9045C	SW846-9045C	SW846-9045C	SW846-9045C
QUANTITATION LIMIT	0	0	0	0
RESULTS	5.08	4.39	5.06	4.92
UNITS	UNITS	UNITS	UNITS	UNITS
QUALIFIER				
ANALYST	JG	JG	JG	JG
DATE ANALYZED	8/18/98	8/18/98	8/20/98	8/20/98
QC BATCH ID				
PRE-PREP BLANK ID				
PREP BLANK ID				
LCS ID				
LCSD ID				
DUP ID				

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

pH

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC.
PROJECT NAME : E&E- WILCOX REFINERY
PROJECT NUMBER :
PRINTED ON : 9/17/98 17:00

PARAMETER: pH

CLIENT SAMPLE ID	SB41-2030D	SB42-2030	SB46-0612	SB46-0612D
SAMPLE ID	4802.021	4802.023	4802.026	4802.027
SAMPLE MATRIX	SOIL	SOIL	SOIL	SOIL
DATE SAMPLED	8/6/98	8/6/98	8/6/98	8/6/98
DATE RECEIVED	8/7/98	8/7/98	8/7/98	8/7/98
METHOD REFERENCE	SW846-9045C	SW846-9045C	SW846-9045C	SW846-9045C
QUANTITATION LIMIT	0	0	0	0
RESULTS	4.56)	4.80	6.21	6.00
UNITS	UNITS	UNITS	UNITS	UNITS
QUALIFIER				
ANALYST	JG	JG	JG	JG
DATE ANALYZED	8/20/98	8/20/98	8/20/98	8/20/98
QC BATCH ID				
PRE-PREP BLANK ID				
PREP BLANK ID				
LCS ID				
LCSD ID				
DUP ID				

Quantitation Report

Data File : H:\GCMS-A\A4491.D
Acq Time : 8/30/98 15:15
Sample : SB20-0030
Misc : 4798.001 30GM/1ML
Quant Time: Aug 31 9:58 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\DFTPPBNA.M
Title :
Last Update :
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	5.18	152	32758	20.00	ng/uL	0.02
20) CI40 Naphthalene-d8	8.16	136	1172513	20.00	ng/uL	0.00
35) CI50 Acenaphthene-d10	12.39	164	1561209	20.00	ng/uL	0.01
56) CI60 Phenanthrene-d10	15.93	188	2130438	20.00	ng/uL	0.03
68) CI70 Chrysene-d12	22.30	240	549749	20.00	ng/uL	0.04
76) CI75 Perylene-d12	25.48	264	504253	20.00	ng/uL	0.09
System Monitoring Compounds						%Recovery
4) CS50 2-Fluorophenol	0.00	112	0	0.00	ng/uL	0.00%
5) CS45 Phenol-d5	0.00	99	0	0.00	ng/uL	0.00%
8) CS70 2-Chlorophenol-d4	0.00	132	0	0.00	ng/uL	0.00%
12) CS75 1,2-Dichlorobenzene-d	0.00	152	0	0.00	ng/uL	0.00%
21) CS20 Nitrobenzene-d5	0.00	82	0	0.00	ng/uL	0.00%
39) CS25 2-Fluorobiphenyl	0.00	172	0	0.00	ng/uL	0.00%
57) CS55 2,4,6-Tribromophenol	0.00	330	0	0.00	ng/uL	0.00%
70) CS30 Terphenyl-d14	20.02	244	182699	4.20	ng/uL	8.41%
Target Compounds						Qvalue
15) C355 2-Methylphenol	6.22	108	3007	1.30	ng/uL#	8
19) C375 Hexachloroethane	6.42	117	1394	1.18	ng/uL#	21
25) C425 2,4-Dimethylphenol	7.85	107	24572	1.07	ng/uL#	67
30) C450 Naphthalene	8.21	128	166034	2.78	ng/uL	81
34) C470 2-Methylnaphthalene	9.92	142	492101	12.20	ng/uL	100
41) C530 2-Nitroaniline	11.49	65	35971	1.27	ng/uL#	9
45) C545 3-Nitroaniline	12.66	138	6713	1.15	ng/uL#	1
48) C560 4-Nitrophenol	13.30	109	10328	1.19	ng/uL#	1
55) C595 4-Nitroaniline	14.08	138	13214	2.26	ng/uL#	71
63) C640 Phenanthrene	15.97	178	557117	4.44	ng/uL	97
69) C715 Pyrene	19.33	202	257278	3.77	ng/uL#	76
75) C740 Chrysene	22.36	228	65996	1.83	ng/uL#	47
83) C790 Benzo(g,h,i)perylene	27.91	276	50949	2.68	ng/uL	80

(#) = qualifier out of range (m) = manual integration

000017

001801

Quantitation Report

Data File : H:\GCMS-A\A4492.D
Acq Time : 08/30/98 15:52
Sample : SB21-0030
Misc : 4798.002 30GM/1ML
Quant Time: Aug 31 9:44 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\DFTPPBNA.M
Title :
Last Update :
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	5.18	152	118888	20.00	ng/uL	0.02
20) CI40 Naphthalene-d8	8.16	136	1139408	20.00	ng/uL	0.00
35) CI50 Acenaphthene-d10	12.38	164	1248425	20.00	ng/uL	0.00
56) CI60 Phenanthrene-d10	15.91	188	2030243	20.00	ng/uL	0.02
68) CI70 Chrysene-d12	22.29	240	707153	20.00	ng/uL	0.03
76) CI75 Perylene-d12	25.46	264	583607	20.00	ng/uL	0.07
System Monitoring Compounds						%Recovery
4) CS50 2-Fluorophenol	0.00	112	0	0.00	ng/uL	0.00%
5) CS45 Phenol-d5	0.00	99	0	0.00	ng/uL	0.00%
8) CS70 2-Chlorophenol-d4	0.00	132	0	0.00	ng/uL	0.00%
12) CS75 1,2-Dichlorobenzene-d	0.00	152	0	0.00	ng/uL	0.00%
21) CS20 Nitrobenzene-d5	0.00	82	0	0.00	ng/uL	0.00%
39) CS25 2-Fluorobiphenyl	0.00	172	0	0.00	ng/uL	0.00%
57) CS55 2,4,6-Tribromophenol	0.00	330	0	0.00	ng/uL	0.00%
70) CS30 Terphenyl-d14	20.00	244	1090149	19.50	ng/uL	39.01%
Target Compounds						Qvalue
34) C470 2-Methylnaphthalene	9.92	142	40411	1.03	ng/uL	82
63) C640 Phenanthrene	15.97	178	493419	4.13	ng/uL	98
67) C655 Fluoranthene	18.81	202	223708	2.08	ng/uL	96
69) C715 Pyrene	19.30	202	317866	3.62	ng/uL#	64
72) C745 bis(2-ethylhexyl)phth	23.02	149	122148	1.78	ng/uL	75
74) C730 Benzo(a)anthracene	22.28	228	73130	1.50	ng/uL#	64
75) C740 Chrysene	22.34	228	122579	2.64	ng/uL	84
78) C765 Benzo(b)fluoranthene	24.71	252	78591	1.94	ng/uLm	58
80) C775 Benzo(a)pyrene	25.34	252	55447	1.71	ng/uL	95
83) C790 Benzo(g,h,i)perylene	27.90	276	62034	2.81	ng/uL	84

(#) = qualifier out of range (m) = manual integration

000024

001802

Quantitation Report

Data File : H:\GCMS-A\A4493.D
Acq Time : 08/30/98 16:29
Sample : SB22-0030
Misc : 4798.003 30GM/1ML
Quant Time: Aug 31 9:45 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\DFTPPBNA.M
Title :
Last Update :
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	5.20	152	78516	20.00	ng/uL	0.04
20) CI40 Naphthalene-d8	8.16	136	905280	20.00	ng/uL	0.00
35) CI50 Acenaphthene-d10	12.37	164	1016413	20.00	ng/uL	0.00
56) CI60 Phenanthrene-d10	15.92	188	1899827	20.00	ng/uL	0.02
68) CI70 Chrysene-d12	22.29	240	707941	20.00	ng/uL	0.03
76) CI75 Perylene-d12	25.46	264	578660	20.00	ng/uL	0.07
System Monitoring Compounds						%Recovery
4) CS50 2-Fluorophenol	0.00	112	0	0.00	ng/uL	0.00%
5) CS45 Phenol-d5	0.00	99	0	0.00	ng/uL	0.00%
8) CS70 2-Chlorophenol-d4	0.00	132	0	0.00	ng/uL	0.00%
12) CS75 1,2-Dichlorobenzene-d	0.00	152	0	0.00	ng/uL	0.00%
21) CS20 Nitrobenzene-d5	0.00	82	0	0.00	ng/uL	0.00%
39) CS25 2-Fluorobiphenyl	0.00	172	0	0.00	ng/uL	0.00%
57) CS55 2,4,6-Tribromophenol	0.00	330	0	0.00	ng/uL	0.00%
70) CS30 Terphenyl-d14	20.00	244	1137375	20.33	ng/uL	40.65%
Target Compounds						Qvalue
72) C745 bis(2-ethylhexyl)phth	23.02	149	242049	3.51	ng/uL	93

(#) = qualifier out of range (m) = manual integration

000019

001803

Quantitation Report

Data File : H:\GCMS-A\A4489.D
Acq Time : 08/30/98 14:02
Sample : SB23-0030
Misc : 4798.004 30GM/1ML
Quant Time: Aug 31 9:20 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\DFTPPBNA.M
Title :
Last Update :
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	5.22	152	78294	20.00	ng/uL	0.05
20) CI40 Naphthalene-d8	8.17	136	1283040	20.00	ng/uL	0.00
35) CI50 Acenaphthene-d10	12.37	164	1248893	20.00	ng/uL	0.00
56) CI60 Phenanthrene-d10	15.91	188	1941911	20.00	ng/uL	0.02
68) CI70 Chrysene-d12	22.28	240	529486	20.00	ng/uL	0.02
76) CI75 Perylene-d12	25.45	264	361125	20.00	ng/uL	0.06
System Monitoring Compounds						%Recovery
4) CS50 2-Fluorophenol	0.00	112	0	0.00	ng/uL	0.00%
5) CS45 Phenol-d5	0.00	99	0	0.00	ng/uL	0.00%
8) CS70 2-Chlorophenol-d4	0.00	132	0	0.00	ng/uL	0.00%
12) CS75 1,2-Dichlorobenzene-d	5.22	152	78282	22.62	ng/uL	45.24%
21) CS20 Nitrobenzene-d5	0.00	82	0	0.00	ng/uL	0.00%
39) CS25 2-Fluorobiphenyl	0.00	172	0	0.00	ng/uL	0.00%
57) CS55 2,4,6-Tribromophenol	0.00	330	0	0.00	ng/uL	0.00%
70) CS30 Terphenyl-d14	20.01	244	867521	20.73	ng/uL	41.46%
Target Compounds						Qvalue
30) C450 Naphthalene	8.21	128	346586	5.30	ng/uL	80
34) C470 2-Methylnaphthalene	9.92	142	740661	16.78	ng/uL	92
59) C615 N-nitrosodiphenylamin	14.27	169	114386	2.07	ng/uL#	46
63) C640 Phenanthrene	15.98	178	5194868	45.47	ng/uL	99
64) C645 Anthracene	16.08	178	389148	3.45	ng/uL	97
65) C647 Carbazole	16.65	167	184183	2.49	ng/uLm	1
67) C655 Fluoranthene	18.81	202	455897	4.44	ng/uL	94
69) C715 Pyrene	19.31	202	2374300	36.11	ng/uL	94
72) C745 bis(2-ethylhexyl)phth	23.02	149	85371	1.66	ng/uL	92
73) C725 3,3`-Dichlorobenzidin	22.45	252	18966	10.96	ng/uL#	31
74) C730 Benzo(a)anthracene	22.27	228	408067	11.16	ng/uL	93
75) C740 Chrysene	22.33	228	869092	25.03	ng/uL	93
78) C765 Benzo(b)fluoranthene	24.68	252	187259	7.49	ng/uLm	90
79) C770 Benzo(k)fluoranthene	24.72	252	44235	1.88	ng/uLm	93
80) C775 Benzo(a)pyrene	25.31	252	199526	9.96	ng/uL#	89
81) C780 Indeno(1,2,3-c,d)pyre	27.45	276	60752	4.77	ng/uL#	88
82) C785 Dibenzo(a,h)anthracen	27.54	278	56821	4.31	ng/uL	92
83) C790 Benzo(g,h,i)perylene	27.88	276	228879	16.78	ng/uL	94

(#) = qualifier out of range (m) = manual integration

000030

Quantitation Report

Data File : H:\GCMS-A\A4490.D
Acq Time : 08/30/98 14:38
Sample : SB24-0020
Misc : 4798.005 30GM/1ML
Quant Time: Aug 31 10:01 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\DFTPPBNA.M
Title :
Last Update :
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	5.22	152	83461	20.00	ng/uL	0.05
20) CI40 Naphthalene-d8	8.19	136	1449259	20.00	ng/uL	0.02
35) CI50 Acenaphthene-d10	12.46	164	1419981	20.00	ng/uL	0.08
56) CI60 Phenanthrene-d10	16.01	188	1861533	20.00	ng/uL	0.12
68) CI70 Chrysene-d12	22.31	240	545805	20.00	ng/uL	0.05
76) CI75 Perylene-d12	25.46	264	409582	20.00	ng/uL	0.07
System Monitoring Compounds						%Recovery
4) CS50 2-Fluorophenol	0.00	112	0	0.00	ng/uL	0.00%
5) CS45 Phenol-d5	0.00	99	0	0.00	ng/uL	0.00%
8) CS70 2-Chlorophenol-d4	0.00	132	0	0.00	ng/uL	0.00%
12) CS75 1,2-Dichlorobenzene-d	5.22	152	84744	22.97	ng/uL	45.95%
21) CS20 Nitrobenzene-d5	6.73	82	5208	0.21	ng/uL	0.42%
39) CS25 2-Fluorobiphenyl	11.04	172	87829	1.04	ng/uL	2.08%
57) CS55 2,4,6-Tribromophenol	0.00	330	0	0.00	ng/uL	0.00%
70) CS30 Terphenyl-d14	20.04	244	652593	15.13	ng/uL	30.25%
Target Compounds						Qvalue
17) C365 4-Methylphenol	6.62	108	7922	1.26	ng/uLm	1
23) C415 Isophorone	7.33	82	133887	2.41	ng/uL#	1
28) C440 2,4-Dichlorophenol	8.09	162	20996	1.08	ng/uL#	40
30) C450 Naphthalene	8.23	128	205260	2.78	ng/uL#	80
31) C455 4-Chloroaniline	8.45	127	16776	1.06	ng/uL#	1
33) C465 4-Chloro-3-methylphen	10.06	107	35969	1.43	ng/uL#	18
40) C525 2-Chloronaphthalene	11.13	162	81118	1.02	ng/uL#	1
41) C530 2-Nitroaniline	11.56	65	41714	1.62	ng/uL#	7
43) C543 2,6-Dinitrotoluene	12.29	165	62742	2.40	ng/uL#	82
45) C545 3-Nitroaniline	12.69	138	24402	4.61	ng/uL#	11
46) C550 Acenaphthene	12.52	153	138953	1.58	ng/uL	93
47) C555 2,4-Dinitrophenol	12.92	184	24235	2.43	ng/uL#	1
49) C570 2,4-Dinitrotoluene	13.20	165	67751	2.12	ng/uL#	61
54) C590 Fluorene	13.79	166	233099	2.50	ng/uL#	62
55) C595 4-Nitroaniline	14.14	138	13575	2.56	ng/uL#	32
58) C610 4,6-Dinitro-2-methylp	14.24	198	56739	3.73	ng/uL#	1
63) C640 Phenanthrene	16.07	178	2141958	19.56	ng/uL	89
64) C645 Anthracene	16.18	178	114893	1.06	ng/uL#	61
65) C647 Carbazole	16.73	167	259901	3.66	ng/uL#	58
67) C655 Fluoranthene	18.89	202	255715	2.60	ng/uL	82
69) C715 Pyrene	19.38	202	2524411	37.24	ng/uLm	94
74) C730 Benzo(a)anthracene	22.36	228	590168	15.66	ng/uLm	63
75) C740 Chrysene	22.51	228	65213	1.82	ng/uLm	1

(#) = qualifier out of range (m) = manual integration

001805

Quantitation Report

Data File : H:\GCMS-A\A4487.D
Acq Time : 08/30/98 12:13
Sample : SB25-0030
Misc : 4798.006 30GM/1ML
Quant Time: Aug 31 9:03 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\DFTPPBNA.M
Title :
Last Update :
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	5.24	152	41443	20.00	ng/uL	0.07
20) CI40 Naphthalene-d8	8.17	136	920354	20.00	ng/uL	0.00
35) CI50 Acenaphthene-d10	12.37	164	988603	20.00	ng/uL	0.00
56) CI60 Phenanthrene-d10	15.90	188	1851965	20.00	ng/uL	0.00
68) CI70 Chrysene-d12	22.28	240	702811	20.00	ng/uL	0.02
76) CI75 Perylene-d12	25.43	264	435790	20.00	ng/uL	0.04
System Monitoring Compounds						%Recovery
4) CS50 2-Fluorophenol	0.00	112	0	0.00	ng/uL	0.00%
5) CS45 Phenol-d5	0.00	99	0	0.00	ng/uL	0.00%
8) CS70 2-Chlorophenol-d4	0.00	132	0	0.00	ng/uL	0.00%
12) CS75 1,2-Dichlorobenzene-d	0.00	152	0	0.00	ng/uL	0.00%
21) CS20 Nitrobenzene-d5	0.00	82	0	0.00	ng/uL	0.00%
39) CS25 2-Fluorobiphenyl	0.00	172	0	0.00	ng/uL	0.00%
57) CS55 2,4,6-Tribromophenol	0.00	330	0	0.00	ng/uL	0.00%
70) CS30 Terphenyl-d14	20.00	244	557011	10.03	ng/uL	20.05%
Target Compounds						Qvalue
30) C450 Naphthalene	8.22	128	135355	2.89	ng/uLm	82
34) C470 2-Methylnaphthalene	9.92	142	227312	7.18	ng/uLm	79
54) C590 Fluorene	13.69	166	70388	1.09	ng/uLm	87
63) C640 Phenanthrene	15.98	178	4294296	39.41	ng/uL	98
64) C645 Anthracene	16.08	178	487902	4.53	ng/uL	94
65) C647 Carbazole	16.63	167	403239	5.71	ng/uL	92
67) C655 Fluoranthene	18.81	202	2453585	25.05	ng/uL	91
69) C715 Pyrene	19.30	202	3081094	35.30	ng/uL	86
73) C725 3,3`-Dichlorobenzidin	22.57	252	9305	4.05	ng/uL#	1
74) C730 Benzo(a)anthracene	22.26	228	868912	17.90	ng/uL	91
75) C740 Chrysene	22.32	228	1106063	24.00	ng/uL	94
78) C765 Benzo(b)fluoranthene	24.67	252	462666	15.33	ng/uL#	88
79) C770 Benzo(k)fluoranthene	24.73	252	140346	4.94	ng/uLm	93
80) C775 Benzo(a)pyrene	25.30	252	295242	12.21	ng/uL#	93
81) C780 Indeno(1,2,3-c,d)pyre	27.42	276	93015	6.06	ng/uLm	68
82) C785 Dibenzo(a,h)anthracen	27.60	278	20760	1.31	ng/uLm	61
83) C790 Benzo(g,h,i)perylene	27.85	276	129614	7.87	ng/uL	90

(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : H:\GCMS-A\A4488.D
Acq Time : 08/30/98 13:25
Sample : SB26-0020
Misc : 4798.007 30GM/1ML
Quant Time: Aug 31 9:14 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\DFTPPBNA.M
Title :
Last Update :
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	5.20	152	28511	20.00	ng/uL	0.04
20) CI40 Naphthalene-d8	8.16	136	864777	20.00	ng/uL	0.00
35) CI50 Acenaphthene-d10	12.37	164	1036878	20.00	ng/uL	0.00
56) CI60 Phenanthrene-d10	15.91	188	1789275	20.00	ng/uL	0.02
68) CI70 Chrysene-d12	22.27	240	718311	20.00	ng/uL	0.01
76) CI75 Perylene-d12	25.43	264	486373	20.00	ng/uL	0.04
System Monitoring Compounds						%Recovery
4) CS50 2-Fluorophenol	0.00	112	0	0.00	ng/uL	0.00%
5) CS45 Phenol-d5	0.00	99	0	0.00	ng/uL	0.00%
8) CS70 2-Chlorophenol-d4	0.00	132	0	0.00	ng/uL	0.00%
12) CS75 1,2-Dichlorobenzene-d	0.00	152	0	0.00	ng/uL	0.00%
21) CS20 Nitrobenzene-d5	0.00	82	0	0.00	ng/uL	0.00%
39) CS25 2-Fluorobiphenyl	0.00	172	0	0.00	ng/uL	0.00%
57) CS55 2,4,6-Tribromophenol	0.00	330	0	0.00	ng/uL	0.00%
70) CS30 Terphenyl-d14	19.99	244	1292334	22.76	ng/uL	45.52%
Target Compounds						Qvalue
30) C450 Naphthalene	8.21	128	83681	1.90	ng/uL#	79
34) C470 2-Methylnaphthalene	9.92	142	156460	5.26	ng/uL	97
63) C640 Phenanthrene	15.97	178	3502026	33.27	ng/uL	98
64) C645 Anthracene	16.07	178	168685	1.62	ng/uL	91
65) C647 Carbazole	16.64	167	186269	2.73	ng/uL	84
67) C655 Fluoranthene	18.80	202	437495	4.62	ng/uL	89
69) C715 Pyrene	19.29	202	1885312	21.13	ng/uL	85
72) C745 bis(2-ethylhexyl)phth	23.02	149	206379	2.95	ng/uL	96
73) C725 3,3`-Dichlorobenzidin	22.56	252	3832	1.63	ng/uL#	1
74) C730 Benzo(a)anthracene	22.26	228	430774	8.68	ng/uL	83
75) C740 Chrysene	22.33	228	894658	18.99	ng/uL	94
78) C765 Benzo(b)fluoranthene	24.68	252	257932	7.66	ng/uLm	96
79) C770 Benzo(k)fluoranthene	24.72	252	71877	2.27	ng/uLm	92
80) C775 Benzo(a)pyrene	25.30	252	183006	6.78	ng/uL#	86
81) C780 Indeno(1,2,3-c,d)pyre	27.43	276	60587	3.53	ng/uL	91
83) C790 Benzo(g,h,i)perylene	27.85	276	159051	8.66	ng/uL	95

(#) = qualifier out of range (m) = manual integration

000120

001807

Quantitation Report

Data File : H:\GCMS-A\A4494.D
Acq Time : 08/30/98 17:06 Operator: CW
Sample : SB36-6070 Inst : A-HP5970B
Misc : 4798.008 30GM/1ML Multiplr: 1.00
Quant Time: Aug 31 9:49 1998

Method : C:\HPCHEM\1\METHODS\DFTPPBNA.M
Title :
Last Update :
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	5.20	152	42102	20.00	ng/uL	0.04
20) CI40 Naphthalene-d8	8.16	136	873242	20.00	ng/uL	0.00
35) CI50 Acenaphthene-d10	12.37	164	1148065	20.00	ng/uL	0.00
56) CI60 Phenanthrene-d10	15.91	188	2020649	20.00	ng/uL	0.02
68) CI70 Chrysene-d12	22.28	240	693518	20.00	ng/uL	0.02
76) CI75 Perylene-d12	25.45	264	538085	20.00	ng/uL	0.06
System Monitoring Compounds						%Recovery
4) CS50 2-Fluorophenol	0.00	112	0	0.00	ng/uL	0.00%
5) CS45 Phenol-d5	0.00	99	0	0.00	ng/uL	0.00%
8) CS70 2-Chlorophenol-d4	0.00	132	0	0.00	ng/uL	0.00%
12) CS75 1,2-Dichlorobenzene-d	0.00	152	0	0.00	ng/uL	0.00%
21) CS20 Nitrobenzene-d5	0.00	82	0	0.00	ng/uL	0.00%
39) CS25 2-Fluorobiphenyl	0.00	172	0	0.00	ng/uL	0.00%
57) CS55 2,4,6-Tribromophenol	0.00	330	0	0.00	ng/uL	0.00%
70) CS30 Terphenyl-d14	20.00	244	1074647	19.60	ng/uL	39.21%
Target Compounds						Qvalue
72) C745 bis(2-ethylhexyl)phth	23.02	149	183286	2.72	ng/uL	94

(#) = qualifier out of range (m) = manual integration

000125

001808

Quantitation Report

Data File : H:\GCMS-A\A4495.D
Acq Time : 08/30/98 17:43
Sample : SB37-6070
Misc : 4798.009 30GM/1ML
Quant Time: Aug 31 9:51 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\DFTPPBNA.M
Title :
Last Update :
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	5.20	152	32422	20.00	ng/uL	0.04
20) CI40 Naphthalene-d8	8.16	136	678895	20.00	ng/uL	0.00
35) CI50 Acenaphthene-d10	12.37	164	1051751	20.00	ng/uL	0.00
56) CI60 Phenanthrene-d10	15.91	188	1736210	20.00	ng/uL	0.01
68) CI70 Chrysene-d12	22.29	240	489495	20.00	ng/uL	0.03
76) CI75 Perylene-d12	25.47	264	373762	20.00	ng/uL	0.08
System Monitoring Compounds						%Recovery
4) CS50 2-Fluorophenol	0.00	112	0	0.00	ng/uL	0.00%
5) CS45 Phenol-d5	0.00	99	0	0.00	ng/uL	0.00%
8) CS70 2-Chlorophenol-d4	0.00	132	0	0.00	ng/uL	0.00%
12) CS75 1,2-Dichlorobenzene-d	0.00	152	0	0.00	ng/uL	0.00%
21) CS20 Nitrobenzene-d5	0.00	82	0	0.00	ng/uL	0.00%
39) CS25 2-Fluorobiphenyl	0.00	172	0	0.00	ng/uL	0.00%
57) CS55 2,4,6-Tribromophenol	0.00	330	0	0.00	ng/uL	0.00%
70) CS30 Terphenyl-d14	20.00	244	347827	8.99	ng/uL	17.98%
Target Compounds						Qvalue
72) C745 bis(2-ethylhexyl)phth	23.02	149	58183	1.22	ng/uL	79

(#) = qualifier out of range (m) = manual integration

000139

001809

Quantitation Report

Data File : H:\GCMS-A\A4496.D
Acq Time : 08/30/98 18:20
Sample : SB38-0010
Misc : 4798.010 30GM/1ML
Quant Time: Aug 31 10:08 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\DFTPPBNA.M
Title :
Last Update :
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	5.20	152	33735	20.00	ng/uL	0.04
20) CI40 Naphthalene-d8	8.16	136	874817	20.00	ng/uL	0.00
35) CI50 Acenaphthene-d10	12.37	164	1153519	20.00	ng/uL	0.00
56) CI60 Phenanthrene-d10	15.91	188	2005363	20.00	ng/uL	0.02
68) CI70 Chrysene-d12	22.29	240	639808	20.00	ng/uL	0.03
76) CI75 Perylene-d12	25.45	264	510895	20.00	ng/uL	0.06
System Monitoring Compounds						%Recovery
4) CS50 2-Fluorophenol	0.00	112	0	0.00	ng/uL	0.00%
5) CS45 Phenol-d5	0.00	99	0	0.00	ng/uL	0.00%
8) CS70 2-Chlorophenol-d4	0.00	132	0	0.00	ng/uL	0.00%
12) CS75 1,2-Dichlorobenzene-d	5.20	152	33722	22.62	ng/uL	45.23%
21) CS20 Nitrobenzene-d5	0.00	82	0	0.00	ng/uL	0.00%
39) CS25 2-Fluorobiphenyl	0.00	172	0	0.00	ng/uL	0.00%
57) CS55 2,4,6-Tribromophenol	0.00	330	0	0.00	ng/uL	0.00%
70) CS30 Terphenyl-d14	20.00	244	995585	19.69	ng/uL	39.37%
Target Compounds						Qvalue
72) C745 bis(2-ethylhexyl)phth	23.01	149	201491	3.24	ng/uL	97

(#) = qualifier out of range (m) = manual integration

000160

Quantitation Report

Data File : H:\GCMS-A\A4534.D
Acq Time : 09/01/98 14:53
Sample : SB27-0030
Misc : 4802.001 PAH 30G/10ML
Quant Time: Sep 15 14:39 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\PAH4505.M
Title : Semivolatiles
Last Update : Tue Sep 15 14:24:35 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	4.97	152	134495	20.00	ng/uL	0.03
2) CI40 Naphthalene-d8	7.96	136	1141304	20.00	ng/uL	0.00
4) CI50 Acenaphthene-d10	12.16	164	903165	20.00	ng/uL	-0.02
8) CI60 Phenanthrene-d10	15.68	188	1775901	20.00	ng/uL	-0.02
12) CI70 Chrysene-d12	22.03	240	1383557	20.00	ng/uL	-0.02
16) CI75 Perylene-d12	25.17	264	1122683	20.00	ng/uL	-0.02
System Monitoring Compounds						%Recovery
14) CS30 Terphenyl-d14	19.76	244	157744	1.87	ng/uL	3.73%
Target Compounds						Qvalue
9) C640 Phenanthrene	15.72	178	507740	4.80	ng/uL	98
11) C655 Fluoranthene	18.56	202	118865	1.15	ng/uL	98
13) C715 Pyrene	19.05	202	630632	5.30	ng/uL#	66
15) C740 Chrysene	22.07	228	446206	4.95	ng/uLm	88
17) C765 Benzo(b)fluoranthene	24.42	252	110230	1.42	ng/uLm	85
19) C775 Benzo(a)pyrene	25.05	252	98516	1.64	ng/uL#	87
22) C790 Benzo(g,h,i)perylene	27.59	276	66796	1.53	ng/uL	84

(#) = qualifier out of range (m) = manual integration

000171

001811

Quantitation Report

Data File : H:\GCMS-A\A4535.D
Acq Time : 09/01/98 15:30 Operator: CW
Sample : SB27-0030 MS Inst : A-HP5970B
Misc : 4802.001MS PAH 30G/10ML Multiplr: 1.00
Quant Time: Sep 15 14:43 1998

Method : C:\HPCHEM\1\METHODS\PAH4505.M
Title : Semivolatiles
Last Update : Tue Sep 15 14:24:35 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	4.98	152	129268	20.00	ng/uL	0.04
2) CI40 Naphthalene-d8	7.96	136	1337848	20.00	ng/uL	0.00
4) CI50 Acenaphthene-d10	12.16	164	958878	20.00	ng/uL	-0.02
8) CI60 Phenanthrene-d10	15.67	188	1935983	20.00	ng/uL	-0.02
12) CI70 Chrysene-d12	22.03	240	1403095	20.00	ng/uL	-0.01
16) CI75 Perylene-d12	25.18	264	924290	20.00	ng/uL	0.00
System Monitoring Compounds						%Recovery
14) CS30 Terphenyl-d14	19.75	244	189739	2.21	ng/uL	4.43%
Target Compounds						Qvalue
3) C450 Naphthalene	7.99	128	113748	1.65	ng/uLm	97
5) C540 Acenaphthylene	11.78	152	152319	1.71	ng/uL	93
6) C550 Acenaphthene	12.22	153	115994	1.94	ng/uL	93
7) C590 Fluorene	13.47	166	109620	1.73	ng/uL	81
9) C640 Phenanthrene	15.73	178	1179249	10.23	ng/uL	96
10) C645 Anthracene	15.85	178	179805	1.56	ng/uL	88
11) C655 Fluoranthene	18.55	202	473793	4.22	ng/uL	97
13) C715 Pyrene	19.05	202	1483508	12.30	ng/uL	86
15) C740 Chrysene	22.09	228	1021450	11.17	ng/uLm	94
17) C765 Benzo(b)fluoranthene	24.42	252	322166	5.05	ng/uL	93
18) C770 Benzo(k)fluoranthene	24.49	252	123616	2.36	ng/uL#	53
19) C775 Benzo(a)pyrene	24.95	252	330487	6.70	ng/uLm	81
20) C780 Indeno(1,2,3-c,d)pyre	27.17	276	86147	2.48	ng/uL#	92
21) C785 Dibenzo(a,h)anthracen	27.28	278	88294	2.41	ng/uL	76
22) C790 Benzo(g,h,i)perylene	27.60	276	142792	3.97	ng/uL	95

(#) = qualifier out of range (m) = manual integration

000151

Quantitation Report

Data File : E:\GCMS-A\A4538.D
Acq Time : 09/01/98 17:21
Sample : SB29-0010
Misc : 4802.003 PAH 30G/10ML
Quant Time: Sep 15 14:55 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\PAH4505.M
Title : Semivolatiles
Last Update : Tue Sep 15 14:24:35 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	4.99	152	156618	20.00	ng/uL	0.05
2) CI40 Naphthalene-d8	7.95	136	1221434	20.00	ng/uL	-0.02
4) CI50 Acenaphthene-d10	12.14	164	951866	20.00	ng/uL	-0.03
8) CI60 Phenanthrene-d10	15.67	188	1802221	20.00	ng/uL	-0.03
12) CI70 Chrysene-d12	22.02	240	1370558	20.00	ng/uL	-0.03
16) CI75 Perylene-d12	25.17	264	1025831	20.00	ng/uL	-0.02
System Monitoring Compounds						%Recovery
14) CS30 Terphenyl-d14	19.75	244	147746	1.76	ng/uL	3.53%
Target Compounds						Qvalue
9) C640 Phenanthrene	15.71	178	485260	4.52	ng/uLm	25
11) C655 Fluoranthene	18.55	202	105551	1.01	ng/uLm	58
13) C715 Pyrene	19.04	202	436149	3.70	ng/uLm	65
15) C740 Chrysene	22.07	228	304053	3.40	ng/uLm	1
17) C765 Benzo(b)fluoranthene	24.42	252	82215	1.16	ng/uLm	55
18) C770 Benzo(k)fluoranthene	24.42	252	82227	1.42	ng/uLm	53
19) C775 Benzo(a)pyrene	24.94	252	121001	2.21	ng/uLm	1
20) C780 Indeno(1,2,3-c,d)pyre	27.59	276	40564	1.05	ng/uLm	88

(#) = qualifier out of range (m) = manual integration

000195

001813

Quantitation Report

Data File : H:\GCMS-A\A4539.D
Acq Time : 09/01/98 17:59
Sample : SB30-0030
Misc : 4802.004 PAH 30G/10ML
Quant Time: Sep 15 14:59 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\PAH4505.M
Title : Semivolatiles
Last Update : Tue Sep 15 14:24:35 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	5.02	152	176146	20.00	ng/uL	0.08
2) CI40 Naphthalene-d8	7.96	136	1049256	20.00	ng/uL	0.00
4) CI50 Acenaphthene-d10	12.14	164	731431	20.00	ng/uL	-0.03
8) CI60 Phenanthrene-d10	15.67	188	1519948	20.00	ng/uL	-0.03
12) CI70 Chrysene-d12	22.02	240	1160444	20.00	ng/uL	-0.03
16) CI75 Perylene-d12	25.18	264	1030881	20.00	ng/uL	-0.01
System Monitoring Compounds						%Recovery
14) CS30 Terphenyl-d14	19.75	244	142974	2.02	ng/uL	4.03%
Target Compounds						Qvalue

(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : H:\GCMS-A\A4540.D
Acq Time : 09/01/98 18:36
Sample : SB31-0030
Misc : 4802.006 PAH 30G/10ML
Quant Time: Sep 15 15:02 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\PAH4505.M
Title : Semivolatiles
Last Update : Tue Sep 15 14:24:35 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	5.00	152	146733	20.00	ng/uL	0.06
2) CI40 Naphthalene-d8	7.96	136	927773	20.00	ng/uL	0.00
4) CI50 Acenaphthene-d10	12.15	164	727862	20.00	ng/uL	-0.03
8) CI60 Phenanthrene-d10	15.67	188	1678972	20.00	ng/uL	-0.03
12) CI70 Chrysene-d12	22.02	240	1344780	20.00	ng/uL	-0.03
16) CI75 Perylene-d12	25.18	264	942210	20.00	ng/uL	-0.01
System Monitoring Compounds						%Recovery
14) CS30 Terphenyl-d14	19.76	244	1190969	14.50	ng/uL	28.99%
Target Compounds						Qvalue
9) C640 Phenanthrene	15.71	178	176761	1.77	ng/uL	98
13) C715 Pyrene	19.04	202	205329	1.78	ng/uL#	25
15) C740 Chrysene	22.07	228	169701	1.94	ng/uLm	81

(#) = qualifier out of range (m) = manual integration

000213

001815

Quantitation Report

Data File : H:\GCMS-A\A4498.D
Acq Time : 08/30/98 19:34
Sample : SB32-0010
Misc : 4802.009 30GM/1ML
Quant Time: Aug 31 10:13 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\DFTPPBNA.M
Title :
Last Update :
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	5.22	152	197595	20.00	ng/uL	0.05
20) CI40 Naphthalene-d8	8.17	136	1355585	20.00	ng/uL	0.00
35) CI50 Acenaphthene-d10	12.37	164	1335829	20.00	ng/uL	0.00
56) CI60 Phenanthrene-d10	15.91	188	2073191	20.00	ng/uL	0.02
68) CI70 Chrysene-d12	22.28	240	660509	20.00	ng/uL	0.02
76) CI75 Perylene-d12	25.45	264	496964	20.00	ng/uL	0.06
System Monitoring Compounds						%Recovery
4) CS50 2-Fluorophenol	0.00	112	0	0.00	ng/uL	0.00%
5) CS45 Phenol-d5	0.00	99	0	0.00	ng/uL	0.00%
8) CS70 2-Chlorophenol-d4	0.00	132	0	0.00	ng/uL	0.00%
12) CS75 1,2-Dichlorobenzene-d	0.00	152	0	0.00	ng/uL	0.00%
21) CS20 Nitrobenzene-d5	0.00	82	0	0.00	ng/uL	0.00%
39) CS25 2-Fluorobiphenyl	0.00	172	0	0.00	ng/uL	0.00%
57) CS55 2,4,6-Tribromophenol	0.00	330	0	0.00	ng/uL	0.00%
70) CS30 Terphenyl-d14	19.99	244	1181460	22.63	ng/uL	45.26%
Target Compounds						Qvalue
63) C640 Phenanthrene	15.96	178	250253	2.05	ng/uL	99
69) C715 Pyrene	19.30	202	168777	2.06	ng/uL#	47
75) C740 Chrysene	22.33	228	71542	1.65	ng/uL	99

(#) = qualifier out of range (m) = manual integration

000221

001816

Quantitation Report

Data File : H:\GCMS-A\A4499.D
Acq Time : 08/30/98 20:10
Sample : SB32-0010D
Misc : 4802.010 30GM/1ML
Quant Time: Aug 31 10:20 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\DFTPPBNA.M
Title :
Last Update :
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	5.23	152	171839	20.00	ng/uL	0.06
20) CI40 Naphthalene-d8	8.18	136	1433513	20.00	ng/uL	0.00
35) CI50 Acenaphthene-d10	12.37	164	1340063	20.00	ng/uL	0.00
56) CI60 Phenanthrene-d10	15.91	188	1948041	20.00	ng/uL	0.01
68) CI70 Chrysene-d12	22.28	240	549895	20.00	ng/uL	0.02
76) CI75 Perylene-d12	25.45	264	393285	20.00	ng/uL	0.06
System Monitoring Compounds						%Recovery
4) CS50 2-Fluorophenol	0.00	112	0	0.00	ng/uL	0.00%
5) CS45 Phenol-d5	0.00	99	0	0.00	ng/uL	0.00%
8) CS70 2-Chlorophenol-d4	0.00	132	0	0.00	ng/uL	0.00%
12) CS75 1,2-Dichlorobenzene-d	5.23	152	171839	22.63	ng/uL	45.25%
21) CS20 Nitrobenzene-d5	0.00	82	0	0.00	ng/uL	0.00%
39) CS25 2-Fluorobiphenyl	0.00	172	0	0.00	ng/uL	0.00%
57) CS55 2,4,6-Tribromophenol	0.00	330	0	0.00	ng/uL	0.00%
70) CS30 Terphenyl-d14	20.00	244	1071219	24.65	ng/uL	49.29%
Target Compounds						Qvalue
34) C470 2-Methylnaphthalene	9.92	142	54153	1.10	ng/uLm	91
48) C560 4-Nitrophenol	13.06	109	13965	1.87	ng/uLm	1
63) C640 Phenanthrene	15.96	178	623205	5.44	ng/uLm	98
69) C715 Pyrene	19.30	202	342552	5.02	ng/uL	84
74) C730 Benzo(a)anthracene	22.26	228	60480	1.59	ng/uL#	74
75) C740 Chrysene	22.34	228	142798	3.96	ng/uL	93
77) C760 Di-n-octylphthalate	24.63	149	71016	1.05	ng/uL	100
80) C775 Benzo(a)pyrene	25.32	252	22142	1.01	ng/uL#	46
83) C790 Benzo(g,h,i)perylene	27.91	276	21100	1.42	ng/uL#	77

(#) = qualifier out of range (m) = manual integration

000233

001817

Quantitation Report

Data File : H:\GCMS-A\A4501.D
Acq Time : 08/30/98 21:24
Sample : SB33-0010
Misc : 4802.011 30GM/1ML
Quant Time: Aug 31 10:34 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\DFTPPBNA.M
Title :
Last Update :
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	5.19	152	134918	20.00	ng/uL	0.03
20) CI40 Naphthalene-d8	8.17	136	1297441	20.00	ng/uL	0.00
35) CI50 Acenaphthene-d10	12.39	164	1326819	20.00	ng/uL	0.02
56) CI60 Phenanthrene-d10	15.94	188	1983492	20.00	ng/uL	0.04
68) CI70 Chrysene-d12	22.30	240	563559	20.00	ng/uL	0.04
76) CI75 Perylene-d12	25.46	264	411183	20.00	ng/uL	0.07
System Monitoring Compounds						**%Recovery**
4) CS50 2-Fluorophenol	0.00	112	0	0.00	ng/uL	0.00%
5) CS45 Phenol-d5	0.00	99	0	0.00	ng/uL	0.00%
8) CS70 2-Chlorophenol-d4	0.00	132	0	0.00	ng/uL	0.00%
12) CS75 1,2-Dichlorobenzene-d	0.00	152	0	0.00	ng/uL	0.00%
21) CS20 Nitrobenzene-d5	6.57	82	5440	0.25	ng/uL	0.49%
39) CS25 2-Fluorobiphenyl	0.00	172	0	0.00	ng/uL	0.00%
57) CS55 2,4,6-Tribromophenol	0.00	330	0	0.00	ng/uL	0.00%
70) CS30 Terphenyl-d14	20.02	244	1052372	23.63	ng/uL	47.25%
Target Compounds						**Qvalue**
42) C535 Dimethylphthalate	12.39	163	323514	3.41	ng/uL#	1
45) C545 3-Nitroaniline	12.70	138	11589	2.34	ng/uL#	26
54) C590 Fluorene	13.72	166	250974	2.88	ng/uL	84
55) C595 4-Nitroaniline	14.09	138	18796	3.79	ng/uL#	32
59) C615 N-nitrosodiphenylamin	14.30	169	115503	2.04	ng/uL#	41
63) C640 Phenanthrene	16.00	178	2645445	22.67	ng/uL	96
64) C645 Anthracene	16.11	178	150412	1.30	ng/uL#	68
65) C647 Carbazole	16.69	167	79887	1.06	ng/uL#	44
67) C655 Fluoranthene	18.84	202	377561	3.60	ng/uL	95
69) C715 Pyrene	19.34	202	1809537	25.85	ng/uL	89
73) C725 3,3`-Dichlorobenzidin	22.47	252	7726	4.19	ng/uL#	31
74) C730 Benzo(a)anthracene	22.28	228	321661	8.26	ng/uL#	82
75) C740 Chrysene	22.36	228	867374	23.47	ng/uL#	73
78) C765 Benzo(b)fluoranthene	24.71	252	190396	6.68	ng/uLm	93
79) C770 Benzo(k)fluoranthene	24.76	252	27880	1.04	ng/uLm	93
80) C775 Benzo(a)pyrene	25.34	252	102506	4.49	ng/uL#	88
81) C780 Indeno(1,2,3-c,d)pyre	27.49	276	36391	2.51	ng/uL#	74
82) C785 Dibenzo(a,h)anthracen	27.56	278	41963	2.80	ng/uL	90
83) C790 Benzo(g,h,i)perylene	27.91	276	85447	5.50	ng/uL	98

(#) = qualifier out of range (m) = manual integration

000248

001818

Quantitation Report

Data File : H:\GCMS-A\A4541.D
Acq Time : 09/01/98 19:13
Sample : SB34-0010
Misc : 4802.012 PAH 30G/10ML
Quant Time: Sep 15 15:08 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\PAH4505.M
Title : Semivolatiles
Last Update : Tue Sep 15 14:24:35 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	5.01	152	202661	20.00	ng/uL	0.08
2) CI40 Naphthalene-d8	7.98	136	1377467	20.00	ng/uL	0.00
4) CI50 Acenaphthene-d10	12.20	164	1506466	20.00	ng/uL	0.03
8) CI60 Phenanthrene-d10	15.88	188	2107653	20.00	ng/uL	0.18
12) CI70 Chrysene-d12	22.10	240	644274	20.00	ng/uL	0.05
16) CI75 Perylene-d12	25.21	264	448390	20.00	ng/uL	0.02
System Monitoring Compounds						%Recovery
14) CS30 Terphenyl-d14	19.84	244	123275	3.13	ng/uL	6.26%
Target Compounds						Qvalue
3) C450 Naphthalene	8.02	128	430621	6.08	ng/uL	79
6) C550 Acenaphthene	12.27	153	541713	5.76	ng/uL	90
7) C590 Fluorene	13.57	166	6159526	61.80	ng/uL	92
9) C640 Phenanthrene	16.00	178	71153027	566.85	ng/uL	89
10) C645 Anthracene	16.05	178	5900400	47.06	ng/uL	79
11) C655 Fluoranthene	18.76	202	10617350	86.82	ng/uL	91
13) C715 Pyrene	19.28	202	33461429	604.37	ng/uLm	88
15) C740 Chrysene	22.20	228	12647646	301.27	ng/uLm	74
17) C765 Benzo(b)fluoranthene	24.46	252	2113329	68.30	ng/uLm	55
19) C775 Benzo(a)pyrene	25.00	252	2689254	112.40	ng/uLm	83
20) C780 Indeno(1,2,3-c,d)pyre	27.61	276	472285	27.99	ng/uLm	81
21) C785 Dibenzo(a,h)anthracen	27.49	278	241218	13.56	ng/uLm	55
22) C790 Benzo(g,h,i)perylene	27.61	276	529414	30.37	ng/uLm	1

(#) = qualifier out of range (m) = manual integration

000185

001819

Quantitation Report

Data File : H:\GCMS-D\D4465.D
Acq Time : 08/30/98 18:18 Operator: CW
Sample : SB40-3040 Inst : D-HP5971A
Misc : 4802.013 30GM/1ML Multiplr: 1.00
Quant Time: Aug 31 14:34 1998

Method : E:\HPCHEM\1\METHODS\SWD4433.M
Title : Semivolatiles SW8270 - 5 point calibration
Last Update : Fri Aug 28 10:08:58 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	10.34	152	114119	20.00	ng/uL	0.01
20) CI40 Naphthalene-d8	14.10	136	809316	20.00	ng/uL	-0.02
35) CI50 Acenaphthene-d10	19.43	164	732473	20.00	ng/uL	0.00
56) CI60 Phenanthrene-d10	22.42	188	1372980	20.00	ng/uL	-0.01
69) CI70 Chrysene-d12	26.55	240	1041279	20.00	ng/uL	0.00
77) CI75 Perylene-d12	28.91	264	930325	20.00	ng/uL	0.00
System Monitoring Compounds						%Recovery
4) CS50 2-Fluorophenol	0.00	112	0	0.00	ng/uL	0.00%
5) CS45 Phenol-d5	0.00	99	0	0.00	ng/uL	0.00%
8) CS70 2-Chlorophenol-d4	0.00	132	0	0.00	ng/uL	0.00%
12) CS75 1,2-Dichlorobenzene-d	0.00	152	0	0.00	ng/uL	0.00%
21) CS20 Nitrobenzene-d5	0.00	82	0	0.00	ng/uL	0.00%
39) CS25 2-Fluorobiphenyl	0.00	172	0	0.00	ng/uL	0.00%
57) CS55 2,4,6-Tribromophenol	0.00	330	0	0.00	ng/uL	0.00%
71) CS30 Terphenyl-d14	25.03	244	2266268	32.68	ng/uL	65.37%
Target Compounds						Qvalue
63) C640 Phenanthrene	22.46	178	1000493	12.38	ng/uL	98
70) C715 Pyrene	24.73	202	437857	5.02	ng/uL	93

(#) = qualifier out of range (m) = manual integration

000281

001820

Quantitation Report

Data File : H:\GCMS-D\D4466.D
Acq Time : 08/30/98 19:04 Operator: CW
Sample : SB39-3040 Inst : D-HP5971A
Misc : 4802.015 30GM/1ML Multiplr: 1.00
Quant Time: Aug 31 14:36 1998

Method : E:\HPCHEM\1\METHODS\SWD4433.M
Title : Semivolatiles SW8270 - 5 point calibration
Last Update : Fri Aug 28 10:08:58 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	10.34	152	141394	20.00	ng/uL	0.01
20) CI40 Naphthalene-d8	14.10	136	1032234	20.00	ng/uL	-0.02
35) CI50 Acenaphthene-d10	19.43	164	908814	20.00	ng/uL	-0.01
56) CI60 Phenanthrene-d10	22.42	188	1511109	20.00	ng/uL	-0.02
69) CI70 Chrysene-d12	26.55	240	1083462	20.00	ng/uL	-0.01
77) CI75 Perylene-d12	28.90	264	938854	20.00	ng/uL	0.00
System Monitoring Compounds						%Recovery
4) CS50 2-Fluorophenol	0.00	112	0	0.00	ng/uL	0.00%
5) CS45 Phenol-d5	0.00	99	0	0.00	ng/uL	0.00%
8) CS70 2-Chlorophenol-d4	0.00	132	0	0.00	ng/uL	0.00%
12) CS75 1,2-Dichlorobenzene-d	0.00	152	0	0.00	ng/uL	0.00%
21) CS20 Nitrobenzene-d5	0.00	82	0	0.00	ng/uL	0.00%
39) CS25 2-Fluorobiphenyl	0.00	172	0	0.00	ng/uL	0.00%
57) CS55 2,4,6-Tribromophenol	0.00	330	0	0.00	ng/uL	0.00%
71) CS30 Terphenyl-d14	25.02	244	1487135	20.61	ng/uL	41.22%

Target Compounds	Qvalue

(#) = qualifier out of range (m) = manual integration

000291

001821

Quantitation Report

Data File : H:\GCMS-D\D4467.D
Acq Time : 08/30/98 19:50 Operator: CW
Sample : SB43-6070 Inst : D-HP5971A
Misc : 4802.016 30GM/1ML Multiplr: 1.00
Quant Time: Aug 31 13:22 1998

Method : E:\HPCHEM\1\METHODS\SWD4433.M
Title : Semivolatiles SW8270 - 5 point calibration
Last Update : Fri Aug 28 10:08:58 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	10.35	152	79961	20.00	ng/uL	0.02
20) CI40 Naphthalene-d8	14.10	136	903684	20.00	ng/uL	-0.02
35) CI50 Acenaphthene-d10	19.42	164	837205	20.00	ng/uL	-0.02
56) CI60 Phenanthrene-d10	22.42	188	1463632	20.00	ng/uL	-0.01
69) CI70 Chrysene-d12	26.55	240	1193760	20.00	ng/uL	-0.01
77) CI75 Perylene-d12	28.90	264	1076984	20.00	ng/uL	0.00
System Monitoring Compounds						%Recovery
4) CS50 2-Fluorophenol	0.00	112	0	0.00	ng/uL	0.00%
5) CS45 Phenol-d5	0.00	99	0	0.00	ng/uL	0.00%
8) CS70 2-Chlorophenol-d4	0.00	132	0	0.00	ng/uL	0.00%
12) CS75 1,2-Dichlorobenzene-d	0.00	152	0	0.00	ng/uL	0.00%
21) CS20 Nitrobenzene-d5	0.00	82	0	0.00	ng/uL	0.00%
39) CS25 2-Fluorobiphenyl	0.00	172	0	0.00	ng/uL	0.00%
57) CS55 2,4,6-Tribromophenol	0.00	330	0	0.00	ng/uL	0.00%
71) CS30 Terphenyl-d14	25.02	244	2325431	29.25	ng/uL	58.51%
Target Compounds						Qvalue

(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : H:\GCMS-D\D4468.D
Acq Time : 08/30/98 20:37 Operator: CW
Sample : SB44-4050 Inst : D-HP5971A
Misc : 4802.017 30GM/1ML Multiplr: 1.00
Quant Time: Aug 31 13:23 1998

Method : E:\HPCHEM\1\METHODS\SWD4433.M
Title : Semivolatiles SW8270 - 5 point calibration
Last Update : Fri Aug 28 10:08:58 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	10.31	152	134630	20.00	ng/uL	-0.01
20) CI40 Naphthalene-d8	14.09	136	985493	20.00	ng/uL	-0.03
35) CI50 Acenaphthene-d10	19.42	164	885465	20.00	ng/uL	-0.02
56) CI60 Phenanthrene-d10	22.42	188	1345678	20.00	ng/uL	-0.02
69) CI70 Chrysene-d12	26.55	240	796207	20.00	ng/uL	-0.01
77) CI75 Perylene-d12	28.90	264	688860	20.00	ng/uL	0.00
System Monitoring Compounds						%Recovery
4) CS50 2-Fluorophenol	0.00	112	0	0.00	ng/uL	0.00%
5) CS45 Phenol-d5	0.00	99	0	0.00	ng/uL	0.00%
8) CS70 2-Chlorophenol-d4	0.00	132	0	0.00	ng/uL	0.00%
12) CS75 1,2-Dichlorobenzene-d	0.00	152	0	0.00	ng/uL	0.00%
21) CS20 Nitrobenzene-d5	0.00	82	0	0.00	ng/uL	0.00%
39) CS25 2-Fluorobiphenyl	0.00	172	0	0.00	ng/uL	0.00%
57) CS55 2,4,6-Tribromophenol	0.00	330	0	0.00	ng/uL	0.00%
71) CS30 Terphenyl-d14	25.02	244	1464115	27.61	ng/uL	55.23%

Target Compounds Qvalue

(#) = qualifier out of range (m) = manual integration

000211

001823

Quantitation Report

Data File : H:\GCMS-D\D4469.D
Acq Time : 08/30/98 21:23
Sample : SB45-0010
Misc : 4802.018 30GM/1ML
Quant Time: Aug 31 13:24 1998

Operator: CW
Inst : D-HP5971A
Multiplr: 1.00

Method : E:\HPCHEM\1\METHODS\SWD4433.M
Title : Semivolatiles SW8270 - 5 point calibration
Last Update : Fri Aug 28 10:08:58 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	10.32	152	166872	20.00	ng/uL	0.00
20) CI40 Naphthalene-d8	14.09	136	1283791	20.00	ng/uL	-0.03
35) CI50 Acenaphthene-d10	19.42	164	1073245	20.00	ng/uL	-0.02
56) CI60 Phenanthrene-d10	22.42	188	1666537	20.00	ng/uL	-0.01
69) CI70 Chrysene-d12	26.54	240	853325	20.00	ng/uL	-0.02
77) CI75 Perylene-d12	28.90	264	733722	20.00	ng/uL	0.00
System Monitoring Compounds						%Recovery
4) CS50 2-Fluorophenol	0.00	112	0	0.00	ng/uL	0.00%
5) CS45 Phenol-d5	0.00	99	0	0.00	ng/uL	0.00%
8) CS70 2-Chlorophenol-d4	0.00	132	0	0.00	ng/uL	0.00%
12) CS75 1,2-Dichlorobenzene-d	0.00	152	0	0.00	ng/uL	0.00%
21) CS20 Nitrobenzene-d5	0.00	82	0	0.00	ng/uL	0.00%
39) CS25 2-Fluorobiphenyl	0.00	172	0	0.00	ng/uL	0.00%
57) CS55 2,4,6-Tribromophenol	0.00	330	0	0.00	ng/uL	0.00%
71) CS30 Terphenyl-d14	25.02	244	1333776	23.47	ng/uL	46.94%
Target Compounds						Qvalue

(#) = qualifier out of range (m) = manual integration
D4469.D SWD4433.M Tue Sep 15 17:23:52 1998

000021

001824

Quantitation Report

Data File : H:\GCMS-A\A4502.D
Acq Time : 08/30/98 22:01 Operator: CW
Sample : SB35-0030 Inst : A-HP5970B
Misc : 4802.019 30GM/1ML Multiplr: 1.00
Quant Time: Aug 31 10:43 1998

Method : C:\HPCHEM\1\METHODS\DFTPPBNA.M
Title :
Last Update :
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	5.25	152	116177	20.00	ng/uL	0.09
20) CI40 Naphthalene-d8	8.25	136	1929900	20.00	ng/uL	0.08
35) CI50 Acenaphthene-d10	12.57	164	1137883	20.00	ng/uL	0.20
56) CI60 Phenanthrene-d10	16.12	188	1432785	20.00	ng/uL	0.22
68) CI70 Chrysene-d12	22.31	240	304887	20.00	ng/uL	0.05
76) CI75 Perylene-d12	25.49	264	206005	20.00	ng/uL	0.10
System Monitoring Compounds						%Recovery
4) CS50 2-Fluorophenol	0.00	112	0	0.00	ng/uL	0.00%
5) CS45 Phenol-d5	4.85	99	4772	0.45	ng/uL	0.60%
8) CS70 2-Chlorophenol-d4	0.00	132	0	0.00	ng/uL	0.00%
12) CS75 1,2-Dichlorobenzene-d	5.47	152	4736	0.92	ng/uL	1.84%
21) CS20 Nitrobenzene-d5	6.72	82	242721	7.37	ng/uL	14.75%
39) CS25 2-Fluorobiphenyl	11.10	172	95148	1.40	ng/uL	2.81%
57) CS55 2,4,6-Tribromophenol	0.00	330	0	0.00	ng/uL	0.00%
70) CS30 Terphenyl-d14	20.06	244	681248	28.27	ng/uL	56.54%
Target Compounds						Qvalue
6) C315 Phenol	4.73	94	17354	1.63	ng/uLm	1
7) C325 bis(2-chloroethyl)eth	4.78	93	8774	1.04	ng/uLm	48
22) C410 Nitrobenzene	6.62	77	52173	1.18	ng/uL#	1
24) C420 2-Nitrophenol	7.40	139	39556	1.75	ng/uL#	1
25) C425 2,4-Dimethylphenol	7.89	107	843552	22.41	ng/uL	99
27) C430 Benzoic acid	8.73	122	34987	1.62	ng/uL#	1
28) C440 2,4-Dichlorophenol	8.15	162	63741	2.45	ng/uL#	24
33) C465 4-Chloro-3-methylphen	10.15	107	115631	3.45	ng/uL#	27
37) C515 2,4,6-Trichlorophenol	10.87	196	58980	3.10	ng/uL#	13
38) C520 2,4,5-Trichlorophenol	11.10	196	53224	2.72	ng/uL#	47
42) C535 Dimethylphthalate	12.45	163	84712	1.04	ng/uL#	1
47) C555 2,4-Dinitrophenol	13.03	184	21611	2.70	ng/uL#	1
49) C570 2,4-Dinitrotoluene	13.41	165	107270	4.18	ng/uL#	1
52) C580 Diethylphthalate	14.21	149	221303	2.56	ng/uL#	60
58) C610 4,6-Dinitro-2-methylp	14.35	198	41648	3.56	ng/uL#	1
62) C635 Pentachlorophenol	15.91	266	7574	1.02	ng/uL#	33
63) C640 Phenanthrene	16.16	178	195449	2.32	ng/uL#	83
69) C715 Pyrene	19.41	202	360051	9.51	ng/uLm	1
73) C725 3,3`-Dichlorobenzidin	22.67	252	4323	4.34	ng/uLm	19
81) C780 Indeno(1,2,3-c,d)pyre	27.91	276	7685	1.06	ng/uLm	52

(#) = qualifier out of range (m) = manual integration

000321

001825

Quantitation Report

Data File : H:\GCMS-D\D4470.D
Acq Time : 08/30/98 22:10 Operator: CW
Sample : SB41-2030 Inst : D-HP5971A
Misc : 4802.020 30GM/1ML Multiplr: 1.00
Quant Time: Aug 31 13:24 1998

Method : E:\HPCHEM\1\METHODS\SWD4433.M
Title : Semivolatiles SW8270 - 5 point calibration
Last Update : Fri Aug 28 10:08:58 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	10.34	152	118036	20.00	ng/uL	0.01
20) CI40 Naphthalene-d8	14.08	136	1175987	20.00	ng/uL	-0.03
35) CI50 Acenaphthene-d10	19.43	164	1038930	20.00	ng/uL	0.00
56) CI60 Phenanthrene-d10	22.42	188	1649353	20.00	ng/uL	-0.02
69) CI70 Chrysene-d12	26.54	240	961138	20.00	ng/uL	-0.01
77) CI75 Perylene-d12	28.91	264	787711	20.00	ng/uL	0.00
System Monitoring Compounds						%Recovery
4) CS50 2-Fluorophenol	0.00	112	0	0.00	ng/uL	0.00%
5) CS45 Phenol-d5	0.00	99	0	0.00	ng/uL	0.00%
8) CS70 2-Chlorophenol-d4	0.00	132	0	0.00	ng/uL	0.00%
12) CS75 1,2-Dichlorobenzene-d	0.00	152	0	0.00	ng/uL	0.00%
21) CS20 Nitrobenzene-d5	0.00	82	0	0.00	ng/uL	0.00%
39) CS25 2-Fluorobiphenyl	0.00	172	0	0.00	ng/uL	0.00%
57) CS55 2,4,6-Tribromophenol	0.00	330	0	0.00	ng/uL	0.00%
71) CS30 Terphenyl-d14	25.02	244	1434487	22.41	ng/uL	44.83%
Target Compounds						Qvalue

(#) = qualifier out of range (m) = manual integration

0000371

001826

Quantitation Report

Data File : H:\GCMS-D\D4471.D
Acq Time : 08/30/98 22:57 Operator: CW
Sample : SB41-2030D Inst : D-HP5971A
Misc : 4802.021 30GM/1ML Multiplr: 1.00
Quant Time: Aug 31 13:25 1998

Method : E:\HPCHEM\1\METHODS\SWD4433.M
Title : Semivolatiles SW8270 - 5 point calibration
Last Update : Fri Aug 28 10:08:58 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	10.34	152	45109	20.00	ng/uL	0.01
20) CI40 Naphthalene-d8	14.09	136	831025	20.00	ng/uL	-0.03
35) CI50 Acenaphthene-d10	19.42	164	931812	20.00	ng/uL	-0.02
56) CI60 Phenanthrene-d10	22.42	188	1391051	20.00	ng/uL	-0.01
69) CI70 Chrysene-d12	26.54	240	901121	20.00	ng/uL	-0.02
77) CI75 Perylene-d12	28.90	264	716339	20.00	ng/uL	0.00
System Monitoring Compounds						%Recovery
4) CS50 2-Fluorophenol	0.00	112	0	0.00	ng/uL	0.00%
5) CS45 Phenol-d5	0.00	99	0	0.00	ng/uL	0.00%
8) CS70 2-Chlorophenol-d4	0.00	132	0	0.00	ng/uL	0.00%
12) CS75 1,2-Dichlorobenzene-d	0.00	152	0	0.00	ng/uL	0.00%
21) CS20 Nitrobenzene-d5	0.00	82	0	0.00	ng/uL	0.00%
39) CS25 2-Fluorobiphenyl	0.00	172	0	0.00	ng/uL	0.00%
57) CS55 2,4,6-Tribromophenol	0.00	330	0	0.00	ng/uL	0.00%
71) CS30 Terphenyl-d14	25.02	244	2174296	36.23	ng/uL	72.47%
Target Compounds						Qvalue

(#) = qualifier out of range (m) = manual integration

000361

001827

Quantitation Report

Data File : H:\GCMS-A\A4497.D
Acq Time : 08/30/98 18:57 Operator: CW
Sample : SB42-2030 Inst : A-HP5970B
Misc : 4802.023 30GM/1ML Multiplr: 1.00
Quant Time: Aug 31 10:10 1998

Method : C:\HPCHEM\1\METHODS\DFTPPBNA.M
Title :
Last Update :
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	5.20	152	61722	20.00	ng/uL	0.04
20) CI40 Naphthalene-d8	8.16	136	751575	20.00	ng/uL	0.00
35) CI50 Acenaphthene-d10	12.37	164	1051186	20.00	ng/uL	0.00
56) CI60 Phenanthrene-d10	15.90	188	1790254	20.00	ng/uL	0.00
68) CI70 Chrysene-d12	22.29	240	661458	20.00	ng/uL	0.03
76) CI75 Perylene-d12	25.46	264	551613	20.00	ng/uL	0.06
System Monitoring Compounds						%Recovery
4) CS50 2-Fluorophenol	0.00	112	0	0.00	ng/uL	0.00%
5) CS45 Phenol-d5	0.00	99	0	0.00	ng/uL	0.00%
8) CS70 2-Chlorophenol-d4	0.00	132	0	0.00	ng/uL	0.00%
12) CS75 1,2-Dichlorobenzene-d	0.00	152	0	0.00	ng/uL	0.00%
21) CS20 Nitrobenzene-d5	0.00	82	0	0.00	ng/uL	0.00%
39) CS25 2-Fluorobiphenyl	0.00	172	0	0.00	ng/uL	0.00%
57) CS55 2,4,6-Tribromophenol	0.00	330	0	0.00	ng/uL	0.00%
70) CS30 Terphenyl-d14	19.99	244	1028538	19.67	ng/uL	39.35%
Target Compounds						Qvalue
40) C525 2-Chloronaphthalene	11.24	162	84622	1.44	ng/uL#	52

(#) = qualifier out of range (m) = manual integration

000371

001828

Quantitation Report

Data File : H:\GCMS-D\D4472.D
Acq Time : 08/30/98 23:43 Operator: CW
Sample : SB46-0612 Inst : D-HP5971A
Misc : 4802.026 30GM/1ML Multiplr: 1.00
Quant Time: Aug 31 14:48 1998

Method : E:\HPCHEM\1\METHODS\SWD4433.M
Title : Semivolatiles SW8270 - 5 point calibration
Last Update : Fri Aug 28 10:08:58 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	10.33	152	20828	20.00	ng/uL	0.00
20) CI40 Naphthalene-d8	14.09	136	577689	20.00	ng/uL	-0.02
35) CI50 Acenaphthene-d10	19.43	164	719169	20.00	ng/uL	-0.01
56) CI60 Phenanthrene-d10	22.42	188	1435405	20.00	ng/uL	-0.01
69) CI70 Chrysene-d12	26.55	240	1162449	20.00	ng/uL	-0.01
77) CI75 Perylene-d12	28.90	264	934903	20.00	ng/uL	0.00
System Monitoring Compounds						%Recovery
4) CS50 2-Fluorophenol	0.00	112	0	0.00	ng/uL	0.00%
5) CS45 Phenol-d5	0.00	99	0	0.00	ng/uL	0.00%
8) CS70 2-Chlorophenol-d4	0.00	132	0	0.00	ng/uL	0.00%
12) CS75 1,2-Dichlorobenzene-d	0.00	152	0	0.00	ng/uL	0.00%
21) CS20 Nitrobenzene-d5	0.00	82	0	0.00	ng/uL	0.00%
39) CS25 2-Fluorobiphenyl	0.00	172	0	0.00	ng/uL	0.00%
57) CS55 2,4,6-Tribromophenol	0.00	330	0	0.00	ng/uL	0.00%
71) CS30 Terphenyl-d14	25.03	244	2667315	34.46	ng/uL	68.91%
Target Compounds						Qvalue
15) C355 2-Methylphenol	11.44	108	197132	190.43	ng/uL#	78
25) C425 2,4-Dimethylphenol	13.44	107	271969	23.83	ng/uL	94

(#) = qualifier out of range (m) = manual integration

000352

001829

Quantitation Report

Data File : H:\GCMS-D\D4473.D
Acq Time : 08/31/98 00:30 Operator: CW
Sample : SB46-0612D Inst : D-HP5971A
Misc : 4802.027 30GM/1ML Multiplr: 1.00
Quant Time: Aug 31 14:50 1998

Method : E:\HPCHEM\1\METHODS\SWD4433.M
Title : Semivolatiles SW8270 - 5 point calibration
Last Update : Fri Aug 28 10:08:58 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	10.35	152	44965	20.00	ng/uL	0.02
20) CI40 Naphthalene-d8	14.09	136	683887	20.00	ng/uL	-0.02
35) CI50 Acenaphthene-d10	19.43	164	658818	20.00	ng/uL	-0.01
56) CI60 Phenanthrene-d10	22.42	188	1304404	20.00	ng/uL	-0.01
69) CI70 Chrysene-d12	26.55	240	1056162	20.00	ng/uL	0.00
77) CI75 Perylene-d12	28.91	264	836421	20.00	ng/uL	0.00
System Monitoring Compounds						%Recovery
4) CS50 2-Fluorophenol	0.00	112	0	0.00	ng/uL	0.00%
5) CS45 Phenol-d5	0.00	99	0	0.00	ng/uL	0.00%
8) CS70 2-Chlorophenol-d4	0.00	132	0	0.00	ng/uL	0.00%
12) CS75 1,2-Dichlorobenzene-d	0.00	152	0	0.00	ng/uL	0.00%
21) CS20 Nitrobenzene-d5	0.00	82	0	0.00	ng/uL	0.00%
39) CS25 2-Fluorobiphenyl	0.00	172	0	0.00	ng/uL	0.00%
57) CS55 2,4,6-Tribromophenol	0.00	330	0	0.00	ng/uL	0.00%
71) CS30 Terphenyl-d14	25.02	244	1915603	27.24	ng/uL	54.47%
Target Compounds						Qvalue
15) C355 2-Methylphenol	11.46	108	475103	212.59	ng/uL#	73
17) C365 4-Methylphenol	11.92	108	34536	15.14	ng/uL#	75
25) C425 2,4-Dimethylphenol	13.44	107	332547	24.62	ng/uL	98

(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : H:\GCMS-D\D4468.D
Acq Time : 08/30/98 20:37 Operator: CW
Sample : SB44-4050 Inst : D-HP5971A
Misc : 4802.017 30GM/1ML Multiplr: 1.00
Quant Time: Aug 31 13:23 1998

Method : E:\HPCHEM\1\METHODS\SWD4433.M
Title : Semivolatiles SW8270 - 5 point calibration
Last Update : Fri Aug 28 10:08:58 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	10.31	152	134630	20.00	ng/uL	-0.01
20) CI40 Naphthalene-d8	14.09	136	985493	20.00	ng/uL	-0.03
35) CI50 Acenaphthene-d10	19.42	164	885465	20.00	ng/uL	-0.02
56) CI60 Phenanthrene-d10	22.42	188	1345678	20.00	ng/uL	-0.02
69) CI70 Chrysene-d12	26.55	240	796207	20.00	ng/uL	-0.01
77) CI75 Perylene-d12	28.90	264	688860	20.00	ng/uL	0.00
System Monitoring Compounds						%Recovery
4) CS50 2-Fluorophenol	0.00	112	0	0.00	ng/uL	0.00%
5) CS45 Phenol-d5	0.00	99	0	0.00	ng/uL	0.00%
8) CS70 2-Chlorophenol-d4	0.00	132	0	0.00	ng/uL	0.00%
12) CS75 1,2-Dichlorobenzene-d	0.00	152	0	0.00	ng/uL	0.00%
21) CS20 Nitrobenzene-d5	0.00	82	0	0.00	ng/uL	0.00%
39) CS25 2-Fluorobiphenyl	0.00	172	0	0.00	ng/uL	0.00%
57) CS55 2,4,6-Tribromophenol	0.00	330	0	0.00	ng/uL	0.00%
71) CS30 Terphenyl-d14	25.02	244	1464115	27.61	ng/uL	55.23%
Target Compounds						Qvalue

(#) = qualifier out of range (m) = manual integration

000211

001831

Michelle Delgado-Brown
Print Originator's Name
Ecology and Environment, Inc.

LABORATORY CONTACT LOG

Conversation with:

Name Mark Bourgeois
Address PDP Analytical
11680 Lake Front Circle, Suite B
The Woodlands, Tx 77380
Phone 281-363-2233 TDD # _____ PAN# 0526015FXX
(Area Code and Number)

Date 10 / 7 / 98
(Mo) (Day) (Year)
Time 9:45 (AM/PM)
[X] Originator Placed Call
[ ] Originator Received Call

Subject Missing tune + QC data

Discussion: - Tune data A4485 and A4530 analyzed on 8/30 + 9/1, 1998 are missing from the data package.

Also missing is all the quality control data for PAHB002, the blank, LCS and MS/MSD.

- Will fax the data ASAP

- called back at 10:10 am. - also need the raw data for the continuing calibrations

Follow-Up Action: - none -

Originator's Signature M. Delgado-Brown

Rev. 11/15/94 DA
TS1459

001832

PDP
Analytical Services
1680 Lake Front Circle, Suite B
The Woodlands, Texas 77380

Facsimile Transmittal Sheet

Date: 10-7-98 **Time:** _____

Pages (Including this page): 22

To: Micheal Brown

Company: E & E

Fax: 214-245-1001

From: Reddy Pakanati **Title:** _____

Notes: _____

If this Fax message is received poorly or incomplete, please notify us at:

Phone: (281) 363-2233 Fax: (281) 298-5784

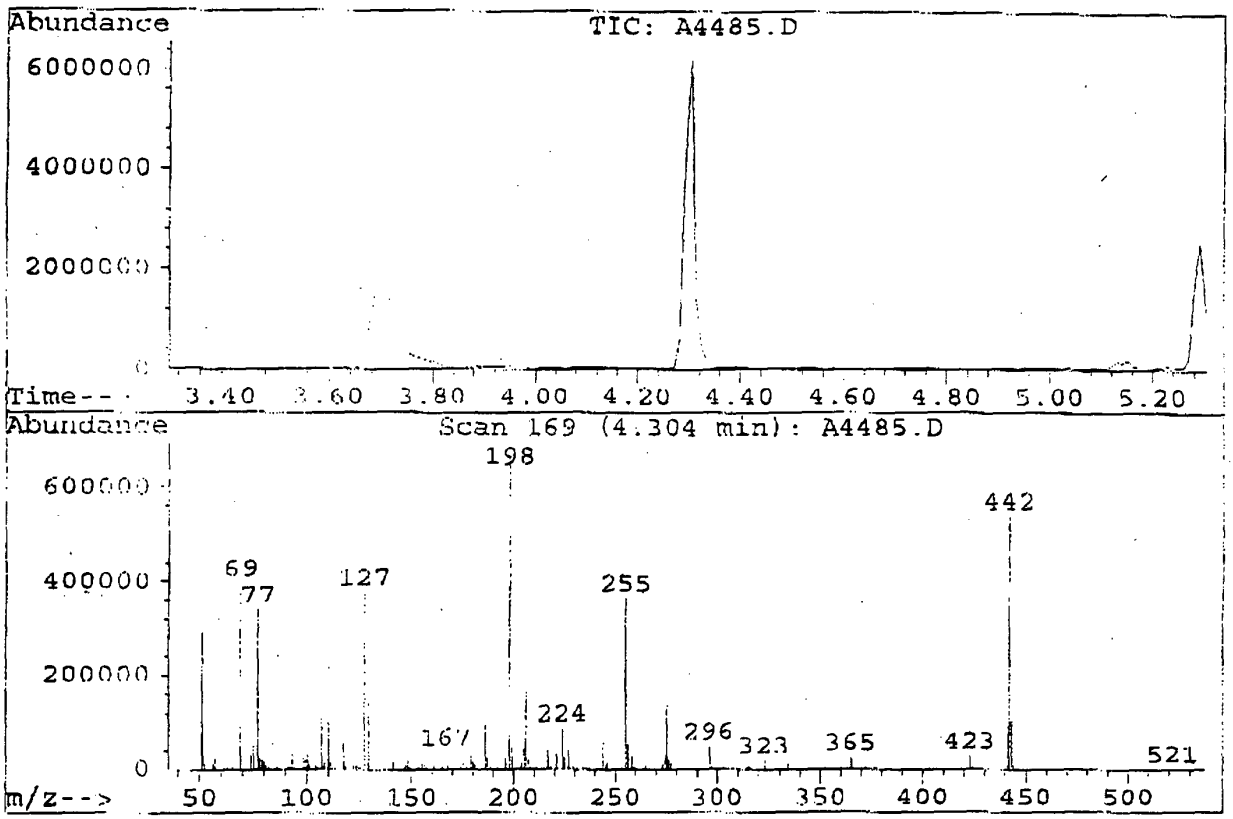
☐ Urgent ☐ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

DFTPP-8270

Data File : C:\HPCHEM\1\DATA\A4485.D
Acq Time : 08/30/98 10:37
Sample : DFTPP
Misc : DFTPP

Operator: RRP
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\DFTPPBNA.M
Title :



Peak Apex is scan: 169

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51	198	30	60	44.4	294080	PASS
68	69	0	2	0.0	0	PASS
69	198	0	99	59.8	396224	PASS
70	69	0	2	0.6	2381	PASS
127	198	40	60	56.6	375360	PASS
197	198	0	1	0.0	0	PASS
198	198	100	100	100.0	662976	PASS
199	198	5	9	7.5	49728	PASS
275	198	10	30	21.9	145344	PASS
365	198	1	99	3.7	24744	PASS
441	443	1	99	90.9	95456	PASS
442	198	41	99	81.4	539584	PASS
443	442	17	23	19.5	104968	PASS

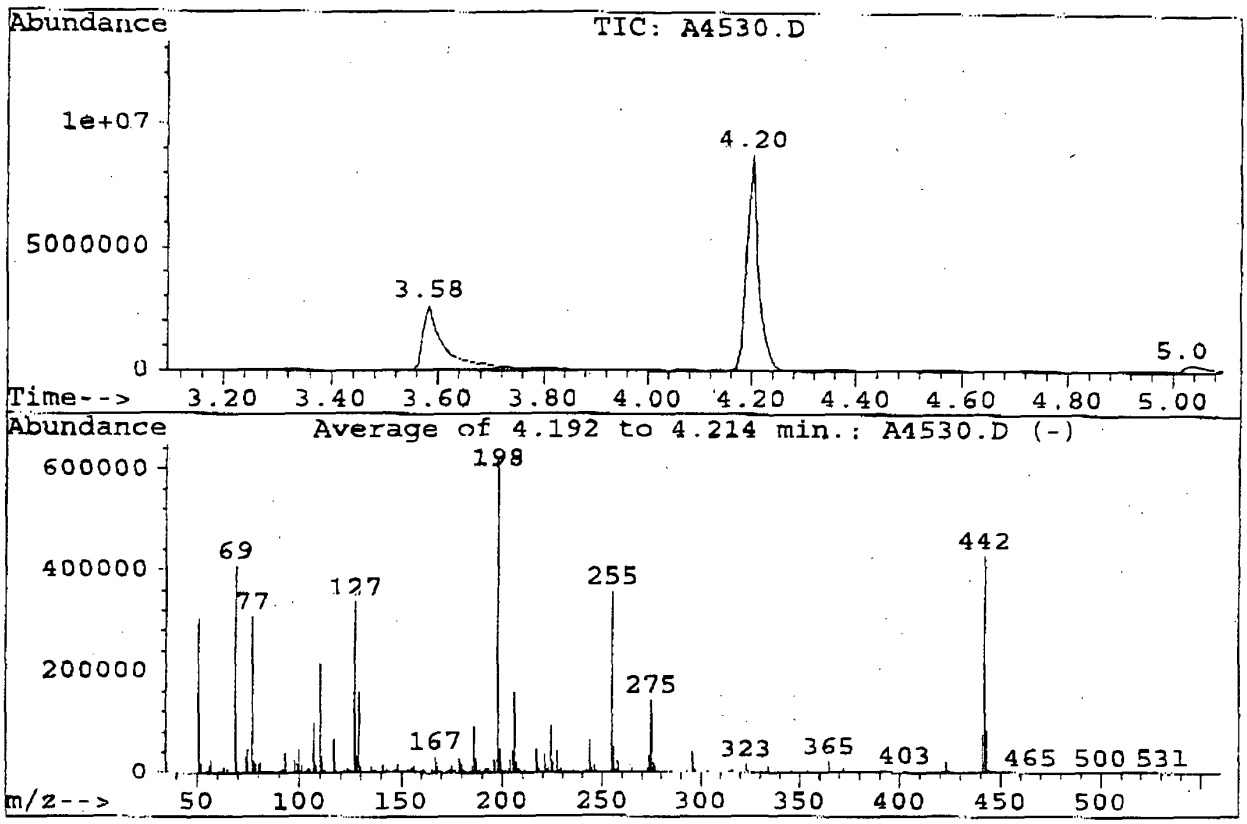
A4485.D DFTPPBNA.M Sun Aug 30 12:01:33 1998

DFTPP-8270

Data File : C:\HPCHEM\1\DATA\A4530.D
Acq Time : 09/01/98 12:23
Sample : DFTPP
Misc : DFTPP

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\DFTPPBNA.M
Title :



Peak Apex is scan: 149

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51	198	30	60	49.1	303782	PASS
68	69	0	2	0.0	0	PASS
69	198	0	99	65.9	407360	PASS
70	69	0	2	0.5	2088	PASS
127	198	40	60	54.5	336960	PASS
197	198	0	1	0.0	0	PASS
198	198	100	100	100.0	618112	PASS
199	198	5	9	7.1	43909	PASS
275	198	10	30	23.2	143597	PASS
365	198	1	99	3.6	22025	PASS
441	443	1	99	92.3	76080	PASS
442	198	41	99	69.3	428075	PASS
443	442	17	23	19.3	82451	PASS

A4530.D DFTPPBNA.M Tue Sep 01 12:36:01 1998

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :		CLIENT SAMPLE ID :	PREP BLANK
PROJECT NAME :		LAB SAMPLE ID :	PAHB002
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :		DATE RECEIVED :	
SAMPLE MATRIX :	SOLID	PRINTED ON :	10/7/98 14:16

% MOISTURE :		ANALYST :	CW
DATE ANALYZED :	9/17/98	DATE EXTRACTED :	8/6/98
DILUTION :	1	EXTRACT VOLUME :	1 mL
INSTRUMENT FILE :	A4752.D	INSTRUMENT ID :	A-HP5970B
SAMPLE WEIGHT :	30 g	TIME ANALYZED :	22:13

PARAMETER	QUANTITATION LIMIT		RESULTS		QUALIFIER
Acenaphthene	330	UG/KG	ND	UG/KG	
Acenaphthylene	330	UG/KG	ND	UG/KG	
Anthracene	330	UG/KG	ND	UG/KG	
Benzo(a)anthracene	330	UG/KG	ND	UG/KG	
Benzo(a)pyrene	330	UG/KG	ND	UG/KG	
Benzo(b)fluoranthene	330	UG/KG	ND	UG/KG	
Benzo(g,h,i)perylene	330	UG/KG	ND	UG/KG	
Benzo(k)fluoranthene	330	UG/KG	ND	UG/KG	
Chrysene	330	UG/KG	ND	UG/KG	
Dibenzo(a,h)anthracene	330	UG/KG	ND	UG/KG	
Fluoranthene	330	UG/KG	ND	UG/KG	
Fluorene	330	UG/KG	ND	UG/KG	
Indeno(1,2,3-c,d)pyrene	330	UG/KG	ND	UG/KG	
Naphthalene	330	UG/KG	ND	UG/KG	
Phenanthrene	330	UG/KG	ND	UG/KG	
Pyrene	330	UG/KG	ND	UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	RECOVERY
Terphenyl-d14	667 UG/KG	18 - 137	172

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID : PAHB002 PREP BLANK ID : PAHB002

Quantitation Report

Data File : C:\HPCHEM\1\DATA\A4752.D
Acq Time : 09/17/98 22:13
Sample : PAH BLANK
Misc : PAHB002 30G/1ML
Quant Time: Sep 18 10:53 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\SWA4743.M
Title : Semivolatiles
Last Update : Fri Sep 18 09:35:01 1998
Response via : Single Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	8.35	152	850764	20.00	ng/uL	-0.01
20) CI40 Naphthalene-d8	11.39	136	3869389	20.00	ng/uL	-0.02
35) CI50 Acenaphthene-d10	15.81	164	1734164	20.00	ng/uL	-0.02
56) CI60 Phenanthrene-d10	19.49	188	2856441	20.00	ng/uL	-0.01
68) CI70 Chrysene-d12	26.18	240	3807530	20.00	ng/uL	-0.01
76) CI75 Perylene-d12	29.71	264	3879258	20.00	ng/uL	0.00
System Monitoring Compounds						%Recovery
4) CS50 2-Fluorophenol	0.00	112	0	0.00	ng/uL	0.00%
5) CS45 Phenol-d5	0.00	99	0	0.00	ng/uL	0.00%
8) CS70 2-Chlorophenol-d4	0.00	132	0	0.00	ng/uL	0.00%
12) CS75 1,2-Dichlorobenzene-d	0.00	152	0	0.00	ng/uL	0.00%
21) CS20 Nitrobenzene-d5	9.77	82	1795	0.03	ng/uL	0.05%
39) CS25 2-Fluorobiphenyl	0.00	172	0	0.00	ng/uL	0.00%
57) CS55 2,4,6-Tribromophenol	0.00	330	0	0.00	ng/uL	0.00%
70) CS30 Terphenyl-d14	23.67	244	7809809	34.41	ng/uL	68.82%
Target Compounds						Qvalue
~~72) C745 bis(2-ethylhexyl)phth~~	~~26.66~~	~~149~~	~~219738~~	~~1.21~~	~~ng/uL~~	~~99~~

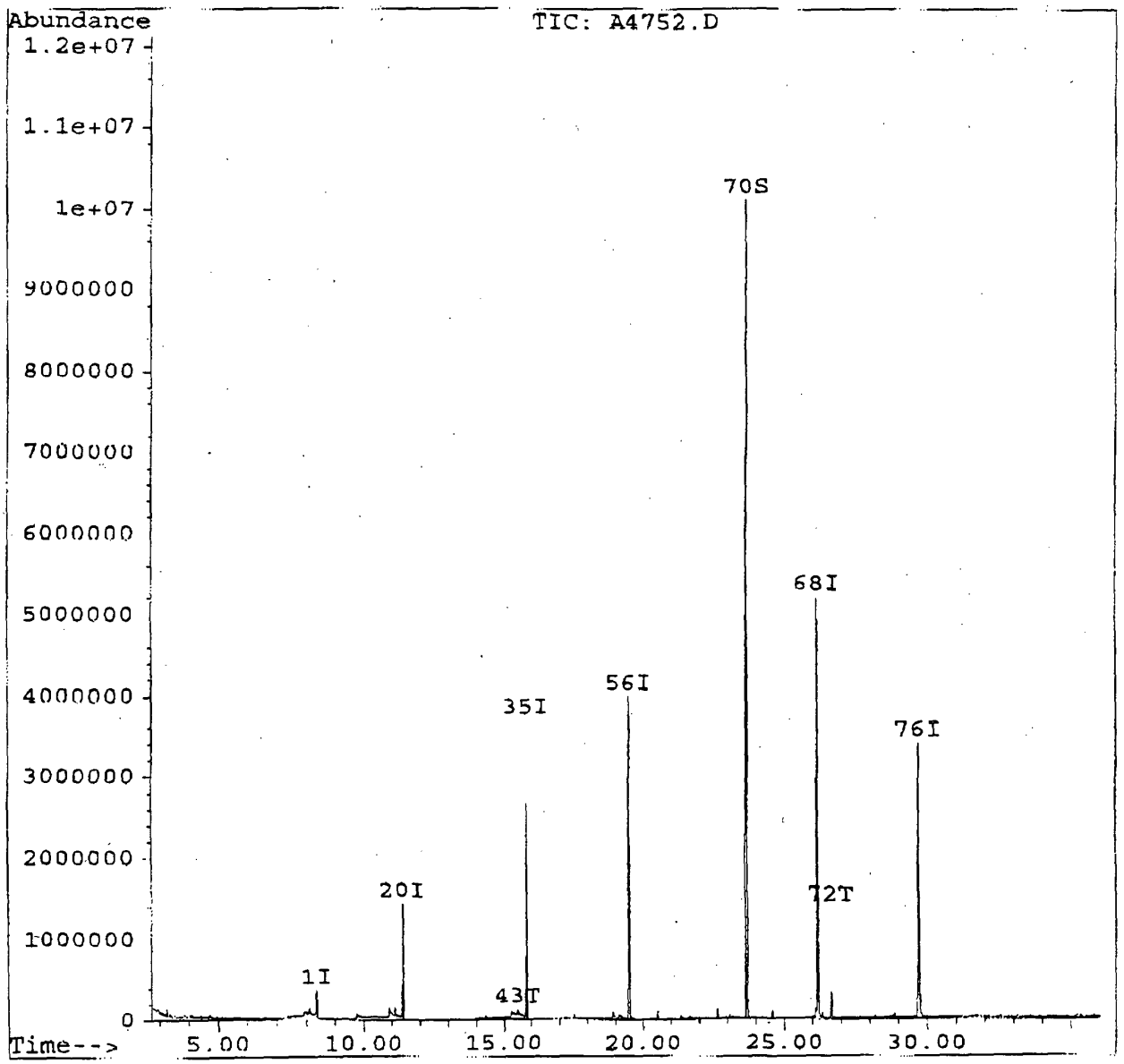
(#) = qualifier out of range (m) = manual integration
A4752.D SWA4743.M Fri Sep 18 15:17:24 1998 Page 1

Quantitation Report

Data File : C:\HPCHEM\1\DATA\A4752.D
Acq Time : 09/17/98 22:13
Sample : PAH BLANK
Misc : PAHB002 30G/1ML
Quant Time: Sep 18 10:53 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\SWA4743.M
Title : Semivolatiles
Last Update : Fri Sep 18 09:35:01 1998
Response via : Single Level Calibration



001838

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :		CLIENT SAMPLE ID :	LAB CONTROL SAMPLE
PROJECT NAME :		LAB SAMPLE ID :	PAHL002
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :		DATE RECEIVED :	
SAMPLE MATRIX :	SOLID	PRINTED ON :	10/7/98 14:17

% MOISTURE :		ANALYST :	CW
DATE ANALYZED :	9/17/98	DATE EXTRACTED :	8/6/98
DILUTION :	1	EXTRACT VOLUME :	1 mL
INSTRUMENT FILE :	A4751.D	INSTRUMENT ID :	A-HP5970B
SAMPLE WEIGHT :	30 g	TIME ANALYZED :	21:29

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	330 UG/KG	230 UG/KG	
Acenaphthylene	330 UG/KG	230 UG/KG	
Anthracene	330 UG/KG	360 UG/KG	
Benzo(a)anthracene	330 UG/KG	450 UG/KG	
Benzo(a)pyrene	330 UG/KG	410 UG/KG	
Benzo(b)fluoranthene	330 UG/KG	440 UG/KG	
Benzo(g,h,i)perylene	330 UG/KG	410 UG/KG	
Benzo(k)fluoranthene	330 UG/KG	460 UG/KG	
Chrysene	330 UG/KG	480 UG/KG	
Dibenzo(a,h)anthracene	330 UG/KG	400 UG/KG	
Fluoranthene	330 UG/KG	580 UG/KG	
Fluorene	330 UG/KG	300 UG/KG	
Indeno(1,2,3-c,d)pyrene	330 UG/KG	380 UG/KG	
Naphthalene	330 UG/KG	180 UG/KG	
Phenanthrene	330 UG/KG	400 UG/KG	
Pyrene	330 UG/KG	360 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	667 UG/KG	18 - 137	117

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB002 PREP BLANK ID :PAHB002

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LCS/LCSD SUMMARY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :
PROJECT NAME :
PROJECT NUMBER :

DATE RECEIVED :
PRINTED ON : 10/7/98

SAMPLE MATRIX : SOLID
METHOD REFERENCE : SW846-8270C

LAB CONTROL SAMPLE
LCS SAMPLE ID : PAHL002
CLIENT SAMPLE ID :
DATE ANALYZED : 9/17/98
INSTRUMENT FILE : A4751.D

LAB CONTROL SAMPLE DUPLICATE
LCSD SAMPLE ID :
CLIENT SAMPLE ID :
DATE ANALYZED :
INSTRUMENT FILE :

PARAMETER	UNITS	LCS TRUE VALUE	LCSD TRUE VALUE	LCS FOUND VALUE	LCSD FOUND VALUE	LCS RECOVERY (%)	LCSD RECOVERY (%)	RPD	RPD LIMIT	QC LIMITS REC.
Acenaphthene	UG/KG	333		232		70			50	31 - 137
Acenaphthylene	UG/KG	333		226		68			50	31 - 137
Anthracene	UG/KG	333		365		110			50	31 - 137
Benzo(a)anthracene	UG/KG	333		447		134			50	31 - 137
Benzo(a)pyrene	UG/KG	333		410		123			50	31 - 137
Benzo(b)fluoranthene	UG/KG	333		439		132			50	31 - 137
Benzo(g,h,i)perylene	UG/KG	333		411		123			50	31 - 137
Benzo(k)fluoranthene	UG/KG	333		461		138 *			50	31 - 137
Chrysene	UG/KG	333		484		145 *			50	31 - 137
Dibenzo(a,h)anthracene	UG/KG	333		404		121			50	31 - 137
Fluoranthene	UG/KG	333		582		175 *			50	31 - 137
Fluorene	UG/KG	333		297		89			50	31 - 137
Indeno(1,2,3-c,d)pyrene	UG/KG	333		384		115			50	31 - 137
Naphthalene	UG/KG	333		178		53			50	31 - 137
Phenanthrene	UG/KG	333		405		122			50	31 - 137
Pyrene	UG/KG	333		357		107			50	35 - 142

* Indicate values outside of QC limits

RPD : 0 out of 0 outside limits
Spike Recovery : 3 out of 16 outside limits

Quantitation Report

Data File : C:\HPCHEM\1\DATA\A4751.D
Acq Time : 09/17/98 21:29
Sample : PAH LCS
Misc : PAHL002 30G/1ML
Quant Time: Sep 18 15:11 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\SWA4743.M
Title : Semivolatiles
Last Update : Fri Sep 18 09:35:01 1998
Response via : Single Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	8.35	152	829224	20.00	ng/uL	-0.01
20) CI40 Naphthalene-d8	11.39	136	3725559	20.00	ng/uL	-0.02
35) CI50 Acenaphthene-d10	15.82	164	1601787	20.00	ng/uL	-0.02
56) CI60 Phenanthrene-d10	19.49	188	2456099	20.00	ng/uL	0.00
68) CI70 Chrysene-d12	26.19	240	2930273	20.00	ng/uL	0.00
76) CI75 Perylene-d12	29.71	264	3003073	20.00	ng/uL	0.00
System Monitoring Compounds						%Recovery
4) CS50 2-Fluorophenol	0.00	112	0	0.00	ng/uL	0.00%
5) CS45 Phenol-d5	0.00	99	0	0.00	ng/uL	0.00%
8) CS70 2-Chlorophenol-d4	0.00	132	0	0.00	ng/uL	0.00%
12) CS75 1,2-Dichlorobenzene-d	0.00	152	0	0.00	ng/uL	0.00%
21) CS20 Nitrobenzene-d5	9.80	82	1706	0.03	ng/uL	0.05%
39) CS25 2-Fluorobiphenyl	0.00	172	0	0.00	ng/uL	0.00%
57) CS55 2,4,6-Tribromophenol	0.00	330	0	0.00	ng/uL	0.00%
70) CS30 Terphenyl-d14	23.66	244	4089295	23.41	ng/uL	46.82%
Target Compounds						Qvalue
30) C450 Naphthalene	11.44	128	991488	5.35	ng/uLm	99
44) C540 Acenaphthylene	15.41	152	957175	6.79	ng/uLm	94
46) C550 Acenaphthene	15.89	153	649660	6.95	ng/uLm	98
54) C590 Fluorene	17.16	166	855152	8.92	ng/uLm	97
63) C640 Phenanthrene	19.54	178	1674403	12.14	ng/uL	98
64) C645 Anthracene	19.65	178	1537565	10.95	ng/uL	99
65) C647 Carbazole	20.12	167	1809070	16.93	ng/uL	95
67) C655 Fluoranthene	22.55	202	2265916	17.47	ng/uL	83
69) C715 Pyrene	23.09	202	2490783	10.70	ng/uL	88
74) C730 Benzo(a)anthracene	26.14	228	2544269	13.42	ng/uL	98
75) C740 Chrysene	26.24	228	2602451	14.52	ng/uL	99
78) C765 Benzo(b)fluoranthene	28.73	252	2304100	13.18	ng/uL#	89
79) C770 Benzo(k)fluoranthene	28.80	252	2414071	13.84	ng/uL#	89
80) C775 Benzo(a)pyrene	29.55	252	1983053	12.29	ng/uL#	88
81) C780 Indeno(1,2,3-c,d)pyre	33.17	276	1381185	11.52	ng/uL#	67
82) C785 Dibenzo(a,h)anthracen	33.29	278	1457089	12.11	ng/uL	82
83) C790 Benzo(g,h,i)perylene	34.17	276	1509018	12.32	ng/uL	96

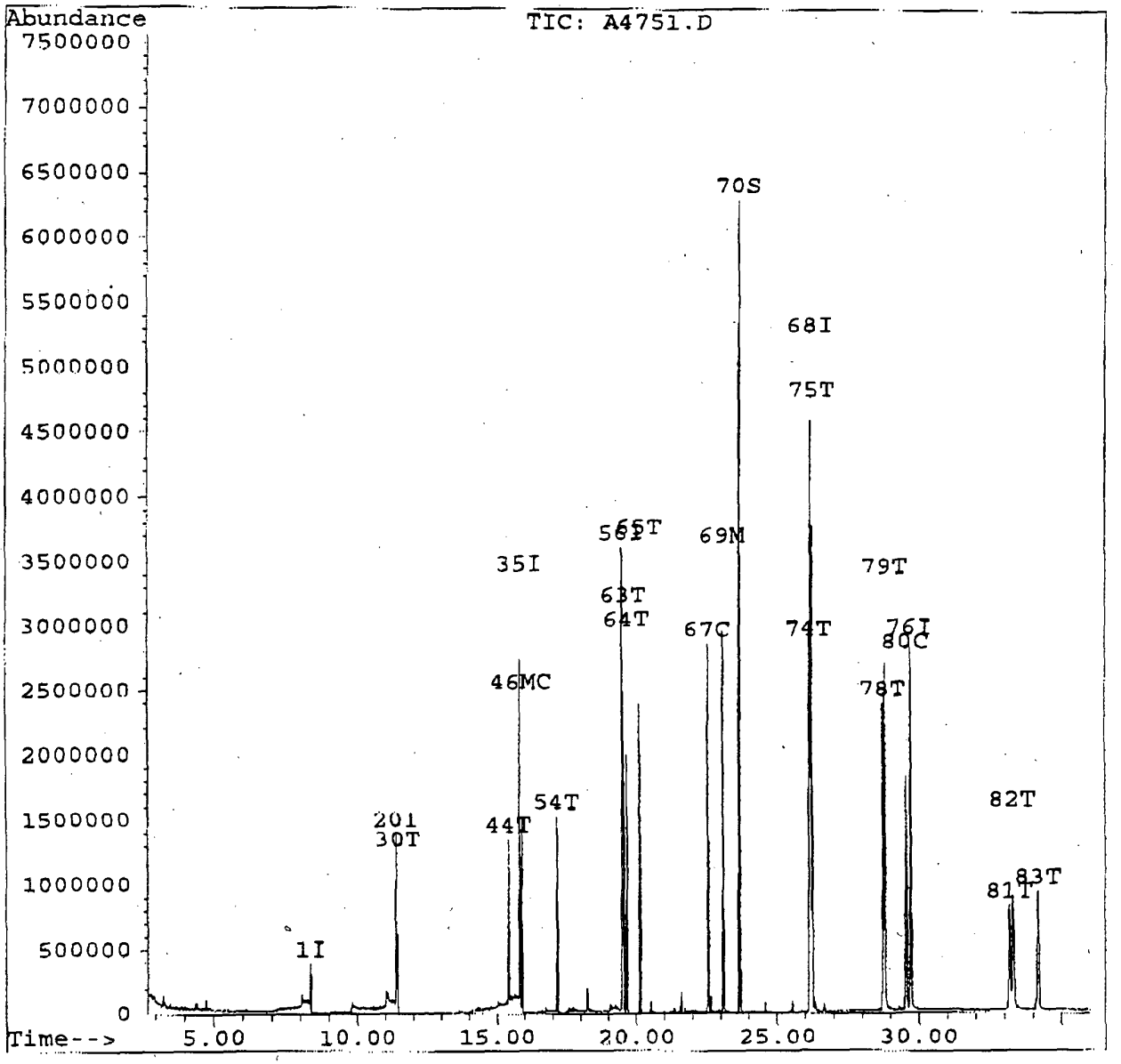
(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : C:\HPCHEM\1\DATA\A4751.D
Acq Time : 09/17/98 21:29
Sample : PAH LCS
Misc : PAHL002 30G/1ML
Quant Time: Sep 18 15:11 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\SWA4743.M
Title : Semivolatiles
Last Update : Fri Sep 18 09:35:01 1998
Response via : Single Level Calibration



001842

Evaluate Continuing Calibration Report

Cont. Cal failed. Reddy used this to run PAH

Data File : G:\HPCHEM\1\DATA\A4486.D
Acq Time : 08/30/98 10:59
Sample : SSTD040
Misc : SSTD040
Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : G:\HPCHEM\1\METHODS\TRI4437.M
Title : Semivolatiles
Last Update : Fri Aug 28 14:52:10 1998
Response via : Multiple Level Calibration

Min. RRF : 0.010 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 200%

		Compound	AvgRRF	CCRRF	%Dev	Area%	Dev(Min)
1	I	CI30 1,4-Dichlorobenzene-d4	1.000	1.000	0.0	83	0.00
2	T	C310 N-Nitrosodimethylamine	1.029	1.410	-37.0#	102	0.00
3	T	C312 Pyridine	1.565	2.251	-43.9#	117	-0.01
4	S	CS50 2-Fluorophenol	1.411	1.580	-12.0	91	0.00
5	S	CS45 Phenol-d5	1.836	2.136	-16.3	92	0.00
6	MC	C315 Phenol	1.831	2.236	-22.1	94	0.00
7	T	C325 bis(2-chloroethyl)ethe	1.449	1.797	-24.0	99	0.01
8	S	CS70 2-Chlorophenol-d4	1.401	1.459	-4.2	87	0.00
9	M	C330 2-Chlorophenol	1.482	1.538	-3.7	84	0.01
10	T	C335 1,3-Dichlorobenzene	1.562	1.501	3.9	81	0.00
11	MC	C340 1,4-Dichlorobenzene	1.643	1.625	1.1	82	0.00
12	S	CS75 1,2-Dichlorobenzene-d4	0.884	0.872	1.3	82	0.01
13	T	C350 1,2-Dichlorobenzene	1.534	1.496	2.5	80	0.00
14	T	C345 Benzyl alcohol	1.066	1.103	-3.4	87	0.00
15	T	C355 2-Methylphenol	1.414	1.415	-0.0	85	0.01
16	T	C357 2,2`-oxybis(1-Chloropr	2.970	3.658	-23.2	98	0.00
17	T	C365 4-Methylphenol	1.502	1.693	-12.7	91	0.01
18	MP	C370 N-Nitroso-di-n-propyla	1.252	1.512	-20.8	99	0.00
19	T	C375 Hexachloroethane	0.721	0.804	-11.4	90	0.00
20	I	CI40 Naphthalene-d8	1.000	1.000	0.0	80	0.00
21	S	CS20 Nitrobenzene-d5	0.341	0.398	-16.7	91	0.01
22	T	C410 Nitrobenzene	0.460	0.564	-22.6	98	0.01
23	T	C415 Isophorone	0.766	0.896	-17.0	95	-0.01
24	C	C420 2-Nitrophenol	0.234	0.230	1.7	80	0.01
25	T	C425 2,4-Dimethylphenol	0.390	0.411	-5.3	85	0.01
26	T	C435 Bis(2-chloroethoxy)met	0.475	0.544	-14.7	92	0.00
27	T	C430 Benzoic acid	0.223	0.193	13.6	69	-0.01
28	C	C440 2,4-Dichlorophenol	0.269	0.262	2.6	75	0.00
29	M	C445 1,2,4-Trichlorobenzene	0.281	0.262	6.7	77	0.00
30	T	C450 Naphthalene	1.018	1.033	-1.4	82	0.00
31	T	C455 4-Chloroaniline	0.219	0.209	4.4	116	0.00
32	C	C460 Hexachlorobutadiene	0.147	0.138	6.2	79	0.00
33	MC	C465 4-Chloro-3-methylpheno	0.347	0.368	-6.0	83	0.01
34	T	C470 2-Methylnaphthalene	0.688	0.689	-0.2	81	0.00
35	I	CI50 Acenaphthene-d10	1.000	1.000	0.0	78	0.00
36	P	C510 Hexachlorocyclopentadi	0.237	0.207	12.5	74	0.00
37	C	C515 2,4,6-Trichlorophenol	0.334	0.310	7.2	79	0.01
38	T	C520 2,4,5-Trichlorophenol	0.344	0.329	4.2	77	0.01
39	S	CS25 2-Fluorobiphenyl	1.190	1.153	3.1	80	0.00
40	T	C525 2-Chloronaphthalene	1.115	1.084	2.8	80	0.01

(#) = Out of Range

Evaluate Continuing Calibration Report

Data File : G:\HPCHEM\1\DATA\A4486.D
Acq Time : 08/30/98 10:59
Sample : SSTD040
Misc : SSTD040

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : G:\HPCHEM\1\METHODS\TRI4437.M
Title : Semivolatiles
Last Update : Fri Aug 28 14:52:10 1998
Response via : Multiple Level Calibration

Min. RRF : 0.010 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 200%

		Compound	AvgRRF	CCRRF	%Dev	Area%	Dev(Min)
41	T	C530 2-Nitroaniline	0.362	0.394	-8.7	91	0.01
42	T	C535 Dimethylphthalate	1.430	1.415	1.1	79	-0.01
43	T	C543 2,6-Dinitrotoluene	0.368	0.352	4.3	77	0.00
44	T	C540 Acenaphthylene	1.802	1.958	-8.7	83	0.00
[redacted]	T	C545 3-Nitroaniline	0.075	0.057	23.3	212#	0.04
46	MC	C550 Acenaphthene	1.236	1.268	-2.6	82	0.01
47	P	C555 2,4-Dinitrophenol	0.141	0.108	23.4	62	0.02
48	MP	C560 4-Nitrophenol	0.111	0.112	-0.3	78	0.04
49	M	C570 2,4-Dinitrotoluene	0.451	0.418	7.4	75	0.01
50	T	C565 Dibenzofuran	1.602	1.590	0.7	78	0.01
51		2,3,4,6-Tetrachlorophenol	0.235	0.233	1.1	79	0.00
52	T	C580 Diethylphthalate	1.521	1.539	-1.1	81	0.00
53	T	C585 4-Chlorophenyl phenyl	0.571	0.581	-1.6	83	0.01
54	T	C590 Fluorene	1.312	1.371	-4.5	83	0.00
55	T	C595 4-Nitroaniline	0.075	0.045	39.5#	52	0.04
56	I	CI60 Phenanthrene-d10	1.000	1.000	0.0	75	0.00
57	S	CS55 2,4,6-Tribromophenol	0.102	0.113	-11.3	90	0.00
58	T	C610 4,6-Dinitro-2-methylph	0.163	0.141	13.9	68	0.00
59	C	C615 N-nitrosodiphenylamine	0.570	0.580	-1.7	78	0.00
[redacted]	T	C625 4-Bromophenyl phenyl e	0.192	0.201	-4.8	80	0.00
[redacted]	T	C630 Hexachlorobenzene	0.231	0.244	-5.4	82	0.02
62	MC	C635 Pentachlorophenol	0.103	0.092	10.6	70	0.02
63	T	C640 Phenanthrene	1.177	1.189	-1.1	79	0.00
64	T	C645 Anthracene	1.163	1.195	-2.8	77	0.00
65	T	C647 Carbazole	0.762	0.701	8.0	68	-0.05
66	T	C650 Di-n-butylphthalate	1.850	1.963	-6.1	81	0.00
67	C	C655 Fluoranthene	1.058	0.994	6.0	70	0.00
68	I	CI70 Chrysene-d12	1.000	1.000	0.0	64	0.00
69	M	C715 Pyrene	2.484	2.711	-9.1	69	0.00
70	S	CS30 Terphenyl-d14	1.581	1.749	-10.7	72	0.00
71	T	C720 Butylbenzylphthalate	1.503	1.606	-6.8	67	0.00
72	T	C745 bis(2-ethylhexyl)phtha	1.946	2.277	-17.0	73	0.00
73	T	C725 3,3`-Dichlorobenzidine	0.065	0.105	-59.9#	101	0.02
74	T	C730 Benzo(a)anthracene	1.381	1.269	8.1	59	0.00
75	T	C740 Chrysene	1.312	1.322	-0.8	66	0.00
76	I	CI75 Perylene-d12	1.000	1.000	0.0	63	0.02
77	C	C760 Di-n-octylphthalate	3.440	3.489	-1.4	64	-0.01
78	T	C765 Benzo(b)fluoranthene	1.385	1.335	3.6	62	0.02
79	T	C770 Benzo(k)fluoranthene	1.303	1.195	8.3	58	0.00

(#) = Out of Range

001844

Evaluate Continuing Calibration Report

Data File : G:\HPCHEM\1\DATA\A4486.D
Acq Time : 08/30/98 10:59 Operator: CW
Sample : SSTD040 Inst : A-HP5970B
Misc : SSTD040 Multiplr: 1.00

Method : G:\HPCHEM\1\METHODS\TRI4437.M
Title : Semivolatiles
Last Update : Fri Aug 28 14:52:10 1998
Response via : Multiple Level Calibration

Min. RRF : 0.010 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 200%

		Compound	AvgRRF	CCRRF	%Dev	Area%	Dev(Min)
80	C	C775 Benzo(a)pyrene	1.109	1.054	5.0	61	0.00
81	T	C780 Indeno(1,2,3-c,d)pyren	0.705	0.756	-7.3	68	0.02
82	T	C785 Dibenzo(a,h)anthracene	0.730	0.811	-11.2	71	0.00
83	T	C790 Benzo(g,h,i)perylene	0.755	0.813	-7.6	70	0.02

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Quantitation Report Used for PAH by Reddy

Data File : G:\HPCHEM\1\DATA\A4486.D
Acq Time : 08/30/98 10:59
Sample : SSTD040
Misc : SSTD040
Quant Time: Aug 31 8:43 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : G:\HPCHEM\1\METHODS\TRI4437.M
Title : Semivolatiles
Last Update : Fri Aug 28 14:52:10 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	5.16	152	547182	20.00	ng/uL	0.00
20) CI40 Naphthalene-d8	8.17	136	2491483	20.00	ng/uL	0.00
35) CI50 Acenaphthene-d10	12.37	164	1541080	20.00	ng/uL	0.00
56) CI60 Phenanthrene-d10	15.90	188	2244603	20.00	ng/uL	0.00
68) CI70 Chrysene-d12	22.27	240	813229	20.00	ng/uL	0.00
76) CI75 Perylene-d12	25.41	264	559639	20.00	ng/uL	0.02
System Monitoring Compounds						%Recovery
4) CS50 2-Fluorophenol	2.33	112	1729266	44.81	ng/uL	59.74%
5) CS45 Phenol-d5	4.79	99	2337425	46.53	ng/uL	62.05%
8) CS70 2-Chlorophenol-d4	4.68	132	1596946	41.66	ng/uL	55.55%
12) CS75 1,2-Dichlorobenzene-d	5.50	152	954710	39.48	ng/uL	78.95%
21) CS20 Nitrobenzene-d5	6.58	82	1984003	46.68	ng/uL	93.37%
39) CS25 2-Fluorobiphenyl	10.96	172	3554882	38.75	ng/uL	77.51%
57) CS55 2,4,6-Tribromophenol	14.33	330	507466	44.53	ng/uL	59.37%
70) CS30 Terphenyl-d14	19.99	244	2845173	44.26	ng/uL	88.53%
Target Compounds						Qvalue
2) C310 N-Nitrosodimethylamin	1.01	74	1543576	54.81	ng/uL#	76
3) C312 Pyridine	0.98	52	2463913	57.55	ng/ulm	68
6) C315 Phenol	4.83	94	2446543	48.84	ng/uL#	75
7) C325 bis(2-chloroethyl)eth	4.80	93	1966376	49.61	ng/uL	96
9) C330 2-Chlorophenol	4.73	128	1682922	41.49	ng/uL	94
10) C335 1,3-Dichlorobenzene	5.00	146	1642376	38.44	ng/uL	99
11) C340 1,4-Dichlorobenzene	5.21	146	1778221	39.56	ng/uL	99
13) C350 1,2-Dichlorobenzene	5.53	146	1636632	38.98	ng/uL	97
14) C345 Benzyl alcohol	5.77	108	1207175	41.38	ng/uL	95
15) C355 2-Methylphenol	6.20	108	1548018	40.01	ng/uL	91
16) C357 2,2`-oxybis(1-Chlorop	6.11	45	4003515	49.26	ng/uL#	35
17) C365 4-Methylphenol	6.64	108	1853230	45.08	ng/uL	94
18) C370 N-Nitroso-di-n-propyl	6.47	70	1655149	48.34	ng/uL	97
19) C375 Hexachloroethane	6.27	117	879462	44.58	ng/uL	83
22) C410 Nitrobenzene	6.63	77	2810205	49.03	ng/uL	82
23) C415 Isophorone	7.29	82	4465480	46.81	ng/uL	94
24) C420 2-Nitrophenol	7.38	139	1146209	39.32	ng/uL	91
25) C425 2,4-Dimethylphenol	7.86	107	2047522	42.13	ng/uL	99
26) C435 Bis(2-chloroethoxy)me	8.01	93	2711524	45.87	ng/uL	95
27) C430 Benzoic acid	8.65	122	961698	34.56	ng/uL#	35
28) C440 2,4-Dichlorophenol	8.06	162	1307612	38.97	ng/uL	99
29) C445 1,2,4-Trichlorobenzen	8.11	180	1304817	37.30	ng/uL	96
30) C450 Naphthalene	8.23	128	5145918	40.56	ng/uL#	80
31) C455 4-Chloroaniline	8.58	127	1042291	38.22	ng/uL	71
32) C460 Hexachlorobutadiene	8.65	225	688753	37.51	ng/uL	99
33) C465 4-Chloro-3-methylphen	10.02	107	1832980	42.41	ng/uL	96

(#) = qualifier out of range (m) = manual integration

001846

Quantitation Report

Data File : G:\HPCHEM\1\DATA\A4486.D
Acq Time : 08/30/98 10:59
Sample : SSTD040
Misc : SSTD040
Quant Time: Aug 31 8:43 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : G:\HPCHEM\1\METHODS\TRI4437.M
Title : Semivolatiles
Last Update : Fri Aug 28 14:52:10 1998
Response via : Multiple Level Calibration

	Compound	R.T.	QIon	Response	Conc	Unit	Qvalue
34)	C470 2-Methylnaphthalene	9.93	142	3435022	40.08	ng/uL	92
36)	C510 Hexachlorocyclopentad	10.34	237	637963	35.00	ng/uL	97
37)	C515 2,4,6-Trichlorophenol	10.78	196	956258	37.11	ng/uL	99
38)	C520 2,4,5-Trichlorophenol	10.85	196	1015478	38.34	ng/uL	98
40)	C525 2-Chloronaphthalene	11.08	162	3340760	38.89	ng/uL	96
41)	C530 2-Nitroaniline	11.53	65	1213733	43.50	ng/uL	90
42)	C535 Dimethylphthalate	12.15	163	4361732	39.58	ng/uL	97
43)	C543 2,6-Dinitrotoluene	12.22	165	1085493	38.29	ng/uL	97
44)	C540 Acenaphthylene	12.01	152	6036335	43.48	ng/uL	97
45)	C545 3-Nitroaniline	12.67	138	176379	30.69	ng/uL	87
46)	C550 Acenaphthene	12.47	153	3907311	41.03	ng/uL	97
47)	C555 2,4-Dinitrophenol	12.83	184	331720	30.64	ng/uL#	74
48)	C560 4-Nitrophenol	13.33	109	344468	40.11	ng/uL#	1
49)	C570 2,4-Dinitrotoluene	13.16	165	1287730	37.04	ng/uL#	63
50)	C565 Dibenzofuran	12.91	168	4901248	39.71	ng/uL	91
51)	2,3,4,6-Tetrachlorophenol	13.33	232	717083	39.54	ng/ul#	100
52)	C580 Diethylphthalate	13.89	149	4742217	40.45	ng/uL	98
53)	C585 4-Chlorophenyl phenyl	13.91	204	1789541	40.64	ng/uL	86
54)	C590 Fluorene	13.72	166	4226261	41.82	ng/uL	96
55)	C595 4-Nitroaniline	14.10	138	139406	24.18	ng/uL#	65
58)	C610 4,6-Dinitro-2-methylp	14.10	198	631106	34.44	ng/uL	90
59)	C615 N-nitrosodiphenylamin	14.25	169	2603999	40.68	ng/uL	95
60)	C625 4-Bromophenyl phenyl	15.04	248	901586	41.93	ng/uL#	81
61)	C630 Hexachlorobenzene	15.00	284	1094278	42.15	ng/uL	78
62)	C635 Pentachlorophenol	15.61	266	415062	35.77	ng/uL	96
63)	C640 Phenanthrene	15.97	178	5338460	40.42	ng/uL	98
64)	C645 Anthracene	16.10	178	5363548	41.10	ng/uL	98
65)	C647 Carbazole	16.65	167	3148260	36.81	ng/uL	94
66)	C650 Di-n-butylphthalate	17.89	149	8811495	42.44	ng/uL	99
67)	C655 Fluoranthene	18.81	202	4462973	37.60	ng/uL	99
69)	C715 Pyrene	19.29	202	4408777	43.65	ng/uL	96
71)	C720 Butylbenzylphthalate	21.42	149	2611920	42.74	ng/uL	93
72)	C745 bis(2-ethylhexyl)phth	23.02	149	3704159	46.82	ng/uL	96
73)	C725 3,3'-Dichlorobenzidin	22.45	252	169981	63.95	ng/uL	89
74)	C730 Benzo(a)anthracene	22.25	228	2064752	36.76	ng/uL	100
75)	C740 Chrysene	22.32	228	2149407	40.31	ng/uL	99
77)	C760 Di-n-octylphthalate	24.51	149	3905652	40.58	ng/uL	100
78)	C765 Benzo(b)fluoranthene	24.66	252	1494483	38.55	ng/uL	96
79)	C770 Benzo(k)fluoranthene	24.72	252	1337461	36.68	ng/uL	96
80)	C775 Benzo(a)pyrene	25.29	252	1179408	37.99	ng/uL	96
81)	C780 Indeno(1,2,3-c,d)pyre	27.43	276	846329	42.90	ng/uL#	82
82)	C785 Dibenzo(a,h)anthracen	27.51	278	908015	44.48	ng/uL	88
83)	C790 Benzo(g,h,i)perylene	27.84	276	909788	43.04	ng/uL	95

(#) = qualifier out of range (m) = manual integration

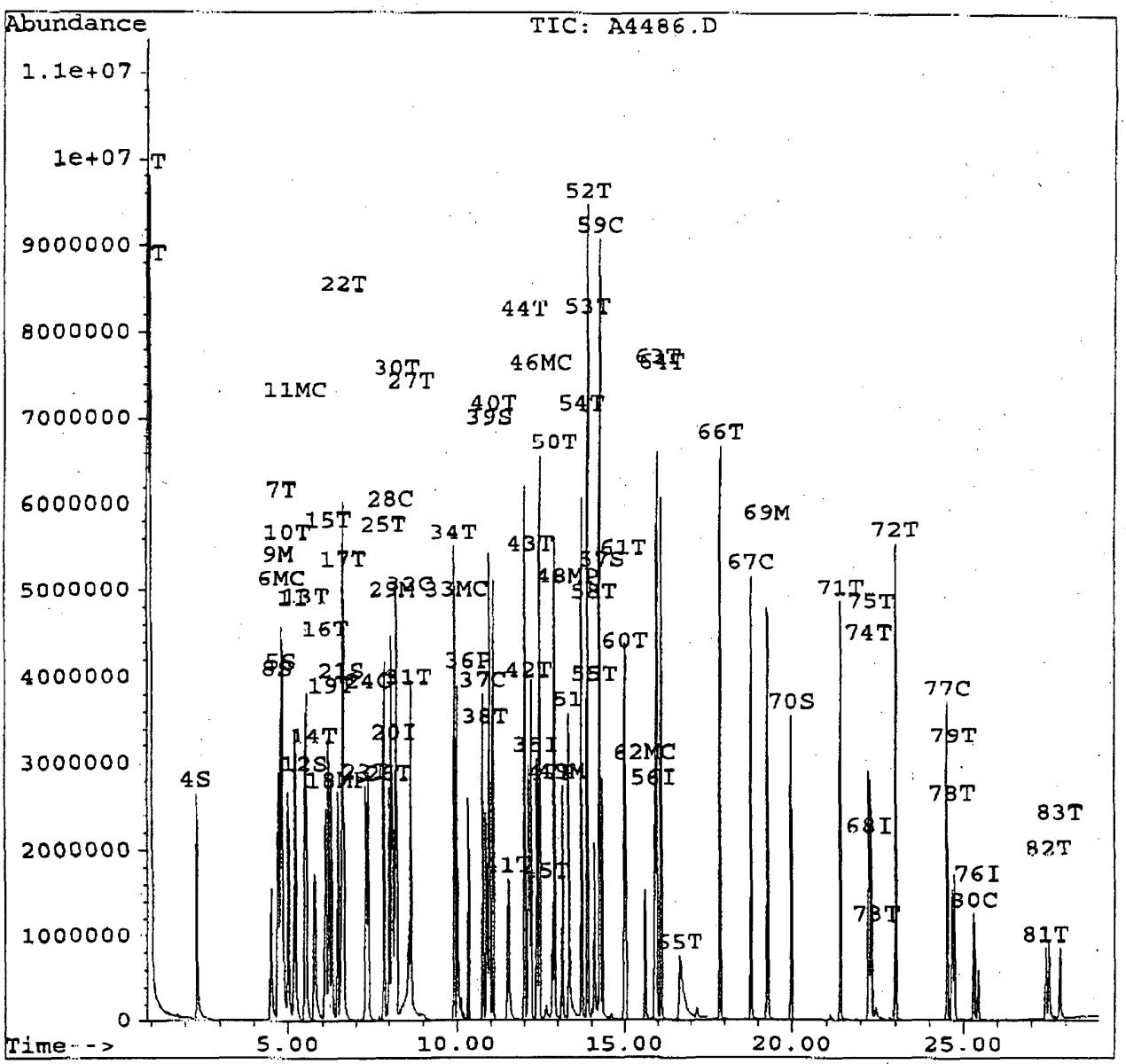
001847

Quantitation Report

Data File : G:\HPCHEM\1\DATA\A4486.D
Acq Time : 08/30/98 10:59
Sample : SSTD040
Misc : SSTD040
Quant Time: Aug 31 8:43 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

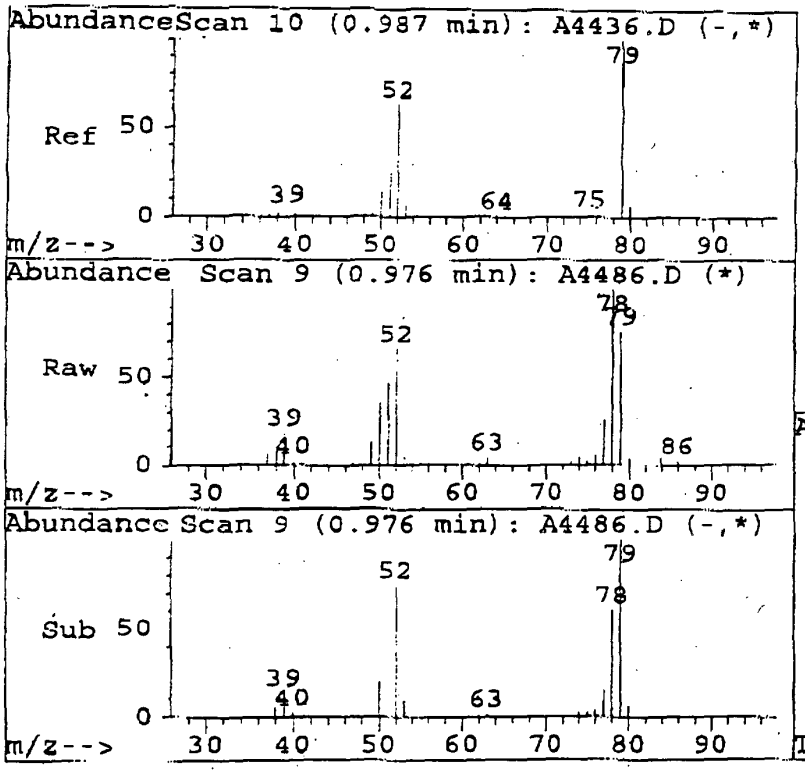
Method : G:\HPCHEM\1\METHODS\TRI4437.M
Title : Semivolatiles
Last Update : Fri Aug 28 14:52:10 1998
Response via : Multiple Level Calibration



001848

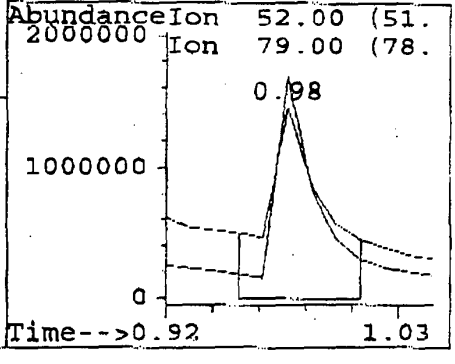
Data File : G:\HPCHEM\1\DATA\A4486.D
Acq Time : 08/30/98 10:59
Sample : SSTD040
Misc : SSTD040

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00



#3
C312 Pyridine
Concen: 57.55 ng/ul m
RT: 0.98 min Scan# 9
Delta R.T. -0.01 min
Integration Range:
Scan= 7 to 12
R.T.= 0.95 to 1.01 (min)
Tgt Ion:52 Resp: 2463913

Ion	Ratio	Lower	Upper
52	100		
79	115.4	93.5	140.2
0	0.0	0.0	0.0
0	0.0	0.0	0.0



001849

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\1\DATA\A4531.D
Acq Time : 09/01/98 12:42
Sample : SSTD040
Misc : SSTD040

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\TRI450S.M
Title : Semivolatiles
Last Update : Tue Sep 01 13:13:58 1998
Response via : Multiple Level Calibration

Min. RRF : 0.010 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 200%

			Compound	AvgRRF	CCRRF	%Dev	Area%	Dev(Min)
1	I	CI30	1,4-Dichlorobenzene-d4	1.000	1.000	0.0	93	0.00
2	T	C310	N-Nitrosodimethylamine	1.156	1.183	-2.3	78	-0.04
3	T	C312	Pyridine	2.043	2.502	-22.4	91	-0.04
4	S	CS50	2-Fluorophenol	1.449	1.421	2.0	89	-0.06
5	S	CS45	Phenol-d5	1.945	1.969	-1.2	89	0.00
6	MC	C315	Phenol	2.066	2.079	-0.6	88	0.00
7	T	C325	bis(2-chloroethyl)ethe	1.579	1.643	-4.1	87	-0.02
8	S	CS70	2-Chlorophenol-d4	1.460	1.426	2.4	88	-0.01
9	M	C330	2-Chlorophenol	1.528	1.486	2.7	87	-0.02
10	T	C335	1,3-Dichlorobenzene	1.589	1.552	2.4	90	-0.02
11	MC	C340	1,4-Dichlorobenzene	1.670	1.640	1.8	88	0.00
12	S	CS75	1,2-Dichlorobenzene-d4	0.908	0.914	-0.7	90	0.00
13	T	C350	1,2-Dichlorobenzene	1.564	1.581	-1.1	90	0.01
14	T	C345	Benzyl alcohol	1.094	1.076	1.6	88	0.02
15	T	C355	2-Methylphenol	1.460	1.305	10.6	82	0.05
16	T	C357	2,2`-oxybis(1-Chloropr	3.315	3.399	-2.5	89	0.03
17	T	C365	4-Methylphenol	1.572	1.591	-1.2	90	0.06
18	MP	C370	N-Nitroso-di-n-propyla	1.447	1.386	4.2	88	0.05
19	T	C375	Hexachloroethane	0.766	0.820	-7.1	90	0.04
20	I	CI40	Naphthalene-d8	1.000	1.000	0.0	94	0.00
21	S	CS20	Nitrobenzene-d5	0.377	0.365	3.4	86	-0.04
22	T	C410	Nitrobenzene	0.517	0.499	3.5	88	-0.02
23	T	C415	Isophorone	0.848	0.793	6.6	85	-0.01
24	C	C420	2-Nitrophenol	0.226	0.225	0.5	89	-0.01
25	T	C425	2,4-Dimethylphenol	0.406	0.385	5.0	88	0.02
26	T	C435	Bis(2-chloroethoxy)met	0.491	0.490	0.3	89	0.00
27	T	C430	Benzoic acid	0.211	0.167	20.5	71	0.00
28	C	C440	2,4-Dichlorophenol	0.263	0.271	-3.0	91	0.00
29	M	C445	1,2,4-Trichlorobenzene	0.278	0.275	1.3	87	0.00
30	T	C450	Naphthalene	1.028	1.010	1.8	89	0.01
31	T	C455	4-Chloroaniline	0.280	0.231	17.5	96	0.02
32	C	C460	Hexachlorobutadiene	0.149	0.158	-5.8	96	0.00
33	MC	C465	4-Chloro-3-methylpheno	0.355	0.347	2.1	88	0.06
34	T	C470	2-Methylnaphthalene	0.685	0.676	1.2	86	0.04
35	I	CI50	Acenaphthene-d10	1.000	1.000	0.0	89	0.00
36	P	C510	Hexachlorocyclopentadi	0.268	0.288	-7.6	94	-0.02
37	C	C515	2,4,6-Trichlorophenol	0.328	0.332	-1.1	87	0.00
38	T	C520	2,4,5-Trichlorophenol	0.338	0.315	7.0	80	0.00
39	S	CS25	2-Fluorobiphenyl	1.228	1.193	2.9	86	-0.01
40	T	C525	2-Chloronaphthalene	1.128	1.087	3.7	87	-0.01
41	T	C530	2-Nitroaniline	0.427	0.361	15.6	75	-0.02
42	T	C535	Dimethylphthalate	1.493	1.438	3.7	85	-0.01
43	T	C543	2,6-Dinitrotoluene	0.366	0.349	4.6	80	0.00
44	T	C540	Acenaphthylene	1.861	1.879	-1.0	86	0.00

45	T	C545	3-Nitroaniline	0.145	0.089	38.9#	104	-0.04
46	MC	C550	Acenaphthene	1.249	1.258	-0.7	85	0.00
47	P	C555	2,4-Dinitrophenol	0.155	0.115	26.2#	61	0.00
48	MP	C560	4-Nitrophenol	0.143	0.119	17.2	77	0.03
49	M	C570	2,4-Dinitrotoluene	0.457	0.387	15.3	75	0.00
50	T	C565	Dibenzofuran	1.614	1.558	3.5	82	0.00
51			2,3,4,6-Tetrachlorophenol	0.237	0.227	4.4	85	0.00
52	T	C580	Diethylphthalate	1.624	1.595	1.8	86	0.00
53	T	C585	4-Chlorophenyl phenyl	0.592	0.554	6.5	81	0.00
54	T	C590	Fluorene	1.323	1.256	5.1	82	0.00
55	T	C595	4-Nitroaniline	0.114	0.115	-0.9	89	0.11
56	I	CI60	Phenanthrene-d10	1.000	1.000	0.0	81	0.00
57	S	CS55	2,4,6-Tribromophenol	0.123	0.137	-11.4	95	-0.01
58	T	C610	4,6-Dinitro-2-methylph	0.169	0.160	5.0	76	-0.02
59	C	C615	N-nitrosodiphenylamine	0.592	0.537	9.3	72	-0.02
60	T	C625	4-Bromophenyl phenyl e	0.207	0.216	-4.2	83	0.00
61	T	C630	Hexachlorobenzene	0.261	0.289	-10.8	89	0.00
62	MC	C635	Pentachlorophenol	0.129	0.117	9.8	73	0.00
63	T	C640	Phenanthrene	1.191	1.175	1.3	79	-0.02
64	T	C645	Anthracene	1.190	1.194	-0.4	78	0.00
[redacted]	T	C647	Carbazole	0.790	0.814	-3.0	76	-0.09
[redacted]	T	C650	Di-n-butylphthalate	1.830	1.891	-3.3	78	0.00
67	C	C655	Fluoranthene	1.161	1.093	5.9	75	0.01
68	I	CI70	Chrysene-d12	1.000	1.000	0.0	79	0.00
69	M	C715	Pyrene	1.719	1.614	6.1	73	-0.01
70	S	CS30	Terphenyl-d14	1.222	1.179	3.5	76	0.00
71	T	C720	Butylbenzylphthalate	1.149	1.120	2.6	75	0.00
72	T	C745	bis(2-ethylhexyl)phtha	1.611	1.526	5.2	75	0.02
73	T	C725	3,3`-Dichlorobenzidine	0.113	0.080	29.6#	66	0.06
74	T	C730	Benzo(a)anthracene	1.358	1.231	9.4	71	0.00
75	T	C740	Chrysene	1.303	1.220	6.4	75	0.00
76	I	CI75	Perylene-d12	1.000	1.000	0.0	101	0.00
77	C	C760	Di-n-octylphthalate	2.493	1.977	20.7	76	0.00
78	T	C765	Benzo(b)fluoranthene	1.380	1.046	24.2	83	0.00
79	T	C770	Benzo(k)fluoranthene	1.132	1.004	11.3	78	0.00
[redacted]	C	C775	Benzo(a)pyrene	1.067	0.957	10.4	89	0.00
81	T	C780	Indeno(1,2,3-c,d)pyren	0.753	0.848	-12.7	107	0.02
82	T	C785	Dibenzo(a,h)anthracene	0.793	0.891	-12.3	108	0.03
83	T	C790	Benzo(g,h,i)perylene	0.778	0.908	-16.7	113	0.00

(#) = Out of Range SPCC's out = 0 CCC's out = 0

A4504.D TRI4505.M Tue Sep 01 13:19:53 1998

Quantitation Report

Used for PAH (failed for regular)

Data File : C:\HPCHEM\1\DATA\A4531.D
Acq Time : 09/01/98 12:42
Sample : SSTD040
Misc : SSTD040
Quant Time: Sep 1 13:18 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\TRI4505.M
Title : Semivolatiles
Last Update : Tue Sep 01 13:13:58 1998
Response via : Multiple Level Calibration

Internal Standards		R.T.	QIon	Response	Conc	Units	Dev(Min)
1)	CI30 1,4-Dichlorobenzene-d	4.94	152	716628	20.00	ng/uL	0.00
20)	CI40 Naphthalene-d8	7.97	136	3420115	20.00	ng/uL	0.00
35)	CI50 Acenaphthene-d10	12.17	164	2047750	20.00	ng/uL	0.00
56)	CI60 Phenanthrene-d10	15.70	188	2809823	20.00	ng/uL	0.00
68)	CI70 Chrysene-d12	22.05	240	1883542	20.00	ng/uL	0.00
76)	CI75 Perylene-d12	25.19	264	2223097	20.00	ng/uL	0.00
System Monitoring Compounds							%Recovery
4)	CS50 2-Fluorophenol	2.15	112	2036843	39.22	ng/uL	52.29%
5)	CS45 Phenol-d5	4.61	99	2821422	40.48	ng/uL	53.98%
8)	CS70 2-Chlorophenol-d4	4.47	132	2043168	39.06	ng/uL	52.08%
12)	CS75 1,2-Dichlorobenzene-d	5.27	152	1309389	40.26	ng/uL	80.53%
21)	CS20 Nitrobenzene-d5	6.36	82	2493709	38.65	ng/uL	77.31%
39)	CS25 2-Fluorobiphenyl	10.77	172	4886296	38.86	ng/uL	77.72%
57)	CS55 2,4,6-Tribromophenol	14.13	330	769721	44.56	ng/uL	59.42%
70)	CS30 Terphenyl-d14	19.77	244	4439511	38.58	ng/uL	77.16%
Target Compounds							Qvalue
2)	C310 N-Nitrosodimethylamin	0.94	74	1694902	40.92	ng/uLm	65
3)	C312 Pyridine	0.90	52	3585465	48.97	ng/ulm	42
6)	C315 Phenol	4.64	94	2979695	40.25	ng/uL#	67
7)	C325 bis(2-chloroethyl)eth	4.58	93	2355073	41.63	ng/uL	88
9)	C330 2-Chlorophenol	4.50	128	2130445	38.92	ng/uL	96
10)	C335 1,3-Dichlorobenzene	4.76	146	2224036	39.05	ng/uL	99
11)	C340 1,4-Dichlorobenzene	4.98	146	2351015	39.29	ng/uL	99
13)	C350 1,2-Dichlorobenzene	5.31	146	2265517	40.44	ng/uL	98
14)	C345 Benzyl alcohol	5.57	108	1542206	39.36	ng/uL	96
15)	C355 2-Methylphenol	6.01	108	1870374	35.76	ng/uL	92
16)	C357 2,2`-oxybis(1-Chlorop	5.89	45	4872004	41.02	ng/uL#	46
17)	C365 4-Methylphenol	6.46	108	2280076	40.48	ng/uL	91
18)	C370 N-Nitroso-di-n-propyl	6.28	70	1986643	38.32	ng/uL	95
19)	C375 Hexachloroethane	6.06	117	1175702	42.86	ng/uL	93
22)	C410 Nitrobenzene	6.43	77	3416466	38.61	ng/uL	86
23)	C415 Isophorone	7.11	82	5421119	37.38	ng/uL	97
24)	C420 2-Nitrophenol	7.18	139	1539733	39.81	ng/uL	94
25)	C425 2,4-Dimethylphenol	7.69	107	2635275	37.99	ng/uL	100
26)	C435 Bis(2-chloroethoxy)me	7.82	93	3349965	39.88	ng/uL	95
27)	C430 Benzoic acid	8.50	122	1145418	31.81	ng/uLm	1
28)	C440 2,4-Dichlorophenol	7.88	162	1850463	41.20	ng/uL	94
29)	C445 1,2,4-Trichlorobenzen	7.90	180	1878551	39.46	ng/uL	98
30)	C450 Naphthalene	8.03	128	6910423	39.30	ng/uL	96
31)	C455 4-Chloroaniline	8.38	127	1581562	32.99	ng/uL	100
32)	C460 Hexachlorobutadiene	8.45	225	1077617	42.32	ng/uL	98
33)	C465 4-Chloro-3-methylphen	9.85	107	2376035	39.17	ng/uL	94

(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : C:\HPCHEM\1\DATA\A4531.D
Acq Time : 09/01/98 12:42
Sample : SSTD040
Misc : SSTD040
Quant Time: Sep 1 13:18 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\TRI4505.M
Title : Semivolatiles
Last Update : Tue Sep 01 13:13:58 1998
Response via : Multiple Level Calibration

	Compound	R.T.	QIon	Response	Conc	Unit	Qvalue
34)	C470 2-Methylnaphthalene	9.73	142	4625343	39.51	ng/uL	95
36)	C510 Hexachlorocyclopentad	10.14	237	1178514	43.03	ng/uL	98
37)	C515 2,4,6-Trichlorophenol	10.59	196	1359110	40.45	ng/uL	98
38)	C520 2,4,5-Trichlorophenol	10.68	196	1288533	37.19	ng/uL	94
40)	C525 2-Chloronaphthalene	10.88	162	4450059	38.51	ng/uL	96
41)	C530 2-Nitroaniline	11.31	65	1477776	33.77	ng/uL	91
42)	C535 Dimethylphthalate	11.96	163	5890572	38.53	ng/uL	97
43)	C543 2,6-Dinitrotoluene	12.03	165	1428620	38.17	ng/uL	95
44)	C540 Acenaphthylene	11.81	152	7697375	40.39	ng/uL	96
45)	C545 3-Nitroaniline	12.40	138	364061	24.45	ng/uL	91
46)	C550 Acenaphthene	12.26	153	5154148	40.29	ng/uL	96
47)	C555 2,4-Dinitrophenol	12.63	184	469715	29.51	ng/uL#	79
48)	C560 4-Nitrophenol	13.15	109	485581	33.13	ng/uL#	1
49)	C570 2,4-Dinitrotoluene	12.96	165	1584403	33.90	ng/uL#	64
50)	C565 Dibenzofuran	12.70	168	6380166	38.62	ng/uL	89
51)	2,3,4,6-Tetrachlorophenol	13.13	232	929193	38.22	ng/ul#	100
52)	C580 Diethylphthalate	13.70	149	6530453	39.29	ng/uL	97
53)	C585 4-Chlorophenyl phenyl	13.69	204	2268652	37.41	ng/uL	88
54)	C590 Fluorene	13.51	166	5144708	37.97	ng/uL	94
55)	C595 4-Nitroaniline	13.98	138	472797	40.35	ng/uLm	52
58)	C610 4,6-Dinitro-2-methylp	13.91	198	901373	38.00	ng/uL	98
59)	C615 N-nitrosodiphenylamin	14.06	169	3019293	36.30	ng/uL	93
60)	C625 4-Bromophenyl phenyl	14.83	248	1212821	41.67	ng/uL#	87
61)	C630 Hexachlorobenzene	14.79	284	1626833	44.32	ng/uL	83
62)	C635 Pentachlorophenol	15.40	266	656688	36.10	ng/uL	97
63)	C640 Phenanthrene	15.75	178	6605721	39.47	ng/uL	99
64)	C645 Anthracene	15.88	178	6711344	40.15	ng/uL	98
65)	C647 Carbazole	16.41	167	4571698	41.20	ng/uLm	94
66)	C650 Di-n-butylphthalate	17.67	149	10624117	41.31	ng/uL	97
67)	C655 Fluoranthene	18.58	202	6139581	37.66	ng/uL	96
69)	C715 Pyrene	19.07	202	6081820	37.57	ng/uL	97
71)	C720 Butylbenzylphthalate	21.21	149	4217990	38.97	ng/uL	92
72)	C745 bis(2-ethylhexyl)phth	22.81	149	5750070	37.90	ng/uL	97
73)	C725 3,3`-Dichlorobenzidin	22.29	252	300841	28.17	ng/uLm	88
74)	C730 Benzo(a)anthracene	22.02	228	4636134	36.26	ng/uL	99
75)	C740 Chrysene	22.11	228	4597223	37.46	ng/uL	98
77)	C760 Di-n-octylphthalate	24.31	149	8788580	31.72	ng/uL	100
78)	C765 Benzo(b)fluoranthene	24.45	252	4651263	30.32	ng/uL	95
79)	C770 Benzo(k)fluoranthene	24.52	252	4464856	35.48	ng/uL#	93
80)	C775 Benzo(a)pyrene	25.08	252	4253617	35.86	ng/uL#	91
81)	C780 Indeno(1,2,3-c,d)pyre	27.21	276	3769961	45.07	ng/uL#	77
82)	C785 Dibenzo(a,h)anthracen	27.30	278	3961029	44.92	ng/uL	88
83)	C790 Benzo(g,h,i)perylene	27.63	276	4036610	46.70	ng/uL	99

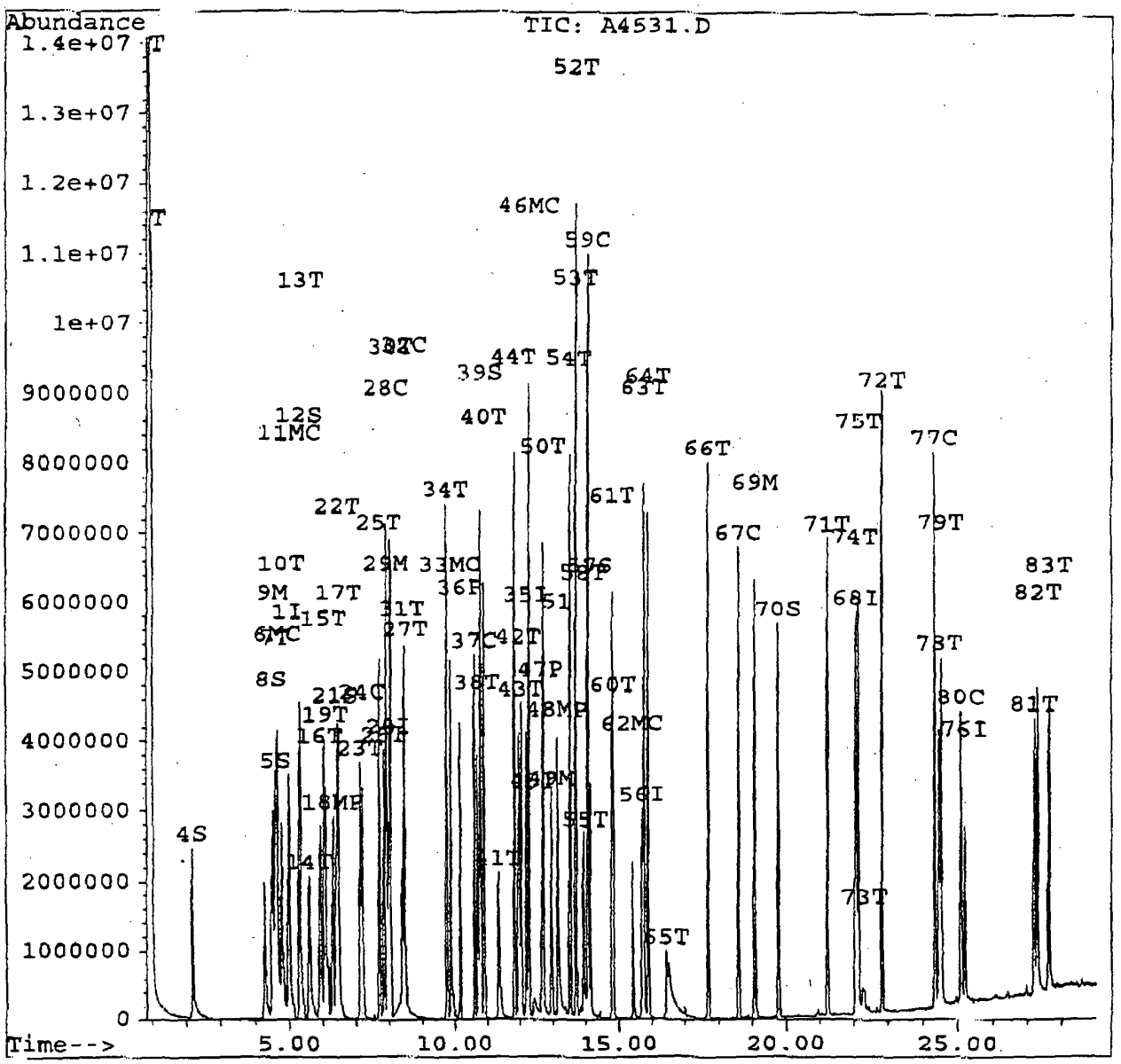
(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : C:\HPCHEM\1\DATA\A4531.D
Acq Time : 09/01/98 12:42
Sample : SSTD040
Misc : SSTD040
Quant Time: Sep 1 13:18 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\TRI4505.M
Title : Semivolatiles
Last Update : Tue Sep 01 13:13:58 1998
Response via : Multiple Level Calibration



001854

Michelle Delgado-Brown
Print Originator's Name
Ecology and Environment, Inc.

LABORATORY CONTACT LOG

Conversation with:

Name Mark Bourgeois
Address PDP Analytical
11680 Lake Front Circle
The Woodlands, TX. 77380
Phone 281-363-2233 TDD # _____ PAN# 05260015FXX
(Area Code and Number)

Date 10 / 08 / 98
(Mo) (Day) (Year)
Time 1:15 AM/(PM)
[X] Originator Placed Call
[ ] Originator Received Call

Subject Need raw data

Discussion: - Need the raw data for lab sample # 4802.002 (5828-0020) - semivolatiles.

Follow-Up Action: _____

Originator's Signature M. Delgado-Brown

Rev. 11/15/94 DA
TS1459

Quantitation Report

Data File : C:\HPCHEM\1\DATA\A4537.D
Acq Time : 09/01/98 16:44
Sample : SB28-0020
Misc : 4802.002 PAH 30G/10ML
Quant Time: Oct 13 14:34 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\PAH4505.M
Title : Semivolatiles
Last Update : Tue Sep 15 14:24:35 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) CI30 1,4-Dichlorobenzene-d	4.96	152	120732	20.00	ng/uL	0.02
2) CI40 Naphthalene-d8	7.95	136	947433	20.00	ng/uL	-0.02
4) CI50 Acenaphthene-d10	12.15	164	801725	20.00	ng/uL	-0.03
8) CI60 Phenanthrene-d10	15.68	188	1748714	20.00	ng/uL	-0.02
12) CI70 Chrysene-d12	22.03	240	1261492	20.00	ng/uL	-0.02
16) CI75 Perylene-d12	25.18	264	783819	20.00	ng/uL	-0.01
System Monitoring Compounds						%Recovery
14) CS30 Terphenyl-d14	19.76	244	157346	2.04	ng/uL	4.08%
Target Compounds						Qvalue
3) C450 Naphthalene	7.99	128	52018	1.07	ng/uL	88
9) C640 Phenanthrene	15.73	178	1435976	13.79	ng/uL	98
10) C645 Anthracene	15.84	178	122912	1.18	ng/uL	93
11) C655 Fluoranthene	18.56	202	434745	4.28	ng/uL	98
13) C715 Pyrene	19.06	202	2034180	18.76	ng/uL	90
15) C740 Chrysene	22.02	228	635873	7.74	ng/uL	92
17) C765 Benzo(b)fluoranthene	24.43	252	232132	4.29	ng/uLm	87
18) C770 Benzo(k)fluoranthene	24.48	252	52191	1.18	ng/uLm	87
19) C775 Benzo(a)pyrene	24.95	252	348241	8.33	ng/uLm	92
20) C780 Indeno(1,2,3-c,d)pyre	27.19	276	42920	1.46	ng/uL#	93
21) C785 Dibenzo(a,h)anthracen	27.27	278	46894	1.51	ng/uL#	58
22) C790 Benzo(g,h,i)perylene	27.60	276	93619	3.07	ng/uL	86

(#) = qualifier out of range (m) = manual integration

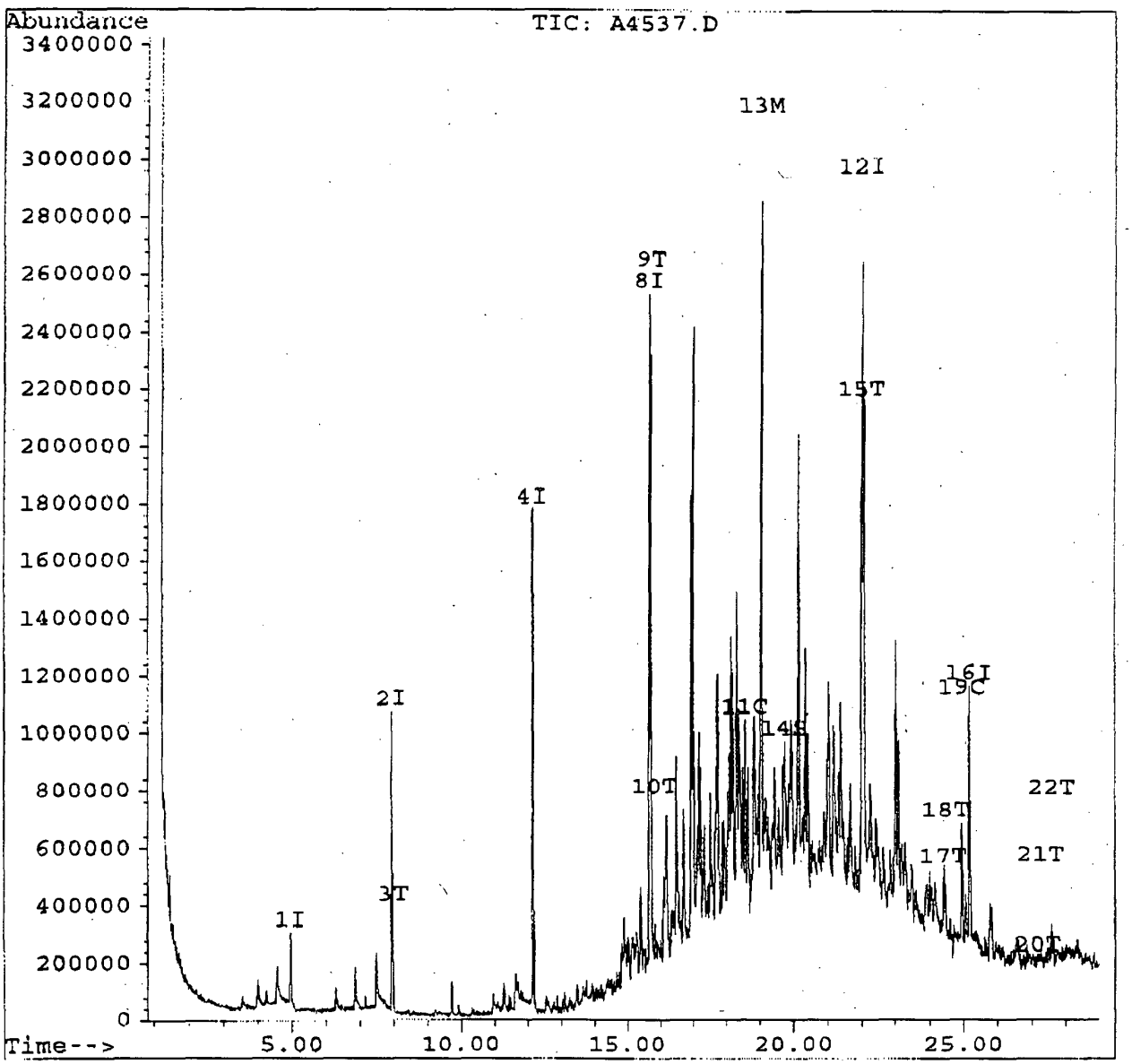
001856

Quantitation Report

Data File : C:\HPCHEM\1\DATA\A4537.D
Acq Time : 09/01/98 16:44
Sample : SB28-0020
Misc : 4802.002 PAH 30G/10ML
Quant Time: Oct 13 14:34 1998

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00

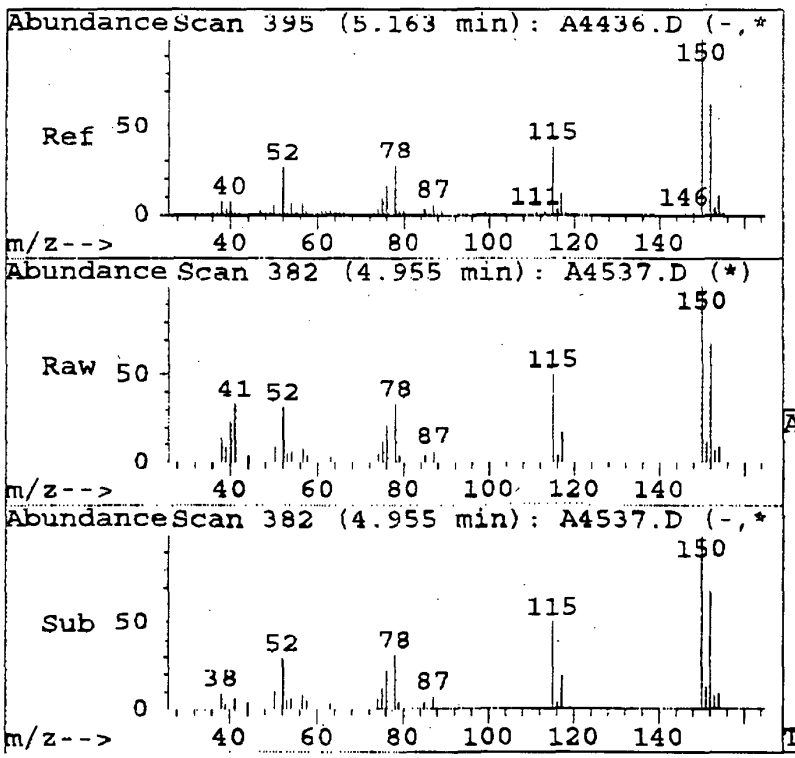
Method : C:\HPCHEM\1\METHODS\PAH4505.M
Title : Semivolatiles
Last Update : Tue Sep 15 14:24:35 1998
Response via : Multiple Level Calibration



001857

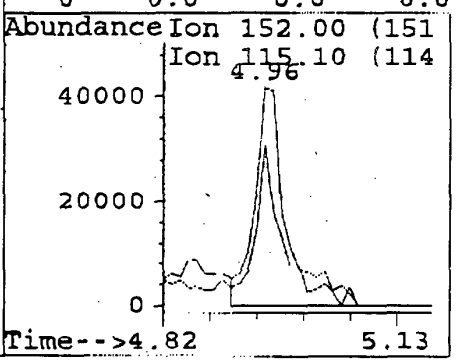
Data File : C:\HPCHEM\1\DATA\A4537.D
Acq Time : 09/01/98 16:44
Sample : SB28-0020
Misc : 4802.002 PAH 30G/10ML

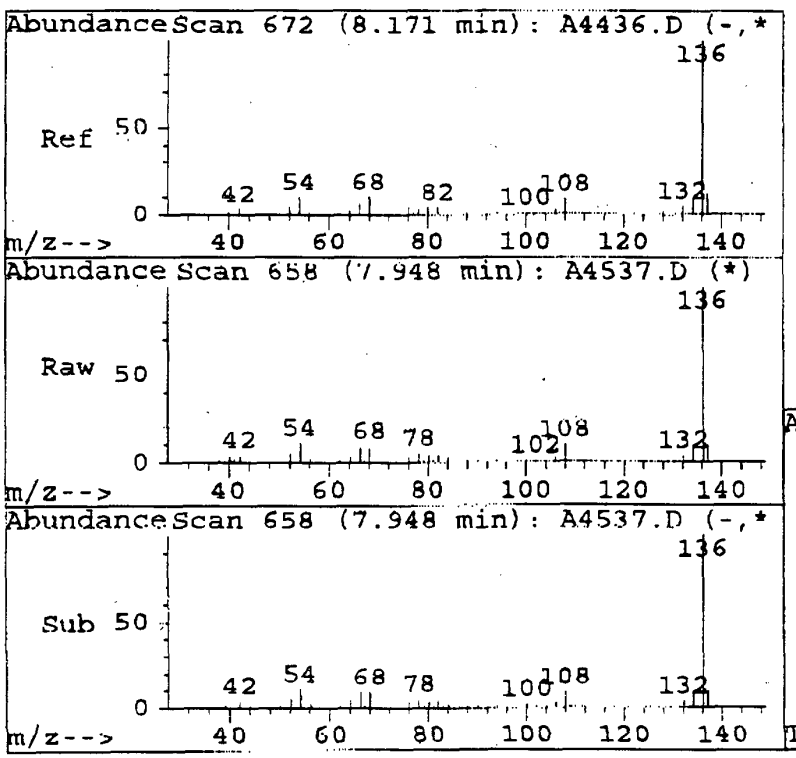
Operator: CW
Inst : A-HP5970B
Multiplr: 1.00



#1
CI30 1,4-Dichlorobenzene-d4
Concen: 20.00 ng/uL
RT: 4.96 min Scan# 382
Delta R.T. 0.02 min
Integration Range:
Scan= 378 to 394
R.T.= 4.91 to 5.09 (min)
Tgt Ion:152 Resp: 120732

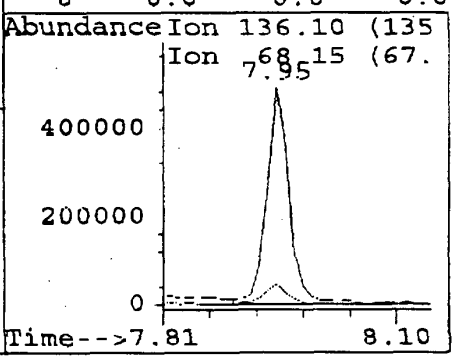
Ion	Ratio	Lower	Upper
152	100		
115	68.3	42.7	82.7
0	0.0	0.0	0.0
0	0.0	0.0	0.0





#2
CI40 Naphthalene-d8
Concen: 20.00 ng/uL
RT: 7.95 min Scan# 658
Delta R.T. -0.02 min
Integration Range:
Scan= 653 to 668
R.T.= 7.89 to 8.06 (min)
Tgt Ion:136.1 Resp: 947433

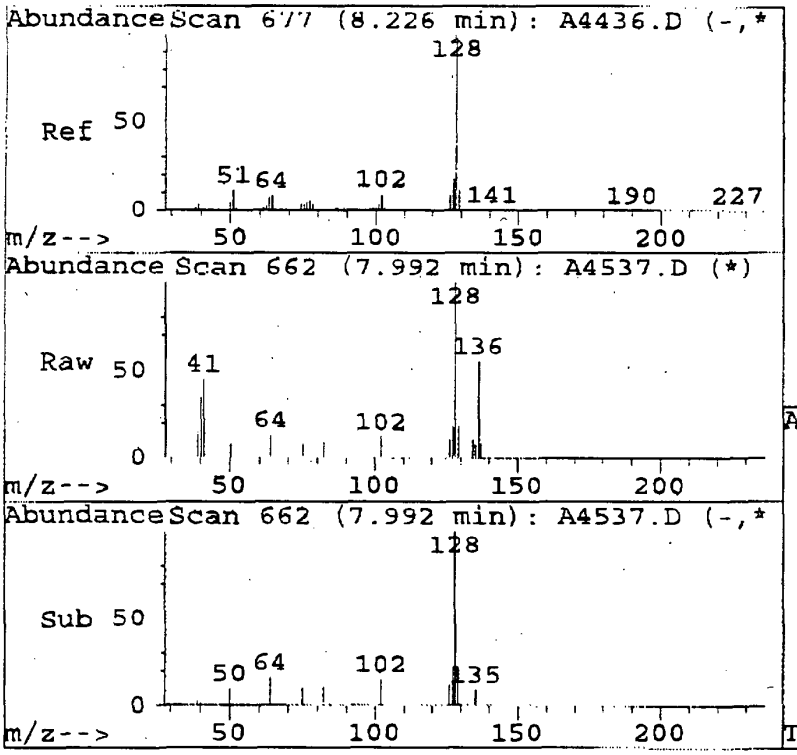
Ion	Ratio	Lower	Upper
136	100		
68	9.2	0.0	30.7
0	0.0	0.0	0.0
0	0.0	0.0	0.0



001858

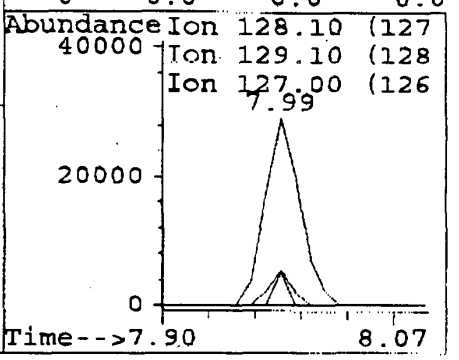
Data File : C:\HPCHEM\1\DATA\A4537.D
Acq Time : 09/01/98 16:44
Sample : SB28-0020
Misc : 4802.002 PAH 30G/10ML

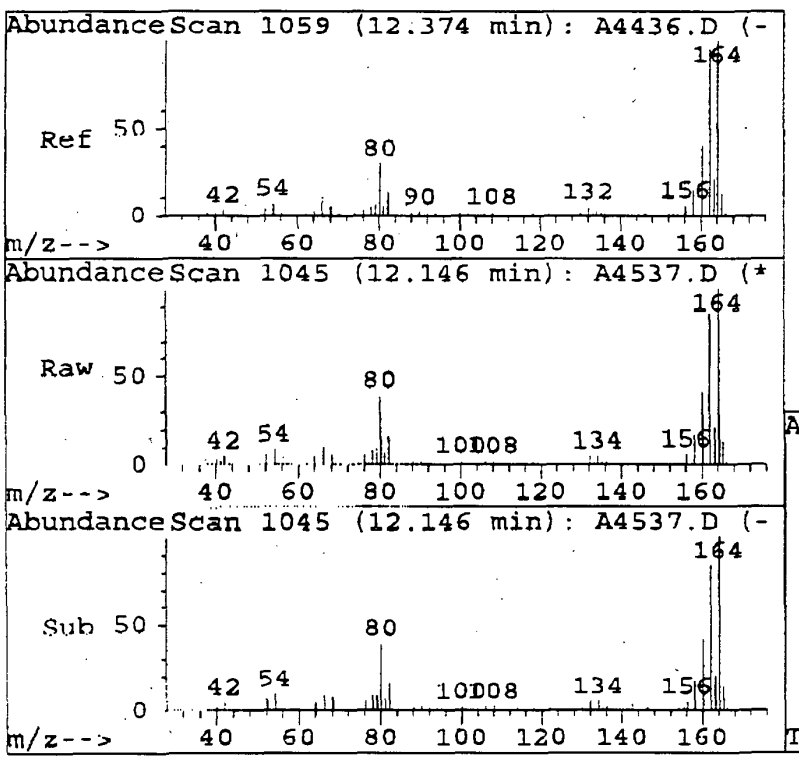
Operator: CW
Inst : A-HP5970B
Multiplr: 1.00



#3
C450 Naphthalene
Concen: 1.07 ng/uL
RT: 7.99 min Scan# 662
Delta R.T. -0.04 min
Integration Range:
Scan= 658 to 667
R.T.= 7.95 to 8.05 (min)
Tgt Ion:128.1 Resp: 52018

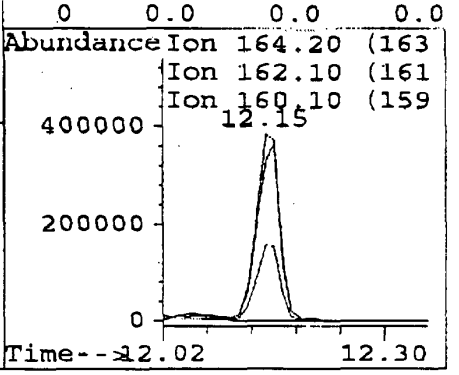
Ion	Ratio	Lower	Upper
128	100		
129	12.3	0.0	30.9
127	6.6	0.0	34.3
0	0.0	0.0	0.0





#4
CI50 Acenaphthene-d10
Concen: 20.00 ng/uL
RT: 12.15 min Scan# 1045
Delta R.T. -0.03 min
Integration Range:
Scan= 1041 to 1056
R.T.= 12.10 to 12.27 (min)
Tgt Ion:164.2 Resp: 801725

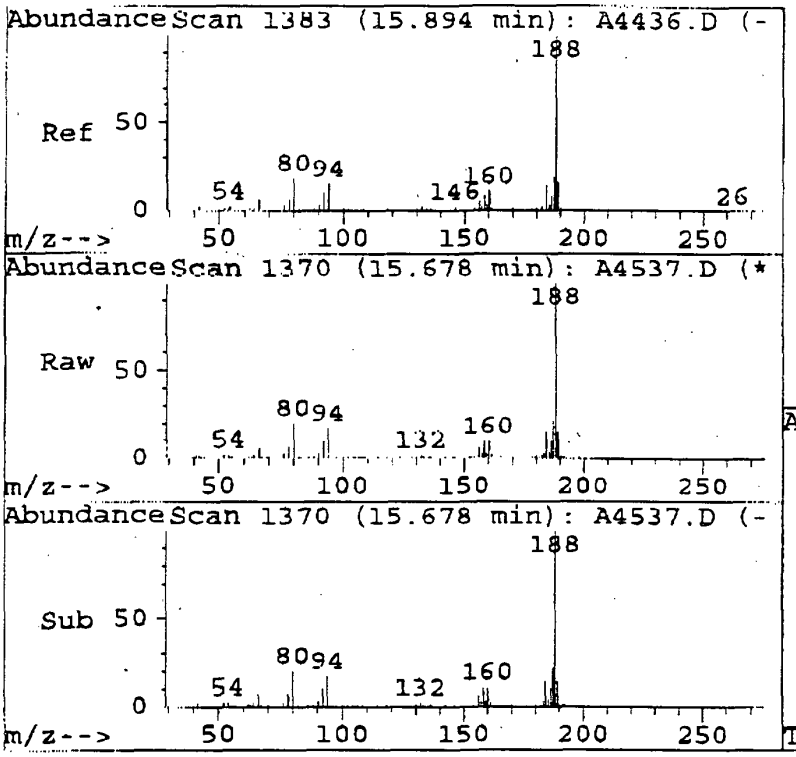
Ion	Ratio	Lower	Upper
164	100		
162	91.2	76.0	116.0
160	41.4	21.8	61.8
0	0.0	0.0	0.0



001859

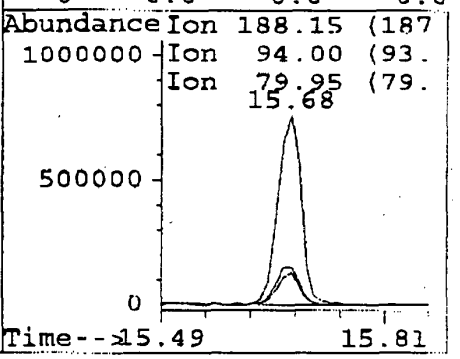
Data File : C:\HPCHEM\1\DATA\A4537.D
Acq Time : 09/01/98 16:44
Sample : SB28-0020
Misc : 4802.002 PAH 30G/10ML

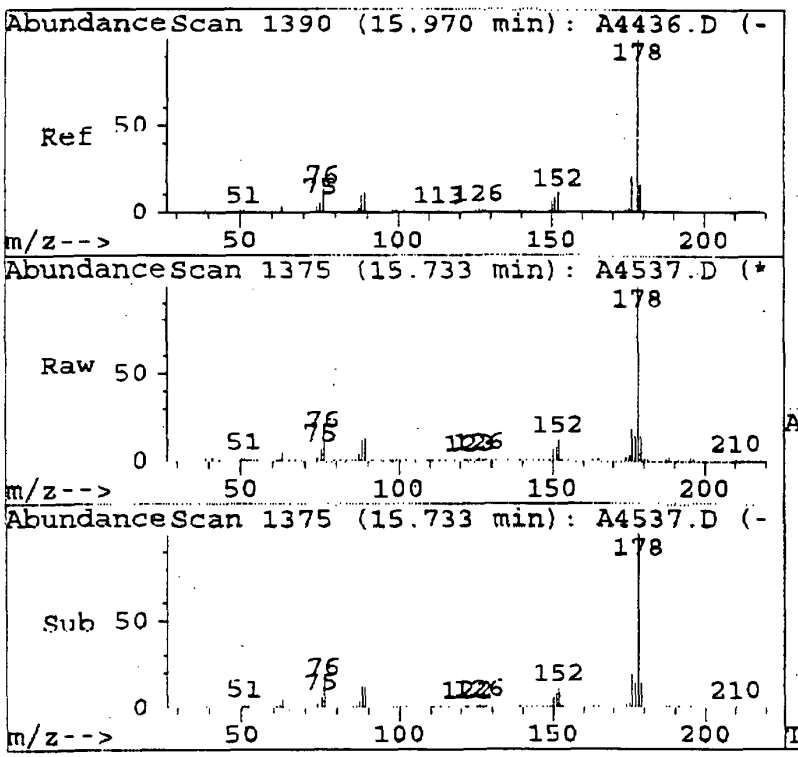
Operator: CW
Inst : A-HP5970B
Multiplr: 1.00



#8
CI60 Phenanthrene-d10
Concen: 20.00 ng/uL
RT: 15.68 min Scan# 1370
Delta R.T. -0.02 min
Integration Range:
Scan= 1362 to 1379
R.T.= 15.59 to 15.78 (min)
Tgt Ion:188.15 Resp: 1748714

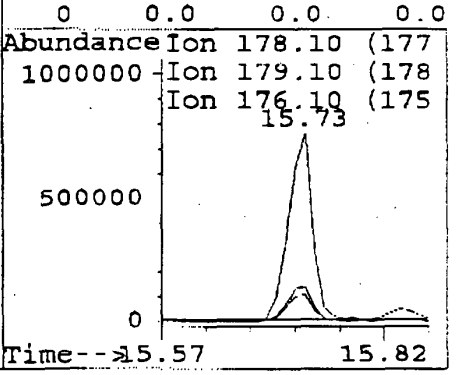
Ion	Ratio	Lower	Upper
188	100		
94	17.2	0.0	32.9
80	21.0	0.0	35.2
0	0.0	0.0	0.0





#9
C640 Phenanthrene
Concen: 13.79 ng/uL
RT: 15.73 min Scan# 1375
Delta R.T. -0.02 min
Integration Range:
Scan= 1367 to 1381
R.T.= 15.65 to 15.80 (min)
Tgt Ion:178.1 Resp: 1435976

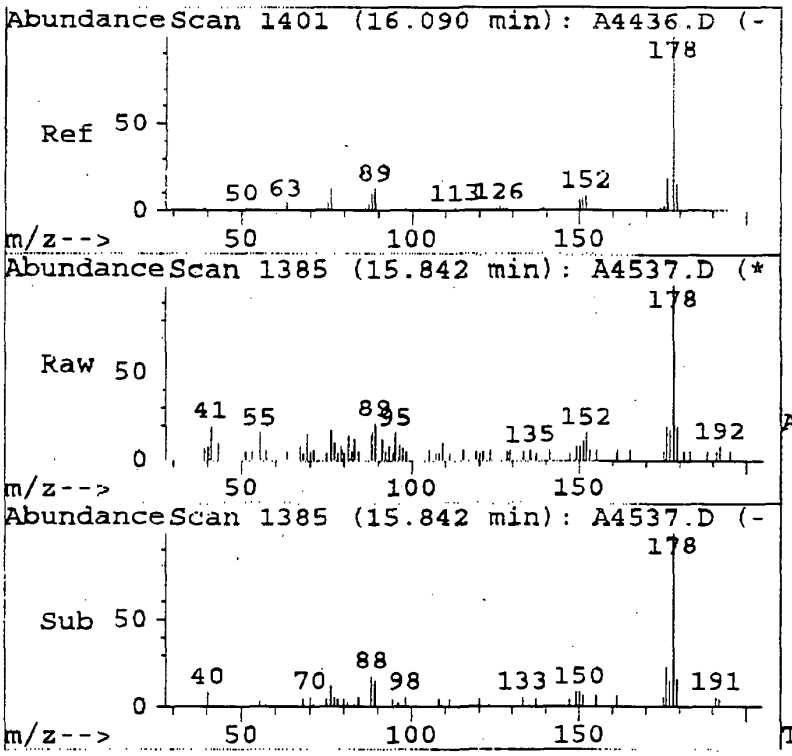
Ion	Ratio	Lower	Upper
178	100		
179	14.9	0.0	35.4
176	20.2	0.0	39.0
0	0.0	0.0	0.0



001860

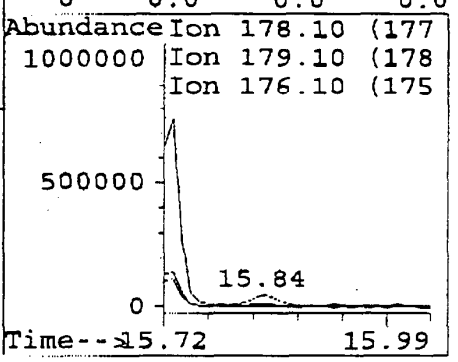
Data File : C:\HPCHEM\1\DATA\A4537.D
Acq Time : 09/01/98 16:44
Sample : SB28-0020
Misc : 4802.002 PAH 30G/10ML

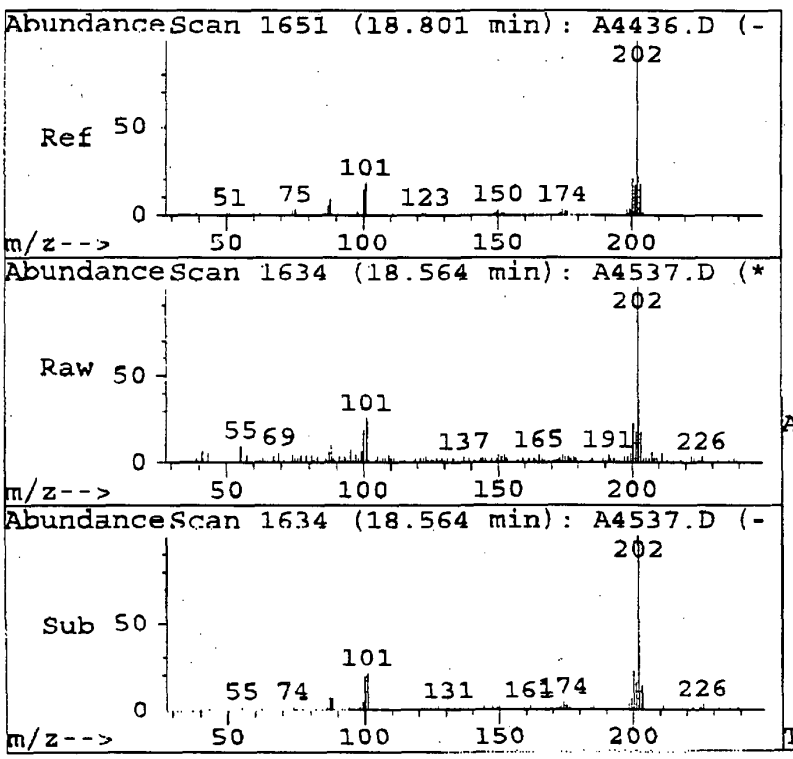
Operator: CW
Inst : A-HP5970B
Multiplr: 1.00



#10
C645 Anthracene
Concen: 1.18 ng/uL
RT: 15.84 min Scan# 1385
Delta R.T. -0.04 min
Integration Range:
Scan= 1381 to 1396
R.T.= 15.80 to 15.96 (min)
Tgt Ion:178.1 Resp: 122912

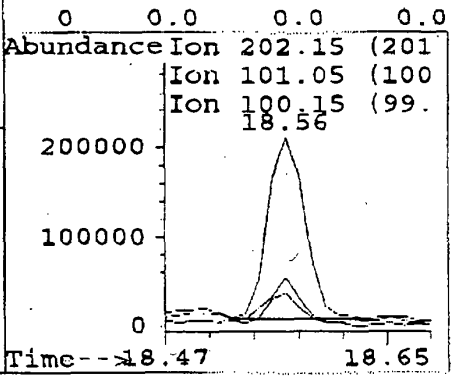
Ion	Ratio	Lower	Upper
178	100		
179	16.4	0.0	35.2
176	22.6	0.0	38.3
0	0.0	0.0	0.0





#11
C655 Fluoranthene
Concen: 4.28 ng/uL
RT: 18.56 min Scan# 1634
Delta R.T. -0.02 min
Integration Range:
Scan= 1630 to 1640
R.T.= 18.52 to 18.63 (min)
Tgt Ion:202.15 Resp: 434745

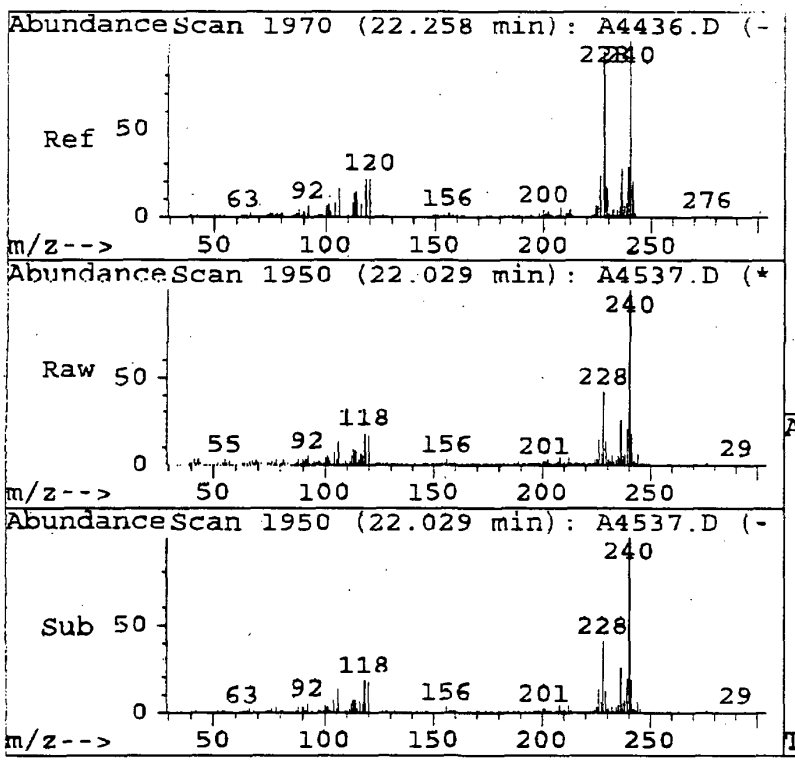
Ion	Ratio	Lower	Upper
202	100		
101	19.7	1.2	41.2
100	16.9	0.0	36.9
0	0.0	0.0	0.0



001861

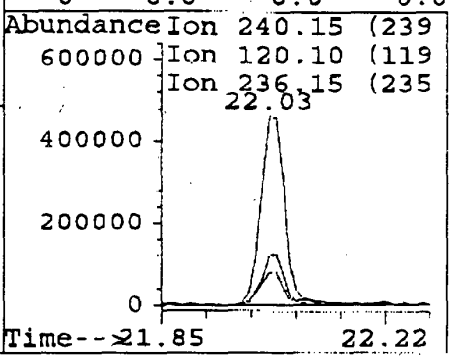
Data File : C:\HPCHEM\1\DATA\A4537.D
Acq Time : 09/01/98 16:44
Sample : SB28-0020
Misc : 4802.002 PAH 30G/10ML

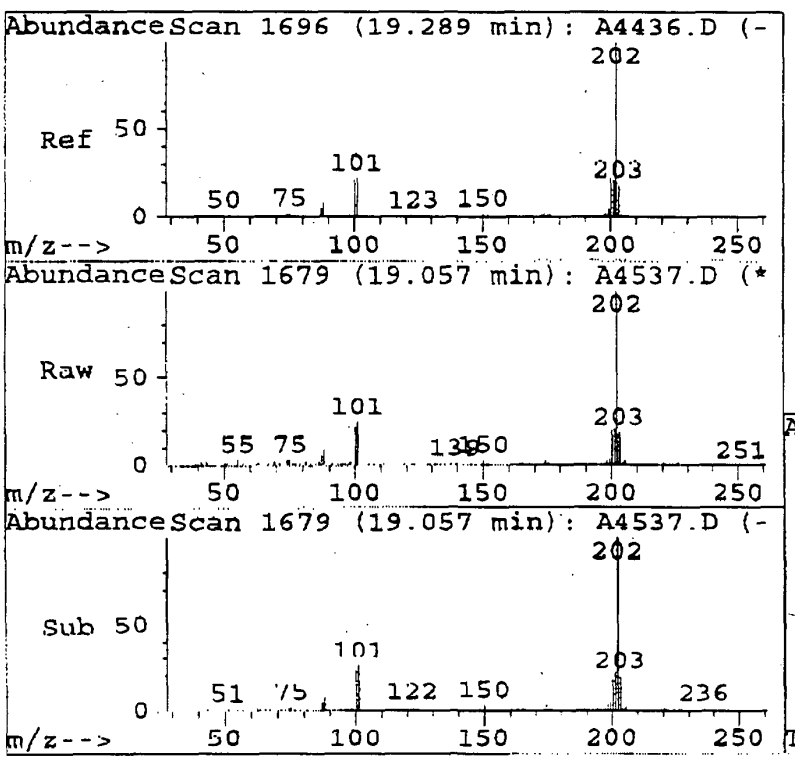
Operator: CW
Inst : A-HP5970B
Multiplr: 1.00



#12
C170 Chrysene-d12
Concen: 20.00 ng/uL
RT: 22.03 min Scan# 1950
Delta R.T. -0.02 min
Integration Range:
Scan= 1944 to 1964
R.T.= 21.96 to 22.18 (min)
Tgt Ion:240.15 Resp: 1261492

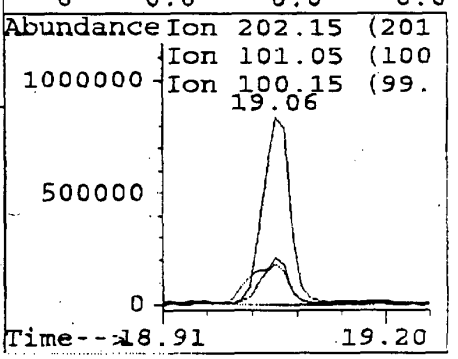
Ion	Ratio	Lower	Upper
240	100		
120	18.0	0.0	39.1
236	26.0	3.0	43.0
0	0.0	0.0	0.0





#13
C715 Pyrene
Concen: 18.76 ng/uL
RT: 19.06 min Scan# 1679
Delta R.T. -0.01 min
Integration Range:
Scan= 1674 to 1689
R.T.= 19.00 to 19.17 (min)
Tgt Ion:202.15 Resp: 2034180

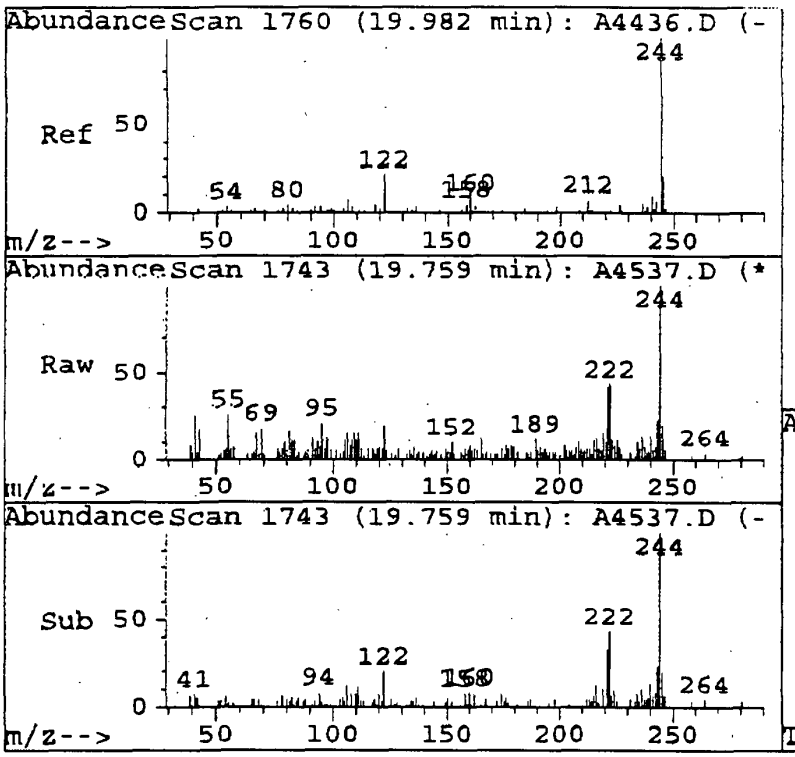
Ion	Ratio	Lower	Upper
202	100		
101	24.5	5.4	45.4
100	30.9	2.0	42.0
0	0.0	0.0	0.0



001862

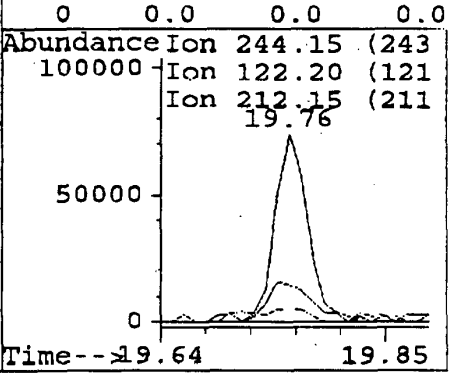
Data File : C:\HPCHEM\1\DATA\A4537.D
Acq Time : 09/01/98 16:44
Sample : SB28-0020
Misc : 4802.002 PAH 30G/10ML

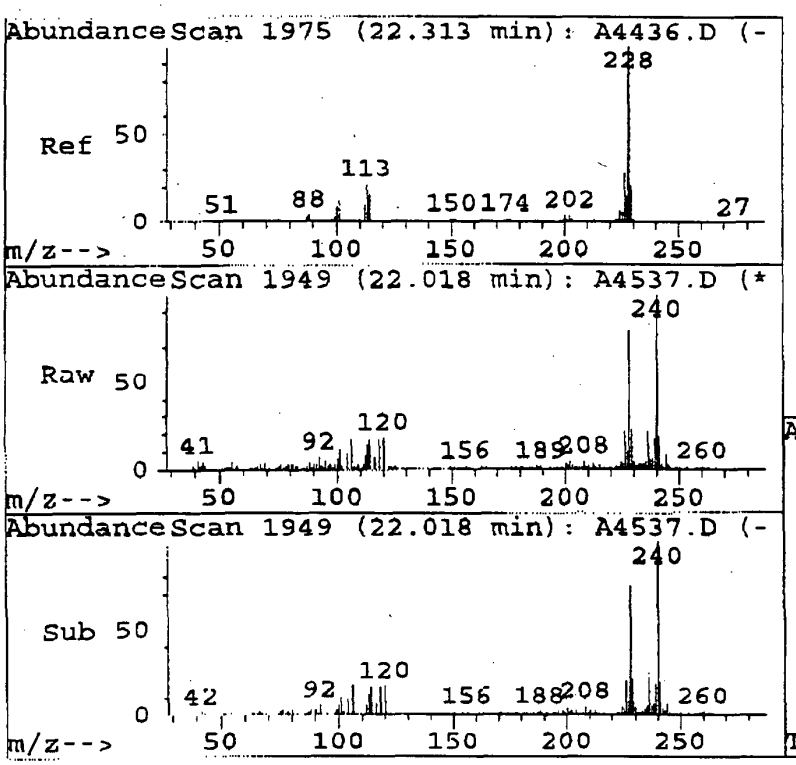
Operator: CW
Inst : A-HP5970B
Multiplr: 1.00



#14
CS30 Terphenyl-d14
Concen: 2.04 ng/uL
RT: 19.76 min Scan# 1743
Delta R.T. -0.01 min
Integration Range:
Scan= 1738 to 1749
R.T.= 19.70 to 19.82 (min)
Tgt Ion:244.15 Resp: 157346

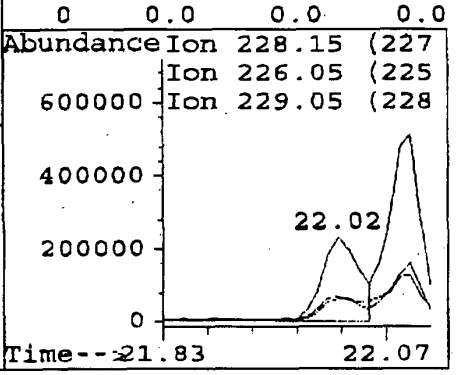
Ion	Ratio	Lower	Upper
244	100		
122	28.6	1.4	41.4
212	7.7	0.0	26.0
0	0.0	0.0	0.0





#15
C740 Chrysene
Concen: 7.74 ng/uL
RT: 22.02 min Scan# 1949
Delta R.T. -0.01 min
Integration Range:
Scan= 1939 to 1952
R.T.= 21.91 to 22.05 (min)
Tgt Ion:228.15 Resp: 635873

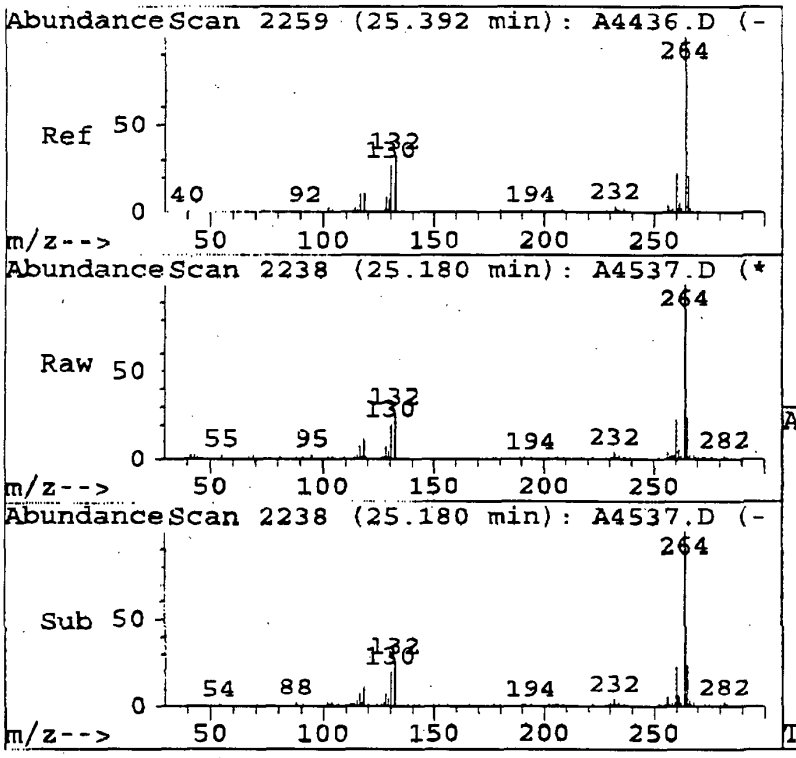
Ion	Ratio	Lower	Upper
228	100		
226	28.9	9.1	49.1
229	28.4	0.0	39.9
0	0.0	0.0	0.0



001863

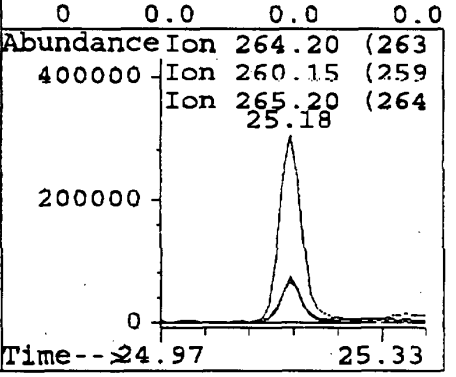
Data File : C:\HPCHEM\1\DATA\A4537.D
Acq Time : 09/01/98 16:44
Sample : SB28-0020
Misc : 4802.002 PAH 30G/10ML

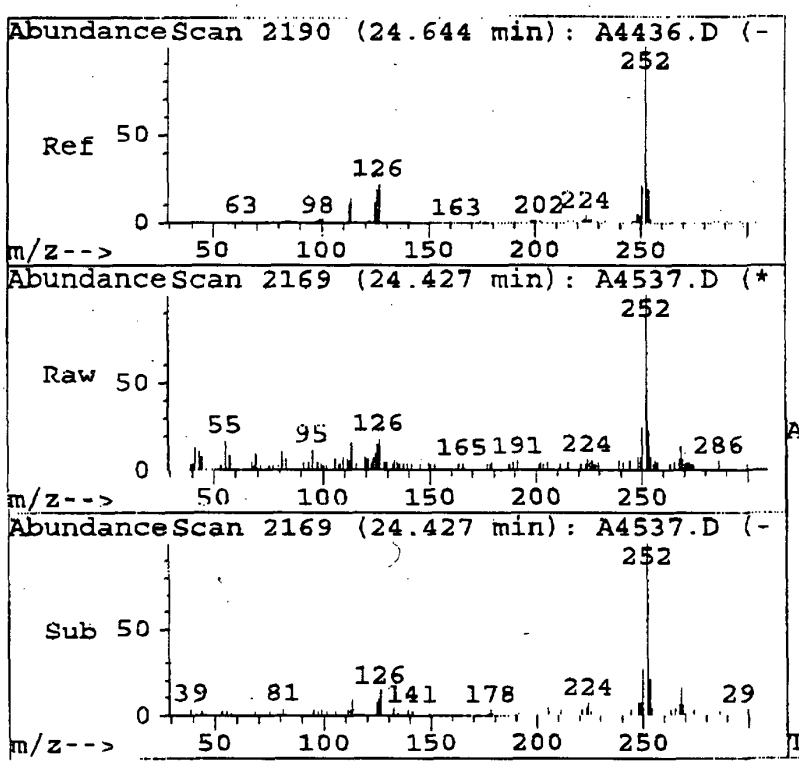
Operator: CW
Inst : A-HP5970B
Multiplr: 1.00



#16
CI75 Perylene-d12
Concen: 20.00 ng/uL
RT: 25.18 min Scan# 2238
Delta R.T. -0.01 min
Integration Range:
Scan= 2229 to 2248
R.T.= 25.08 to 25.29 (min)
Tgt Ion:264.2 Resp: 783819

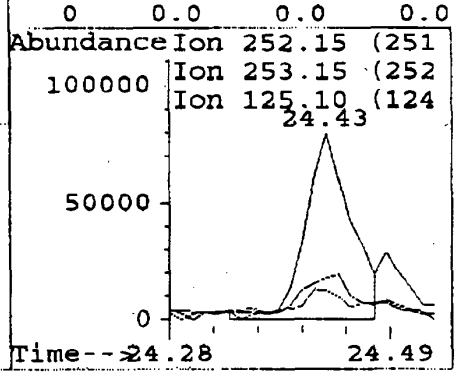
Ion	Ratio	Lower	Upper
264	100		
260	22.2	2.0	42.0
265	23.3	0.9	40.9
0	0.0	0.0	0.0





#17
C765 Benzo(b)fluoranthene
Concen: 4.29 ng/uL m
RT: 24.43 min Scan# 2169
Delta R.T. -0.02 min
Integration Range:
Scan= 2161 to 2173
R.T.= 24.34 to 24.47 (min)
Tgt Ion:252.15 Resp: 232132

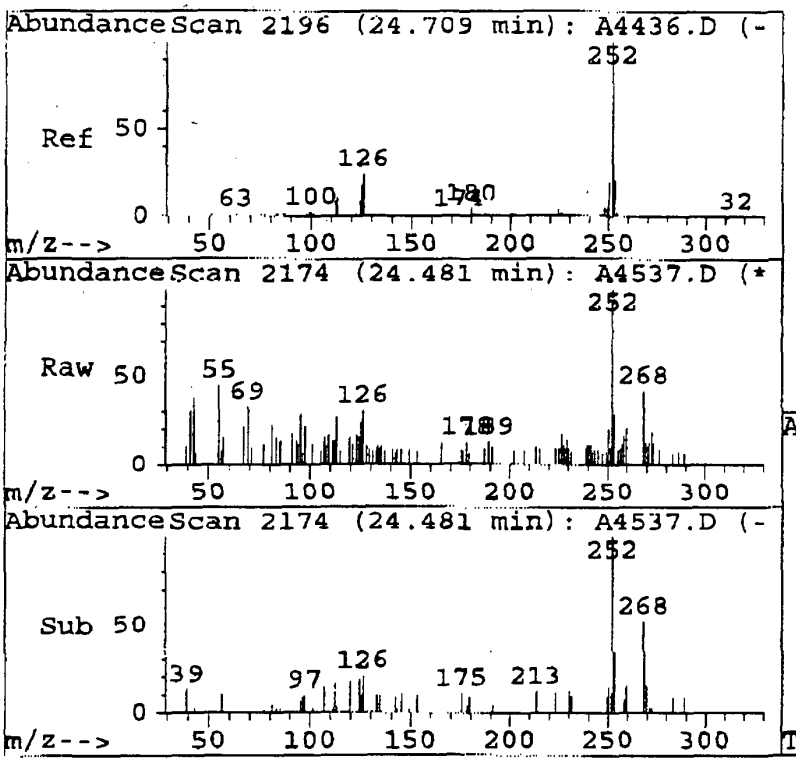
Ion	Ratio	Lower	Upper
252	100		
253	21.8	16.3	24.4
125	15.1	17.6	26.3#
0	0.0	0.0	0.0



001864

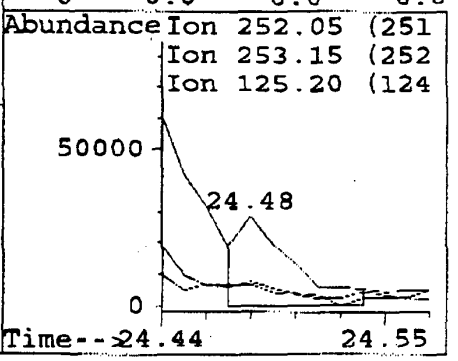
Data File : C:\HPCHEM\1\DATA\A4537.D
Acq Time : 09/01/98 16:44
Sample : SB28-0020
Misc : 4802.002 PAH 30G/10ML

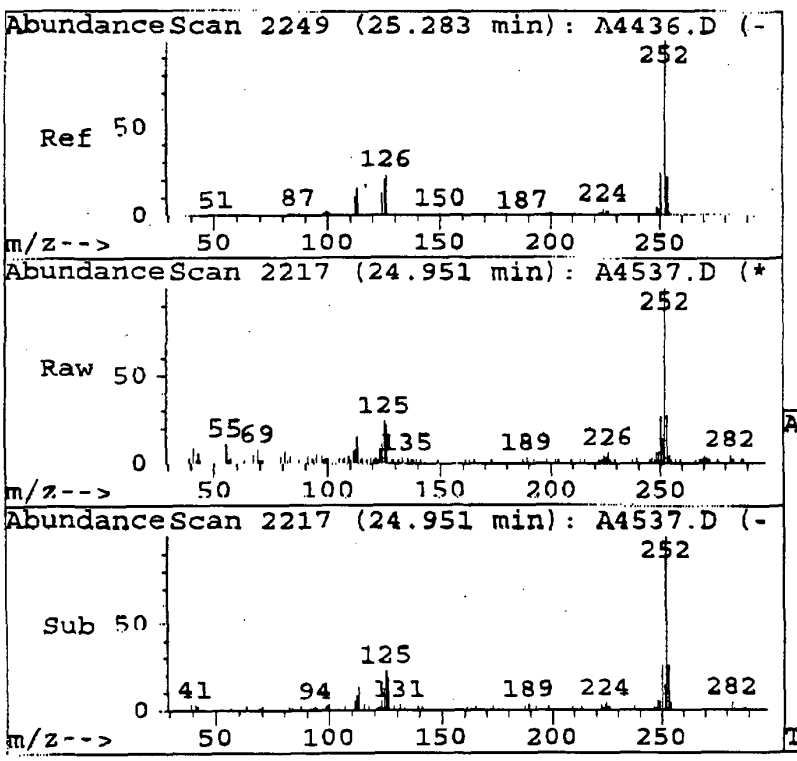
Operator: CW
Inst : A-HP5970B
Multiplr: 1.00



#18
C770 Benzo(k)fluoranthene
Concen: 1.18 ng/uL m
RT: 24.48 min Scan# 2174
Delta R.T. -0.03 min
Integration Range:
Scan= 2173 to 2179
R.T.= 24.47 to 24.54 (min)
Tgt Ion:252.05 Resp: 52191

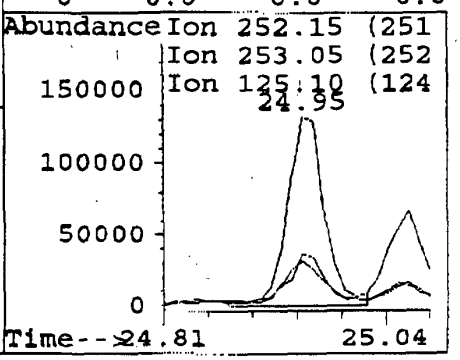
Ion	Ratio	Lower	Upper
252	100		
253	27.6	17.4	26.1#
125	24.0	18.7	28.0
0	0.0	0.0	0.0





#19
C775 Benzo(a)pyrene
Concen: 8.33 ng/uL m
RT: 24.95 min Scan# 2217
Delta R.T. -0.13 min
Integration Range:
Scan= 2210 to 2223
R.T.= 24.87 to 25.02 (min)
Tgt Ion:252.15 Resp: 348241

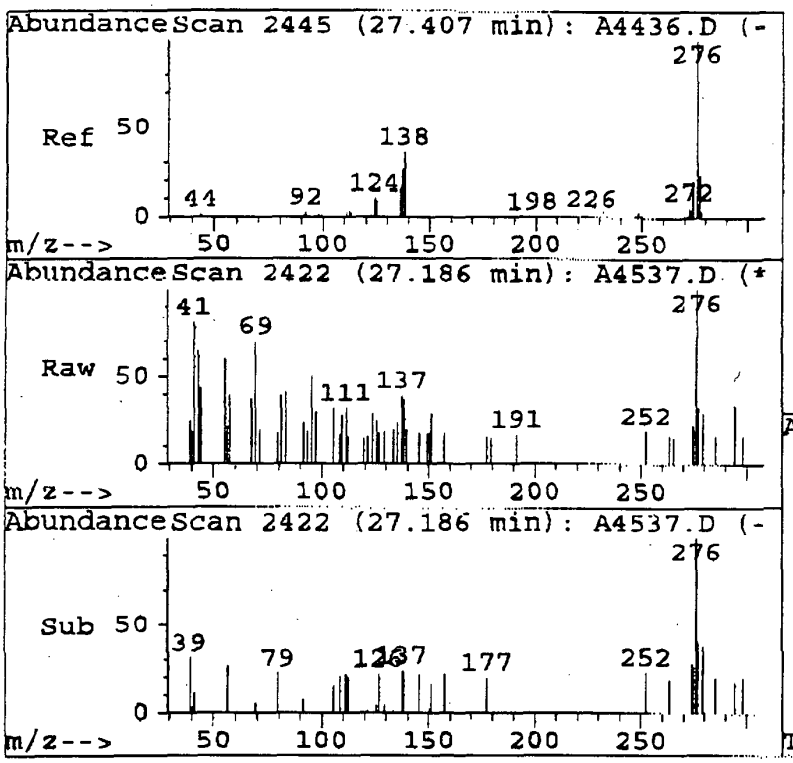
Ion	Ratio	Lower	Upper
252	100		
253	27.8	16.4	24.5#
125	24.1	19.8	29.7
0	0.0	0.0	0.0



001865

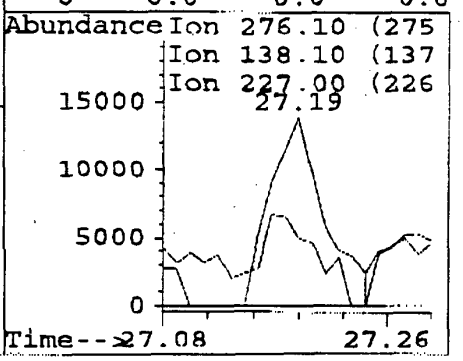
Data File : C:\HPCHEM\1\DATA\A4537.D
Acq Time : 09/01/98 16:44
Sample : SB28-0020
Misc : 4802.002 PAH 30G/10ML

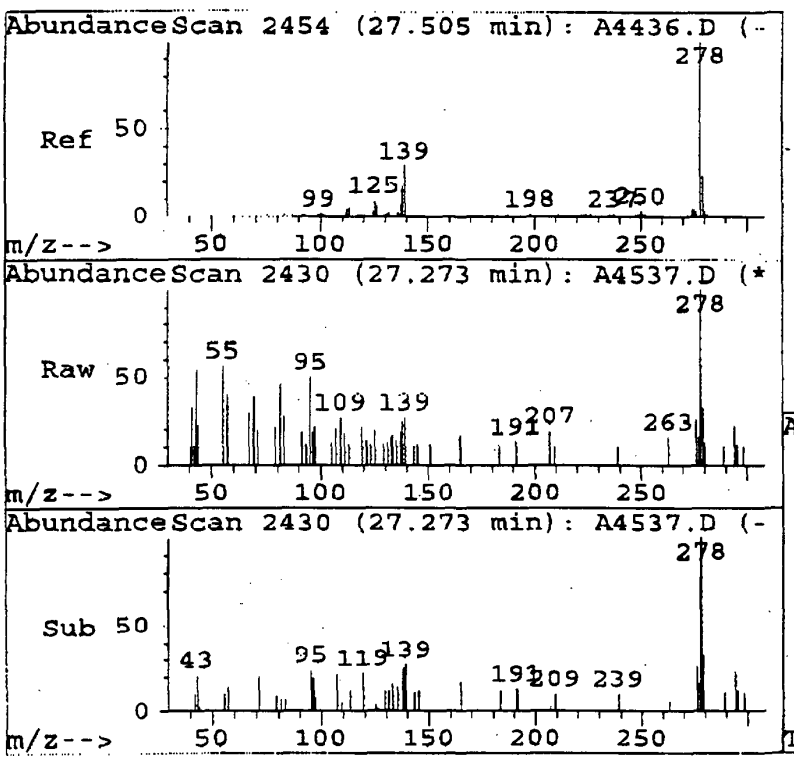
Operator: CW
Inst : A-HP5970B
Multiplr: 1.00



#20
C780 Indeno(1,2,3-c,d)pyrene
Concen: 1.46 ng/uL
RT: 27.19 min Scan# 2422
Delta R.T. -0.02 min
Integration Range:
Scan= 2417 to 2427
R.T.= 27.13 to 27.24 (min)
Tgt Ion:276.1 Resp: 42920

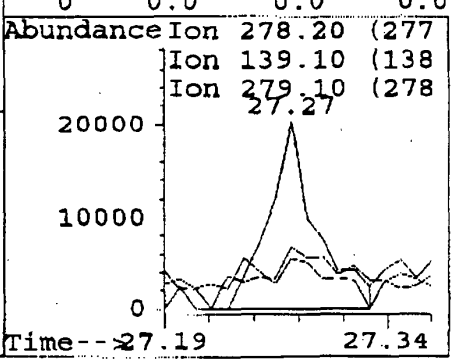
Ion	Ratio	Lower	Upper
276	100		
138	52.3	27.4	67.4
227	0.0	0.0	20.0
0	0.0	0.0	0.0





#21
C785 Dibenzo(a,h)anthracene
Concen: 1.51 ng/uL
RT: 27.27 min Scan# 2430
Delta R.T. -0.03 min
Integration Range:
Scan= 2426 to 2435
R.T.= 27.23 to 27.33 (min)
Tgt Ion:278.2 Resp: 46894

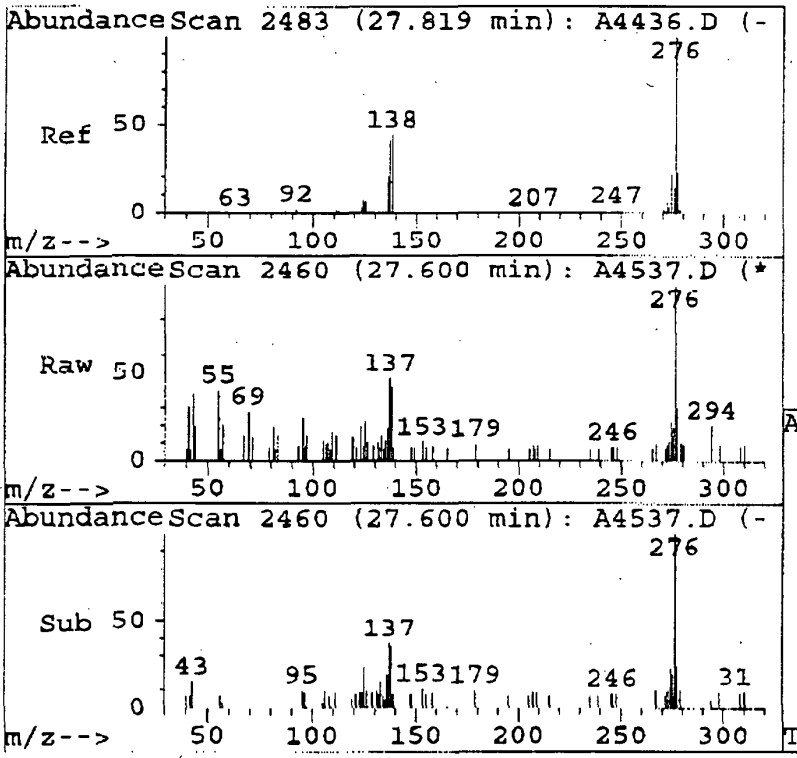
Ion	Ratio	Lower	Upper
278	100		
139	28.4	15.9	55.9
279	64.2	0.5	40.5#
0	0.0	0.0	0.0



001866

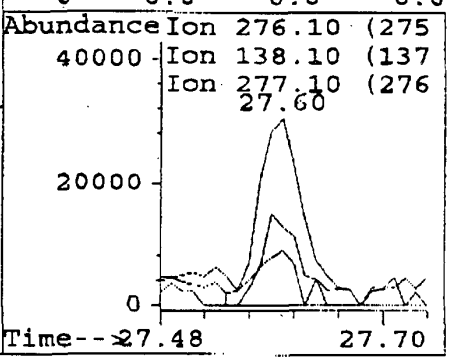
Data File : C:\HPCHEM\1\DATA\A4537.D
Acq Time : 09/01/98 16:44
Sample : SB28-0020
Misc : 4802.002 PAH 30G/10ML

Operator: CW
Inst : A-HP5970B
Multiplr: 1.00



#22
C790 Benzo(g,h,i)perylene
Concen: 3.07 ng/uL
RT: 27.60 min Scan# 2460
Delta R.T. -0.03 min
Integration Range:
Scan= 2455 to 2467
R.T.= 27.55 to 27.68 (min)
Tgt Ion:276.1 Resp: 93619

Ion	Ratio	Lower	Upper
276	100		
138	46.0	13.8	53.8
277	25.6	3.8	43.8
0	0.0	0.0	0.0



001867

TPH1005
CASE: ECOLOGY & ENVIRONMENT
SDG: 4798/4802

COMPLETE SAMPLE DATA PACKAGE

PAGE 1 TO 225

PDP ANALYTICAL SERVICES
1680 LAKE FRONT CIRCLE, SUITE B, THE WOODLANDS TX 77380

PDP ANALYTICAL SERVICES

1680 Lake Front Circle, Suite B • The Woodlands, TX 77380 • Phone (281)363-2233

Contract No.	Case No. E&E	SDG No. 4798/4802 (TPH1005)

SDG NARRATIVE

SAMPLE RECEIPT :

08/05/98 and 08/07/98 - Received soil and water sample for TPH analysis.

TPH:

No problems encountered.

Manual integration's were performed for some calibration standards samples for the compounds listed against them. These manual integration's were necessary because the software failed to accurately integrate the entire peak. In all the above instances, the quantitation reports are flagged with "m". A hard copy printout of the manual integration's along with the scan ranges and initials of the operator is included in the data package .

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the laboratory manager or his designee, as verified by the following signature:

S Kudchadka / Project Mgr — Signature and Title

08/24/98 — Date of Signature

:\NETDATA\QA\FORMS\CLP\NARR1296.DOC

000001

ENVIRONMENTAL PROTECTION AGENCY

OFFICIAL
CHAIN OF CUSTODY RECORD

PROJ. NO.: KJ6103 052601SFXX
PROJECT NAME: WILCOX REFINERY
SAMPLERS: (Signature) J.Beer B. Martinez

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Metals (6010B)	PAHs (8310)	TPH (TNRCC 1005)	pH	BTEX (8021B Mod.)	REMARKS
SB20-0030	8/4	0910		✓	SB20-(0'-3')	3	✓	✓	✓	✓	✓	EPA Sample Tag # 4798.001 6-097026 / 6-097027 / 6-097028 CJS
SB21-0030		1010		✓	SB21-0030	3	✓	✓	✓	✓	✓	6-097029 / 6-097030 4798.002
SB22-0030		1040		✓	SB22 (0'-3')	3	✓	✓	✓	✓	✓	6-097031 / 6-097032 .003
SB23-0030		1045		✓	SB23 (0'-3')	3	✓	✓	✓	✓	✓	6-097033 / 6-097034 .004
SB24-0030		1430		✓	SB24 (0'-3')	3	✓	✓	✓	✓	✓	6-097035 / 6-097036 .005
SB25-0030		1505		✓	SB25 (0'-3')	3	✓	✓	✓	✓	✓	6-097037 / 6-097038 .006
SB26-0020		1600		✓	SB26 (0'-2')	3	✓	✓	✓	✓	✓	6-097049 / 6-097050 .007
SB36-6070		0940		✓	SB36 (6-7')	3	✓	✓	✓	✓	✓	6-097435 / 6-097436 .008
SB37-6070		1501		✓	SB37 (6-7')	3	✓	✓	✓	✓	✓	6-097432 / 6-097434 JB .009
SB38-0010		1540		✓	SB38 (0-1')	3	✓	✓	✓	✓	✓	6-097433 / 6-097449 .010
SW03		1425		✓	SW03 (Background)	4			✓		✓	6-097437 / 6-097438 .011
TB0804		1655		✓	Trip Blank	2					✓	6-097439 / 6-097 JB .012

000002

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
B. Martinez	8/4/98 1800				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
		Francisco Hernandez	Francisco Hernandez	8/5/98 10:30	
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
				Fed Ex Airbill # 8055500043006	
Shipped by:		Airbill Number:			

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Return[illegible] Warrant

EPA 7500-53 (11/96)

6- 09262

001870

OFFICIAL
CHAIN OF CUSTODY RECORD

PROJ. NO. KJ6103 052601SFXX

PROJECT NAME: WILCOX REFINERY

SAMPLERS: (Signature) Loren Williams

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	METALS (6010B)	PAH (8310)	TPH (TNRCC 1005)	PH	BTEX (8021B M)	REMARKS
												EPA TAG #
SB27-0030	4/5/98	0830		X	SB27-(0'-3')	3	✓	✓	✓	✓	✓	6-097351 / 6-097352 4802.001
SB28-0020		0945		X	SB28 (0'-2')	3	✓	✓	✓	✓	✓	6-097354 / 6-097353 .002
SB29-0010		1020		X	SB29 (0'-1')	3	✓	✓	✓	✓	✓	6-097355 / 6-097356 .003
~~SW01~~		~~1045~~			~~SW01~~ COS 4/5/98							
SB30-0030		1100		X	SB30 (0'-3')	3	✓	✓	✓	✓	✓	6-097358 / 6-097359 4802.004
SW01		1045		X	SW01	4			✓		✓	6097360 / 6097357 .005
SB31-0030 ~~SB31-0030~~		1145		X	SB31 (0'-3')	3	✓	✓	✓	✓	✓	6097361 / 6097362 .006
SW02		1415		X	SW02	4			✓		✓	6097363 / 6097364 .007
SW02D		1425		X	SW02D	4			✓		✓	6097365 / 6097366 .008D
SB32-0010		1440		X	SB32 (0'-1')	3	✓	✓	✓	✓	✓	~~6097B32~~ 6097367 / 6-097368 ~~.009~~
SB32-0010D		1440		X	SB32 (0'-1') d	3	✓	✓	✓	✓	✓	6-097369 / 6-097370 .010 ~~.009~~
SB33-0010		1515		X	SB33 (0'-1')	3	✓	✓	✓	✓	✓	6097371 / 6-097372 .011 ~~.010~~
SB34-0010		1540		X	SB34 (0'-1')	3	✓	✓	✓	✓	✓	6097373 / 6-097374 .012 ~~.011~~

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	4/5/98 1800				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
			4/7/98 9:45		
Shipped by:		Airbill Number:			

FedEx Airbill # ~~805550003387~~ KM 4/6/98
805550003398

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files;
Green to Report; Yellow Returns with Warrant

EPA 7500-53
(11/96)

6-09263

001871

OFFICIAL

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
KJ6163 052601SFXY	WILCOX REFINERY

SAMPLERS: (Signature) Chris Mahoney / Paul Peacock / B Mahoney

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Metals (6010B)	PAH (8310)	TPH (TNRCC 1005)	pH	BTEX (8021B MOD)	REMARKS
SB40 3040	8/5/98	0911		X	SB40 (3'-4')	2	✓	✓	✓	✓		✓ EPA TAG # 13 6-097441 / 6-097440 4802.044
SB40 6WG		0855		X	SB40-6WG	4			✓			✓ 6097442 / 6-097443 .014 ~~.042~~
SB39 3040		1135		X	SB39 (3'-4')	3	✓	✓	✓	✓		✓ 6097444 / 6097445 .015 ~~.043~~
SB43 6070		1449		X	SB43 (6'-7')	3	✓	✓	✓	✓		✓ 6097446 / 6097447 .016 ~~.044~~
SB44 4050		1425		X	SB44 (4'-5')	3	✓	✓	✓	✓		✓ 6097448 / 6097039 .017 ~~.045~~
SB45 0010	↓	1650		X	SB45 (0'-1')	3	✓	✓	✓	✓		✓ 6097040 / 6097041 .018 ~~.046~~
~~TB-0805~~	8/5/98			X	~~TB-0805~~	1					✓	B Mahoney 8/6

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
B Mahoney	8/5/98 1800				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		[illegible]	8/7/98 1345	FedEx Airbill # ~~8055500[illegible]3387~~ BM 8/6/98 8055500[illegible]3398	
Shipped by:		Airbill Number:			

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Returns with Warrant

EPA 7500-53 (11/96)

6- 09264

001872

OFFICIAL
CHAIN OF CUSTODY RECORD

PROJ. NO. KJ6103 052G01SFXX

PROJECT NAME: WILCOX REFINERY

SAMPLERS: (Signature) Christopher Simpson / Bn Martinez

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	METALS (6010 B)	PAH (8310)	TPH (1NPCC 1005)	PH	BTEX (8021B-M)	REMARKS / EPA TAG #
SB35-0030	8/6/98	0815		X	SB35 (0'-3')	3	✓	✓	✓	✓	✓	6-099460 / 6-099461 4802 ~~.019~~
SB41-2030	8/6/98	0840		X	SB41 (2'-3')	3	✓	✓	✓	✓	✓	6-097042 / 6-097044 ~~.020~~
SB41-2030-D	8/6/98	0842		X	SB41-D (2'-3')	3	✓	✓	✓	✓	✓	6-097043 / 6-097045 .021 ~~.021~~
SB42-GW07	8/6/98	0939		X	SB42-GW07	4			✓		✓	6-097046 / 6-097047 .022 ~~.022~~
SB42-2030	8/6/98	0945		X	SB42 (2'-3')	3	✓	✓	✓	✓	✓	6-097048 / 6-097375 .023 ~~.023~~
SW04	8/6/98	1024		X	SW04	4			✓		✓	6-097376 / 6-097377 .024 ~~.024~~
SB37-GW08	8/6/98	1145		X	SB37-GW08	1					✓	6-097378 .025 ~~.025~~
SB46-6012	8/6/98	1430		X	SB46 (6'-12')	3	✓	✓	✓	✓	✓	6-097380 / 6-097381 .026 ~~.026~~
SB46-6012-D	8/6/98	1435		X	SB46-D (6'-12')	3	✓	✓	✓	✓	✓	6-097382 / 6-097383 .027 ~~.027~~
TB-0806	8/6/98	1600		X	TB-0806	1					✓	6-097379 .028 ~~.028~~

000005

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Bn Martinez	8/6/98 1800				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
			8/7/98 1445	FedEx AirBill # 805550003398	
Shipped by:		Airbill Number:			

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files;
Green to Report; Yellow Returns with Warrant

EPA 7500-53
(11/96)

6- 09279

001873

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/6/98 17:40:08

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/06/98
ClientProject #: **Date Received:** 08/05/98
P.O. No.: **Time Received:** 10:30
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
4798.001	SB20-0030	3	SOIL	08/04/98	09:10	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.002	SB21-0030	3	SOIL	08/04/98	10:10	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.003	SB22-0030	3	SOIL	08/04/98	10:40	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.004	SB23-0030	3	SOIL	08/04/98	11:45	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.005	SB24-0020	3	SOIL	08/04/98	14:30	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.006	SB25-0030	3	SOIL	08/04/98	15:05	6-09262		
	Tests Required							

SW 8/6/98

Lab Approval **Client Approval**

000006

001874

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/6/98 17:40:11

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/06/98
ClientProject #: **Date Received:** 08/05/98
P.O. No.: **Time Received:** 10:30
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.007	SB26-0020	3	SOIL	08/04/98	16:00	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.008	SB36-6070	3	SOIL	08/04/98	09:40	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.009	SB37-6070	3	SOIL	08/04/98	15:01	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.010	SB38-0010	3	SOIL	08/04/98	15:40	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.011	SW03	4	WATER	08/04/98	14:25	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- TPH1005						08/19/98	

SK 8/6/98

Lab Approval **Client Approval**

000007

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/6/98 17:40:12

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/06/98
ClientProject #: **Date Received:** 08/05/98
P.O. No.: **Time Received:** 10:30
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
4798.012	TB0804	2	WATER	08/04/98	16:55	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- TPH1005						08/19/98	

Instructions To Lab:

CLP LIKE DATA PACKAGE
FAX DUE: 14 DAYS
HARD COPY: 21 DAYS
USE E&E SOW

8/9/98
Lab Approval

Client Approval

000005

001876

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/24/98 9:16:48

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
4802.001	SB27-0030	3	SOIL	08/05/98	08:30	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.002	SB28-0020	3	SOIL	08/05/98	09:45	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.003	SB29-0010	3	SOIL	08/05/98	10:20	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.004	SB30-0030	3	SOIL	08/05/98	11:00	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.005	SW01	4	WATER	08/05/98	10:45	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.006	SB31-0030	3	SOIL	08/05/98	11:45	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	

Sep 8/24/98

Lab Approval **Client Approval**

000009

001877

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/24/98 9:16:50

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.007	SW02	4	WATER	08/05/98	14:15	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.008	SW02D	4	WATER	08/05/98	14:25	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.009	SB32-0010	3	SOIL	08/05/98	14:40	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.010	SB32-0010D	3	SOIL	08/05/98	14:40	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.011	SB33-0010	3	SOIL	08/05/98	15:15	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.012	SB34-0010	3	SOIL	08/05/98	15:40	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	

SW 8/25/98

Lab Approval **Client Approval**

000010

001878

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/24/98 9:16:52

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- TPH1005						08/21/98	
4802.013	SB40-3040	3	SOIL	08/05/98	09:11	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.014	SB40-GW06	4	WATER	08/05/98	08:55	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.015	SB39-3040	3	SOIL	08/05/98	11:35	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.016	SB43-6070	3	SOIL	08/05/98	14:49	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.017	SB44-4050	3	SOIL	08/05/98	16:25	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.018	SB45-0010	3	SOIL	08/05/98	16:50	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	

SE 8/24/98

Lab Approval **Client Approval**

000011

001879

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/24/98 9:16:52

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.019	SB35-0030	3	SOIL	08/06/98	08:15	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.020	SB41-2030	3	SOIL	08/06/98	08:40	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.021	SB41-2030D	3	SOIL	08/06/98	08:42	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.022	SB42-GW07	4	WATER	08/06/98	09:39	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.023	SB42-2030	3	SOIL	08/06/98	09:45	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.024	SW04	4	WATER	08/06/98	10:24	6- 09279		
	Tests Required							

Sup 8/24/98

Lab Approval **Client Approval**

000012

001880

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/24/98 9:16:53

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.025	SB37-GW08	1	WATER	08/06/98	11:45	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
4802.026	SB46-0612	3	SOIL	08/06/98	14:30	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.027	SB46-0612D	3	SOIL	08/06/98	14:35	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.028	TB-0806	1	WATER	08/06/98	16:00	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	

Instructions To Lab:

CLP LIKE DATA PACKAGE
FAX DUE: 14 DAYS
HARD COPY: 21 DAYS
USE E&E SOW

*MS/MSD REQUIRED ON E&E SAMPLES.

Lab Approval

Client Approval

000013

001881

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LCS/LCSD SUMMARY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :
PROJECT NAME :
PROJECT NUMBER :

DATE RECEIVED :
PRINTED ON : 8/21/98

SAMPLE MATRIX : SOLID
METHOD REFERENCE : TNRCC-1005

LAB CONTROL SAMPLE

LCS SAMPLE ID : TPHTL019
CLIENT SAMPLE ID :
DATE ANALYZED : 8/11/98
INSTRUMENT FILE : C03133

LAB CONTROL SAMPLE DUPLICATE

LCSD SAMPLE ID :
CLIENT SAMPLE ID :
DATE ANALYZED :
INSTRUMENT FILE :

PARAMETER	UNITS	LCS TRUE VALUE	LCSD TRUE VALUE	LCS FOUND VALUE	LCSD FOUND VALUE	LCS RECOVERY (%)	LCSD RECOVERY (%)	RPD	RPD LIMIT	QC LIMITS REC.
TPH-(>C10-C28)	MG/KG	500		501		100			30	70 - 130
TPH-(C6-C10)	MG/KG	500		499		100			30	70 - 130

* Indicate values outside of QC limits

RPD : 0 out of 0 outside limits
Spike Recovery : 0 out of 2 outside limits

000014

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LCS/LCSD SUMMARY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :
PROJECT NAME :
PROJECT NUMBER :

DATE RECEIVED :
PRINTED ON : 8/21/98

SAMPLE MATRIX : LIQUID
METHOD REFERENCE : TNRCC-1005

LAB CONTROL SAMPLE
LCS SAMPLE ID : TPHTL020
CLIENT SAMPLE ID :
DATE ANALYZED : 8/12/98
INSTRUMENT FILE : C03155

LAB CONTROL SAMPLE DUPLICATE
LCSD SAMPLE ID :
CLIENT SAMPLE ID :
DATE ANALYZED :
INSTRUMENT FILE :

PARAMETER	UNITS	LCS TRUE VALUE	LCSD TRUE VALUE	LCS FOUND VALUE	LCSD FOUND VALUE	LCS RECOVERY (%)	LCSD RECOVERY (%)	RPD	RPD LIMIT	QC LIMITS REC.
TPH-(>C10-C28)	MG/L	50.0		53.9		108			50	70 - 130
TPH-(C6-C10)	MG/L	50.0		50.3		101			50	70 - 130

* Indicate values outside of QC limits

RPD : 0 out of 0 outside limits
Spike Recovery : 0 out of 2 outside limits

000015

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LCS/LCSD SUMMARY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :
PROJECT NAME :
PROJECT NUMBER :

DATE RECEIVED :
PRINTED ON : 8/21/98

SAMPLE MATRIX : SOLID
METHOD REFERENCE : TNRCC-1005

LAB CONTROL SAMPLE

LCS SAMPLE ID : TPHTL021
CLIENT SAMPLE ID :
DATE ANALYZED : 8/12/98
INSTRUMENT FILE : C03167

LAB CONTROL SAMPLE DUPLICATE

LCSD SAMPLE ID :
CLIENT SAMPLE ID :
DATE ANALYZED :
INSTRUMENT FILE :

PARAMETER	UNITS	LCS TRUE VALUE	LCSD TRUE VALUE	LCS FOUND VALUE	LCSD FOUND VALUE	LCS RECOVERY (%)	LCSD RECOVERY (%)	RPD	RPD LIMIT	QC LIMITS REC.
TPH-(>C10-C28)	MG/KG	500		460		92			30	70 - 130
TPH-(C6-C10)	MG/KG	500		450		90			30	70 - 130

* Indicate values outside of QC limits

RPD : 0 out of 0 outside limits
Spike Recovery : 0 out of 2 outside limits

000016

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

MS/MSD SUMMARY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC.
PROJECT NAME : E&E- WILCOX REFINERY
PROJECT NUMBER :

DATE RECEIVED : 8/5/98
PRINTED ON : 8/21/98

SAMPLE MATRIX : SOIL

METHOD REFERENCE : TNRCC-1005

SAMPLE	MATRIX SPIKE	MATRIX SPIKE DUPLICATE
SAMPLE ID : 4798.003	MS SAMPLE ID : 4798.003MS	MSD SAMPLE ID : 4798.003MSD
CLIENT SAMPLE ID : SB22-0030	CLIENT SAMPLE ID : SB22-0030MS	CLIENT SAMPLE ID : SB22-0030MSD
DATE ANALYZED : 8/11/98	DATE ANALYZED : 8/11/98	DATE ANALYZED : 8/12/98
INSTRUMENT FILE : C03136	INSTRUMENT FILE : C03145	INSTRUMENT FILE : C03146

PARAMETER	UNITS	MS SPIKE ADDED	MSD SPIKE ADDED	SAMPL CONC.	MS CONC.	MSD CONC.	MS RECOVERY (%)	MSD RECOVERY (%)	RPD	RPD LIMIT	QC LIMIT REC.
TPH-(>C10-C28)	MG/KG	529	529	0	428	459	81	87	7.1	50	70 - 130
TPH-(C6-C10)	MG/KG	529	529	0	427	493	81	93	13.8	50	70 - 130

* Indicate values outside of QC limits

RPD : 0 out of 2 outside limits
Spike Recovery : 0 out of 4 outside limits

000017

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

MS/MSD SUMMARY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC.
PROJECT NAME : E&E- WILCOX REFINERY
PROJECT NUMBER :

DATE RECEIVED : 8/5/98
PRINTED ON : 8/21/98

SAMPLE MATRIX : WATER

METHOD REFERENCE : TNRCC-1005

SAMPLE	MATRIX SPIKE	MATRIX SPIKE DUPLICATE
SAMPLE ID : 4798.011	MS SAMPLE ID : 4798.011MS	MSD SAMPLE ID : 4798.011MSD
CLIENT SAMPLE ID : SW03	CLIENT SAMPLE ID : SW03MS	CLIENT SAMPLE ID : SW03MSD
DATE ANALYZED : 8/12/98	DATE ANALYZED : 8/12/98	DATE ANALYZED : 8/12/98
INSTRUMENT FILE : C03156	INSTRUMENT FILE : C03157	INSTRUMENT FILE : C03158

PARAMETER	UNITS	MS SPIKE ADDED	MSD SPIKE ADDED	SAMPL CONC.	MS CONC.	MSD CONC.	MS RECOVERY (%)	MSD RECOVERY (%)	RPD	RPD LIMIT	QC LIMIT REC.
TPH-(>C10-C28)	MG/L	50.0	50.0	0	53.7	62.3	107	125	15.5	50	70 - 130
TPH-(C6-C10)	MG/L	50.0	50.0	0	53.6	60.6	107	121	12.3	50	70 - 130

* Indicate values outside of QC limits

RPD : 0 out of 2 outside limits
Spike Recovery : 0 out of 4 outside limits

000015

001886

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

MS/MSD SUMMARY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME : ECOLOGY & ENVIRONMENT, INC.
PROJECT NAME : E&E- WILCOX REFINERY
PROJECT NUMBER :

DATE RECEIVED : 8/7/98
PRINTED ON : 8/21/98

SAMPLE MATRIX : SOIL

METHOD REFERENCE : TNRCC-1005

SAMPLE	MATRIX SPIKE	MATRIX SPIKE DUPLICATE
SAMPLE ID : 4802.006	MS SAMPLE ID : 4802.006MS	MSD SAMPLE ID : 4802.006MSD
CLIENT SAMPLE ID : SB31-0030	CLIENT SAMPLE ID : SB31-0030MS	CLIENT SAMPLE ID : SB31-0030MSD
DATE ANALYZED : 8/12/98	DATE ANALYZED : 8/13/98	DATE ANALYZED : 8/13/98
INSTRUMENT FILE : C03168	INSTRUMENT FILE : C03182	INSTRUMENT FILE : C03183

PARAMETER	UNITS	MS SPIKE ADDED	MSD SPIKE ADDED	SAMPL CONC.	MS CONC.	MSD CONC.	MS RECOVERY (%)	MSD RECOVERY (%)	RPD	RPD LIMIT	QC LIMIT REC.
TPH-(>C10-C28)	MG/KG	594	594	0	661	629	111	106	4.6	50	70 - 130
TPH-(C6-C10)	MG/KG	594	594	0	653	600	110	101	8.5	50	70 - 130

* Indicate values outside of QC limits

RPD : 0 out of 2 outside limits
Spike Recovery : 0 out of 4 outside limits

000019

001887

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB20-0030		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.001		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	15:02	

% MOISTURE	: 7.9	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03134
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 15:32		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	54.3 MG/KG	70.2 MG/KG	
TPH-(C6-C10)	54.3 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB21-0030		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.002		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	15:02	

% MOISTURE	: 2.2	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03135
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 16:16		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	51.1 MG/KG	ND MG/KG	
TPH-(C6-C10)	51.1 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

000024

001889

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB22-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.003
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 15:02

% MOISTURE	: 5.4	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03136
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 16:59		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	52.8 MG/KG	ND MG/KG	
TPH-(C6-C10)	52.8 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB23-0030		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.004		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	15:02	

% MOISTURE	: 2.1	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03137
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 17:43		

PARAMETER	QUANTITATION LIMIT	RESULTS		QUALIFIER
TPH-(>C10-C28)	51.1 MG/KG	ND	MG/KG	
TPH-(C6-C10)	51.1 MG/KG	ND	MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

0000032

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB24-0020		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.005		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	15:03	

% MOISTURE	: 14.4	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03141
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 20:36		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	58.4 MG/KG	1140 MG/KG	
TPH-(C6-C10)	58.4 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB25-0030		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.006		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	15:03	

% MOISTURE	: 1.7	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03138
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 18:26		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	50.9 MG/KG	ND MG/KG	
TPH-(C6-C10)	50.9 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs:

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

000040

001893

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB26-0020
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.007
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98 15:03

% MOISTURE	: 2.8	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03139
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 19:10		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	51.4 MG/KG	ND MG/KG	
TPH-(C6-C10)	51.4 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB36-6070
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.008
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 15:03

% MOISTURE	: 2.5	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03140
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 19:53		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	51.3 MG/KG	ND MG/KG	
TPH-(C6-C10)	51.3 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	S837-6070
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.009
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 15:03

% MOISTURE	: 6.8	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03143
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 22:01		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	53.6 MG/KG	ND MG/KG	
TPH-(C6-C10)	53.6 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB38-0010
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.010
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 15:03

% MOISTURE	: 16.2	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03144
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 22:44		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	59.7 MG/KG	ND MG/KG	
TPH-(C6-C10)	59.7 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SW03		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.011		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98		
SAMPLE MATRIX	: WATER	PRINTED ON	: 8/21/98	15:03	

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03156	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 08:58

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	ND MG/L	
TPH-(C6-C10)	5.0 MG/L	ND MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB020	PREP BLANK ID :TPHTB020	LCS ID :TPHTL020
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB27-0030		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.001		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:57	

% MOISTURE	: 4.8	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03147
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 00:52		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	52.6 MG/KG	ND MG/KG	
TPH-(C6-C10)	52.6 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB28-0020		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.002		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:57	

% MOISTURE	: 4.5	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03148
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 01:34		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	52.3 MG/KG	ND MG/KG	
TPH-(C6-C10)	52.3 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB29-0010		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.003		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:57	

% MOISTURE	: 2.4	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03149
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 02:16		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	51.2 MG/KG	ND MG/KG	
TPH-(C6-C10)	51.2 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB30-0030		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.004		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:57	

% MOISTURE	: 10.9	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03150
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 02:59		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	56.1 MG/KG	ND MG/KG	
TPH-(C6-C10)	56.1 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SW01		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.005		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: WATER	PRINTED ON	: 8/21/98	14:57	

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03159	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 11:05

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	ND MG/L	
TPH-(C6-C10)	5.0 MG/L	ND MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB020	PREP BLANK ID :TPHTB020	LCS ID :TPHTL020
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB31-0030
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.006
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98 14:57

% MOISTURE	: 15.8	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03168
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 17:37		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	59.4 MG/KG	ND MG/KG	
TPH-(C6-C10)	59.4 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SW02		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.007		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: WATER	PRINTED ON	: 8/21/98	14:57	

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03160	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 11:49

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	ND MG/L	
TPH-(C6-C10)	5.0 MG/L	ND MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB020	PREP BLANK ID :TPHTB020	LCS ID :TPHTL020
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SW02D
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.008
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	WATER	PRINTED ON :	8/21/98 14:58

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03161	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 12:32

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	ND MG/L	
TPH-(C6-C10)	5.0 MG/L	ND MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB020	PREP BLANK ID :TPHTB020	LCS ID :TPHTL020
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB32-0010		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.009		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:58	

% MOISTURE	: 42.7	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03169
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 18:21		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	87.3 MG/KG	ND MG/KG	
TPH-(C6-C10)	87.3 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB32-0010D
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.010
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:58

% MOISTURE	: 42.1	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03170
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 19:05		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	86.3 MG/KG	ND MG/KG	
TPH-(C6-C10)	86.3 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB33-0010		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.011		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:58	

% MOISTURE	: 22.2	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03171
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 19:49		

PARAMETER	QUANTITATION LIMIT		RESULTS		QUALIFIER
TPH-(>C10-C28)	64.3	MG/KG	125	MG/KG	
TPH-(C6-C10)	64.3	MG/KG	ND	MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB34-0010
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.012
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:58

% MOISTURE	: 22.6	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03172
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 20:32		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	64.6 MG/KG	1370 MG/KG	
TPH-(C6-C10)	64.6 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB40-3040		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.013		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:58	

% MOISTURE	: 15.1	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03151
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 03:41		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	58.9 MG/KG	ND MG/KG	
TPH-(C6-C10)	58.9 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB40-GW06
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.014
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	WATER	PRINTED ON :	8/21/98 14:58

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03164	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 14:43

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	ND MG/L	
TPH-(C6-C10)	5.0 MG/L	ND MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB020	PREP BLANK ID :TPHTB020	LCS ID :TPHTL020
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB39-3040		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.015		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:58	

% MOISTURE	: 16.7	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03152
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 04:23		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	60.0 MG/KG	ND MG/KG	
TPH-(C6-C10)	60.0 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs:

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB43-6070		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.016		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:58	

% MOISTURE	: 7.8	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03173
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 21:16		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	54.2 MG/KG	ND MG/KG	
TPH-(C6-C10)	54.2 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB44-4050		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.017		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:58	

% MOISTURE	: 9.3	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03174
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 21:58		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	55.1 MG/KG	ND MG/KG	
TPH-(C6-C10)	55.1 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB45-0010		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.018		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:58	

% MOISTURE	: 20.4	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03175
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 22:41		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	62.8 MG/KG	ND MG/KG	
TPH-(C6-C10)	62.8 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB35-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.019
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:58

% MOISTURE	: 12.4	ANALYST	: BP
DATE ANALYZED	: 08/13/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03177
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 00:05		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	57.1 MG/KG	ND MG/KG	
TPH-(C6-C10)	57.1 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs:

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB41-2030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.020
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:59

% MOISTURE	: 17.7	ANALYST	: BP
DATE ANALYZED	: 08/13/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03178
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 00:47		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	60.7 MG/KG	ND MG/KG	
TPH-(C6-C10)	60.7 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB41-2030D		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.021		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/6/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:59	

% MOISTURE	: 10.2	ANALYST	: BP
DATE ANALYZED	: 08/13/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03179
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 01:29		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	55.7 MG/KG	ND MG/KG	
TPH-(C6-C10)	55.7 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB42-GW07		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.022		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/6/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: WATER	PRINTED ON	: 8/21/98	14:59	

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03162	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 13:15

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	ND MG/L	
TPH-(C6-C10)	5.0 MG/L	ND MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB020	PREP BLANK ID :TPHTB020	LCS ID :TPHTL020
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB42-2030		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.023		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/6/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:59	

% MOISTURE	: 14.9	ANALYST	: BP
DATE ANALYZED	: 08/13/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03180
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 02:12		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	58.7 MG/KG	ND MG/KG	
TPH-(C6-C10)	58.7 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SW04		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.024		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/6/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: WATER	PRINTED ON	: 8/21/98	14:59	

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03163	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 13:59

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	ND MG/L	
TPH-(C6-C10)	5.0 MG/L	ND MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB020	PREP BLANK ID :TPHTB020	LCS ID :TPHTL020
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB46-0612
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.026
PROJECT NUMBER	:		METHOD REFERENCE	:	TNRCC-1005
DATE SAMPLED	:	8/6/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 14:59

% MOISTURE	: 15	ANALYST	: BP
DATE ANALYZED	: 08/13/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03181
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 02:54		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	58.8 MG/KG	ND MG/KG	
TPH-(C6-C10)	58.8 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs:

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB46-0612D
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.027
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:59

% MOISTURE	: 12	ANALYST	: BP
DATE ANALYZED	: 08/13/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03184
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 04:59		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	56.8 MG/KG	ND MG/KG	
TPH-(C6-C10)	56.8 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

Response Factor Report C-HP5890

Method : E:\HPCHEM\6\METHODS\TPH03046.M
Title : TPH-TNRCC1005
Last Update : Mon Jul 20 08:41:00 1998
Response via : Initial Calibration

Calibration Files
1 =C03046.D 2 =C03047.D 3 =C03048.D
4 =C03049.D 5 =C03050.D

	Compound	1	2	3	4	5	Avg	%RSD
1) H	TPH (C6-C10)	11.9	10.6	8.9	9.9	9.8	10.2 E3	11.10 ✓
2) H	TPH-(>C10-C28)	21.5	19.7	20.0	24.5	25.8	22.3 E3	12.25 ✓

000165

(#) = Out of Range

001925

Quantitation Report

Data File : E:\HPCHEM\6\DATA\C03153.D
Acq On : 08/12/98 05:05
Sample : CONT. CAL
Misc : 500 ug/ml
Quant Time: Aug 12 8:05 1998

Vial: 23
Operator: BP
Inst : C-HP5890A
Multiplr: 1.00

Method : E:\HPCHEM\6\METHODS\TPH03046.M
Title : TPH-TNRCC1005
Last Update : Mon Jul 20 08:41:00 1998
Response via : Multiple Level Calibration

Volume Inj. : 2 UL
Signal Phase : HP-5
Signal Info : 30M/0.53MM/0.25UM

Compound	R.T.	Response	Conc Units
Target Compounds			
1) H TPH (C6-C10)	6.45	5265023	515.23 ug/mL
2) H TPH-(>C10-C28)	15.00	11684370	523.87 ug/mL

(f)=RT Delta > 1/2 Window (m)=manual int.

000193

001926

Quantitation Report

Data File : E:\HPCHEM\6\DATA\C03165.D
Acq On : 08/12/98 15:27
Sample : CONT. CAL
Misc : 500 ug/ml
Quant Time: Aug 13 8:47 1998

Vial: 11
Operator: BP
Inst : C-HP5890A
Multiplr: 1.00

Method : E:\HPCHEM\6\METHODS\TPH03046.M
Title : TPH-TNRCC1005
Last Update : Mon Jul 20 08:41:00 1998
Response via : Multiple Level Calibration

Volume Inj. : 2 UL
Signal Phase : HP-5
Signal Info : 30M/0.53MM/0.25UM

Compound	R.T.	Response	Conc Units
Target Compounds			
1) H TPH (C6-C10)	6.45	5534206	541.58 ug/mL
2) H TPH-(>C10-C28)	15.00	10804972	484.44 ug/mL

(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report

Data File : E:\HPCHEM\6\DATA\C03176.D
Acq On : 08/12/98 23:23
Sample : CONT. CAL
Misc : 500 ug/ml
Quant Time: Aug 13 8:52 1998

Vial: 22
Operator: BP
Inst : C-HP5890A
Multiplr: 1.00

Method : E:\HPCHEM\6\METHODS\TPH03046.M
Title : TPH-TNRCC1005
Last Update : Mon Jul 20 08:41:00 1998
Response via : Multiple Level Calibration

Volume Inj. : 2 UL
Signal Phase : HP-5
Signal Info : 30M/0.53MM/0.25UM

Compound	R.T.	Response	Conc Units
Target Compounds			
1) H TPH (C6-C10)	6.45	5054129	494.60 ug/mL
2) H TPH-(>C10-C28)	15.00	11699128	524.53 ug/mL

(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report

Data File : E:\HPCHEM\6\DATA\C03186.D
Acq On : 08/13/98 06:23
Sample : CONT. CAL
Misc : 500 ug/ml
Quant Time: Aug 13 8:57 1998

Vial: 82
Operator: BP
Inst : C-HP5890A
Multiplr: 1.00

Method : E:\HPCHEM\6\METHODS\TPH03046.M
Title : TPH-TNRCC1005
Last Update : Mon Jul 20 08:41:00 1998
Response via : Multiple Level Calibration

Volume Inj. : 2 UL
Signal Phase : HP-5
Signal Info : 30M/0.53MM/0.25UM

Compound	R.T.	Response	Conc Units
Target Compounds			
1) H TPH (C6-C10)	6.45	4985317	487.86 ug/mL
2) H TPH-(>C10-C28)	15.00	11761605	527.33 ug/mL

(f)=RT Delta > 1/2 Window (m)=manual int.

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :		CLIENT SAMPLE ID :	PREP BLANK
PROJECT NAME :		LAB SAMPLE ID :	TPHTB019
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :		DATE RECEIVED :	
SAMPLE MATRIX :	SOLID	PRINTED ON :	8/21/98 15:04

% MOISTURE :		ANALYST :	BP
DATE ANALYZED :	08/11/98	DILUTION :	1
EXTRACT VOLUME :	10 ML	INSTRUMENT FILE :	C03132
INSTRUMENT ID :	C-HP5980	SAMPLE SIZE :	10 G
TIME ANALYZED :	10:41		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	50.0 MG/KG	ND MG/KG	
TPH-(C6-C10)	50.0 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019 PREP BLANK ID :TPHTB019

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :		CLIENT SAMPLE ID :	PREP BLANK
PROJECT NAME :		LAB SAMPLE ID :	TPHTB020
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :		DATE RECEIVED :	
SAMPLE MATRIX :	LIQUID	PRINTED ON :	8/21/98 15:04

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03154	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 05:48

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	ND MG/L	
TPH-(C6-C10)	5.0 MG/L	ND MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB020 PREP BLANK ID :TPHTB020

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :		CLIENT SAMPLE ID :	PREP BLANK
PROJECT NAME :		LAB SAMPLE ID :	TPHTB021
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :		DATE RECEIVED :	
SAMPLE MATRIX :	SOLID	PRINTED ON :	8/21/98 15:00

% MOISTURE	:	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03166
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 16:10		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	50.0 MG/KG	ND MG/KG	
TPH-(C6-C10)	50.0 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021

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001932

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :		CLIENT SAMPLE ID :	LAB CONTROL SAMPLE
PROJECT NAME :		LAB SAMPLE ID :	TPHTL019
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :		DATE RECEIVED :	
SAMPLE MATRIX :	SOLID	PRINTED ON :	8/21/98 15:04

% MOISTURE :		ANALYST :	BP
DATE ANALYZED :	08/11/98	DILUTION :	1
EXTRACT VOLUME :	10 ML	INSTRUMENT FILE :	C03133
INSTRUMENT ID :	C-HP5980	SAMPLE SIZE :	10 G
TIME ANALYZED :	11:24		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	50.0 MG/KG	501 MG/KG	
TPH-(C6-C10)	50.0 MG/KG	499 MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019 PREP BLANK ID :TPHTB019

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :		CLIENT SAMPLE ID :	LAB CONTROL SAMPLE
PROJECT NAME :		LAB SAMPLE ID :	TPHTL020
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :		DATE RECEIVED :	
SAMPLE MATRIX :	LIQUID	PRINTED ON :	8/21/98 15:04

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03155	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 06:30

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	53.9 MG/L	
TPH-(C6-C10)	5.0 MG/L	50.3 MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID : TPHTB020	PREP BLANK ID : TPHTB020

0002224

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB22-0030MS
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.003MS
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 15:03

% MOISTURE	: 5.4	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03145
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 23:27		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	52.8 MG/KG	428 MG/KG	
TPH-(C6-C10)	52.8 MG/KG	427 MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019

000228

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB22-0030MSD
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.003MSD
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 15:03

% MOISTURE	: 5.4	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03146
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 00:09		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	52.8 MG/KG	459 MG/KG	
TPH-(C6-C10)	52.8 MG/KG	493 MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019 PREP BLANK ID :TPHTB019 LCS ID :TPHTL019
MS ID :4798.003MS

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SW03MS		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.011MS		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98		
SAMPLE MATRIX	: WATER	PRINTED ON	: 8/21/98	15:03	

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03157	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 09:40

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	54 MG/L	
TPH-(C6-C10)	5.0 MG/L	54 MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID	PREP BLANK ID	LCS ID
:TPHTB020	:TPHTB020	:TPHTL020

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SW03MSD
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.011MSD
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	WATER	PRINTED ON :	8/21/98 15:04

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03158	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 10:23

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	62 MG/L	
TPH-(C6-C10)	5.0 MG/L	61 MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB020	PREP BLANK ID :TPHTB020	LCS ID :TPHTL020
MS ID :4798.011MS		

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB31-0030MS
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.006MS
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 15:00

% MOISTURE	: 15.8	ANALYST	: BP
DATE ANALYZED	: 08/13/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03182
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 03:35		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	59.4 MG/KG	661 MG/KG	
TPH-(C6-C10)	59.4 MG/KG	653 MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021

000244

001939

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB31-0030MSD
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.006MSD
PROJECT NUMBER	:		METHOD REFERENCE	:	TNRCC-1005
DATE SAMPLED	:	8/5/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 15:00

% MOISTURE	: 15.8	ANALYST	: BP
DATE ANALYZED	: 08/13/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03183
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 04:17		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	59.4 MG/KG	629 MG/KG	
TPH-(C6-C10)	59.4 MG/KG	600 MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS		

000228

001940

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :		CLIENT SAMPLE ID :	LAB CONTROL SAMPLE
PROJECT NAME :		LAB SAMPLE ID :	TPHTL021
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :		DATE RECEIVED :	
SAMPLE MATRIX :	SOLID	PRINTED ON :	8/21/98 15:01

% MOISTURE :		ANALYST :	BP
DATE ANALYZED :	08/12/98	DILUTION :	1
EXTRACT VOLUME :	10 ML	INSTRUMENT FILE :	C03167
INSTRUMENT ID :	C-HP5980	SAMPLE SIZE :	10 G
TIME ANALYZED :	16:54		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	50.0 MG/KG	460 MG/KG	
TPH-(C6-C10)	50.0 MG/KG	450 MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021

0000252

METALS
CASE: ECOLOGY & ENVIRONMENT
SDG: 4802

SAMPLE DATA PACKAGE

PAGE 1 TO 67

PDP ANALYTICAL SERVICES
1680 LAKE FRONT CIRCLE, SUITE B, THE WOODLANDS TX 77380

ENVIRONMENTAL PROTECTION AGENCY

OFFICIAL
CHAIN OF CUSTODY RECORD

PROJ. NO.: KJ6103 05260ISFXX
PROJECT NAME: WILCOX REFINERY
SAMPLERS: (Signature) JBeer B. Martinez

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Metals (6010B)	PAHs (8310)	TPH (TNRCC 1005)	pH	BTEX (8021B Mod.)	REMARKS
SB20-0030	8/4	0910		✓	SB20-(0'-3')	3	✓	✓	✓	✓	✓	EPA Sample Tag # 4798.000 6-097026 / 6-097027 / 6-097028 CJS
SB21-0030		1010		✓	~~SB20~~ - SB21-0030	3	✓	✓	✓	✓	✓	6-097029 / 6-097030 4798.002
SB22-0030		1040		✓	SB22 (0'-3')	3	✓	✓	✓	✓	✓	6-097031 / 6-097032 .003
SB23-0030		1445		✓	SB23 (0'-3')	3	✓	✓	✓	✓	✓	6-097033 / 6-097034 .004
SB24-0030		1430		✓	SB24 (0'-3')	3	✓	✓	✓	✓	✓	6-097035 / 6-097036 .005
SB25-0030		1506		✓	SB25 (0'-3')	3	✓	✓	✓	✓	✓	6-097037 / 6-097038 .006
SB26-0020		1600		✓	SB26 (0'-2')	3	✓	✓	✓	✓	✓	6-097049 / 6-097050 .007
SB36-6070		0940		✓	SB36 (6-7')	3	✓	✓	✓	✓	✓	6-097435 / 6-097436 .008
SB37-6070		1501		✓	SB37 (6-7')	3	✓	✓	✓	✓	✓	6-097432 / 6-097434 .009
SB38-0010		1540		✓	SB38 (0-1')	3	✓	✓	✓	✓	✓	6-097433 / 6-097449 .010
SW03		1425		✓	SW03 (Background)	4			✓		✓	6-097437 / 6-097438 .011
TB0804		1655		✓	Trip Blank	2					✓	6-097439 / 6-097 JB .012

000002

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
B. Martinez	8/4/98 1800				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
		[signature]	[signature]	8/5/98 10:30	
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
				Fed Ex Airbill # 8Φ555ΦΦΦ43Φ6	
Shipped by:		Airbill Number:			

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files;
Green to Report; Yellow Returns with Warrant

EPA 7500-53
(11/86)

001943

6- 00002

OFFICIAL
CHAIN OF CUSTODY RECORD

PROJ. NO. KJ6103 0526Ø13FXX

PROJECT NAME: WILCOX REFINERY

SAMPLERS: (Signature) Loren Willis

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Metals (6010B)	PAH (8310)	TPH (GC/FID 1005)	PH	BTEX (8021B/M)	REMARKS
SB27-0030	4/5/98	0830		X	SB27-(0'-3')	3	✓	✓	✓	✓	✓	EPA TAG # 6-097351 / 6-097352 4802.001
SB28-0020		0945		X	SB28 (0'-2')	3	✓	✓	✓	✓	✓	6-097354 / 6-097353 .002
SB29-0010		1020		X	SB29 (0'-1')	3	✓	✓	✓	✓	✓	6-097355 / 6-097356 .003
~~SWØ1~~		~~1045~~			~~SWØ1~~ COS 4/5/98							
SB30 0030		1100		X	SB30 (0'-3')	3	✓	✓	✓	✓	✓	6-097358 / 6-097359 4802.004
SWØ1		1045		X	SWØ1	4			✓		✓	6097360 / 6097357 .005
~~SB31-0030~~ ~~SB31-0030~~		1145		X	SB31 (0'-3')	3	✓	✓	✓	✓	✓	6097361 / 6097362 .006
SWØ2		1415		X	SWØ2	4			✓		✓	6097363 / 6097364 .007
SWØ2D		1425		X	SWØ2D	4			✓		✓	6097365 / 6097366 .008
SB32 0010		1440		X	SB32 (0'-1')	3	✓	✓	✓	✓	✓	~~6097BTEX~~ 6097367 / 6-097368 ~~.009~~
SB32 0010D		1440		X	SB32 (0'-1') d	3	✓	✓	✓	✓	✓	6-097369 / 6-097370 .010 ~~.009~~
SB33 0010		1515		X	SB33 (0'-1')	3	✓	✓	✓	✓	✓	6097371 / 6-097372 .011 ~~.010~~
SB34 0010		1540		X	SB34 (0'-1')	3	✓	✓	✓	✓	✓	6097373 / 6-097374 .012 ~~.012~~

000003

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	4/5/98 1800				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		[signature]	4/7/98 9:45	FedEx Airbill # 805550000 3387 7m 8/6/98 805550000 3398	
Shipped by:		Airbill Number:			

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Return with Warrant

EPA 7500-53 (11/96)

6- 09263

001944

OFFICIAL
CHAIN OF CUSTODY RECORD

PROJ. NO. KJ6103 052601SFXY

PROJECT NAME: WILCOX REFINERY

SAMPLERS: (Signature) Chris Mahan / Paul Meiswinkel / B Mahan

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Metals (6010B)	PAH (8310)	TPH (TNRCC 1005)	pH	BTEX (8021B M)	REMARKS
SB40 3040	8/5/98	0911		X	SB40 (3'-4')	2	✓	✓	✓	✓	✓	EPA TAG # 13 6-097441 / 6-097440 4802.044
SB40 6W06		0855		X	SB40-6W06	4			✓		✓	6097442 / 6-097443 .014 ~~.042~~
SB39 3040		1135		X	SB39 (3'-4')	3	✓	✓	✓	✓	✓	6097444 / 6097445 .015 ~~.043~~
SB43 6070		1449		X	SB43 (6'-7')	3	✓	✓	✓	✓	✓	6097446 / 6097447 .016 ~~.044~~
SB44 4050		1625		X	SB44 (4'-5')	3	✓	✓	✓	✓	✓	6097448 / 6097039 .017 ~~.045~~
SB45 0010	↓	1650		X	SB45 (0'-1')	3	✓	✓	✓	✓	✓	6097040 / 6097041 .018 ~~.046~~
TB-0805	8/5/98			X	TB-0805	1					✓	B Mahan 8/5

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
B Mahan	8/5/98 1800				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		[illegible]	8/7/98 1345	FedEx Airbill # ~~8055500 3387 Br 8/6/98~~ 8055500 3398	
Shipped by:		Airbill Number:			

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Return[illegible] Warrant

EPA 7500-53 (11/96)

001945

6- 09264

OFFICIAL
CHAIN OF CUSTODY RECORD

PROJ. NO. KJ6103 052604SFXX

PROJECT NAME: WILCOX REFINERY

SAMPLERS: (Signature) Christopher Simpson / Ben Martinez

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	METALS (6010 B)	PAH (8310)	TPH (TNRCC 1005)	PH	BTEX (8021B-M)	REMARKS: EPA TAG #
SB35-0030	8/6/98	0815		X	SB35 (0'-3')	3	✓	✓	✓	✓		✓	6-099460 / 6-099461 4802 ~~.019~~
SB41-2030	8/6/98	0840		X	SB41 (2'-3')	3	✓	✓	✓	✓		✓	6-097042 / 6-097044 ~~.020~~
SB41-2030-D	8/6/98	0842		X	SB41-D (2'-3')	3	✓	✓	✓	✓		✓	6-097043 / 6-097045 .021 ~~.021~~
SB42-GW07	8/6/98	0939		X	SB42-GW07	4			✓			✓	6-097046 / 6-097047 .022 ~~.022~~
SB42-2030	8/6/98	0945		X	SB42 (2'-3')	3	✓	✓	✓	✓		✓	6-097048 / 6-097375 .023 ~~.023~~
SW04	8/6/98	1024		X	SW04	4			✓			✓	6-097376 / 6-097377 .024 ~~.024~~
SB37-GW08	8/6/98	1145		X	SB37-GW08	1						✓	6-097378 .025 ~~.025~~
SB46-6012	8/6/98	1430		X	SB46 (6'-12')	3	✓	✓	✓	✓		✓	6-097380 / 6-097381 .026 ~~.026~~
SB46-6012-D	8/6/98	1435		X	SB46-D (6'-12')	3	✓	✓	✓	✓		✓	6-097382 / 6-097383 .027 ~~.027~~
TB-0806	8/6/98	1600		X	TB-0806	1						✓	6-097379 .028 ~~.028~~

000005

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Ben Martinez	8/6/98 1800				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		[illegible]	8/7/98 1945	FedEx AirBill # 805550003398	
Shipped by:		Airbill Number:			

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Return with Warrant

EPA 7500-53 (11/96)

6- 09279

001946

PDP Analytical Services

1680 Lake Front Circle, Suite B, The Woodlands TX 77380

Sample Log-In Report

Logged By: AFG **Report Date:** 8/6/98 17:40:08

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/06/98
ClientProject #: **Date Received:** 08/05/98
P.O. No.: **Time Received:** 10:30
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
4798.001	SB20-0030	3	SOIL	08/04/98	09:10	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.002	SB21-0030	3	SOIL	08/04/98	10:10	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.003	SB22-0030	3	SOIL	08/04/98	10:40	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.004	SB23-0030	3	SOIL	08/04/98	11:45	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.005	SB24-0020	3	SOIL	08/04/98	14:30	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.006	SB25-0030	3	SOIL	08/04/98	15:05	6-09262		
	Tests Required							

SVB 8/6/98

Lab Approval

Client Approval

000006

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/6/98 17:40:11

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/06/98
ClientProject #: **Date Received:** 08/05/98
P.O. No.: **Time Received:** 10:30
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.007	SB26-0020	3	SOIL	08/04/98	16:00	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.008	SB36-6070	3	SOIL	08/04/98	09:40	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.009	SB37-6070	3	SOIL	08/04/98	15:01	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.010	SB38-0010	3	SOIL	08/04/98	15:40	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.011	SW03	4	WATER	08/04/98	14:25	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- TPH1005						08/19/98	

SK 8/6/98

Lab Approval **Client Approval**

000007

PDP Analytical Services

1680 Lake Front Circle, Suite B, The Woodlands TX 77380

Sample Log-In Report

Logged By: AFG **Report Date:** 8/6/98 17:40:12

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/06/98
ClientProject #: **Date Received:** 08/05/98
P.O. No.: **Time Received:** 10:30
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
4798.012	TB0804	2	WATER	08/04/98	16:55	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- TPH1005						08/19/98	

Instructions To Lab:

CLP LIKE DATA PACKAGE
FAX DUE: 14 DAYS
HARD COPY: 21 DAYS
USE E&E SOW

8/6/98

Lab Approval **Client Approval**

000005

001949

PDP Analytical Services

1680 Lake Front Circle, Suite B, The Woodlands TX 77380

Sample Log-In Report

Logged By: AFG **Report Date:** 8/24/98 9:16:48

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
4802.001	SB27-0030	3	SOIL	08/05/98	08:30	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.002	SB28-0020	3	SOIL	08/05/98	09:45	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.003	SB29-0010	3	SOIL	08/05/98	10:20	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.004	SB30-0030	3	SOIL	08/05/98	11:00	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.005	SW01	4	WATER	08/05/98	10:45	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.006	SB31-0030	3	SOIL	08/05/98	11:45	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	

8/24/98

Lab Approval **Client Approval**

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001950

PDP Analytical Services

1680 Lake Front Circle, Suite B, The Woodlands TX 77380

Sample Log-In Report

Logged By: AFG **Report Date:** 8/24/98 9:16:50

Client Name: ECOLOGY & ENVIRONMENT, INC.
Client Project Name: E&E- WILCOX REFINERY
ClientProject #:
P.O. No.:
Courier/No.:

Lab Project ID: Q1056-E&E
Date Logged: 08/10/98
Date Received: 08/07/98
Time Received: 9:45

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.007	SW02	4	WATER	08/05/98	14:15	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.008	SW02D	4	WATER	08/05/98	14:25	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.009	SB32-0010	3	SOIL	08/05/98	14:40	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.010	SB32-0010D	3	SOIL	08/05/98	14:40	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.011	SB33-0010	3	SOIL	08/05/98	15:15	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.012	SB34-0010	3	SOIL	08/05/98	15:40	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	

SW 8/27/98

Lab Approval

Client Approval

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001951

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/24/98 9:16:52

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- TPH1005						08/21/98	
4802.013	SB40-3040	3	SOIL	08/05/98	09:11	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE ✓						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.014	SB40-GW06	4	WATER	08/05/98	08:55	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.015	SB39-3040	3	SOIL	08/05/98	11:35	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE ✓						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.016	SB43-6070	3	SOIL	08/05/98	14:49	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE ✓						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.017	SB44-4050	3	SOIL	08/05/98	16:25	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE ✓						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.018	SB45-0010	3	SOIL	08/05/98	16:50	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE ✓						08/21/98	

SK 8/24/98

Lab Approval

Client Approval

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001952

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/24/98 9:16:52

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.019	SB35-0030	3	SOIL	08/06/98	08:15	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.020	SB41-2030	3	SOIL	08/06/98	08:40	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.021	SB41-2030D	3	SOIL	08/06/98	08:42	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.022	SB42-GW07	4	WATER	08/06/98	09:39	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.023	SB42-2030	3	SOIL	08/06/98	09:45	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.024	SW04	4	WATER	08/06/98	10:24	6- 09279		
	Tests Required							

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Lab Approval **Client Approval**

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PDP Analytical Services

1680 Lake Front Circle, Suite B, The Woodlands TX 77380

Sample Log-In Report

Logged By: AFG **Report Date:** 8/24/98 9:16:53

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.025	SB37-GW08	1	WATER	08/06/98	11:45	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
4802.026	SB46-0612	3	SOIL	08/06/98	14:30	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.027	SB46-0612D	3	SOIL	08/06/98	14:35	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.028	TB-0806	1	WATER	08/06/98	16:00	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	

Instructions To Lab:

CLP LIKE DATA PACKAGE
FAX DUE: 14 DAYS
HARD COPY: 21 DAYS
USE E&E SOW

*MS/MSD REQUIRED ON E&E SAMPLES.

Lab Approval

Client Approval

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COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E__ SAS No.: _____ SDG No.:SB27-0

SOW No.: ILM04.0

EPA Sample No.	Lab Sample ID
_SB27-0030____	_4802.001_____
_SB27-0030MS__	_4802.001MS____
SB27-0030MSD	_4802.001MSD___
_SB28-0020____	_4802.002_____
_SB29-0010____	_4802.003_____
_SB30-0030____	_4802.004_____
_SB31-0030____	_4802.006_____
_SB32-0010____	_4802.009_____
_SB32-0010D___	_4802.010_____
_SB33-0010____	_4802.011_____
_SB34-0010____	_4802.012_____
_SB35-0030____	_4802.019_____
_SB35-0030____	_4802.019_____
_SB39-3040____	_4802.015_____
_SB40-3040____	_4802.013_____
_SB41-2030____	_4802.020_____
_SB41-2030D___	_4802.021_____
_SB42-2030____	_4802.023_____
_SB43-6070____	_4802.016_____
_SB44-4050____	_4802.017_____

Were ICP interelement corrections applied ? Yes/No YES

Were ICP background corrections applied ? Yes/No YES
If yes - were raw data generated before application of background corrections ? Yes/No NO_

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Reddy Pakanati Name: REDDY PAKANATI

Date: 9/2/98 Title: LAB MGR.

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COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E__ SAS No.: _____ SDG No.:SB27-0

SOW No.: ILM04.0

EPA Sample No.	Lab Sample ID
_SB45-0010____	_4802.018_____
_SB46-0612____	_4802.026_____
_SB46-0612D___	_4802.027_____

Were ICP interelement corrections applied ? Yes/No YES

Were ICP background corrections applied ? Yes/No YES

If yes - were raw data generated before application of background corrections ? Yes/No NO_

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Reddy Palanati Name: ~~Lab~~ REDDY PALANATI

Date: 9/2/98 Title: Lab Mgr.

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB27-0030

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.001

Level (low/med): _____ Date Received: 08/07/98

% Solids: _95.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3220			P
7440-36-0	Antimony	0.51	U	N	P
7440-38-2	Arsenic	2.3			P
7440-39-3	Barium	51.8			P
7440-41-7	Beryllium	0.21	B		P
7440-43-9	Cadmium	0.19	B		P
7440-70-2	Calcium	3460			P
7440-47-3	Chromium	6.1			P
7440-48-4	Cobalt	2.5	B		P
7440-50-8	Copper	8.1			P
7439-89-6	Iron	5310			P
7439-92-1	Lead	141			P
7439-95-4	Magnesium	1890			P
7439-96-5	Manganese	176		N	P
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	4.9			P
7440-09-7	Potassium	704			P
7782-49-2	Selenium	0.47	U		P
7440-22-4	Silver	0.59	B		P
7440-23-5	Sodium	142	B		P
7440-28-0	Thallium	0.26	U		P
7440-62-2	Vanadium	9.1			P
7440-66-6	Zinc	29.6			P
	Cyanide				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB27-0030MSD

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.001MSD

Level (low/med): _____ Date Received: 08/10/98

% Solids: _95.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3510			P
7440-36-0	Antimony	15.1		N	P
7440-38-2	Arsenic	226			P
7440-39-3	Barium	276			P
7440-41-7	Beryllium	5.5			P
7440-43-9	Cadmium	5.5			P
7440-70-2	Calcium	3310			P
7440-47-3	Chromium	27.0			P
7440-48-4	Cobalt	56.5			P
7440-50-8	Copper	34.2			P
7439-89-6	Iron	5810			P
7439-92-1	Lead	227			P
7439-95-4	Magnesium	1790			P
7439-96-5	Manganese	263		N	P
7439-97-6	Mercury	0.74			CV
7440-02-0	Nickel	57.9			P
7440-09-7	Potassium	614			P
7782-49-2	Selenium	203			P
7440-22-4	Silver	4.7			P
7440-23-5	Sodium	197	B		P
7440-28-0	Thallium	211			P
7440-62-2	Vanadium	61.7			P
7440-66-6	Zinc	80.5			P
	Cyanide				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB28-0020

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.002

Level (low/med): _____ Date Received: 08/07/98

% Solids: _95.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2240			P
7440-36-0	Antimony	0.76	B	N	P
7440-38-2	Arsenic	3.0			P
7440-39-3	Barium	42.6			P
7440-41-7	Beryllium	0.28	B		P
7440-43-9	Cadmium	0.20	B		P
7440-70-2	Calcium	951			P
7440-47-3	Chromium	15.0			P
7440-48-4	Cobalt	3.0	B		P
7440-50-8	Copper	7.3			P
7439-89-6	Iron	8630			P
7439-92-1	Lead	450			P
7439-95-4	Magnesium	443	B		P
7439-96-5	Manganese	213		N	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	3.9	B		P
7440-09-7	Potassium	243	B		P
7782-49-2	Selenium	0.47	U		P
7440-22-4	Silver	0.13	U		P
7440-23-5	Sodium	89.7	B		P
7440-28-0	Thallium	0.26	U		P
7440-62-2	Vanadium	9.2			P
7440-66-6	Zinc	29.6			P
	Cyanide				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB29-0010

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.003

Level (low/med): _____ Date Received: 08/07/98

% Solids: _97.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1460			P
7440-36-0	Antimony	0.80	B	N	P
7440-38-2	Arsenic	1.4			P
7440-39-3	Barium	21.9			P
7440-41-7	Beryllium	0.11	B		P
7440-43-9	Cadmium	0.10	B		P
7440-70-2	Calcium	1560			P
7440-47-3	Chromium	3.5			P
7440-48-4	Cobalt	1.6	B		P
7440-50-8	Copper	4.5			P
7439-89-6	Iron	2690			P
7439-92-1	Lead	162			P
7439-95-4	Magnesium	796			P
7439-96-5	Manganese	157		N	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	2.4	B		P
7440-09-7	Potassium	168	B		P
7782-49-2	Selenium	0.46	U		P
7440-22-4	Silver	0.12	U		P
7440-23-5	Sodium	70.6	B		P
7440-28-0	Thallium	0.26	U		P
7440-62-2	Vanadium	4.2	B		P
7440-66-6	Zinc	13.7			P
	Cyanide				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

_____

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB30-0030

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.004

Level (low/med): _____ Date Received: 08/07/98

% Solids: _89.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2350			P
7440-36-0	Antimony	0.55	U	N	P
7440-38-2	Arsenic	1.2			P
7440-39-3	Barium	32.7			P
7440-41-7	Beryllium	0.19	B		P
7440-43-9	Cadmium	0.12	B		P
7440-70-2	Calcium	828			P
7440-47-3	Chromium	4.6			P
7440-48-4	Cobalt	2.2	B		P
7440-50-8	Copper	4.5			P
7439-89-6	Iron	3920			P
7439-92-1	Lead	77.2			P
7439-95-4	Magnesium	401	B		P
7439-96-5	Manganese	338		N	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	2.8	B		P
7440-09-7	Potassium	472	B		P
7782-49-2	Selenium	0.51	U		P
7440-22-4	Silver	0.20	B		P
7440-23-5	Sodium	86.6	B		P
7440-28-0	Thallium	0.28	U		P
7440-62-2	Vanadium	7.2			P
7440-66-6	Zinc	22.3			P
	Cyanide				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB31-0030

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.006

Level (low/med): _____ Date Received: 08/07/98

% Solids: _84.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2190			P
7440-36-0	Antimony	0.58	U	N	P
7440-38-2	Arsenic	0.73	B		P
7440-39-3	Barium	28.7			P
7440-41-7	Beryllium	0.15	B		P
7440-43-9	Cadmium	0.07	B		P
7440-70-2	Calcium	321	B		P
7440-47-3	Chromium	3.8			P
7440-48-4	Cobalt	2.0	B		P
7440-50-8	Copper	19.0			P
7439-89-6	Iron	3180			P
7439-92-1	Lead	811			P
7439-95-4	Magnesium	271	B		P
7439-96-5	Manganese	78.7		N	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	3.2	B		P
7440-09-7	Potassium	588	B		P
7782-49-2	Selenium	0.53	U		P
7440-22-4	Silver	0.35	B		P
7440-23-5	Sodium	98.5	B		P
7440-28-0	Thallium	0.30	U		P
7440-62-2	Vanadium	6.6			P
7440-66-6	Zinc	12.2			P
	Cyanide				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB32-0010

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.009

Level (low/med): _____ Date Received: 08/07/98

% Solids: _57.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2090			P
7440-36-0	Antimony	0.86	U	N	P
7440-38-2	Arsenic	8.3			P
7440-39-3	Barium	84.6			P
7440-41-7	Beryllium	0.12	B		P
7440-43-9	Cadmium	0.15	B		P
7440-70-2	Calcium	1370			P
7440-47-3	Chromium	3.9			P
7440-48-4	Cobalt	3.8	B		P
7440-50-8	Copper	4.0	B		P
7439-89-6	Iron	25300			P
7439-92-1	Lead	194			P
7439-95-4	Magnesium	392	B		P
7439-96-5	Manganese	921		N	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	0.94	B		P
7440-09-7	Potassium	691	B		P
7782-49-2	Selenium	0.79	U		P
7440-22-4	Silver	2.3			P
7440-23-5	Sodium	202	B		P
7440-28-0	Thallium	0.44	U		P
7440-62-2	Vanadium	6.1	B		P
7440-66-6	Zinc	7.7			P
	Cyanide				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB32-0010D

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.010

Level (low/med): _____ Date Received: 08/10/98

% Solids: _57.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1870			P
7440-36-0	Antimony	0.85	U	N	P
7440-38-2	Arsenic	11.4			P
7440-39-3	Barium	104			P
7440-41-7	Beryllium	0.14	B		P
7440-43-9	Cadmium	0.25	B		P
7440-70-2	Calcium	1630			P
7440-47-3	Chromium	3.6			P
7440-48-4	Cobalt	3.0	B		P
7440-50-8	Copper	3.8	B		P
7439-89-6	Iron	31500			P
7439-92-1	Lead	245			P
7439-95-4	Magnesium	421	B		P
7439-96-5	Manganese	1100		N	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	0.52	U		P
7440-09-7	Potassium	218	B		P
7782-49-2	Selenium	0.78	U		P
7440-22-4	Silver	2.0			P
7440-23-5	Sodium	112	B		P
7440-28-0	Thallium	0.43	U		P
7440-62-2	Vanadium	5.7	B		P
7440-66-6	Zinc	8.0			P
	Cyanide				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB33-0010

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.011

Level (low/med): _____ Date Received: 08/07/98

% Solids: _77.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	11300			P
7440-36-0	Antimony	0.63	U	N	P
7440-38-2	Arsenic	4.0			P
7440-39-3	Barium	171			P
7440-41-7	Beryllium	0.73			P
7440-43-9	Cadmium	0.13	B		P
7440-70-2	Calcium	1110			P
7440-47-3	Chromium	14.1			P
7440-48-4	Cobalt	5.1	B		P
7440-50-8	Copper	5.8			P
7439-89-6	Iron	14600			P
7439-92-1	Lead	15.3			P
7439-95-4	Magnesium	1580			P
7439-96-5	Manganese	179		N	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	10.7			P
7440-09-7	Potassium	1820			P
7782-49-2	Selenium	0.58	U		P
7440-22-4	Silver	0.15	U		P
7440-23-5	Sodium	190	B		P
7440-28-0	Thallium	0.32	U		P
7440-62-2	Vanadium	23.9			P
7440-66-6	Zinc	19.4			P
	Cyanide				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
SB34-0010

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.012

Level (low/med): _____ Date Received: 08/07/98

% Solids: _77.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3410			P
7440-36-0	Antimony	0.63	U	N	P
7440-38-2	Arsenic	3.5			P
7440-39-3	Barium	53.0			P
7440-41-7	Beryllium	0.23	B		P
7440-43-9	Cadmium	0.08	B		P
7440-70-2	Calcium	717			P
7440-47-3	Chromium	6.7			P
7440-48-4	Cobalt	3.9	B		P
7440-50-8	Copper	11.7			P
7439-89-6	Iron	8990			P
7439-92-1	Lead	1080			P
7439-95-4	Magnesium	628	B		P
7439-96-5	Manganese	301		N	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.1	B		P
7440-09-7	Potassium	764			P
7782-49-2	Selenium	0.58	U		P
7440-22-4	Silver	0.88	B		P
7440-23-5	Sodium	159	B		P
7440-28-0	Thallium	0.32	U		P
7440-62-2	Vanadium	10.1			P
7440-66-6	Zinc	14.7			P
	Cyanide				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB35-0030

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.019

Level (low/med): _____ Date Received: 08/07/98

% Solids: _87.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4180			P
7440-36-0	Antimony	0.56	U	N	P
7440-38-2	Arsenic	1.0	B		P
7440-39-3	Barium	36.7			P
7440-41-7	Beryllium	0.20	B		P
7440-43-9	Cadmium	0.24	B		P
7440-70-2	Calcium	6590			P
7440-47-3	Chromium	4.5			P
7440-48-4	Cobalt	1.3	B		P
7440-50-8	Copper	8.9			P
7439-89-6	Iron	4260			P
7439-92-1	Lead	15200			P
7439-95-4	Magnesium	2120			P
7439-96-5	Manganese	87.4		N	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	3.1	B		P
7440-09-7	Potassium	495	B		P
7782-49-2	Selenium	0.51	U		P
7440-22-4	Silver	0.27	B		P
7440-23-5	Sodium	143	B		P
7440-28-0	Thallium	0.29	U		P
7440-62-2	Vanadium	6.1			P
7440-66-6	Zinc	7.6			P
	Cyanide				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB35-00

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.019X

Level (low/med): LOW__ Date Received: 08/10/98

% Solids: _12.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_				NR
7440-36-0	Antimony_				NR
7440-38-2	Arsenic__				NR
7440-39-3	Barium___				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium__				NR
7440-70-2	Calcium__				NR
7440-47-3	Chromium_				NR
7440-48-4	Cobalt___				NR
7440-50-8	Copper___				NR
7439-89-6	Iron_____				NR
7439-92-1	Lead_____				NR
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury__				NR
7440-02-0	Nickel___				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium_				NR
7440-22-4	Silver___				NR
7440-23-5	Sodium___				NR
7440-28-0	Thallium_				NR
7440-62-2	Vanadium_				NR
7440-66-6	Zinc_____				NR
_____	Cyanide__				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB39-3040

b Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

b Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

trix (soil/water): SOIL_ Lab Sample ID: 4802.015

vel (low/med): _____ Date Received: 08/07/98

Solids: _83.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4570			P
7440-36-0	Antimony	0.59	U	N	P
7440-38-2	Arsenic	3.0			P
7440-39-3	Barium	27.2			P
7440-41-7	Beryllium	0.36	B		P
7440-43-9	Cadmium	0.06	U		P
7440-70-2	Calcium	606			P
7440-47-3	Chromium	8.4			P
7440-48-4	Cobalt	3.2	B		P
7440-50-8	Copper	3.1			P
7439-89-6	Iron	8820			P
7439-92-1	Lead	3.6			P
7439-95-4	Magnesium	653			P
7439-96-5	Manganese	60.9		N	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	6.9			P
7440-09-7	Potassium	917			P
7782-49-2	Selenium	0.54	U		P
7440-22-4	Silver	0.19	B		P
7440-23-5	Sodium	63.3	B		P
7440-28-0	Thallium	0.30	U		P
7440-62-2	Vanadium	13.6			P
7440-66-6	Zinc	6.2			P
	Cyanide				NR

lor Before: _____ Clarity Before: _____ Texture: _____

lor After: _____ Clarity After: _____ Artifacts: _____

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
SB40-3040

ab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

ab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

atrix (soil/water): SOIL_ Lab Sample ID: 4802.013

evel (low/med): _____ Date Received: 08/07/98

Solids: _84.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3020			P
7440-36-0	Antimony	0.58	U	N	P
7440-38-2	Arsenic	5.7			P
7440-39-3	Barium	48.4			P
7440-41-7	Beryllium	0.29	B		P
7440-43-9	Cadmium	0.06	B		P
7440-70-2	Calcium	528	B		P
7440-47-3	Chromium	5.6			P
7440-48-4	Cobalt	3.2	B		P
7440-50-8	Copper	2.2	B		P
7439-89-6	Iron	10400			P
7439-92-1	Lead	3.2			P
7439-95-4	Magnesium	483	B		P
7439-96-5	Manganese	312		N	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	4.3	B		P
7440-09-7	Potassium	514	B		P
7782-49-2	Selenium	0.53	U		P
7440-22-4	Silver	0.47	B		P
7440-23-5	Sodium	60.9	B		P
7440-28-0	Thallium	0.29	U		P
7440-62-2	Vanadium	10.3			P
7440-66-6	Zinc	4.2			P
	Cyanide				NR

olor Before: _____ Clarity Before: _____ Texture: _____

olor After: _____ Clarity After: _____ Artifacts: _____

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
SB41-2030

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.020

Level (low/med): _____ Date Received: 08/10/98

% Solids: _82.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2760			P
7440-36-0	Antimony	0.60	U	N	P
7440-38-2	Arsenic	1.5			P
7440-39-3	Barium	33.1			P
7440-41-7	Beryllium	0.24	B		P
7440-43-9	Cadmium	0.06	U		P
7440-70-2	Calcium	536	B		P
7440-47-3	Chromium	4.6			P
7440-48-4	Cobalt	2.7	B		P
7440-50-8	Copper	3.3			P
7439-89-6	Iron	5250			P
7439-92-1	Lead	6.6			P
7439-95-4	Magnesium	476	B		P
7439-96-5	Manganese	40.0		N	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.6			P
7440-09-7	Potassium	501	B		P
7782-49-2	Selenium	0.55	U		P
7440-22-4	Silver	0.35	B		P
7440-23-5	Sodium	76.1	B		P
7440-28-0	Thallium	0.30	U		P
7440-62-2	Vanadium	8.5			P
7440-66-6	Zinc	5.8			P
	Cyanide				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB41-230D

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.021

Level (low/med): _____ Date Received: 08/07/98

% Solids: _89.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1800			P
7440-36-0	Antimony	0.55	U	N	P
7440-38-2	Arsenic	1.1	B		P
7440-39-3	Barium	15.5	B		P
7440-41-7	Beryllium	0.12	B		P
7440-43-9	Cadmium	0.06	U		P
7440-70-2	Calcium	324	B		P
7440-47-3	Chromium	3.7			P
7440-48-4	Cobalt	1.3	B		P
7440-50-8	Copper	2.1	B		P
7439-89-6	Iron	3260			P
7439-92-1	Lead	3.8			P
7439-95-4	Magnesium	271	B		P
7439-96-5	Manganese	45.1		N	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	3.2	B		P
7440-09-7	Potassium	569			P
7782-49-2	Selenium	0.50	U		P
7440-22-4	Silver	0.71	B		P
7440-23-5	Sodium	105	B		P
7440-28-0	Thallium	0.28	U		P
7440-62-2	Vanadium	5.5	B		P
7440-66-6	Zinc	4.0			P
	Cyanide				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB42-2030

ab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

ab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

latrix (soil/water): SOIL_ Lab Sample ID: 4802.023

evel (low/med): _____ Date Received: 08/07/98

Solids: _85.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2280			P
7440-36-0	Antimony	0.58	U	N	P
7440-38-2	Arsenic	4.2			P
7440-39-3	Barium	22.6	B		P
7440-41-7	Beryllium	0.25	B		P
7440-43-9	Cadmium	0.06	U		P
7440-70-2	Calcium	333	B		P
7440-47-3	Chromium	6.4			P
7440-48-4	Cobalt	2.4	B		P
7440-50-8	Copper	2.7	B		P
7439-89-6	Iron	8180			P
7439-92-1	Lead	4.4			P
7439-95-4	Magnesium	370	B		P
7439-96-5	Manganese	114		N	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	3.9	B		P
7440-09-7	Potassium	547	B		P
7782-49-2	Selenium	0.53	U		P
7440-22-4	Silver	0.91	B		P
7440-23-5	Sodium	129	B		P
7440-28-0	Thallium	0.29	U		P
7440-62-2	Vanadium	11.3			P
7440-66-6	Zinc	4.0			P
	Cyanide				NR

olor Before: _____ Clarity Before: _____ Texture: _____

olor After: _____ Clarity After: _____ Artifacts: _____

omments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB43-6070

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.016

Level (low/med): _____ Date Received: 08/07/98

% Solids: _92.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2410			P
7440-36-0	Antimony	0.53	U	N	P
7440-38-2	Arsenic	1.6			P
7440-39-3	Barium	28.0			P
7440-41-7	Beryllium	0.21	B		P
7440-43-9	Cadmium	0.07	B		P
7440-70-2	Calcium	292	B		P
7440-47-3	Chromium	5.4			P
7440-48-4	Cobalt	2.1	B		P
7440-50-8	Copper	2.0	B		P
7439-89-6	Iron	5990			P
7439-92-1	Lead	2.2			P
7439-95-4	Magnesium	369	B		P
7439-96-5	Manganese	84.4		N	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	12.5			P
7440-09-7	Potassium	387	B		P
7782-49-2	Selenium	0.49	U		P
7440-22-4	Silver	0.13	U		P
7440-23-5	Sodium	41.1	B		P
7440-28-0	Thallium	0.27	U		P
7440-62-2	Vanadium	8.5			P
7440-66-6	Zinc	4.1			P
	Cyanide				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB44-4050

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.017

Level (low/med): _____ Date Received: 08/07/98

% Solids: _90.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1420			P
7440-36-0	Antimony	0.54	U	N	P
7440-38-2	Arsenic	0.73	B		P
7440-39-3	Barium	14.3	B		P
7440-41-7	Beryllium	0.11	B		P
7440-43-9	Cadmium	0.06	U		P
7440-70-2	Calcium	199	B		P
7440-47-3	Chromium	3.0			P
7440-48-4	Cobalt	0.95	B		P
7440-50-8	Copper	4.1			P
7439-89-6	Iron	2430			P
7439-92-1	Lead	1.6			P
7439-95-4	Magnesium	215	B		P
7439-96-5	Manganese	32.4		N	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	7.8			P
7440-09-7	Potassium	311	B		P
7782-49-2	Selenium	0.50	U		P
7440-22-4	Silver	0.50	B		P
7440-23-5	Sodium	61.7	B		P
7440-28-0	Thallium	0.28	U		P
7440-62-2	Vanadium	4.0	B		P
7440-66-6	Zinc	3.4			P
	Cyanide				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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000034

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
SB45-0010

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.018

Level (low/med): _____ Date Received: 08/07/98

% Solids: _79.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2660			P
7440-36-0	Antimony	0.62	U	N	P
7440-38-2	Arsenic	2.2			P
7440-39-3	Barium	27.1			P
7440-41-7	Beryllium	0.19	B		P
7440-43-9	Cadmium	0.06	U		P
7440-70-2	Calcium	289	B		P
7440-47-3	Chromium	4.5			P
7440-48-4	Cobalt	2.0	B		P
7440-50-8	Copper	3.8			P
7439-89-6	Iron	5830			P
7439-92-1	Lead	38.9			P
7439-95-4	Magnesium	402	B		P
7439-96-5	Manganese	39.5		N	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	4.5	B		P
7440-09-7	Potassium	700			P
7782-49-2	Selenium	0.57	U		P
7440-22-4	Silver	0.82	B		P
7440-23-5	Sodium	123	B		P
7440-28-0	Thallium	0.31	U		P
7440-62-2	Vanadium	7.2			P
7440-66-6	Zinc	8.0			P
	Cyanide				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

000035

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
SB46-0612

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.026

Level (low/med): _____ Date Received: 08/07/98

% Solids: _85.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5640			P
7440-36-0	Antimony	0.58	U	N	P
7440-38-2	Arsenic	3.0			P
7440-39-3	Barium	43.7			P
7440-41-7	Beryllium	0.39	B		P
7440-43-9	Cadmium	0.06	B		P
7440-70-2	Calcium	463	B		P
7440-47-3	Chromium	7.6			P
7440-48-4	Cobalt	3.0	B		P
7440-50-8	Copper	5.7			P
7439-89-6	Iron	9260			P
7439-92-1	Lead	142			P
7439-95-4	Magnesium	688			P
7439-96-5	Manganese	95.7		N	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	9.1			P
7440-09-7	Potassium	894			P
7782-49-2	Selenium	0.53	U		P
7440-22-4	Silver	0.67	B		P
7440-23-5	Sodium	573	B		P
7440-28-0	Thallium	0.29	U		P
7440-62-2	Vanadium	16.2			P
7440-66-6	Zinc	6.7			P
	Cyanide				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB46-0612D

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4602.027

Level (low/med): _____ Date Received: 08/07/98

% Solids: 88.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2640 ~~26.4~~			P
7440-36-0	Antimony	0.56 ~~0.01~~	U	N	P
7440-38-2	Arsenic	0.84 ~~0.01~~	B		P
7440-39-3	Barium	41.7 ~~0.42~~			P
7440-41-7	Beryllium	0.14 ~~0.00~~	B		P
7440-43-9	Cadmium	0.06 ~~0.00~~	U		P
7440-70-2	Calcium	233 ~~2.3~~	B		P
7440-47-3	Chromium	4.5 ~~0.04~~			P
7440-48-4	Cobalt	0.11 ~~0.02~~	B		P
7440-50-8	Copper	2.6 ~~0.03~~	B		P
7439-89-6	Iron	2630 ~~26.3~~			P
7439-92-1	Lead	183 ~~1.8~~			P
7439-95-4	Magnesium	356 ~~3.6~~	B		P
7439-96-5	Manganese	16.3 ~~0.18~~		N	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.0 ~~0.05~~			P
7440-09-7	Potassium	653 ~~5.9~~			P
7782-49-2	Selenium	0.51 ~~0.01~~	U		P
7440-22-4	Silver	0.60 ~~0.01~~	B		P
7440-23-5	Sodium	432 ~~4.3~~	B		P
7440-28-0	Thallium	0.28 ~~0.00~~	U		P
7440-62-2	Vanadium	4.6 ~~0.05~~	B		P
7440-66-6	Zinc	3.7 ~~0.04~~			P
_____	Cyanide	_____			NR
_____	_____	_____			

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Initial Calibration Source: CLPP-ICV-123

Continuing Calibration Source: CLPP-CAL-123

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum	5000.0	5162.09	103.2	10000.0	10005.85	100.1	10372.22	103.7	P
Antimony	1250.0	1282.29	102.6	2500.0	2502.93	100.1	2614.57	104.6	P
Arsenic	250.0	252.83	101.1	500.0	499.28	99.9	523.53	104.7	P
Barium	5000.0	5267.64	105.4	10000.0	10032.02	100.3	10379.24	103.8	P
Beryllium	125.0	131.64	105.3	250.0	250.84	100.3	258.93	103.6	P
Cadmium	125.0	128.99	103.2	250.0	248.63	99.5	257.11	102.8	P
Calcium	12500.0	13020.06	104.2	25000.0	25094.13	100.4	25995.81	104.0	P
Chromium	500.0	521.64	104.3	1000.0	1003.68	100.4	1034.72	103.5	P
Cobalt	1250.0	1330.34	106.4	2500.0	2516.60	100.7	2607.18	104.3	P
Copper	625.0	672.49	107.6	1250.0	1272.42	101.8	1213.64	97.1	P
Iron	2500.0	2655.90	106.2	5000.0	5093.24	101.9	5254.52	105.1	P
Lead	250.0	255.62	102.2	500.0	508.96	101.8	533.76	106.8	P
Magnesium	12500.0	13234.60	105.9	25000.0	25268.77	101.1	26097.08	104.4	P
Manganese	1250.0	1322.63	105.8	2500.0	2504.08	100.2	2581.02	103.2	P
Mercury	2.0	1.92	96.0	2.0	1.83	91.5	1.99	99.5	CV
Nickel	1250.0	1311.80	104.9	2500.0	2475.26	99.0	2589.67	103.6	P
Potassium	12500.0	12482.85	99.9	25000.0	24688.16	98.8	23918.96	95.7	P
Selenium	250.0	242.76	97.1	500.0	501.07	100.2	516.87	103.4	P
Silver	625.0	662.30	106.0	1250.0	1267.22	101.4	1301.82	104.1	P
Sodium	12500.0	12882.78	103.1	25000.0	24976.58	99.9	25745.27	103.0	P
Thallium	250.0	253.71	101.5	500.0	493.89	98.8	524.17	104.8	P
Vanadium	1250.0	1334.23	106.7	2500.0	2533.43	101.3	2622.41	104.9	P
Zinc	1250.0	1319.71	105.6	2500.0	2519.18	100.8	2584.10	103.4	P
Cyanide									NR

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Initial Calibration Source: CLPP-ICV-123

Continuing Calibration Source: CLPP-CAL-123

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum				10000.0	10371.84	103.7	10359.08	103.6	P
Antimony				2500.0	2499.64	100.0	2577.62	103.1	P
Arsenic				500.0	498.50	99.7	521.17	104.2	P
Barium				10000.0	10360.60	103.6	10355.60	103.6	P
Beryllium				250.0	258.56	103.4	258.44	103.4	P
Cadmium				250.0	245.76	98.3	257.25	102.9	P
Calcium				25000.0	26005.56	104.0	26041.63	104.2	P
Chromium				1000.0	1033.52	103.4	1032.24	103.2	P
Cobalt				2500.0	2610.14	104.4	2608.93	104.4	P
Copper				1250.0	1216.53	97.3	1281.70	102.5	P
Iron				5000.0	5233.56	104.7	5223.04	104.5	P
Lead				500.0	515.19	103.0	549.07	109.8	P
Magnesium				25000.0	26099.08	104.4	26149.03	104.6	P
Manganese				2500.0	2573.01	102.9	2568.05	102.7	P
Mercury				2.0	1.85	92.5	1.84	92.0	CV
Nickel				2500.0	2476.76	99.1	2563.96	102.6	P
Potassium				25000.0	24502.35	98.0	23631.07	94.5	P
Selenium				500.0	490.18	98.0	515.42	103.1	P
Silver				1250.0	1300.85	104.1	1307.15	104.6	P
Sodium				25000.0	25924.65	103.7	25601.31	102.4	P
Thallium				500.0	498.27	99.7	520.00	104.0	P
Vanadium				2500.0	2619.11	104.8	2619.06	104.8	P
Zinc				2500.0	2581.16	103.2	2582.91	103.3	P
Cyanide									NR

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Initial Calibration Source: CLPP-ICV-123

Continuing Calibration Source: CLPP-CAL-123

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum				10000.0	10051.98	100.5	9893.34	98.9	P
Antimony				2500.0	2521.90	100.9	2471.91	98.9	P
Arsenic				500.0	505.70	101.1	500.56	100.1	P
Barium				10000.0	10052.64	100.5	10032.86	100.3	P
Beryllium				250.0	250.18	100.1	249.67	99.9	P
Cadmium				250.0	258.86	103.5	252.07	100.8	P
Calcium				25000.0	25113.06	100.5	25121.22	100.5	P
Chromium				1000.0	1006.83	100.7	992.93	99.3	P
Cobalt				2500.0	2526.09	101.0	2497.08	99.9	P
Copper				1250.0	1251.92	100.2	1146.38	91.7	P
Iron				5000.0	5084.40	101.7	5005.66	100.1	P
Lead				500.0	500.56	100.1	495.02	99.0	P
Magnesium				25000.0	25135.52	100.5	24757.99	99.0	P
Manganese				2500.0	2510.62	100.4	2500.79	100.0	P
Mercury									NR
Nickel				2500.0	2584.54	103.4	2539.25	101.6	P
Potassium				25000.0	23044.93	92.2	22848.21	91.4	P
Selenium				500.0	506.06	101.2	495.07	99.0	P
Silver				1250.0	1241.14	99.3	1219.22	97.5	P
Sodium				25000.0	24856.30	99.4	24267.44	97.1	P
Thallium				500.0	505.52	101.1	501.83	100.4	P
Vanadium				2500.0	2490.32	99.6	2457.41	98.3	P
Zinc				2500.0	2515.78	100.6	2469.10	98.8	P
Cyanide									NR

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

2B
CRDL STANDARD FOR AA AND ICP

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

AA CRDL Standard Source: I-0013_____

ICP CRDL Standard Source: CRI-CRA-123_

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R	True	Initial Found	%R	Final Found	%R
Aluminum								
Antimony				120.0	112.05	93.4	112.18	93.5
Arsenic				20.0	20.60	103.0	22.54	112.7
Barium								
Beryllium				10.0	10.14	101.4	9.88	98.8
Cadmium				10.0	11.01	110.1	11.17	111.7
Calcium								
Chromium				20.0	20.47	102.4	19.93	99.6
Cobalt				100.0	107.83	107.8	107.56	107.6
Copper				50.0	55.44	110.9	54.58	109.2
Iron								
Lead				6.0	4.02	67.0	6.76	112.7
Magnesium								
Manganese				30.0	32.09	107.0	31.81	106.0
Mercury	0.2	0.24	120.0					
Nickel				80.0	82.58	103.2	85.62	107.0
Potassium								
Selenium				10.0	0.86	8.6	9.86	98.6
Silver				20.0	19.73	98.6	20.84	104.2
Sodium								
Thallium				20.0	23.40	117.0	26.58	132.9
Vanadium				100.0	104.17	104.2	101.67	101.7
Zinc				40.0	41.68	104.2	41.31	103.3

Control Limits: no limits have been established by EPA at this time

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3
BLANKS

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Preparation Blank Matrix (soil/water): SOIL_

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	12.5	U	12.5	U	12.5	U	12.5	U	1.250	U	P
Antimony	5.9	B	5.4	B	4.9	U	4.9	U	0.490	U	P
Arsenic	3.8	U	3.8	U	3.8	U	3.8	U	0.390	B	P
Barium	0.8	U	0.8	U	0.8	U	0.8	U	0.080	U	P
Beryllium	0.4	U	0.4	U	0.4	U	0.4	U	0.040	U	P
Cadmium	0.5	U	0.5	U	0.5	U	0.5	U	0.050	U	P
Calcium	7.8	U	7.8	U	7.8	U	7.8	U	0.780	U	P
Chromium	1.0	U	1.0	U	1.0	U	1.0	U	0.100	U	P
Cobalt	0.9	U	0.9	U	0.9	U	0.9	U	0.090	U	P
Copper	1.7	U	5.4	B	9.6	B	10.3	B	0.288	B	P
Iron	7.4	U	7.4	U	7.4	U	7.4	U	0.740	U	P
Lead	2.4	U	2.4	U	2.6	B	7.6		0.401		P
Magnesium	69.8	U	69.8	U	69.8	U	69.8	U	6.980	U	P
Manganese	0.8	U	0.8	U	0.8	U	0.8	U	0.080	U	P
Mercury	0.2	U	0.2	U	0.2	U	0.2	U	0.000	U	CV
Nickel	3.0	U	3.0	U	3.0	U	5.5	B	0.300	U	P
Potassium	-2161.6	B	1170.0	U	1170.0	U	1170.0	U	117.000	U	P
Selenium	4.5	U	-11.5		-13.7		-10.0		-0.631		P
Silver	1.2	U	2.2	B	3.5	B	6.5	B	0.215	B	P
Sodium	-214.2	B	155.0	U	155.0	U	239.3	B	15.500	U	P
Thallium	-3.4	B	-4.8	B	2.5	U	3.5	B	0.323	B	P
Vanadium	0.9	U	0.9	B	1.5	B	1.3	B	0.106	B	P
Zinc	1.4	U	1.4	U	1.4	U	1.4	U	0.140	U	P
Cyanide											NR

U.S. EPA - CLP

3
BLANKS

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Preparation Blank Matrix (soil/water): _____

Preparation Blank Concentration Units (ug/L or mg/kg): _____

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum			12.5	U	12.5	U	12.5	U			P
Antimony			4.9	U	4.9	U	5.1	B			P
Arsenic			3.8	U	3.8	U	3.8	U			P
Barium			0.8	B	0.8	U	0.8	U			P
Beryllium			0.4	U	0.4	U	0.4	U			P
Cadmium			0.5	U	0.5	U	0.5	U			P
Calcium			7.8	U	7.8	U	7.8	U			P
Chromium			1.0	U	1.0	U	1.0	U			P
Cobalt			0.9	U	0.9	U	0.9	U			P
Copper			8.8	B	2.9	B	6.3	B			P
Iron			7.4	U	7.4	U	7.4	U			P
Lead			10.8		2.4	U	4.2				P
Magnesium			69.8	U	69.8	U	69.8	U			P
Manganese			0.8	U	0.8	U	0.8	U			P
Mercury			0.2	U	0.2	U					CV
Nickel			5.8	B	3.0	U	3.0	U			P
Potassium			1170.0	U	1170.0	U	-2049.9	B			P
Selenium			-12.6		4.5	U	4.5	U			P
Silver			5.5	B	1.2	U	1.2	U			P
Sodium			319.2	B	155.0	U	155.0	U			P
Thallium			2.5	U	2.5	U	2.5	U			P
Vanadium			2.1	B	0.9	U	0.9	U			P
Zinc			1.4	U	1.4	U	1.4	U			P
Cyanide											NR

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ICP INTERFERENCE CHECK SAMPLE

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No: _____ SDG No.: SB27-0

ICP ID Number: ICAP3000XL__ ICS Source: CLPP-ICS-A__

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Aluminum	500000	500000	509917	507972.6	101.6	503036	502674.8	100.5
Antimony		600		588.2	98.0		584.1	97.4
Arsenic		100		101.9	101.9		101.3	101.3
Barium		500		486.3	97.3		476.3	95.3
Beryllium		500		502.4	100.5		497.5	99.5
Cadmium		1000		971.8	97.2		974.0	97.4
Calcium	500000	500000	463160	463731.1	92.7	461120	459968.7	92.0
Chromium		500		482.6	96.5		474.8	95.0
Cobalt		500		451.0	90.2		445.5	89.1
Copper		500		453.4	90.7		438.4	87.7
Iron	200000	200000	183851	183969.8	92.0	181879	182198.1	91.1
Lead		50		46.5	93.0		53.6	107.2
Magnesium	500000	500000	463169	462329.9	92.5	455804	456969.0	91.4
Manganese		500		488.7	97.7		480.0	96.0
Mercury								
Nickel		1000		925.7	92.6		941.1	94.1
Potassium								
Selenium		50		47.7	95.4		50.0	100.0
Silver		200		205.4	102.7		198.7	99.4
Sodium								
Thallium		100		95.8	95.8		99.2	99.2
Vanadium		500		502.2	100.4		486.4	97.3
Zinc		1000		899.3	89.9		877.1	87.7

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5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

SB27-0030S

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL__ Level (low/med): _____

% Solids for Sample: __4.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum		47671.5854		63936.7271		4166.67	-390.4		P
Antimony	75-125	314.4188		10.2083	U	1041.67	30.2	N	P
Arsenic	75-125	4495.4438		44.7125		4166.67	106.8		P
Barium	75-125	5147.7312		1026.9896		4166.67	98.9		P
Beryllium	75-125	108.3188		4.0812	B	104.17	100.1		P
Cadmium	75-125	109.9604		3.6792	B	104.17	102.0		P
Calcium									NR
Chromium	75-125	510.6625		120.6729		416.67	93.6		P
Cobalt	75-125	1126.4646		50.4375	B	1041.67	103.3		P
Copper	75-125	637.3896		159.8958		520.83	91.7		P
Iron		94709.2604		105388.1812		2083.33	-512.6		P
Lead	75-125	3588.6729		2790.7417		1041.67	76.6		P
Magnesium									NR
Manganese	75-125	4052.3042		3483.3021		1041.67	54.6	N	P
Mercury	75-125	2.0688		0.4167	U	2.08	99.5		CV
Nickel	75-125	1134.2667		97.9500		1041.67	99.5		P
Potassium									NR
Selenium	75-125	4065.8396		9.3750	U	4166.67	97.6		P
Silver	75-125	96.9375		11.7354	B	104.17	81.8		P
Sodium									NR
Thallium	75-125	4250.4271		5.2083	U	4166.67	102.0		P
Vanadium	75-125	1195.8688		179.5646		1041.67	97.6		P
Zinc	75-125	1403.3542		587.5729		1041.67	78.3		P
Cyanide									NR

Comments:

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5B
POST DIGEST SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.
SB27-0030A

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water) : SOIL__ Level (low/med): _____

Concentration Units: ug/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Added (SA)	%R	Q	M
Aluminum		32656.84		30689.63		2000.0	98.4		P
Antimony		432.24		4.90	U	500.0	86.4		P
Arsenic		2082.82		21.46		2000.0	103.1		P
Barium		2532.14		492.96		2000.0	102.0		P
Beryllium		51.47		1.96	B	50.0	99.0		P
Cadmium		52.41		1.77	B	50.0	101.3		P
Calcium									NR
Chromium		256.89		57.92		200.0	99.5		P
Cobalt		534.52		24.21	B	500.0	102.1		P
Copper		313.29		76.75		250.0	94.6		P
Iron		51741.52		50586.33		1000.0	115.5		P
Lead		1881.56		1339.56		500.0	108.4		P
Magnesium									NR
Manganese		2181.20		1671.98		500.0	101.8		P
Mercury									NR
Nickel		551.16		47.02		500.0	100.8		P
Potassium									NR
Selenium		1959.57		4.50	U	2000.0	98.0		P
Silver		42.87		5.63	B	50.0	74.5		P
Sodium									NR
Thallium		2088.53		2.50	U	2000.0	104.4		P
Vanadium		575.74		86.19		500.0	97.9		P
Zinc		740.43		282.04		500.0	91.7		P
Cyanide									NR

Comments:

Duplicate

Sample ID: 4802.001		Sample ID: 4802.001MSD		RPD	0/0D
Sample Qty:		Sample Qty: 1			
Element	Mean Conc.	Element	Mean Conc.		
Y 371.030	101.1	Y 371.030	101.7		
Ag 338.289	0.0465	Ag 338.289	0.0449		~~46.5~~ *
Al 308.215	22.88	Al 308.215	33.43	37.5	46.5 *
As 188.979	2.158	As 188.979	2.151		0.3
Ba 233.527	2.471	Ba 233.527	2.625		6.2
Be 313.107	0.05199	Be 313.107	0.05259		1.2
Ca 315.887	23.33	Ca 315.887	31.48	29.7	34.9
Cd 226.502	0.05278	Cd 226.502	0.05278		0
Co 228.616	0.5407	Co 228.616	0.5378		0.5
Cr 267.716	0.2451	Cr 267.716	0.2573		5.0
Cu 324.754	0.3059	Cu 324.754	0.3254		7.0
Fe 273.955	45.46	Fe 273.955	55.27		21.6
K 404.721	3.061	K 404.721	5.847	62.3	91.0 *
Mg 279.079	12.22	Mg 279.079	17.00	32.7	39.3 *
Mn 257.610	1.945	Mn 257.610	2.500		28.5
Na 330.237	1.690	Na 330.237	1.877		11.1
Ni 232.003	0.5444	Ni 232.003	0.5514		1.3
Pb 220.353	1.723	Pb 220.353	2.163		25.5
Sb 206.833	0.1509	Sb 206.833	0.1435		4.9
Se 196.026	1.952	Se 196.026	1.929		1.2
Tl 190.800	2.040	Tl 190.800	2.011		1.4
V 292.402	0.5740	V 292.402	0.5871		2.3
Zn 206.200	0.6736	Zn 206.200	0.7662		13.7

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LABORATORY CONTROL SAMPLE

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Solid LCS Source: _____

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum				500.0	501.3		400.0	600.0	100.3
Antimony				125.0	131.2		125.0	150.0	105.0
Arsenic				25.0	27.1		20.0	30.0	108.4
Barium				500.0	512.1		400.0	600.0	102.4
Beryllium				12.5	12.7		10.0	15.0	101.6
Cadmium				12.5	12.6		10.0	15.0	100.8
Calcium				1250.0	1278.0		1000.0	1500.0	102.2
Chromium				50.0	51.4		40.0	60.0	102.8
Cobalt				125.0	128.5		100.0	150.0	102.8
Copper				62.5	61.3		50.0	75.0	98.1
Iron				250.0	262.2		200.0	300.0	104.9
Lead				25.0	25.2		20.0	30.0	100.8
Magnesium				1250.0	1278.9		1000.0	1500.0	102.3
Manganese				125.0	129.1		100.0	150.0	103.3
Mercury									
Nickel				125.0	129.7		100.0	150.0	103.8
Potassium				1250.0	1083.7		1000.0	1500.0	86.7
Selenium				25.0	25.2		20.0	30.0	100.8
Silver				62.5	61.5		50.0	75.0	98.4
Sodium				1250.0	1245.8		1000.0	1500.0	99.7
Thallium				25.0	26.0		20.0	30.0	104.0
Vanadium				125.0	128.1		100.0	150.0	102.5
Zinc				125.0	115.2		100.0	150.0	92.2
Cyanide									

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LABORATORY CONTROL SAMPLE

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Solid LCS Source: _____

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum				500.0	496.0		400.0	600.0	99.2
Antimony				125.0	125.8		125.0	150.0	100.6
Arsenic				25.0	26.6		20.0	30.0	106.4
Barium				500.0	506.9		400.0	600.0	101.4
Beryllium				12.5	12.5		10.0	15.0	100.0
Cadmium				12.5	12.3		10.0	15.0	98.4
Calcium				1250.0	1266.3		1000.0	1500.0	101.3
Chromium				50.0	50.2		40.0	60.0	100.4
Cobalt				125.0	127.0		100.0	150.0	101.6
Copper				62.5	60.9		50.0	75.0	97.4
Iron				250.0	256.2		200.0	300.0	102.5
Lead				25.0	24.6		20.0	30.0	98.4
Magnesium				1250.0	1265.1		1000.0	1500.0	101.2
Manganese				125.0	127.5		100.0	150.0	102.0
Mercury									
Nickel				125.0	127.3		100.0	150.0	101.8
Potassium				1250.0	1077.5		1000.0	1500.0	86.2
Selenium				25.0	24.5		20.0	30.0	98.0
Silver				62.5	61.2		50.0	75.0	97.9
Sodium				1250.0	1217.8		1000.0	1500.0	97.4
Thallium				25.0	25.2		20.0	30.0	100.8
Vanadium				125.0	126.6		100.0	150.0	101.3
Zinc				125.0	114.0		100.0	150.0	91.2
Cyanide									

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LABORATORY CONTROL SAMPLE

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Solid LCS Source: _____

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum									
Antimony									
Arsenic									
Barium									
Beryllium									
Cadmium									
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead									
Magnesium									
Manganese									
Mercury							0.8	1.2	
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									
Cyanide									

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LABORATORY CONTROL SAMPLE

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Solid LCS Source: _____

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum									
Antimony									
Arsenic									
Barium									
Beryllium									
Cadmium									
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead									
Magnesium									
Manganese									
Mercury							0.8	1.2	
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									
Cyanide									

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8
STANDARD ADDITION RESULTS

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract:_____

Lab Code: PDP___ Case No.: E&E___ SAS No.:_____ SDG No.:SB27-0

Concentration Units: ug/L

EPA Sample No.	An	0 ADD ABS	1 ADD CON	1 ADD ABS	2 ADD CON	2 ADD ABS	3 ADD CON	3 ADD ABS	Final Conc.	r	Q

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9

ICP SERIAL DILUTION

EPA SAMPLE NO.

SB27-0030L

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Level (low/med): _____

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	30689.63		30996.79		1.0		P
Antimony	4.90	U	24.50	U			P
Arsenic	21.46		50.84		136.9		P
Barium	492.96		521.02	B	5.7		P
Beryllium	1.96	B	2.04	B	4.1		P
Cadmium	1.77	B	2.50	U	100.0		P
Calcium	32909.96		34117.58		3.7		P
Chromium	57.92		60.37		4.2		P
Cobalt	24.21	B	23.70	B	2.1		P
Copper	76.75		78.07	B	1.7		P
Iron	50586.33		53120.64		5.0		P
Lead	1339.56		1444.20		7.8		P
Magnesium	18005.81		18522.19	B	2.9		P
Manganese	1671.98		1749.37		4.6		P
Mercury							NR
Nickel	47.02		51.29	B	9.1		P
Potassium	6698.75		5850.00	U	100.0		P
Selenium	4.50	U	22.50	U			P
Silver	5.63	B	10.50	B	86.5		P
Sodium	1356.28	B	1642.62	B	21.1		P
Thallium	2.50	U	12.50	U			P
Vanadium	86.19		88.58	B	2.8		P
Zinc	282.04		309.52		9.7		P

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Instrument Detection Limits (Quarterly)

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

ICP ID Number: _____ Date: 07/06/98

Flame AA ID Number : BUCK-1_____

Furnace AA ID Number : _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury	253.00		0.2	0.2	CV
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR
Cyanide			10		NR

Comments:

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Instrument Detection Limits (Quarterly)

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

ICP ID Number: ICAP3000XL__ Date: 07/07/98

Flame AA ID Number : _____

Furnace AA ID Number : _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum	308.22		200	12.5	P
Antimony	206.83		60	4.9	P
Arsenic	188.98		10	3.8	P
Barium	233.53		200	0.8	P
Beryllium	313.11		5	0.4	P
Cadmium	226.50		5	0.5	P
Calcium	315.89		5000	7.8	P
Chromium	267.72		10	1.0	P
Cobalt	228.62		50	0.9	P
Copper	324.75		25	1.7	P
Iron	273.96		100	7.4	P
Lead	220.35		3	2.4	P
Magnesium	279.08		5000	69.8	P
Manganese	257.61		15	0.8	P
Mercury			0.2		NR
Nickel	232.00		40	3.0	P
Potassium	404.72		5000	1170.0	P
Selenium	196.03		5	4.5	P
Silver	338.29		10	1.2	P
Sodium	330.30		5000	155.0	P
Thallium	190.80		10	2.5	P
Vanadium	292.40		50	0.9	P
Zinc	206.20		20	1.4	P
Cyanide			10		NR

Comments:

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11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

ICP ID Number: ICAP3000XL__ Date: 07/08/98

Analyte	Wave-length (nm)	Interelement Correction Factors for : Al	Ca	Fe	Mg	CR_
Aluminum_	308.22	0.0000000	0.0000380	-0.0002030	0.0001190	0.0001930
Antimony_	206.83	-0.0000140	0.0000000	-0.0000060	-0.0000020	0.0003780
Arsenic__	188.98	0.0000100	0.0000000	0.0000070	0.0000030	-0.0000170
Barium___	233.53	-0.0000020	0.0000010	0.0000670	-0.0000060	-0.0000080
Beryllium	313.11	-0.0000270	-0.0000060	-0.0003630	0.0000070	-0.0071530
Cadmium__	226.50	0.0000220	0.0000000	0.0000600	0.0000050	0.0000020
Calcium__	315.89	0.0000050	0.0000000	-0.0001350	-0.0000440	-0.0003960
Chromium_	267.72	0.0000020	-0.0000010	-0.0001020	0.0000390	0.0000000
Cobalt___	228.62	0.0000230	0.0000010	0.0002260	0.0000200	0.0000180
Copper___	324.75	0.0000380	0.0000270	-0.0073450	0.0000220	-0.0000800
Iron_____	273.96	0.0000040	0.0000000	0.0000000	0.0000760	-0.0136920
Lead_____	220.35	0.0000250	-0.0000040	0.0000290	0.0000000	0.0000120
Magnesium	279.08	0.0000040	0.0000100	0.0003010	0.0000000	0.0000970
Manganese	257.61	-0.0001350	0.0000170	-0.0061700	0.0006890	-0.0017750
Mercury__						
Nickel___	232.00	0.0000060	-0.0000010	0.0006400	0.0000230	0.0069110
Potassium	404.72	-0.0000040	0.0000010	-0.0007790	-0.0000060	-0.0000680
Selenium_	196.03	0.0000140	0.0000000	-0.0001540	0.0000010	0.0000000
Silver___	338.29	0.0000040	0.0000280	0.0000640	-0.0000010	0.0044080
Sodium___	330.30	-0.0000030	-0.0000050	-0.0001630	-0.0000080	0.0001370
Thallium_	190.80	0.0000000	0.0000000	0.0000050	-0.0000030	0.0000110
Vanadium_	292.40	0.0000030	0.0000010	0.0019070	0.0000130	0.0008510
Zinc_____	206.20	-0.0000490	-0.0000010	0.0000270	0.0000290	-0.0062870

Comments:

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11B

ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

ICP ID Number: ICAP3000XL__ Date: 07/08/98

Analyte	Wave-length (nm)	Interelement Correction Factors for : MN_	NI_	V__	___	___
Aluminum	308.22	0.0000900	0.0006110	0.0054770		
Antimony	206.83	0.0000000	0.0000120	0.0000000		
Arsenic	188.98	0.0000000	-0.0000090	0.0000040		
Barium	233.53	-0.0000030	-0.0000990	0.0002150		
Beryllium	313.11	-0.0000050	-0.0006840	0.0003270		
Cadmium	226.50	0.0000020	0.0005330	-0.0000030		
Calcium	315.89	-0.0000230	-0.0010470	-0.0013810		
Chromium	267.72	0.0000420	-0.0000370	-0.0001330		
Cobalt	228.62	0.0000040	0.0009350	0.0000080		
Copper	324.75	0.0000170	-0.0000550	-0.0001040		
Iron	273.96	0.0000150	0.0000800	0.0099180		
Lead	220.35	-0.0000010	-0.0003080	-0.0000030		
Magnesium	279.08	0.0000220	-0.0000540	0.0000530		
Manganese	257.61	0.0000000	0.0001020	0.0000020		
Mercury						
Nickel	232.00	0.0000080	0.0000000	0.0000230		
Potassium	404.72	-0.0000070	0.0001210	-0.0004310		
Selenium	196.03	0.0000020	-0.0000060	0.0000010		
Silver	338.29	0.0000210	0.0004620	0.0000130		
Sodium	330.30	0.0000250	-0.0003090	-0.0000610		
Thallium	190.80	0.0000020	0.0000060	-0.0005640		
Vanadium	292.40	0.0000210	0.0000170	0.0000000		
Zinc	206.20	-0.0000010	-0.0000850	-0.0000070		

Comments:

U.S. EPA - CLP

12
ICP LINEAR RANGES (QUARTERLY)

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

ICP ID Number: ICAP3000XL__ Date: 01/31/98

Analyte	Integ. Time (sec.)	Concentration (ug/L)	M
Aluminum	50.00	500000.0	P
Antimony	50.00	20000.0	P
Arsenic	50.00	10000.0	P
Barium	50.00	20000.0	P
Beryllium	50.00	10000.0	P
Cadmium	50.00	20000.0	P
Calcium	50.00	500000.0	P
Chromium	50.00	50000.0	P
Cobalt	50.00	10000.0	P
Copper	50.00	60000.0	P
Iron	50.00	200000.0	P
Lead	50.00	25000.0	P
Magnesium	50.00	500000.0	P
Manganese	50.00	20000.0	P
Mercury			NR
Nickel	50.00	20000.0	P
Potassium	50.00	100000.0	P
Selenium	50.00	10000.0	P
Silver	50.00	30000.0	P
Sodium	50.00	250000.0	P
Thallium	50.00	4000.0	P
Vanadium	50.00	50000.0	P
Zinc	50.00	50000.0	P

Comments:

U.S. EPA - CLP

13
PREPARATION LOG

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.:_E&E___ SAS No.: _____ SDG No.:SB27-0

Method: P_

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
LCSS1	08/17/98	1.00	100
LCSS1D	08/17/98	1.00	100
PBS1	08/17/98	1.00	100
SB27-00	08/17/98	1.00	100
SB27-00	08/17/98	1.00	100
SB27-00	08/17/98	1.00	100
SB28-00	08/17/98	1.00	100

U.S. EPA - CLP

13
PREPARATION LOG

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.:_E&E___ SAS No.: _____ SDG No.:SB27-0

Method: P_

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
SB29-00	08/17/98	1.00	100
SB30-00	08/17/98	1.00	100
SB31-00	08/17/98	1.00	100
SB32-00	08/17/98	1.00	100
SB32-00	08/17/98	1.00	100
SB33-00	08/17/98	1.00	100
SB34-00	08/17/98	1.00	100
SB35-00	08/17/98	1.00	100
SB35-00	08/17/98	1.00	100
SB39-30	08/17/98	1.00	100
SB40-30	08/17/98	1.00	100
SB41-20	08/17/98	1.00	100
SB41-20	08/17/98	1.00	100
SB42-20	08/17/98	1.00	100
SB43-60	08/17/98	1.00	100
SB44-40	08/17/98	1.00	100
SB45-00	08/17/98	1.00	100
SB46-06	08/17/98	1.00	100
SB46-06	08/17/98	1.00	100

U.S. EPA - CLP

14
ANALYSIS RUN LOG

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.:SB27-0

Instrument ID Number: BUCK-1_____ Method: CV

Start Date: 08/19/98 End Date: 08/19/98

EPA Sample No.	D/F	Time	% R	Analytes																												
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1430																X									
S0.2	1.00	1431																X									
S0.5	1.00	1432																X									
S1	1.00	1433																X									
S2	1.00	1434																X									
S4	1.00	1435																X									
ICV	1.00	1435																X									
ICB	1.00	1436																X									
CRA	1.00	1437																X									
CCV	1.00	1438																X									
CCB	1.00	1439																X									
ZZZZZZ	1.00	1440																									
ZZZZZZ	1.00	1441																									
ZZZZZZ	1.00	1442																									
ZZZZZZ	1.00	1443																									
ZZZZZZ	1.00	1444																									
ZZZZZZ	1.00	1445																									
ZZZZZZ	1.00	1446																									
ZZZZZZ	1.00	1447																									
ZZZZZZ	1.00	1448																									
ZZZZZZ	1.00	1449																									
CCV	1.00	1450																X									
CCB	1.00	1451																X									
ZZZZZZ	1.00	1452																									
ZZZZZZ	1.00	1453																									
ZZZZZZ	1.00	1454																									
ZZZZZZ	1.00	1455																									
ZZZZZZ	1.00	1456																									
PBS2	1.00	1457																X									
LCSS2	1.00	1458																X									
LCSS2D	1.00	1459																X									
B27-0030	1.00	1500																X									

U.S. EPA - CLP

14
ANALYSIS RUN LOG

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.:SB27-0

Instrument ID Number: BUCK-1_____ Method: CV

Start Date: 08/19/98 End Date: 08/19/98

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
27-0030S	1.00	1501																												
CV	1.00	1502																X												
CCB	1.00	1503																X												
27-0030S	1.00	1504																X												
B28-0020	1.00	1505																X												
B29-0010	1.00	1506																X												
B30-0030	1.00	1507																X												
B31-0030	1.00	1508																X												
B32-0010	1.00	1509																X												
32-0010D	1.00	1510																X												
B33-0010	1.00	1511																X												
B34-0010	1.00	1512																X												
B40-3040	1.00	1513																X												
CCV	1.00	1514																												
CCB	1.00	1515																X												
B39-3040	1.00	1516																X												
B43-6070	1.00	1517																X												
44-4050	1.00	1518																X												
35-0010	1.00	1519																X												
B35-0030	1.00	1520																X												
B41-2030	1.00	1521																X												
41-2030D	1.00	1522																X												
B42-2030	1.00	1523																X												
B46-0612	1.00	1524																X												
46-0612D	1.00	1525																X												
ZZZZZZ	1.00	1526																												
CCV	1.00	1527																X												
CCB	1.00	1528																X												

002003

U.S. EPA - CLP

14
ANALYSIS RUN LOG

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.:SB27-0

Instrument ID Number: ICAP3000XL___ Method: P_

Start Date: 08/21/98 End Date: 08/21/98

EPA Sample No.	D/F	Time	% R	Analytes																						
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
ZZZZZZ__	1.00	1057		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ALIB___	1.00	1057		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
CALIB___	1.00	1058		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
ICV_____	1.00	1058		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
ICB_____	1.00	1058		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
CRI_____	1.00	1058			X	X		X	X		X	X	X		X		X	_	X		X	X		X	X	_
ICSA____	1.00	1059		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
ICSAB___	1.00	1059		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
CCV_____	1.00	1059		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
CCB_____	1.00	1059		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
B29-0010	1.00	1122		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
B30-0030	1.00	1128		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
B31-0030	1.00	1133		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
B32-0010	1.00	1139		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
32-0010D	1.00	1145		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
B33-0010	1.00	1151		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
B34-0010	1.00	1156		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
0-3040	1.00	1202		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
39-3040	1.00	1208		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
B43-6070	1.00	1213		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
CCV_____	1.00	1219		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
CCB_____	1.00	1225		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
B44-4050	1.00	1230		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
B45-0010	1.00	1236		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
B35-0030	1.00	1242		X	X	X	X	X	X	X	X	X	X	X	_	X	X	_	X	X	X	X	X	X	X	_
B41-2030	1.00	1248		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
41-2030D	1.00	1253		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
B42-2030	1.00	1259		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
B46-0612	1.00	1305		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
46-0612D	1.00	1310		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
CCV_____	1.00	1316		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
CCB_____	1.00	1321		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
_____				_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_

U.S. EPA - CLP

14
ANALYSIS RUN LOG

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.:SB27-0

Instrument ID Number: ICAP3000XL___ Method: P_

Start Date: 08/21/98 End Date: 08/21/98

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
ZZZZZZ	1.00	1327																												
5-0030	10.00	1438													X															
CCV	1.00	1444		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	X	_		
CCB	1.00	1449		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	X	_		

FORM XIV - IN ILM04.0

000063

002005

U.S. EPA - CLP

14
ANALYSIS RUN LOG

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.:SB27-0

Instrument ID Number: ICAP3000XL___ Method: P_

Start Date: 08/20/98 End Date: 08/20/98

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CALIB___	1.00	1554		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
CALIB___	1.00	1554		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
ZZZZZZ__	1.00	1554																									
ZZZZZZ__	1.00	1554		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
CRI_____	1.00	1555		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
ICSA____	1.00	1555		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
ICSAB___	1.00	1555		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
CCV_____	1.00	1555		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
CCB_____	1.00	1556		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
PBS1____	1.00	1621		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
ZZZZZZ__	1.00	1626																									
LCSS1___	1.00	1632		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
LCSS1D__	1.00	1637		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
B27-0030	1.00	1643		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
27-0030S	1.00	1649		X	X	X	X	X	X	_	X	X	X	X	X	_	X	_	X	_	X	X	_	X	X	X	_
27-0030M	1.00	1655		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	X	_
27-0030A	1.00	1700		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	X	_
-0030L	5.00	1706		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	X	_
B28-0020	1.00	1712		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	X	_
CCV_____	1.00	1718																									
CCB_____	1.00	1723		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
				_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
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002006

RCS NO. 549-MPL-0598

PDP ANALYTICAL SERVICES
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

METALS PREPARATION LOG

PREPARATION TYPE: ICP ANALYST: FC PREPARATION DATE/TIME: 8/17/98 / 9:00

SAMPLE MATRIX: SOIL LCS ID: (498-097-98, C07, C08-97)2 MATRIX SPIKE ID: (498-009, -010, -011-97)2

PDP SAMPLE ID	SAMPLE ALIQUOT (GRAMS/MLS)	FINAL VOLUME (MLS)	COLOR BEFORE	CLARITY BEFORE	COLOR AFTER	CLARITY AFTER	TEXTURE
ICP B 911	1.0	100ml					
ICP B 911	↓	↓					
ICPL 911 D	↓	↓					
4802.001		↓			colorless	clear	
.001 MS		↓			↓	↓	
.001 MSD		↓			↓	↓	
.002		↓			↓	↓	
.003		↓			↓	↓	
.004		↓			↓	↓	
.006		↓			↓	↓	
.009		↓			↓	↓	
.010		↓			↓	↓	
.011		↓			↓	↓	
.012		↓			↓	↓	
.013		↓			↓	↓	
.015		↓			↓	↓	
.016		↓			↓	↓	
.017		↓			↓	↓	
.018		↓			↓	↓	
.019		↓			↓	↓	

Z:\NETDATA\QA\S\FORMS\LAB98\MPL0598

COLOR: red, blue, yellow, green, orange, violet, white, colorless, brown, gray, black
CLARITY: clear, cloudy, opaque
TEXTURE: fine (powdery), medium (sand), coarse (large crystals or rocks)

000066

COMMENTS: _____

RECEIVED BY: Janaki DATE: 8/20/98 TIME: 11:15 PAGE NO.: 000105

002008

RCS NO. 549-MPL-0598

PDP ANALYTICAL SERVICES

1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

METALS PREPARATION LOG

PREPARATION TYPE: ICP ANALYST: FC PREPARATION DATE/TIME: 08/17/98 / 9:00

SAMPLE MATRIX: SOIL LCS ID: (498-097-98, -007, -008-97) 2 MATRIX SPIKE ID: (498-009, -005-011-97) 2

PDP SAMPLE ID	SAMPLE ALIQUOT (GRAMS/MLS)	FINAL VOLUME (MLS)	COLOR BEFORE	CLARITY BEFORE	COLOR AFTER	CLARITY AFTER	TEXTURE
4802-020	1	100ml			colorless	clear	
.021							
.023							
.026							
.027							

JI 8/19/98

Z:\NETDATA\QA\S\FORMS\LAB98\MPL0598

COLOR: red, blue, yellow, green, orange, violet, white, colorless, brown, gray, black
CLARITY: clear, cloudy, opaque
TEXTURE: fine (powdery), medium (sand), coarse (large crystals or rocks)

COMMENTS: 000067

RECEIVED BY: Janaki DATE: 8/20/98 TIME: 11:15 PAGE NO.: 000106

002009

BRENDAN LOWREY
Print Originator's Name
Ecology and Environment, Inc.

RECORD OF COMMUNICATION

Conversation with: PDP Analytical Services	Date 09 / 25 / 98 (Mo) (Day) (Year)
Name: Randy	Time: 3:00 AM/PM
Address:	[X] Originator Placed Call
Phone:	[] Originator Received Call
Subject:	

Discussion:

- same as ROC for 9/21/98
- said Monday he would get the info and fax it or call with information.

Follow-Up-Action:

Originator's Signature _____

06:FORMS-ROC/WOMERGE-05/02/97-D1

BRENDAN LOWREY
Print Originator's Name
Ecology and Environment, Inc.

RECORD OF COMMUNICATION

Conversation with: PDP Analytical Services	Date 09 / 21 / 98 (Mo) (Day) (Year)
Name: Sasha	Time: 2:00 AM (PM)
Address: 1680 Lakefront Circle, Suite B, The Woodlands, Tx. 77380	[x] Originator Placed Call
Phone: (281) 292-7090	[ ] Originator Received Call
Subject: Analytical Lab Report	

Discussion:

- START missing a Form IV (ICP Interference Check) from a sample data package (SDG: 4798)
- From the sample run log, an ICP Interference Check was done, but not reported.
- They will check their files for the Form III and fax to START
- Additionally, on the group of samples in question, no duplicates were run. Again, they will check their files and call back START to explain why.

Follow-Up-Action:

Wait for fax and call back.

Originator's Signature

06:FORMS-ROC/WOMERGE-05/02/97-D1

METALS
CASE: ECOLOGY & ENVIRONMENT
SDG: 4798

SAMPLE DATA PACKAGE

PAGE 1 TO 56

PDP ANALYTICAL SERVICES
1680 LAKE FRONT CIRCLE, SUITE B, THE WOODLANDS TX 77380

OFFICIAL
CHAIN OF CUSTODY RECORD

PROJ. NO.: KJ6103 052601SFXX
PROJECT NAME: WILCOX REFINERY
SAMPLERS: (Signature) JBeer B. Martinez

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Metals (6010B)	PAHs (8310)	TPH (TNRCC 1005)	pH	BTEX (8021B Mod.)	REMARKS: EPA Sample Tag # 4798.000
SB20-0030	8/4	0910		✓	SB20-(0'-3')	3	✓	✓	✓	✓	✓	6-097026 / 6-097027 / 6-097028 CJS
SB21-0030		1010		✓	~~SB20~~ CJS - SB21-0030	3	✓	✓	✓	✓	✓	6-097029 / 6-097030 4798.002
SB22-0030		1040		✓	SB22 (0'-3')	3	✓	✓	✓	✓	✓	6-097031 / 6-097032 .003
SB23-0030		1145		✓	SB23 (0'-3')	3	✓	✓	✓	✓	✓	6-097033 / 6-097034 .004
SB24-0030 CJS		1430		✓	SB24 (0'-3')	3	✓	✓	✓	✓	✓	6-097035 / 6-097036 .005
SB25-0030		1505		✓	SB25 (0'-3')	3	✓	✓	✓	✓	✓	6-097037 / 6097038 .006
SB26-0020	↓	1600		✓	SB26 (0'-2')	3	✓	✓	✓	✓	✓	6-097049 / 6097050 .007
SB36-6070		0940		✓	SB36 (6-7')	3	✓	✓	✓	✓	✓	6-097435 / 6-097436 .008
SB37-6070		1501		✓	SB37 (6-7')	3	✓	✓	✓	✓	✓	6-097432 / 6-097434 JB .009
SB38-0010		1540		✓	SB38 (0-1')	3	✓	✓	✓	✓	✓	6-097433 / 6-097449 .010
SW03		1425		✓	SW03 (Background)	4			✓		✓	6-097437 / 6-097438 .011
TB0804	↓	1655		✓	Trip Blank	2					✓	6-097439 / 6-097 JB .012

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
B. Martinez	8/4/98 1800				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
		Francisco	Francisco	8/5/98 10:30	
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
				Fed Ex Airbill # 870555000436	
Shipped by:		Airbill Number:			

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files;
Green to Report; Yellow Returns with Warrant

EPA 7500-53
(11/96)
002013

6- 09262

0000002

OFFICIAL

CHAIN OF CUSTODY RECORD

PROJ. NO. K)6103 0526015FXX

PROJECT NAME: WILCOX REFINERY

SAMPLERS: (Signature) Lorena Williams

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	METALS (6010B)	PAH (8310)	TPH (TNRCC 1005)	PH	BTEX (8021B M)	REMARKS / EPA TAG #
SB27-0030	8/5/98	0830		X	SB27-(0'-3')	3	✓	✓	✓	✓	✓	6-097351 / 6-097352 4802.001
SB28 0020		0945		X	SB28 (0'-2')	3	✓	✓	✓	✓	✓	6-097354 / 6-097353 .002
SB29 0010		1020		X	SB29 (0'-1')	3	✓	✓	✓	✓	✓	6-097355 / 6-097356 .003
SW01		1045			SW01 CSS 8/5/98							
SB30 0030		1100		X	SB30 (0'-3')	3	✓	✓	✓	✓	✓	6-097358 / 6-097359 4802.004
SW01		1045		X	SW01	4			✓		✓	6097360 / 6097357 .005
SB31 0030		1145		X	SB31 (0'-3')	3	✓	✓	✓	✓	✓	6097361 / 6097362 .006
SW02		1415		X	SW02	4			✓		✓	6097363 / 6097364 .007
SW02D		1425		X	SW02D	4			✓		✓	6097365 / 6097366 .008D
SB32 0010		1440		X	SB32 (0'-1')	3	✓	✓	✓	✓	✓	6097367 / 6-097368 .009
SB32 0010D		1440		X	SB32 (0'-1') d	3	✓	✓	✓	✓	✓	6-097369 / 6-097370 .010 .011
SB33 0010		1515		X	SB33 (0'-1')	3	✓	✓	✓	✓	✓	6097371 / 6-097372 .011 .010
SB34 0010		1540		X	SB34 (0'-1')	3	✓	✓	✓	✓	✓	6-097373 / 6-097374 .012 .013

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	8/5/98 1800				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
			8/6/98 9:45	FedEx AirBill # 805550003387 KM 8/6/98 805550003398	
Shipped by:		Airbill Number:			

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Return[illegible] Warrant

EPA 7500-53 (11/96)

6- 09263

002014

CHAIN OF CUSTODY RECORD

PROJ. NO. PJ6103 052601SFXX | PROJECT NAME: WILCOX REFINERY

SAMPLERS: (Signature)

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Metals (6010B)	PAH (8310)	TPH (TNRCC 1005)	pH	BTEX (8020B M)	REMARKS
SB40 3040	8/5/98	0911		X	SB40 (3'-4')	2	✓	✓	✓	✓	✓	EPA TAG # 13 6-097441 / 6-097440 4802.~~044~~
SB40 6W06		0855		X	SB40-6W06	4			✓		✓	6-097442 / 6-097443 .01~~4042~~
SB39 3040		1135		X	SB39 (3'-4')	3	✓	✓	✓	✓	✓	6097444 / 6097445 .015~~043~~
SB43 6070		1449		X	SB43 (6'-7')	3	✓	✓	✓	✓	✓	6097446 / 6097447 .016~~044~~
SB44 4080		1625		X	SB44 (4'-5')	3	✓	✓	✓	✓	✓	6097448 / 6097039 .017~~045~~
SB45 0010	↓	1650		X	SB45 (0'-1')	3	✓	✓	✓	✓	✓	6097040 / 6097041 .016~~046~~
~~TB-0805~~	8/5/98			X	~~TB 0805~~	1					✓	~~K. Mandt 8/6~~

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	8/5/98 1800				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature) [signature]	Date / Time 8/7/98 1945	Remarks	
Shipped by:		Airbill Number:			

FedEx Airbill #
~~8055500[illegible]3387~~ Dr 8/6/98
8055500[illegible]3398

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files;
Green to Report; Yellow Returns with Warrant

EPA 7500-53
(11/96)

6- 09264

002015

CHAIN OF CUSTODY RECORD

PROJ. NO. KJ6103 052604151FXX

PROJECT NAME: WILCOX REFINERY

SAMPLERS: (Signature) Christopher Sinsabaugh / Bn Martin

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	METALS (6010 B)	PAH (8310)	TPH (TNRCC 1005)	pH	BTEX (8021B-M)	REMARKS: EPA TAG #
SB35-0030	8/6/98	0815		X	SB35 (0'-3')	3	✓	✓	✓	✓	✓	6-099460 / 6-099461 4802 ~~.019~~
SB41-2030	8/6/98	0840		X	SB41 (2'-3')	3	✓	✓	✓	✓	✓	6-097042 / 6-097044 ~~.020~~
SB41-2030-D	8/6/98	0842		X	SB41-D (2'-3')	3	✓	✓	✓	✓	✓	6-097043 / 6-097045 .021 ~~.021~~
SB42-GW07	8/6/98	0939		X	SB42-GW07	4			✓		✓	6-097046 / 6-097047 .022 ~~.022~~
SB42-2030	8/6/98	0945		X	SB42 (2'-3')	3	✓	✓	✓	✓	✓	6-097048 / 6-097375 .023 ~~.023~~
SW04	8/6/98	1024		X	SW04	4			✓		✓	6-097376 / 6-097377 .024 ~~.024~~
SB37-GW08	8/6/98	1145		X	SB37-GW08	1					✓	6-097378 .025 ~~.025~~
SB46-6012	8/6/98	1430		X	SB46 (6'-12')	3	✓	✓	✓	✓	✓	6-097380 / 6-097381 .026 ~~.026~~
SB46-6012-D	8/6/98	1435		X	SB46-D (6'-12')	3	✓	✓	✓	✓	✓	6-097382 / 6-097383 .027 ~~.027~~
TB-0806	8/6/98	1600		X	TB-0806	1					✓	6-097379 .028 ~~.028~~

000005

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Bn Martin	8/6/98 1800				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
			8/7/98 1945	FedEx AirBill # 805550003398	
Shipped by:		Airbill Number:			

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Returns with Warrant

EPA 7500-53 (11/96)

6- 09279

002016

PDP Analytical Services

1680 Lake Front Circle, Suite B, The Woodlands TX 77380

Sample Log-In Report

Logged By: AFG **Report Date:** 8/6/98 17:40:08

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/06/98
ClientProject #: **Date Received:** 08/05/98
P.O. No.: **Time Received:** 10:30
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
4798.001	SB20-0030	3	SOIL	08/04/98	09:10	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.002	SB21-0030	3	SOIL	08/04/98	10:10	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.003	SB22-0030	3	SOIL	08/04/98	10:40	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.004	SB23-0030	3	SOIL	08/04/98	11:45	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.005	SB24-0020	3	SOIL	08/04/98	14:30	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.006	SB25-0030	3	SOIL	08/04/98	15:05	6-09262		
	Tests Required							

8/6/98

Lab Approval **Client Approval**

000006

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/6/98 17:40:11

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/06/98
ClientProject #: **Date Received:** 08/05/98
P.O. No.: **Time Received:** 10:30
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.007	SB26-0020	3	SOIL	08/04/98	16:00	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.008	SB36-6070	3	SOIL	08/04/98	09:40	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.009	SB37-6070	3	SOIL	08/04/98	15:01	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.010	SB38-0010	3	SOIL	08/04/98	15:40	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- MET_TOTAL_TAL_EE						08/19/98	
	- PAH8310						08/19/98	
	- PH_9045C						08/19/98	
	- TPH1005						08/19/98	
4798.011	SW03	4	WATER	08/04/98	14:25	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- TPH1005						08/19/98	

SV 8/6/98

Lab Approval

Client Approval

000007

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/6/98 17:40:12

Client Name: ECOLOGY & ENVIRONMENT, INC.
Client Project Name: E&E- WILCOX REFINERY
ClientProject #:
P.O. No.:
Courier/No.:

Lab Project ID: Q1056-E&E
Date Logged: 08/06/98
Date Received: 08/05/98
Time Received: 10:30

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
4798.012	TB0804	2	WATER	08/04/98	16:55	6-09262		
	Tests Required							
	- BTEX8021B						08/19/98	
	- TPH1005						08/19/98	

Instructions To Lab:

CLP LIKE DATA PACKAGE
FAX DUE: 14 DAYS
HARD COPY: 21 DAYS
USE E&E SOW

8/9/98

Lab Approval

Client Approval

000005

PDP Analytical Services

1680 Lake Front Circle, Suite B, The Woodlands TX 77380

Sample Log-In Report

Logged By: AFG **Report Date:** 8/24/98 9:16:48

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
4802.001	SB27-0030	3	SOIL	08/05/98	08:30	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.002	SB28-0020	3	SOIL	08/05/98	09:45	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.003	SB29-0010	3	SOIL	08/05/98	10:20	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.004	SB30-0030	3	SOIL	08/05/98	11:00	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.005	SW01	4	WATER	08/05/98	10:45	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.006	SB31-0030	3	SOIL	08/05/98	11:45	6- 09263		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	

Sa 8/24/98

Lab Approval **Client Approval**

000009

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/24/98 9:16:50

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.007	SW02	4	WATER	08/05/98	14:15	6- 09263		
	Tests Required							
	- BTEX80213						08/21/98	
	- TPH1005						08/21/98	
4802.008	SW02D	4	WATER	08/05/98	14:25	6- 09263		
	Tests Required							
	- BTEX80213						08/21/98	
	- TPH1005						08/21/98	
4802.009	SB32-0010	3	SOIL	08/05/98	14:40	6- 09263		
	Tests Required							
	- BTEX80213						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.010	SB32-0010D	3	SOIL	08/05/98	14:40	6- 09263		
	Tests Required							
	- BTEX80213						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.011	SB33-0010	3	SOIL	08/05/98	15:15	6- 09263		
	Tests Required							
	- BTEX80213						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.012	SB34-0010	3	SOIL	08/05/98	15:40	6- 09263		
	Tests Required							
	- BTEX80213						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	

SW 8/24/98

Lab Approval

Client Approval

000010

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/24/98 9:16:52

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- TPH1005						08/21/98	
4802.013	SB40-3040	3	SOIL	08/05/98	09:11	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.014	SB40-GW06	4	WATER	08/05/98	08:55	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.015	SB39-3040	3	SOIL	08/05/98	11:35	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.016	SB43-6070	3	SOIL	08/05/98	14:49	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.017	SB44-4050	3	SOIL	08/05/98	16:25	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.018	SB45-0010	3	SOIL	08/05/98	16:50	6- 09264		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	

SK 8/24/98

Lab Approval

Client Approval

000011

002022

PDP Analytical Services

1680 Lake Front Circle, Suite B, The Woodlands TX 77380

Sample Log-In Report

Logged By: AFG **Report Date:** 8/24/98 9:16:52

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH100S						08/21/98	
4802.019	SB35-0030	3	SOIL	08/06/98	08:15	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH100S						08/21/98	
4802.020	SB41-2030	3	SOIL	08/06/98	08:40	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH100S						08/21/98	
4802.021	SB41-2030D	3	SOIL	08/06/98	08:42	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH100S						08/21/98	
4802.022	SB42-GW07	4	WATER	08/06/98	09:39	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- TPH100S						08/21/98	
4802.023	SB42-2030	3	SOIL	08/06/98	09:45	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH100S						08/21/98	
4802.024	SW04	4	WATER	08/06/98	10:24	6- 09279		
	Tests Required							

Sup 8/24/98

Lab Approval **Client Approval**

000012

002023

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands TX 77380
Sample Log-In Report

Logged By: AFG **Report Date:** 8/24/98 9:16:53

Client Name: ECOLOGY & ENVIRONMENT, INC. **Lab Project ID:** Q1056-E&E
Client Project Name: E&E- WILCOX REFINERY **Date Logged:** 08/10/98
ClientProject #: **Date Received:** 08/07/98
P.O. No.: **Time Received:** 9:45
Courier/No.:

Lab Sample ID	Client Sample ID	No. Cont.	Sample Matrix	Date Sampled	Time Sampled	Chain Of Custody No.	Date Due	Remarks
	- BTEX8021B						08/21/98	
	- TPH1005						08/21/98	
4802.025	SB37-GW08	1	WATER	08/06/98	11:45	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
4802.026	SB46-0612	3	SOIL	08/06/98	14:30	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.027	SB46-0612D	3	SOIL	08/06/98	14:35	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	
	- MET_TOTAL_TAL_EE						08/21/98	
	- PAH8310						08/21/98	
	- PH_9045C						08/21/98	
	- TPH1005						08/21/98	
4802.028	TB-0806	1	WATER	08/06/98	16:00	6- 09279		
	Tests Required							
	- BTEX8021B						08/21/98	

Instructions To Lab:

CLP LIKE DATA PACKAGE
FAX DUE: 14 DAYS
HARD COPY: 21 DAYS
USE E&E SOW

*MS/MSD REQUIRED ON E&E SAMPLES.

8/24/98

Lab Approval

Client Approval

000013

002024

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COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E__ SAS No.: _____ SDG No.:SB20-0

SOW No.: ILM04.0

EPA Sample No.	Lab Sample ID
SB20-0030	4798.001
SB20-0030MS	4798.001MS
SB21-0030	4798.002
SB22-0030	4798.003
SB23-0030	4798.004
SB24-0020	4798.005
SB25-0030	4798.006
SB26-0020	4798.007
SB36-6070	4798.008
SB37-6070	4798.009
SB38-0010	4798.010

Were ICP interelement corrections applied ? Yes/No YES

Were ICP background corrections applied ? Yes/No YES
If yes - were raw data generated before application of background corrections ? Yes/No NO_

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Reddy Pakanati Name: REDDY PAKANATI

Date: 9/9/98 Title: LAB MGR.

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1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB20-0030

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4798.001

Level (low/med): _____ Date Received: 08/05/98

% Solids: _92.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1770			P
7440-36-0	Antimony	1.3	B	N	P
7440-38-2	Arsenic	2.7		N	P
7440-39-3	Barium	37.7			P
7440-41-7	Beryllium	0.12	B	N	P
7440-43-9	Cadmium	0.14	B	N	P
7440-70-2	Calcium	594			P
7440-47-3	Chromium	6.1		E	P
7440-48-4	Cobalt	1.0	B	N	P
7440-50-8	Copper	15.7			P
7439-89-6	Iron	4800			P
7439-92-1	Lead	1960			P
7439-95-4	Magnesium	327	B		P
7439-96-5	Manganese	27.1			P
7439-97-6	Mercury	0.39			CV
7440-02-0	Nickel	3.9	B		P
7440-09-7	Potassium	356	B		P
7782-49-2	Selenium	0.49	U		P
7440-22-4	Silver	1.2			P
7440-23-5	Sodium	67.8	B		P
7440-28-0	Thallium	0.27	U		P
7440-62-2	Vanadium	6.6		E	P
7440-66-6	Zinc	15.4		E	P
	Cyanide				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

FORM I - IN ILM04.0

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1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB21-0030

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4798.002

Level (low/med): _____ Date Received: 08/05/98

% Solids: _97.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1260			P
7440-36-0	Antimony	0.50	U	N	P
7440-38-2	Arsenic	2.7		N	P
7440-39-3	Barium	15.5	B		P
7440-41-7	Beryllium	0.08	B	N	P
7440-43-9	Cadmium	0.07	B	N	P
7440-70-2	Calcium	18400			P
7440-47-3	Chromium	4.1		E	P
7440-48-4	Cobalt	1.0	B	N	P
7440-50-8	Copper	3.6			P
7439-89-6	Iron	4000			P
7439-92-1	Lead	61.6			P
7439-95-4	Magnesium	9910			P
7439-96-5	Manganese	424			P
7439-97-6	Mercury				NR
7440-02-0	Nickel	2.7	B		P
7440-09-7	Potassium	475	B		P
7782-49-2	Selenium	0.46	U		P
7440-22-4	Silver	1.4			P
7440-23-5	Sodium	97.3	B		P
7440-28-0	Thallium	0.26	U		P
7440-62-2	Vanadium	4.9	B	E	P
7440-66-6	Zinc	14.1		E	P
	Cyanide				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB22-0030

ab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

ab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

atrix (soil/water): SOIL_ Lab Sample ID: 4798.003

evel (low/med): _____ Date Received: 08/05/98

Solids: _94.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4290			P
7440-36-0	Antimony	1.00	B	N	P
7440-38-2	Arsenic	2.2		N	P
7440-39-3	Barium	58.8			P
7440-41-7	Beryllium	0.25	B	N	P
7440-43-9	Cadmium	0.10	B	N	P
7440-70-2	Calcium	471	B		P
7440-47-3	Chromium	6.2		E	P
7440-48-4	Cobalt	3.2	B	N	P
7440-50-8	Copper	7.9			P
7439-89-6	Iron	5120			P
7439-92-1	Lead	4.2			P
7439-95-4	Magnesium	490	B		P
7439-96-5	Manganese	165			P
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	4.9			P
7440-09-7	Potassium	679			P
7782-49-2	Selenium	0.48	U		P
7440-22-4	Silver	0.99	B		P
7440-23-5	Sodium	57.1	B		P
7440-28-0	Thallium	0.26	U		P
7440-62-2	Vanadium	9.2		E	P
7440-66-6	Zinc	6.2		E	P
	Cyanide				NR

olor Before: _____ Clarity Before: _____ Texture: _____

olor After: _____ Clarity After: _____ Artifacts: _____

omments:

FORM I - IN ILM04.0

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1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB23-0030

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4798.004

Level (low/med): _____ Date Received: 08/05/98

% Solids: _97.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1350			P
7440-36-0	Antimony	0.50	U	N	P
7440-38-2	Arsenic	1.8		N	P
7440-39-3	Barium	20.9			P
7440-41-7	Beryllium	0.12	B	N	P
7440-43-9	Cadmium	0.17	B	N	P
7440-70-2	Calcium	619			P
7440-47-3	Chromium	3.5		E	P
7440-48-4	Cobalt	1.4	B	N	P
7440-50-8	Copper	8.4			P
7439-89-6	Iron	4960			P
7439-92-1	Lead	181			P
7439-95-4	Magnesium	300	B		P
7439-96-5	Manganese	127			P
7439-97-6	Mercury	0.13			CV
7440-02-0	Nickel	3.3	B		P
7440-09-7	Potassium	339	B		P
7782-49-2	Selenium	0.46	U		P
7440-22-4	Silver	1.1			P
7440-23-5	Sodium	69.5	B		P
7440-28-0	Thallium	0.26	U		P
7440-62-2	Vanadium	5.0	B	E	P
7440-66-6	Zinc	18.3		E	P
	Cyanide				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

000018

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB24-0020

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4798.005

Level (low/med): _____ Date Received: 08/05/98

% Solids: _85.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1140			P
7440-36-0	Antimony	1.1	B	N	P
7440-38-2	Arsenic	2.7		N	P
7440-39-3	Barium	31.4			P
7440-41-7	Beryllium	0.13	B	N	P
7440-43-9	Cadmium	0.25	B	N	P
7440-70-2	Calcium	4190			P
7440-47-3	Chromium	5.2		E	P
7440-48-4	Cobalt	2.3	B	N	P
7440-50-8	Copper	122			P
7439-89-6	Iron	7840			P
7439-92-1	Lead	724			P
7439-95-4	Magnesium	2140			P
7439-96-5	Manganese	223			P
7439-97-6	Mercury	0.12	U		CV
7440-02-0	Nickel	6.4			P
7440-09-7	Potassium	256	B		P
7782-49-2	Selenium	0.53	U		P
7440-22-4	Silver	1.3			P
7440-23-5	Sodium	154	B		P
7440-28-0	Thallium	0.29	U		P
7440-62-2	Vanadium	5.7	B	E	P
7440-66-6	Zinc	61.9		E	P
	Cyanide				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
SB25-0030

ab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

ab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

atrix (soil/water): SOIL_ Lab Sample ID: 4798.006

evel (low/med): _____ Date Received: 08/05/98

Solids: _98.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1280			P
7440-36-0	Antimony	0.50	U	N	P
7440-38-2	Arsenic	2.2		N	P
7440-39-3	Barium	16.0	B		P
7440-41-7	Beryllium	0.10	B	N	P
7440-43-9	Cadmium	0.44	B	N	P
7440-70-2	Calcium	10700			P
7440-47-3	Chromium	4.9		E	P
7440-48-4	Cobalt	1.3	B	N	P
7440-50-8	Copper	12.9			P
7439-89-6	Iron	6140			P
7439-92-1	Lead	125			P
7439-95-4	Magnesium	5890			P
7439-96-5	Manganese	208			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	4.5			P
7440-09-7	Potassium	342	B		P
7782-49-2	Selenium	0.46	U		P
7440-22-4	Silver	1.5			P
7440-23-5	Sodium	192	B		P
7440-28-0	Thallium	0.25	U		P
7440-62-2	Vanadium	4.8	B	E	P
7440-66-6	Zinc	83.8		E	P
	Cyanide				NR

olor Before: _____ Clarity Before: _____ Texture: _____

olor After: _____ Clarity After: _____ Artifacts: _____

omments:

FORM I - IN ILM04.0

060020

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1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB26-0020

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4798.007

Level (low/med): _____ Date Received: 08/05/98

% Solids: _97.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3010			P
7440-36-0	Antimony	0.50	U	N	P
7440-38-2	Arsenic	1.7		N	P
7440-39-3	Barium	24.8			P
7440-41-7	Beryllium	0.17	B	N	P
7440-43-9	Cadmium	0.11	B	N	P
7440-70-2	Calcium	898			P
7440-47-3	Chromium	5.4		E	P
7440-48-4	Cobalt	1.8	B	N	P
7440-50-8	Copper	4.9			P
7439-89-6	Iron	4100			P
7439-92-1	Lead	72.2			P
7439-95-4	Magnesium	595			P
7439-96-5	Manganese	98.7			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	4.4			P
7440-09-7	Potassium	595			P
7782-49-2	Selenium	0.46	U		P
7440-22-4	Silver	1.0	B		P
7440-23-5	Sodium	119	B		P
7440-28-0	Thallium	0.26	U		P
7440-62-2	Vanadium	6.8		E	P
7440-66-6	Zinc	14.3		E	P
	Cyanide				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

060021

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
SB36-6070

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4798.008

Level (low/med): _____ Date Received: 08/05/98

% Solids: _97.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1290			P
7440-36-0	Antimony	0.50	U	N	P
7440-38-2	Arsenic	1.0		N	P
7440-39-3	Barium	10.9	B		P
7440-41-7	Beryllium	0.09	B	N	P
7440-43-9	Cadmium	0.05	U	N	P
7440-70-2	Calcium	211	B		P
7440-47-3	Chromium	3.3		E	P
7440-48-4	Cobalt	1.1	B	N	P
7440-50-8	Copper	2.0	B		P
7439-89-6	Iron	2330			P
7439-92-1	Lead	3.2			P
7439-95-4	Magnesium	201	B		P
7439-96-5	Manganese	50.9			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	18.3			P
7440-09-7	Potassium	350	B		P
7782-49-2	Selenium	0.46	U		P
7440-22-4	Silver	1.0			P
7440-23-5	Sodium	53.2	B		P
7440-28-0	Thallium	0.26	U		P
7440-62-2	Vanadium	4.2	B	E	P
7440-66-6	Zinc	4.0		E	P
	Cyanide				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
SB37-6070

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4798.009

Level (low/med): _____ Date Received: 08/05/98

% Solids: _93.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	915			P
7440-36-0	Antimony	0.53	U	N	P
7440-38-2	Arsenic	0.45	B	N	P
7440-39-3	Barium	9.4	B		P
7440-41-7	Beryllium	0.05	B	N	P
7440-43-9	Cadmium	0.05	U	N	P
7440-70-2	Calcium	148	B		P
7440-47-3	Chromium	1.6		E	P
7440-48-4	Cobalt	0.29	B	N	P
7440-50-8	Copper	1.5	B		P
7439-89-6	Iron	769			P
7439-92-1	Lead	2.8			P
7439-95-4	Magnesium	151	B		P
7439-96-5	Manganese	4.1			P
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	1.9	B		P
7440-09-7	Potassium	360	B		P
7782-49-2	Selenium	0.48	U		P
7440-22-4	Silver	1.7			P
7440-23-5	Sodium	55.6	B		P
7440-28-0	Thallium	0.27	U		P
7440-62-2	Vanadium	2.6	B	E	P
7440-66-6	Zinc	0.75	B	E	P
	Cyanide				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

_____

_____

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
SB38-0010

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4798.010

Level (low/med): _____ Date Received: 08/05/98

% Solids: _83.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4460 ~~44.6~~			P
7440-36-0	Antimony	0.58 ~~0.01~~	U	N	P
7440-38-2	Arsenic	1.0 ~~0.01~~	B	N	P
7440-39-3	Barium	27.9 ~~0.28~~			P
7440-41-7	Beryllium	0.25 ~~0.00~~	B	N	P
7440-43-9	Cadmium	0.0~~60.06~~ ~~0.00~~	U	N	P
7440-70-2	Calcium	386 ~~3.9~~	B		P
7440-47-3	Chromium	6.2 ~~0.06~~		E	P
7440-48-4	Cobalt	1.5 ~~0.01~~	B	N	P
7440-50-8	Copper	2.7 ~~0.03~~	B		P
7439-89-6	Iron	3160 ~~31.7~~			P
7439-92-1	Lead	3.9 ~~0.04~~			P
7439-95-4	Magnesium	673 ~~6.7~~			P
7439-96-5	Manganese	23.4 ~~0.23~~			P
7439-97-6	Mercury	~~0.12~~	U		CV
7440-02-0	Nickel	5.0 ~~0.05~~			P
7440-09-7	Potassium	907 ~~9.1~~			P
7782-49-2	Selenium	0.54 ~~0.01~~	U		P
7440-22-4	Silver	1.2 ~~0.01~~			P
7440-23-5	Sodium	66.0 ~~0.65~~	B		P
7440-28-0	Thallium	0.30 ~~0.00~~	U		P
7440-62-2	Vanadium	11.1 ~~0.11~~		E	P
7440-66-6	Zinc	6.3 ~~0.06~~		E	P
	Cyanide				NR

Color Before: _____ Clarity Before: pc Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Initial Calibration Source: CLPP-ICV-123

Continuing Calibration Source: CLPP-CAL-123

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum	5000.0	5012.99	100.3	10000.0	9983.88	99.8	10140.80	101.4	P
Antimony	1250.0	1264.07	101.1	2500.0	2551.99	102.1	2598.19	103.9	P
Arsenic	250.0	253.80	101.5	500.0	511.35	102.3	524.27	104.9	P
Barium	5000.0	5164.16	103.3	10000.0	10017.81	100.2	10298.53	103.0	P
Beryllium	125.0	129.41	103.5	250.0	250.18	100.1	257.08	102.8	P
Cadmium	125.0	126.06	100.8	250.0	251.60	100.6	249.48	99.8	P
Calcium	12500.0	12738.77	101.9	25000.0	25110.28	100.4	25814.60	103.3	P
Chromium	500.0	508.34	101.7	1000.0	998.54	99.9	1016.80	101.7	P
Cobalt	1250.0	1296.23	103.7	2500.0	2512.83	100.5	2577.31	103.1	P
Copper	625.0	663.15	106.1	1250.0	1260.26	100.8	1160.96	92.9	P
Iron	2500.0	2588.56	103.5	5000.0	5065.77	101.3	5146.16	102.9	P
Lead	250.0	261.78	104.7	500.0	514.74	102.9	519.16	103.8	P
Magnesium	12500.0	12999.85	104.0	25000.0	25200.88	100.8	25697.71	102.8	P
Manganese	1250.0	1297.36	103.8	2500.0	2500.70	100.0	2558.32	102.3	P
Mercury	2.0	1.92	96.0	2.0	1.83	91.5	1.99	99.5	CV
Nickel	1250.0	1280.64	102.5	2500.0	2497.42	99.9	2548.38	101.9	P
Potassium	12500.0	13371.94	107.0	25000.0	25025.26	100.1	23461.56	93.8	P
Selenium	250.0	248.28	99.3	500.0	512.88	102.6	530.18	106.0	P
Silver	625.0	642.29	102.8	1250.0	1250.43	100.0	1257.53	100.6	P
Sodium	12500.0	12712.39	101.7	25000.0	24910.19	99.6	24958.19	99.8	P
Thallium	250.0	251.81	100.7	500.0	503.48	100.7	517.85	103.6	P
Vanadium	1250.0	1301.81	104.1	2500.0	2499.99	100.0	2549.93	102.0	P
Zinc	1250.0	1281.70	102.5	2500.0	2514.49	100.6	2502.54	100.1	P
Cyanide									NR

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Initial Calibration Source: CLPP-ICV-123

Continuing Calibration Source: CLPP-CAL-123

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum				10000.0	10117.10	101.2	10098.41	101.0	P
Antimony				2500.0	2585.40	103.4	2596.32	103.9	P
Arsenic				500.0	527.04	105.4	533.47	106.7	P
Barium				10000.0	10317.43	103.2	10291.17	102.9	P
Beryllium				250.0	257.73	103.1	257.77	103.1	P
Cadmium				250.0	259.45	103.8	256.73	102.7	P
Calcium				25000.0	25905.48	103.6	25926.38	103.7	P
Chromium				1000.0	1018.95	101.9	1017.99	101.8	P
Cobalt				2500.0	2597.94	103.9	2605.06	104.2	P
Copper				1250.0	1236.44	98.9	1173.90	93.9	P
Iron				5000.0	5159.66	103.2	5139.93	102.8	P
Lead				500.0	527.94	105.6	530.65	106.1	P
Magnesium				25000.0	25928.78	103.7	25950.47	103.8	P
Manganese				2500.0	2556.75	102.3	2544.29	101.8	P
Mercury				2.0	1.85	92.5	1.84	92.0	CV
Nickel				2500.0	2562.98	102.5	2553.12	102.1	P
Potassium				25000.0	23443.36	93.8	23282.88	93.1	P
Selenium				500.0	523.65	104.7	533.38	106.7	P
Silver				1250.0	1281.63	102.5	1273.44	101.9	P
Sodium				25000.0	25408.10	101.6	25084.33	100.3	P
Thallium				500.0	512.75	102.6	515.08	103.0	P
Vanadium				2500.0	2560.72	102.4	2559.48	102.4	P
Zinc				2500.0	2568.91	102.8	2556.11	102.2	P
Cyanide									NR

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Initial Calibration Source: CLPP-ICV-123

Continuing Calibration Source: CLPP-CAL-123

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum				10000.0	10064.30	100.6			P
Antimony				2500.0	2576.64	103.1			P
Arsenic				500.0	535.36	107.1			P
Barium				10000.0	10274.54	102.7			P
Beryllium				250.0	257.59	103.0			P
Cadmium				250.0	255.84	102.3			P
Calcium				25000.0	25948.67	103.8			P
Chromium				1000.0	1018.51	101.9			P
Cobalt				2500.0	2611.88	104.5			P
Copper				1250.0	1171.09	93.7			P
Iron				5000.0	5147.90	103.0			P
Lead				500.0	535.09	107.0			P
Magnesium				25000.0	26061.18	104.2			P
Manganese				2500.0	2537.06	101.5			P
Mercury									NR
Nickel				2500.0	2556.87	102.3			P
Potassium				25000.0	24779.74	99.1			P
Selenium				500.0	527.38	105.5			P
Silver				1250.0	1283.02	102.6			P
Sodium				25000.0	25459.12	101.8			P
Thallium				500.0	521.50	104.3			P
Vanadium				2500.0	2567.75	102.7			P
Zinc				2500.0	2548.73	101.9			P
Cyanide									NR

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

2B
CRDL STANDARD FOR AA AND ICP

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

AA CRDL Standard Source: I-0013_____

ICP CRDL Standard Source: CRI-CRA-123_

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R	True	Initial Found	%R	Final Found	%R
Aluminum								
Antimony				120.0	113.52	94.6	0.00	0.0
Arsenic				20.0	19.63	98.2	0.00	0.0
Barium								
Beryllium				10.0	10.01	100.1	0.00	0.0
Cadmium				10.0	10.35	103.5	0.00	0.0
Calcium								
Chromium				20.0	20.30	101.5	0.00	0.0
Cobalt				100.0	105.39	105.4	0.00	0.0
Copper				50.0	56.26	112.5	0.00	0.0
Iron								
Lead				6.0	8.82	147.0	0.00	0.0
Magnesium								
Manganese				30.0	31.64	105.5	0.00	0.0
Mercury	0.2	0.24	120.0					
Nickel				80.0	82.74	103.4	0.00	0.0
Potassium								
Selenium				10.0	11.14	111.4	0.00	0.0
Silver				20.0	22.44	112.2	0.00	0.0
Sodium								
Thallium				20.0	14.92	74.6	0.00	0.0
Vanadium				100.0	103.70	103.7	0.00	0.0
Zinc				40.0	38.53	96.3	0.00	0.0

Control Limits: no limits have been established by EPA at this time

U.S. EPA - CLP

3
BLANKS

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Preparation Blank Matrix (soil/water): SOIL_

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	12.5	U	12.5	U	38.1	B	12.5	U	1.250	U	P
Antimony	14.5	B	10.0	B	5.6	B	13.3	B	0.490	U	P
Arsenic	3.8	U	3.8	U	3.8	U	3.8	U	0.380	U	P
Barium	0.8	U	0.8	U	2.4	B	17.1	B	0.080	U	P
Beryllium	0.4	U	0.4	U	1.1	B	0.4	U	0.040	U	P
Cadmium	0.5	U	0.5	U	0.5	B	0.9	B	0.050	U	P
Calcium	28	U	7.8	U	119.6	B	7.8	U	0.780	U	P
Chromium	1.0	U	1.0	U	1.0	U	1.1	B	0.100	U	P
Cobalt	0.9	U	0.9	U	0.9	U	4.1	B	0.090	U	P
Copper	3.1	B	7.9	B	15.6	B	10.1	B	0.359	B	P
Iron	7.4	U	7.4	U	7.4	U	11.0	B	0.740	U	P
Lead	2.4	U	7.6		6.1		7.8		0.789		P
Magnesium	69.8	U	69.8	U	116.6	B	69.8	U	6.980	U	P
Manganese	0.8	U	0.8	U	0.8	U	3.0	B	0.080	U	P
Mercury	0.2	U	0.2	U	0.2	U	0.2	U	0.100	U	CV
Nickel	3.2	U	3.2	B	4.6	B	5.8	B	0.364	B	P
Potassium	117.0	U	1473.5	B	1170.0	U	-1600.2	B	117.000	U	P
Selenium	-5.9	B	-4.8	B	4.5	U	-6.6		0.450	U	P
Silver	1.2	U	8.2	B	10.0		4.6	B	0.756	B	P
Sodium	155	U	276.2	B	260.9	B	-163.7	B	15.500	U	P
Thallium	-5.5	B	-9.2	B	-5.0	B	-7.9	B	-0.263	B	P
Vanadium	0.7	U	1.2	B	12.4	B	1.5	B	0.167	B	P
Zinc	1.4	U	1.4	U	-8.3	B	-6.3	B	-1.145	B	P
Cyanide											NR

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U.S. EPA - CLP

3
BLANKS

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Preparation Blank Matrix (soil/water): _____

Preparation Blank Concentration Units (ug/L or mg/kg): _____

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum			-29.5	B							P
Antimony			4.9	U							P
Arsenic			3.8	U							P
Barium			0.9	B							P
Beryllium			0.4	U							P
Cadmium			0.5	U							P
Calcium			9.3	B							P
Chromium			1.0	U							P
Cobalt			0.9	U							P
Copper			11.5	B							P
Iron			9.2	B							P
Lead			14.9								P
Magnesium			69.8	U							P
Manganese			0.8	U							P
Mercury			0.2	U	0.2	U					CV
Nickel			5.4	B							P
Potassium			1170.0	U							P
Selenium			4.5	U							P
Silver			15.4								P
Sodium			293.6	B							P
Thallium			-8.4	B							P
Vanadium			2.5	B							P
Zinc			-10.9	B							P
Cyanide											NR

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Sample_ID	DATE ANALYZE	TIME ANALYZE	ANALYTE	TRUE	FOUND	% R
ICSAB	8/19/98	16:58:16	Iron	200	183.147156	91.6
ICSAB	8/19/98	16:58:16	Aluminum	500	503.010803	100.6
ICSAB	8/19/98	16:58:16	Arsenic	0.1	0.10202434	102.0
ICSAB	8/19/98	16:58:16	Barium	0.5	0.48289076	96.6
ICSAB	8/19/98	16:58:16	Beryllium	0.5	0.49870891	99.7
ICSAB	8/19/98	16:58:16	Calcium	500	467.386754	93.5
ICSAB	8/19/98	16:58:16	Cadmium	1	0.96006773	96.0
ICSAB	8/19/98	16:58:16	Cobalt	0.5	0.45107863	90.2
ICSAB	8/19/98	16:58:16	Silver	0.2	0.2101146	105.1
ICSAB	8/19/98	16:58:16	Copper	0.5	0.44893618	89.8
ICSAB	8/19/98	16:58:16	Zinc	1	0.89383322	89.4
ICSAB	8/19/98	16:58:16	Potassium		-2.3810097	
ICSAB	8/19/98	16:58:16	Magnesium	500	469.218985	93.8
ICSAB	8/19/98	16:58:16	Manganese	0.5	0.48790198	97.6
ICSAB	8/19/98	16:58:16	Sodium		1.48309315	
ICSAB	8/19/98	16:58:16	Nickel	1	0.94195039	94.2
ICSAB	8/19/98	16:58:16	Lead	0.05	0.04496898	89.9
ICSAB	8/19/98	16:58:16	Antimony	0.6	0.61482997	102.5
ICSAB	8/19/98	16:58:16	Selenium	0.05	0.04999702	100.0
ICSAB	8/19/98	16:58:16	Thallium	0.1	0.08976465	89.8
ICSAB	8/19/98	16:58:16	Vanadium	0.5	0.4991023	99.8
ICSAB	8/19/98	16:58:16	Chromium	0.5	0.47991485	96.0

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Sample_ID	Sam_Date	Sam_Time	ANALYTE	TRUE	FOUND	%R
ICSA	8/19/98	4:58:00 PM	Iron	200	182.007538	91.
ICSA	8/19/98	4:58:00 PM	Aluminum	500	500.68766	100.1
ICSA	8/19/98	4:58:00 PM	Arsenic			
ICSA	8/19/98	4:58:00 PM	Barium			
ICSA	8/19/98	4:58:00 PM	Beryllium			
ICSA	8/19/98	4:58:00 PM	Calcium	500	462.261945	92.5
ICSA	8/19/98	4:58:00 PM	Cadmium			
ICSA	8/19/98	4:58:00 PM	Cobalt			
ICSA	8/19/98	4:58:00 PM	Silver			
ICSA	8/19/98	4:58:00 PM	Copper			
ICSA	8/19/98	4:58:00 PM	Zinc			
ICSA	8/19/98	4:58:00 PM	Potassium			
ICSA	8/19/98	4:58:00 PM	Magnesium	500	467.544748	93.5
ICSA	8/19/98	4:58:00 PM	Manganese			
ICSA	8/19/98	4:58:00 PM	Sodium			
ICSA	8/19/98	4:58:00 PM	Nickel			
ICSA	8/19/98	4:58:00 PM	Lead			
ICSA	8/19/98	4:58:00 PM	Antimony			
ICSA	8/19/98	4:58:00 PM	Selenium			
ICSA	8/19/98	4:58:00 PM	Thallium			
ICSA	8/19/98	4:58:00 PM	Vanadium			
ICSA	8/19/98	4:58:00 PM	Chromium			

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U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.
SB20-0030S

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Matrix (soil/water): SOIL__ Level (low/med): _____

% Solids for Sample: _92.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
[illegible]minum									NR
Antimony	75-125	0.2694		1.3131	B	0.54	-193.3	N	P
Arsenic	75-125	2.5263		2.6747		2.17	-6.8	N	P
Barium		2.7724		37.6597		2.17	-1607.7		P
Beryllium	75-125	0.0596		0.1225	B	0.05	-125.8	N	P
Cadmium	75-125	0.0616		0.1448	B	0.05	-166.4	N	P
Calcium									NR
Chromium		0.2645		6.0613		0.22	-2634.9		P
Cobalt	75-125	0.6268		1.0117	B	0.54	-71.3	N	P
Copper		0.4874		15.7172		0.27	-5640.7		P
Iron									NR
Lead		16.6312		1959.0141		0.54			P
Magnesium									NR
Manganese		0.8353		27.1238		0.54	-4868.2		P
Mercury	75-125	0.8409		0.3887		0.54	83.7		CV
Nickel		0.6199		3.9025	B	0.54	-607.9		P
[illegible]tassium									NR
[illegible]lenium	75-125	2.2454		0.4886	U	2.17	103.5		P
Silver		0.0758		1.2038		0.05	-2256.0		P
Sodium									NR
Thallium	75-125	2.3282		0.2714	U	2.17	107.3		P
Vanadium		0.6338		6.5670		0.54	-1098.7		P
Zinc		0.6998		15.3835		0.54	-2719.2		P
Cyanide									NR

Comments:

U.S. EPA - CLP

5B

POST DIGEST SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

SB20-0030A

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Matrix (soil/water) : SOIL__ Level (low/med): _____

Concentration Units: ug/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Added (SA)	%R	Q	M
Aluminum		18383.36		16257.41		2000.0	106.3		P
Antimony		467.58		12.09	B	500.0	91.1		P
Arsenic		2214.13		24.63		2000.0	109.5		P
Barium		2528.73		346.85		2000.0	109.1		P
Beryllium		53.29		1.13	B	50.0	104.3		P
Cadmium		55.40		1.33	B	50.0	108.1		P
Calcium									NR
Chromium		249.36		55.82		200.0	96.8		P
Cobalt		563.41		9.32	B	500.0	110.8		P
Copper		423.39		144.76		250.0	111.5		P
Iron		45501.38		44207.89		1000.0	129.3		P
Lead		18743.82		18042.52		500.0	140.3		P
Magnesium									NR
Manganese		788.26		249.81		500.0	107.7		P
Mercury									NR
Nickel		559.90		35.94	B	500.0	104.8		P
Potassium									NR
Selenium		2037.95		4.50	U	2000.0	101.9		P
Silver		64.36		11.09		50.0	106.5		P
Sodium									NR
Thallium		2168.55		2.50	U	2000.0	108.4		P
Vanadium		586.02		60.48		500.0	105.1		P
Zinc		645.97		141.68		500.0	100.9		P
Cyanide									NR

Comments:

002045

Duplicate

ms/d

Mean Data ID: 4798.00 Sample Qty: Seq Pre Dat		Mean Data ID: 4798.00 Sample Qty: Seq Pre Dat			
Element	Mean Conc.	Element	Mean Conc.	RPD	%RPD
Y 371.030	108.1	Y 371.030	107.9		1.5
Ag 338.289	0.0688	Ag 338.289	0.0698		3.3
Al 308.215	16.84	Al 308.215	17.39		0.3
As 188.979	2.321	As 188.979	2.327		0
Ba 233.527	2.552	Ba 233.527	2.553		0.6
Be 313.107	0.05458	Be 313.107	0.05493		16.5
Ca 315.887	4.849	Ca 315.887	5.651		0.7
Cd 226.502	0.05716	Cd 226.502	0.05675		0.3
Co 228.616	0.5791	Co 228.616	0.5773		1.0
Cr 267.716	0.2412	Cr 267.716	0.2436		14.5
Cu 324.754	0.3922	Cu 324.754	0.4489		
Fe 273.955	22.29	Fe 273.955	35.07	44.6	~~57.3~~ *
K 404.721	4.677	K 404.721	4.053		13.3
Mg 279.079	2.374	Mg 279.079	2.976	22.5	~~25.4~~
Mn 257.610	0.7105	Mn 257.610	0.7693		8.3
Na 330.237	1.542	Na 330.237	1.669		8.2
Ni 232.003	0.5686	Ni 232.003	0.5709		0.4
Pb 220.353	9.369	Pb 220.353	15.32	48.2	~~63.5~~ *
Sb 206.833	0.2331	Sb 206.833	0.2481		6.4
Se 196.026	2.100	Se 196.026	2.068		1.5
Tl 190.800	2.167	Tl 190.800	2.144		1.1
V 292.402	0.5772	V 292.402	0.5837		1.1
Zn 206.200	0.6272	Zn 206.200	0.6445		2.8

DA.

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7

LABORATORY CONTROL SAMPLE

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Solid LCS Source: _____

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum				500.0	516.5		400.0	600.0	103.3
Antimony				125.0	130.7		125.0	150.0	104.6
Arsenic				25.0	28.5		20.0	30.0	114.0
Barium				500.0	531.8		400.0	600.0	106.4
Beryllium				12.5	13.2		10.0	15.0	105.6
Cadmium				12.5	12.7		10.0	15.0	101.6
Calcium				1250.0	1343.4		1000.0	1500.0	107.5
Chromium				50.0	52.3		40.0	60.0	104.6
Cobalt				125.0	134.5		100.0	150.0	107.6
Copper				62.5	64.4		50.0	75.0	103.0
Iron				250.0	268.4		200.0	300.0	107.4
Lead				25.0	26.8		20.0	30.0	107.2
Magnesium				1250.0	1354.0		1000.0	1500.0	108.3
Manganese				125.0	132.4		100.0	150.0	105.9
Mercury									
Nickel				125.0	129.8		100.0	150.0	103.8
Potassium				1250.0	1104.4		1000.0	1500.0	88.4
Selenium				25.0	25.8		20.0	30.0	103.2
Silver				62.5	65.0		50.0	75.0	104.0
Sodium				1250.0	1289.4		1000.0	1500.0	103.2
Thallium				25.0	25.8		20.0	30.0	103.2
Vanadium				125.0	134.2		100.0	150.0	107.4
Zinc				125.0	122.9		100.0	150.0	98.3
Cyanide									

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LABORATORY CONTROL SAMPLE

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Solid LCS Source: _____

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum				500.0	511.6		400.0	600.0	102.3
Antimony				125.0	129.2		125.0	150.0	103.4
Arsenic				25.0	27.9		20.0	30.0	111.6
Barium				500.0	530.8		400.0	600.0	106.2
Beryllium				12.5	13.2		10.0	15.0	105.6
Cadmium				12.5	12.5		10.0	15.0	100.0
Calcium				1250.0	1328.6		1000.0	1500.0	106.3
Chromium				50.0	52.1		40.0	60.0	104.2
Cobalt				125.0	134.2		100.0	150.0	107.4
Copper				62.5	65.3		50.0	75.0	104.5
Iron				250.0	265.8		200.0	300.0	106.3
Lead				25.0	26.8		20.0	30.0	107.2
Magnesium				1250.0	1347.4		1000.0	1500.0	107.8
Manganese				125.0	132.1		100.0	150.0	105.7
Mercury									
Nickel				125.0	130.1		100.0	150.0	104.1
Potassium				1250.0	1112.6		1000.0	1500.0	89.0
Selenium				25.0	25.9		20.0	30.0	103.6
Silver				62.5	65.0		50.0	75.0	104.0
Sodium				1250.0	1277.2		1000.0	1500.0	102.2
Thallium				25.0	25.3		20.0	30.0	101.2
Vanadium				125.0	134.0		100.0	150.0	107.2
Zinc				125.0	121.9		100.0	150.0	97.5
Cyanide									

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LABORATORY CONTROL SAMPLE

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Solid LCS Source: _____

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum									
Antimony									
Arsenic									
Barium									
Beryllium									
Cadmium									
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead									
Magnesium									
Manganese									
Mercury				1.0	1.0		0.8	1.2	100.0
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									
Cyanide									

U.S. EPA - CLP

7

LABORATORY CONTROL SAMPLE

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Solid LCS Source: _____

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum									
Antimony									
Arsenic									
Barium									
Beryllium									
Cadmium									
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead									
Magnesium									
Manganese									
Mercury				1.0	1.0		0.8	1.2	100.0
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									
Cyanide									

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8
STANDARD ADDITION RESULTS

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract:_____

Lab Code: PDP___ Case No.: E&E___ SAS No.:_____ SDG No.:SB20-0

Concentration Units: ug/L

EPA Sample No.	An	0 ADD ABS	1 ADD CON	1 ADD ABS	2 ADD CON	2 ADD ABS	3 ADD CON	3 ADD ABS	Final Conc.	r	Q

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ICP SERIAL DILUTION

EPA SAMPLE NO.

SB20-0030L

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Matrix (soil/water): SOIL_ Level (low/med): _____

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Differ-ence	Q	M
Aluminum	16257.41		16223.10		0.2		P
Antimony	12.09	B	24.50	U	100.0		P
Arsenic	24.63		59.64		142.1		P
Barium	346.85		352.42	B	1.6		P
Beryllium	1.13	B	2.00	U	100.0		P
Cadmium	1.33	B	2.50	U	100.0		P
Calcium	5466.68		5604.70	B	2.5		P
Chromium	55.82		44.24	B	20.7	E	P
Cobalt	9.32	B	6.22	B	33.3		P
Copper	144.76		151.04		4.3		P
Iron	44207.89		45722.72		3.4		P
Lead	18042.52		18691.94		3.6		P
Magnesium	3011.83	B	3068.98	B	1.9		P
Manganese	249.81		251.86		0.8		P
Mercury							NR
Nickel	35.94	B	58.78	B	63.6		P
Potassium	3276.46	B	5850.00	U	100.0		P
Selenium	4.50	U	22.50	U			P
Silver	11.09		70.90		539.3		P
Sodium	624.52	B	2385.90	B	282.0		P
Thallium	2.50	U	12.50	U			P
Vanadium	60.48		71.74	B	18.6	E	P
Zinc	141.68		91.10	B	35.7	E	P

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Instrument Detection Limits (Quarterly)

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

ICP ID Number: _____ Date: 07/06/98

Flame AA ID Number : BUCK-1_____

Furnace AA ID Number : _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury	253.00		0.2	0.2	CV
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR
Cyanide			10		NR

Comments:

002053

U.S. EPA - CLP

10

Instrument Detection Limits (Quarterly)

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

ICP ID Number: ICAP3000XL__ Date: 07/07/98

Flame AA ID Number : _____

Furnace AA ID Number : _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum	308.22		200	12.5	P
Antimony	206.83		60	4.9	P
Arsenic	188.98		10	3.8	P
Barium	233.53		200	0.8	P
Beryllium	313.11		5	0.4	P
Cadmium	226.50		5	0.5	P
Calcium	315.89		5000	7.8	P
Chromium	267.72		10	1.0	P
Cobalt	228.62		50	0.9	P
Copper	324.75		25	1.7	P
Iron	273.96		100	7.4	P
Lead	220.35		3	2.4	P
Magnesium	279.08		5000	69.8	P
Manganese	257.61		15	0.8	P
Mercury			0.2		NR
Nickel	232.00		40	3.0	P
Potassium	404.72		5000	1170.0	P
Selenium	196.03		5	4.5	P
Silver	338.29		10	1.2	P
Sodium	330.30		5000	155.0	P
Thallium	190.80		10	2.5	P
Vanadium	292.40		50	0.9	P
Zinc	206.20		20	1.4	P
Cyanide			10		NR

Comments:

U.S. EPA - CLP

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

ICP ID Number: ICAP3000XL__ Date: 07/08/98

Analyte	Wave-length (nm)	Interelement Correction Factors for : Al	Ca	Fe	Mg	CR_
Aluminum	308.22	0.0000000	0.0000380	-0.0002030	0.0001190	0.0001930
Antimony	206.83	-0.0000140	0.0000000	-0.0000060	-0.0000020	0.0003780
Arsenic	188.98	0.0000100	0.0000000	0.0000070	0.0000030	-0.0000170
Barium	233.53	-0.0000020	0.0000010	0.0000670	-0.0000060	-0.0000080
Beryllium	313.11	-0.0000270	-0.0000060	-0.0003630	0.0000070	-0.0071530
Cadmium	226.50	0.0000220	0.0000000	0.0000600	0.0000050	0.0000020
Calcium	315.89	0.0000050	0.0000000	-0.0001350	-0.0000440	-0.0003960
Chromium	267.72	0.0000020	-0.0000010	-0.0001020	0.0000390	0.0000000
Cobalt	228.62	0.0000230	0.0000010	0.0002260	0.0000200	0.0000180
Copper	324.75	0.0000380	0.0000270	-0.0073450	0.0000220	-0.0000800
Iron	273.96	0.0000040	0.0000000	0.0000000	0.0000760	-0.0136920
Lead	220.35	0.0000250	-0.0000040	0.0000290	0.0000000	0.0000120
Magnesium	279.08	0.0000040	0.0000100	0.0003010	0.0000000	0.0000970
Manganese	257.61	-0.0001350	0.0000170	-0.0061700	0.0006890	-0.0017750
Mercury						
Nickel	232.00	0.0000060	-0.0000010	0.0006400	0.0000230	0.0069110
Potassium	404.72	-0.0000040	0.0000010	-0.0007790	-0.0000060	-0.0000680
Selenium	196.03	0.0000140	0.0000000	-0.0001540	0.0000010	0.0000000
Silver	338.29	0.0000040	0.0000280	0.0000640	-0.0000010	0.0044080
Sodium	330.30	-0.0000030	-0.0000050	-0.0001630	-0.0000080	0.0001370
Thallium	190.80	0.0000000	0.0000000	0.0000050	-0.0000030	0.0000110
Vanadium	292.40	0.0000030	0.0000010	0.0019070	0.0000130	0.0008510
Zinc	206.20	-0.0000490	-0.0000010	0.0000270	0.0000290	-0.0062870

Comments:

U.S. EPA - CLP

11B

ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

ICP ID Number: ICAP3000XL__ Date: 07/08/98

Analyte	Wave-length (nm)	Interelement Correction Factors for : MN_	NI_	V__	___	___
Aluminum	308.22	0.0000900	0.0006110	0.0054770		
Antimony	206.83	0.0000000	0.0000120	0.0000000		
Arsenic	188.98	0.0000000	-0.0000090	0.0000040		
Barium	233.53	-0.0000030	-0.0000990	0.0002150		
Beryllium	313.11	-0.0000050	-0.0006840	0.0003270		
Cadmium	226.50	0.0000020	0.0005330	-0.0000030		
Calcium	315.89	-0.0000230	-0.0010470	-0.0013810		
Chromium	267.72	0.0000420	-0.0000370	-0.0001330		
Cobalt	228.62	0.0000040	0.0009350	0.0000080		
Copper	324.75	0.0000170	-0.0000550	-0.0001040		
Iron	273.96	0.0000150	0.0000800	0.0099180		
Lead	220.35	-0.0000010	-0.0003080	-0.0000030		
Magnesium	279.08	0.0000220	-0.0000540	0.0000530		
Manganese	257.61	0.0000000	0.0001020	0.0000020		
Mercury						
Nickel	232.00	0.0000080	0.0000000	0.0000230		
Potassium	404.72	-0.0000070	0.0001210	-0.0004310		
Selenium	196.03	0.0000020	-0.0000060	0.0000010		
Silver	338.29	0.0000210	0.0004620	0.0000130		
Sodium	330.30	0.0000250	-0.0003090	-0.0000610		
Thallium	190.80	0.0000020	0.0000060	-0.0005640		
Vanadium	292.40	0.0000210	0.0000170	0.0000000		
Zinc	206.20	-0.0000010	-0.0000850	-0.0000070		

Comments:

002056

U.S. EPA - CLP

12
ICP LINEAR RANGES (QUARTERLY)

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

ICP ID Number: ICAP3000XL__ Date: 01/31/98

Analyte	Integ. Time (sec.)	Concentration (ug/L)	M
Aluminum	50.00	500000.0	P
Antimony	50.00	20000.0	P
Arsenic	50.00	10000.0	P
Barium	50.00	20000.0	P
Beryllium	50.00	10000.0	P
Cadmium	50.00	20000.0	P
Calcium	50.00	500000.0	P
Chromium	50.00	50000.0	P
Cobalt	50.00	10000.0	P
Copper	50.00	60000.0	P
Iron	50.00	200000.0	P
Lead	50.00	25000.0	P
Magnesium	50.00	500000.0	P
Manganese	50.00	20000.0	P
Mercury			NR
Nickel	50.00	20000.0	P
Potassium	50.00	100000.0	P
Selenium	50.00	10000.0	P
Silver	50.00	30000.0	P
Sodium	50.00	250000.0	P
Thallium	50.00	4000.0	P
Vanadium	50.00	50000.0	P
Zinc	50.00	50000.0	P

Comments:

U.S. EPA - CLP

13
PREPARATION LOG

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.:_E&E___ SAS No.: _____ SDG No.:SB20-0

Method: P_

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
LCSS1	08/18/98	1.00	100
LCSS1D	08/18/98	1.00	100
PBS1	08/18/98	1.00	100
SB20-00	08/18/98	1.00	100
SB20-00	08/18/98	1.00	100
SB21-00	08/18/98	1.00	100
SB22-00	08/18/98	1.00	100
SB23-00	08/18/98	1.00	100
SB24-00	08/18/98	1.00	100
SB25-00	08/18/98	1.00	100
SB26-00	08/18/98	1.00	100
SB36-60	08/18/98	1.00	100
SB37-60	08/18/98	1.00	100
SB38-00	08/18/98	1.00	100

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PREPARATION LOG

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.:_E&E___ SAS No.: _____ SDG No.:SB20-0

Method: C_

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
LCSS2	08/17/98	0.20	100
LCSS2D	08/17/98	0.20	100
PBS2	08/17/98	0.20	100
SB20-00	08/17/98	0.20	100
SB20-00	08/17/98	0.20	100
SB21-00	08/17/98	0.20	100
SB22-00	08/17/98	0.20	100
SB23-00	08/17/98	0.20	100
SB24-00	08/17/98	0.20	100
SB25-00	08/17/98	0.20	100
SB26-00	08/17/98	0.20	100
SB36-60	08/17/98	0.20	100
SB37-60	08/17/98	0.20	100
SB38-00	08/17/98	0.20	100

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14
ANALYSIS RUN LOG

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.:SB20-0

Instrument ID Number: BUCK-1_____ Method: CV

Start Date: 08/19/98 End Date: 08/19/98

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1430																X									
[illegible].2	1.00	1431																X									
[illegible].5	1.00	1432																X									
S1	1.00	1433																X									
S2	1.00	1434																X									
S4	1.00	1435																X									
ICV	1.00	1435																X									
ICB	1.00	1436																X									
CRA	1.00	1437																X									
CCV	1.00	1438																X									
CCB	1.00	1439																X									
ZZZZZZ	1.00	1440																									
ZZZZZZ	1.00	1441																									
ZZZZZZ	1.00	1442																									
B20-0030	1.00	1443																X									
20-0030S	1.00	1444																									
20-0030S	1.00	1445																X									
ZZZZZZ	1.00	1446																									
[illegible]2-0030	1.00	1447																X									
B23-0030	1.00	1448																X									
B24-0020	1.00	1449																X									
CCV	1.00	1450																X									
CCB	1.00	1451																X									
B25-0030	1.00	1452																X									
B26-0020	1.00	1453																X									
B36-6070	1.00	1454																X									
B37-6070	1.00	1455																X									
B38-0010	1.00	1456																X									
PBS2	1.00	1457																X									
LCSS2	1.00	1458																X									
LCSS2D	1.00	1459																X									
ZZZZZZ	1.00	1500																									

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U.S. EPA - CLP

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ANALYSIS RUN LOG

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.:SB20-0

Instrument ID Number: BUCK-1_____ Method: CV

Start Date: 08/19/98 End Date: 08/19/98

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
ZZZZZZ	1.00	1501																									
CCV	1.00	1502																X									
CCB	1.00	1503																X									
ZZZZZZ	1.00	1504																									
ZZZZZZ	1.00	1505																									
ZZZZZZ	1.00	1506																									
ZZZZZZ	1.00	1507																									
ZZZZZZ	1.00	1508																									
ZZZZZZ	1.00	1509																									
ZZZZZZ	1.00	1510																									
ZZZZZZ	1.00	1511																									
ZZZZZZ	1.00	1512																									
ZZZZZZ	1.00	1513																									
CCV	1.00	1514																									
CCB	1.00	1515																X									
ZZZZZZ	1.00	1516																									
ZZZZZZ	1.00	1517																									
ZZZZZZ	1.00	1518																									
ZZZZZZ	1.00	1519																									
ZZZZZZ	1.00	1520																									
ZZZZZZ	1.00	1521																									
ZZZZZZ	1.00	1522																									
ZZZZZZ	1.00	1523																									
ZZZZZZ	1.00	1524																									
ZZZZZZ	1.00	1525																									
ZZZZZZ	1.00	1526																									
CCV	1.00	1527																X									
CCB	1.00	1528																X									

U.S. EPA - CLP

14
ANALYSIS RUN LOG

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.:SB20-0

Instrument ID Number: ICAP3000XL___ Method: P_

Start Date: 08/19/98 End Date: 08/19/98

EPA Sample No.	D/F	Time	% R	Analytes																						
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1656		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
S1	1.00	1656		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
CV	1.00	1657		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
ZZZZZZ (CB)	1.00	1657																								
CRI	1.00	1657		_	X	X	_	X	X	_	X	X	X	_	X	_	X	_	X	_	X	X	_	X	X	X	_
ICSA	1.00	1658		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
ICSAB	1.00	1658		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
CCV	1.00	1658		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
CCB	1.00	1658		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
ZZZZZZ	1.00	1741																								
CCV	1.00	1747		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
CCB	1.00	1753		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
ZZZZZZ	1.00	1849																								
CCV	1.00	1855		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
CCB	1.00	1901		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
ZZZZZZ	1.00	2024																								
PBS1	1.00	2029		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
LCSS1	1.00	2035		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
LCSS1D	1.00	2042		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
B20-0030	1.00	2047		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
20-0030S	1.00	2053																								
20-0030S	1.00	2058		X	X	X	X	X	X	_	X	X	X	X	X	_	X	_	X	_	X	X	_	X	X	X	_
20-0030A	1.00	2104		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
20-0030L	5.00	2109		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
B21-0030	1.00	2116		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
CCV	1.00	2122		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
CCB	1.00	2127		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
B22-0030	1.00	2133		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
B23-0030	1.00	2139		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
B24-0020	1.00	2145		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
B25-0030	1.00	2151		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
B26-0020	1.00	2156		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	_
				_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_

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U.S. EPA - CLP

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ANALYSIS RUN LOG

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.:SB20-0

Instrument ID Number: ICAP3000XL___ Method: P_

Start Date: 08/19/98 End Date: 08/19/98

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
B36-6070	1.00	2202		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	X	_
B37-6070	1.00	2207		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	X	_
[redacted]-0010	1.00	2213		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	X	_
ZZZZZZ__	1.00	2226																										
CCV_____	1.00	2232		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	X	_
CCB_____	1.00	2237		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	X	X	X	X	X	X	X	_

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RCS NO. 549-MPL-0598

PDP ANALYTICAL SERVICES
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

METALS PREPARATION LOG

PREPARATION TYPE: ICP ANALYST: FC PREPARATION DATE/TIME: 8/18/98 /9-00

SAMPLE MATRIX: SOIL LCS ID: (498-007-98, 007, 008-97) 2 MATRIX SPIKE ID: (498-009, -010-011-97) 2

PDP SAMPLE ID	SAMPLE ALIQUOT (GRAMS/MLS)	FINAL VOLUME (MLS)	COLOR BEFORE	CLARITY BEFORE	COLOR AFTER	CLARITY AFTER	TEXTURE
ICPB 910	1.0	100 ml					
ICPL 910	↓	↓					
ICPL 910D	↓	↓					
4798-001		↓	Brown		colorless	clear	Fine
.001MS		↓	↓		↓	↓	↓
.001MSD		↓	↓		↓	↓	↓
.002		↓	↓		↓	↓	↓
.003		↓	↓		↓	↓	↓
.004		↓	↓		↓	↓	↓
.005		↓	↓		↓	↓	↓
.006		↓	↓		↓	↓	↓
.007		↓	↓		↓	↓	↓
.008		↓	↓		↓	↓	↓
.009		↓	↓		↓	↓	↓
.010		↓	↓		↓	↓	↓
4806-002		↓	Black		Yellow	clear	medium fine
.002MS		↓	↓		↓	↓	↓
.002MSD		↓	↓		↓	↓	↓
.003		↓	↓		↓	↓	↓
			TI 8/18/98				

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COLOR: red, blue, yellow, green, orange, violet, white, colorless, brown, gray, black
CLARITY: clear, cloudy, opaque
TEXTURE: fine (powdery), medium (sand), coarse (large crystals or rocks)

COMMENTS: _____

RECEIVED BY: Janakiff. DATE: 8/19/98 TIME: 7:30PM PAGE NO.: 000050 000108

LCS NO: 529- HGP-0198

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PDP ANALYTICAL SERVICES
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

MERCURY PREPARATION LOG

SOP # PDP-MET-1007 and PDP-MET-1008, METHODS EPA SW-846:7470A, 7471A

Analyst: FC Date/Time: 8/17/98/9:30 ICV ID: 496-005 CRA ID: 496-004

Matrix: SOIL LCS ID: 496-005 Matrix Spike ID: 496-004

Sample No.	BOD Bottle No.	Sample Wt. (g) or Volume (mls)	Final Volume (mls)	Dilution Factor	Anomalies Observed
STD BLK	7	100ml	100ml	1x	
STD1	247	↓	↓	↓	
STD2	23				
STD3	11				
STD4	12				
STD5	70				
ICV	42				
ICB	431				
CRA	16				
CCV	31				
CCB	32	↓		↓	
HGB738	37	0.2		500x	
#GL738	20	↓		↓	
HGL738D	1	↓		↓	
4798-001	44	0.20		500 x	
-001MS	40	0.21		476.2x	
-001MSD	721	0.22		454.5x	
-002	65	0.23		434.8 x	
-003	17	0.21	↓	476.2 x	

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RCS NO: 529- HGP-0198

PDP ANALYTICAL SERVICES
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

MERCURY PREPARATION LOG

SOP # PDP-MET-1007 and PDP-MET-1008, METHODS EPA SW-846:7470A, 7471A

Analyst: FC Date/Time: 8/17/98 9:30 ICV ID: 496-005 CRA ID: 496-004

Matrix: SOIL LCS ID: 496-005 Matrix Spike ID: 496-004

Sample No.	BOD Bottle No.	Sample Wt. (g) or Volume (mls)	Final Volume (mls)	Dilution Factor	Anomalies Observed
·004	414	0.20	100ml	500x	
·005	410	0.20		500x	
CCV	16	100ml		1x	
CCB	114	↓		↓	
4798-006	61	0.21		476.2x	
·007	35	0.21		476.2x	
·008	216	0.20		500x	
·009	250	0.21		476.2x	
·010	425	0.20		500x	
HGB739	210	0.2		500x	
HGL739	30	↓		↓	
HGL739D	490	↓		↓	
4802·001	140	0.22		454.5x	
·001 MS	150	·022		454.5x	
CCV	52	100ml		1x	
CCB	10	↓		↓	
·001 MSD	51	0.23		434.8x	
4802·002	14	0.22		454.5x	
·003	124	0.21	↓	476.2x	

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RCS NO: 529- HGP-0198

PDP ANALYTICAL SERVICES
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

MERCURY PREPARATION LOG

SOP # PDP-MET-1007 and PDP-MET-1008, METHODS EPA SW-846:7470A, 7471A

Analyst: FC Date/Time: 8/17/98 / 9:30 ICV ID: 496-005 CRA ID: 496-004

Matrix: SOIL LCS ID: 496-005 Matrix Spike ID: 496-004

Sample No.	BOD Bottle No.	Sample Wt. (g) or Volume (mls)	Final Volume (mls)	Dilution Factor	Anomalies Observed
4802-004	127	0.20	100ml	500X	
.006	78	0.21		476.2X	
.009	50	0.21		476.2X	
.010	40	0.20		500X	
.011	5	0.22		454.5X	
.012	2	0.22		454.5X	
.013	3	0.22		454.5X	
CCV	4	100ml		1X	
CCB	11	↓		↓	
4802.015	20	0.23		434.8X	
.016	100	0.20		500X	
.017	115	0.20		500X	
.018	200	~~0.020~~ 0.38		500X	
.019	220	~~0.021~~ 0.31		476.2X	
.020	300	0.22		454.5X	
.021	420	0.21		476.2X	
.023	470	0.21		476.2X	
.026	380	0.22		454.5X	
.027	395	0.21	↓	476.2X	

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RCS NO: 529- HGP-0198

PDP ANALYTICAL SERVICES
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

MERCURY PREPARATION LOG

SOP # PDP-MET-1007 and PDP-MET-1008, METHODS EPA SW-846:7470A, 7471A

Analyst: FC Date/Time: 8/13/98/9:30 ICV ID: 496-005 CRA ID: 496-004

Matrix: SOIL LCS ID: 496-005 Matrix Spike ID: 496-004

Sample No.	BOD Bottle No.	Sample Wt. (g) or Volume (mls)	Final Volume (mls)	Dilution Factor	Anomalies Observed
CRA	130	100ml	100ml	1x	
CCV	170	↓	↓	↓	
CCB	85	↓	↓	↓	
		JT 8/13/98			

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RCS NO. 516-PML-0198

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

PERCENT SOLIDS / MOISTURE

DATE IN: 8/17/98 DATE OUT: 8/18/98 ANALYST: JT

TIME IN: 4:00 PM TEMP IN: 104°C TIME OUT: 4:00 PM TEMP. OUT: 104°C

SAMPLE ID	MASS OF PAN + WET SAMPLE	MASS OF PAN + DRY SAMPLE	MASS OF PAN	MASS OF WET SAMPLE	MASS OF DRY SAMPLE	PERCENT MOISTURE	PERCENT SOLIDS
012D	6.5331	5.6076	1.0467				
4790-013	6.0660	5.8171	1.0560				
014	6.3915	5.7738	1.0553				
015	6.0750	5.8030	1.0552				
016	6.2109	5.6210	1.0549				
017	6.4937	6.1528	1.0555				
018	6.5021	5.6455	1.0603				
019	6.5581	5.8794	1.0584				
020	6.6666	6.1690	1.0606				
021	8.4472	6.9445	1.0524				
022	6.7632	6.4525	1.0469				
023	7.5275	6.7144	1.0436				
4790-COMPX/MSD	6.0773	5.7043	1.0470				
4798-001	6.6740	6.2341	1.0435	5.6305	5.1906	7.9	92.1
002	6.6170	6.4979	1.0442	5.5728	5.4537	2.2	97.8
003	6.7806	6.4724	1.0434	5.7372	5.429	5.4	94.6
004	7.1786	7.0527	1.0481	6.1305	6.0046	2.1	97.9
005	7.6092	6.6677	1.0478	6.5614	5.6199	14.4	85.6
006	6.5404	6.4497	1.0528	5.4876	5.3969	1.7	98.3
007	6.6895	6.5322	1.0526	5.6369	5.4796	2.8	97.2
BLK.			1.0448				
4798-008	6.0973	5.9710	1.0423	5.0550	~~4.9460~~ 4.9287	~~10.1~~ 2.5	~~89.9~~ 97.5
008D	6.0892	5.9764	1.0647	5.0245	4.9117	2.3	97.7

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RCS NO. 516-PML-0198

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

PERCENT SOLIDS / MOISTURE

DATE IN: 8/17/98 DATE OUT: 8/18/98 ANALYST: JT

TIME IN: ~~10~~ JT 4:00PM TEMP IN: 104°C TIME OUT: 4:00PM TEMP. OUT: 104°C

SAMPLE ID	MASS OF PAN + WET SAMPLE	MASS OF PAN + DRY SAMPLE	MASS OF PAN	MASS OF WET SAMPLE	MASS OF DRY SAMPLE	PERCENT MOISTURE	PERCENT SOLIDS
4798-009	6.2220	5.8695	1.0~~559~~606	5.1614	4.8089	6.8	93.2
.010	7.7281	6.6460	1.0559	6.6722	5.5901	16.2	83.8
4802-001	6.2162	5.9655	1.0273	5.1889	4.9382	4.8	95.2
.002	6.1442	5.9163	1.0302	5.114	4.8861	4.5	95.5
.003	6.5786	6.4503	1.0414	5.5372	5.4089	2.4	97.6
.004	6.5851	5.9825	1.0400	5.5446	4.942	10.9	89.1
.006	8.0580	6.9465	1.0332	7.0248	5.9133	15.8	84.2
.009	9.2733	5.7840	1.0286	8.2447	4.7554	42.7	57.6
.010	6.4317	4.1640	1.0371	5.3946	3.1269	42.1	57.9
.011	6.6250	5.4425	1.0430	5.5820	4.3995	22.2	78.8
.012	6.6218	5.4159	1.0460	5.5758	4.3699	22.6	78.4
.013	6.3854	5.5789	1.0556	5.3298	4.5233	15.1	84.9
.015	6.5033	5.5921	1.0592	5.4441	4.5329	16.7	83.3
.016	6.2582	5.8500	1.0498	5.2084	4.8002	7.8	92.2
.017	6.5419	6.0336	1.0482	5.4937	4.9854	9.3	90.7
.018	6.7130	5.5570	1.0500	5.6630	4.507	20.4	79.6
.019	6.3002	5.6520	1.0537	5.2465	4.5983	12.4	87.6
.020	6.6785	5.6792	1.0451	5.6334	4.6341	17.7	82.3
.021	6.~~7885~~ 09535	5.5797	1.0513	5.044	4.5284	10.2	89.8
BLK			1.0563				
4802.023	6.5651	5.7447	1.0492	5.5159	4.6955	14.9	85.1
~~5/.0230~~ 025	6.7810	5.~~8934~~ 8039	1.0544	5.7266	4.7495	17.1	82.9
.025	6.4636	5.6478	1.0390	5.4246	4.6058	15.0	85.0

Z:\NETDATA\QA\FORMS\LAB98\PML0198.DOC

REVIEWED BY/DATE: _____ PAGE NO: 000092

000056

002070

BRENDAN LOWREY
Print Originator's Name
Ecology and Environment, Inc.

RECORD OF COMMUNICATION

Conversation with: PDP Analytical Services	Date 09 / 21 / 98 (Mo) (Day) (Year)
Name: Sasha	Time: 2:00 AM/PM
Address: 1680 Lakefront Circle, Suite B, The Woodlands, Tx. 77380	☒ Originator Placed Call
Phone: (281) 292-7090	☐ Originator Received Call

Subject: Analytical Lab Report

Discussion:

- START missing a Form III (ICP Interference Check) from a sample data package (SDG: 4798)
- From the sample run log, an ICP Interference Check was done, but not reported.
- They will check their files for the Form III and fax to START
- Additionally, on the group of samples in question, no duplicates were run. Again, they will check their files and call back START to explain why.

Follow-Up-Action:

Wait for fax and call back.

Originator's Signature

06:FORMS-ROC/WOMERGE-05/02/97-D1

ecology and environment, inc.
1999 Bryan St., Suite 2000
Dallas, TX 75201
(214) 245-1000

International Specialists in the Environment
FAX: (214) 245-1001

FAX TRANSMISSION FORM

Date: December 22, 1998	**Time:**
Job Charge: 608KJ06040000-052601SFXX	**Total pages: 2** (including transmission form)

To: Mark Bourgeois Reddy P.

Company: PDP Analytical

Fax phone: 281-298-5784

From: David Anderson

IF THIS FAX IS INCOMPLETELY RECEIVED OR IS ILLEGIBLE, PLEASE CALL FOR RETRANSMISSION.

Mark and Reddy,

We have encountered some deficiencies during our validation of the analytical data from PDP for our Case number 6S188, PDP project ID Q1073-E&E6S188. Please supply the necessary data ASAP.

SDG 4960V
1. Summary report for MS/MSD (CLP form 3) of sample ST-15 (PDP 4960.034) was missing from the data package.
2. The Run Logs supplies instead of CLP forms 4 and 5 to associate samples with specific method blanks, tunings and calibrations are confusing without run times being entered. Multiple standards and tunings may be listed on the log and correlation with the data reported in the package is difficult. The Run Log which includes the tuning and initial calibration conducted on 10/20 to 10/21 was missing from the data package.
3. A CLP form 8 or equivalent (Internal Standard Area and Retention Time Summary was not included in the data package.
4. PDP utilized a 5 ppb standard as the lowest point on the calibration and the quantitation limit reported, however the RRFs for this standard are not included in the average RRF or %RSD calculations for the calibration. E&E has no problem with the laboratory utilizing this lower quantitation limit but the laboratory must demonstrate that the standard meets the linearity criteria.

SDG SVOAS
1. A CLP form 8 or equivalent (Internal Standard Area and Retention Time Summary was not included in the data package.
2. Run logs as a substitute for CLP form 5 were not included in the data package.
3. Raw data in the package indicates that samples ST-10, NT-02, NT-05, NT-04 and NT-07 (PDP sample numbers 4960.017 thru 4960.021) and preparation blank SVOB247 were analyzed between 2256 on 10/20/98 and 0321 on 10/21/98. No instrument tunings, initial or continuing

calibrations which correspond to these analyses were found in the data package. The earliest initial calibration reported occured after the analysis of these samples.

SDG SVOAS2
1. A CLP form 8 or equivalent (Internal Standard Area and Retention Time Summary was not included in the data package.
2. Raw data in the package indicates that preparation blank SVOB247 was analyzed at 2256 on 10/20/98. No instrument tunings, initial or continuing calibrations which correspond to these analyses were found in the data package. The earliest initial calibration reported occured after the analysis of these samples.
3. SDG narrative should indicate that no MS/MSD was conducted for the water matrix due to insufficient sample supplied.

For Case 6S180, PDP jobs 4798 and 4802, I am still awaiting the additional corrections that I requested on 12/11/98, specifically correction of the mercury results for 4802.002, correction to soil instead of water concentrations for sample 4802.027, and a new Form 5 for 4798 which will correspond with the flags on the Form 1s resubmitted on 12/9/98.

ecology and environment, inc.
International Specialists in the Environment

ANALYTICAL SERVICES CENTER
4493 Walden Avenue
Lancaster, New York 14086
Tel. (716) 685-8080, Fax: (716) 685-0852

MEMORANDUM

TO: Tom Beer - E & E Inc. Dallas

FROM: Caryn Wojtowicz - ASC Project Manager

DATE: June 23, 1998

SUBJECT: KJ6103.052601SFXX
START - Dallas

RE: 9801.181

CC: Lab File

Attached is the laboratory report of the analyses conducted on samples received at the Analytical Services Center on June 3, 1998. Analyses were performed according to the procedures set forth in the "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Update III, Third Edition, U.S. EPA, June 1997.

The chain of custody form provided herein is integral to this report and must be included with the analytical results forms upon transferral to another data user.

All samples on which this report is based will be retained by E & E for a period of 30 days from the date of this report, unless otherwise instructed by the client. If additional storage of samples is requested by the client, a storage fee of $1.00 per sample container per month will be charged for each sample, with such charges accruing until destruction of the samples is authorized by the client.

CW/bk
Enclosure

1

Recycled paper

On June 3, 1998 a total of fourteen samples (2 waters, 12 soils) were received at Analytical Services Center. Results were provided by facsimile on June 17, 1998.

BETX

Project specified surrogate recovery was not met in the analysis of sample SB07D-0405 or the matrix spike analysis of sample SB06-0102. These samples do meet in-house surrogate recovery limits of 26-139.

Samples SB13-6575 and SB13-6575 D required analysis using lesser sample weight due to the presence of petroleum hydrocarbons observed in the samples. Quantitation limits have been adjusted accordingly.

Surrogate recovery in the aqueous laboratory control sample analyzed on June 8, 1998 is artificially high due to a coeluting peak contained in the spike mix. (The halocarbon/aromatic volatile mix was used instead of the aromatics only). All BTEX spike recoveries were acceptable.

Sample SB13-GW-2 required analysis at a dilution due to the level of target compounds present. Quantitation limits have been adjusted accordingly.

Confirmation analysis was not required for this project.

TNRCC

Sample SB13-GW-2 required analysis at a dilution due to the level of target compounds.

PAH

Due to the consistently high percent difference for benzo(a)pyrene determined on continuing calibrations on the HYPER PAH column, this compound, if present, is reported from the ENV PAH column analysis.

Some low level contamination was observed in the soil method blank. As the resulting concentrations were less than required reporting limits, the blank is reported as "ND", none detected.

METALS

Client sample identifications have been truncated throughout this section of the report due to space limitations of the software program used. The full sample identification is listed in the comments field of Form I.

002075

Aluminum and iron were detected in the method blank at concentrations of 26.6 mg/kg and 10.7 mg/kg respectively. Associated sample concentrations exceeded the blank amount by ten times. No corrective action was required.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in the hardcopy data package has been authorized by the Laboratory Manager's designee, as verified by the following signature.

Caryn Wojtowicz

Caryn Wojtowicz – Project Manager
Analytical Services Center
June 22, 1998

002076

OFFICIAL
CHAIN OF CUSTODY RECORD

PROJ. NO. K3610205260 1SFAX

PROJECT NAME: Wilcox Refinery

SAMPLERS: (Signature) Sharon Moore / Sharon Moore J. Beer

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Metals (6010B)	PAH (8310)	TPH (TNRCC 1005)	g/k	BTEX (8021B or M)	REMARKS
SB06-0102	6/2/98	0756		✓	SB06 1-2' sample	1	✓	✓	✓	✓		EPA Tag No. 6-006498
SB06-0102	6/2/98	0756		✓	SB06 1-2' sample	2					✓	EPA Tag No. 6-006499
SB07-0405	6/2/98	1045		✓	SB07 4-5' sample	1	✓	✓	✓	✓		EPA Tag No. 6-009540
SB07-0405	6/2/98	1045		✓	SB07 4-5' sample	2					✓	EPA Tag No. 6-009539
SB07D-0405	6/2/98	1045		✓	SB07 4-5' duplicate sample	1	✓	✓	✓	✓		EPA Tag No. 6-006500
SB07D-0405	6/2/98	1045		✓	SB07 4-5' duplicate sample	1					✓	EPA Tag No. 6-009538
SB08-0102	6/2/98	1125		✓	SB08 1-2' sample	1	✓	✓	✓	✓		EPA Tag No. 6-009542
SB08-0102	6/2/98	1125		✓	SB08 1-2' Sample	2					✓	EPA Tag No. 6-009541
SB09-0102	6/2/98	1140		✓	SB09 1-2' Sample	1	✓	✓	✓	✓		EPA Tag No. 6-009550.
SB09-0102	6/2/98	1140		✓	SB09 1-2' Sample	2					✓	EPA Tag No. 6-009543
SB10-0304	6/2/98	1355		✓	SB10 3-4' Sample	1	✓	✓	✓	✓		EPA Tag No. 6-009551
SB10-0304	6/2/98	1355		✓	SB10 3-4' Sample	2	✓	✓	✓	✓ (5)	✓	EPA Tag No. 6-009557
SB11-0203	6/2/98	1440		✓	SB11 2-3' Sample	2					✓	EPA Tag No. 6-009553
SB11-0203	6/2/98	1440		✓	SB11 2-3' Sample	1	✓	✓	✓	✓		EPA Tag No. 6-009554
SB12-0102	6/2/98	1550		✓	SB12 1-2' Sample	1	✓	✓	✓	✓		EPA Tag No. 6-009556

4

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Sharon E. Moore	6/2/98 1730				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature) Fedex	Date / Time 6-3-98 0945	Received for Laboratory by: (Signature)	Date / Time 6-3-98 0945	Remarks Fed Ex Airbill No. 805550003424	
Shipped by:		Airbill Number			

1 of 2

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Returns with Warrant

EPA 7500-53 (11/96)

6-

002077

ENVIRONMENTAL PROTECTION AGENCY
Office of Enforcement

REGION 6
First International Bldg., 1201 Elm St.
Dallas, Texas 75270

CHAIN OF CUSTODY RECORD

PROJ. NO. KJ6103 | PROJECT NAME Wilcox Refinery

SAMPLERS: (Signature) Shawn E. Moore / J. Bell

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Metals (6010B)	PAHs (8310)	TPH (TNRCC 1005)	PH	BTEX (8021B)	REMARKS
SB12-0102	6/2/98	1550		✓	SB12 1-2' sample	2					✓	EPA Tag No. 6-009555
SB12-0809	6/2/98	1557		✓	SB12 8-9' Sample	1	✓	✓	✓	✓		EPA Tag No. 6-009557
SB12-0809	6/2/98	1557		✓	SB12 8-9' Sample	2					✓	EPA Tag No. 6-009558
SB13GW2	6/2/98	1650		✓	SB13 Groundwater	2	✓	✓	✓	✓		EPA Tag No. 6-009562 TPH only
SB13-GW2	6/2/98	1650		✓	SB13 Groundwater	2					✓	EPA Tag No. 6-009560
TB	6/2/98	1705		✓	Trip Blank	2					✓	EPA Tag No. 6-009564
SB13-6575	6/2/98	1708		✓	SB13 6.5-7.5' Sample	1	✓	✓	✓	✓		EPA Tag No. 6-009559
SB13-6575	6/2/98	1708		✓	SB13 6.5-7.5' Sample	2					✓	EPA Tag No. 6-009561
SB13D-6575	6/2/98	1710		✓	SB13 6.5-7.5' dup	1	✓	✓	✓	✓		EPA Tag No. 6-009567
SB13D-6575	6/2/98	1710		✓	SB13 6.5-7.5' dup	2					✓	EPA Tag No. 6-009563
SB13-0102	6/2/98	1655		✓	SB13 1-2' sample	1	✓	✓	✓	✓		EPA Tag No. 6-009568
SB13-0102	6/2/98	1655		✓	SB13 1-2' sample	2					✓	EPA Tag No. 6-009569

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Shawn Moore	6/2/98 1730				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
Fed Ex	6-3-98 0945		6-3-98 0945	Fed Ex Airbill No. 805350003424	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

002078

JOB NUMBER : 9801.181

Ecology and Environment, Inc.
SAMPLE TRACKING REPORT

SAMPLE NUMBER	CLIENT SAMPLE ID	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED
PH -S				
7928.03	SB06-0102	06/02/98		06/04/98
7929.03	SB07-0405	06/02/98		06/04/98
7930.03	SB07D-0405	06/02/98		06/04/98
7931.03	SB08-0102	06/02/98		06/04/98
7932.03	SB09-0102	06/02/98		06/04/98
7933.03	SB10-0304	06/02/98		06/04/98
7934.03	SB11-0203	06/02/98		06/04/98
7935.03	SB12-0102	06/02/98		06/04/98
7936.03	SB12-0809	06/02/98		06/04/98
7937.03	SB13-0102	06/02/98		06/04/98
7938.03	SB13-6575	06/02/98		06/04/98
7939.03	SB13D-6575	06/02/98		06/04/98
SOLIDS TOTAL -S				
7928.03	SB06-0102	06/02/98		06/04/98
7929.03	SB07-0405	06/02/98		06/04/98
7930.03	SB07D-0405	06/02/98		06/04/98
7931.03	SB08-0102	06/02/98		06/04/98
7932.03	SB09-0102	06/02/98		06/04/98
7933.03	SB10-0304	06/02/98		06/04/98
7934.03	SB11-0203	06/02/98		06/04/98
7935.03	SB12-0102	06/02/98		06/04/98
7936.03	SB12-0809	06/02/98		06/04/98
7937.03	SB13-0102	06/02/98		06/04/98
7938.03	SB13-6575	06/02/98		06/04/98
7939.03	SB13D-6575	06/02/98		06/04/98
8021B BETX -S				
7928.01	SB06-0102	06/02/98		06/09/98
7929.01	SB07-0405	06/02/98		06/09/98
7930.01	SB07D-0405	06/02/98		06/09/98
7931.01	SB08-0102	06/02/98		06/09/98
7932.01	SB09-0102	06/02/98		06/09/98
7933.01	SB10-0304	06/02/98		06/09/98
7934.01	SB11-0203	06/02/98		06/09/98

002079

JOB NUMBER : 9801.181

Ecology and Environment, Inc.
SAMPLE TRACKING REPORT

SAMPLE NUMBER	CLIENT SAMPLE ID		DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED
8021B BETX		-S			
7935.01	SB12-0102		06/02/98		06/09/98
7936.01	SB12-0809		06/02/98		06/09/98
7937.01	SB13-0102		06/02/98		06/09/98
7938.01	SB13-6575		06/02/98		06/10/98
7939.01	SB13D-6575		06/02/98		06/10/98
8021B BETX		-W			
7940.01	SB13-GW-2		06/02/98		06/08/98
7941.01	TB		06/02/98		06/05/98
TPH-TNRCC		-S			
7928.03	SB06-0102		06/02/98		06/09/98
7929.03	SB07-0405		06/02/98		06/09/98
7930.03	SB07D-0405		06/02/98		06/09/98
7931.03	SB08-0102		06/02/98		06/09/98
7932.03	SB09-0102		06/02/98		06/09/98
7933.03	SB10-0304		06/02/98		06/09/98
7934.03	SB11-0203		06/02/98		06/10/98
7935.03	SB12-0102		06/02/98		06/10/98
7936.03	SB12-0809		06/02/98		06/10/98
7937.03	SB13-0102		06/02/98		06/10/98
7938.03	SB13-6575		06/02/98		06/10/98
7939.01	SB13D-6575		06/02/98		06/10/98
TPH-TNRCC		-W			
7940.03	SB13-GW-2		06/02/98		06/07/98
8310 PAH/LC		-S			
7928.03	SB06-0102		06/02/98	06/04/98	06/09/98
7929.03	SB07-0405		06/02/98	06/04/98	06/09/98
7930.03	SB07D-0405		06/02/98	06/04/98	06/09/98
7931.03	SB08-0102		06/02/98	06/04/98	06/09/98
7932.03	SB09-0102		06/02/98	06/04/98	06/09/98
7933.03	SB10-0304		06/02/98	06/04/98	06/10/98
7934.03	SB11-0203		06/02/98	06/04/98	06/10/98
7935.03	SB12-0102		06/02/98	06/04/98	06/10/98
7936.03	SB12-0809		06/02/98	06/04/98	06/10/98
7937.03	SB13-0102		06/02/98	06/04/98	06/10/98
7938.03	SB13-6575		06/02/98	06/04/98	06/10/98
7939.03	SB13D-6575		06/02/98	06/04/98	06/10/98

002080

Job Number: 9801.181

Client: START - Dallas

Reviewer: C Nogtowicz

Date: 6/23/98

GC
TABLE OF CONTENTS
BETX

A.	SURROGATE SUMMARY	✓
B.	MS/MSD SUMMARY	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
	LCS SUMMARY	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
C.	RESULT SUMMARY FOR EACH SAMPLE	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT (PRIMARY RAW DATA PRECEDES CONFIRMATION RAW DATA)	✓
D.	EXTRACTION LOGBOOK PAGE(S)	✓
E.	RETENTION TIME WINDOW SUMMARY	✓
F.	INITIAL CALIBRATION SUMMARY ~~AND CHROMATOGRAMS~~ *	✓
G.	DAILY ANALYTICAL SEQUENCE INFORMATION AS FOLLOWS *	
	1. DAILY INJECTION LOGBOOK	✓
	2. CALIBRATION CHECK SUMMARY	✓
	3. CHROMATOGRAMS AND DATA SYSTEM PRINTOUTS FOR ALL STANDARDS IN THE DAILY SEQUENCE	✓
H.	BLANK RESULTS	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
I.	CALCULATION EXAMPLE	✓

* = ALL CALIBRATION INFORMATION IS ORGANIZED PER INSTRUMENT, CHRONOLOGICALLY

PURGEABLE AROMATICS
QUALITY CONTROL FOR ACCURACY: PERCENT
RECOVERY OF SURROGATE SPIKES
(MATRIX: SOLID)

9801.181

E & E Laboratory No.-98

(ug/kg)

Compound	Amount Added	Amount Determined	Percent Recovery	Project QC Targets
Trifluorotoluene				50 - 150
07928	40.0	27.0	67.5	
07928 MS	40.0	16.4	41.0*	
07928 MSD	40.0	22.3	55.8	
07929	40.0	23.7	59.2	
07930	40.0	19.2	48.0*	
07931	40.0	28.4	71.0	
07932	40.0	26.2	65.5	
07933	40.0	28.8	72.0	
07934	40.0	24.3	60.7	
07935	40.0	29.7	74.2	
07936	40.0	31.2	78.0	
07937	40.0	22.8	57.0	
07938	40.0	39.8	99.5	
07939	40.0	41.9	105	
Method Blank (06/09)	40.0	40.0	100	
LCS (06/09)	40.0	35.3	88.3	

THESE RECOVERIES ARE WITHIN PROJECT LIMITS WITH THE EXCEPTION OF "*" FLAGGED RESULTS ARE WITHIN ASC QC TARGET LIMITS OF 26 - 139%.

MS = MATRIX SPIKE
MSD = MATRIX SPIKE DUPLICATE
LCS = LABORATORY CONTROL SAMPLE

002082

ECOLOGY AND ENVIRONMET, INC.
ANALYTICAL SERVICES CENTER
QUALITY AND CONTROL FOR ACCURACY AND PRECISION
PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)
OFSOIL SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MSD)

MATRIX -SOIL
UNITS: UG/KG
RUN: 22, 23
JOB# 9801.181
SAMPLE# 7928.01 MS/MSD
ANALYZED: 6/9/98
BATCH# 980609301R-
METHOD: 8021-BTEX VOLATILE MS/MSD
NOTEBOOK:1236-68

PARAMETER	AMOUNT ADDED	ORIGINAL VALUE	AMOUNT DETERMINED		PERCENT RECOVERY		
			MS	MSD	MS	MSD	RPD
BENZENE	20		15.1	16.4	76%	82%	8.3%
TOLUENE	20		15.3	16.9	77%	85%	9.9%
ETHYLBENZENE	20		14.3	14.9	72%	75%	4.1%
TOTAL XYLENES	60		44.2	46	74%	77%	4.0%
MTBE	40				#VALUE!	#VALUE!	#VALUE!
TFT SURR	40		16.4	22.3	41%	56%	30.5%

Software Version	: 6.0.2:G11	Date	: 06/10/98 10:17:36 AM
Operator	: FOURNIERD	Sample Name	: RLCS
Sample Number	: 009	Study	: 10ULLCS,5ULSS/5.0G/5ML
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: V3600_1	Channel	: A
Interface Serial #	: 7102273182	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 28.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 L	Area Reject	: 0.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/09/98 04:37:40 PM	Cycle	: 9

Raw Data File : \\GCSRV1\TCDATA\v36001\980609301r\v3601a_0609_009.raw
Result File : \\GCSRV1\TCDATA\V36001\980609301R\v3601a_0609_009.rst
Inst Method : \\GCSRV1\TCDATA\v36001\3601_acq_28_min from
\\GCSRV1\TCDATA\V36001\980609301R\v3601a_0609_009.rst
Proc Method : \\GCSRV1\TCDATA\v36001\pid_060998btexsc.mth from
\\GCSRV1\TCDATA\V36001\980609301R\v3601a_0609_009.rst
Calib Method : \\GCSRV1\TCDATA\v36001\pid_060998btexsc.mth from
\\GCSRV1\TCDATA\V36001\980609301R\v3601a_0609_009.rst
Sequence File : \\GCSRV1\TCDATA\V36001\980609301R\V3601_060998.seq

LCS/LCSD REPORT

Instrument: V3600 #1 Method: 8021 B BETX

Batch #: 980609301R

Job #: 9801.181

Component Name	Time [min]	Area [µV·s]	Spike Amt. ug/L	Amount Determ. ug/L	% Recovery
BENZENE	7.11	419400.68	20.0	20.597	103.0
TFT (TRIFLUOROTOLUEN	8.30	264147.41	40.0	35.318	88.3
LUENE	10.40	391200.91	20.0	20.882	104.4
ETHYLBENZENE	13.58	324346.05	20.0	20.336	101.7
M/P-XYLENE	13.78	971887.90	40.0	42.043	105.1
O-XYLENE	14.70	358651.66	20.0	19.956	99.8
		2729634.61			

Control Limits:

Report stored in ASCII file: E:\V36001\980609301R\v3601a_0609_009.TX0

TEST CODE :SBTX0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07928 MATRIX : SOLID
SAMPLE ID CLIENT: SB06-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.3
Toluene	ND		2.3
Ethylbenzene	ND		2.3
Total Xylenes	ND		2.3

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :SBTX0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 87 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07929 MATRIX : SOLID
SAMPLE ID CLIENT: SB07-0405

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.3
Toluene	ND		2.3
Ethylbenzene	ND		2.3
Total Xylenes	ND		2.3

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002086

TEST CODE :SBTX0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 89 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07930 MATRIX : SOLID
SAMPLE ID CLIENT: SB07D-0405

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.2
Toluene	ND		2.2
Ethylbenzene	ND		2.2
Total Xylenes	ND		2.2

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002087

TEST CODE :SBTX0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 92 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07931 MATRIX : SOLID
SAMPLE ID CLIENT: SB08-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.2
Toluene	ND		2.2
Ethylbenzene	ND		2.2
Total Xylenes	ND		2.2

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002088

TEST CODE :SBTX0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07932 MATRIX : SOLID
SAMPLE ID CLIENT: SB09-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.3
Toluene	ND		2.3
Ethylbenzene	ND		2.3
Total Xylenes	ND		2.3

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :SBTX0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 90 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07933 MATRIX : SOLID
SAMPLE ID CLIENT: SB10-0304

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.2
Toluene	ND		2.2
Ethylbenzene	ND		2.2
Total Xylenes	ND		2.2

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :SBTX0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 85 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07934 MATRIX : SOLID
SAMPLE ID CLIENT: SB11-0203

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.4
Toluene	ND		2.4
Ethylbenzene	ND		2.4
Total Xylenes	ND		2.4

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002091

TEST CODE :SBTX0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 87 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07935 MATRIX : SOLID
SAMPLE ID CLIENT: SB12-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.3
Toluene	ND		2.3
Ethylbenzene	ND		2.3
Total Xylenes	ND		2.3

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :SBTX0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 86 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07936 MATRIX : SOLID
SAMPLE ID CLIENT: SB12-0809

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.3
Toluene	ND		2.3
Ethylbenzene	ND		2.3
Total Xylenes	ND		2.3

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002093

TEST CODE :SBTX0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 89 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07937 MATRIX : SOLID
SAMPLE ID CLIENT: SB13-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.2
Toluene	ND		2.2
Ethylbenzene	ND		2.2
Total Xylenes	ND		2.2

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :SBTX0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 86 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07938 MATRIX : SOLID
SAMPLE ID CLIENT: SB13-6575

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		12
Toluene	ND		12
Ethylbenzene	ND		12
Total Xylenes	13		12

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :SBTX0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 87 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07939 MATRIX : SOLID
SAMPLE ID CLIENT: SB13D-6575

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		11
Toluene	ND		11
Ethylbenzene	23		11
Total Xylenes	91		11

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002096

8021B Retention Time Window Study

Instrument ID: VARIAN 3600 #1 CHARLIE
Column: 30 M: 0.53mm; RTX-VOLATILES FSCC
Run Dates: 04/27-4/29/98

Method: 8021B-Aromatics
Spreadsheet: 8020RTW.WB1 (3600#1 RTW)

Aroclor		4/27/98 Mid Level RT	4/28/98 Mid Level RT	4/29/98 Mid Level RT	Mean RT	Std Dev	Calculated RTW (3x Std Dev)
MTBE		4.50	4.50	4.49	4.50	0.005	0.014
BENZENE		7.16	7.15	7.15	7.15	0.005	0.014
TOLUENE		10.46	10.45	10.45	10.45	0.005	0.014
CL-BENZENE		13.41	13.40	13.40	13.40	0.005	0.014
ETHLYBENZENE		13.65	13.64	13.63	13.64	0.008	0.024
M/P-XYLENE		13.85	13.83	13.83	13.84	0.009	0.028
O-XYLENE		14.77	14.76	14.76	14.76	0.005	0.014
1,3-DICHLOROBENZENE		18.69	18.69	18.69	18.69	0.000	0.000
1,4-DICHLOROBENZENE		18.94	18.94	18.93	18.94	0.005	0.014
1,2-DICHLOROBENZENE		19.77	19.78	19.77	19.77	0.005	0.014
TFT SURROGATE		8.35	8.36	8.38	8.36	0.012	0.037

Software Version	: 6.0.2:G11	Date	: 06/10/98 10:18:20 AM
Operator	: PLEUTHNERG	Sample Name	: RCVS
Sample Number	: 020	Study	: 5ULSURR,10ULCVS/5G/5ML
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: V3600_1	Channel	: A
Interface Serial #	: 7102273182	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 28.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 L	Area Reject	: 0.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/10/98 12:25:52 AM	Cycle	: 20

Raw Data File : \\GCSRV1\TCDATA\v36001\980609301r\v3601a_0609_020.raw
Result File : \\GCSRV1\TCDATA\V36001\980609301R\v3601a_0609_020.rst
Inst Method : \\GCSRV1\TCDATA\v36001\3601_acq_28_min from
\\GCSRV1\TCDATA\V36001\980609301R\v3601a_0609_020.rst
Proc Method : \\GCSRV1\TCDATA\v36001\pid_060998btexsc.mth from
\\GCSRV1\TCDATA\V36001\980609301R\v3601a_0609_020.rst
Calib Method : \\GCSRV1\TCDATA\v36001\pid_060998btexsc.mth from
\\GCSRV1\TCDATA\V36001\980609301R\v3601a_0609_020.rst
Sequence File : \\GCSRV1\TCDATA\V36001\980609301R\V3601_060998.seq

CONTINUING CALIBRATION STD / CVS REPORT

Instrument: 3.6CC #1 Method: 8021B BETX

Batch #: 980609301R

Job #: 9801.181

Peak #	Component Name	Time [min]	Area [µV·s]	Amount Determ. ug/L	Expected Amt. ug/L	% Difference
19	BENZENE	7.11	359924.39	17.7	20.0	-11.6
21	TFT (TRIFLUOROTOLUEN	8.31	193445.29	25.9	40.0	-35.3 % recovery
24	TOLUENE	10.41	344799.61	18.4	20.0	-8.0
29	ETHYLBENZENE	13.59	286999.81	18.0	20.0	-10.0
30	M/P-XYLENE	13.79	859489.48	37.2	40.0	-7.0
31	O-XYLENE	14.71	317804.14	17.7	20.0	-11.6
			2362462.71			

Control Limits:

Software Version	: 6.0.2:G11	Date	: 06/10/98 10:18:35 AM
Operator	: PLEUTHNERG	Sample Name	: RCVS
Sample Number	: 021	Study	: 5ULSURR,10ULCVS/5G/5ML
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: V3600_1	Channel	: A
Interface Serial #	: 7102273182	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 28.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 L	Area Reject	: 0.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/10/98 01:05:09 AM	Cycle	: 21

Raw Data File : \\GCSRV1\TCDATA\v36001\980609301r\v3601a_0609_021.raw
Result File : \\GCSRV1\TCDATA\V36001\980609301R\v3601a_0609_021.rst
Inst Method : \\GCSRV1\TCDATA\v36001\3601_acq_28_min from
\\GCSRV1\TCDATA\V36001\980609301R\v3601a_0609_021.rst
Proc Method : \\GCSRV1\TCDATA\v36001\pid_060998btexsc.mth from
\\GCSRV1\TCDATA\V36001\980609301R\v3601a_0609_021.rst
Calib Method : \\GCSRV1\TCDATA\v36001\pid_060998btexsc.mth from
\\GCSRV1\TCDATA\V36001\980609301R\v3601a_0609_021.rst
Sequence File : \\GCSRV1\TCDATA\V36001\980609301R\V3601_060998.seq

CONTINUING CALIBRATION STD / CVS REPORT

Instrument: V 3600 #1 Method: 8021B BTEX

Batch #: 980609301R

Job #: 9801.181

Peak #	Component Name	Time [min]	Area [µV·s]	Amount Determ. ug/L	Expected Amt. ug/L	% Difference
16	BENZENE	7.11	364789.71	17.9	20.0	-10.4
18	TFT (TRIFLUOROTOLUEN	8.31	175791.25	23.5	40.0	~~-41.2~~ % recovery
22	TOLUENE	10.41	341704.05	18.2	20.0	-8.8
30	ETHYLBENZENE	13.59	288359.52	18.1	20.0	-9.6
31	M/P-XYLENE	13.79	866047.56	37.5	40.0	-6.3
32	O-XYLENE	14.71	321656.31	17.9	20.0	-10.5
			2358348.39			

Control Limits:

Software Version	: 6.0.2:G11	Date	: 06/10/98 10:24:26 AM
Operator	: PLEUTHNERG	Sample Name	: RCVS
Sample Number	: 028	Study	: 5ULSURR,10UL CVS/5G/5ML
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: V3600_1	Channel	: A
Interface Serial #	: 7102273182	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 28.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 L	Area Reject	: 0.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/10/98 05:40:09 AM	Cycle	: 28

Raw Data File : \\GCSRV1\TCDATA\v36001\980609301r\v3601a_0609_028.raw
Result File : \\GCSRV1\TCDATA\V36001\980609301R\v3601a_0609_028.rst
Inst Method : \\GCSRV1\TCDATA\v36001\3601_acq_28_min from
\\GCSRV1\TCDATA\V36001\980609301R\v3601a_0609_028.rst
Proc Method : \\GCSRV1\TCDATA\v36001\pid_060998btexsc.mth from
\\GCSRV1\TCDATA\V36001\980609301R\v3601a_0609_028.rst
Calib Method : \\GCSRV1\TCDATA\v36001\pid_060998btexsc.mth from
\\GCSRV1\TCDATA\V36001\980609301R\v3601a_0609_028.rst
Sequence File : \\GCSRV1\TCDATA\V36001\980609301R\V3601_060998.seq

CONTINUING CALIBRATION STD / CVS REPORT

Instrument: V3600 A1 Method: 8021 B BFTX

Batch #: 980609301R

Job #: 9801,181

Peak #	Component Name	Time [min]	Area [µV·s]	Amount Determ. ug/L	Expected Amt. ug/L	% Difference
14	BENZENE	7.11	436459.75	21.4	20.0	7.2
16	TFT (TRIFLUOROTOLUEN	8.32	216175.93	28.9	40.0	-27.7
20	TOLUENE	10.42	401061.85	21.4	20.0	7.0
27	ETHYLBENZENE	13.60	338821.66	21.2	20.0	6.2
28	M/P-XYLENE	13.80	1006060.17	43.5	40.0	8.8
29	O-XYLENE	14.72	379107.81	21.1	20.0	5.5
			2777687.18			

Control Limits:

84

TEST CODE :SBTX0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB :Method Blank (06/09) MATRIX : SOLID

Associated Samples: 7928; 7929; 7930; 7931; 7932; 7933;
7934; 7935; 7936; 7937; 7938; 7939

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.0
Toluene	ND		2.0
Ethylbenzene	ND		2.0
Total Xylenes	ND		2.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

DATA REDUCTION/EVALUATION/REPORTING

Quantitate using the curve or mean calibration factor.

The data system prints results in µg/L or µg/kg. The following formulae are given as checks.

Water or soil samples when not quantitating from a curve.

$$\text{Concentration, } \mu g/kg \text{ or } \mu g/L = \frac{(A_x)\ (Df)}{(\overline{CF_x})}$$

Where,

Ax = Area of the peak for the compound to be measured

$\overline{CF_x}$ = mean calibration factor for compound (area / µg/L or area / µg/kg)

Df = Dilution factor. The dilution factor is defined as follows:

For waters:

$$\frac{\text{mL of sample used to make dilution + mL ASTM Type II Water}}{\text{mL of sample used to make dilution}}$$

For soils:

$$\frac{5g}{\text{grams of soil purged}}$$

Medium level (methanol extract) when not quantitating from a curve.

$$\text{Soil Sample Concentration, } \mu g/kg = \frac{(A_x)}{(\overline{CF_x})}\left[\frac{5}{V_e}\frac{V_t}{S}\right]$$

Where,

A_x = area of the peak for the compound to be measured

$\overline{CF_x}$ = mean calibration factor for compound x (area / µg/L)

S = Mass of sample extracted (g) usually 4 g

5 = amount of water (mL) to which the method extract is added (to account for units of curve)

Vt = Volume (mL) of total methanol extract, usually 10 mL.

Ve = Volume (mL) of methanol extract added to 5 mL of water for purging, usually 0.100 mL.

002102

PURGEABLE AROMATICS
QUALITY CONTROL FOR ACCURACY: PERCENT
RECOVERY OF SURROGATE SPIKES
(MATRIX: WATER)

9801.181

E & E Laboratory No.-98

(ug/L)

Compound	Amount Added	Amount Determined	Percent Recovery	Project QC Targets
Trifluorotoluene				65 - 130
07940	10.0	9.5	95.0	
07941	10.0	9.2	92.0	
Method Blank (06/05)	10.0	10.0	100	
Method Blank (06/08)	40.0	40.0	100	
LCS (06/05)	40.0	44.2	111	
LCS (06/08)	40.0	96.0	960*	

THESE RECOVERIES ARE WITHIN PROJECT QC TARGETS WITH THE EXCEPTION OF THOSE FLAGGED "*". THIS ELEVATED RECOVERY IS DUE TO COELUTING SPIKE COMPOUND. SEE NARRATIVE.

LCS = LABORATORY CONTROL SAMPLE

002103

ECOLOGY AND ENVIRONMET, INC.
ANALYTICAL SERVICES CENTER
QUALITY AND CONTROL FOR ACCURACY AND PRECISION
PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)
OF WATER SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MSD)

UNITS: UG/L
MATRIX -WATER
JOB# 9801.165 SAMPLE# 8044 MS/MSD
ANALYZED:
BATCH# 980605303R- BTEX VOLATILE

PARAMETER	AMOUNT ADDED	ORIGINA VALUE	AMOUNT DETERMINED		PERCENT RECOVERY		
			MS	MSD	MS	MSD	RPD
BENZENE	10		8.31	7.79	83%	78%	6.5%
TOLUENE	10		7.99	7.56	80%	76%	5.5%
ETHYLBENZENE	10		8.24	7.29	82%	73%	12.2%
TOTAL XYLENES	30		26.3	25.1	88%	84%	4.7%

ECOLOGY AND ENVIRONMET, INC.
ANALYTICAL SERVICES CENTER
QUALITY AND CONTROL FOR ACCURACY AND PRECISION
PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)
OF WATER SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MSD)

UNITS: UG/L
MATRIX -WATER
JOB# 9801.181 SAMPLE# 7836 MS/MSD
ANALYZED:
BATCH# 980608303R- BTEX VOLATILE

PARAMETER	AMOUNT ADDED	ORIGINA VALUE	AMOUNT DETERMINED		PERCENT RECOVERY		
			MS	MSD	MS	MSD	RPD
BENZENE	20		20.5	21.6	103%	108%	5.2%
TOLUENE	20		21.4	22.8	107%	114%	6.3%
ETHYLBENZENE	20		22.4	26.4	112%	132%	16.4%
TOTAL XYLENES	60		63.9	67.4	107%	112%	5.3%
TFT SURR	40		103	90.4	258%	226%	13.0%

coelutes with PCE IN STD

53

ECOLOGY AND ENVIRONMET, INC.
ANALYTICAL SERVICES CENTER
QUALITY AND CONTROL FOR ACCURACY AND PRECISION
PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)
OF WATER/SOIL MATRIX SPIKE (MS)

MATRIX --WATER

UNITS: UG/L
SAMPLE : WLCS 060598

JOB# 9801.203
DATE:
BATCH# 980605306R-
NOTEBOOK:

8021-BETX VOLATILE

	AMOUNT	ORIGINAL	AMOUNT		PERCENT	
PARAMETER	ADDED	VALUE	DETERMINED		RECOVERY	
					MS	
MTBE	20		16.9		99%	
BENZENE	20		17.1		86%	
TOLUENE	20		17.7		89%	
ETHYLBENZENE	20		17.7		89%	
TOTAL XYLENES	60		56.3		94%	
TFT SURROGATE(% REC)	40		44.5		111%	

106

ECOLOGY AND ENVIRONMET, INC.
ANALYTICAL SERVICES CENTER
QUALITY AND CONTROL FOR ACCURACY AND PRECISION
PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)
OF WATER/SOIL MATRIX SPIKE (MS)

MATRIX --WATER

UNITS: UG/L
SAMPLE : WLCS 060898

JOB# 9801.181
DATE:
BATCH# 980608306R-
NOTEBOOK:

8021-BETX VOLATILE
SOP-GC.59 REVISION 3.0

	AMOUNT	ORIGINAL	AMOUNT		PERCENT	
PARAMETER	ADDED	VALUE	DETERMINED		RECOVERY	
					MS	
BENZENE	20		18.2		91%	
TOLUENE	20		18.4		92%	
ETHYLBENZENE	20		20		100%	
TOTAL XYLENES	60		67.7		113%	

TEST CODE :WBTX0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8021B BETX UNITS : UG/L
SAMPLE ID LAB : EE-98-07940 MATRIX: WATER
SAMPLE ID CLIENT: SB13-GW-2

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	PRESENT		50
Toluene	ND		50
Ethylbenzene	210		50
Total Xylenes	PRESENT		50

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :WBTX0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8021B BETX UNITS : UG/L
SAMPLE ID LAB : EE-98-07941 MATRIX: WATER
SAMPLE ID CLIENT: TB

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.0
Toluene	ND		2.0
Ethylbenzene	ND		2.0
Total Xylenes	ND		2.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

8020 Retention Time Window Study

Instrument ID: VARIAN 3400 #8
Column: RESTEK 502.2 30METER 0.53MM ID
Run Dates: 08/05/97 - 08/08/97

Aroclor	Pk #	08/05/97 Mid Level RT	08/06/97 Mid Level RT	08/08/97 Mid Level RT	Mean RT	Std Dev	Calculated RTW (3.14x Std Dev)
MTBE	1	4.475	4.499	4.497	4.490	0.0109	0.034
BENZENE	2	7.427	7.455	7.450	7.444	0.0122	0.038
TOLUENE	3	11.004	11.025	11.029	11.019	0.0110	0.034
ETHYLBENZENE	4	14.867	14.885	14.884	14.879	0.0083	0.026
M/P-XYLENE	5	15.092	15.110	15.108	15.103	0.0081	0.025
O-XYLENE	1	16.331	16.346	16.343	16.340	0.0065	0.020
CL-BENZENE	2	14.668	14.686	14.686	14.680	0.0085	0.027
1,3-DICHLOROBENZENE	3	21.737	21.757	21.750	21.748	0.0083	0.026
1,4-DICHLOROBENZENE	4	22.118	22.139	22.130	22.129	0.0086	0.027
1,2-DICHLOROBENZENE	5	23.324	23.340	23.334	23.333	0.0066	0.021

Software Version	: 6.0.2:G11	Date	: 06/16/98 06:41:58 PM
Operator	: FOURNIERD	Sample Name	: R100NGSTD
Sample Number	: 001	Study	: 10ULRSTD/5ML
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: V34008B	Channel	: A
Interface Serial #	: 3341210154	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 38.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 L	Area Reject	: 0.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/05/98 12:56:47 PM	Cycle	: 1

Raw Data File : \\GCSRV1\TCDATA\v34008\980605306r\v34008_0605_001.raw
Result File : \\GCSRV1\TCDATA\V34008\980605306R\v34008_0605_001.rst
Inst Method : \\GCSRV1\TCDATA\v34008\34008mth4_run from
\\GCSRV1\TCDATA\V34008\980605306R\v34008_0605_001.rst
Proc Method : \\GCSRV1\TCDATA\v34008\8021aro_060498wc.mth from
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Sequence File : \\GCSRV1\TCDATA\V34008\980605306R\V34008_060598R.seq

CONTINUING CALIBRATION STD / CVS REPORT

Instrument: V3400 #8 Method: 980605306R BATCH

Batch #: 980605306R 8021B - START BTEX

Job #: _____

Peak #	Component Name	Time [min]	Area [µV·s]	Amount Determ. ug/L	Expected Amt. ug/L	% Difference
6	MTBE	8.66	90379.23	37.5	40.0	-6.3
12	BENZENE	12.97	125163.13	19.5	20.0	-2.5 ✓
14	TFT	14.26	677.88	0.4	~~40.0~~ Not Added	~~-99.0~~
17	TOLUENE	17.17	113253.55	19.3	20.0	-3.5 ✓
20	CHLOROBENZENE	20.83	125855.61	19.7	20.0	-1.7
21	ETHYLBENZENE	20.91	107736.48	20.1	20.0	0.5 ✓
22	M-P-XYLENE	21.11	284175.94	40.4	40.0	1.0 ✓
23	O-XYLENE	22.27	120015.55	19.4	20.0	-2.9 ✓
31	1,3-DICHLOROBENZENE	26.94	140386.85	17.8	20.0	-11.0
32	1,4-DICHLOROBENZENE	27.21	111912.81	20.2	20.0	1.2
33	1,2-DICHLOROBENZENE	28.27	87584.85	19.1	20.0	-4.4
			1307141.87			

Control Limits: _____

Software Version	: 6.0.2:G11	Date	: 06/16/98 06:42:22 PM
Operator	: FOURNIERD	Sample Name	: RCVS
Sample Number	: 015	Study	: 10ULCVS,5ULSTARTSS/5ML
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: V34008B	Channel	: A
Interface Serial #	: 3341210154	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 38.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 L	Area Reject	: 0.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/06/98 12:46:01 AM	Cycle	: 15

Raw Data File : \\GCSRV1\TCDATA\v34008\980605306r\v34008_0605_015.raw
Result File : \\GCSRV1\TCDATA\V34008\980605306R\v34008_0605_015.rst
Inst Method : \\GCSRV1\TCDATA\v34008\34008mth4_run from \\GCSRV1\TCDATA\V34008\980605306R\v34008_0605_015.rst
Proc Method : \\GCSRV1\TCDATA\v34008\8021aro_060498wc.mth from \\GCSRV1\TCDATA\V34008\980605306R\v34008_0605_015.rst
Calib Method : \\GCSRV1\TCDATA\v34008\8021aro_060498wc.mth from \\GCSRV1\TCDATA\V34008\980605306R\v34008_0605_015.rst
Sequence File : \\GCSRV1\TCDATA\V34008\980605306R\V34008_060598R.seq

CONTINUING CALIBRATION STD / CVS REPORT

Instrument: V3400 #8 Method: 8021B - START BETX

Batch #: 980605306R -

Job #: _____

Peak #	Component Name	Time [min]	Area [µV·s]	Amount Determ. ug/L	Expected Amt. ug/L	% Difference
7	MTBE	8.66	87144.87	36.1	40.0	-9.6
12	BENZENE	12.98	114097.05	17.8	20.0	-11.1 ✓
13	TFT	14.28	20227.11	12.0	~~40.0~~ 10 MAX	~~-70.0~~ (12c)
16	TOLUENE	17.18	107636.92	18.3	20.0	-8.3 ✓
20	CHLOROBENZENE	20.84	122331.38	19.1	20.0	-4.5 ✓
21	ETHYLBENZENE	20.92	102952.17	19.2	20.0	-4.0 ✓
22	M-P-XYLENE	21.12	273532.33	38.9	40.0	-2.8 ✓
23	O-XYLENE	22.28	107766.22	17.4	20.0	-12.8
33	1,3-DICHLOROBENZENE	26.95	135885.70	17.2	20.0	-13.9
34	1,4-DICHLOROBENZENE	27.22	102738.48	18.6	20.0	-7.1
36	1,2-DICHLOROBENZENE	28.28	82258.16	18.0	20.0	-10.2
			1256570.40			

Control Limits: _____

Software Version	: 6.0.2:G11	Date	: 06/16/98 06:42:35 PM
Operator	: FOURNIERD	Sample Name	: RCVS
Sample Number	: 019	Study	: 10ULCVS,5ULSTARTSS/5ML
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: V34008B	Channel	: A
Interface Serial #	: 3341210154	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 38.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 L	Area Reject	: 0.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/06/98 03:47:24 AM	Cycle	: 19

Raw Data File : \\GCSRV1\TCDATA\v34008\980605306r\v34008_0605_019.raw
Result File : \\GCSRV1\TCDATA\V34008\980605306R\v34008_0605_019.rst
Inst Method : \\GCSRV1\TCDATA\v34008\34008mth4_run from
\\GCSRV1\TCDATA\V34008\980605306R\v34008_0605_019.rst
Proc Method : \\GCSRV1\TCDATA\v34008\8021aro_060498wc.mth from
\\GCSRV1\TCDATA\V34008\980605306R\v34008_0605_019.rst
Calib Method : \\GCSRV1\TCDATA\v34008\8021aro_060498wc.mth from
\\GCSRV1\TCDATA\V34008\980605306R\v34008_0605_019.rst
Sequence File : \\GCSRV1\TCDATA\V34008\980605306R\V34008_060598R.seq

CONTINUING CALIBRATION STD / CVS REPORT

Instrument: V3400 08 Method: 8021B START BTX

Batch #: 980605306R -

Job #: _____

Peak #	Component Name	Time [min]	Area [µV·s]	Amount Determ. ug/L	Expected Amt. ug/L	% Difference
6	MTBE	8.66	86457.91	35.9	40.0	-10.3
14	BENZENE	12.97	115907.75	18.1	20.0	-9.7 ✓
16	TFT	14.27	17551.29	10.4	40.0	-74.0
19	TOLUENE	17.17	103529.12	17.6	20.0	-11.8 ✓
23	CHLOROBENZENE	20.83	124320.99	19.4	20.0	-2.9 ✓
24	ETHYLBENZENE	20.90	94083.30	17.6	20.0	-12.2 ✓
25	M-P-XYLENE	21.11	254624.21	36.2	40.0	-9.5 ✓
26	O-XYLENE	22.26	95893.68	15.5	20.0	-22.4
34	1,3-DICHLOROBENZENE	26.93	96832.34	12.3	20.0	-38.6
35	1,4-DICHLOROBENZENE	27.21	99697.91	18.0	20.0	-9.8
36	1,2-DICHLOROBENZENE	28.26	79828.97	17.4	20.0	-12.9
			1168727.47			

Control Limits: _____

Software Version	: 6.0.2:G11	Date	: 06/08/98 12:12:08 PM
Operator	: PLEUTHNERG	Sample Name	: R100NGSTD
Sample Number	: 001	Study	: 10ULRSTD/5ML
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: V34008B	Channel	: A
Interface Serial #	: 3341210154	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 38.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 L	Area Reject	: 0.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/08/98 11:11:13 AM	Cycle	: 1

Raw Data File : \\GCSRV1\TCDATA\V34008\980608306R-\v34008_0608_001.raw
Result File :
Inst Method : \\GCSRV1\TCDATA\v34008\34008mth4_run from
Proc Method : \\GCSRV1\TCDATA\V34008\8021ARO_060498WC.mth from
Calib Method : \\GCSRV1\TCDATA\V34008\8021ARO_060498WC.mth from
Sequence File : \\GCSRV1\TCDATA\V34008\980608306R-\V34008_060898.seq

CONTINUING CALIBRATION STD / CVS REPORT

Instrument: V3400 #8 Method: 8021B - BETX

Batch #: 980608306R-

Job #: _____

Peak #	Component Name	Time [min]	Area [µV·s]	Amount Determ. ug/L	Expected Amt. ug/L	% Difference
8	MTBE	8.66	87511.08	36.3	40.0	-9.3
15	BENZENE	12.97	144955.22	22.6	20.0	12.9 ✓
16	TFT	14.27	66183.80	39.2	40.0	-2.0
23	TOLUENE	17.17	119653.35	20.4	20.0	2.0 ✓
29	CHLOROBENZENE	20.83	131025.21	20.5	20.0	2.3 ✓
30	ETHYLBENZENE	20.91	112545.79	21.0	20.0	5.0 ✓
31	M-P-XYLENE	21.11	292340.61	41.5	40.0	3.9
33	O-XYLENE	22.26	107186.94	17.3	20.0	-13.3
44	1,3-DICHLOROBENZENE	26.93	138490.00	17.6	20.0	-12.2
45	1,4-DICHLOROBENZENE	27.21	113143.49	20.5	20.0	2.4
46	1,2-DICHLOROBENZENE	28.26	89018.13	19.4	20.0	-2.8
			1402053.61			

Control Limits: _____

002114

Software Version	: 6.0.2:G11	Date	: 06/16/98 06:48:27 PM
Operator	: PLEUTHNERG	Sample Name	: RCVS
Sample Number	: 015	Study	: 5ULSURR,10ULRSTD
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: V34008B	Channel	: A
Interface Serial #	: 3341210154	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 38.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 L	Area Reject	: 0.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/08/98 11:29:01 PM	Cycle	: 15

Raw Data File : \\GCSRV1\TCDATA\V34008\980608306R-\v34008_0608_015.raw
Result File : \\GCSRV1\TCDATA\V34008\980608306R-\v34008_0608_015.rst
Inst Method : \\GCSRV1\TCDATA\v34008\34008mth4_run from
\\GCSRV1\TCDATA\V34008\980608306R-\v34008_0608_015.rst
Proc Method : \\GCSRV1\TCDATA\v34008\8021aro_060498wc.mth from
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Calib Method : \\GCSRV1\TCDATA\v34008\8021aro_060498wc.mth from
\\GCSRV1\TCDATA\V34008\980608306R-\v34008_0608_015.rst
Sequence File : \\GCSRV1\TCDATA\V34008\980608306R-\V34008_060898RECAL.seq

CONTINUING CALIBRATION STD / CVS REPORT

Instrument: _____ Method: _____

Batch #: _____

Job #: _____

Peak #	Component Name	Time [min]	Area [µV·s]	Amount Determ. ug/L	Expected Amt. ug/L	% Difference
9	MTBE	8.65	81926.17	34.0	40.0	-15.0
17	BENZENE	12.98	112910.91	17.6	20.0	-12.0
18	TFT	14.27	151300.02	88.2	40.0	120.5
23	TOLUENE	17.17	104351.59	17.8	20.0	-11.1
30	CHLOROBENZENE	20.83	126845.11	19.8	20.0	-1.0
31	ETHYLBENZENE	20.91	102916.40	19.2	20.0	-4.0
32	M-P-XYLENE	21.11	272404.88	38.7	40.0	-3.2
33	O-XYLENE	22.26	171715.63	27.8	20.0	38.9
45	1,3-DICHLOROBENZENE	26.93	164987.28	20.9	20.0	4.6
46	1,4-DICHLOROBENZENE	27.21	103617.50	18.7	20.0	-6.3
48	1,2-DICHLOROBENZENE	28.26	78920.60	17.2	20.0	-13.9
			1471896.11			

Control Limits:_____

TEST CODE :WBTX0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8021B BETX UNITS : UG/L
SAMPLE ID LAB :Method Blank (06/05) MATRIX: WATER

Associated Sample: 7941

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.0
Toluene	ND		2.0
Ethylbenzene	ND		2.0
Total Xylenes	ND		2.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

DATA REDUCTION/EVALUATION/REPORTING

Quantitate using the curve or mean calibration factor.

The data system prints results in µg/L or µg/kg. The following formulae are given as checks.

Water or soil samples when not quantitating from a curve.

$$\text{Concentration, } \mu g/kg \text{ or } \mu g/L = \frac{(A_x)\ (Df)}{(\overline{CF_x})}$$

Where,

Ax = Area of the peak for the compound to be measured

$\overline{CF_x}$ = mean calibration factor for compound (area / µg/L or area / µg/kg)

Df = Dilution factor. The dilution factor is defined as follows:

For waters:

$$\frac{\text{mL of sample used to make dilution + mL ASTM Type II Water}}{\text{mL of sample used to make dilution}}$$

For soils:

$$\frac{5g}{\text{grams of soil purged}}$$

Medium level (methanol extract) when not quantitating from a curve.

$$\textit{Soil Sample Concentration, } \mu g/kg = \frac{(A_x)}{(\overline{CF_x})}\left[\frac{5}{V_e}\frac{V_t}{S}\right]$$

Where,

A_x = area of the peak for the compound to be measured

$\overline{CF_x}$ = mean calibration factor for compound x (area / µg/L)

S = Mass of sample extracted (g) usually 4 g

5 = amount of water (mL) to which the method extract is added (to account for units of curve)

Vt = Volume (mL) of total methanol extract, usually 10 mL.

Ve = Volume (mL) of methanol extract added to 5 mL of water for purging, usually 0.100 mL.

002117

Job Number: 9801.131
Client: Dallas START
Reviewer: [signature]
Date: 6/23/98

GC
TABLE OF CONTENTS
TNRCC

A.	SURROGATE SUMMARY	✓ NA
B.	MS/MSD SUMMARY	NA
	FOLLOWED BY:	
	1. CHROMATOGRAM	↓
	2. DATA SYSTEM PRINTOUT	
	LCS SUMMARY LCS/LCSD	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
C.	RESULT SUMMARY FOR EACH SAMPLE	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT (PRIMARY RAW DATA PRECEDES CONFIRMATION RAW DATA)	✓
D.	EXTRACTION LOGBOOK PAGE(S)	✓
E.	RETENTION TIME WINDOW SUMMARY	default windows
F.	INITIAL CALIBRATION SUMMARY AND CHROMATOGRAMS *	✓
G.	DAILY ANALYTICAL SEQUENCE INFORMATION AS FOLLOWS *	
	1. DAILY INJECTION LOGBOOK	✓
	2. CALIBRATION CHECK SUMMARY	✓
	3. CHROMATOGRAMS AND DATA SYSTEM PRINTOUTS FOR ALL STANDARDS IN THE DAILY SEQUENCE	✓
H.	BLANK RESULTS	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
I.	CALCULATION EXAMPLE	

* = ALL CALIBRATION INFORMATION IS ORGANIZED PER INSTRUMENT, CHRONOLOGICALLY

ECOLOGY & ENVIRONMENT, INC

TNRCC Method 1005 - Toatal Petroleum Hydrocarbons

Quality and Control for Accuracy and Precision:
Percent Recovery of Laboratory Control Sample (LCS)
and Duplicate (LCSD) for water matrix.

885-131-2
885-131-3

Units: mg/L

Job No: 9801.181

PARAMETER	Amount Added		Amount Determined		% Recovery				RPD
	LCS	LCSD	LCS	LCSD	LCS	Q	LCSD	Q	
C6 TO C10	35.7	35.7	38.0	34.7	106.6%		97.1%		9.3%
C10 TO C28	35.7	35.7	38.8	35.0	108.6%		98.1%		10.2%
C6 TO C28	71.4	71.4	76.8	69.7	107.6%		97.6%		9.8%

Recovery Limits: 70 - 130
RPD Limits: 30

* - Value is outside E & E QC limits.

TEST CODE :W1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : TPH-TNRCC UNITS : MG/L
SAMPLE ID LAB : EE-98-07940 MATRIX: WATER
SAMPLE ID CLIENT: SB13-GW-2

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	140		5.0
>C10 -> C28 Hydrocarbons	530		5.0
C6 -> C28 Hydrocarbons	680		5.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

Software Version	: 6.0.2:G11	Date	: 06/10/98 09:41:37 AM
Operator	: LEWANDOWSKIB	Sample Name	: 7940
Sample Number	: 029	Study	: 9801.181
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: HP58903A	Channel	: A
Interface Serial #	: 1092513053	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 35.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 ul	Area Reject	: 100.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/07/98 12:15:19 PM	Cycle	: 29

Raw Data File : \\gcsrv1\TCData\HP58903\JUNE\980606350R\3a_0606_029.raw
Result File : \\gcsrv1\TCData\HP58903\JUNE\980606350R\3a_0606_029.rst
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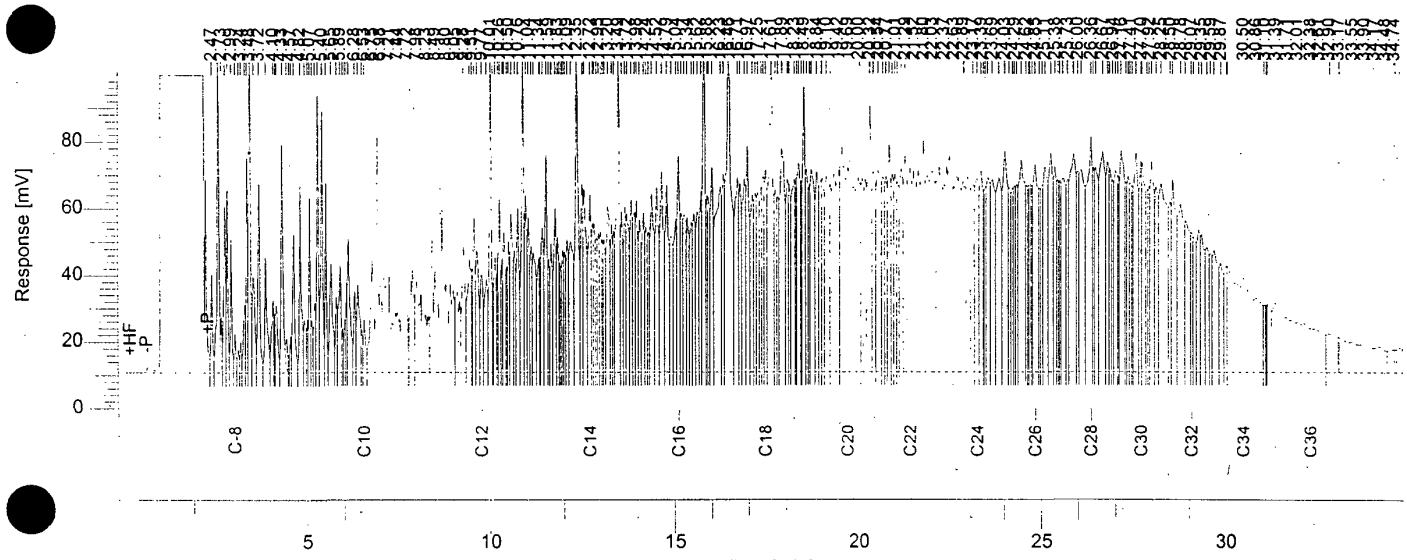
\\gcsrv1\TCData\HP58903\JUNE\980606350R\3a_0606_029.rst
Proc Method : \\gcsrv1\TCData\hp58903\methods\3a_tnrcc_0606.mth
Calib Method : \\gcsrv1\TCData\hp58903\methods\3a_tnrcc_0606.mth
Sequence File : \\gcsrv1\TCData\HP58903\JUNE\980606350R\3A_0606R.seq



TPH BY GC/FID TNRCC 1005

Peak #	Ret. Time	Component Name	Area [µV·s]	Volume Extracted (ml)	Final Volume	Result mg/L
	4.63	C6-C10 TPH	5033161	27.4	3.0	143.4774
	14.55	C6-C28 TPH	62774715	27.4	3.0	~~884.0710~~ 675
	16.70	C10-C28 TPH	57515396	27.4	3.0	532.4768
275	27.70	C30	279473	27.4	3.0	~~6586.6828~~
286	29.07	C32	159053	27.4	3.0	~~0.0000~~
296	30.50	C34	301826	27.4	3.0	~~640.9055~~
309	32.38	C36	180161	27.4	3.0	~~91006.1089~~

4/15/98

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COLUMN: 30 M RTX-1 0.53mm ID 0.25 um Film

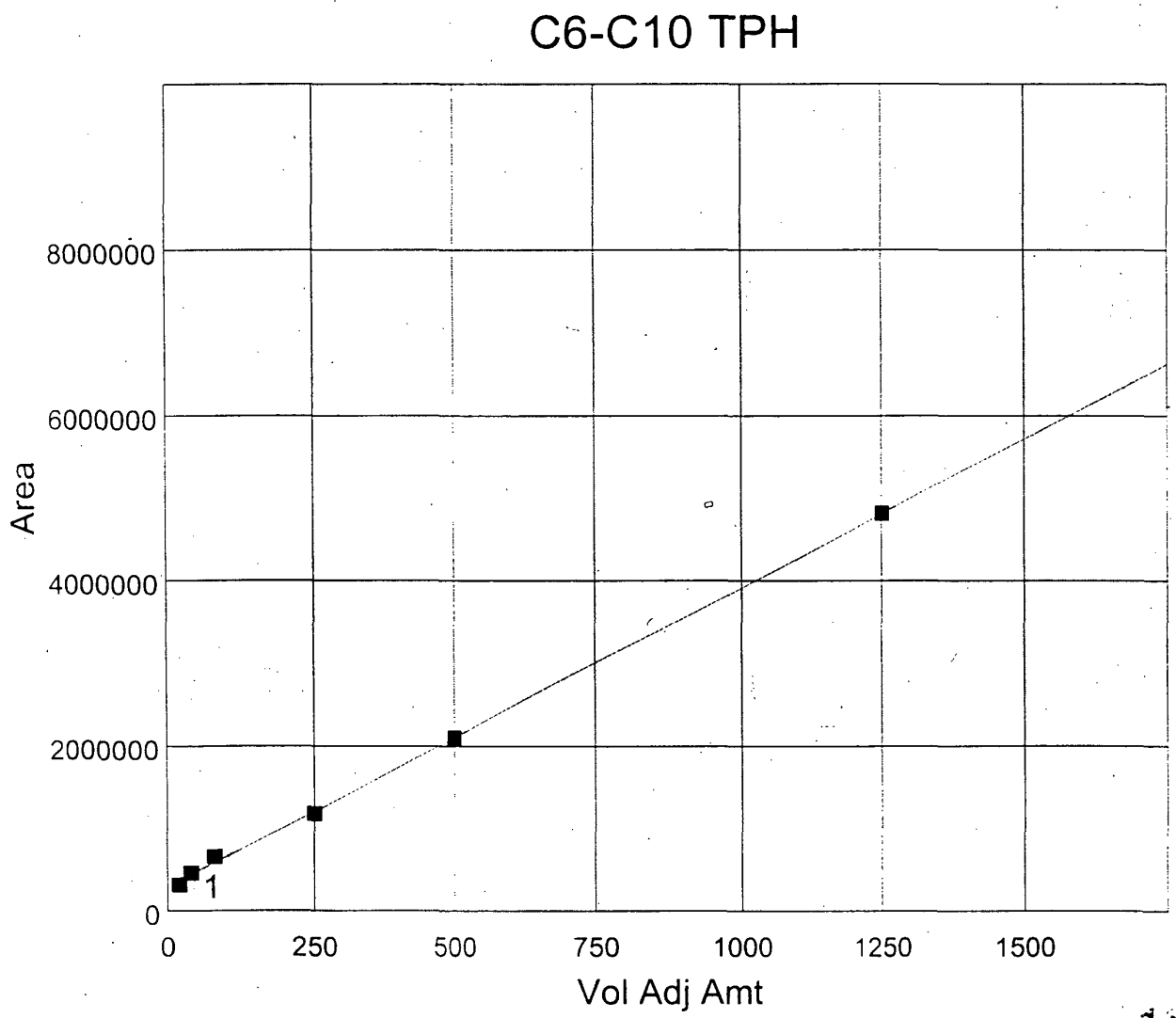
Fit Analysis Output For Method File: \\GCSRV1\TCDATA\HP58903\METHODS\3A TNRCC 0606.mth
Component Name : C6-C10 TPH
Date : 06/10/98 10:56:41 AM

Curve Parameters:

Curve #1 : 1st Order
Weighting Factor = 1 (No Weighting) R-Squared = 0.999400
Calibration Curve : Y = (304599.350915) +(3611.048040) X

Curve #1 :

Level Name	Observed X-Value	Calculated X-Value	Delta	%Diff.	Observed Y-Value	Calculated Y-Value	Delta	%Diff.
LOW	20.000000	4.695441	15.304559	325.945	321554.814458	376820.312	-55265.497	-14.666
MLOW	40.000000	43.918270	-3.918270	-8.922	463190.334282	449041.273	14149.062	3.151
MID	80.000000	99.190481	-19.190481	-19.347	662780.943803	593483.194	69297.750	11.676
MHIGH	250.000000	242.834852	7.165148	2.951	1181487.667760	1207361.361	-25873.693	-2.143
HIGH	500.000000	498.394380	1.605620	0.322	2104325.401857	2110123.371	-5797.969	-0.275
XHIGH	1250.000000	1250.966575	-0.966575	-0.077	4821899.749735	4818409.401	3490.348	0.072



185

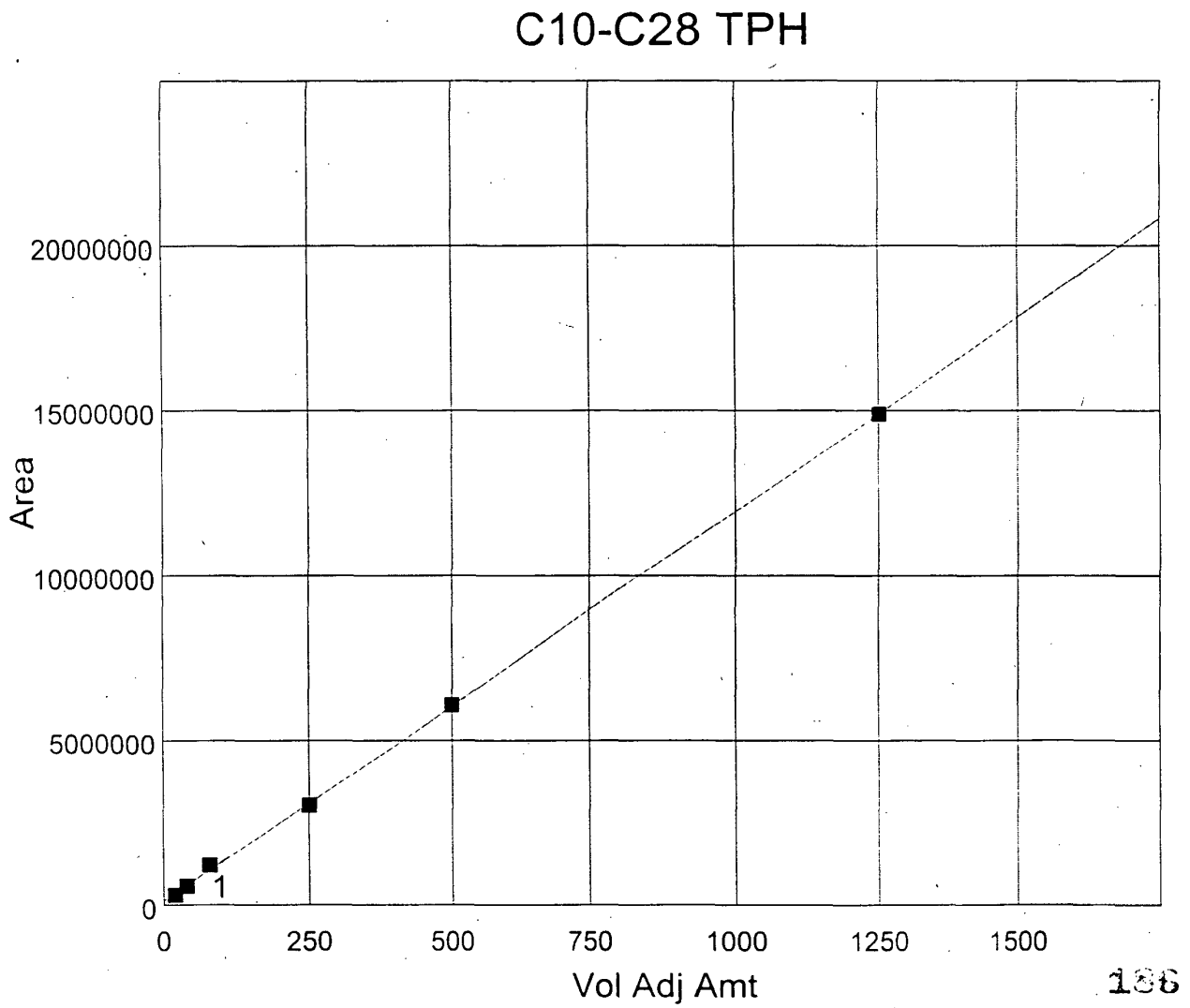
Fit Analysis Output For Method File: \\GCSRV1\TCDATA\HP58903\METHODS\3A TNRCC 0606.mth
Component Name : C10-C28 TPH
Date : 06/10/98 10:56:58 AM

Curve Parameters:

Curve #1 : 1st Order
Weighting Factor = 1 (No Weighting) R-Squared = 0.999821
Calibration Curve : Y = (139476.114742) +(11806.381617) X

Curve #1 :

Level Name	Observed X-Value	Calculated X-Value	Delta	%Diff.	Observed Y-Value	Calculated Y-Value	Delta	%Diff.
LOW	20.000000	14.471355	5.528645	38.204	310330.449585	375603.747	-65273.297	-17.378
MLOW	40.000000	36.956915	3.043085	8.234	575803.559906	611731.379	-35927.820	-5.873
MID	80.000000	91.145503	-11.145503	-12.228	1215574.700000	1083986.644	131588.056	12.139
MHIGH	250.000000	244.991488	5.008512	2.044	3031939.116018	3091071.519	-59132.403	-1.913
HIGH	500.000000	503.267520	-3.267520	-0.649	6081244.516852	6042666.923	38577.594	0.638
XHIGH	1250.000000	1249.167219	0.832781	0.067	14887621.006734	14897453.136	-9832.129	-0.066



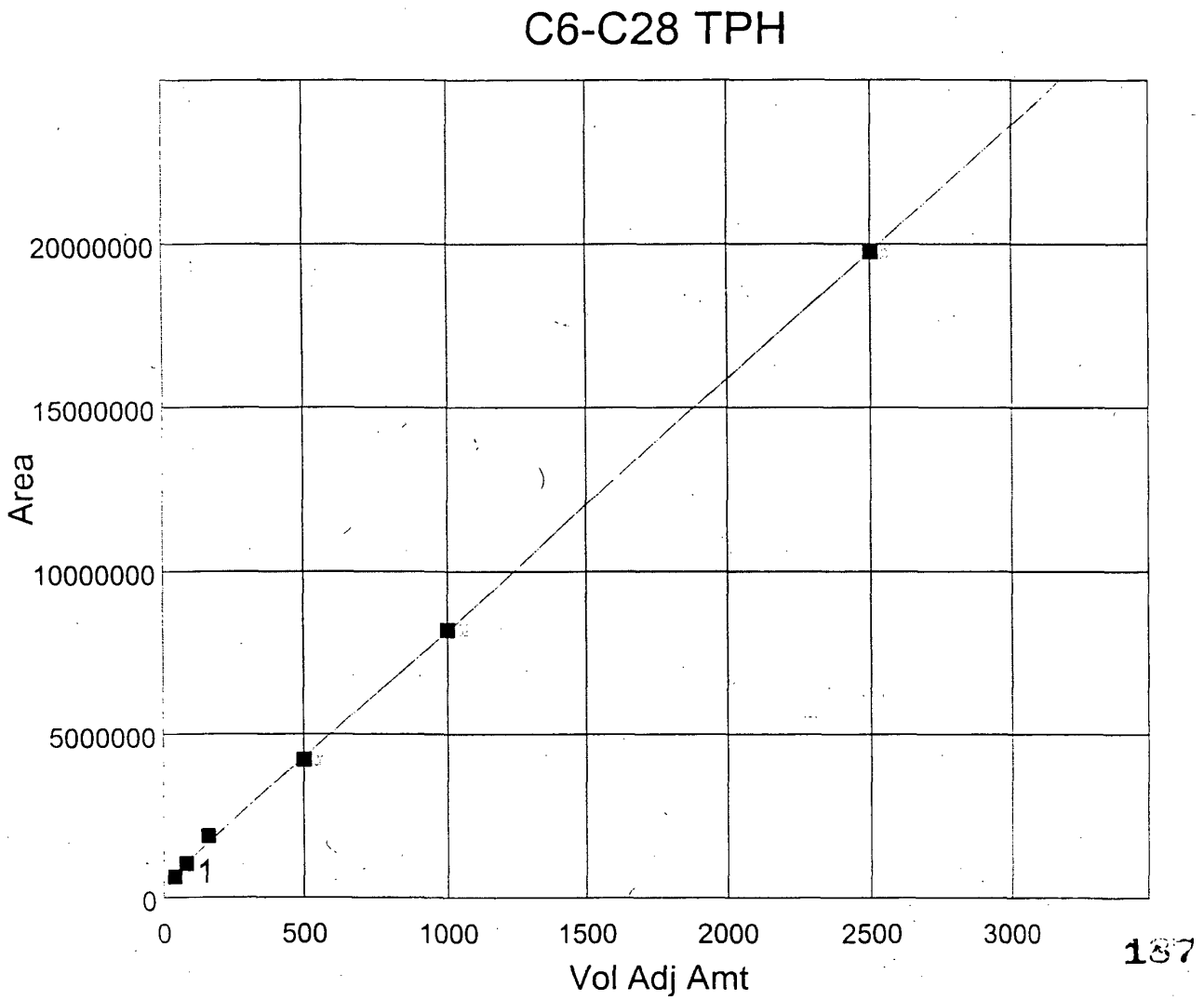
Fit Analysis Output For Method File: \\GCSRV1\TCDATA\HP58903\METHODS\3A TNRCC 0606.mth
Component Name : C6-C28 TPH
Date : 06/10/98 10:56:50 AM

Curve Parameters:

Curve #1 : 1st Order
Weighting Factor = 1 (No Weighting) R-Squared = 0.999766
Calibration Curve : Y = (443861.925369) +(7725.093380) X

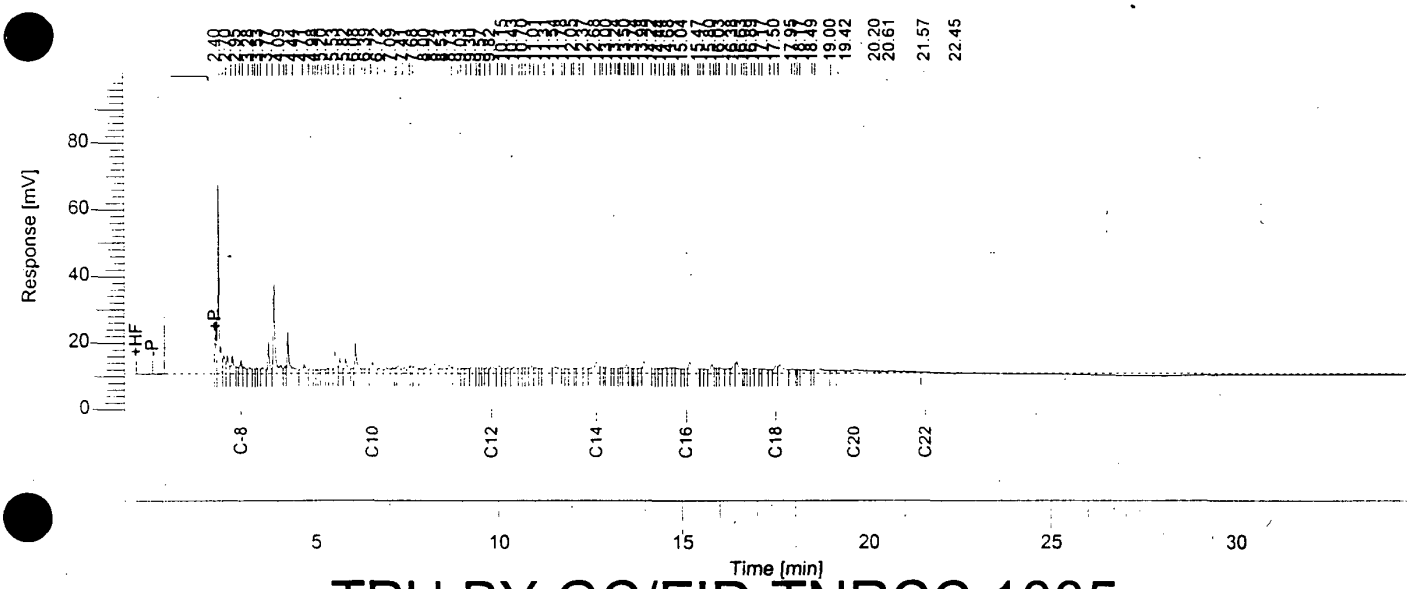
Curve #1 :

Level Name	Observed X-Value	Calculated X-Value	Delta	%Diff.	Observed Y-Value	Calculated Y-Value	Delta	%Diff.
LOW	40.000000	24.339297	15.660703	64.343	631885.264043	752865.661	-120980.397	-16.069
MLOW	80.000000	77.038806	2.961194	3.844	1038993.894188	1061869.396	-22875.502	-2.154
MID	160.000000	185.692735	-25.692735	-13.836	1878355.643803	1679876.866	198478.778	11.815
MHIGH	500.000000	489.380539	10.619461	2.170	4224372.288242	4306408.616	-82036.327	-1.905
HIGH	1000.000000	1004.539561	-4.539561	-0.452	8204023.842052	8168955.306	35068.536	0.429
XHIGH	2500.000000	2499.009062	0.990938	0.040	19748940.287845	19756595.376	-7655.088	-0.039



Software Version	: 6.0.2:G11	Date	: 06/10/98 09:41:55 AM
Operator	: LEWANDOWSKIB	Sample Name	: M1005 80 UG/ML EA
Sample Number	: 036	Study	: M1005 CCV
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: HP58903A	Channel	: A
Interface Serial #	: 1092513053	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 35.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 ul	Area Reject	: 100.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/07/98 18:28:15 PM	Cycle	: 36

Raw Data File : \\gcsrv1\TCData\HP58903\JUNE\980606350R\3a_0606_036.raw
Result File : \\gcsrv1\TCData\HP58903\JUNE\980606350R\3a_0606_036.rst
Inst Method : \\gcsrv1\TCData\hp58903\methods\3a_trncc from
\\gcsrv1\TCData\HP58903\JUNE\980606350R\3a_0606_036.rst
Proc Method : \\gcsrv1\TCData\hp58903\methods\3a_tnrcc_0606.mth
Calib Method : \\gcsrv1\TCData\hp58903\methods\3a_tnrcc_0606.mth
Sequence File : \\gcsrv1\TCData\HP58903\JUNE\980606350R\3A_0606R.seq



TPH BY GC/FID TNRCC 1005

Peak #	Ret. Time	Component Name	Area [µV·s]	Result ug/Ml
	4.63	C6-C10 TPH	613899	85.6538
	14.55	C6-C28 TPH	1863923	183.8244
	16.70	C10-C28 TPH	1250023	94.0633

TV %D
80 7.06
FC 17.6

COLUMN: 30 M RTX-1 0.53mm ID 0.25 um Film

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TEST CODE :W1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : TPH-TNRCC UNITS : MG/L
SAMPLE ID LAB :Method Blank 855-131-1 MATRIX: WATER

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		5.0
>C10 -> C28 Hydrocarbons	ND		5.0
C6 -> C28 Hydrocarbons	ND		5.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

EXAMPLE CALCULATION

C6- C10 FOR LCS

Curve Y= c0 + c1*x

c0= is the y intercept

c1= the slope of the line

Y =304599.350915 + 3611.048040*x

Area (y) for C6 to C10 = 1907000

$$\text{Amount (X)} = \frac{1907000-304599.350915}{3611.048040}$$

$$= \frac{443.7494688 \text{ ug/ml} * 3\text{ml FV}}{35 \text{ ml extraction volume}}$$

= 38.0357 mg/L

002127

Job Number: 9801.181

Client: START - Dallas

Reviewer: C Hoffmann

Date: 6/23/98

GC
TABLE OF CONTENTS
TNRCC

A.	SURROGATE SUMMARY	NA
B.	MS/MSD SUMMARY	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
	LCS SUMMARY	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
C.	RESULT SUMMARY FOR EACH SAMPLE	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT (PRIMARY RAW DATA PRECEDES CONFIRMATION RAW DATA)	✓
D.	EXTRACTION LOGBOOK PAGE(S)	✓
E.	RETENTION TIME WINDOW SUMMARY	Default windows
F.	INITIAL CALIBRATION SUMMARY AND CHROMATOGRAMS *	✓
G.	DAILY ANALYTICAL SEQUENCE INFORMATION AS FOLLOWS *	
	1. DAILY INJECTION LOGBOOK	✓
	2. CALIBRATION CHECK SUMMARY	✓
	3. CHROMATOGRAMS AND DATA SYSTEM PRINTOUTS FOR ALL STANDARDS IN THE DAILY SEQUENCE	✓
H.	BLANK RESULTS	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
I.	CALCULATION EXAMPLE	✓

* = ALL CALIBRATION INFORMATION IS ORGANIZED PER INSTRUMENT, CHRONOLOGICALLY

ECOLOGY & ENVIRONMENT, INC

TNRCC Method 1005 - Toatal Petroleum Hydrocarbons

Quality and Control for Accuracy and Precision:
Percent Recovery of Matrix Spike (MS) and
Matrix Spike Duplicate (MSD) for soil matrix.

Sample ID: 7935

Units: mg/Kg

Job No: 9801.181

PARAMETER	Original Amount	Amount Added		Amount Determined		% Recovery				RPD
		MS	MSD	MS	MSD	MS	Q	MSD	Q	
C6 TO C10	0	442	446	400	405	90.4%		90.7%		0.4%
C10 TO C28	0	442	446	362	373	81.8%		83.6%		2.1%
C6 TO C28	0	885	893	762	778	86.1%		87.1%		1.2%

Recovery Limits: 70 - 130
RPD Limits: 30

* - Value is outside E & E QC limits.

208

Software Version	: 6.0.2:G11	Date	: 06/10/98 16:08:44 PM
Operator	: LEWANDOWSKIB	Sample Name	: 7935MS
Sample Number	: 016	Study	: 9801.181
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: HP58903A	Channel	: A
Interface Serial #	: 1092513053	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 35.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 ul	Area Reject	: 100.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/10/98 03:54:30 AM	Cycle	: 16

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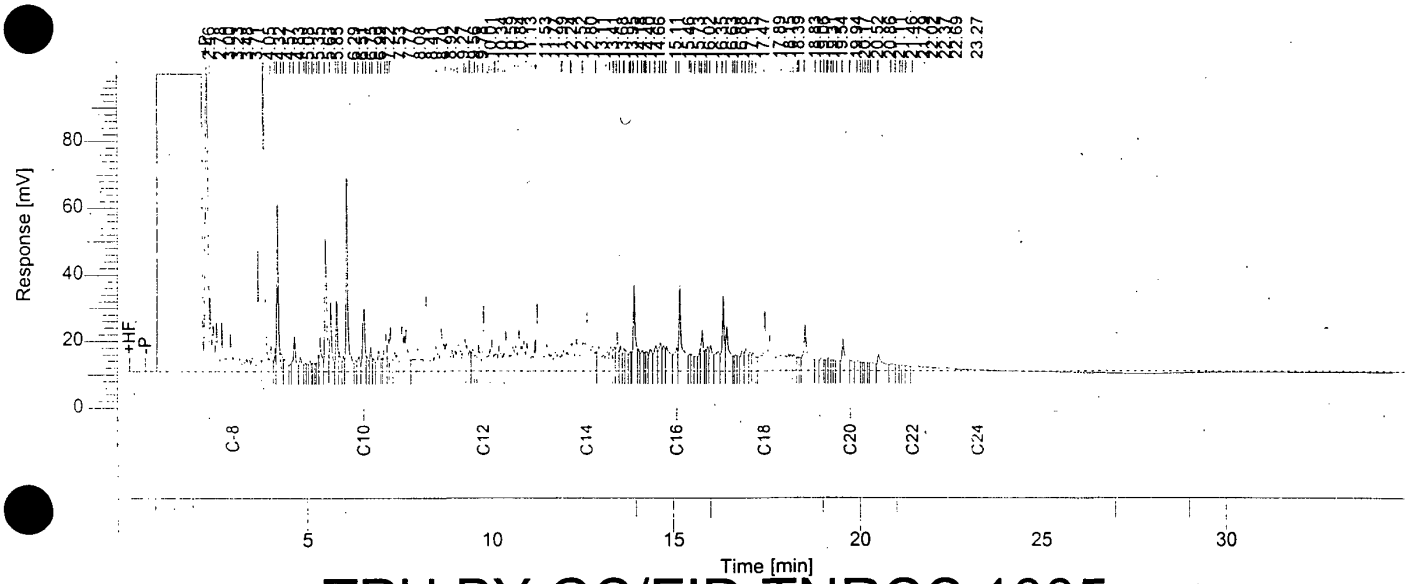
Result File : \\gcsrv1\TCData\HP58903\JUNE\980609350R\3a_0609_016.rst
Inst Method : \\gcsrv1\TCData\hp58903\methods\3a_trncc from \\gcsrv1\TCData\HP58903\JUNE\980609350R\3a_0609_016.rst
Proc Method : \\gcsrv1\TCData\hp58903\methods\3a_tnrcc_0606.mth
Calib Method : \\gcsrv1\TCData\hp58903\methods\3a_tnrcc_0606.mth
Sequence File : \\gcsrv1\TCData\HP58903\JUNE\980609350R\3A_0609R.seq



TPH BY GC/FID TNRCC 1005

Peak #	Ret. Time	Component Name	Area [µV·s]	Weight Extracted (G)	Final Volume	Result mg/KG
	4.63	C6-C10 TPH	1929815	11.3	10.0	400.0601
	14.55	C6-C28 TPH	6874301	11.3	10.0	~~739.9194~~
	16.70	C10-C28 TPH	4944486	11.3	10.0	361.7637

TV ~~10~~
~~500~~ 442.5
~~500~~ 442.5
RCJ 6/10/98

COLUMN: 30 M RTX-1 0.53mm ID 0.25 um Film

209

C6-C28 - 762

Software Version	: 6.0.2:G11	Date	: 06/10/98 16:08:47 PM
Operator	: LEWANDOWSKIB	Sample Name	: 7935MSD
Sample Number	: 017	Study	: 9801.181
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: HP58903A	Channel	: A
Interface Serial #	: 1092513053	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 35.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 ul	Area Reject	: 100.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/10/98 04:48:12 AM	Cycle	: 17

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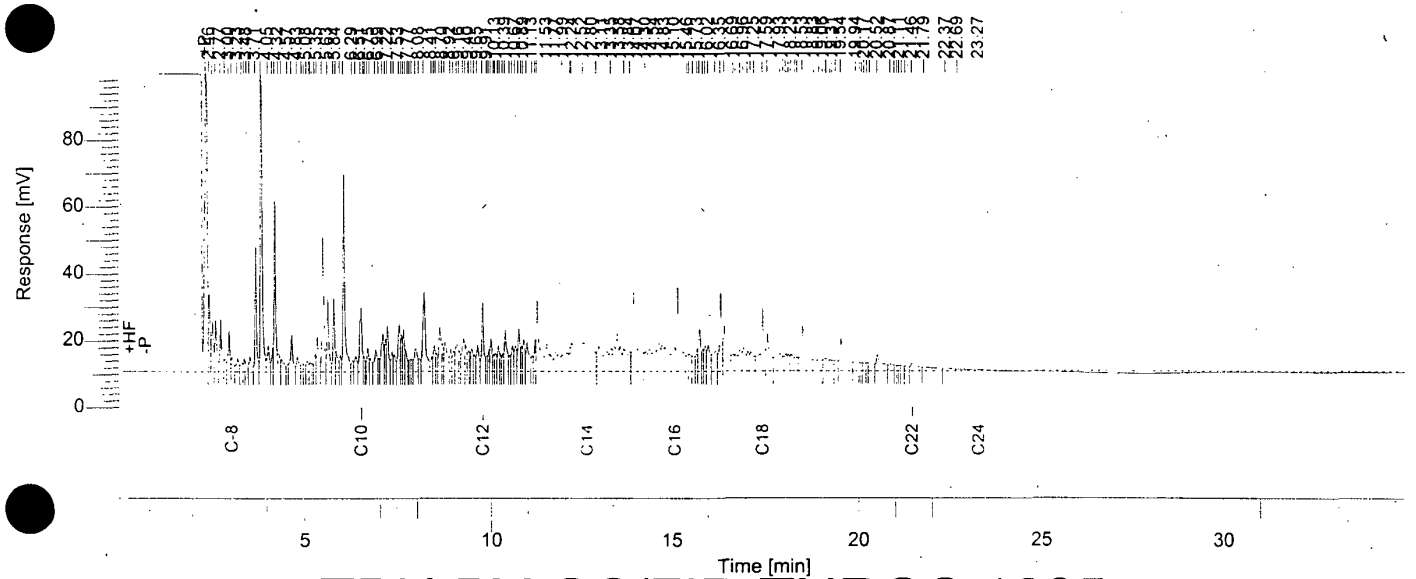
Result File : \\gcsrv1\TCData\HP58903\JUNE\980609350R\3a_0609_017.rst
Inst Method : \\gcsrv1\TCData\hp58903\methods\3a_trncc from
\\gcsrv1\TCData\HP58903\JUNE\980609350R\3a_0609_017.rst
Proc Method : \\gcsrv1\TCData\hp58903\methods\3a_tnrcc_0606.mth
Calib Method : \\gcsrv1\TCData\hp58903\methods\3a_tnrcc_0606.mth
Sequence File : \\gcsrv1\TCData\HP58903\JUNE\980609350R\3A_0609R.seq



TPH BY GC/FID TNRCC 1005

Peak #	Ret. Time	Component Name	Area [µV·s]	Weight Extracted (G)	Final Volume	Result mg/KG
	4.63	C6-C10 TPH	1945035	11.2	10.0	404.5257
	14.55	C6-C28 TPH	7030422	11.2	10.0	~~759.2331~~
	16.70	C10-C28 TPH	5085387	11.2	10.0	373.0351

TV
446.4
446.4

COLUMN: 30 M RTX-1 0.53mm ID 0.25 um Film

Rm 6/15/98

210

ECOLOGY & ENVIRONMENT, INC

TNRCC Method 1005 - Toatal Petroleum Hydrocarbons

Quality and Control for Accuracy and Precision:
Percent Recovery of Laboratory Control Sample (LCS)

885-131-2

Units: mg/Kg

Job No: 9801.181

PARAMETER	Amount Added LCS	Amount Determined LCS	% Recovery LCS	Q
C6 TO C10	500.0	476.0	95.2%	
C10 TO C28	500.0	463.0	92.6%	
C6 TO C28	1000.0	939.0	93.9%	

Recovery Limits: 70 - 130
RPD Limits: 30

* - Value is outside E & E QC limits.

Software Version	: 6.0.2:G11	Date	: 06/10/98 16:08:17 PM
Operator	: LEWANDOWSKIB	Sample Name	: LCS 855-132-2
Sample Number	: 005	Study	: 9801.165/181
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: HP58903A	Channel	: A
Interface Serial #	: 1092513053	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 35.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 ul	Area Reject	: 100.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/09/98 18:09:01 PM	Cycle	: 5

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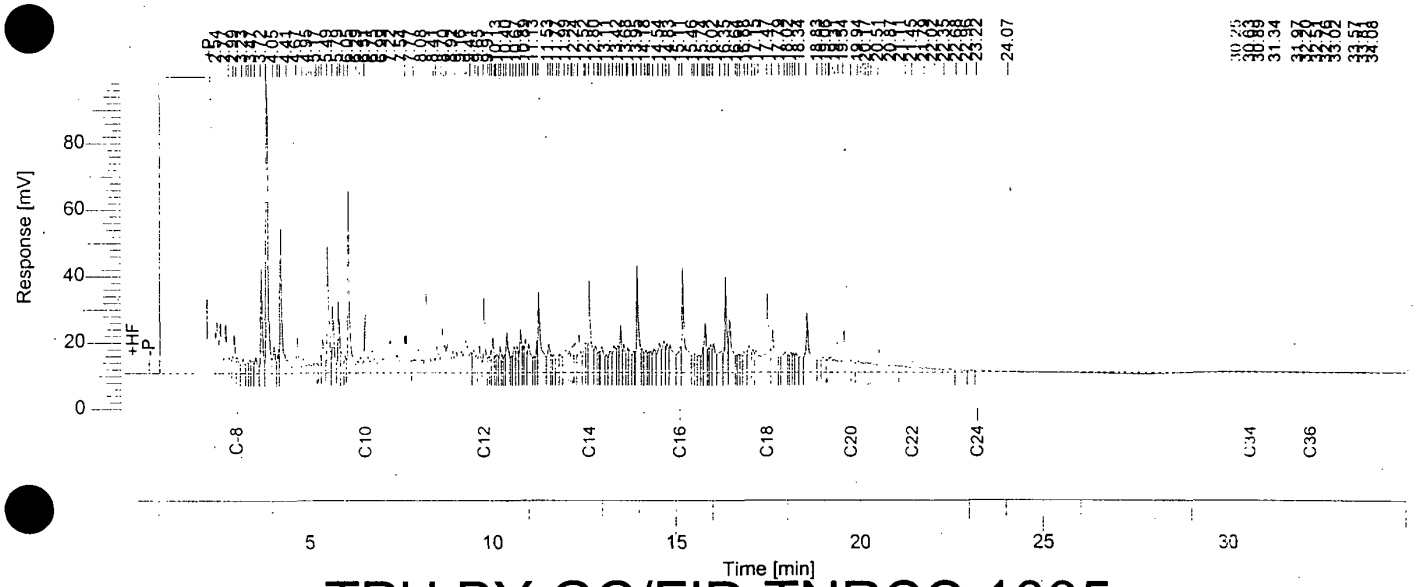
Result File : \\gcsrv1\TCData\HP58903\JUNE\980609350R\3a_0609_005.rst
Inst Method : \\gcsrv1\TCData\hp58903\methods\3a_trncc from
\\gcsrv1\TCData\HP58903\JUNE\980609350R\3a_0609_005.rst
Proc Method : \\gcsrv1\TCData\hp58903\methods\3a_tnrcc_0606.mth
Calib Method : \\gcsrv1\TCData\hp58903\methods\3a_tnrcc_0606.mth
Sequence File : \\gcsrv1\TCData\HP58903\JUNE\980609350R\3A_0609R.seq



TPH BY GC/FID TNRCC 1005

Peak #	Ret. Time	Component Name	Area [µV·s]	Weight Extracted (G)	Final Volume	Result mg/KG
	4.63	C6-C10 TPH	2023849	10.0	10.0	476.1083
	14.55	C6-C28 TPH	7635161	10.0	10.0	~~930.9013~~
	16.70	C10-C28 TPH	5611312	10.0	10.0	463.4643
195	30.63	C34	3525	10.0	10.0	~~269.1060~~
201	32.32	C36	1602	10.0	10.0	~~44923.9125~~

TV
500
500

COLUMN: 30 M RTX-1 0.53mm ID 0.25 um Film

6/15/98
C6 - C28 = 939

212

TEST CODE :S1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07928 MATRIX : SOLID
SAMPLE ID CLIENT: SB06-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		57
>C10 -> C28 Hydrocarbons	ND		57
C6 -> C28 Hydrocarbons	ND		57

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 87 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07929 MATRIX : SOLID
SAMPLE ID CLIENT: SB07-0405

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		57
>C10 -> C28 Hydrocarbons	ND		57
C6 -> C28 Hydrocarbons	ND		57

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 89 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07930 MATRIX : SOLID
SAMPLE ID CLIENT: SB07D-0405

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		56
>C10 -> C28 Hydrocarbons	ND		56
C6 -> C28 Hydrocarbons	ND		56

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 92 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07931 MATRIX : SOLID
SAMPLE ID CLIENT: SB08-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		54
>C10 -> C28 Hydrocarbons	ND		54
C6 -> C28 Hydrocarbons	ND		54

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07932 MATRIX : SOLID
SAMPLE ID CLIENT: SB09-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		57
>C10 -> C28 Hydrocarbons	ND		57
C6 -> C28 Hydrocarbons	ND		57

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 90 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07933 MATRIX : SOLID
SAMPLE ID CLIENT: SB10-0304

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		56
>C10 -> C28 Hydrocarbons	ND		56
C6 -> C28 Hydrocarbons	ND		56

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 85 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07934 MATRIX : SOLID
SAMPLE ID CLIENT: SB11-0203

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		59
>C10 -> C28 Hydrocarbons	ND		59
C6 -> C28 Hydrocarbons	ND		59

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 87 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07935 MATRIX : SOLID
SAMPLE ID CLIENT: SB12-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		57
>C10 -> C28 Hydrocarbons	ND		57
C6 -> C28 Hydrocarbons	ND		57

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 86 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07936 MATRIX : SOLID
SAMPLE ID CLIENT: SB12-0809

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		58
>C10 -> C28 Hydrocarbons	ND		58
C6 -> C28 Hydrocarbons	ND		58

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 89 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07937 MATRIX : SOLID
SAMPLE ID CLIENT: SB13-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		56
>C10 -> C28 Hydrocarbons	ND		56
C6 -> C28 Hydrocarbons	ND		56

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 86 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07938 MATRIX : SOLID
SAMPLE ID CLIENT: SB13-6575

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	PRESENT		58
>C10 -> C28 Hydrocarbons	ND		58
C6 -> C28 Hydrocarbons	ND		58

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 87 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07939 MATRIX : SOLID
SAMPLE ID CLIENT: SB13D-6575

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		57
>C10 -> C28 Hydrocarbons	ND		57
C6 -> C28 Hydrocarbons	ND		57

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

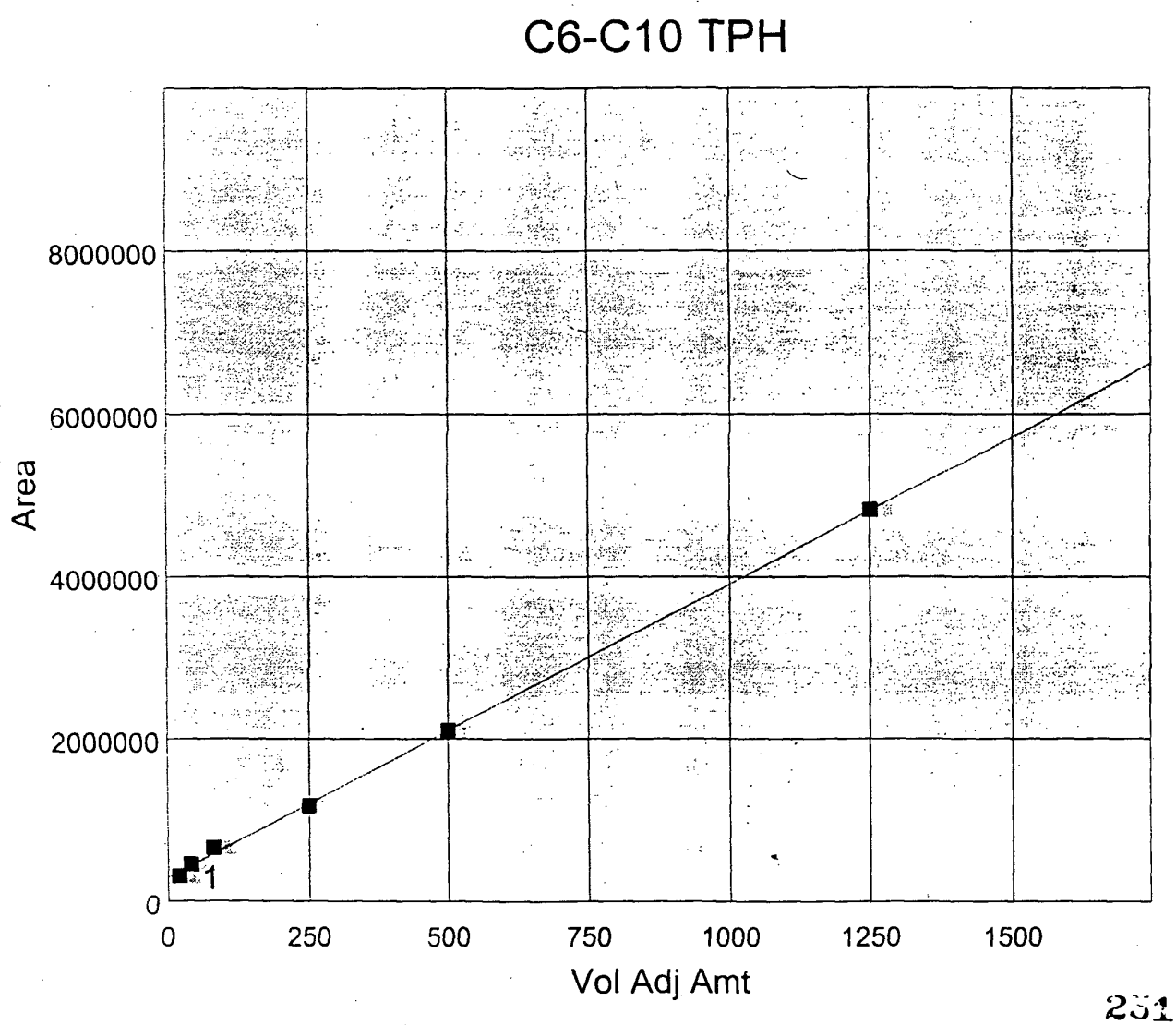
Fit Analysis Output For Method File: \\GCSRV1\TCDATA\HP58903\METHODS\3A TNRCC 0606.mth
Component Name : C6-C10 TPH
Date : 06/10/98 10:56:41 AM

Curve Parameters:

Curve #1 : 1st Order
Weighting Factor = 1 (No Weighting) R-Squared = 0.999400
Calibration Curve : Y = (304599.350915) +(3611.048040)*X

Curve #1 :

Level Name	Observed X-Value	Calculated X-Value	Delta	%Diff.	Observed Y-Value	Calculated Y-Value	Delta	%Diff.
LOW	20.000000	4.695441	15.304559	325.945	321554.814458	376820.312	-55265.497	-14.666
MLOW	40.000000	43.918270	-3.918270	-8.922	463190.334282	449041.273	14149.062	3.151
MID	80.000000	99.190481	-19.190481	-19.347	662780.943803	593483.194	69297.750	11.676
MHIGH	250.000000	242.834852	7.165148	2.951	1181487.667760	1207361.361	-25873.693	-2.143
HIGH	500.000000	498.394380	1.605620	0.322	2104325.401857	2110123.371	-5797.969	-0.275
XHIGH	1250.000000	1250.966575	-0.966575	-0.077	4821899.749735	4818409.401	3490.348	0.072



251

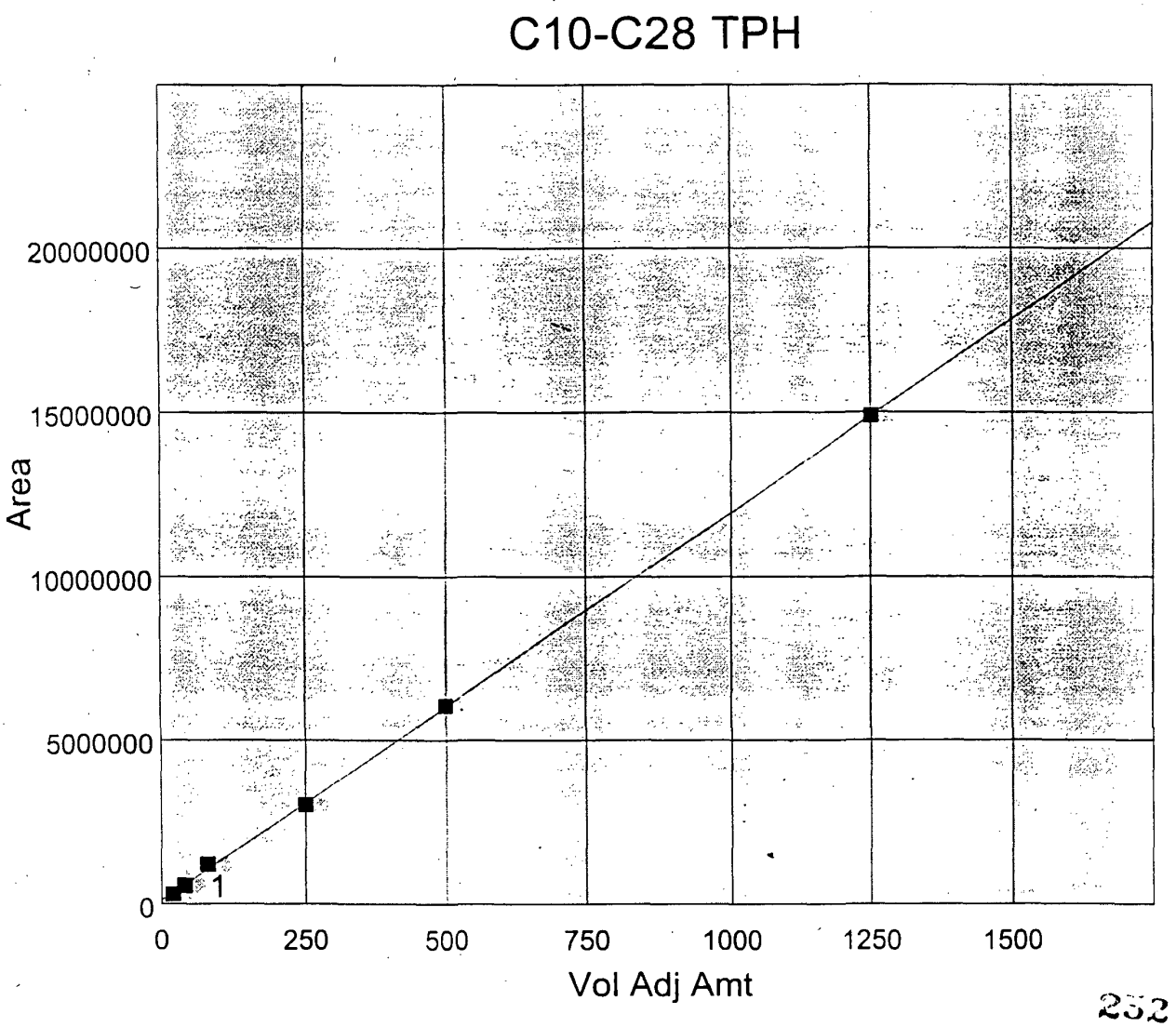
Fit Analysis Output For Method File: \\GCSRV1\TCDATA\HP58903\METHODS\3A TNRCC 0606.mth
Component Name : C10-C28 TPH
Date : 06/10/98 10:56:58 AM

Curve Parameters:

Curve #1 : 1st Order
Weighting Factor = 1 (No Weighting) R-Squared = 0.999821
Calibration Curve : Y = (139476.114742) +(11806.381617) X

Curve #1 :

Level Name	Observed X-Value	Calculated X-Value	Delta	%Diff.	Observed Y-Value	Calculated Y-Value	Delta	%Diff.
LOW	20.000000	14.471355	5.528645	38.204	310330.449585	375603.747	-65273.297	-17.378
MLOW	40.000000	36.956915	3.043085	8.234	575803.559906	611731.379	-35927.820	-5.873
MID	80.000000	91.145503	-11.145503	-12.228	1215574.700000	1083986.644	131588.056	12.139
MHIGH	250.000000	244.991488	5.008512	2.044	3031939.116018	3091071.519	-59132.403	-1.913
HIGH	500.000000	503.267520	-3.267520	-0.649	6081244.516852	6042666.923	38577.594	0.638
XHIGH	1250.000000	1249.167219	0.832781	0.067	14887621.006734	14897453.136	-9832.129	-0.066



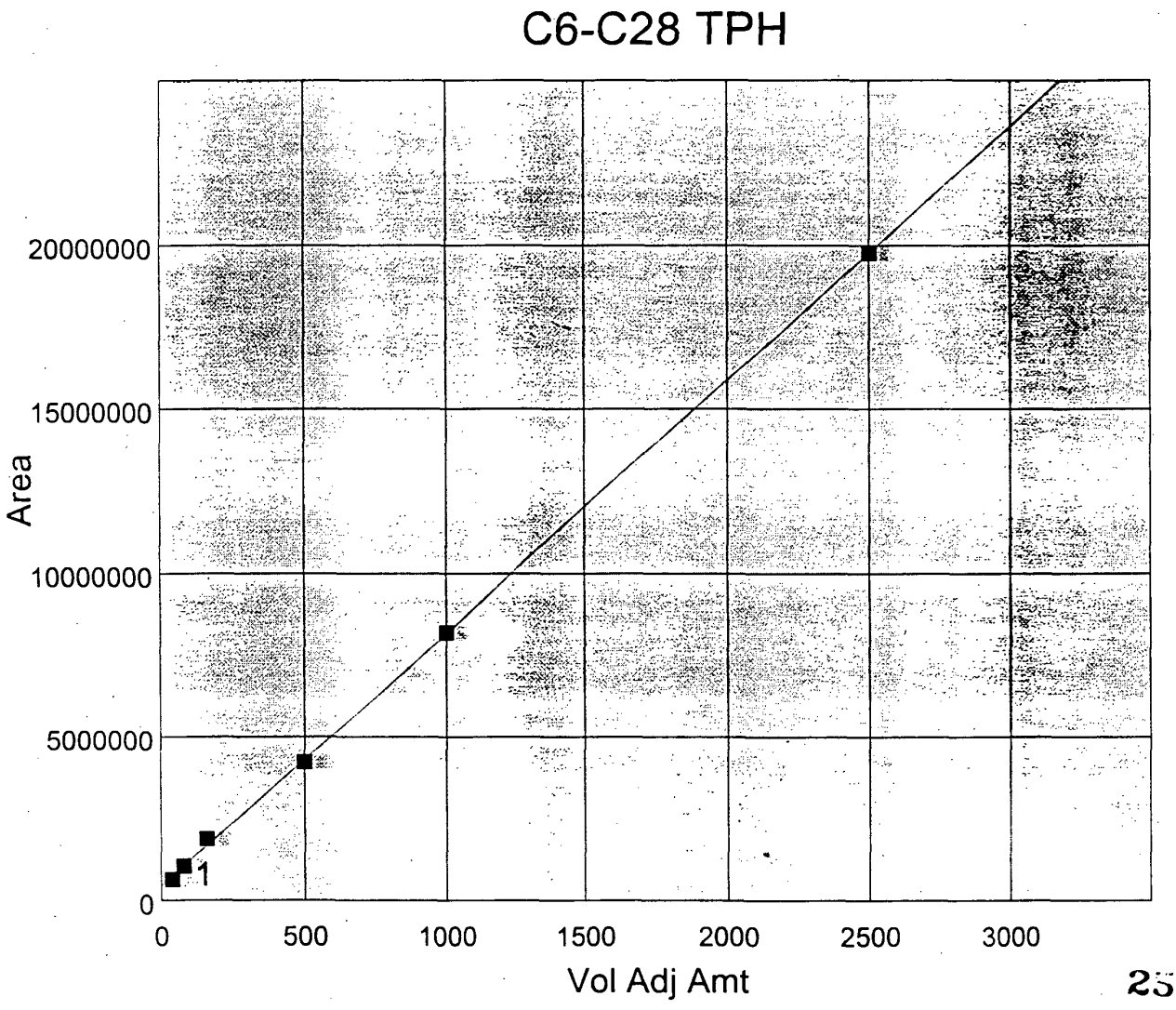
Fit Analysis Output For Method File: \\GCSRV1\TCDATA\HP58903\METHODS\3A TNRCC 0606.mth
Component Name : C6-C28 TPH
Date : 06/10/98 10:56:50 AM

Curve Parameters:

Curve #1 : 1st Order
Weighting Factor = 1 (No Weighting) R-Squared = 0.999766
Calibration Curve : Y = (443861.925369) +(7725.093380) X

Curve #1 :

Level Name	Observed X-Value	Calculated X-Value	Delta	%Diff.	Observed Y-Value	Calculated Y-Value	Delta	%Diff.
LOW	40.000000	24.339297	15.660703	64.343	631885.264043	752865.661	-120980.397	-16.069
MLOW	80.000000	77.038806	2.961194	3.844	1038993.894188	1061869.396	-22875.502	-2.154
MID	160.000000	185.692735	-25.692735	-13.836	1878355.643803	1679876.866	198478.778	11.815
MHIGH	500.000000	489.380539	10.619461	2.170	4224372.288242	4306408.616	-82036.327	-1.905
HIGH	1000.000000	1004.539561	-4.539561	-0.452	8204023.842052	8168955.306	35068.536	0.429
XHIGH	2500.000000	2499.009062	0.990938	0.040	19748940.287845	19756595.376	-7655.088	-0.039



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Operator	: LEWANDOWSKIB	Sample Name	: M1005 250 UG/ML EA
Sample Number	: 003	Study	: M1005 CCV
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: HP58903A	Channel	: A
Interface Serial #	: 1092513053	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 35.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 ul	Area Reject	: 100.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/09/98 16:23:10 PM	Cycle	: 3

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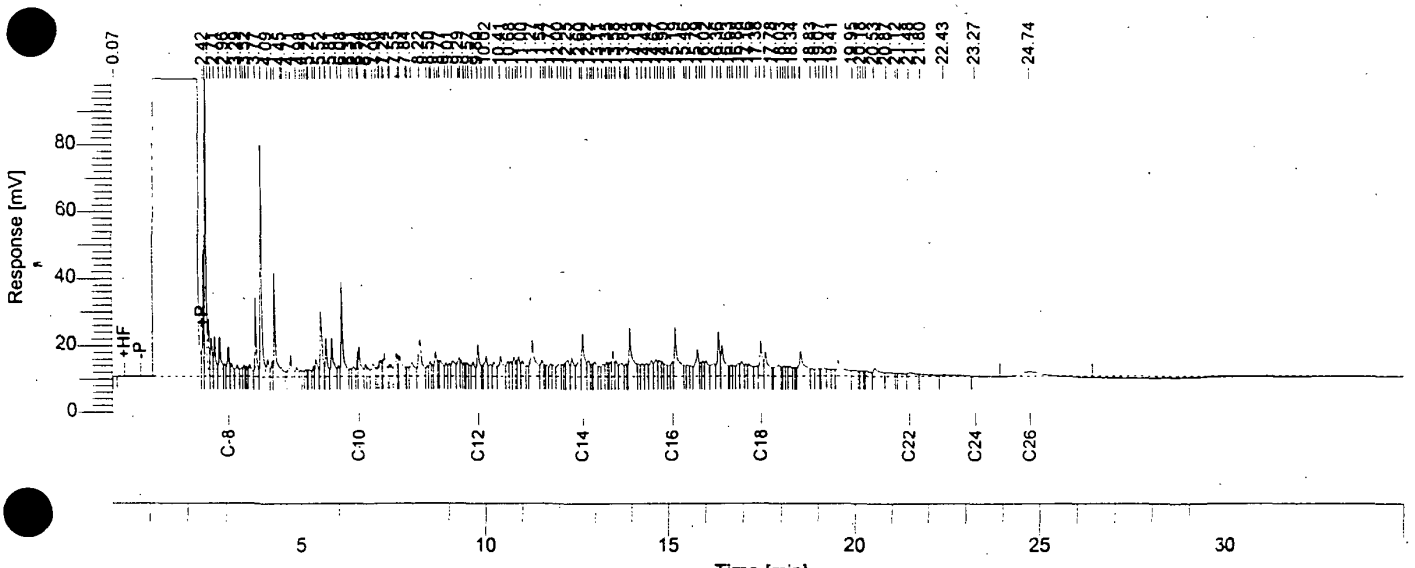

TPH BY GC/FID TNRCC 1005

Peak #	Ret. Time	Component Name	Area [µV·s]	Result ug/Ml	% DRIFT (LIMIT+/- 25%)
	4.63	C6-C10 TPH	1273096	268.2037	-7.28
	14.55	C6-C28 TPH	4555260	532.2134	-6.44
	16.70	C10-C28 TPH	3269754	265.1344	-6.05

COLUMN: 30 M RTX-1 0.53mm ID 0.25 um Film

Software Version	: 6.0.2:G11	Date	: 06/10/98 16:08:41 PM
Operator	: LEWANDOWSKIB	Sample Name	: M1005 250 UG/ML EA
Sample Number	: 015	Study	: M1005 CCV
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: HP58903A	Channel	: A
Interface Serial #	: 1092513053	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 35.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 ul	Area Reject	: 100.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/10/98 03:01:26 AM	Cycle	: 15

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Result File : \\gcsrv1\TCData\HP58903\JUNE\980609350R\3a_0609_015.rst
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Proc Method : \\gcsrv1\TCData\hp58903\methods\3a_tnrcc_0606.mth
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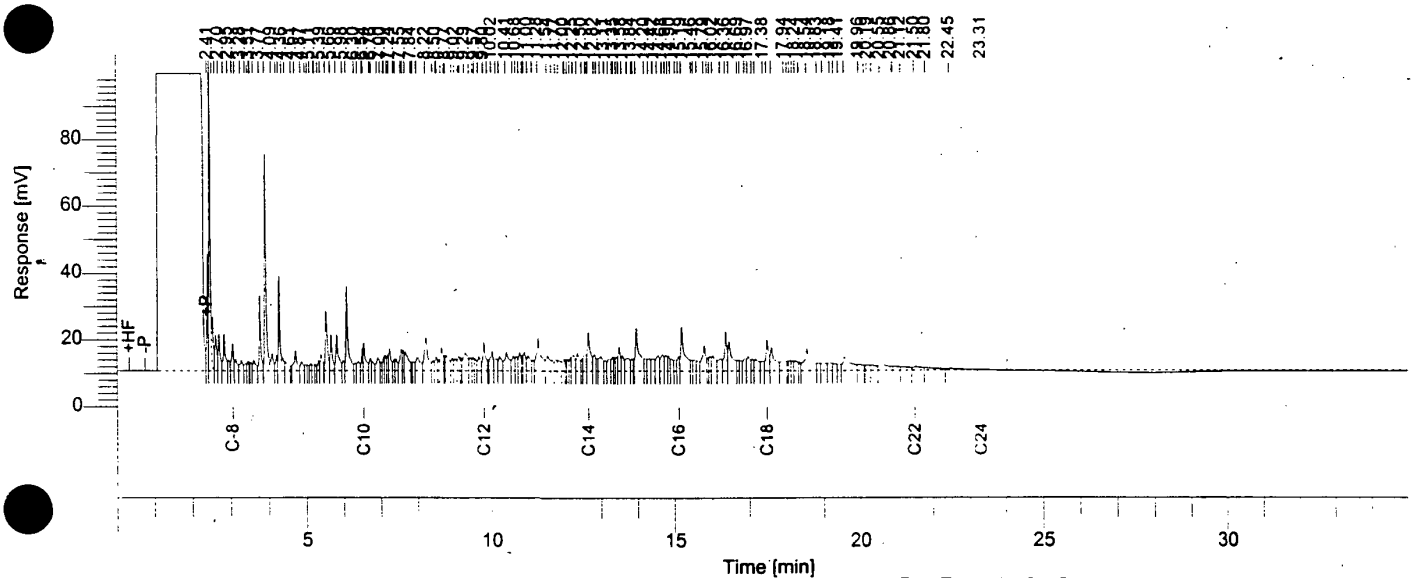

TPH BY GC/FID TNRCC 1005

Peak #	Ret. Time	Component Name	Area [µV·s]	Result ug/Ml	% DRIFT (LIMIT+/- 25%)
	4.63	C6-C10 TPH	1171154	239.9733	4.01
	14.55	C6-C28 TPH	4237146	491.0340	1.79
	16.70	C10-C28 TPH	3054107	246.8691	1.25

COLUMN: 30 M RTX-1 0.53mm ID 0.25 um Film

BD/6/10/98

253

Software Version	: 6.0.2:G11	Date	: 06/10/98 16:09:10 PM
Operator	: LEWANDOWSKIB	Sample Name	: M1005 250 UG/ML EA
Sample Number	: 027	Study	: M1005 CCV
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: HP58903A	Channel	: A
Interface Serial #	: 1092513053	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 35.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 ul	Area Reject	: 100.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/10/98 13:45:06 PM	Cycle	: 27

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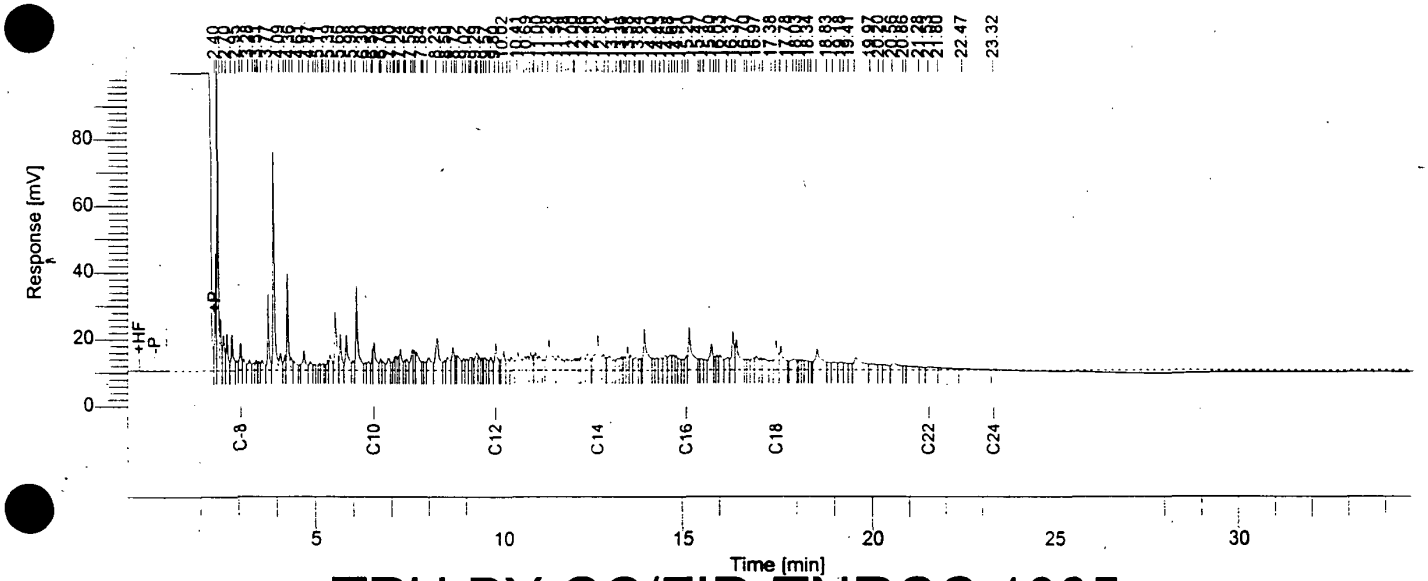
Proc Method : \\gcsrv1\TCData\hp58903\methods\3a_tnrcc_0606.mth
Calib Method : \\gcsrv1\TCData\hp58903\methods\3a_tnrcc_0606.mth
Sequence File : \\gcsrv1\TCData\HP58903\JUNE\980609350R\3A_0609R.seq



TPH BY GC/FID TNRCC 1005

Peak #	Ret. Time	Component Name	Area [µV·s]	Result ug/Ml	% DRIFT (LIMIT+/- 25%)
	4.63	C6-C10 TPH	1183024	243.2604	2.70
	14.55	C6-C28 TPH	4316080	501.2519	-0.25
	16.70	C10-C28 TPH	3120694	252.5090	-1.00

COLUMN: 30 M RTX-1 0.53mm ID 0.25 um Film

270

Software Version	: 6.0.2:G11	Date	: 06/12/98 07:36:41 AM
Operator	: LEWANDOWSKIB	Sample Name	: M1005 250 UG/ML EA
Sample Number	: 039	Study	: M1005 CCV
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: HP58903A	Channel	: A
Interface Serial #	: 1092513053	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 35.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 ul	Area Reject	: 100.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/11/98 00:27:49 AM	Cycle	: 39

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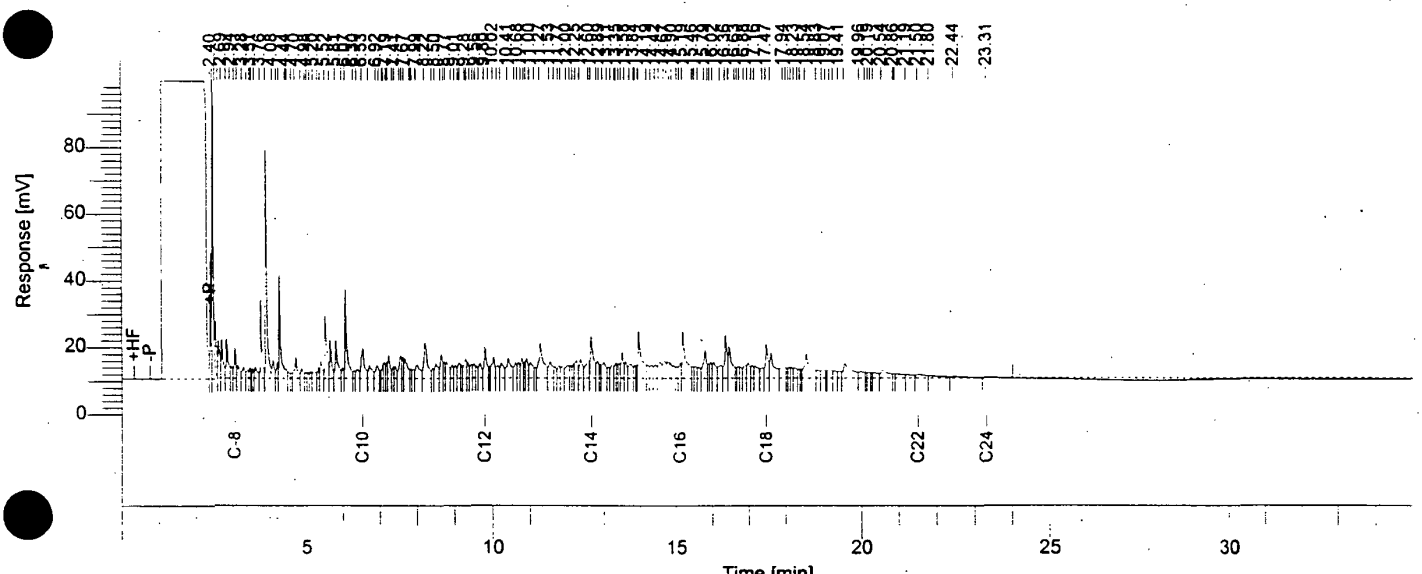

TPH BY GC/FID TNRCC 1005

Peak #	Ret. Time	Component Name	Area [µV·s]	Result ug/Ml	% DRIFT (LIMIT+/- 25%)
	4.63	C6-C10 TPH	1247054	260.9920	-4.40
	14.55	C6-C28 TPH	4504834	525.6859	-5.14
	16.70	C10-C28 TPH	3257780	264.1202	-5.65

COLUMN: 30 M RTX-1 0.53mm ID 0.25 um Film

2 2

Software Version	: 6.0.2:G11	Date	: 06/12/98 07:51:00 AM
Operator	: LEWANDOWSKIB	Sample Name	: M1005 250 UG/ML EA
Sample Number	: 049	Study	: M1005 CCV
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: HP58903A	Channel	: A
Interface Serial #	: 1092513053	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 35.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 ul	Area Reject	: 100.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
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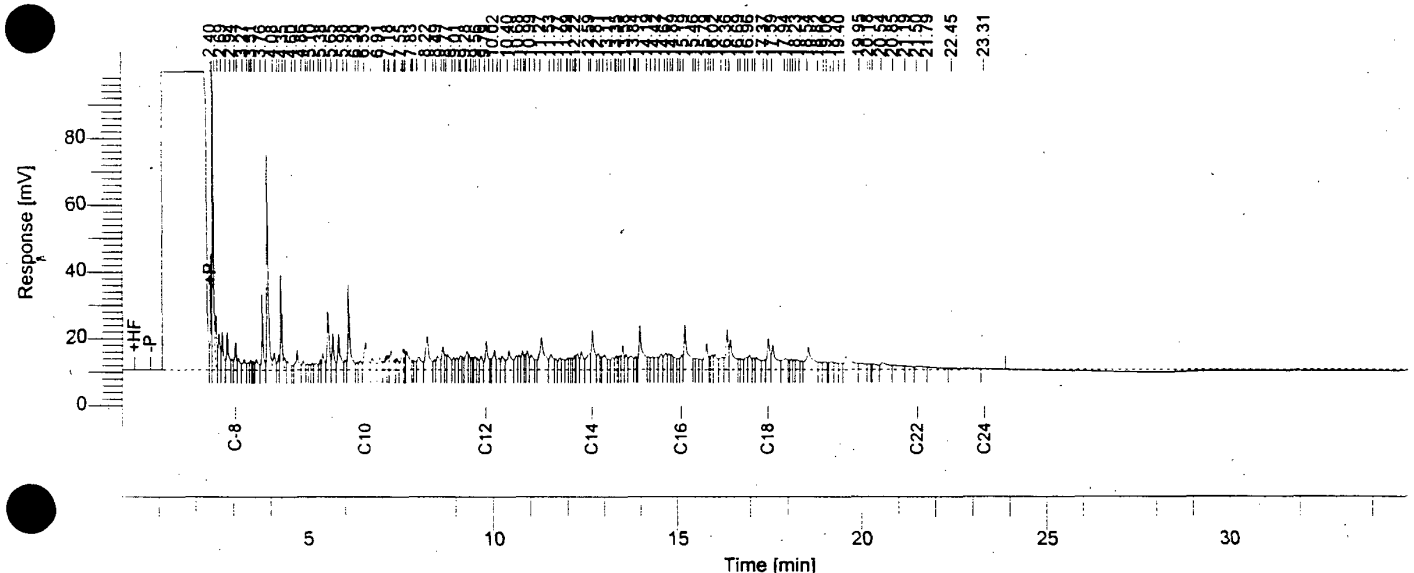

TPH BY GC/FID TNRCC 1005

Peak #	Ret. Time	Component Name	Area [µV·s]	Result ug/Ml	% DRIFT (LIMIT+/- 25%)
	4.63	C6-C10 TPH	1198628	247.5814	0.97
	14.55	C6-C28 TPH	4348991	505.5123	-1.10
	16.70	C10-C28 TPH	3150364	255.0220	-2.01

COLUMN: 30 M RTX-1 0.53mm ID 0.25 um Film

TEST CODE :S1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB :Method Blank 855-132-1 MATRIX : SOLID

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		50
>C10 -> C28 Hydrocarbons	ND		50
C6 -> C28 Hydrocarbons	ND		50

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

EXAMPLE CALCULATION - Soil

C6- C10 FOR ~~LCS~~ MS

Curve Y= c0 + c1*x

c0= is the y intercept

c1= the slope of the line

Y =304599.350915 + 3611.048040*x

Area (y) for C6 to C10 = 1907000

$$\text{Amount (X)} = \frac{1929815 - 304599.350915}{3611.048040}$$

$$= \frac{450 \quad 443.7494688 \text{ ug/ml} * 10\text{mL} \quad 3\text{ml FV}}{35 \text{ ml extraction volume} \quad 11.25\text{ g}}$$

= 38.0357 mg/L 400 mg/kg

6/23/98

2-3

Job Number: 9801.181

Client: START - Dallas

Reviewer: [illegible]

Date: 6/23/98

HPLC
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* = ALL CALIBRATION INFORMATION IS ORGANIZED PER INSTRUMENT, CHRONOLOGICALLY

QUALITY CONTROL FOR ACCURACY: PERCENT RECOVERY
OF SURROGATE SPIKES

9801.181

E & E Laboratory 98-

(ug/kg)

Parameter	Amount Added	Amount Determined	Percent Recovery
Terphenyl-d14			
07928	1000	850	85.0
07929	1000	822	82.2
07930	1000	1000	100
07931	1000	886	88.6
07932	1000	1040	104
07933	1000	832	83.2
07933 MS	1000	834	83.3
07933 MSD	1000	832	83.2
07934	1000	1010	101
07935	1000	865	86.5
07936	1000	863	86.3
07937	1000	894	89.4
07938	1000	771	77.1
07939	1000	818	81.8
Method Blank (1339-17-1)	1000	872	87.2
LCS (1339-17-1)	1000	915	91.5

THESE RECOVERIES ARE WITHIN E & E, INC. QC TARGETS.

MS = MATRIX SPIKE
MSD = MATRIX SPIKE DUPLICATE
LCS = LABORATORY CONTROL SAMPLE

002157

QUALITY CONTROL FOR ACCURACY;PERCENT RECOVERY FOR SPIKED SAMPLES

ANALYSIS DATE: 6/10/98 JOB#:9801.165/.181

NOTEBOOK: 1263-47 SAMPLE #: 7933 BATCH#:980609521R/980604586P

MATRIX::SOIL UNITS:UG/KG

PARAMETER	ORIGINAL VALUE	AMOUNT ADDED	AMT FOUND MS	AMT FOUND MSD	% REC MS	% REC MSD	RPD
NAPHTHALENE	0	2500	2000	2005	80.0	80.2	0.25
ACENAPHTHYLENE	0	2500	2008	2022	80.3	80.9	0.69
ACENAPHTHENE	0	2500	2271	2288	90.8	91.5	0.75
FLUORENE	0	250	200	201	80.0	80.4	0.50
PHENANTHRENE	0	250	213	213	85.2	85.2	0.00
ANTHRACENE	0	125	92.0	90.2	73.6	72.2	2.0
FLUORANTHENE	0	670	613	610	91.5	91.0	0.49
PYRENE	0	670	574	571	85.7	85.2	0.52
BENZO(A)ANTHRACENE	0	250	216	214	86.4	85.6	0.93
CHRYSENE	0	250	215	214	86.0	85.6	0.47
BENZO(B)FLUORANTHENE	0	250	210	205	84.0	82.0	2.4
BENZO(K)FLUORANTHENE	0	250	204	201	81.6	80.4	1.5
BENZO(A)PYRENE	0	250	224	219	90	87.6	2.3
DIBENZO(AH)ANTHRACENE	0	670	510	524	76.1	78.2	2.7
BENZO(GHI)PERYLENE	0	670	576	543	86.0	81.0	5.9
INDENO(CD123)PYRENE	0	250	199	188	79.6	75.2	5.7

IN CONTROL mc 6-10-98

COPY QA

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002158

QUALITY CONTROL FOR ACCURACY:PERCENT RECOVERY FOR SPIKED SAMPLES

ANALYSIS DATE: 6/9/98 JOB#:9801.168/.181

NOTEBOOK: 1263-47 SAMPLE #:SLCS 1339-17-2 BATCH#:980609521R/9806004586P

MATRIX:SOIL UNITS:UG/KG

PARAMETER	ORIGINAL VALUE	AMOUNT ADDED	AMT FOUND MS	% REC MA
NAPHTHALENE	0	2500	2316 ✓	92.6
ACENAPHTHYLENE	0	2500	2223 ✓	88.9
ACENAPHTHENE	0	2500	2515 ✓	101
FLUORENE	0	250	216 ✓	86.4
PHENANTHRENE	0	250	230 ✓	92.0
ANTHRACENE	0	117	97.8 ✓	83.6
FLUORANTHENE	0	670	667 ✓	99.6
PYRENE	0	670	640 ✓	95.5
BENZO(A)ANTHRACENE	0	250	236 ✓	94.4
CHRYSENE	0	250	236 ✓	94.4
BENZO(B)FLUORANTHENE	0	250	228 ✓	91.2
BENZO(K)FLUORANTHENE	0	250	218 ✓	87.2
BENZO(A)PYRENE	0	250	232 ✓	92.8
DIBENZO(AH)ANTHRACENE	0	670	543 ✓	81.0
BENZO(GHI)PERYLENE	0	670	595 ✓	88.8
INDENO(CD123)PYRENE	0	250	208 ✓	83.2

IN CONTROL mc 6-10-98

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Copy QA

TEST CODE :SPAH0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07928 MATRIX : SOLID
SAMPLE ID CLIENT: SB06-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		230
Acenaphthylene	ND		230
1-methylnaphthalene	ND		230
2-Methylnaphthalene	ND		230
Acenaphthene	ND		230
Fluorene	ND		23
Phenanthrene	31		23
Anthracene	ND		23
Fluoranthene	66		57
Pyrene	ND		57
Benzo(a)anthracene	15	J	23
Chrysene	25		23
Benzo(b)fluoranthene	25		23
Benzo(k)fluoranthene	ND		23
Benzo(a)pyrene	31		23
Dibenzo(a,h)anthracene	ND		57
Benzo(ghi)perylene	28	J	57
Indeno(1,2,3-cd)pyrene	ND		23

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :SPAH0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 87 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07929 MATRIX : SOLID
SAMPLE ID CLIENT: SB07-0405

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		230
Acenaphthylene	ND		230
1-methylnaphthalene	ND		230
2-Methylnaphthalene	ND		230
Acenaphthene	ND		230
Fluorene	ND		23
Phenanthrene	ND		23
Anthracene	ND		23
Fluoranthene	ND		57
Pyrene	ND		57
Benzo(a)anthracene	ND		23
Chrysene	ND		23
Benzo(b)fluoranthene	ND		23
Benzo(k)fluoranthene	ND		23
Benzo(a)pyrene	ND		23
Dibenzo(a,h)anthracene	ND		57
Benzo(ghi)perylene	ND		57
Indeno(1,2,3-cd)pyrene	ND		23

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :SPAH0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 89 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07930 MATRIX : SOLID
SAMPLE ID CLIENT: SB07D-0405

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		220
Acenaphthylene	ND		220
1-methylnaphthalene	ND		220
2-Methylnaphthalene	ND		220
Acenaphthene	ND		220
Fluorene	ND		22
Phenanthrene	ND		22
Anthracene	ND		22
Fluoranthene	56		56
Pyrene	84		56
Benzo(a)anthracene	31		22
Chrysene	ND		22
Benzo(b)fluoranthene	64		22
Benzo(k)fluoranthene	17	J	22
Benzo(a)pyrene	70		22
Dibenzo(a,h)anthracene	ND		56
Benzo(ghi)perylene	ND		56
Indeno(1,2,3-cd)pyrene	ND		22

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :SPAH0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 92 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07931 MATRIX : SOLID
SAMPLE ID CLIENT: SB08-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		220
Acenaphthylene	ND		220
1-methylnaphthalene	ND		220
2-Methylnaphthalene	ND		220
Acenaphthene	ND		220
Fluorene	ND		22
Phenanthrene	ND		22
Anthracene	ND		22
Fluoranthene	ND		54
Pyrene	ND		54
Benzo(a)anthracene	ND		22
Chrysene	ND		22
Benzo(b)fluoranthene	ND		22
Benzo(k)fluoranthene	ND		22
Benzo(a)pyrene	ND		22
Dibenzo(a,h)anthracene	ND		54
Benzo(ghi)perylene	ND		54
Indeno(1,2,3-cd)pyrene	ND		22

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :SPAH0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07932 MATRIX : SOLID
SAMPLE ID CLIENT: SB09-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		230
Acenaphthylene	ND		230
1-methylnaphthalene	ND		230
2-Methylnaphthalene	ND		230
Acenaphthene	ND		230
Fluorene	ND		23
Phenanthrene	68		23
Anthracene	ND		23
Fluoranthene	61		57
Pyrene	ND		57
Benzo(a)anthracene	39		23
Chrysene	56		23
Benzo(b)fluoranthene	16	J	23
Benzo(k)fluoranthene	24		23
Benzo(a)pyrene	44		23
Dibenzo(a,h)anthracene	ND		57
Benzo(ghi)perylene	ND		57
Indeno(1,2,3-cd)pyrene	ND		23

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :SPAH0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 90 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07933 MATRIX : SOLID
SAMPLE ID CLIENT: SB10-0304

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		220
Acenaphthylene	ND		220
1-methylnaphthalene	ND		220
2-Methylnaphthalene	ND		220
Acenaphthene	ND		220
Fluorene	ND		22
Phenanthrene	ND		22
Anthracene	ND		22
Fluoranthene	ND		56
Pyrene	ND		56
Benzo(a)anthracene	ND		22
Chrysene	ND		22
Benzo(b)fluoranthene	ND		22
Benzo(k)fluoranthene	ND		22
Benzo(a)pyrene	ND		22
Dibenzo(a,h)anthracene	ND		56
Benzo(ghi)perylene	ND		56
Indeno(1,2,3-cd)pyrene	ND		22

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002165

TEST CODE :SPAH0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 85 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07934 MATRIX : SOLID
SAMPLE ID CLIENT: SB11-0203

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		240
Acenaphthylene	ND		240
1-methylnaphthalene	ND		240
2-Methylnaphthalene	ND		240
Acenaphthene	ND		240
Fluorene	ND		24
Phenanthrene	42		24
Anthracene	ND		24
Fluoranthene	140		59
Pyrene	120		59
Benzo(a)anthracene	72		24
Chrysene	120		24
Benzo(b)fluoranthene	88		24
Benzo(k)fluoranthene	59		24
Benzo(a)pyrene	110		24
Dibenzo(a,h)anthracene	ND		59
Benzo(ghi)perylene	39	J	59
Indeno(1,2,3-cd)pyrene	28		24

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :SPAH0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 87 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07935 MATRIX : SOLID
SAMPLE ID CLIENT: SB12-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		230
Acenaphthylene	ND		230
1-methylnaphthalene	ND		230
2-Methylnaphthalene	ND		230
Acenaphthene	ND		230
Fluorene	ND		23
Phenanthrene	ND		23
Anthracene	ND		23
Fluoranthene	ND		57
Pyrene	ND		57
Benzo(a)anthracene	ND		23
Chrysene	ND		23
Benzo(b)fluoranthene	ND		23
Benzo(k)fluoranthene	ND		23
Benzo(a)pyrene	ND		23
Dibenzo(a,h)anthracene	ND		57
Benzo(ghi)perylene	ND		57
Indeno(1,2,3-cd)pyrene	ND		23

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :SPAH0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 86 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07936 MATRIX : SOLID
SAMPLE ID CLIENT: SB12-0809

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		230
Acenaphthylene	ND		230
1-methylnaphthalene	ND		230
2-Methylnaphthalene	ND		230
Acenaphthene	ND		230
Fluorene	ND		23
Phenanthrene	ND		23
Anthracene	ND		23
Fluoranthene	ND		58
Pyrene	ND		58
Benzo(a)anthracene	ND		23
Chrysene	ND		23
Benzo(b)fluoranthene	ND		23
Benzo(k)fluoranthene	ND		23
Benzo(a)pyrene	ND		23
Dibenzo(a,h)anthracene	ND		58
Benzo(ghi)perylene	ND		58
Indeno(1,2,3-cd)pyrene	ND		23

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :SPAH0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 89 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07937 MATRIX : SOLID
SAMPLE ID CLIENT: SB13-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		220
Acenaphthylene	ND		220
1-methylnaphthalene	ND		220
2-Methylnaphthalene	ND		220
Acenaphthene	ND		220
Fluorene	ND		22
Phenanthrene	38		22
Anthracene	ND		22
Fluoranthene	76		56
Pyrene	ND		56
Benzo(a)anthracene	21	J	22
Chrysene	43		22
Benzo(b)fluoranthene	56		22
Benzo(k)fluoranthene	18	J	22
Benzo(a)pyrene	74		22
Dibenzo(a,h)anthracene	ND		56
Benzo(ghi)perylene	40	J	56
Indeno(1,2,3-cd)pyrene	27		22

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :SPAH0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 86 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07938 MATRIX : SOLID
SAMPLE ID CLIENT: SB13-6575

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		230
Acenaphthylene	ND		230
1-methylnaphthalene	ND		230
2-Methylnaphthalene	ND		230
Acenaphthene	ND		230
Fluorene	ND		23
Phenanthrene	ND		23
Anthracene	ND		23
Fluoranthene	ND		58
Pyrene	ND		58
Benzo(a)anthracene	ND		23
Chrysene	ND		23
Benzo(b)fluoranthene	ND		23
Benzo(k)fluoranthene	ND		23
Benzo(a)pyrene	ND		23
Dibenzo(a,h)anthracene	ND		58
Benzo(ghi)perylene	ND		58
Indeno(1,2,3-cd)pyrene	ND		23

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :SPAH0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 87 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07939 MATRIX : SOLID
SAMPLE ID CLIENT: SB13D-6575

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		230
Acenaphthylene	ND		230
1-methylnaphthalene	ND		230
2-Methylnaphthalene	ND		230
Acenaphthene	ND		230
Fluorene	ND		23
Phenanthrene	ND		23
Anthracene	ND		23
Fluoranthene	ND		57
Pyrene	ND		57
Benzo(a)anthracene	ND		23
Chrysene	ND		23
Benzo(b)fluoranthene	ND		23
Benzo(k)fluoranthene	ND		23
Benzo(a)pyrene	ND		23
Dibenzo(a,h)anthracene	ND		57
Benzo(ghi)perylene	ND		57
Indeno(1,2,3-cd)pyrene	ND		23

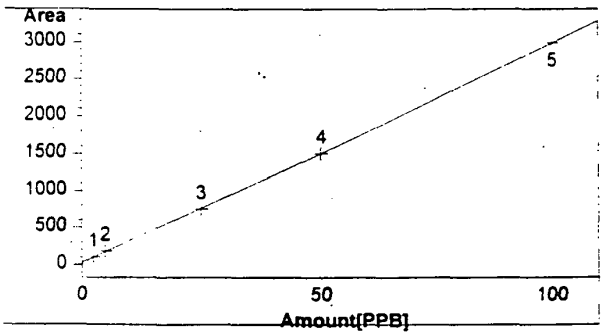
QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

PAH RETENTION TIME WINDOWS
HYPERPAH 100x4.6

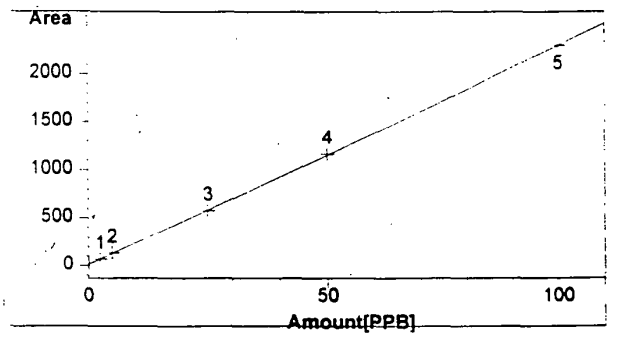
	1/7/97 RT	1/10/97 RT	1/14/97 RT	AVE RT	3X STDEV
NAPHTHALENE	9.060	9.055	9.047	9.054	0.020
ACENAPHTHALENE	10.075	10.071	10.063	10.070	0.018
ACENAPHTHENE	11.537	11.534	11.528	11.533	0.014
FLUORENE	11.796	11.795	11.789	11.793	0.011
PHENANTHRENE	12.749	12.748	12.744	12.747	0.008
ANTHRACENE	13.654	13.655	13.652	13.654	0.005
FLUORANTHENE	14.692	14.695	14.696	14.694	0.006
PYRENE	15.482	15.487	15.489	15.486	0.011
TERPHENYL D-14	16.649	16.660	16.662	16.657	0.021
BENZO(A)ANTHRACENE	17.840	17.852	17.857	17.850	0.026
CHRYSENE	18.367	18.382	18.388	18.379	0.032
BENZO(B)FLUORANTHENE	20.313	20.335	20.338	20.329	0.041
BENZO(K)FLUORANTHENE	21.167	21.198	21.201	21.189	0.056
BENZO(A)PYRENE	22.045	22.075	22.076	22.065	0.053
DIBENZO(AH)ANTHRACENE	23.124	23.156	23.160	23.147	0.059
BENZO(GHI)PERYLENE	24.230	24.234	24.238	24.234	0.012
INDENO(CD123)PYRENE	24.717	24.759	24.768	24.748	0.082

002172

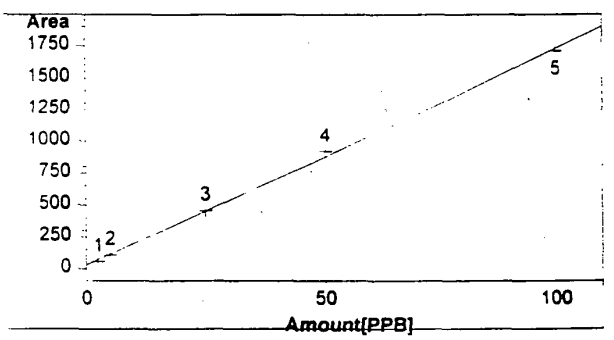
Calibration Curves



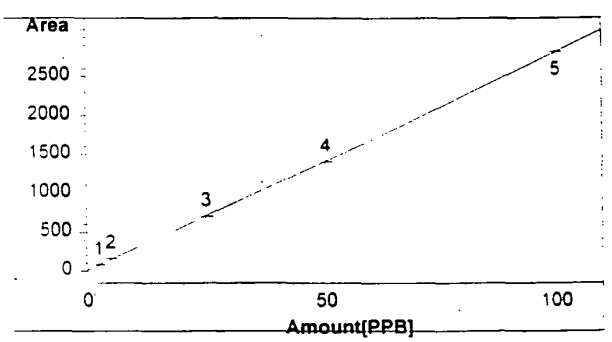
NAPHTHALENE at exp. RT: 11.368
VWD1 A, Wavelength=254 nm
Correlation: 0.99998
Residual Std. Dev.: 8.61906
Formula: y = mx + b
m: 29.60375
b: 29.84070
x: Amount
y: Area



ACENAPTHYLENE at exp. RT: 12.334
VWD1 A, Wavelength=254 nm
Correlation: 0.99997
Residual Std. Dev.: 8.29213
Formula: y = mx + b
m: 22.81496
b: 18.25920
x: Amount
y: Area



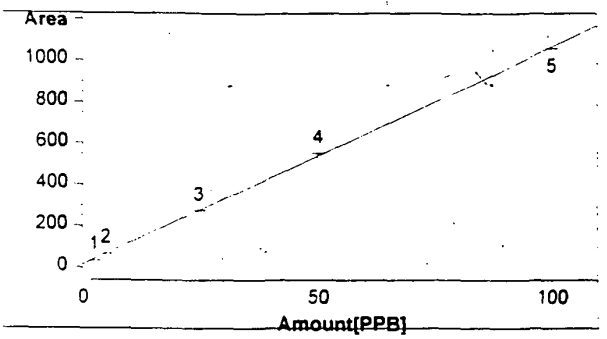
1-METHYLNAPHTHALENE at exp. RT: 12.900
VWD1 A, Wavelength=254 nm
Correlation: 0.99937
Residual Std. Dev.: 28.01689
Formula: y = mx + b
m: 16.99461
b: 28.60273
x: Amount
y: Area



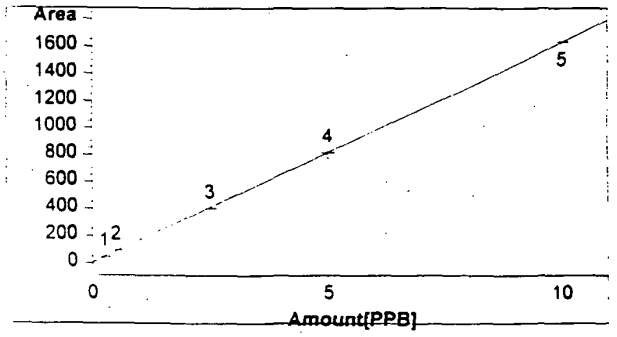
2-METHYLNAPHTHALENE at exp. RT: 13.191
VWD1 A, Wavelength=254 nm
Correlation: 0.99996
Residual Std. Dev.: 11.69282
Formula: y = mx + b
m: 28.00910
b: 10.92825
x: Amount
y: Area

381

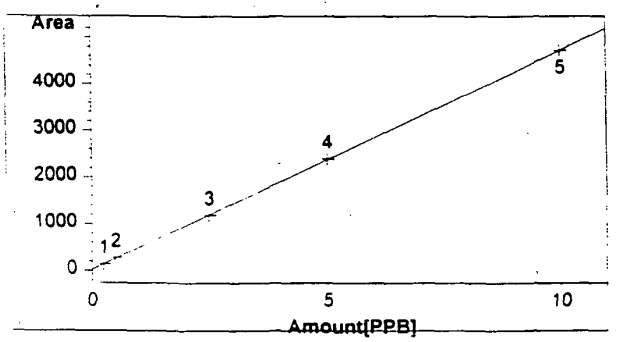
002173



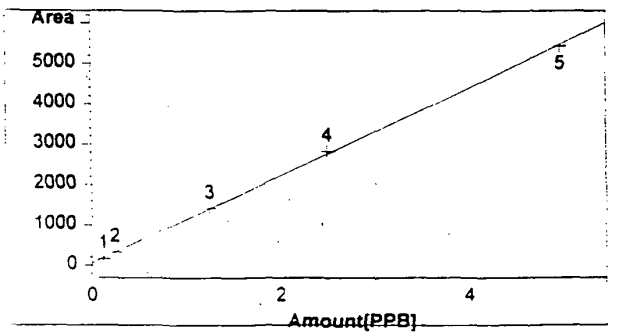
ACENAPHTHENE at exp. RT: 13.524
VWD1 A, Wavelength=254 nm
Correlation: 0.99981
Residual Std. Dev.: 9.48577
Formula: y = mx + b
m: 10.51838
b: 13.83540
x: Amount
y: Area



FLUORENE at exp. RT: 13.768
VWD1 A, Wavelength=254 nm
Correlation: 0.99997
Residual Std. Dev.: 5.64776
Formula: y = mx + b
m: 162.39955
b: 5.64926
x: Amount
y: Area

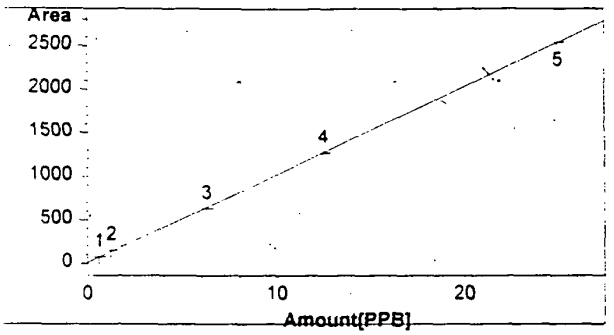


PHENANTHRENE at exp. RT: 14.511
VWD1 A, Wavelength=254 nm
Correlation: 0.99998
Residual Std. Dev.: 14.63936
Formula: y = mx + b
m: 469.92865
b: 26.63216
x: Amount
y: Area

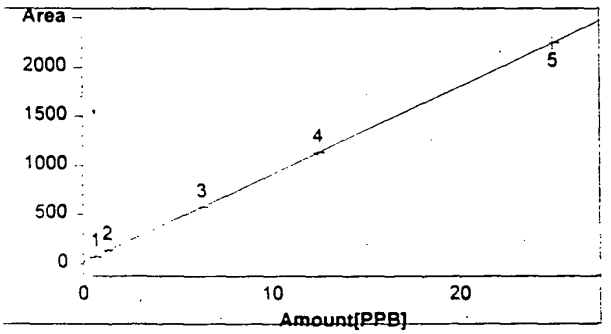


ANTHRACENE at exp. RT: 15.200
VWD1 A, Wavelength=254 nm
Correlation: 0.99983
Residual Std. Dev.: 46.21400
Formula: y = mx + b
m: 1083.67517
b: 55.22206
x: Amount
y: Area

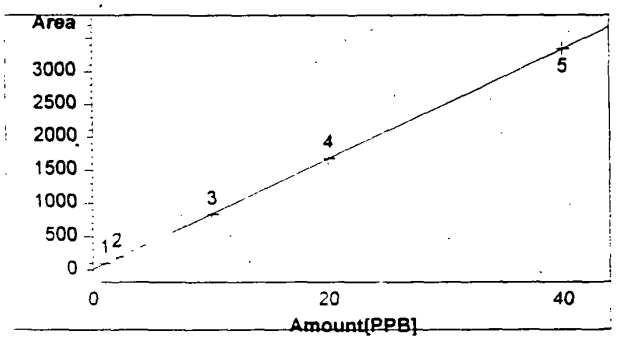
002174



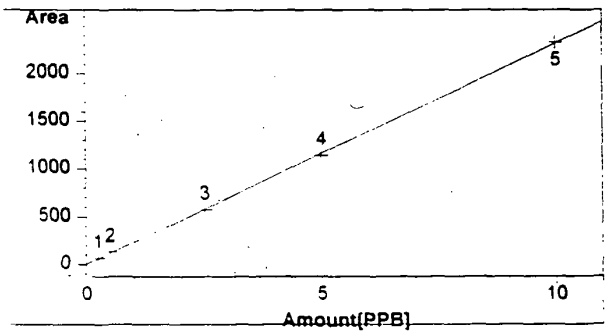
FLUORANTHENE at exp. RT: 15.991
VWD1 A, Wavelength=254 nm
Correlation: 0.99996
Residual Std. Dev.: 10.29423
Formula: y = mx + b
m: 101.01775
b: 9.01388
x: Amount
y: Area



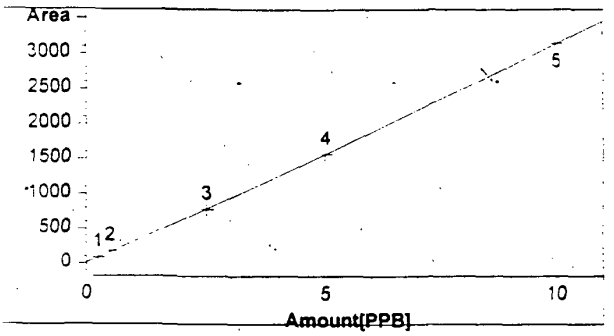
PYRENE at exp. RT: 16.558
VWD1 A, Wavelength=254 nm
Correlation: 0.99998
Residual Std. Dev.: 5.95560
Formula: y = mx + b
m: 89.07327
b: 19.36412
x: Amount
y: Area



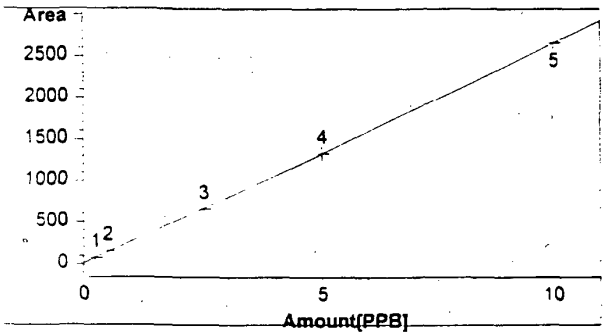
TERPHENYL at exp. RT: 17.493
VWD1 A, Wavelength=254 nm
Correlation: 0.99997
Residual Std. Dev.: 10.99116
Formula: y = mx + b
m: 83.16153
b: 14.78691
x: Amount
y: Area



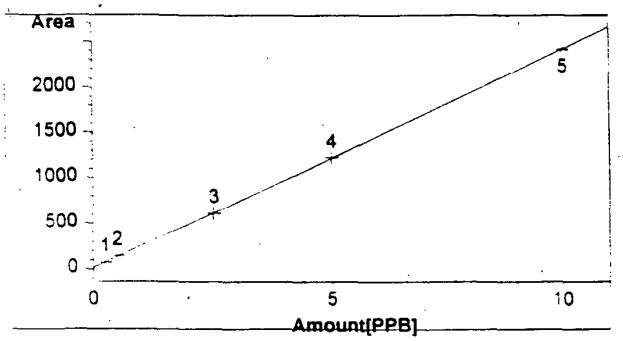
BENZO(A)ANTHRACENE at exp. RT: 18.295
VWD1 A, Wavelength=254 nm
Correlation: 0.99989
Residual Std. Dev.: 16.23285
Formula: y = mx + b
m: 231.32744
b: 4.54955
x: Amount
y: Area



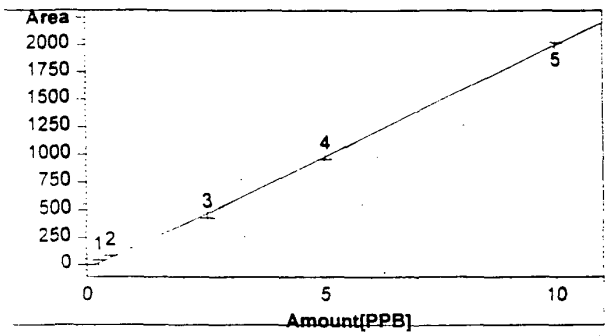
CHRYSENE at exp. RT: 18.688
VWD1 A, Wavelength=254 nm
Correlation: 0.99998
Residual Std. Dev.: 10.27704
Formula: y = mx + b
m: 313.37421
b: 13.57489
x: Amount
y: Area



BENZO(B)FLUORANTHE at exp. RT: 19.990
VWD1 A, Wavelength=254 nm
Correlation: 0.99997
Residual Std. Dev.: 8.96692
Formula: y = mx + b
m: 264.68066
b: 16.81769
x: Amount
y: Area

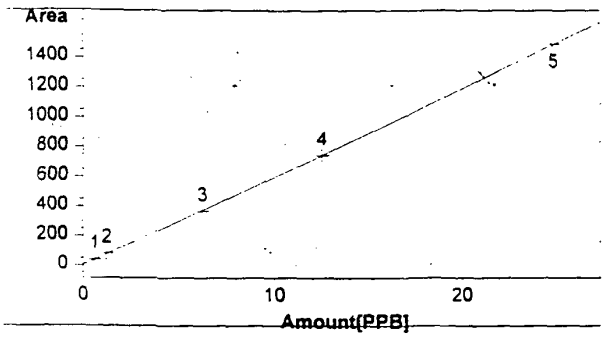


BENZO(K)FLUORANTHE at exp. RT: 20.575
VWD1 A, Wavelength=254 nm
Correlation: 0.99998
Residual Std. Dev.: 6.76702
Formula: y = mx + b
m: 240.20303
b: 19.10104
x: Amount
y: Area

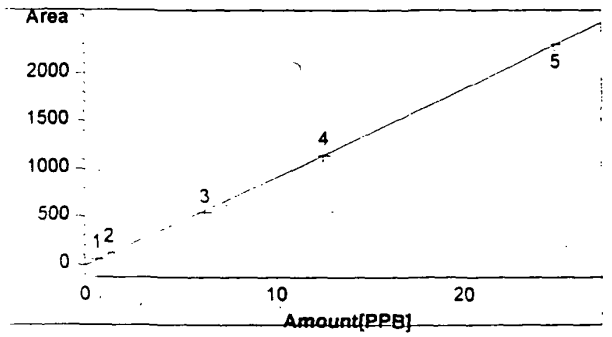


BENZO(A)PYRENE at exp. RT: 21.149
VWD1 A, Wavelength=254 nm
Correlation: 0.99927
Residual Std. Dev.: 36.26219
Formula: y = mx + b
m: 203.98056
b: -38.80044
x: Amount
y: Area

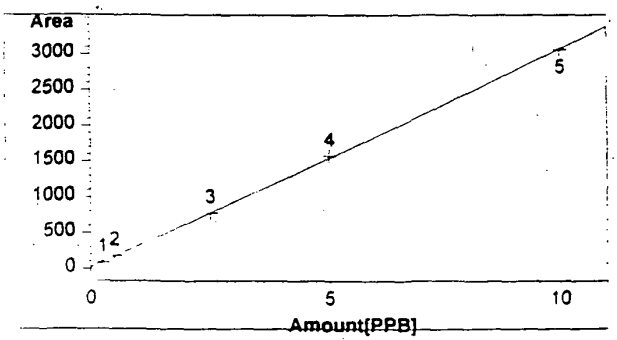
002176



DIBENZOANTHRACENE at exp. RT: 21.967
VWD1 A, Wavelength=254 nm
Correlation: 0.99997
Residual Std. Dev.: 5.15589
Formula: y = mx + b
m: 59.42434
b: 5.58615
x: Amount
y: Area



BENZO(GHI)PERYLENE at exp. RT: 22.814
VWD1 A, Wavelength=254 nm
Correlation: 0.99988
Residual Std. Dev.: 16.38755
Formula: y = mx + b
m: 92.37862
b: -8.67490
x: Amount
y: Area



INDENOPYRENE at exp. RT: 23.321
VWD1 A, Wavelength=254 nm
Correlation: 0.99991
Residual Std. Dev.: 19.51298
Formula: y = mx + b
m: 304.98169
b: 21.53078
x: Amount
y: Area

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002177

PERCENT RECOVERY FOR REFERENCE STANDARD :2ND SOURCE
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

ANALYSIS DATE: 4/10/98 JOB#:9800.564/.565/.640

NOTEBOOK: 1229-178 STD #: 1190-128-8 BATCH#:980410521R

VIAL:108-1 UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	75.0	73.7	98.3
ACENAPHTHYLENE	75.0	72.6	96.8
ACENAPHTHENE	75.0	75.0	100
FLUORENE	7.50	7.37	98.3
PHENANTHRENE	7.50	7.61	101
ANTHRACENE	3.50	3.61	103
FLUORANTHENE	20.0	22.4	112
PYRENE	20.0	22.5	113
BENZO(A)ANTHRACENE	7.50	8.20	109
CHRYSENE	7.50	7.67	102
BENZO(B)FLUORANTHENE	7.50	7.80	104
BENZO(K)FLUORANTHENE	7.50	7.50	100
BENZO(A)PYRENE	7.50	6.96	92.8
DIBENZO(AH)ANTHRACENE	20.0	18.4	92.0
BENZO(GHI)PERYLENE	20.0	19.7	98.5
INDENO(CD123)PYRENE	7.50	7.37	98.3

IN CONTROL AVERAGE = 101

Mc 4/13/98 Copy QA

3/8

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

INITIAL CAL NOTEBOOK:1229-178
INITIAL CAL. DATE:041098

ANALYSIS DATE: 4/11/98

JOB#:9800.564/.565/.611

NOTEBOOK:1229-178

STD#: 1190-128-4
STD TYPE: CONTINUING

BATCH#:980410521R

VIAL:104-2

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	50.3	101
ACENAPHTHYLENE	50.0	51.0	102
1-METHYLNAPHTHALENE	50.0	53	106
2-METHYLNAPHTHALENE	50.0	50.1	100
ACENAPHTHENE	50.0	51.4	103
FLUORENE	5.00	5.10	102
PHENANTHRENE	5.00	5.11	102
ANTHRACENE	2.50	2.57	103
FLUORANTHENE	12.5	13.7	110
PYRENE	12.5	14.1	113
P-TERPHENYL-D14	20.0	20.9	105
BENZO(A)ANTHRACENE	5.00	5.49	110
CHRYSENE	5.00	5.54	111
BENZO(B)FLUORANTHENE	5.00	5.63	113
BENZO(K)FLUORANTHENE	5.00	5.61	112
BENZO(A)PYRENE	5.00	5.38	108
DIBENZO(AH)ANTHRACENE	12.5	14.0	112
BENZO(GHI)PERYLENE	12.5	13.1	105
INDENO(CD123)PYRENE	5.00	5.31	106

IN CONTROL mc 4/13/98 AVERAGE = 106

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PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

INITIAL CAL NOTEBOOK:1229-178
INITIAL CAL. DATE:041098

ANALYSIS DATE: 4/11/98

JOB#:9800.564/.565/.611

NOTEBOOK:1229-178 STD#: 1190-128-4
STD TYPE: ENDING

BATCH#:980410521R

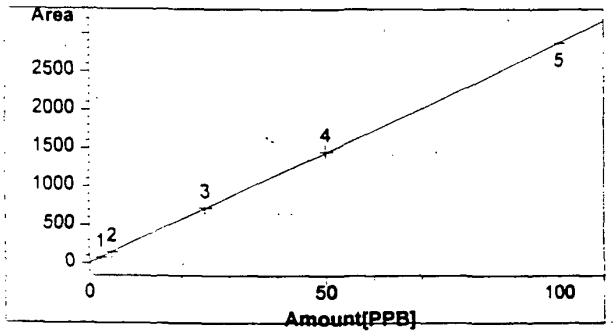
VIAL:104-4

UNITS:UG/ML

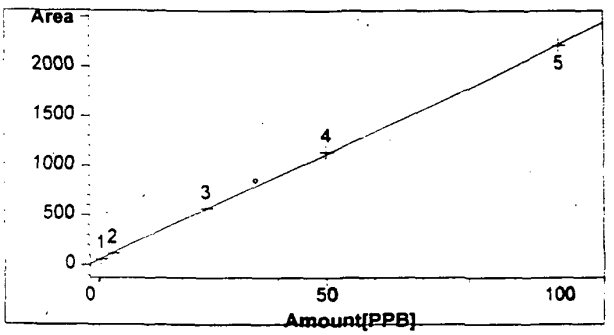
PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	50.2	100
ACENAPHTHYLENE	50.0	51.1	102
1-METHYLNAPHTHALENE	50.0	52.9	106
2-METHYLNAPHTHALENE	50.0	50.3	101
ACENAPHTHENE	50.0	51.2	102
FLUORENE	5.00	5.21	104
PHENANTHRENE	5.00	5.14	103
ANTHRACENE	2.50	2.60	104
FLUORANTHENE	12.5	14.0	112
PYRENE	12.5	14.0	112
P-TERPHENYL-D14	20.0	21.4	107
BENZO(A)ANTHRACENE	5.00	5.55	111
CHRYSENE	5.00	5.60	112
BENZO(B)FLUORANTHENE	5.00	5.48	110
BENZO(K)FLUORANTHENE	5.00	5.43	109
BENZO(A)PYRENE	5.00	5.28	106
DIBENZO(AH)ANTHRACENE	12.5	13.9	111
BENZO(GHI)PERYLENE	12.5	12.7	102
INDENO(CD123)PYRENE	5.00	5.24	105

IN CONTROL MC4/13/98 AVERAGE = 106

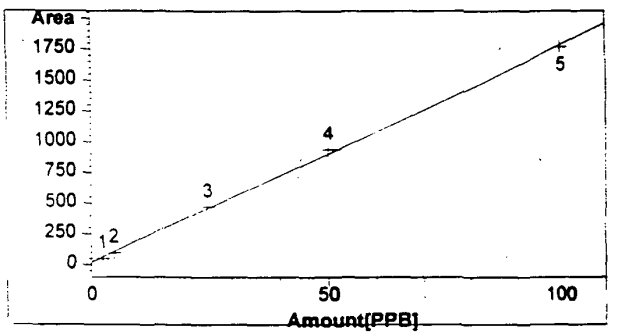
Calibration Curves



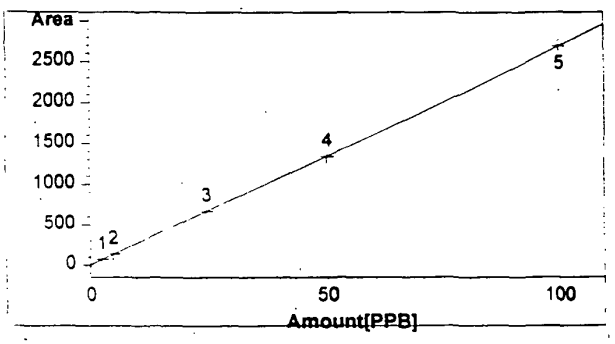
NAPHTHALENE at exp. RT: 10.326
VWD1 A, Wavelength=254 nm
Correlation: 0.99998
Residual Std. Dev.: 9.35419
Formula: y = mx + b
m: 28.79510
b: 8.23071
x: Amount
y: Area



ACENAPTHYLENE at exp. RT: 11.374
VWD1 A, Wavelength=254 nm
Correlation: 0.99989
Residual Std. Dev.: 15.49880
Formula: y = mx + b
m: 22.14003
b: 11.94546
x: Amount
y: Area



1-METHYLNAPHTHALENE at exp. RT: 12.066
VWD1 A, Wavelength=254 nm
Correlation: 0.99948
Residual Std. Dev.: 26.41903
Formula: y = mx + b
m: 17.68183
b: 19.96260
x: Amount
y: Area



2-METHYLNAPHTHALENE at exp. RT: 12.427
VWD1 A, Wavelength=254 nm
Correlation: 1.00000
Residual Std. Dev.: 2.16417
Formula: y = mx + b
m: 26.88180
b: 2.31399
x: Amount
y: Area

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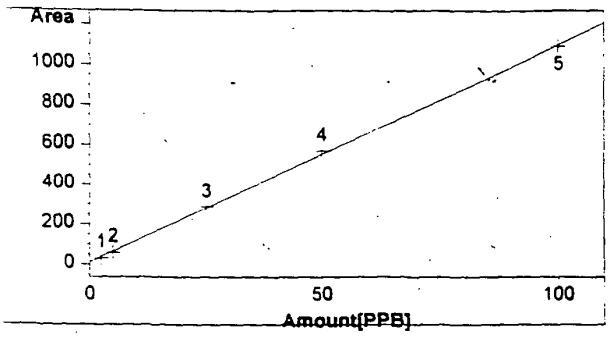
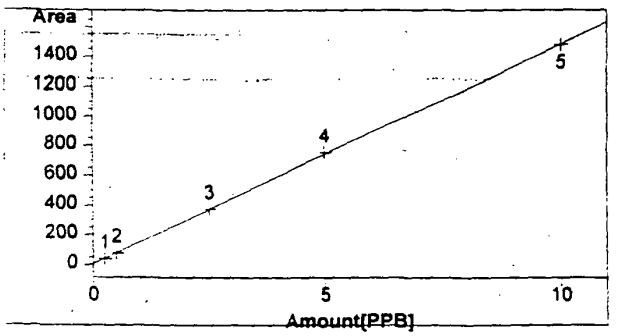
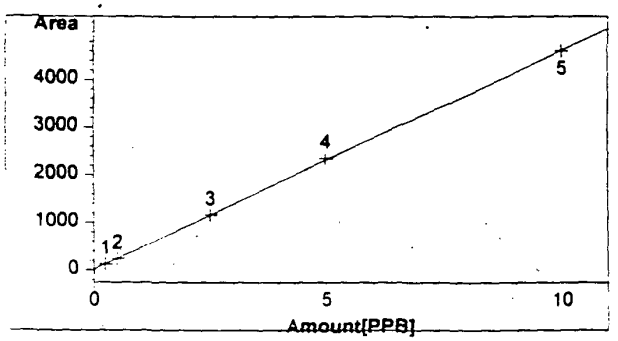
002181



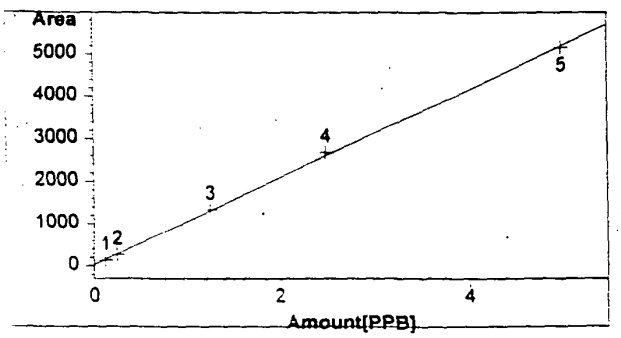
ACENAPHTHENE at exp. RT: 12.837
VWD1 A, Wavelength=254 nm
Correlation: 0.99970
Residual Std. Dev.: 12.40004
Formula: y = mx + b
m: 10.87429
b: 10.84167
x: Amount
y: Area



FLUORENE at exp. RT: 13.135
VWD1 A, Wavelength=254 nm
Correlation: 0.99994
Residual Std. Dev.: 7.73917
Formula: y = mx + b
m: 148.32066
b: 5.43912
x: Amount
y: Area

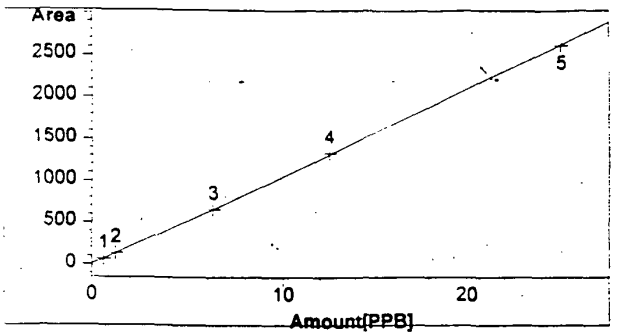


PHENANTHRENE at exp. RT: 14.112
VWD1 A, Wavelength=254 nm
Correlation: 0.99995
Residual Std. Dev.: 22.05206
Formula: y = mx + b
m: 459.51065
b: 16.38516
x: Amount
y: Area

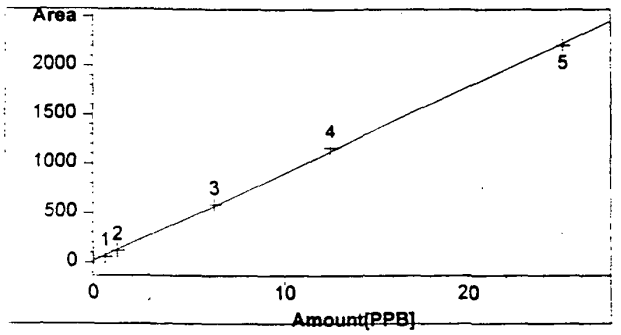


ANTHRACENE at exp. RT: 15.056
VWD1 A, Wavelength=254 nm
Correlation: 0.99977
Residual Std. Dev.: 51.27747
Formula: y = mx + b
m: 1032.39746
b: 34.42780
x: Amount
y: Area

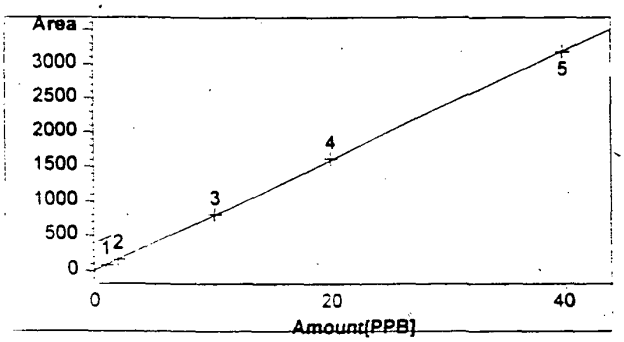
002182



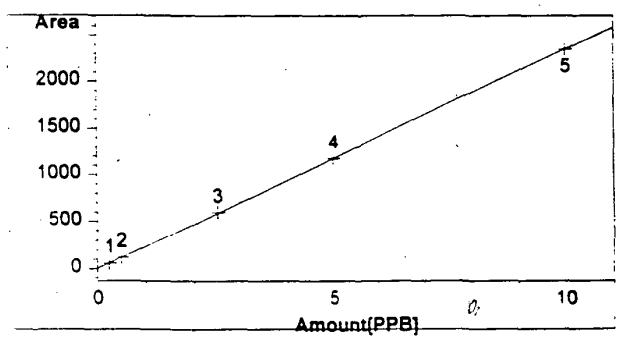
FLUORANTHENE at exp. RT: 16.110
VWD1 A, Wavelength=254 nm
Correlation: 0.99996
Residual Std. Dev.: 10.83279
Formula: y = mx + b
m: 105.08126
b: 5.69488
x: Amount
y: Area



PYRENE at exp. RT: 16.930
VWD1 A, Wavelength=254 nm
Correlation: 0.99960
Residual Std. Dev.: 29.23656
Formula: y = mx + b
m: 88.49943
b: 23.21814
x: Amount
y: Area

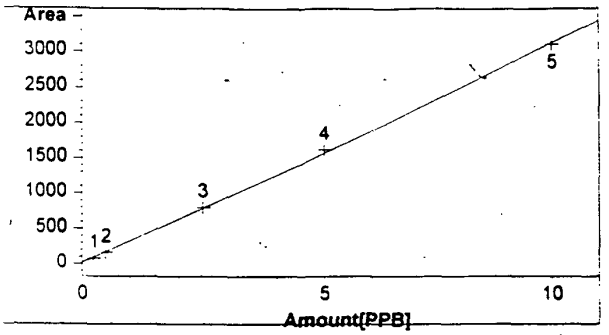


TERPHENYL at exp. RT: 18.099
VWD1 A, Wavelength=254 nm
Correlation: 0.99994
Residual Std. Dev.: 15.79841
Formula: y = mx + b
m: 79.49236
b: 11.78551
x: Amount
y: Area

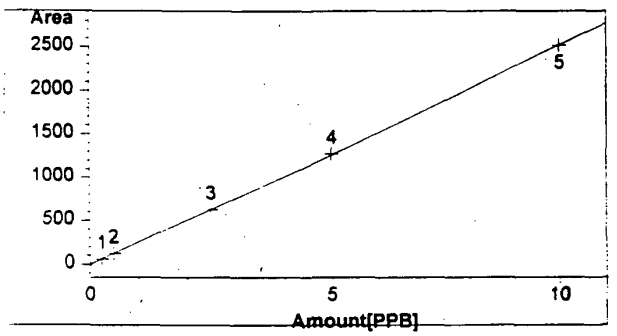


BENZO(A)ANTHRACENE at exp. RT: 19.323
VWD1 A, Wavelength=254 nm
Correlation: 0.99999
Residual Std. Dev.: 5.55763
Formula: y = mx + b
m: 234.81491
b: 5.33799
x: Amount
y: Area

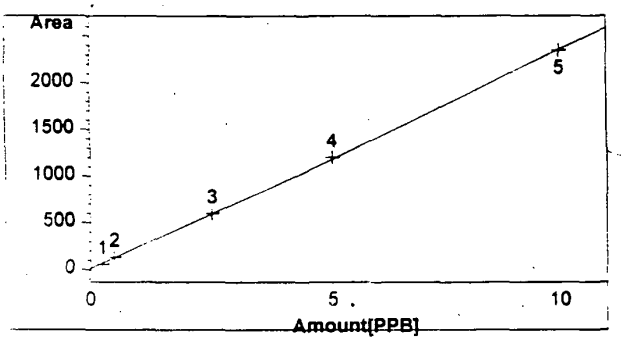
002183



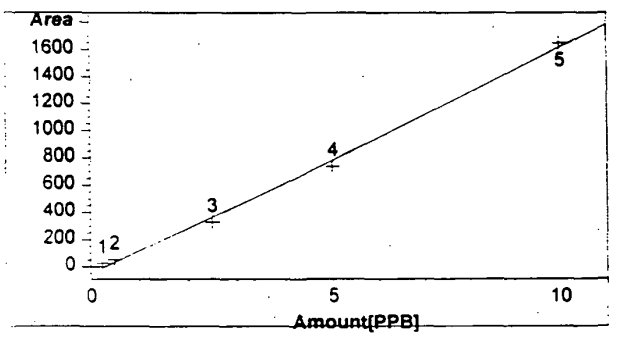
CHRYSENE at exp. RT: 19.896
VWD1 A, Wavelength=254 nm
Correlation: 0.99975
Residual Std. Dev.: 32.48157
Formula: y = mx + b
m: 311.10321
b: 21.94993
x: Amount
y: Area



BENZO(B)FLUORANTHE at exp. RT: 21.733
VWD1 A, Wavelength=254 nm
Correlation: 0.99998
Residual Std. Dev.: 7.99853
Formula: y = mx + b
m: 252.11150
b: 4.86495
x: Amount
y: Area

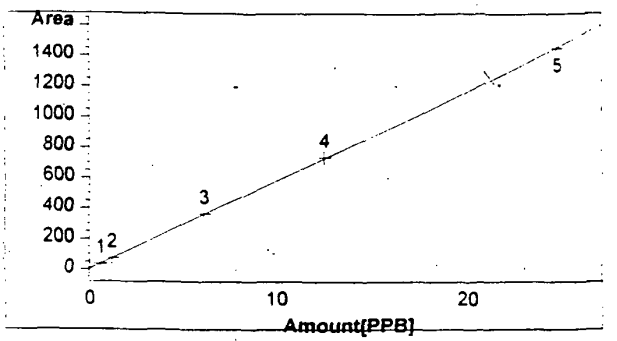


BENZO(K)FLUORANTHE at exp. RT: 22.546
VWD1 A, Wavelength=254 nm
Correlation: 0.99991
Residual Std. Dev.: 14.44068
Formula: y = mx + b
m: 234.43965
b: 12.69512
x: Amount
y: Area

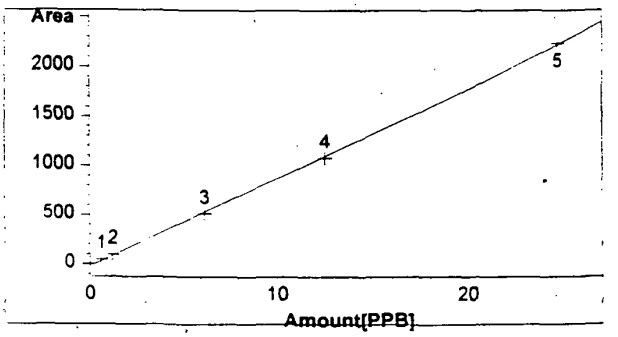


BENZO(A)PYRENE at exp. RT: 23.413
VWD1 A, Wavelength=254 nm
Correlation: 0.99845
Residual Std. Dev.: 43.38871
Formula: y = mx + b
m: 166.70459
b: -50.07952
x: Amount
y: Area

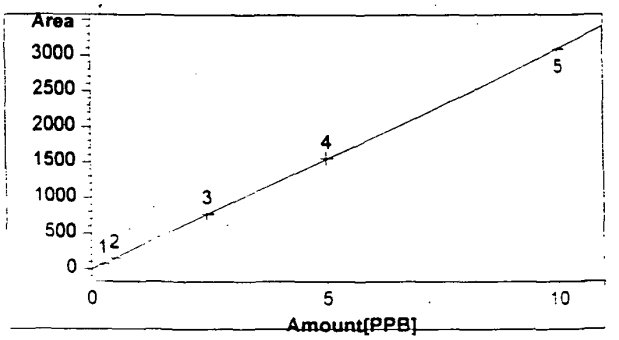
002184



DIBENZOANTHRACENE at exp. RT: 24.473
VWD1 A, Wavelength=254 nm
Correlation: 0.99998
Residual Std. Dev.: 4.34441
Formula: y = mx + b
m: 58.18977
b: 2.11533
x: Amount
y: Area



BENZO(GHI)PERYLENE at exp. RT: 25.789
VWD1 A, Wavelength=254 nm
Correlation: 0.99982
Residual Std. Dev.: 19.84039
Formula: y = mx + b
m: 89.99433
b: -24.96167
x: Amount
y: Area



INDENOPYRENE at exp. RT: 26.417
VWD1 A, Wavelength=254 nm
Correlation: 0.99998
Residual Std. Dev.: 8.37816
Formula: y = mx + b
m: 309.45309
b: 1.16986
x: Amount
y: Area

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002185

PERCENT RECOVERY FOR REFERENCE STANDARD :2ND SOURCE
METHOD/COLUMN/INSTRUMENT: PAH/HYPERPAH/LC-2

ANALYSIS DATE: 4/9/98 JOB # 9800 .564/565/566

NOTEBOOK:1229-171 STD. ID: STD # 1190-127-6 BATCH#:980408521R
STD. TYPE: REFERENCE

VIAL:108-3 UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	75.0	77.4	103
ACENAPHTHYLENE	75.0	76.1	101
ACENAPHTHENE	75.0	78.5	105
FLUORENE	7.50	7.6	101
PHENANTHRENE	7.50	7.86	105
ANTHRACENE	3.50	3.67	105
FLUORANTHENE	20.0	21.4	107
PYRENE	20.0	21.7	109
BENZO(A)ANTHRACENE	7.50	7.96	106
CHRYSENE	7.50	7.61	101
BENZO(B)FLUORANTHENE	7.50	8.04	107
BENZO(K)FLUORANTHENE	7.50	7.56	101
BENZO(A)PYRENE	7.50	6.98	93
DIBENZO(AH)ANTHRACENE	20.0	19.1	96
BENZO(GHI)PERYLENE	20.0	20.1	101
INDENO(CD123)PYRENE	7.50	7.53	100

DWS 4/9/98

IN CONTROL AVERAGE = 102.6

417

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

INITIAL CAL NOTEBOOK:1229-178
INITIAL CAL. DATE:041098

ANALYSIS DATE: 6/9/98

JOB#:9801.165/.181/.127/.170

NOTEBOOK:1263-47

STD#: 1190-140-9
STD TYPE: DAILY

BATCH#:980609521R

VIAL:102-02

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	47.2	94.4
ACENAPHTHYLENE	50.0	47.2	94.4
1-METHYLNAPHTHALENE	50.0	52.5	105
2-METHYLNAPHTHALENE	50.0	47.2	94.4
ACENAPHTHENE	50.0	50.9	102
FLUORENE	5.00	4.48	89.6
PHENANTHRENE	5.00	4.54	90.8
ANTHRACENE	2.50	2.29	91.6
FLUORANTHENE	12.5	12.0	96.0
PYRENE	12.5	11.1	88.8
P-TERPHENYL-D14	20.0	18.2	91.0
BENZO(A)ANTHRACENE	5.00	4.77	95.4
CHRYSENE	5.00	4.80	96.0
BENZO(B)FLUORANTHENE	5.00	4.53	90.6
BENZO(K)FLUORANTHENE	5.00	4.53	90.6
BENZO(A)PYRENE	5.00	5.27	105
DIBENZO(AH)ANTHRACENE	12.5	11.5	92.0
BENZO(GHI)PERYLENE	12.5	12.1	96.8
INDENO(CD123)PYRENE	5.00	4.64	92.8

IN CONTROL MC 6/9/98 AVERAGE = 94.6

431

PERCENT RECOVERY FOR REFERENCE STANDARD :2ND SOURCE
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

ANALYSIS DATE: 6/9/98 JOB#:9801.165/.181/.170/.127

NOTEBOOK: 1263-47 STD #: 1190-139-7 BATCH#:980609521R

VIAL:103-3 UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	75.0	72.3	96.4
ACENAPHTHYLENE	75.0	68.8	91.7
ACENAPHTHENE	75.0	76.5	102
FLUORENE	7.50	6.56	87.5
PHENANTHRENE	7.50	6.88	91.7
ANTHRACENE	3.50	3.21	91.7
FLUORANTHENE	20.0	20.3	102
PYRENE	20.0	18.7	93.5
BENZO(A)ANTHRACENE	7.50	7.28	97.1
CHRYSENE	7.50	7.15	95.3
BENZO(B)FLUORANTHENE	7.50	7.08	94.4
BENZO(K)FLUORANTHENE	7.50	6.75	90.0
BENZO(A)PYRENE	7.50	7.9	105
DIBENZO(AH)ANTHRACENE	20.0	17.4	87.0
BENZO(GHI)PERYLENE	20.0	19.4	97.0
INDENO(CD123)PYRENE	7.50	6.78	90.4

IN CONTROL mr 6-9-98 AVERAGE = 94.5

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434

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

INITIAL CAL NOTEBOOK:1229-178
INITIAL CAL. DATE:041098

ANALYSIS DATE: 6/9/98

JOB#:9801.165/.181/.127/.170

NOTEBOOK:1263-47

STD#: 1190-140-9
STD TYPE: 1st CONTINUING

BATCH#:980609521R

VIAL:102-04

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	47.3	94.6
ACENAPHTHYLENE	50.0	47.1	94.2
1-METHYLNAPHTHALENE	50.0	52.4	105
2-METHYLNAPHTHALENE	50.0	47.2	94.4
ACENAPHTHENE	50.0	50.4	101
FLUORENE	5.00	4.42	88.4
PHENANTHRENE	5.00	4.55	91.0
ANTHRACENE	2.50	2.25	90.0
FLUORANTHENE	12.5	12.0	96.0
PYRENE	12.5	11.0	88.0
P-TERPHENYL-D14	20.0	18.2	91.0
BENZO(A)ANTHRACENE	5.00	4.63	92.6
CHRYSENE	5.00	4.64	92.8
BENZO(B)FLUORANTHENE	5.00	4.41	88.2
BENZO(K)FLUORANTHENE	5.00	4.34	86.8
BENZO(A)PYRENE	5.00	4.90	98.0
DIBENZO(AH)ANTHRACENE	12.5	11.3	90.4
BENZO(GHI)PERYLENE	12.5	12.0	96.0
INDENO(CD123)PYRENE	5.00	4.54	90.8

IN CONTROL

AVERAGE = 93.1

MC 6-10-98

437

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

INITIAL CAL NOTEBOOK:1229-178
INITIAL CAL. DATE:041098

ANALYSIS DATE: 6/10/98

JOB#:9801.165/.181/.127/.170

NOTEBOOK:1263-47

STD#: 1190-140-9
STD TYPE: 2nd CONTINUING

BATCH#:980609521R

VIAL:102-06

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	47.3	94.6
ACENAPHTHYLENE	50.0	47.5	95.0
1-METHYLNAPHTHALENE	50.0	52.8	106
2-METHYLNAPHTHALENE	50.0	47.5	95.0
ACENAPHTHENE	50.0	51.2	102
FLUORENE	5.00	4.52	90.4
PHENANTHRENE	5.00	4.58	91.6
ANTHRACENE	2.50	2.24	89.6
FLUORANTHENE	12.5	12.1	96.8
PYRENE	12.5	11.3	90.4
P-TERPHENYL-D14	20.0	18.3	91.5
BENZO(A)ANTHRACENE	5.00	4.73	94.6
CHRYSENE	5.00	4.78	95.6
BENZO(B)FLUORANTHENE	5.00	4.49	89.8
BENZO(K)FLUORANTHENE	5.00	4.50	90.0
BENZO(A)PYRENE	5.00	5.06	101
DIBENZO(AH)ANTHRACENE	12.5	11.7	93.6
BENZO(GHI)PERYLENE	12.5	12.0	96.0
INDENO(CD123)PYRENE	5.00	4.61	92.2

IN CONTROL MC 6-23-98

AVERAGE = 94.5

440

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

INITIAL CAL NOTEBOOK:1229-178
INITIAL CAL. DATE:041098

ANALYSIS DATE: 6/10/98

JOB#:9801.165/.181/.127/.170

NOTEBOOK:1263-47

STD#: 1190-140-9
STD TYPE: 3rd CONTINUING

BATCH#:980609521R

VIAL:102-08

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	48.0	96.0
ACENAPHTHYLENE	50.0	47.7	95.4
1-METHYLNAPHTHALENE	50.0	53.0	106
2-METHYLNAPHTHALENE	50.0	47.8	95.6
ACENAPHTHENE	50.0	51.6	103
FLUORENE	5.00	4.53	90.6
PHENANTHRENE	5.00	4.60	92.0
ANTHRACENE	2.50	2.24	89.6
FLUORANTHENE	12.5	12.2	97.6
PYRENE	12.5	11.4	91.2
P-TERPHENYL-D14	20.0	18.3	91.5
BENZO(A)ANTHRACENE	5.00	4.72	94.4
CHRYSENE	5.00	4.80	96.0
BENZO(B)FLUORANTHENE	5.00	4.60	92.0
BENZO(K)FLUORANTHENE	5.00	4.73	94.6
BENZO(A)PYRENE	5.00	5.04	101
DIBENZO(AH)ANTHRACENE	12.5	12.0	96.0
BENZO(GHI)PERYLENE	12.5	11.9	95.2
INDENO(CD123)PYRENE	5.00	4.66	93.2

IN CONTROL

AVERAGE = 95.3

MS - 6-10-98

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PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

INITIAL CAL NOTEBOOK:1229-178
INITIAL CAL. DATE:041098

ANALYSIS DATE: 6/10/98

JOB#:9801.165/.181/.127/.170

NOTEBOOK:1263-47

STD#: 1190-140-9
STD TYPE: ENDING

BATCH#:980609521R

VIAL:102-10

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	48.5	97.0
ACENAPHTHYLENE	50.0	48.4	96.8
1-METHYLNAPHTHALENE	50.0	53.7	107
2-METHYLNAPHTHALENE	50.0	48.4	96.8
ACENAPHTHENE	50.0	52.1	104
FLUORENE	5.00	4.59	91.8
PHENANTHRENE	5.00	4.66	93.2
ANTHRACENE	2.50	2.28	91.2
FLUORANTHENE	12.5	12.3	98.4
PYRENE	12.5	11.5	92.0
P-TERPHENYL-D14	20.0	18.7	93.5
BENZO(A)ANTHRACENE	5.00	4.82	96.4
CHRYSENE	5.00	4.87	97.4
BENZO(B)FLUORANTHENE	5.00	4.54	90.8
BENZO(K)FLUORANTHENE	5.00	4.54	90.8
BENZO(A)PYRENE	5.00	5.22	104
DIBENZO(AH)ANTHRACENE	12.5	12.0	96.0
BENZO(GHI)PERYLENE	12.5	12.3	98.4
INDENO(CD123)PYRENE	5.00	4.72	94.4

IN CONTROL MC

AVERAGE = 96.4

445

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/HYPERPAH/LC-2

INITIAL CAL NOTEBOOK:1229-171
INITIAL CAL. DATE:04/08/98

ANALYSIS DATE:06/10/98

JOB#:9801.165/181/.127

NOTEBOOK:1263-51 STD. ID : STD #:1190-140-11
STD. TYPE: DAILY

BATCH#:980610521R

VIAL:102-02

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	50.5	101
ACENAPHTHYLENE	50.0	50.0	100
1-METHYLNAPHTHALENE	50.0	51.3	103
2-METHYLNAPHTHALENE	50.0	48.6	97.2
ACENAPHTHENE	50.0	51.4	103
FLUORENE	5.00	4.93	98.6
PHENANTHRENE	5.00	4.75	95.0
ANTHRACENE	2.50	2.48	99.2
FLUORANTHENE	12.50	11.7	93.6
PYRENE	12.50	11.3	90.4
P-TERPHENYL-D14	20.0	19.4	97.0
BENZO(A)ANTHRACENE	5.00	4.79	95.8
CHRYSENE	5.00	4.94	98.8
BENZO(B)FLUORANTHENE	5.00	4.83	96.6
BENZO(K)FLUORANTHENE	5.00	4.62	92.4
BENZO(A)PYRENE	5.00	6.77	135 **
DIBENZO(AH)ANTHRACENE	12.5	12.2	97.6
BENZO(GHI)PERYLENE	12.5	13.3	106
INDENO(CD123)PYRENE	5.00	4.73	94.6

** IN CONTROL using 15% average factor criteria AVERAGE = 99.7

MC 6-11-98

PERCENT RECOVERY FOR REFERENCE STANDARD :2ND SOURCE
METHOD/COLUMN/INSTRUMENT:

ANALYSIS DATE: 6/10/98 JOB#:9801.165/.181/.127

NOTEBOOK: 1263-51 STD #: 1190-139-7 BATCH#:980610521R

VIAL:103-3 UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	75.0	75.0	100
ACENAPHTHYLENE	75.0	71.0	94.7
ACENAPHTHENE	75.0	76.0	101
FLUORENE	7.50	7.07	94.3
PHENANTHRENE	7.50	7.04	93.9
ANTHRACENE	3.50	3.39	96.9
FLUORANTHENE	20.0	19.1	95.5
PYRENE	20.0	18.4	92.0
BENZO(A)ANTHRACENE	7.50	7.19	95.9
CHRYSENE	7.50	7.16	95.5
BENZO(B)FLUORANTHENE	7.50	7.40	98.7
BENZO(K)FLUORANTHENE	7.50	6.90	92.0
BENZO(A)PYRENE	7.50	10.1	135 **
DIBENZO(AH)ANTHRACENE	20.0	17.9	89.5
BENZO(GHI)PERYLENE	20.0	20.8	104
INDENO(CD123)PYRENE	7.50	6.74	89.9

AVERAGE = 98.0

** IN CONTROL USING 15% AVERAGE CRITERIA

MI 6-11-98

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459

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/HYPERPAH/LC-2

INITIAL CAL NOTEBOOK:1229-171
INITIAL CAL. DATE:04/08/98

ANALYSIS DATE:06/11/98

JOB#:9801.165/181/.127

NOTEBOOK:1263-51 STD. ID : STD #:1190-140-11
STD. TYPE: CONTINUING

BATCH#:980610521R

VIAL:102-04

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	50.3	101
ACENAPHTHYLENE	50.0	49.8	100
1-METHYLNAPHTHALENE	50.0	51.1	102
2-METHYLNAPHTHALENE	50.0	48.6	97.2
ACENAPHTHENE	50.0	51.2	102
FLUORENE	5.00	4.94	98.8
PHENANTHRENE	5.00	4.76	95.2
ANTHRACENE	2.50	2.44	97.6
FLUORANTHENE	12.50	11.7	93.6
PYRENE	12.50	11.3	90.4
P-TERPHENYL-D14	20.0	19.4	97.0
BENZO(A)ANTHRACENE	5.00	4.75	95.0
CHRYSENE	5.00	4.89	97.8
BENZO(B)FLUORANTHENE	5.00	4.81	96.2
BENZO(K)FLUORANTHENE	5.00	4.69	93.8
BENZO(A)PYRENE	5.00	6.21	124 **
DIBENZO(AH)ANTHRACENE	12.5	12.4	99.2
BENZO(GHI)PERYLENE	12.5	13.2	106
INDENO(CD123)PYRENE	5.00	4.75	95.0

** IN CONTROL using 15% average factor criteria AVERAGE = 99.0

6-11-98

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/HYPERPAH/LC-2

INITIAL CAL NOTEBOOK:1229-171
INITIAL CAL. DATE:04/08/98

ANALYSIS DATE:06/11/98

JOB#:9801.165/181/.127

NOTEBOOK:1263-51 STD. ID : STD #:1190-140-11
STD. TYPE: ENDING

BATCH#:980610521R

VIAL:102-06

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	50.9	102
ACENAPHTHYLENE	50.0	50.5	101
1-METHYLNAPHTHALENE	50.0	51.9	104
2-METHYLNAPHTHALENE	50.0	49.2	98.4
ACENAPHTHENE	50.0	52.0	104
FLUORENE	5.00	4.98	99.6
PHENANTHRENE	5.00	4.82	96.4
ANTHRACENE	2.50	2.46	98.4
FLUORANTHENE	12.50	11.9	95.2
PYRENE	12.50	11.6	92.8
P-TERPHENYL-D14	20.0	19.7	98.5
BENZO(A)ANTHRACENE	5.00	4.86	97.2
CHRYSENE	5.00	4.97	99.4
BENZO(B)FLUORANTHENE	5.00	4.93	98.6
BENZO(K)FLUORANTHENE	5.00	4.73	94.6
BENZO(A)PYRENE	5.00	6.19	124 **
DIBENZO(AH)ANTHRACENE	12.5	12.4	99.2
BENZO(GHI)PERYLENE	12.5	13.2	106
INDENO(CD123)PYRENE	5.00	4.78	95.6

** IN CONTROL using 15% average factor criteria AVERAGE = 100.2

MLG-11-98

457

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRAUMENT: PAH/KEYSTONE/LC-1-LOW LEVEL

INITIAL CAL NOTEBOOK:1137-46
INITIAL CAL. DATE:060597

ANALYSIS DATE:6/12/98

JOB#:9801.127/.254/.280/.181

NOTEBOOK:1255-45

STD. #: 1190-141-4
STD. TYPE: DAILY

BATCH#:980612511R

VIAL:102-02

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	1.25	1.17	93.6
ACENAPHTHYLENE	1.25	1.28	102
ACENAPHTHENE	1.25	1.26	101
FLUORENE	0.125	0.127	102
PHENANTHRENE	0.1250	0.129	103
ANTHRACENE	0.063	0.0640	102
FLUORANTHENE	0.3125	0.3201	102
PYRENE	0.3125	0.3236	104
P-TERPHENYL-D14	0.500	0.526	105
BENZO(A)ANTHRACENE	0.125	0.125	100
CHRYSENE	0.125	0.120	96.0
BENZO(B)FLUORANTHENE	0.125	0.125	100
BENZO(K)FLUORANTHENE	0.125	0.126	101
BENZO(A)PYRENE	0.125	0.128	102
DIBENZO(AH)ANTHRACENE	0.3125	0.3154	101
BENZO(GHI)PERYLENE	0.3125	0.3249	104
INDENO(CD123)PYRENE	0.125	0.127	102

INCONTROL mr 6/12/98

AVERAGE= 101

4 3

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRAUMENT: PAH/KEYSTONE/LC-1-LOW LEVEL

INITIAL CAL NOTEBOOK:1137-46
INITIAL CAL. DATE:060597

ANALYSIS DATE:6/12/98

JOB#:9801.127/.254/.280/.181

NOTEBOOK:1255-45

STD. #: 1190-141-4
STD. TYPE: CONTINUING

BATCH#:980612511R

VIAL:102-04

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	1.25	1.18	94.4
ACENAPHTHYLENE	1.25	1.30	104
ACENAPHTHENE	1.25	1.27	102
FLUORENE	0.125	0.128	102
PHENANTHRENE	0.1250	0.131	105
ANTHRACENE	0.063	0.0642	103
FLUORANTHENE	0.3125	0.3184	102
PYRENE	0.3125	0.3279	105
P-TERPHENYL-D14	0.500	0.515	103
BENZO(A)ANTHRACENE	0.125	0.125	100
CHRYSENE	0.125	0.123	98.4
BENZO(B)FLUORANTHENE	0.125	0.127	102
BENZO(K)FLUORANTHENE	0.125	0.127	102
BENZO(A)PYRENE	0.125	0.132	106
DIBENZO(AH)ANTHRACENE	0.3125	0.3195	102
BENZO(GHI)PERYLENE	0.3125	0.3334	107
INDENO(CD123)PYRENE	0.125	0.131	105

INCONTROL mc 6/15/98 AVERAGE= 102

431

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRAUMENT: PAH/KEYSTONE/LC-1-LOW LEVEL

INITIAL CAL NOTEBOOK:1137-46
INITIAL CAL. DATE:060597

ANALYSIS DATE:6/13/98

JOB#:9801.127/.254/.280/.181

NOTEBOOK:1255-45 STD. #: 1190-141-4
STD. TYPE: ENDING

BATCH#:980612511R

VIAL:102-06

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	1.25	1.19	95.2
ACENAPHTHYLENE	1.25	1.30	104
ACENAPHTHENE	1.25	1.28	102
FLUORENE	0.125	0.129	103
PHENANTHRENE	0.1250	0.131	105
ANTHRACENE	0.063	0.0650	104
FLUORANTHENE	0.3125	0.3241	104
PYRENE	0.3125	0.3293	105
P-TERPHENYL-D14	0.500	0.534	107
BENZO(A)ANTHRACENE	0.125	0.125	100
CHRYSENE	0.125	0.120	96.0
BENZO(B)FLUORANTHENE	0.125	0.127	102
BENZO(K)FLUORANTHENE	0.125	0.128	102
BENZO(A)PYRENE	0.125	0.132	106
DIBENZO(AH)ANTHRACENE	0.3125	0.3258	104
BENZO(GHI)PERYLENE	0.3125	0.3387	108
INDENO(CD123)PYRENE	0.125	0.133	106

INCONTROL mc 6/15/98

AVERAGE= 103

TEST CODE :SPAH0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB :Method Blank 1339-17-1 MATRIX : SOLID

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		200
Acenaphthylene	ND		200
1-methylnaphthalene	ND		200
2-Methylnaphthalene	ND		200
Acenaphthene	ND		200
Fluorene	ND		20
Phenanthrene	ND		20
Anthracene	ND		20
Fluoranthene	ND		50
Pyrene	ND		50
Benzo(a)anthracene	ND		20
Chrysene	ND		20
Benzo(b)fluoranthene	ND		20
Benzo(k)fluoranthene	ND		20
Benzo(a)pyrene	ND		20
Dibenzo(a,h)anthracene	ND		50
Benzo(ghi)perylene	ND		50
Indeno(1,2,3-cd)pyrene	ND		20

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002200

6.0 CALCULATIONS

6.1 The instrument printout for processed samples is in µg/kg or µg/L. The equations below are based on quantitation versus the curve and are provided as a check.

6.1.1 Soil Samples

$$\mu g/g = \frac{[Ax - b]}{[M]} \cdot \frac{V}{M}$$

where

A_x = Response of analyte in sample (area or peak height).
b = Curve intercept (area or peak height).
m = Slope of curve (area/conc.).
M = Mass of sample, g.
V = Final additive volume of supernatant plus water solution.

Bracketed term = Concentration (µg/mL) on curve associated with area A_x.
Typically, M = 30; V = 1.0

6.1.2 Water

$$\mu g/L = \frac{[A_x - b]}{[M]} \cdot \frac{Vd}{Vs}$$

where

V_s = Volume of sample extracted, L.
V_d = Final additive volume of acetonitrile extract plus an (equal) amount of water.

Commonly, V_s = 1.000 mL; V_d = 1 mL.

6.1.3 Swipe

$$\frac{ug}{swipe} = \frac{[Ax - b]}{[M]} * \frac{V}{swipe}$$

002201

START - DALLAS

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.:6-0102

EPA Sample No.	Lab Sample ID
_SB10-0304____	_7933_____
_SB11-0203____	_7934_____
_SB12-0102____	_7935_____
_SB12-0809____	_7936_____
_SB13-0102____	_7937_____
_SB13-6575____	_7938_____
_SB13D-6575___	_7939_____
_SB6-0102_____	_7928_____
_SB7-0405_____	_7929_____
_SB7D-0405____	_7930_____
_SB8-0102_____	_7931_____
_SB9-0102_____	_7932_____

Were ICP interelement corrections applied ? Yes/No YES

Were ICP background corrections applied ? Yes/No YES
If yes - were raw data generated before application of background corrections ? Yes/No NO_

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Caryn Wojtowicz Name: Caryn Wojtowicz

Date: 6/23/98 Title: Project Manager

COVER PAGE - IN

002202

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

10-0304

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL_ Lab Sample ID: 7933

Level (low/med): LOW__ Date Received: 06/03/98

% Solids: _89.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2110			P
7440-36-0	Antimony	1.1	U		P
7440-38-2	Arsenic	1.3			P
7440-39-3	Barium	15.1			P
7440-41-7	Beryllium	0.53	U		P
7440-43-9	Cadmium	0.59			P
7440-70-2	Calcium	522			P
7440-47-3	Chromium	6.5			P
7440-48-4	Cobalt	2.1	U		P
7440-50-8	Copper	2.2			P
7439-89-6	Iron	4270			P
7439-92-1	Lead	2.0			P
7439-95-4	Magnesium	431			P
7439-96-5	Manganese	43.4		N*	P
7439-97-6	Mercury	0.04			CV
7440-02-0	Nickel	2.2			P
7440-09-7	Potassium	340			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	232			P
7440-28-0	Thallium	0.53	U		P
7440-62-2	Vanadium	7.0			P
7440-66-6	Zinc	4.7			P

Color Before: _____ Clarity Before: _____ Texture: SD____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB10-0304_____

FORM I - IN

002203

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

11-0203

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL_ Lab Sample ID: 7934

Level (low/med): LOW__ Date Received: 06/03/98

% Solids: _85.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3600			P
7440-36-0	Antimony	1.2	U		P
7440-38-2	Arsenic	2.3			P
7440-39-3	Barium	54.8			P
7440-41-7	Beryllium	0.59	U		P
7440-43-9	Cadmium	0.99			P
7440-70-2	Calcium	798			P
7440-47-3	Chromium	8.4			P
7440-48-4	Cobalt	2.8			P
7440-50-8	Copper	6.4			P
7439-89-6	Iron	6770			P
7439-92-1	Lead	20.9			P
7439-95-4	Magnesium	582			P
7439-96-5	Manganese	59.9		N*	P
7439-97-6	Mercury	0.03			CV
7440-02-0	Nickel	3.3			P
7440-09-7	Potassium	487			P
7782-49-2	Selenium	1.2	U		P
7440-22-4	Silver	1.2	U		P
7440-23-5	Sodium	118	U		P
7440-28-0	Thallium	0.59	U		P
7440-62-2	Vanadium	12.8			P
7440-66-6	Zinc	13.3			P

Color Before: _____ Clarity Before: _____ Texture: CY____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB11-0203_____

FORM I - IN

002204

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

12-0102

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL_ Lab Sample ID: 7935

Level (low/med): LOW__ Date Received: 06/03/98

% Solids: _86.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4480			P
7440-36-0	Antimony	1.1	U		P
7440-38-2	Arsenic	3.0			P
7440-39-3	Barium	77.0			P
7440-41-7	Beryllium	0.56	U		P
7440-43-9	Cadmium	1.4			P
7440-70-2	Calcium	818			P
7440-47-3	Chromium	8.6			P
7440-48-4	Cobalt	4.1			P
7440-50-8	Copper	4.5			P
7439-89-6	Iron	9530			P
7439-92-1	Lead	4.7			P
7439-95-4	Magnesium	634			P
7439-96-5	Manganese	156		N*	P
7439-97-6	Mercury	0.05			CV
7440-02-0	Nickel	5.6			P
7440-09-7	Potassium	562			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	254			P
7440-28-0	Thallium	0.56	U		P
7440-62-2	Vanadium	14.5			P
7440-66-6	Zinc	8.4			P

Color Before: _____ Clarity Before: _____ Texture: SD/CY_

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB12-0102_____

FORM I - IN

496

002205

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

12-0809

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL_ Lab Sample ID: 7936

Level (low/med): LOW__ Date Received: 06/03/98

% Solids: _86.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1600			P
7440-36-0	Antimony	1.1	U		P
7440-38-2	Arsenic	0.88			P
7440-39-3	Barium	16.5			P
7440-41-7	Beryllium	0.56	U		P
7440-43-9	Cadmium	0.56	U		P
7440-70-2	Calcium	512			P
7440-47-3	Chromium	4.0			P
7440-48-4	Cobalt	2.3	U		P
7440-50-8	Copper	2.3	U		P
7439-89-6	Iron	1870			P
7439-92-1	Lead	1.7			P
7439-95-4	Magnesium	337			P
7439-96-5	Manganese	24.0		N*	P
7439-97-6	Mercury	0.05			CV
7440-02-0	Nickel	2.3	U		P
7440-09-7	Potassium	299			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	156			P
7440-28-0	Thallium	0.56	U		P
7440-62-2	Vanadium	3.5			P
7440-66-6	Zinc	4.0			P

Color Before: _____ Clarity Before: _____ Texture: SD____

Color After: CL_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID:__SB12-0809

FORM I - IN

002206

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

13-0102

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL_ Lab Sample ID: 7937

Level (low/med): LOW__ Date Received: 06/03/98

% Solids: _89.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3600			P
7440-36-0	Antimony	1.1	U		P
7440-38-2	Arsenic	4.5			P
7440-39-3	Barium	23.2			P
7440-41-7	Beryllium	0.54	U		P
7440-43-9	Cadmium	1.4			P
7440-70-2	Calcium	585			P
7440-47-3	Chromium	7.8			P
7440-48-4	Cobalt	2.6			P
7440-50-8	Copper	2.9			P
7439-89-6	Iron	9930			P
7439-92-1	Lead	48.0			P
7439-95-4	Magnesium	414			P
7439-96-5	Manganese	25.3		N*	P
7439-97-6	Mercury	0.04			CV
7440-02-0	Nickel	3.2			P
7440-09-7	Potassium	568			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	108	U		P
7440-28-0	Thallium	0.54	U		P
7440-62-2	Vanadium	13.7			P
7440-66-6	Zinc	9.2			P

Color Before: _____ Clarity Before: _____ Texture: SD____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB13-0102_____

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002207

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

13-6575

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL_ Lab Sample ID: 7938

Level (low/med): LOW__ Date Received: 06/03/98

% Solids: _86.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3160			P
7440-36-0	Antimony	1.1	U		P
7440-38-2	Arsenic	3.9			P
7440-39-3	Barium	45.4			P
7440-41-7	Beryllium	0.57	U		P
7440-43-9	Cadmium	1.8			P
7440-70-2	Calcium	1010			P
7440-47-3	Chromium	10.3			P
7440-48-4	Cobalt	4.3			P
7440-50-8	Copper	4.7			P
7439-89-6	Iron	12700			P
7439-92-1	Lead	5.5			P
7439-95-4	Magnesium	763			P
7439-96-5	Manganese	76.7		N*	P
7439-97-6	Mercury	0.05			CV
7440-02-0	Nickel	8.1			P
7440-09-7	Potassium	506			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	114	U		P
7440-28-0	Thallium	0.57	U		P
7440-62-2	Vanadium	21.4			P
7440-66-6	Zinc	10.5			P

Color Before: _____ Clarity Before: _____ Texture: SD/CY_

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB13-6575_____

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002208

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

13D-657

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL_ Lab Sample ID: 7939

Level (low/med): LOW__ Date Received: 06/03/98

% Solids: _86.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2290			P
7440-36-0	Antimony	1.2	U		P
7440-38-2	Arsenic	2.4			P
7440-39-3	Barium	39.3			P
7440-41-7	Beryllium	0.58	U		P
7440-43-9	Cadmium	1.1			P
7440-70-2	Calcium	786			P
7440-47-3	Chromium	7.5			P
7440-48-4	Cobalt	3.6			P
7440-50-8	Copper	3.2			P
7439-89-6	Iron	8040			P
7439-92-1	Lead	3.5			P
7439-95-4	Magnesium	615			P
7439-96-5	Manganese	52.0		N*	P
7439-97-6	Mercury	0.05			CV
7440-02-0	Nickel	6.8			P
7440-09-7	Potassium	500			P
7782-49-2	Selenium	1.2	U		P
7440-22-4	Silver	1.2	U		P
7440-23-5	Sodium	115	U		P
7440-28-0	Thallium	0.58	U		P
7440-62-2	Vanadium	12.1			P
7440-66-6	Zinc	8.7			P

Color Before: _____ Clarity Before: _____ Texture: SD/CY_

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID:__SB13D-6575

FORM I - IN

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

6-0102

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL_ Lab Sample ID: 7928

Level (low/med): LOW__ Date Received: 06/03/98

% Solids: _87.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2590			P
7440-36-0	Antimony	1.1	U		P
7440-38-2	Arsenic	2.1			P
7440-39-3	Barium	28.8			P
7440-41-7	Beryllium	0.56	U		P
7440-43-9	Cadmium	0.75			P
7440-70-2	Calcium	380			P
7440-47-3	Chromium	5.8			P
7440-48-4	Cobalt	2.3	U		P
7440-50-8	Copper	2.3	U		P
7439-89-6	Iron	5130			P
7439-92-1	Lead	3.0			P
7439-95-4	Magnesium	210			P
7439-96-5	Manganese	112		N*	P
7439-97-6	Mercury	0.04			CV
7440-02-0	Nickel	2.3	U		P
7440-09-7	Potassium	412			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	113	U		P
7440-28-0	Thallium	0.56	U		P
7440-62-2	Vanadium	9.2			P
7440-66-6	Zinc	5.0			P

Color Before: _____ Clarity Before: _____ Texture: SD____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB06-0102_____

FORM I - IN

002210

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

7-0405

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL_ Lab Sample ID: 7929

Level (low/med): LOW__ Date Received: 06/03/98

% Solids: _86.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4760			P
7440-36-0	Antimony	1.2	U		P
7440-38-2	Arsenic	4.1			P
7440-39-3	Barium	31.9			P
7440-41-7	Beryllium	0.58	U		P
7440-43-9	Cadmium	1.2			P
7440-70-2	Calcium	745			P
7440-47-3	Chromium	13.2			P
7440-48-4	Cobalt	2.7			P
7440-50-8	Copper	3.3			P
7439-89-6	Iron	8400			P
7439-92-1	Lead	6.1			P
7439-95-4	Magnesium	378			P
7439-96-5	Manganese	47.5		N*	P
7439-97-6	Mercury	0.06			CV
7440-02-0	Nickel	2.7			P
7440-09-7	Potassium	601			P
7782-49-2	Selenium	1.2	U		P
7440-22-4	Silver	1.2	U		P
7440-23-5	Sodium	123			P
7440-28-0	Thallium	0.58	U		P
7440-62-2	Vanadium	14.4			P
7440-66-6	Zinc	7.6			P

Color Before: _____ Clarity Before: _____ Texture: SD/CY_

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB07-0405_____

FORM I - IN

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START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

7D-0405

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL_ Lab Sample ID: 7930

Level (low/med): LOW__ Date Received: 06/03/98

% Solids: _88.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3780			P
7440-36-0	Antimony	1.1	U		P
7440-38-2	Arsenic	3.4			P
7440-39-3	Barium	26.9			P
7440-41-7	Beryllium	0.55	U		P
7440-43-9	Cadmium	1.2			P
7440-70-2	Calcium	531			P
7440-47-3	Chromium	11.6			P
7440-48-4	Cobalt	2.6			P
7440-50-8	Copper	3.7			P
7439-89-6	Iron	7870			P
7439-92-1	Lead	17.9			P
7439-95-4	Magnesium	289			P
7439-96-5	Manganese	87.1		N*	P
7439-97-6	Mercury	0.07			CV
7440-02-0	Nickel	2.2	U		P
7440-09-7	Potassium	529			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	164			P
7440-28-0	Thallium	0.55	U		P
7440-62-2	Vanadium	13.2			P
7440-66-6	Zinc	10.2			P

Color Before: _____ Clarity Before: _____ Texture: SD/CY_

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB07D-0405_____

FORM I - IN

002212

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

8-0102

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL_ Lab Sample ID: 7931

Level (low/med): LOW__ Date Received: 06/03/98

% Solids: _92.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1250			P
7440-36-0	Antimony	1.1	U		P
7440-38-2	Arsenic	1.8			P
7440-39-3	Barium	20.0			P
7440-41-7	Beryllium	0.53	U		P
7440-43-9	Cadmium	0.53			P
7440-70-2	Calcium	189			P
7440-47-3	Chromium	3.6			P
7440-48-4	Cobalt	2.1	U		P
7440-50-8	Copper	2.1	U		P
7439-89-6	Iron	3430			P
7439-92-1	Lead	10.5			P
7439-95-4	Magnesium	110			P
7439-96-5	Manganese	134		N*	P
7439-97-6	Mercury	0.06			CV
7440-02-0	Nickel	2.1	U		P
7440-09-7	Potassium	264			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	105	U		P
7440-28-0	Thallium	0.53	U		P
7440-62-2	Vanadium	5.9			P
7440-66-6	Zinc	5.0			P

Color Before: _____ Clarity Before: _____ Texture: SD____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB08-0102_____

FORM I - IN

002213

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

9-0102

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL_ Lab Sample ID: 7932

Level (low/med): LOW__ Date Received: 06/03/98

% Solids: _88.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3540			P
7440-36-0	Antimony	1.1	U		P
7440-38-2	Arsenic	2.8			P
7440-39-3	Barium	27.4			P
7440-41-7	Beryllium	0.56	U		P
7440-43-9	Cadmium	1.1			P
7440-70-2	Calcium	646			P
7440-47-3	Chromium	8.3			P
7440-48-4	Cobalt	2.2	U		P
7440-50-8	Copper	2.2	U		P
7439-89-6	Iron	7820			P
7439-92-1	Lead	5.0			P
7439-95-4	Magnesium	318			P
7439-96-5	Manganese	103		N*	P
7439-97-6	Mercury	0.05			CV
7440-02-0	Nickel	3.2			P
7440-09-7	Potassium	466			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	111	U		P
7440-28-0	Thallium	0.56	U		P
7440-62-2	Vanadium	12.6			P
7440-66-6	Zinc	5.6			P

Color Before: _____ Clarity Before: _____ Texture: SD/CY_

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB09-0102_____

FORM I - IN

002214

START - DALLAS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.: 6-0102

Initial Calibration Source: VHG_____

Continuing Calibration Source: VHG_____

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
[redacted]uminum	1000.0	1019.78	102.0	5000.0	5266.06	105.3	5371.63	107.4	P
Antimony	1000.0	1002.47	100.2	1000.0	1002.95	100.3	1025.95	102.6	P
Arsenic	1000.0	999.20	99.9	500.0	504.56	100.9	517.47	103.5	P
Barium	1000.0	993.21	99.3	500.0	469.87	94.0	479.62	95.9	P
Beryllium	400.0	412.43	103.1	500.0	502.23	100.4	514.28	102.9	P
Cadmium	500.0	499.42	99.9	500.0	479.26	95.9	487.90	97.6	P
Calcium	10000.0	10011.66	100.1	25000.0	24989.99	100.0	24612.57	98.5	P
Chromium	1000.0	991.41	99.1	500.0	479.13	95.8	491.27	98.3	P
Cobalt	1000.0	982.13	98.2	500.0	465.12	93.0	472.44	94.5	P
Copper	1000.0	985.36	98.5	500.0	485.54	97.1	486.01	97.2	P
Iron	1000.0	1018.95	101.9	5000.0	4640.66	92.8	4746.81	94.9	P
Lead	1000.0	989.50	98.9	1000.0	943.47	94.3	966.52	96.7	P
Magnesium	10000.0	9857.54	98.6	25000.0	24610.21	98.4	24505.44	98.0	P
Manganese	1000.0	1017.71	101.8	500.0	477.95	95.6	486.94	97.4	P
Mercury	5.0	5.04	100.8	5.0	5.00	100.0	5.00	100.0	CV
Nickel	1000.0	989.24	98.9	500.0	461.63	92.3	468.10	93.6	P
Potassium	10000.0	9224.82	92.2	25000.0	24551.66	98.2	24991.50	100.0	P
[redacted]lenium	1000.0	989.77	99.0	500.0	495.52	99.1	513.55	102.7	P
[redacted]lver	200.0	190.83	95.4	500.0	479.46	95.9	486.64	97.3	P
Sodium	10000.0	9587.64	95.9	25000.0	23705.31	94.8	23907.73	95.6	P
Thallium	1000.0	1002.38	100.2	500.0	484.08	96.8	493.43	98.7	P
Vanadium	1000.0	1015.30	101.5	500.0	500.74	100.1	510.24	102.0	P
Zinc	1000.0	1016.38	101.6	500.0	502.22	100.4	511.27	102.3	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

START - DALLAS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.: 6-0102

Initial Calibration Source: VHG_____

Continuing Calibration Source: VHG_____

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum				5000.0	5323.49	106.5	5342.81	106.9	P
Antimony				1000.0	1025.28	102.5	1030.02	103.0	P
Arsenic				500.0	520.38	104.1	517.52	103.5	P
Barium				500.0	478.05	95.6	475.82	95.2	P
Beryllium				500.0	510.08	102.0	510.41	102.1	P
Cadmium				500.0	488.29	97.7	483.39	96.7	P
Calcium				25000.0	25026.63	100.1	24975.29	99.9	P
Chromium				500.0	491.76	98.4	490.87	98.2	P
Cobalt				500.0	472.31	94.5	469.44	93.9	P
Copper				500.0	479.67	95.9	488.21	97.6	P
Iron				5000.0	4745.96	94.9	4694.17	93.9	P
Lead				1000.0	962.41	96.2	958.89	95.9	P
Magnesium				25000.0	24502.17	98.0	24245.96	97.0	P
Manganese				500.0	484.33	96.9	482.14	96.4	P
Mercury				5.0	4.93	98.6	5.08	101.6	CV
Nickel				500.0	468.58	93.7	464.84	93.0	P
Potassium				25000.0	24552.75	98.2	24802.65	99.2	P
Selenium				500.0	513.12	102.6	507.03	101.4	P
Silver				500.0	483.47	96.7	482.90	96.6	P
Sodium				25000.0	23834.51	95.3	23790.54	95.2	P
Thallium				500.0	498.23	99.6	500.83	100.2	P
Vanadium				500.0	510.03	102.0	504.89	101.0	P
Zinc				500.0	513.22	102.6	510.10	102.0	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

START - DALLAS

3
BLANKS

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.181 SAS No.: _____ SDG No.: 6-0102

Preparation Blank Matrix (soil/water): SOIL_

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	100.0	U	100.0	U	100.0	U	100.0	U	26.644		P
Antimony	10.0	U	10.0	U	10.0	U	10.0	U	1.000	U	P
Arsenic	5.0	U	5.0	U	5.0	U	5.0	U	0.500	U	P
Barium	20.0	U	20.0	U	20.0	U	20.0	U	2.000	U	P
Beryllium	5.0	U	5.0	U	5.0	U	5.0	U	0.500	U	P
Cadmium	5.0	U	5.0	U	5.0	U	5.0	U	0.500	U	P
Calcium	500.0	U	500.0	U	500.0	U	500.0	U	50.000	U	P
Chromium	10.0	U	10.0	U	10.0	U	10.0	U	1.000	U	P
Cobalt	20.0	U	20.0	U	20.0	U	20.0	U	2.000	U	P
Copper	20.0	U	20.0	U	20.0	U	20.0	U	2.000	U	P
Iron	50.0	U	50.0	U	50.0	U	50.0	U	10.662		P
Lead	5.0	U	5.0	U	5.0	U	5.0	U	0.500	U	P
Magnesium	500.0	U	500.0	U	500.0	U	500.0	U	50.000	U	P
Manganese	10.0	U	10.0	U	10.0	U	10.0	U	1.000	U	P
Mercury	0.1	U	0.1	U	0.1	U	0.1	U	0.050	U	CV
Nickel	20.0	U	20.0	U	20.0	U	20.0	U	2.000	U	P
Potassium	1000.0	U	1000.0	U	1000.0	U	1000.0	U	100.000	U	P
Selenium	10.0	U	10.0	U	10.0	U	10.0	U	1.000	U	P
Silver	10.0	U	10.0	U	10.0	U	10.0	U	1.000	U	P
Sodium	1000.0	U	1000.0	U	1000.0	U	1000.0	U	100.000	U	P
Thallium	5.0	U	5.0	U	5.0	U	5.0	U	0.500	U	P
Vanadium	20.0	U	20.0	U	20.0	U	20.0	U	2.000	U	P
Zinc	10.0	U	10.0	U	10.0	U	10.0	U	1.000	U	P

FORM III - IN

503

002217

START - DALLAS

3
BLANKS

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.181 SAS No.: _____ SDG No.: 6-0102

Preparation Blank Matrix (soil/water): _____

Preparation Blank Concentration Units (ug/L or mg/kg): _____

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum			100.0	U							P
Antimony			10.0	U							P
Arsenic			5.0	U							P
Barium			20.0	U							P
Beryllium			5.0	U							P
Cadmium			5.0	U							P
Calcium			500.0	U							P
Chromium			10.0	U							P
Cobalt			20.0	U							P
Copper			20.0	U							P
Iron			50.0	U							P
Lead			5.0	U							P
Magnesium			500.0	U							P
Manganese			10.0	U							P
Mercury			0.1	U							CV
Nickel			20.0	U							P
Potassium			1000.0	U							P
Selenium			10.0	U							P
Silver			10.0	U							P
Sodium			1000.0	U							P
Thallium			5.0	U							P
Vanadium			20.0	U							P
Zinc			10.0	U							P

START - DALLAS

4
ICP INTERFERENCE CHECK SAMPLE

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No: _____ SDG No.: 6-0102

ICP ID Number: OPTIMA_____ ICS Source: VHG_____

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Aluminum		469543		484040.4	103.1			
Antimony		906		909.1	100.3			
Arsenic		866		892.4	103.0			
Barium		409		417.1	102.0			
Beryllium		428		437.7	102.3			
Cadmium		798		826.7	103.6			
Calcium								
Chromium		411		415.8	101.2			
Cobalt		387		386.0	99.7			
Copper		484		464.9	96.1			
Iron		147514		148713.8	100.8			
Lead		787		807.0	102.5			
Magnesium								
Manganese		420		426.8	101.6			
Mercury								
Nickel		741		741.9	100.1			
Potassium								
Selenium		837		876.2	104.7			
Silver		988		941.4	95.3			
Sodium								
Thallium		743		744.2	100.2			
Vanadium		394		406.9	103.3			
Zinc		916		949.7	103.7			

START - DALLAS

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No: _____ SDG No.: 6-0102

ICP ID Number: OPTIMA_____ ICS Source: VHG_____

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Aluminum								
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium								
Calcium		384371		514780.7	133.9			
Chromium								
Cobalt								
Copper								
Iron								
Lead								
Magnesium		449914		520123.5	115.6			
Manganese								
Mercury								
Nickel								
Potassium		0		6150.0				
Selenium								
Silver								
Sodium		0		7551.3				
Thallium								
Vanadium								
Zinc								

FORM IV - IN

511

START - DALLAS

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

BATCHS

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL__ Level (low/med): LOW___

% Solids for Sample: _94.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony	75-125	51.8405		1.0328	U	52.66	98.4		P
Arsenic	75-125	212.6987		1.0042		210.66	100.5		P
Barium	75-125	219.5873		10.4342		210.66	99.3		P
Beryllium	75-125	5.2525		0.5164	U	5.27	99.7		P
Cadmium	75-125	5.7310		0.5164	U	5.27	108.7		P
Calcium									NR
Chromium	75-125	23.8812		2.4414		21.07	101.8		P
Cobalt	75-125	54.7639		2.4344		52.66	99.4		P
Copper	75-125	28.0093		2.0657	U	26.33	106.4		P
Iron									NR
Lead	75-125	53.9994		1.1264		52.66	100.4		P
Magnesium									NR
Manganese	75-125	206.6375		167.4148		52.66	74.5	N	P
Mercury									NR
Nickel	75-125	53.1123		2.0657	U	52.66	100.9		P
Potassium									NR
Selenium	75-125	206.6694		1.0328	U	210.66	98.1		P
Silver	75-125	5.2233		1.0328	U	5.27	99.1		P
Sodium									NR
Thallium	75-125	211.9851		0.5164	U	210.66	100.6		P
Vanadium	75-125	57.5801		4.0262		52.66	101.7		P
Zinc	75-125	57.1554		3.5026		52.66	101.9		P

Comments:

FORM V (Part 1) - IN

002221

START - DALLAS

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

BATCHS1

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL__ Level (low/med): LOW___

% Solids for Sample: _94.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony	75-125	51.0101		1.0328	U	52.66	96.9		P
Arsenic	75-125	212.9950		1.0042		210.66	100.6		P
Barium	75-125	225.2018		10.4342		210.66	101.9		P
Beryllium	75-125	5.3178		0.5164	U	5.27	100.9		P
Cadmium	75-125	5.7605		0.5164	U	5.27	109.3		P
Calcium									NR
Chromium	75-125	23.7673		2.4414		21.07	101.2		P
Cobalt	75-125	55.2428		2.4344		52.66	100.3		P
Copper	75-125	27.8376		2.0657	U	26.33	105.7		P
Iron									NR
Lead	75-125	54.7945		1.1264		52.66	101.9		P
Magnesium									NR
Manganese	75-125	322.3498		167.4148		52.66	294.2	N	P
Mercury									NR
Nickel	75-125	53.4112		2.0657	U	52.66	101.4		P
Potassium									NR
Selenium	75-125	207.7138		1.0328	U	210.66	98.6		P
Silver	75-125	5.2340		1.0328	U	5.27	99.3		P
Sodium									NR
Thallium	75-125	213.5309		0.5164	U	210.66	101.4		P
Vanadium	75-125	58.7880		4.0262		52.66	104.0		P
Zinc	75-125	58.0136		3.5026		52.66	103.5		P

Comments:

START - DALLAS

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

BATCHS

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL__ Level (low/med): LOW___

% Solids for Sample: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony									NR
Arsenic									NR
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead									NR
Magnesium									NR
Manganese									NR
Mercury	75-125	0.4459		0.1833		0.33	79.6		CV
Nickel									NR
Potassium									NR
Selenium									NR
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR

Comments:

FORM V (Part 1) - IN

002223

START - DALLAS

6
DUPLICATES

EPA SAMPLE NO.

BATCHD

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL_ Level (low/med): _LOW__

% Solids for Sample: _94.0 % Solids for Duplicate: __94.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		1721.5003		1831.4749		6.2		P
Antimony		51.8405		51.0101		1.6		P
Arsenic		212.6987		212.9950		0.1		P
Barium		219.5873		225.2018		2.5		P
Beryllium		5.2525		5.3178		1.2		P
Cadmium		5.7310		5.7605		0.5		P
Calcium	52.6650	187.9645		204.3133		8.3		P
Chromium		23.8812		23.7673		0.5		P
Cobalt		54.7639		55.2428		0.9		P
Copper		28.0093		27.8376		0.6		P
Iron		3250.2640		3344.3210		2.9		P
Lead		53.9994		54.7945		1.5		P
Magnesium	52.6650	67.7781		73.2141		7.7		P
Manganese		206.6375		322.3498		43.7	*	P
Mercury								NR
Nickel		53.1123		53.4112		0.6		P
Potassium	105.3300	452.6086		422.3058		6.9		P
Selenium		206.6694		207.7138		0.5		P
Silver	1.0530	5.2233		5.2340		0.2		P
Sodium	105.3300	137.8125		131.1066		5.0		P
Thallium		211.9851		213.5309		0.7		P
Vanadium		57.5801		58.7880		2.1		P
Zinc		57.1554		58.0136		1.5		P

FORM VI - IN

002224

START - DALLAS

6
DUPLICATES

EPA SAMPLE NO.

BATCHD

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL_ Level (low/med): _LOW__

% Solids for Sample: 100.0 % Solids for Duplicate: _100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum								NR
Antimony								NR
Arsenic								NR
Barium								NR
Beryllium								NR
Cadmium								NR
Calcium								NR
Chromium								NR
Cobalt								NR
Copper								NR
Iron								NR
Lead								NR
Magnesium								NR
Manganese								NR
Mercury		0.1833		0.1767		3.7		CV
Nickel								NR
Potassium								NR
Selenium								NR
Silver								NR
Sodium								NR
Thallium								NR
Vanadium								NR
Zinc								NR

FORM VI - IN

7

LABORATORY CONTROL SAMPLE

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.181 SAS No.: _____ SDG No.: 6-0102

Solid LCS Source: ERA_____

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
[illegible]uminum									
[illegible]timony									
Arsenic									
Barium									
Beryllium									
Cadmium									
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead									
Magnesium									
Manganese									
Mercury				4.4	4.3		3.0	5.8	97.7
Nickel									
Potassium									
Selenium									
[illegible]lver									
[illegible]dium									
Thallium									
Vanadium									
Zinc									

START - DALLAS

8

STANDARD ADDITION RESULTS

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract:_____

Lab Code: EANDE_ Case No.: 9801.181 SAS No.:_____ SDG No.:6-0102

Concentration Units: ug/L

EPA Sample No.	An	0 ADD ABS	1 ADD CON	1 ADD ABS	2 ADD CON	2 ADD ABS	3 ADD CON	3 ADD ABS	Final Conc.	r	Q

START - DALLAS

9

ICP SERIAL DILUTION

EPA SAMPLE NO.

BATCHL

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL_ Level (low/med): LOW__

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum							NR
Antimony							NR
Arsenic							NR
Barium							NR
Beryllium							NR
Cadmium							NR
Calcium	1541.06		2500.00	U	100.0		P
Chromium							NR
Cobalt							NR
Copper							NR
Iron							NR
Lead							NR
Magnesium	500.00	U	2500.00	U			P
Manganese							NR
Mercury							NR
Nickel							NR
Potassium	6222.92		7935.09		27.5		P
Selenium							NR
Silver							NR
Sodium	1000.00	U	5000.00	U			P
Thallium							NR
Vanadium							NR
Zinc							NR

START - DALLAS

9

ICP SERIAL DILUTION

EPA SAMPLE NO.

13D-6575L

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL_ Level (low/med): LOW__

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	19889.56		19961.60		0.4		P
Antimony	10.00	U	50.00	U			P
Arsenic	20.58		26.55		29.0		P
Barium	341.68		349.04		2.2		P
Beryllium	5.00	U	25.00	U			P
Cadmium	9.99		25.00	U	100.0		P
Calcium							NR
Chromium	64.88		636.88		881.6		P
Cobalt	31.40		100.00	U	100.0		P
Copper	27.84		100.00	U	100.0		P
Iron	69868.74		74341.45		6.4		P
Lead	30.05		42.34		40.9		P
Magnesium							NR
Manganese	452.24		880.13		94.6		P
Mercury							NR
Nickel	58.96		329.98		459.7		P
Potassium							NR
Selenium	10.00	U	50.00	U			P
Silver	10.00	U	50.00	U			P
Sodium							NR
Thallium	5.00	U	25.00	U			P
Vanadium	105.49		110.73		5.0		P
Zinc	75.99		140.62		85.1		P

START - DALLAS

10
Instrument Detection Limits (Quarterly)

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.181 SAS No.: _____ SDG No.: 6-0102

ICP ID Number: OPTIMA_____

Flame AA ID Number : _____

Furnace AA ID Number : _____

Analyte	Wave-length (nm)	Back-ground	PQL (ug/L)	M
Aluminum	396.15		100.0	P
Antimony	206.83		10.0	P
Arsenic	188.98		5.0	P
Barium	233.53		20.0	P
Beryllium	313.11		5.0	P
Cadmium	226.50		5.0	P
Calcium	315.89		500.0	P
Chromium	205.55		10.0	P
Cobalt	228.62		20.0	P
Copper	324.75		20.0	P
Iron	259.94		50.0	P
Lead	220.35		5.0	P
Magnesium	279.08		500.0	P
Manganese	257.61		10.0	P
Mercury				NR
Nickel	231.60		20.0	P
Potassium	766.49		1000.0	P
Selenium	196.03		10.0	P
Silver	328.07		10.0	P
Sodium	589.59		1000.0	P
Thallium	190.80		5.0	P
Vanadium	292.40		20.0	P
Zinc	213.86		10.0	P

Comments:

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002230

START - DALLAS

10
Instrument Detection Limits (Quarterly)

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.181 SAS No.: _____ SDG No.: 6-0102

ICP ID Number: _____

Flame AA ID Number : 2380_____

Furnace AA ID Number : _____

Analyte	Wave-length (nm)	Back-ground	PQL (ug/L)	M
Aluminum				NR
Antimony				NR
Arsenic				NR
Barium				NR
Beryllium				NR
Cadmium				NR
Calcium				NR
Chromium				NR
Cobalt				NR
Copper				NR
Iron				NR
Lead				NR
Magnesium				NR
Manganese				NR
Mercury	253.70		0.1	CV
Nickel				NR
Potassium				NR
Selenium				NR
Silver				NR
Sodium				NR
Thallium				NR
Vanadium				NR
Zinc				NR

Comments:

START - DALLAS

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.181 SAS No.: _____ SDG No.: 6-0102

ICP ID Number: OPTIMA_____ Date: 03/20/98

Analyte	Wave-length (nm)	Interelement Correction Factors for : Al	Ca	Fe	Mg	___
Aluminum	396.15	0.0000000	0.0000000	0.0000000	0.0000000	
Antimony	206.83	0.0430283	0.0000000	0.0000000	0.0000000	
Arsenic	188.98	0.0480027	0.0000000	0.0000000	0.0000000	
[illegible]rium	233.53	0.0000000	0.0000000	0.0000000	0.0000000	
Beryllium	313.11	0.0000000	0.0000000	0.0000000	0.0000000	
Cadmium	226.50	0.0000000	0.0000000	0.0001562	0.0000000	
Calcium	315.89	0.0000000	0.0000000	0.0000000	0.0000000	
Chromium	205.55	0.0000000	0.0000000	0.0000000	0.0000000	
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	
Copper	324.75	0.0000000	0.0000000	0.0000000	0.0000000	
Iron	259.94	0.0000000	0.0000000	0.0000000	0.0000000	
Lead	220.35	-0.0482720	0.0000000	0.0000000	0.0000000	
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000211	
Mercury						
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	
Selenium	196.03	-0.1642520	0.0000000	0.0000000	-0.0000167	
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	
Sodium	589.59	0.0000000	0.0000000	0.0000000	0.0000000	
Thallium	190.80	0.0000000	0.0000292	-0.0000820	0.0000000	
[illegible]nadium	292.40	0.0000000	0.0000000	-0.0002010	0.0000000	
[illegible]nc	213.86	0.0000000	0.0000000	0.0001255	0.0000315	

Comments:

_____

_____

_____

_____

START - DALLAS

12
ICP LINEAR RANGES (QUARTERLY)

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.181 SAS No.: _____ SDG No.: 6-0102

ICP ID Number: OPTIMA_____ Date: 05/09/98

Analyte	Integ. Time (sec.)	Concentration (ug/L)	M
Aluminum	10.00	500000.0	P
Antimony	10.00	50000.0	P
Arsenic	10.00	20000.0	P
Barium	10.00	10000.0	P
Beryllium	10.00	10000.0	P
Cadmium	10.00	10000.0	P
Calcium	10.00	50000.0	P
Chromium	10.00	10000.0	P
Cobalt	10.00	20000.0	P
Copper	10.00	50000.0	P
Iron	10.00	100000.0	P
Lead	10.00	10000.0	P
Magnesium	10.00	500000.0	P
Manganese	10.00	10000.0	P
Mercury			NR
Nickel	10.00	10000.0	P
Potassium	10.00	50000.0	P
Selenium	10.00	20000.0	P
Silver	10.00	5000.0	P
Sodium	10.00	50000.0	P
Thallium	10.00	20000.0	P
Vanadium	10.00	20000.0	P
Zinc	10.00	5000.0	P

Comments:

START - DALLAS

13
PREPARATION LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.:6-0102

Method: P_

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
10-0304	06/05/98	1.05	100
11-0203	06/05/98	1.00	100
12-0102	06/05/98	1.02	100
12-0809	06/05/98	1.03	100
13-0102	06/05/98	1.04	100
13-6575	06/05/98	1.02	100
13D-657	06/05/98	1.00	100
6-0102	06/05/98	1.01	100
7-0405	06/05/98	1.00	100
7D-0405	06/05/98	1.02	100
8-0102	06/05/98	1.03	100
9-0102	06/05/98	1.02	100
LCSS	06/05/98	1.00	100
PBS	06/05/98	1.00	100

FORM XIII - IN

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START - DALLAS

13
PREPARATION LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.:6-0102

Method: CV

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
10-0304	06/10/98	0.60	100
11-0203	06/10/98	0.60	100
12-0102	06/10/98	0.61	100
12-0809	06/10/98	0.62	100
13-0102	06/10/98	0.61	100
13-6575	06/10/98	0.63	100
13D-657	06/10/98	0.61	100
6-0102	06/10/98	0.60	100
7-0405	06/10/98	0.60	100
7D-0405	06/10/98	0.60	100
8-0102	06/10/98	0.60	100
9-0102	06/10/98	0.60	100
LCSS	06/10/98	0.20	100
PBS	06/10/98	0.20	100

FORM XIII - IN

002235

START - DALLAS

14
ANALYSIS RUN LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.181 SAS No.: _____ SDG No.:6-0102

Instrument ID Number: OPTIMA_____ Method: P_

Start Date: 06/09/98 End Date: 06/10/98

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	
S0	1.00	2244		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
S	1.00	2248			X	X	X	X	X		X	X	X		X		X		X		X	X		X	X	X	
S	1.00	2250		X										X													
[redacted]	1.00	2253																									
CCV	1.00	2256		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
ICB	1.00	2300		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
CCV	1.00	2303		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
CCB	1.00	2306		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
ICSAB	1.00	2310		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
PBS	1.00	2313		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
LCSS	1.00	2317		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
BATCH	1.00	2320		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
BATCHS	1.00	2324			X	X	X	X	X		X	X	X		X		X		X		X	X		X	X	X	
BATCHS1	1.00	2327			X	X	X	X	X		X	X	X		X		X		X		X	X		X	X	X	
ZZZZZZ	1.00	2330																									
ZZZZZZ	1.00	2333																									
ZZZZZZ	1.00	2337																									
ZZZZZZ	1.00	2340																									
CCV	1.00	2344		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
CCB	1.00	2347		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
ZZZZZZ	1.00	2351																									
[redacted]0102	1.00	2354		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
[redacted]0405	1.00	2358		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
7D-0405	1.00	0001		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
8-0102	1.00	0004		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
9-0102	1.00	0008		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
10-0304	1.00	0012		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
11-0203	1.00	0015		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
12-0102	1.00	0018		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
12-0809	1.00	0022		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
CCV	1.00	0025		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
CCB	1.00	0028		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	

FORM XIV - IN

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002236

START - DALLAS

14
ANALYSIS RUN LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.181 SAS No.: _____ SDG No.:6-0102

Instrument ID Number: OPTIMA_____ Method: P_

Start Date: 06/09/98 End Date: 06/10/98

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN				
13-0102	1.00	0032		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X				
13-6575	1.00	0035		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X				
13D-6575	1.00	0039		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X				
D-6575L	5.00	0042		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X				
ZZZZZZ	1.00	0045																												
ZZZZZZ	1.00	0049																												
ZZZZZZ	1.00	0052																												
ZZZZZZ	1.00	0056																												
ZZZZZZ	1.00	0059																												
ZZZZZZ	1.00	0102																												
CCV	1.00	0106		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X				
CCB	1.00	0109		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X				

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START - DALLAS

14
ANALYSIS RUN LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.181 SAS No.: _____ SDG No.:6-0102

Instrument ID Number: OPTIMA_____ Method: P_

Start Date: 06/12/98 End Date: 06/12/98

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	
S0	1.00	1249								X						X				X			X				
S	1.00	1250								X						X				X			X				
S	1.00	1250								X						X				X			X				
[redacted]	1.00	1250								X						X				X			X				
[redacted]	1.00	1251								X						X				X			X				
ICV	1.00	1251								X						X				X			X				
ICB	1.00	1251								X						X				X			X				
CCV	1.00	1251								X						X				X			X				
CCB	1.00	1251								X						X				X			X				
ICSAB	10.00	1251								X						X				X			X				
PBS	1.00	1251								X						X				X			X				
LCSS	1.00	1251								X						X				X			X				
BATCH	1.00	1251								X						X				X			X				
BATCHS	1.00	1251																									
BATCHS1	1.00	1251																									
BATCH	1.00	1251								X						X				X			X				
BATCHL	5.00	1251								X						X				X			X				
ZZZZZZ	1.00	1251																									
ZZZZZZ	1.00	1251																									
CCV	1.00	1251								X						X				X			X				
CCB	1.00	1251								X						X				X			X				
[redacted]ZZZZZ	1.00	1251																									
[redacted]ZZZZZ	1.00	1251																									
6-0102	1.00	1251								X						X				X			X				
7-0405	1.00	1251								X						X				X			X				
7D-0405	1.00	1251								X						X				X			X				
8-0102	1.00	1251								X						X				X			X				
9-0102	1.00	1252								X						X				X			X				
CCV	1.00	1252								X						X				X			X				
CCB	1.00	1252								X						X				X			X				
10-0304	1.00	1252								X						X				X			X				
11-0203	1.00	1252								X						X				X			X				

FORM XIV - IN

002238

START - DALLAS

14
ANALYSIS RUN LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.181 SAS No.: _____ SDG No.:6-0102

Instrument ID Number: OPTIMA_____ Method: P_

Start Date: 06/12/98 End Date: 06/12/98

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN				
12-0102_	1.00	1252								X						X				X			X							
12-0809_	1.00	1252								X						X				X			X							
13-0102_	1.00	1252								X						X				X			X							
[redacted]-6575_	1.00	1252								X						X				X			X							
[redacted]D-6575	1.00	1252								X						X				X			X							
CCV_____	1.00	1252								X						X				X			X							
CCB_____	1.00	1252								X						X				X			X							

FORM XIV - IN

530

002239

START - DALLAS

14
ANALYSIS RUN LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.181 SAS No.: _____ SDG No.:6-0102

Instrument ID Number: 2380_____ Method: CV

Start Date: 06/10/98 End Date: 06/10/98

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	
S0	1.00	1448																X									
S0.5	1.00	1450																X									
S1	1.00	1452																X									
[illegible]	1.00	1454																X									
[illegible]	1.00	1456																X									
S10	1.00	1458																X									
ICV	1.00	1500																X									
ICB	1.00	1502																X									
CCV	1.00	1504																X									
CCB	1.00	1506																X									
PBS	1.00	1508																X									
LCSS	1.00	1510																X									
6-0102	1.00	1512																X									
7-0405	1.00	1514																X									
7D-0405	1.00	1516																X									
8-0102	1.00	1518																X									
9-0102	1.00	1520																X									
10-0304	1.00	1522																X									
11-0203	1.00	1524																X									
12-0102	1.00	1526																X									
CCV	1.00	1528																X									
[illegible]	1.00	1530																X									
[illegible]-0809	1.00	1532																X									
13-0102	1.00	1534																X									
13-6575	1.00	1536																X									
13D-6575	1.00	1538																X									
ZZZZZZ	1.00	1540																									
ZZZZZZ	1.00	1542																									
ZZZZZZ	1.00	1544																									
ZZZZZZ	1.00	1546																									
ZZZZZZ	1.00	1548																									
ZZZZZZ	1.00	1550																									

FORM XIV - IN

531

START - DALLAS

14
ANALYSIS RUN LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.181 SAS No.: _____ SDG No.:6-0102

Instrument ID Number: 2380_____ Method: CV

Start Date: 06/10/98 End Date: 06/10/98

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	
CCV	1.00	1552																X									
CCB	1.00	1554																X									
ZZZZZZ	1.00	1556																									
[redacted]TCH	1.00	1558																X									
BATCHD	1.00	1600																X									
BATCHS	1.00	1602																X									
ZZZZZZ	1.00	1604																									
ZZZZZZ	1.00	1606																									
ZZZZZZ	1.00	1608																									
ZZZZZZ	1.00	1610																									
ZZZZZZ	1.00	1612																									
ZZZZZZ	1.00	1614																									
CCV	1.00	1616																X									
CCB	1.00	1618																X									

FORM XIV - IN

532

002241

TEST CODE :SPH 1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : PH UNITS : S.U.
PARAMETER : pH

SAMPLE ID	RESULTS	Q	QNT. LIMIT
EE-98-07928			
SB06-0102	3.2		0.10
EE-98-07929			
SB07-0405	3.1		0.10
EE-98-07930			
SB07D-0405	3.3		0.10
EE-98-07931			
SB08-0102	2.3		0.10
EE-98-07932			
SB09-0102	3.0		0.10
EE-98-07933			
SB10-0304	2.8		0.10
EE-98-07934			
SB11-0203	4.7		0.10
EE-98-07935			
SB12-0102	3.8		0.10
EE-98-07936			
SB12-0809	5.9		0.10
EE-98-07937			
SB13-0102	3.9		0.10
EE-98-07938			
SB13-6575	6.0		0.10
EE-98-07939			
SB13D-6575	5.9		0.10

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE
NA = NOT APPLICABLE

002242

QUALITY CONTROL FOR PRECISION
RESULTS OF ANALYSIS OF DUPLICATE
ANALYSES OF SOIL SAMPLES

9801.181

(s.u.)

Parameter	E & E Laboratory No. 98-	Sample Result	Duplicate Result	Relative Percent Difference (RPD)
pH	07939	5.93	6.10	2.8

THIS RPD IS WITHIN E & E, INC. QC TARGETS.

002243

TEST CODE :STS 1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : SOLIDS TOTAL UNITS : %
PARAMETER : Solids-Total

SAMPLE ID	RESULTS	Q
EE-98-07928		
SB06-0102	88	
EE-98-07929		
SB07-0405	86	
EE-98-07930		
SB07D-0405	89	
EE-98-07931		
SB08-0102	92	
EE-98-07932		
SB09-0102	88	
EE-98-07933		
SB10-0304	90	
EE-98-07934		
SB11-0203	85	
EE-98-07935		
SB12-0102	87	
EE-98-07936		
SB12-0809	86	
EE-98-07937		
SB13-0102	89	
EE-98-07938		
SB13-6575	86	
EE-98-07939		
SB13D-6575	87	

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE

QUALITY CONTROL FOR PRECISION
RESULTS OF ANALYSIS OF DUPLICATE
ANALYSES OF SOLID SAMPLES

9801.181

(%)

Parameter	E & E Laboratory No. 98-	Sample Result	Duplicate Result	Relative Percent Difference (RPD)
Solids-Total	07939	86.9	87.6	0.8

THIS RPD IS WITHIN E & E, INC. QC TARGETS.

002245

ecology and environment, inc.
International Specialists in the Environment

ANALYTICAL SERVICES CENTER
4493 Walden Avenue
Lancaster, New York 14086
Tel. (716) 685-8080, Fax: (716) 685-0852

MEMORANDUM

TO: Tom Beer - E & E Inc. Dallas

FROM: Caryn Wojtowicz - ASC Project Manager

DATE: June 2, 1998

SUBJECT: KJ6103.052601SFXX
START - Dallas

RE: 9801.165

CC: Lab File

Attached is the laboratory report of the analyses conducted on samples received at the Analytical Services Center on June 2, 1998. Analyses were performed according to the procedures set forth in the "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Update III, Third Edition, U.S. EPA, June 1997.

The chain of custody form provided herein is integral to this report and must be included with the analytical results forms upon transferral to another data user.

All samples on which this report is based will be retained by E & E for a period of 30 days from the date of this report, unless otherwise instructed by the client. If additional storage of samples is requested by the client, a storage fee of $1.00 per sample container per month will be charged for each sample, with such charges accruing until destruction of the samples is authorized by the client.

CW/bk
Enclosure

1

recycled paper

On June 2, 1998 a total of seven samples were received at Analytical Services Center. All samples were received in good condition.

BETX

One water and six soil samples were analyzed for benzene, toluene, ethylbenzene and xylenes. Confirmation analysis was not required according to the Statement of Work. Several instrument generated QC (MS, MSD, LCS) forms reflect in-house limits rather than project specified.

All samples were analyzed within project holding times. Sample SB05-0405 required analysis at a dilution due to the level of target compounds detected. Quantitation limits have been adjusted accordingly. Due to a scheduling error, sample SB05-0405 was not reanalyzed using methanol extraction procedures. Ethylbenzene and xylenes are flagged "X" indicating that the calibrated range has been exceeded.

Benzene and toluene recoveries exceeded project limits in the aqueous batch QC MS/MSD. The laboratory control sample met all recovery criteria. All project criteria were met for both the soil MS/MSD and LCS.

PAH

Due to the consistently high percent difference for benzo(a)pyrene determined on continuing calibrations on the primary column, this compound, if present, is reported from the confirmation column analysis. Several samples required dilution due to the level of target compounds present in the sample. Quantitation limits have been adjusted accordingly.

Some low level contamination was observed in the soil method blank. As the resulting concentrations were less than required reporting limits, the blank is reported as "ND", none detected.

METALS

Client sample identifications have been truncated throughout this section of the report due to space limitations of the software program used. The full sample identification is listed in the comments field of Form I.

Recovery of manganese was high for the matrix spike duplicate analysis of sample SB02-12. Matrix spike recovery was within acceptable limits. The resulting RPD value was high. All sample manganese results have been flagged "N*".

Aluminum and iron were detected in the method blank at concentrations of 26.6 mg/kg and 10.7 mg/kg respectively. Associated sample concentrations exceeded the blank amount by ten times. No corrective action was required.

Results of the batch serial dilution are provided as a measure of quality control.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in the hardcopy data package has been authorized by the Laboratory Manager's designee, as verified by the following signature.

Caryn Wojtowicz – Project Manager
Analytical Services Center
June 22, 1998

002248

OFFICIAL
CHAIN OF CUSTODY RECORD

PROJ. NO.: K56103 05260151FXX
PROJECT NAME: Wilcox Refining
SAMPLERS: (Signature): Shawn Moore, Tom Beer

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Metals (6010B)	TAT (8310)	TPH (GRO/DRO)	VOC	BTEX	REMARKS
SB02-12	6/1/98	1335		✓	SB02 - 1-2' sample	1	✓	✓	✓	✓			EPA Tag No. 6-006630
SB02-12	6/1/98	1335		✓	SB02 - 1-2' sample	2						✓	EPA Tag No. 6-006485
SB03-1.52	6/1/98	1359		✓	SB03 - 1.5-2' sample	1	✓	✓	✓	✓			EPA Tag No. 6-006487
SB03-1.52	6/1/98	1359		✓	SB03 - 1.5-2' sample	2						✓	EPA Tag No. 6-006486
SB04-0405	6/1/98	1435		✓	SB04 - 4-5' sample	1	✓	✓	✓	✓		(SM)	EPA Tag No. 6-006489
SB04-0405	6/1/98	1435		✓	SB04 - 4-5' sample	2						✓	EPA Tag No. 6-006488
SB05-0102	6/1/98	1535		✓	SB05 - 1-2' sample	1	✓	✓	✓	✓			EPA Tag No. 6-006493
SB05-0102	6/1/98	1535		✓	SB05 - 1-2' sample	2						✓	EPA Tag No. 6-006492 (SM)
SB05-0405	6/1/98	1640		✓	SB05 4-5' sample	1	✓	✓	✓	✓			EPA Tag No. 6-006491
SB05-0405	6/1/98	1640		✓	SB05 4-5' Sample	2						✓	EPA Tag No. 6-006490
SB05-GW1	6/1/98	1630		✓	Groundwater SB05	2						✓	EPA Tag No. 6-006494
SB05-GW1	6/1/98	1630		✓	Groundwater SB05	2			✓				EPA Tag No. 6-006495
SB05-1415	6/1/98	1650		✓	SB05 - 14-15' Sample	1	✓	✓	✓	✓			EPA Tag No. 6-006497
SB05-1415	6/1/98	1650		✓	SB05 - 14-15' sample	2						✓	EPA Tag No. 6-006496

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
S. Moore T. Beer	6/1/98 1700				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature) FedEx	Date / Time 6-2-98 1030	Received for Laboratory by: (Signature)	Date / Time 6-2-98 1030	Remarks Fed Ex Airbill 805550005313	
Shipped by:		Airbill Number:			

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Return with Warrant

EPA 7500-53 (11/96)

6-

002249

JOB NUMBER : 9801.165

Ecology and Environment, Inc.
SAMPLE TRACKING REPORT

-	SAMPLE NUMBER	CLIENT SAMPLE ID		DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED
PH			-S			
	7830.03	SB02-12		06/01/98		06/03/98
	7831.03	SB03-1.52		06/01/98		06/03/98
	7832.03	SB04-0405		06/01/98		06/03/98
	7833.03	SB05-0102		06/01/98		06/03/98
	7834.03	SB05-0405		06/01/98		06/03/98
	7835.03	SB05-1415		06/01/98		06/03/98
SOLIDS TOTAL			-S			
	7830.03	SB02-12		06/01/98		06/16/98
	7831.03	SB03-1.52		06/01/98		06/16/98
	7832.03	SB04-0405		06/01/98		06/16/98
	7833.03	SB05-0102		06/01/98		06/16/98
	7834.03	SB05-0405		06/01/98		06/16/98
	7835.03	SB05-1415		06/01/98		06/16/98
8021B BETX			-S			
	7830.01	SB02-12		06/01/98		06/02/98
	7831.01	SB03-1.52		06/01/98		06/03/98
	7832.01	SB04-0405		06/01/98		06/03/98
	7833.01	SB05-0102		06/01/98		06/03/98
	7834.01	SB05-0405		06/01/98		06/03/98
	7835.01	SB05-1415		06/01/98		06/04/98
8021B BETX			-W			
	7836.01	SB05-GW1		06/01/98		06/09/98
TPH-TNRCC			-S			
	7830.03	SB02-12		06/01/98		06/10/98
	7831.03	SB03-1.52		06/01/98		06/10/98
	7832.03	SB04-0405		06/01/98		06/10/98
	7833.03	SB05-0102		06/01/98		06/10/98
	7834.03	SB05-0405		06/01/98		06/10/98
	7835.03	SB05-1415		06/01/98		06/10/98
TPH-TNRCC			-W			
	7836.03	SB05-GW1		06/01/98		06/07/98
8310 PAH/LC			-S			
	7830.03	SB02-12		06/01/98	06/04/98	06/09/98
	7831.03	SB03-1.52		06/01/98	06/04/98	06/09/98
	7832.03	SB04-0405		06/01/98	06/04/98	06/09/98
	7833.03	SB05-0102		06/01/98	06/04/98	06/10/98
	7834.03	SB05-0405		06/01/98	06/04/98	06/10/98
	7835.03	SB05-1415		06/01/98	06/04/98	06/10/98

002250

PURGEABLE AROMATICS
QUALITY CONTROL FOR ACCURACY: PERCENT
RECOVERY OF SURROGATE SPIKES
(MATRIX: WATER)

9801.165

E & E Laboratory No.-98

(ug/L)

Compound	Amount Added	Amount Determined	Percent Recovery	Project QC Targets
Trifluorotoluene				65 - 130
07836	10.0	10.6	106	
Method Blank (06/09)	10.0	10.0	100	
LCS (06/09)	10.0	11.0	110	

THESE RECOVERIES ARE WITHIN E & E, INC. QC TARGETS.

LCS = LABORATORY CONTROL SAMPLE

002251

ECOLOGY AND ENVIRONMET, INC.
ANALYTICAL SERVICES CENTER
QUALITY AND CONTROL FOR ACCURACY AND PRECISION
PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)
OF WATER SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MSD)

UNITS: UG/L
MATRIX -WATER
JOB# 9801.165 SAMPLE# 8044 MS/MSD
ANALYZED:
BATCH# 980609303R- BTEX VOLATILE

PARAMETER	AMOUNT ADDED	ORIGINA VALUE	AMOUNT DETERMINED		PERCENT RECOVERY		
			MS	MSD	MS	MSD	RPD
BENZENE	20	12	40.8	40.8	144%	144%	0.0%
TOLUENE	20	8.7	35.3	35.3	133%	133%	0.0%
ETHYLBENZENE	20	8.3	22.2	21.3	70%	65%	6.7%
TOTAL XYLENES	60	18	84	80.4	110%	104%	5.6%
TFT SURR	10		6.6	6.5	66%	65%	1.5%
DILUTION	2.5X						

6

ECOLOGY AND ENVIRONMET, INC.
ANALYTICAL SERVICES CENTER
QUALITY AND CONTROL FOR ACCURACY AND PRECISION
PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)
OF WATER/SOIL MATRIX SPIKE (MS)

MATRIX --WATER

UNITS: UG/L
SAMPLE : WLCS 060998

JOB# 9801.165/.203
DATE:
BATCH# 980609306R-R
NOTEBOOK:

8021-BETX VOLATILE

	AMOUNT	ORIGINAL	AMOUNT		PERCENT	
PARAMETER	ADDED	VALUE	DETERMINED		RECOVERY	
					MS	
MTBE	10		8.67		99%	
BENZENE	10		9.21		92%	
TOLUENE	10		9.21		92%	
ETHYLBENZENE	10		9.03		90%	
TOTAL XYLENES	30		26.1		87%	
TFT SURROGATE(% REC)	10		11		110%	

16

TEST CODE :WBTX0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8021B BETX UNITS : UG/L
SAMPLE ID LAB : EE-98-07836 MATRIX: WATER
SAMPLE ID CLIENT: SB05-GW1

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.0
Toluene	ND		2.0
Ethylbenzene	190		2.0
Total Xylenes	35		4.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

8020 Retention Time Window Study

Instrument ID: VARIAN 3400 #8
Column: RESTEK 502.2 30METER 0.53MM ID
Run Dates: 08/05/97 - 08/08/97

Aroclor	Pk #	08/05/97 Mid Level RT	08/06/97 Mid Level RT	08/08/97 Mid Level RT	Mean RT	Std Dev	Calculated RTW (3.14x Std Dev)
MTBE	1	4.475	4.499	4.497	4.490	0.0109	0.034
BENZENE	2	7.427	7.455	7.450	7.444	0.0122	0.038
TOLUENE	3	11.004	11.025	11.029	11.019	0.0110	0.034
ETHYLBENZENE	4	14.867	14.885	14.884	14.879	0.0083	0.026
M/P-XYLENE	5	15.092	15.110	15.108	15.103	0.0081	0.025
O-XYLENE	1	16.331	16.346	16.343	16.340	0.0065	0.020
CL-BENZENE	2	14.668	14.686	14.686	14.680	0.0085	0.027
1,3-DICHLOROBENZENE	3	21.737	21.757	21.750	21.748	0.0083	0.026
1,4-DICHLOROBENZENE	4	22.118	22.139	22.130	22.129	0.0086	0.027
1,2-DICHLOROBENZENE	5	23.324	23.340	23.334	23.333	0.0066	0.021

Software Version	: 6.0.2:G11	Date	: 06/16/98 01:33:30 PM
Operator	: PLEUTHNERG	Sample Name	: RCVS
Sample Number	: 019	Study	: 5ULSURR,10UL CVS/5ML
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: V34008B	Channel	: A
Interface Serial #	: 3341210154	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 38.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 L	Area Reject	: 0.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/10/98 02:30:01 AM	Cycle	: 19

Raw Data File : \\GCSRV1\TCDATA\V34008\980609306R-\v34008_0609_019.raw
Result File : \\GCSRV1\TCDATA\V34008\980609306R-\v34008_0609_019.rst
Inst Method : \\GCSRV1\TCDATA\v34008\34008mth4_run from
\\GCSRV1\TCDATA\V34008\980609306R-\v34008_0609_019.rst
Proc Method : \\GCSRV1\TCDATA\v34008\8021betx_060998wc.mth from
\\GCSRV1\TCDATA\V34008\980609306R-\v34008_0609_019.rst
Calib Method : \\GCSRV1\TCDATA\v34008\8021betx_060998wc.mth from
\\GCSRV1\TCDATA\V34008\980609306R-\v34008_0609_019.rst
Sequence File : \\GCSRV1\TCDATA\V34008\980609306R-\V34008_060998RECAL.seq

CONTINUING CALIBRATION STD / CVS REPORT

Instrument: V34008 Method: 8021B - Aromatics

Batch #: 980609306R

Job #: 9801.165

Peak #	Component Name	Time [min]	Area [µV·s]	Amount Determ. ug/L	Expected Amt. ug/L	% Difference
11	BENZENE	12.98	103545.50	16.1	20.0	-19.5
12	TFT	14.27	10637.55	6.8	~~40.0~~ 10	~~82.9~~ 6.8 (68%)
14	TOLUENE	17.17	99727.60	17.8	20.0	-10.9
19	ETHYLBENZENE	20.92	104950.62	21.0	20.0	5.0
20	M-P-XYLENE	21.12	260410.41	38.4	40.0	-4.0
21	O-XYLENE	22.27	148737.13	23.8	20.0	19.2
			728008.80			

Control Limits:

58.6/5 = 11.7% D
Average
N Damm
6/16/98

52

Software Version	: 6.0.2:G11	Date	: 06/16/98 01:34:19 PM
Operator	: PLEUTHNERG	Sample Name	: RCVS
Sample Number	: 022	Study	: .203 5ULSURR/2ML/5ML
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: V34008B	Channel	: A
Interface Serial #	: 3341210154	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 38.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 L	Area Reject	: 0.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/10/98 04:46:10 AM	Cycle	: 22

Raw Data File : \\GCSRV1\TCDATA\V34008\980609306R-\v34008_0609_022.raw
Result File : \\GCSRV1\TCDATA\V34008\980609306R-\v34008_0609_022.rst
Inst Method : \\GCSRV1\TCDATA\v34008\34008mth4_run from
\\GCSRV1\TCDATA\V34008\980609306R-\v34008_0609_022.rst
Proc Method : \\GCSRV1\TCDATA\v34008\8021betx_060998wc.mth from
\\GCSRV1\TCDATA\V34008\980609306R-\v34008_0609_022.rst
Calib Method : \\GCSRV1\TCDATA\v34008\8021betx_060998wc.mth from
\\GCSRV1\TCDATA\V34008\980609306R-\v34008_0609_022.rst
Sequence File : \\GCSRV1\TCDATA\V34008\980609306R-\V34008_060998RECAL.seq

CONTINUING CALIBRATION STD / CVS REPORT

Instrument: V3400 #8 Method: 8021B-Aromatics

Batch #: 980609306R

Job #: 9801.165

Peak #	Component Name	Time [min]	Area [µV·s]	Amount Determ. ug/L	Expected Amt. ug/L	% Difference
10	BENZENE	12.98	104043.25	16.2	20.0	-19.1
11	TFT	14.28	11822.82	7.6	~~40.0~~	~~-81.0~~ (76% recovery)
14	TOLUENE	17.17	98617.98	17.6	20.0	-11.9
18	ETHYLBENZENE	20.92	106600.66	21.3	20.0	6.7
19	M-P-XYLENE	21.12	262654.34	38.7	40.0	-3.2
20	O-XYLENE	22.27	144297.54	23.1	20.0	15.6
			728036.59			

Control Limits:

56.5/5 11.3/OD

Average
R Sommer
6/16/98

56

TEST CODE :WBTX0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8021B BETX UNITS : UG/L
SAMPLE ID LAB :Method Blank (06/09) MATRIX: WATER

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.0
Toluene	ND		2.0
Ethylbenzene	ND		2.0
Total Xylenes	ND		2.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002258

DATA REDUCTION/EVALUATION/REPORTING

Quantitate using the curve or mean calibration factor.

The data system prints results in µg/L or µg/kg. The following formulae are given as checks.

Water or soil samples when not quantitating from a curve.

$$\text{Concentration, } \mu g/kg \text{ or } \mu g/L = \frac{(A_x)\ (Df)}{(\overline{CF_x})}$$

Where,

Ax = Area of the peak for the compound to be measured

$\overline{CF_x}$ = mean calibration factor for compound (area / µg/L or area / µg/kg)

Df = Dilution factor. The dilution factor is defined as follows:

For waters:

$$\frac{\text{mL of sample used to make dilution + mL ASTM Type II Water}}{\text{mL of sample used to make dilution}}$$

For soils:

$$\frac{5g}{\text{grams of soil purged}}$$

Medium level (methanol extract) when not quantitating from a curve.

$$\textit{Soil Sample Concentration, } \mu g/kg = \frac{(A_x)}{(\overline{CF_x})}\left[\frac{5}{V_e}\frac{V_t}{S}\right]$$

Where,

A_x = area of the peak for the compound to be measured

$\overline{CF_x}$ = mean calibration factor for compound x (area / µg/L)

S = Mass of sample extracted (g) usually 4 g

5 = amount of water (mL) to which the method extract is added (to account for units of curve)

Vt = Volume (mL) of total methanol extract, usually 10 mL.

Ve = Volume (mL) of methanol extract added to 5 mL of water for purging, usually 0.100 mL.

002259

PURGEABLE AROMATICS
QUALITY CONTROL FOR ACCURACY: PERCENT
RECOVERY OF SURROGATE SPIKES
(MATRIX: SOLID)

9801.165

E & E Laboratory No.-98

(ug/kg)

Compound	Amount Added	Amount Determined	Percent Recovery	Project QC Targets
Trifluorotoluene				50 - 150
07830	40.0	45.1	113	
07830 MS	40.0	37.5	93.8	
07830 MSD	40.0	30.8	77.0	
07831	40.0	44.9	112	
07832	40.0	36.2	90.5	
07833	40.0	38.8	97.0	
Method Blank (06/02)	40.0	40.0	100	
LCS (06/02)	40.0	40.4	101	

THESE RECOVERIES ARE WITHIN E & E, INC. QC TARGETS.

MS = MATRIX SPIKE
MSD = MATRIX SPIKE DUPLICATE
LCS = LABORATORY CONTROL SAMPLE

002260

ECOLOGY AND ENVIRONMET, INC.
ANALYTICAL SERVICES CENTER
QUALITY AND CONTROL FOR ACCURACY AND PRECISION
PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)
OF SOIL SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MSD)

MATRIX --SOIL UNITS: UG/KG

JOB# 9801.165 SAMPLE# 7830.01 MS/MSD
ANALYZED: 6/2/98 RUN# 17,18
BATCH# 980602301R- 8021B AROMATICS
NOTEBOOK: 1236-62

	AMOUNT	ORIGINAL	AMOUNT		PERCENT			LCL	UCL
PARAMETER	ADDED	VALUE	DETERMINED		RECOVERY				
			MS	MSD	MS	MSD	RPD		
MTBE	40		39.7	33.8	99%	85%	16.1%	50.0%	150%
BENZENE	20		23.4	20.5	117%	103%	13.2%	49.3%	124%
TFT (TRIFLUOROTOLUEN	40		37.5	30.8	94%	77%	19.6%	26.4%	139%
TOLUENE	20		20.3	16.7	102%	84%	19.5%	46.0%	117%
CHLOROBENZENE	20		19.4	16.0	97%	80%	19.2%	70.0%	130%
ETHYLBENZENE	20		19.7	16.2	99%	81%	19.5%	43.9%	122%
TOTAL XYLENES	60		62.4	51.2	104%	85%	19.7%	53.5%	118%
1,3-DICHLOROBENZENE	20		19.7	16.3	99%	82%	18.9%	50.0%	141%
1,4-DICHLOROBENZENE	20		20.0	16.6	100%	83%	18.6%	42.0%	143%
1,2-DICHLOROBENZENE	20		17.8	14.8	89%	74%	18.4%	37.0%	154%

LCL=LOWER CONTROL LIMIT
UCL=UPPER CONTROL LIMIT

ECOLOGY AND ENVIRONMET, INC.
ANALYTICAL SERVICES CENTER
QUALITY AND CONTROL FOR ACCURACY AND PRECISION
PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)
OF SOIL SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MSD)

MATRIX --SOIL

UNITS: UG/KG

JOB# 9801.166
ANALYZED: 6/4/98
BATCH# 980604301R-
NOTEBOOK: 1236-64

SAMPLE# 7837.01 MS/MSD
RUN# 6, 7
8021B AROMATICS

PARAMETER	AMOUNT ADDED	ORIGINAL VALUE	AMOUNT DETERMINED		PERCENT RECOVERY		RPD	LCL	UCL
			MS	MSD	MS	MSD			
MTBE	40		30.8	26.4	77%	66%	15.4%	50.0%	150%
BENZENE	20		17.6	15.1	88%	76%	15.3%	49.3%	124%
TFT (TRIFLUOROTOLUEN	40		27.8	25.6	70%	64%	8.2%	26.4%	139%
TOLUENE	20		12.9	11.6	65%	58%	10.6%	46.0%	117%
CHLOROBENZENE	20		10.7	10.2	54%	51%	4.8%	70.0%	130%
ETHYLBENZENE	20		11.0	10.5	55%	53%	4.7%	43.9%	122%
TOTAL XYLENES	60		34.2	32.5	57%	54%	5.1%	53.5%	118%
1,3-DICHLOROBENZENE	20		8.4	9.1	42%	46%	8.0%	50.0%	141%
1,4-DICHLOROBENZENE	20		8.5	9.3	43%	47%	9.0%	42.0%	143%
1,2-DICHLOROBENZENE	20		7.6	8.3	38%	42%	8.8%	37.0%	154%

LCL=LOWER CONTROL LIMIT
UCL=UPPER CONTROL LIMIT

21

ECOLOGY AND ENVIRONMET, INC.
ANALYTICAL SERVICES CENTER
QUALITY AND CONTROL FOR ACCURACY AND PRECISION
LABORATORY CONTROL SPIKE

MATRIX --SOIL

UNITS: UG/KG

JOB# 9801.165
ANALYZED: 6/2/98
BATCH# 980602301R
NOTEBOOK: 1236-62

SAMPLE# LCS (SOIL)
RUN# 9
8021B AROMATICS

PARAMETER	AMOUNT ADDED	ORIGINAL VALUE	AMOUNT DETERMINED LCS	PERCENT RECOVERY LCS	LCL	UCL
MTBE	40		41.8	104%	70.5%	115%
BENZENE	20		22.1	111%	70.4%	124%
TFT (TRIFLUOROTOLUEN	40		40.4	101%	26.4%	139%
TOLUENE	20		20.5	103%	73.2%	117%
CHLOROBENZENE	20		20.7	103%	72.0%	117%
ETHYLBENZENE	20		21.2	106%	71.2%	122%
TOTAL XYLENES	60		67.2	112%	75.5%	118%
1,3-DICHLOROBENZENE	20		21.3	106%	74.1%	115%
1,4-DICHLOROBENZENE	20		21.5	108%	68.9%	119%
1,2-DICHLOROBENZENE	20		20.0	100%	69.8%	118%

LCL=LOWER CONTROL LIMIT
UCL=UPPER CONTROL LIMIT

ECOLOGY AND ENVIRONMET, INC.
ANALYTICAL SERVICES CENTER
QUALITY AND CONTROL FOR ACCURACY AND PRECISION
LABORATORY CONTROL SPIKE

MATRIX --SOIL

UNITS: UG/KG

JOB# 9801.165, .166
ANALYZED: 6/4/98
BATCH# 980604301R
NOTEBOOK: 1236-64

SAMPLE# LCS (SOIL)
RUN# 4
8021B AROMATICS

PARAMETER	AMOUNT ADDED	ORIGINAL VALUE	AMOUNT DETERMINED LCS	PERCENT RECOVERY LCS	LCL	UCL
MTBE	40		34.6	87%	70.5%	115%
BENZENE	20		23.6	118%	70.4%	124%
TFT (TRIFLUOROTOLUEN	40		43.1	108%	26.4%	139%
TOLUENE	20		19.2	96%	73.2%	117%
CHLOROBENZENE	20		20.9	105%	72.0%	117%
ETHYLBENZENE	20		21.6	108%	71.2%	122%
TOTAL XYLENES	60		69.1	115%	75.5%	118%
1,3-DICHLOROBENZENE	20		23.8	119%	74.1%	115%
1,4-DICHLOROBENZENE	20		23.8	119%	68.9%	119%
1,2-DICHLOROBENZENE	20		22.8	114%	69.8%	118%

LCL=LOWER CONTROL LIMIT
UCL=UPPER CONTROL LIMIT

79

TEST CODE :SBTX0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 94 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07830 MATRIX : SOLID
SAMPLE ID CLIENT: SB02-12

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.1
Toluene	ND		2.1
Ethylbenzene	ND		2.1
Total Xylenes	ND		2.1

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :SBTX0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 94 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07831 MATRIX : SOLID
SAMPLE ID CLIENT: SB03-1.52

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.1
Toluene	ND		2.1
Ethylbenzene	ND		2.1
Total Xylenes	ND		2.1

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002266

TEST CODE :SBTX0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 94 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07832 MATRIX : SOLID
SAMPLE ID CLIENT: SB04-0405

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.1
Toluene	ND		2.1
Ethylbenzene	ND		2.1
Total Xylenes	ND		2.1

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002267

TEST CODE :SBTX0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07833 MATRIX : SOLID
SAMPLE ID CLIENT: SB05-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.3
Toluene	34		2.3
Ethylbenzene	ND		2.3
Total Xylenes	ND		2.3

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002268

TEST CODE :SBTX0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 81 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07834 MATRIX : SOLID
SAMPLE ID CLIENT: SB05-0405

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	40		12
Toluene	18		12
Ethylbenzene	840	X	12
Total Xylenes	1100	X	12

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
X = EXCEEDS CALIBRATED RANGE

002269

TEST CODE :SBTX0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 82 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07835 MATRIX : SOLID
SAMPLE ID CLIENT: SB05-1415

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	4.3		2.4
Toluene	ND		2.4
Ethylbenzene	23		2.4
Total Xylenes	78		2.4

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

8021B Retention Time Window Study

Instrument ID: VARIAN 3600 #1 CHARLIE
Column: 30 M: 0.53mm; RTX-VOLATILES FSCC
Run Dates: 04/27-4/29/98

Method: 8021B-Aromatics
Spreadsheet: 8020RTW.WB1 (3600#1 RTW)

Aroclor		4/27/98 Mid Level RT	4/28/98 Mid Level RT	4/29/98 Mid Level RT	Mean RT	Std Dev	Calculated RTW (3x Std Dev)
MTBE		4.50	4.50	4.49	4.50	0.005	0.014
BENZENE		7.16	7.15	7.15	7.15	0.005	0.014
TOLUENE		10.46	10.45	10.45	10.45	0.005	0.014
CL-BENZENE		13.41	13.40	13.40	13.40	0.005	0.014
ETHLYBENZENE		13.65	13.64	13.63	13.64	0.008	0.024
M/P-XYLENE		13.85	13.83	13.83	13.84	0.009	0.028
O-XYLENE		14.77	14.76	14.76	14.76	0.005	0.014
1,3-DICHLOROBENZENE		18.69	18.69	18.69	18.69	0.000	0.000
1,4-DICHLOROBENZENE		18.94	18.94	18.93	18.94	0.005	0.014
1,2-DICHLOROBENZENE		19.77	19.78	19.77	19.77	0.005	0.014
TFT SURROGATE		8.35	8.36	8.38	8.36	0.012	0.037

110

Software Version	: 6.0.2:G11	Date	: 06/03/98 12:39:15 PM
Operator	: PLEUTHNERG	Sample Name	: RCVS
Sample Number	: 020	Study	: 5ULSURR,10ULCVS
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: V3600_1	Channel	: A
Interface Serial #	: 7102273182	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 28.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 L	Area Reject	: 0.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/03/98 04:30:23 AM	Cycle	: 20

Raw Data File : \\GCSRV1\TCDATA\v36001\980602301r\v3601a_0602_020.raw
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Proc Method : \\GCSRV1\TCDATA\v36001\pid_060298sc.mth from
\\GCSRV1\TCDATA\V36001\980602301R\v3601a_0602_020.rst
C[redacted] Method : \\GCSRV1\TCDATA\v36001\pid_060298sc.mth from
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Sequence File : \\GCSRV1\TCDATA\V36001\980602301R\V3601_060298.seq

CONTINUING CALIBRATION STD / CVS REPORT

Instrument: V3600 #1 Method: 8021B

Batch #: 9806023011R

Job #: 9801.165,066

[redacted] #	Component Name	Time [min]	Area [µV·s]	Amount Determ. ug/Kg	Expected Amt. ug/Kg	% Difference
2	MTBE	4.46	48577.28	39.6	40.0	-1.1
4	BENZENE	7.10	73048.16	26.4	20.0	31.8
6	TFT (TRIFLUOROTOLUEN	8.29	41863.20	32.7	40.0	-18.3
7	TOLUENE	10.39	66704.36	19.1	20.0	-4.5
10	CHLOROBENZENE	13.34	69160.08	20.9	20.0	4.3
11	ETHYLBENZENE	13.58	67361.62	21.3	20.0	6.4
12	M/P-XYLENE	13.77	194473.58	43.7	40.0	9.2
13	O-XYLENE	14.70	70561.64	19.4	20.0	-3.1
18	1,3-DICHLOROBENZENE	18.61	61663.69	21.5	20.0	7.5
19	1,4-DICHLOROBENZENE	18.86	69425.61	21.6	20.0	7.8
20	1,2-DICHLOROBENZENE	19.70	54301.74	19.4	20.0	-3.2
			817140.96			

DNA 6/9/98

total 8.8 %D

Control Limits:_____

135

Software Version	: 6.0.2:G11	Date	: 06/04/98 11:42:52 AM
Operator	: FOURNIERD	Sample Name	: R100NGSTD
Sample Number	: 001	Study	: 10ULRSTD/5G/5ML
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: V3600_1	Channel	: A
Interface Serial #	: 7102273182	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 28.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 L	Area Reject	: 0.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/04/98 10:47:38 AM	Cycle	: 1

Raw Data File : \\GCSRV1\TCDATA\V36001\980604301R\v3601a_0604_001.raw
Result File :
Inst Method : \\GCSRV1\TCDATA\v36001\3601_acq_28_min from
Proc Method : \\GCSRV1\TCDATA\V36001\PID_060298SC.mth from
Calib Method : \\GCSRV1\TCDATA\V36001\PID_060298SC.mth from
Sequence File : \\GCSRV1\TCDATA\V36001\980604301R\V3601_060498.seq

CONTINUING CALIBRATION STD / CVS REPORT

Instrument: V3600 #1 Method: 8021B

Batch #: 980604301R

Job #: 9801.165, 166

Peak #	Component Name	Time [min]	Area [µV·s]	Amount Determ. ug/L	Expected Amt. ug/L	% Difference
2	MTBE	4.45	45454.77	37.0	40.0	-7.5
4	BENZENE	7.09	62964.04	22.7	20.0	13.6
7	TOLUENE	10.38	67699.00	19.4	20.0	-3.0
8	CHLOROBENZENE	13.32	66227.34	20.0	20.0	-0.1
9	ETHYLBENZENE	13.55	62513.53	19.7	20.0	-1.3
10	M/P-XYLENE	13.75	178047.85	40.0	40.0	-0.1
11	O-XYLENE	14.67	65299.85	17.9	20.0	-10.4
18	1,3-DICHLOROBENZENE	18.60	58697.18	20.5	20.0	2.3
19	1,4-DICHLOROBENZENE	18.85	72195.50	22.4	20.0	12.1
20	1,2-DICHLOROBENZENE	19.69	57220.84	20.4	20.0	2.0
			736319.90			

Control Limits:

Software Version	: 6.0.2:G11	Date	: 06/05/98 08:02:05 AM
Operator	: FOURNIERD	Sample Name	: RCVS
Sample Number	: 010	Study	: 10ULCVS,5ULSS/5G/5ML
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: V3600_1	Channel	: A
Interface Serial #	: 7102273182	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 28.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 L	Area Reject	: 0.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/04/98 08:30:13 PM	Cycle	: 10

Raw Data File : \\GCSRV1\TCDATA\V36001\980604301R\v3601a_0604_010.raw
Result File :
Inst Method : \\GCSRV1\TCDATA\v36001\3601_acq_28_min from
Proc Method : \\GCSRV1\TCDATA\V36001\PID_060298SC.mth from
Calib Method : \\GCSRV1\TCDATA\V36001\PID_060298SC.mth from
Sequence File : \\GCSRV1\TCDATA\V36001\980604301R\V3601_060498.seq

CONTINUING CALIBRATION STD / CVS REPORT

Instrument: V 3600 #1 Method: 8021 B

Batch #: 980604301R

Job #: 9801.165,166

Peak #	Component Name	Time [min]	Area [µV·s]	Amount Determ. ug/L	Expected Amt. ug/L	% Difference
2	MTBE	4.47	41145.71	33.5	40.0	-16.2
4	BENZENE	7.11	60109.87	21.7	20.0	8.4
6	TFT (TRIFLUOROTOLUEN	8.31	44583.98	35.3	40.0	-11.8
8	TOLUENE	10.41	58886.51	16.9	20.0	-15.7
11	CHLOROBENZENE	13.35	55877.79	16.9	20.0	-15.7
12	ETHYLBENZENE	13.59	55004.39	17.4	20.0	-13.1
13	M/P-XYLENE	13.79	157292.04	35.3	40.0	-11.7
14	O-XYLENE	14.71	58729.09	16.1	20.0	-19.4
21	1,3-DICHLOROBENZENE	18.63	49640.78	17.3	20.0	-13.5
22	1,4-DICHLOROBENZENE	18.88	56235.10	17.5	20.0	-12.7
23	1,2-DICHLOROBENZENE	19.71	44835.48	16.0	20.0	-20.1
			682340.73			

total %D = 14.4 %

Control Limits:

002274

TEST CODE :SBTX0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB :Method Blank (06/02) MATRIX : SOLID

Associated Samples: 7830; 7831; 7832; 7833; 7835

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.0
Toluene	ND		2.0
Ethylbenzene	ND		2.0
Total Xylenes	ND		2.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :SBTX0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB :Method Blank (06/03) MATRIX : SOLID

Associated Samples: 7834

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.0
Toluene	ND		2.0
Ethylbenzene	ND		2.0
Total Xylenes	ND		2.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002276

TEST CODE :SBTX0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB :Method Blank (06/04) MATRIX : SOLID

Associated Samples: 7837

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.0
Toluene	ND		2.0
Ethylbenzene	ND		2.0
Total Xylenes	ND		2.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

DATA REDUCTION/EVALUATION/REPORTING

Quantitate using the curve or mean calibration factor.

The data system prints results in µg/L or µg/kg. The following formulae are given as checks.

Water or soil samples when not quantitating from a curve.

$$\text{Concentration, } \mu g/kg \text{ or } \mu g/L = \frac{(A_x)\,(Df)}{(\overline{CF_x})}$$

Where,

Ax = Area of the peak for the compound to be measured

$\overline{CF_x}$ = mean calibration factor for compound (area / µg/L or area / µg/kg)

Df = Dilution factor. The dilution factor is defined as follows:

For waters:

$$\frac{\text{mL of sample used to make dilution + mL ASTM Type II Water}}{\text{mL of sample used to make dilution}}$$

For soils:

$$\frac{5g}{\text{grams of soil purged}}$$

Medium level (methanol extract) when not quantitating from a curve.

$$\textit{Soil Sample Concentration, } \mu g/kg = \frac{(A_x)}{(\overline{CF_x})}\left[\frac{5}{V_e}\frac{V_t}{S}\right]$$

Where,

A_x = area of the peak for the compound to be measured

$\overline{CF_x}$ = mean calibration factor for compound x (area / µg/L)

S = Mass of sample extracted (g) usually 4 g

5 = amount of water (mL) to which the method extract is added (to account for units of curve)

Vt = Volume (mL) of total methanol extract, usually 10 mL.

Ve = Volume (mL) of methanol extract added to 5 mL of water for purging, usually 0.100 mL.

002278

Job Number: 9801.165
Client: START - DALLAS
Reviewer: CWojtowicz
Date: 6/22/98

GC
TABLE OF CONTENTS
TNRCC

A.	SURROGATE SUMMARY	✓NA
B.	MS/MSD SUMMARY	
	FOLLOWED BY:	
	1. CHROMATOGRAM	
	2. DATA SYSTEM PRINTOUT	
	LCS SUMMARY LCS/LCSD	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
C.	RESULT SUMMARY FOR EACH SAMPLE	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
	(PRIMARY RAW DATA PRECEDES CONFIRMATION RAW DATA)	conf - NA
D.	EXTRACTION LOGBOOK PAGE(S)	✓
E.	RETENTION TIME WINDOW SUMMARY	Default Windows
F.	INITIAL CALIBRATION SUMMARY AND CHROMATOGRAMS *	✓
G.	DAILY ANALYTICAL SEQUENCE INFORMATION AS FOLLOWS *	
	1. DAILY INJECTION LOGBOOK	✓
	2. CALIBRATION CHECK SUMMARY	✓
	3. CHROMATOGRAMS AND DATA SYSTEM PRINTOUTS FOR ALL STANDARDS IN THE DAILY SEQUENCE	✓
H.	BLANK RESULTS	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
I.	CALCULATION EXAMPLE	✓

* = ALL CALIBRATION INFORMATION IS ORGANIZED PER INSTRUMENT, CHRONOLOGICALLY

ECOLOGY & ENVIRONMENT, INC

TNRCC Method 1005 - Total Petroleum Hydrocarbons

Quality and Control for Accuracy and Precision:
Percent Recovery of Laboratory Control Sample (LCS)
and Duplicate (LCSD) for water matrix.

885-131-2
885-131-3

Units: mg/L

Job No: 9801.165

PARAMETER	Amount Added		Amount Determined		% Recovery				RPD
	LCS	LCSD	LCS	LCSD	LCS	Q	LCSD	Q	
C6 TO C10	35.7	35.7	38.0	34.7	106.6%		97.1%		9.3%
C10 TO C28	35.7	35.7	38.8	35.0	108.6%		98.1%		10.2%
C6 TO C28	71.4	71.4	76.8	69.7	107.6%		97.6%		9.8%

Recovery Limits: 70 - 130
RPD Limits: 30

* - Value is outside E & E QC limits.

002280

TEST CODE :W1050A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : TPH-TNRCC UNITS : MG/L
SAMPLE ID LAB : EE-98-07836 MATRIX: WATER
SAMPLE ID CLIENT: SB05-GW1

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	100		5.0
>C10 -> C28 Hydrocarbons	20		5.0
C6 -> C28 Hydrocarbons	120		5.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002281

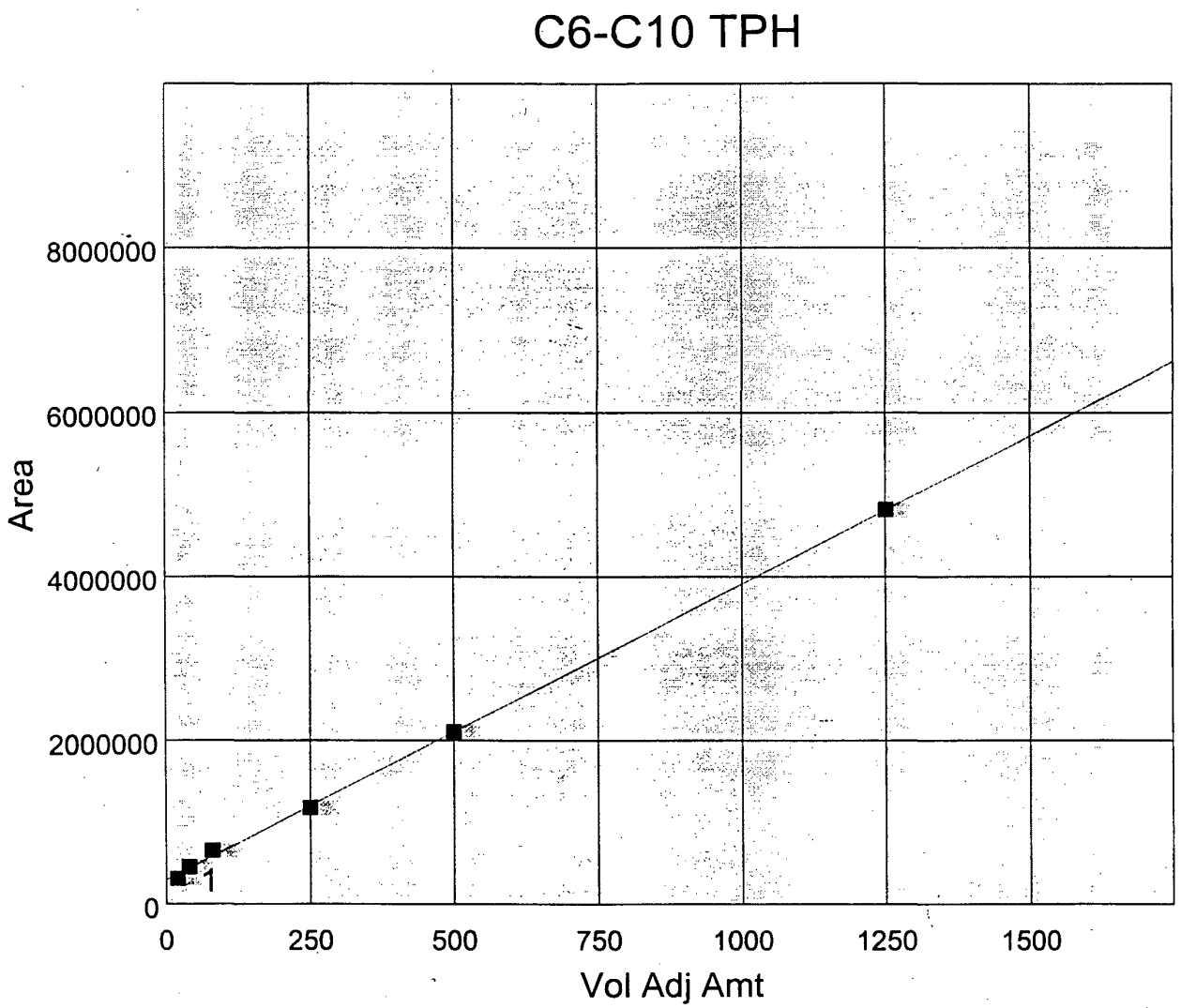
Fit Analysis Output For Method File: \\GCSRV1\TCDATA\HP58903\METHODS\3A TNRCC 0606.mth
Component Name : C6-C10 TPH
Date : 06/10/98 10:56:41 AM

Curve Parameters:

Curve #1 : 1st Order
Weighting Factor = 1 (No Weighting) R-Squared = 0.999400
Calibration Curve : Y = (304599.350915) +(3611.048040) X

Curve #1 :

Level Name	Observed X-Value	Calculated X-Value	Delta	%Diff.	Observed Y-Value	Calculated Y-Value	Delta	%Diff.
LOW	20.000000	4.695441	15.304559	325.945	321554.814458	376820.312	-55265.497	-14.666
MLOW	40.000000	43.918270	-3.918270	-8.922	463190.334282	449041.273	14149.062	3.151
MID	80.000000	99.190481	-19.190481	-19.347	662780.943803	593483.194	69297.750	11.676
MHIGH	250.000000	242.834852	7.165148	2.951	1181487.667760	1207361.361	-25873.693	-2.143
HIGH	500.000000	498.394380	1.605620	0.322	2104325.401857	2110123.371	-5797.969	-0.275
XHIGH	1250.000000	1250.966575	-0.966575	-0.077	4821899.749735	4818409.401	3490.348	0.072



recycled paper
ecology and environment

002282

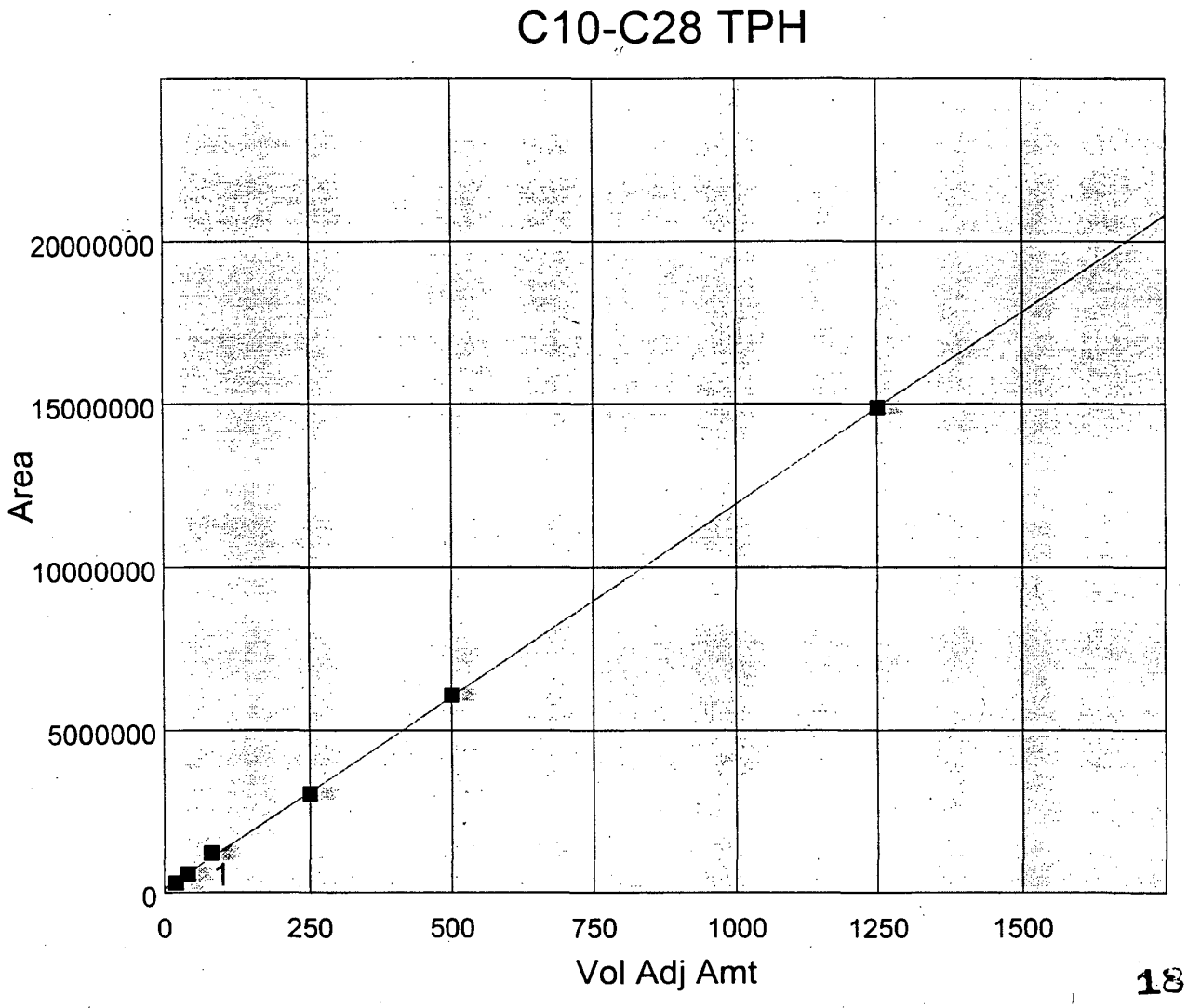
Fit Analysis Output For Method File: \\GCSRV1\TCDATA\HP58903\METHODS\3A TNRCC 0606.mth
Component Name : C10-C28 TPH
Date : 06/10/98 10:56:58 AM

Curve Parameters:

Curve #1 : 1st Order
Weighting Factor = 1 (No Weighting) R-Squared = 0.999821
Calibration Curve : Y = (139476.114742) +(11806.381617) X

Curve #1 :

Level Name	Observed X-Value	Calculated X-Value	Delta	%Diff.	Observed Y-Value	Calculated Y-Value	Delta	%Diff.
LOW	20.000000	14.471355	5.528645	38.204	310330.449585	375603.747	-65273.297	-17.378
MLOW	40.000000	36.956915	3.043085	8.234	575803.559906	611731.379	-35927.820	-5.873
MID	80.000000	91.145503	-11.145503	-12.228	1215574.700000	1083986.644	131588.056	12.139
MHIGH	250.000000	244.991488	5.008512	2.044	3031939.116018	3091071.519	-59132.403	-1.913
HIGH	500.000000	503.267520	-3.267520	-0.649	6081244.516852	6042666.923	38577.594	0.638
XHIGH	1250.000000	1249.167219	0.832781	0.067	14887621.006734	14897453.136	-9832.129	-0.066



186

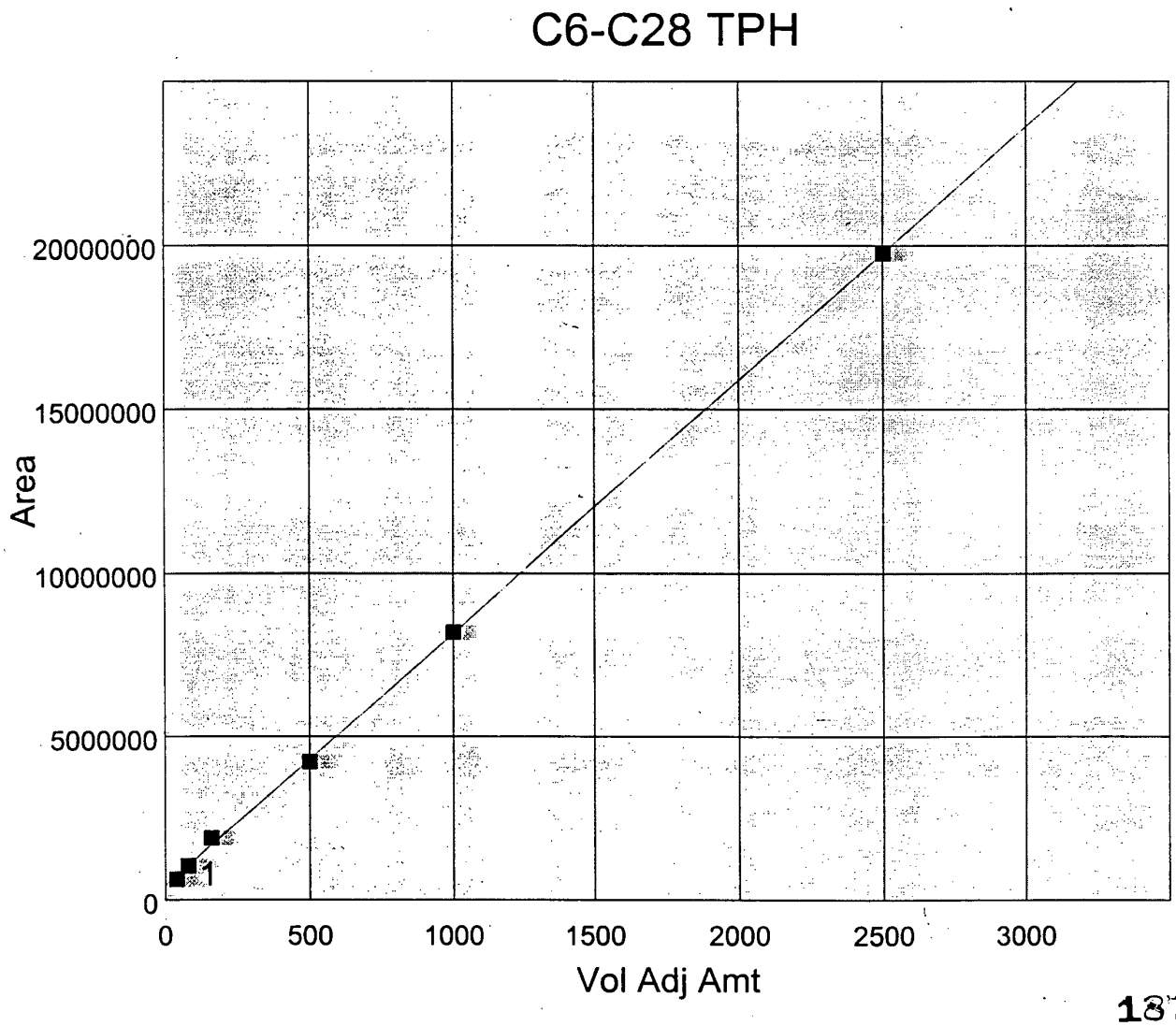
Fit Analysis Output For Method File: \\GCSRV1\TCDATA\HP58903\METHODS\3A TNRCC 0606.mth
Component Name : C6-C28 TPH
Date : 06/10/98 10:56:50 AM

Curve Parameters:

Curve #1 : 1st Order
Weighting Factor = 1 (No Weighting) R-Squared = 0.999766
Calibration Curve : Y = (443861.925369) +(7725.093380) X

Curve #1 :

Level Name	Observed X-Value	Calculated X-Value	Delta	%Diff.	Observed Y-Value	Calculated Y-Value	Delta	%Diff.
LOW	40.000000	24.339297	15.660703	64.343	631885.264043	752865.661	-120980.397	-16.069
MLOW	80.000000	77.038806	2.961194	3.844	1038993.894188	1061869.396	-22875.502	-2.154
MID	160.000000	185.692735	-25.692735	-13.836	1878355.643803	1679876.866	198478.778	11.815
MHIGH	500.000000	489.380539	10.619461	2.170	4224372.288242	4306408.616	-82036.327	-1.905
HIGH	1000.000000	1004.539561	-4.539561	-0.452	8204023.842052	8168955.306	35068.536	0.429
XHIGH	2500.000000	2499.009062	0.990938	0.040	19748940.287845	19756595.376	-7655.088	-0.039



recycled paper
ecology and environment

Software Version	: 6.0.2:G11	Date	: 06/10/98 09:41:55 AM
Operator	: LEWANDOWSKIB	Sample Name	: M1005 80 UG/ML EA
Sample Number	: 036	Study	: M1005 CCV
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: HP58903A	Channel	: A
Interface Serial #	: 1092513053	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 35.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 ul	Area Reject	: 100.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/07/98 18:28:15 PM	Cycle	: 36

Raw Data File : \\gcsrv1\TCData\HP58903\JUNE\980606350R\3a_0606_036.raw
Result File : \\gcsrv1\TCData\HP58903\JUNE\980606350R\3a_0606_036.rst
Inst Method : \\gcsrv1\TCData\hp58903\methods\3a_trncc from
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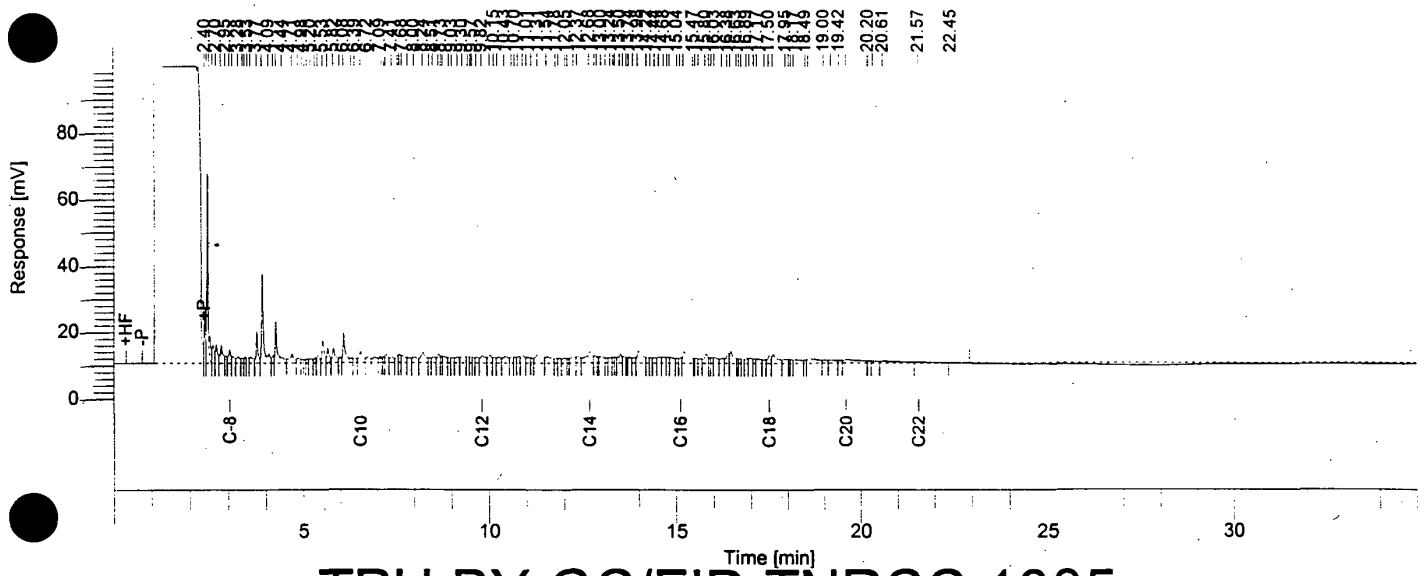
Proc Method : \\gcsrv1\TCData\hp58903\methods\3a_tnrcc_0606.mth
Calib Method : \\gcsrv1\TCData\hp58903\methods\3a_tnrcc_0606.mth
Sequence File : \\gcsrv1\TCData\HP58903\JUNE\980606350R\3A_0606R.seq



TPH BY GC/FID TNRCC 1005

Peak #	Ret. Time	Component Name	Area [µV·s]	Result ug/Ml
	4.63	C6-C10 TPH	613899	85.6538
	14.55	C6-C28 TPH	1863923	183.8244
	16.70	C10-C28 TPH	1250023	94.0633

TV 0/0D
80 7.06
80 17.6

COLUMN: 30 M RTX-1 0.53mm ID 0.25 um Film

BEJ 6/10/98

203

TEST CODE :W1050A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : TPH-TNRCC UNITS : MG/L
SAMPLE ID LAB :Method Blank MATRIX: WATER

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		5.0
>C10 -> C28 Hydrocarbons	ND		5.0
C6 -> C28 Hydrocarbons	ND		5.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

EXAMPLE CALCULATION

C6- C10 FOR LCS

Curve Y= c0 + c1*x

c0= is the y intercept

c1= the slope of the line

Y =304599.350915 + 3611.048040*x

Area (y) for C6 to C10 = 1907000

$$\text{Amount (X)} = \frac{1907000-304599.350915}{3611.048040}$$

$$= \frac{443.7494688 \text{ ug/ml} * 3\text{ml FV}}{35 \text{ ml extraction volume}}$$

= 38.0357 mg/L

002287

Job Number: 9801.165

Client: START - DALLAS

Reviewer: CWojtowicz

Date: 6/22/98

GC
TABLE OF CONTENTS
TNRCC

A.	SURROGATE SUMMARY	NA
B.	MS/MSD SUMMARY	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
	LCS SUMMARY	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
C.	RESULT SUMMARY FOR EACH SAMPLE	✓
	FOLLOWED BY:	✓
	1. CHROMATOGRAM	I ✓ Conf NA
	2. DATA SYSTEM PRINTOUT (PRIMARY RAW DATA PRECEDES CONFIRMATION RAW DATA)	
D.	EXTRACTION LOGBOOK PAGE(S)	✓
E.	RETENTION TIME WINDOW SUMMARY	Default Windows
F.	INITIAL CALIBRATION SUMMARY AND CHROMATOGRAMS *	✓
G.	DAILY ANALYTICAL SEQUENCE INFORMATION AS FOLLOWS *	
	1. DAILY INJECTION LOGBOOK	✓
	2. CALIBRATION CHECK SUMMARY	✓
	3. CHROMATOGRAMS AND DATA SYSTEM PRINTOUTS FOR ALL STANDARDS IN THE DAILY SEQUENCE	✓
H.	BLANK RESULTS	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
I.	CALCULATION EXAMPLE	✓

* = ALL CALIBRATION INFORMATION IS ORGANIZED PER INSTRUMENT, CHRONOLOGICALLY

ECOLOGY & ENVIRONMENT, INC

TNRCC Method 1005 - Total Petroleum Hydrocarbons

Quality and Control for Accuracy and Precision:
Percent Recovery of Matrix Spike (MS) and
Matrix Spike Duplicate (MSD) for soil matrix.

Sample ID: 7935

Units: mg/Kg

Job No: Batch QC

PARAMETER	Original Amount	Amount Added		Amount Determined		% Recovery				RPD
		MS	MSD	MS	MSD	MS	Q	MSD	Q	
C6 TO C10	0	442	446	400	405	90.4%		90.7%		0.4%
C10 TO C28	0	442	446	362	373	81.8%		83.6%		2.1%
C6 TO C28	0	885	893	762	778	86.1%		87.1%		1.2%

Recovery Limits: 70 - 130
RPD Limits: 30

* - Value is outside E & E QC limits.

002289

ECOLOGY & ENVIRONMENT, INC

TNRCC Method 1005 - Total Petroleum Hydrocarbons

Quality and Control for Accuracy and Precision:
Percent Recovery of Laboratory Control Sample (LCS)

885-131-2

Units: mg/Kg Job No: 9801.165

PARAMETER	Amount Added LCS	Amount Determined LCS	% Recovery LCS	Q
C6 TO C10	500.0	476.0	95.2%	
C10 TO C28	500.0	463.0	92.6%	
C6 TO C28	1000.0	939.0	93.9%	

Recovery Limits: 70 - 130
RPD Limits: 30

* - Value is outside E & E QC limits.

002290

TEST CODE :S1050A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 94 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07830 MATRIX : SOLID
SAMPLE ID CLIENT: SB02-12

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		53
>C10 -> C28 Hydrocarbons	ND		53
C6 -> C28 Hydrocarbons	ND		53

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 94 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07831 MATRIX : SOLID
SAMPLE ID CLIENT: SB03-1.52

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		53
>C10 -> C28 Hydrocarbons	ND		53
C6 -> C28 Hydrocarbons	ND		53

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 94 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07832 MATRIX : SOLID
SAMPLE ID CLIENT: SB04-0405

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		53
>C10 -> C28 Hydrocarbons	ND		53
C6 -> C28 Hydrocarbons	ND		53

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07833 MATRIX : SOLID
SAMPLE ID CLIENT: SB05-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		57
>C10 -> C28 Hydrocarbons	ND		57
C6 -> C28 Hydrocarbons	ND		57

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 81 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07834 MATRIX : SOLID
SAMPLE ID CLIENT: SB05-0405

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	700		62
>C10 -> C28 Hydrocarbons	2600		62
C6 -> C28 Hydrocarbons	3400		62

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 82 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07835 MATRIX : SOLID
SAMPLE ID CLIENT: SB05-1415

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	260		61
>C10 -> C28 Hydrocarbons	730		61
C6 -> C28 Hydrocarbons	990		61

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

2284

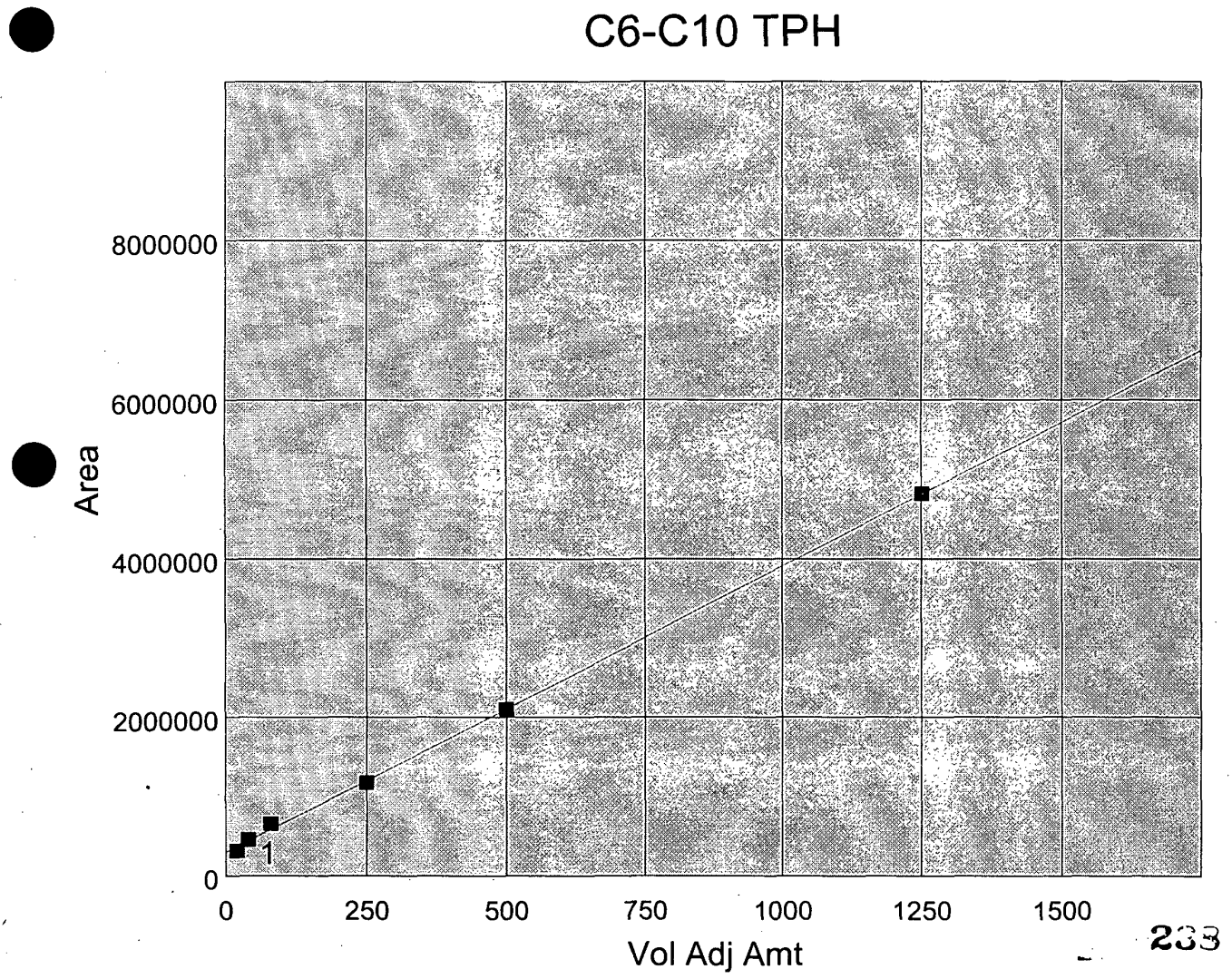
Fit Analysis Output For Method File: \\GCSRV1\TCDATA\HP58903\METHODS\3A TNRCC 0606.mth
Component Name : C6-C10 TPH
Date : 06/10/98 10:56:41 AM

Curve Parameters:

Curve #1 : 1st Order
Weighting Factor = 1 (No Weighting) R-Squared = 0.999400
Calibration Curve : Y = (304599.350915) +(3611.048040) X

Curve #1 :

Level Name	Observed X-Value	Calculated X-Value	Delta	%Diff.	Observed Y-Value	Calculated Y-Value	Delta	%Diff.
LOW	20.000000	4.695441	15.304559	325.945	321554.814458	376820.312	-55265.497	-14.666
MLOW	40.000000	43.918270	-3.918270	-8.922	463190.334282	449041.273	14149.062	3.151
MID	80.000000	99.190481	-19.190481	-19.347	662780.943803	593483.194	69297.750	11.676
MHIGH	250.000000	242.834852	7.165148	2.951	1181487.667760	1207361.361	-25873.693	-2.143
HIGH	500.000000	498.394380	1.605620	0.322	2104325.401857	2110123.371	-5797.969	-0.275
XHIGH	1250.000000	1250.966575	-0.966575	-0.077	4821899.749735	4818409.401	3490.348	0.072



233

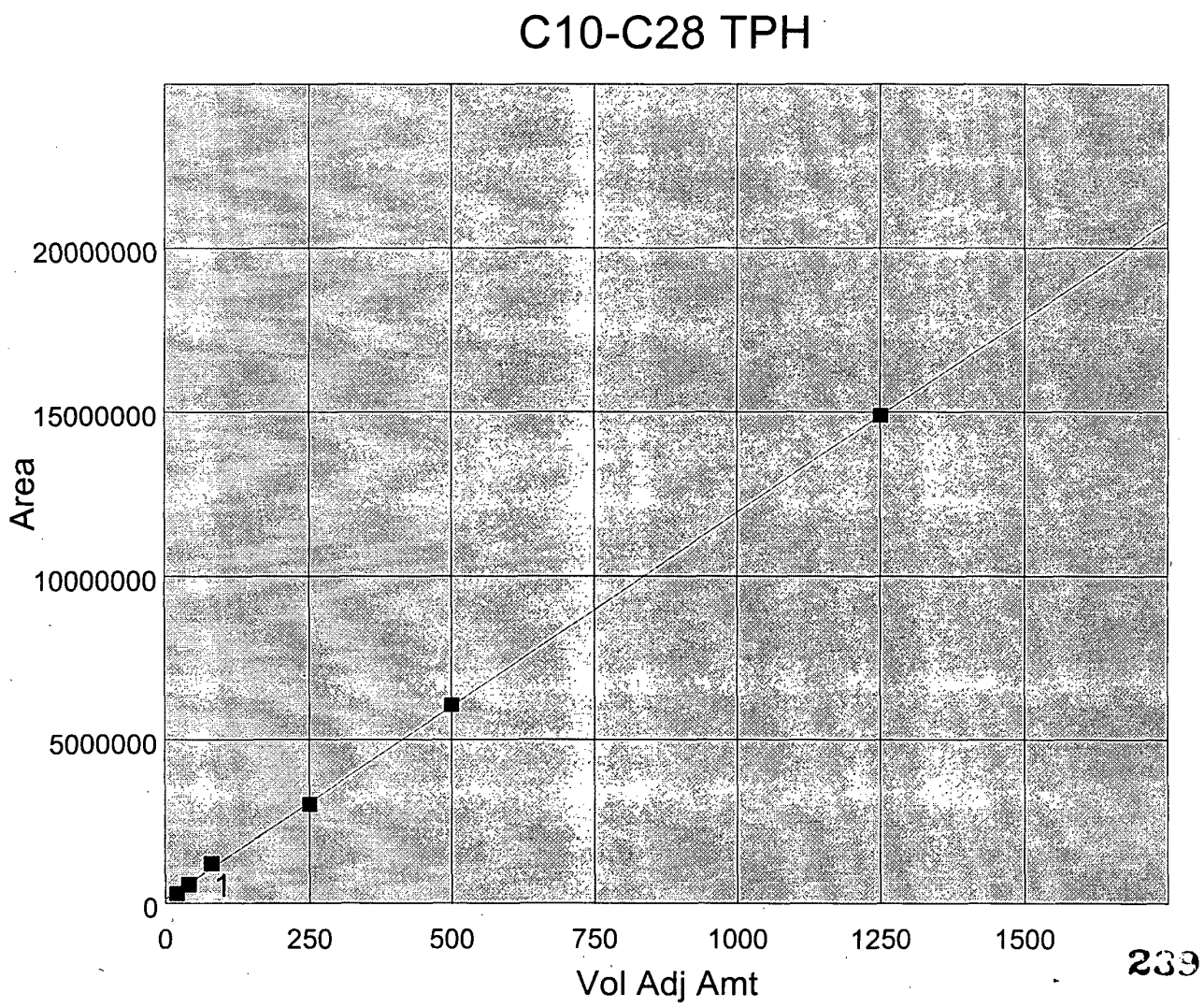
Fit Analysis Output For Method File: \\GCSRV1\TCDATA\HP58903\METHODS\3A TNRCC 0606.mth
Component Name : C10-C28 TPH
Date : 06/10/98 10:56:58 AM

Curve Parameters:

Curve #1 : 1st Order
Weighting Factor = 1 (No Weighting) R-Squared = 0.999821
Calibration Curve : Y = (139476.114742) +(11806.381617) X

Curve #1 :

Level Name	Observed X-Value	Calculated X-Value	Delta	%Diff.	Observed Y-Value	Calculated Y-Value	Delta	%Diff.
LOW	20.000000	14.471355	5.528645	38.204	310330.449585	375603.747	-65273.297	-17.378
MLOW	40.000000	36.956915	3.043085	8.234	575803.559906	611731.379	-35927.820	-5.873
MID	80.000000	91.145503	-11.145503	-12.228	1215574.700000	1083986.644	131588.056	12.139
MHIGH	250.000000	244.991488	5.008512	2.044	3031939.116018	3091071.519	-59132.403	-1.913
HIGH	500.000000	503.267520	-3.267520	-0.649	6081244.516852	6042666.923	38577.594	0.638
XHIGH	1250.000000	1249.167219	0.832781	0.067	14887621.006734	14897453.136	-9832.129	-0.066



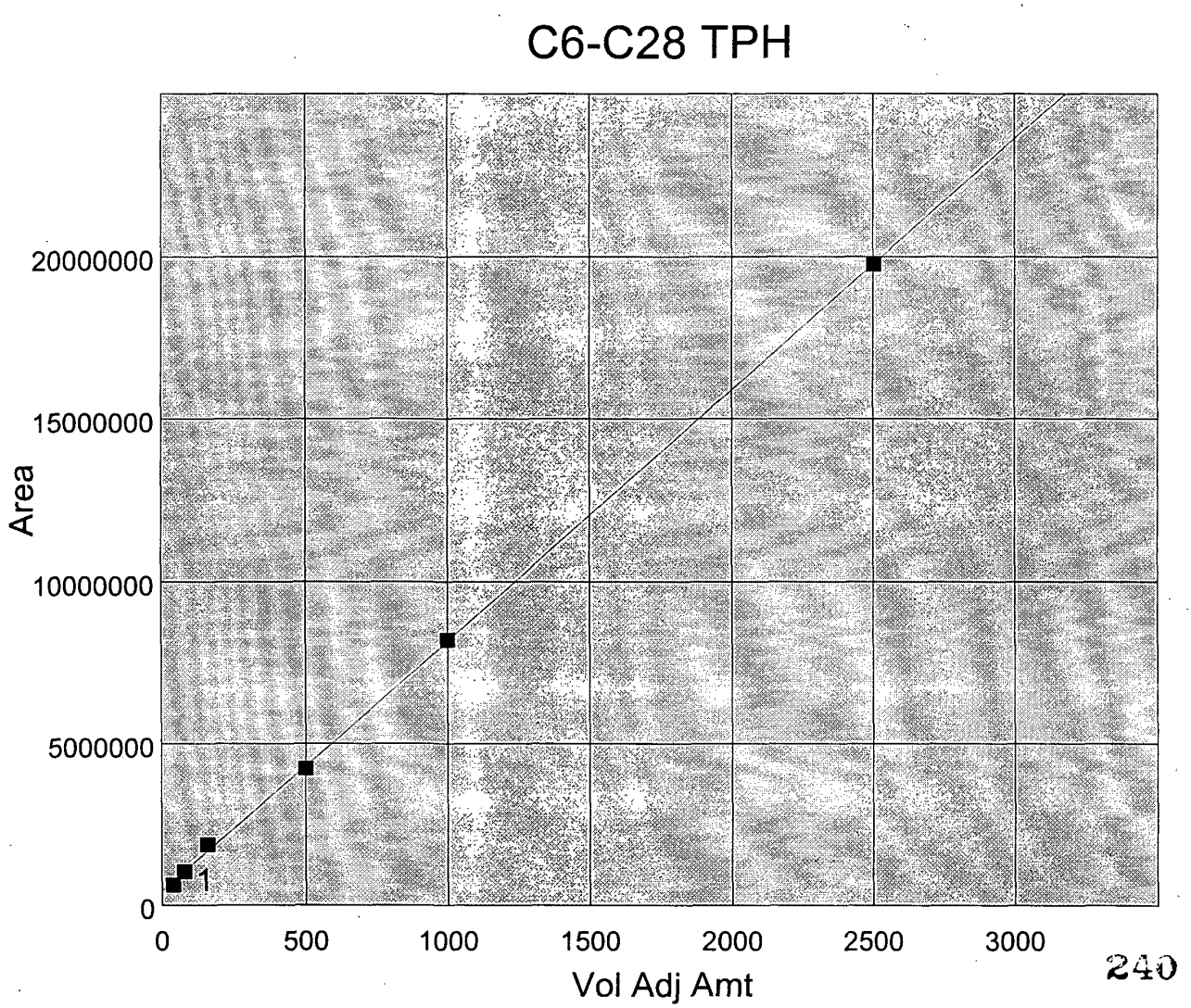
Fit Analysis Output For Method File: \\GCSRV1\TCDATA\HP58903\METHODS\3A TNRCC 0606.mth
Component Name : C6-C28 TPH
Date : 06/10/98 10:56:50 AM

Curve Parameters:

Curve #1 : 1st Order
Weighting Factor = 1 (No Weighting) R-Squared = 0.999766
Calibration Curve : Y = (443861.925369) +(7725.093380) X

Curve #1 :

Level Name	Observed X-Value	Calculated X-Value	Delta	%Diff.	Observed Y-Value	Calculated Y-Value	Delta	%Diff.
LOW	40.000000	24.339297	15.660703	64.343	631885.264043	752865.661	-120980.397	-16.069
MLOW	80.000000	77.038806	2.961194	3.844	1038993.894188	1061869.396	-22875.502	-2.154
MID	160.000000	185.692735	-25.692735	-13.836	1878355.643803	1679876.866	198478.778	11.815
MHIGH	500.000000	489.380539	10.619461	2.170	4224372.288242	4306408.616	-82036.327	-1.905
HIGH	1000.000000	1004.539561	-4.539561	-0.452	8204023.842052	8168955.306	35068.536	0.429
XHIGH	2500.000000	2499.009062	0.990938	0.040	19748940.287845	19756595.376	-7655.088	-0.039



240

TEST CODE :S1050A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB :Method Blank 855-132-1 MATRIX : SOLID

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		50
>C10 -> C28 Hydrocarbons	ND		50
C6 -> C28 Hydrocarbons	ND		50

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

EXAMPLE CALCULATION

C6- C10 FOR LCS

Curve Y= c0 + c1*x

c0= is the y intercept

c1= the slope of the line

Y =304599.350915 + 3611.048040*x

Area (y) for C6 to C10 = 1907000

$$\text{Amount (X)} = \frac{1907000-304599.350915}{3611.048040}$$

$$= \frac{443.7494688 \text{ ug/ml} * 3\text{ml FV}}{35 \text{ ml extraction volume}}$$

= 38.0357 mg/L

002301

QUALITY CONTROL FOR ACCURACY: PERCENT RECOVERY
OF SURROGATE SPIKES

9801.165

E & E Laboratory 98-

(ug/kg)

Parameter	Amount Added	Amount Determined	Percent Recovery
Terphenyl-d14			
07830	1000	613	61.3
07831	1000	810	81.0
07832	1000	783	78.3
07833	1000	1060	106
07833 MS	1000	832	83.2
07833 MSD	1000	834	83.4
07834	1000	1050	105
07835	1000	759	75.9
Method Blank (1339-17-1)	1000	872	87.2
LCS (1339-17-1)	1000	915	91.5

THESE RECOVERIES ARE WITHIN E & E, INC. QC TARGETS.

MS = MATRIX SPIKE
MSD = MATRIX SPIKE DUPLICATE
LCS = LABORATORY CONTROL SAMPLE

002302

QUALITY CONTROL FOR ACCURACY;PERCENT RECOVERY FOR SPIKED SAMPLES

ANALYSIS DATE: 6/10/98 JOB#:9801.165/.181

NOTEBOOK: 1263-47 SAMPLE #: 7933 BATCH#:980609521R/980604586P

MATRIX::SOIL UNITS:UG/KG

PARAMETER	ORIGINAL VALUE	AMOUNT ADDED	AMT FOUND MS	AMT FOUND MSD	% REC MS	% REC MSD	RPD
NAPHTHALENE	0	2500	2000 ✓	2005 ✓	80.0	80.2	0.25
ACENAPHTHYLENE	0	2500	2008 ✓	2022 ✓	80.3	80.9	0.69
ACENAPHTHENE	0	2500	2271 ✓	2288 ✓	90.8	91.5	0.75
FLUORENE	0	250	200 ✓	201 ✓	80.0	80.4	0.50
PHENANTHRENE	0	250	213 ✓	213 ✓	85.2	85.2	0.00
ANTHRACENE	0	125	92.0 ✓	90.2 ✓	73.6	72.2	2.0
FLUORANTHENE	0	670	613 ✓	610 ✓	91.5	91.0	0.49
PYRENE	0	670	574 ✓	571 ✓	85.7	85.2	0.52
BENZO(A)ANTHRACENE	0	250	216 ✓	214 ✓	86.4	85.6	0.93
CHRYSENE	0	250	215 ✓	214 ✓	86.0	85.6	0.47
BENZO(B)FLUORANTHENE	0	250	210 ✓	205 ✓	84.0	82.0	2.4
BENZO(K)FLUORANTHENE	0	250	204 ✓	201 ✓	81.6	80.4	1.5
BENZO(A)PYRENE	0	250	224 ✓	219 ✓	90	87.6	2.3
DIBENZO(AH)ANTHRACENE	0	670	510 ✓	524 ✓	76.1	78.2	2.7
BENZO(GHI)PERYLENE	0	670	576 ✓	543 ✓	86.0	81.0	5.9
INDENO(CD123)PYRENE	0	250	199 ✓	188 ✓	79.6	75.2	5.7

IN CONTROL mc 6-10-98

COPY QA

288

QUALITY CONTROL FOR ACCURACY;PERCENT RECOVERY FOR SPIKED SAMPLES

ANALYSIS DATE: 6/9/98 JOB#:9801.168/.181

NOTEBOOK: 1263-47 SAMPLE #:SLCS 1339-17-2 BATCH#:980609521R/9806004586P

MATRIX:SOIL UNITS:UG/KG

PARAMETER	ORIGINAL VALUE	AMOUNT ADDED	AMT FOUND MS	% REC MA
NAPHTHALENE	0	2500	2316 ✓	92.6
ACENAPHTHYLENE	0	2500	2223 ✓	88.9
ACENAPHTHENE	0	2500	2515 ✓	101
FLUORENE	0	250	216 ✓	86.4
PHENANTHRENE	0	250	230 ✓	92.0
ANTHRACENE	0	117	97.8 ✓	83.6
FLUORANTHENE	0	670	667 ✓	99.6
PYRENE	0	670	640 ✓	95.5
BENZO(A)ANTHRACENE	0	250	236 ✓	94.4
CHRYSENE	0	250	236 ✓	94.4
BENZO(B)FLUORANTHENE	0	250	228 ✓	91.2
BENZO(K)FLUORANTHENE	0	250	218 ✓	87.2
BENZO(A)PYRENE	0	250	232 ✓	92.8
DIBENZO(AH)ANTHRACENE	0	670	543 ✓	81.0
BENZO(GHI)PERYLENE	0	670	595 ✓	88.8
INDENO(CD123)PYRENE	0	250	208 ✓	83.2

IN CONTROL mc 6-10-98

2.5

Copy QA

TEST CODE :SPAH0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 94 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07830 MATRIX : SOLID
SAMPLE ID CLIENT: SB02-12

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		210
Acenaphthylene	ND		210
1-methylnaphthalene	ND		210
2-Methylnaphthalene	ND		210
Acenaphthene	ND		210
Fluorene	ND		21
Phenanthrene	ND		21
Anthracene	ND		21
Fluoranthene	ND		53
Pyrene	ND		53
Benzo(a)anthracene	ND		21
Chrysene	ND		21
Benzo(b)fluoranthene	ND		21
Benzo(k)fluoranthene	ND		21
Benzo(a)pyrene	ND		21
Dibenzo(a,h)anthracene	ND		53
Benzo(ghi)perylene	ND		53
Indeno(1,2,3-cd)pyrene	ND		21

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :SPAH0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 94 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07831 MATRIX : SOLID
SAMPLE ID CLIENT: SB03-1.52

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		210
Acenaphthylene	ND		210
1-methylnaphthalene	ND		210
2-Methylnaphthalene	ND		210
Acenaphthene	ND		210
Fluorene	ND		21
Phenanthrene	ND		21
Anthracene	ND		21
Fluoranthene	ND		53
Pyrene	ND		53
Benzo(a)anthracene	ND		21
Chrysene	ND		21
Benzo(b)fluoranthene	ND		21
Benzo(k)fluoranthene	ND		21
Benzo(a)pyrene	ND		21
Dibenzo(a,h)anthracene	ND		53
Benzo(ghi)perylene	ND		53
Indeno(1,2,3-cd)pyrene	ND		21

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :SPAH0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 94 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07832 MATRIX : SOLID
SAMPLE ID CLIENT: SB04-0405

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		210
Acenaphthylene	ND		210
1-methylnaphthalene	ND		210
2-Methylnaphthalene	ND		210
Acenaphthene	ND		210
Fluorene	ND		21
Phenanthrene	ND		21
Anthracene	ND		21
Fluoranthene	ND		53
Pyrene	ND		53
Benzo(a)anthracene	ND		21
Chrysene	ND		21
Benzo(b)fluoranthene	ND		21
Benzo(k)fluoranthene	ND		21
Benzo(a)pyrene	ND		21
Dibenzo(a,h)anthracene	ND		53
Benzo(ghi)perylene	ND		53
Indeno(1,2,3-cd)pyrene	ND		21

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002307

TEST CODE :SPAH0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07833 MATRIX : SOLID
SAMPLE ID CLIENT: SB05-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		1100
Acenaphthylene	ND		1100
1-methylnaphthalene	ND		1100
2-Methylnaphthalene	ND		1100
Acenaphthene	ND		1100
Fluorene	ND		110
Phenanthrene	ND		110
Anthracene	ND		110
Fluoranthene	350		280
Pyrene	ND		280
Benzo(a)anthracene	140		110
Chrysene	ND		110
Benzo(b)fluoranthene	80	J	110
Benzo(k)fluoranthene	91	J	110
Benzo(a)pyrene	110		110
Dibenzo(a,h)anthracene	ND		280
Benzo(ghi)perylene	ND		280
Indeno(1,2,3-cd)pyrene	ND		110

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002308

TEST CODE :SPAH0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 81 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07834 MATRIX : SOLID
SAMPLE ID CLIENT: SB05-0405

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		2500
Acenaphthylene	ND		2500
1-methylnaphthalene	4600		2500
2-Methylnaphthalene	5300		2500
Acenaphthene	ND		2500
Fluorene	ND		250
Phenanthrene	1200		250
Anthracene	ND		250
Fluoranthene	2500		620
Pyrene	ND		620
Benzo(a)anthracene	670		250
Chrysene	ND		250
Benzo(b)fluoranthene	250		250
Benzo(k)fluoranthene	170	J	250
Benzo(a)pyrene	200	J	250
Dibenzo(a,h)anthracene	ND		620
Benzo(ghi)perylene	ND		620
Indeno(1,2,3-cd)pyrene	ND		250

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002309

TEST CODE :SPAH0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 82 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07835 MATRIX : SOLID
SAMPLE ID CLIENT: SB05-1415

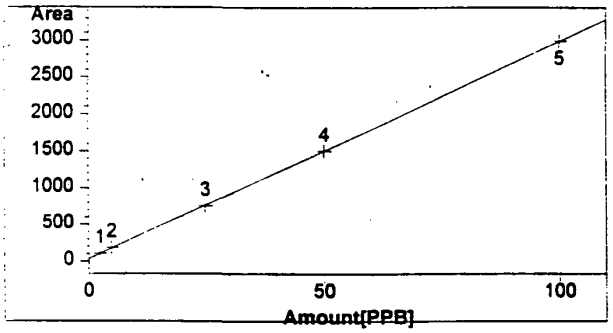
PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		1200
Acenaphthylene	ND		1200
1-methylnaphthalene	1800		1200
2-Methylnaphthalene	2300		1200
Acenaphthene	ND		1200
Fluorene	120		120
Phenanthrene	740		120
Anthracene	ND		120
Fluoranthene	1500	J	610
Pyrene	ND		300
Benzo(a)anthracene	430		240
Chrysene	130	J	240
Benzo(b)fluoranthene	150	J	240
Benzo(k)fluoranthene	120	J	120
Benzo(a)pyrene	150		120
Dibenzo(a,h)anthracene	ND		300
Benzo(ghi)perylene	ND		300
Indeno(1,2,3-cd)pyrene	ND		120

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

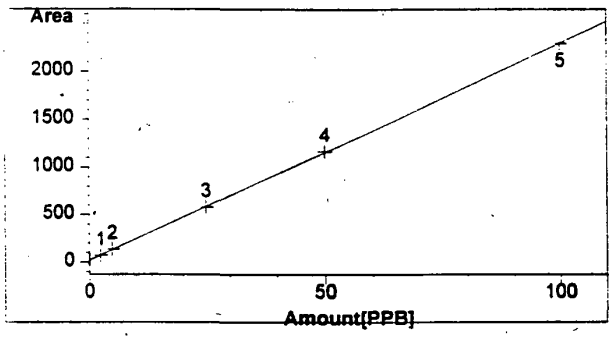
PAH RETENTION TIME WINDOWS
HYPERPAH 100x4.6

	1/7/97 RT	1/10/97 RT	1/14/97 RT	AVE RT	3X STDEV
NAPHTHALENE	9.060	9.055	9.047	9.054	0.020
ACENAPHTHALENE	10.075	10.071	10.063	10.070	0.018
ACENAPHTHENE	11.537	11.534	11.528	11.533	0.014
FLUORENE	11.796	11.795	11.789	11.793	0.011
PHENANTHRENE	12.749	12.748	12.744	12.747	0.008
ANTHRACENE	13.654	13.655	13.652	13.654	0.005
FLUORANTHENE	14.692	14.695	14.696	14.694	0.006
PYRENE	15.482	15.487	15.489	15.486	0.011
TERPHENYL D-14	16.649	16.660	16.662	16.657	0.021
BENZO(A)ANTHRACENE	17.840	17.852	17.857	17.850	0.026
CHRYSENE	18.367	18.382	18.388	18.379	0.032
BENZO(B)FLUORANTHENE	20.313	20.335	20.338	20.329	0.041
BENZO(K)FLUORANTHENE	21.167	21.198	21.201	21.189	0.056
BENZO(A)PYRENE	22.045	22.075	22.076	22.065	0.053
DIBENZO(AH)ANTHRACENE	23.124	23.156	23.160	23.147	0.059
BENZO(GHI)PERYLENE	24.230	24.234	24.238	24.234	0.012
INDENO(CD123)PYRENE	24.717	24.759	24.768	24.748	0.082

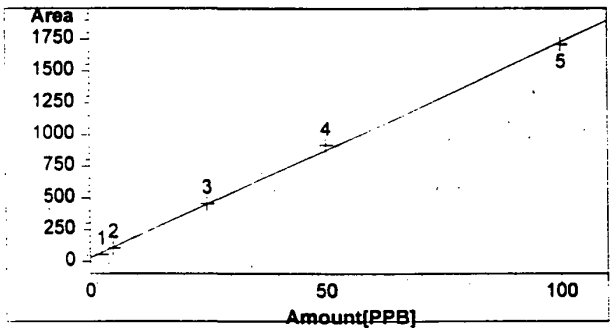
Calibration Curves



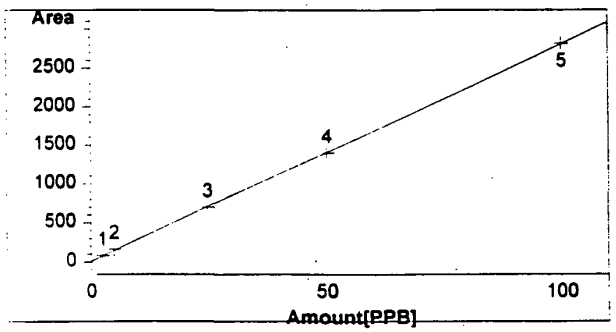
NAPHTHALENE at exp. RT: 11.368
VWD1 A, Wavelength=254 nm
Correlation: 0.99998
Residual Std. Dev.: 8.61906
Formula: y = mx + b
m: 29.60375
b: 29.84070
x: Amount
y: Area



ACENAPTHYLENE at exp. RT: 12.334
VWD1 A, Wavelength=254 nm
Correlation: 0.99997
Residual Std. Dev.: 8.29213
Formula: y = mx + b
m: 22.81496
b: 18.25920
x: Amount
y: Area



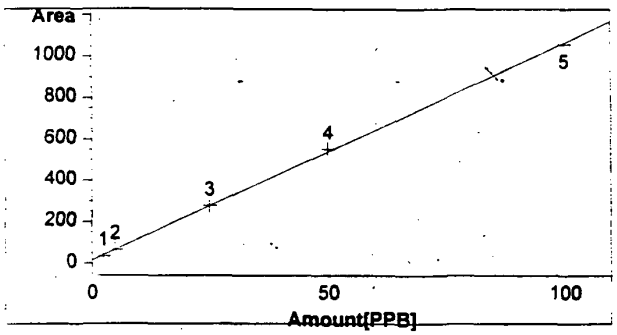
1-METHYLNAPHTHALENE at exp. RT: 12.900
VWD1 A, Wavelength=254 nm
Correlation: 0.99937
Residual Std. Dev.: 28.01689
Formula: y = mx + b
m: 16.99461
b: 28.60273
x: Amount
y: Area



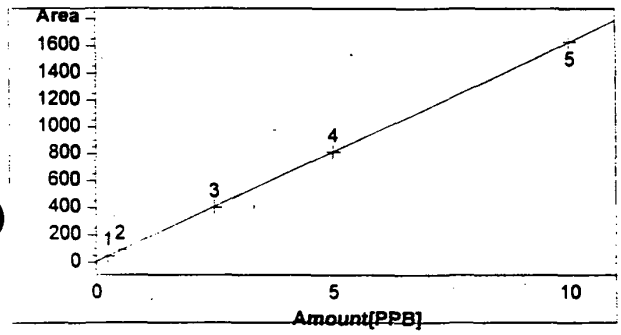
2-METHYLNAPHTHALENE at exp. RT: 13.191
VWD1 A, Wavelength=254 nm
Correlation: 0.99996
Residual Std. Dev.: 11.69282
Formula: y = mx + b
m: 28.00910
b: 10.92825
x: Amount
y: Area

320

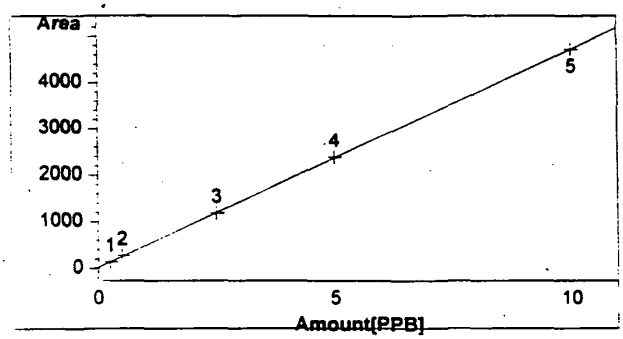
002312



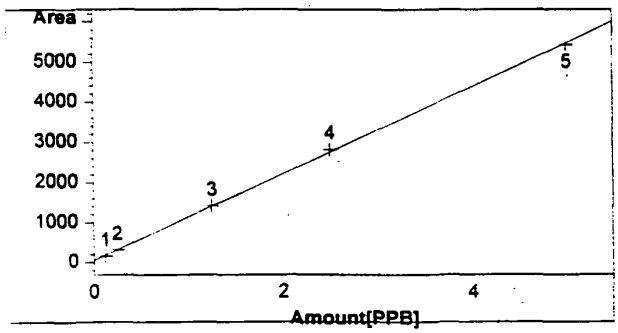
ACENAPHTHENE at exp. RT: 13.524
VWD1 A, Wavelength=254 nm
Correlation: 0.99981
Residual Std. Dev.: 9.48577
Formula: y = mx + b
m: 10.51838
b: 13.83540
x: Amount
y: Area



FLUORENE at exp. RT: 13.768
VWD1 A, Wavelength=254 nm
Correlation: 0.99997
Residual Std. Dev.: 5.64776
Formula: y = mx + b
m: 162.39955
b: 5.64926
x: Amount
y: Area

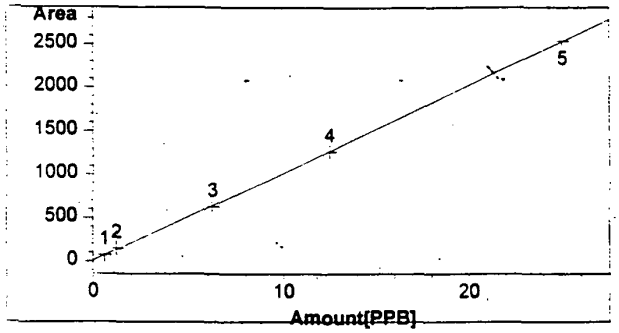


PHENANTHRENE at exp. RT: 14.511
VWD1 A, Wavelength=254 nm
Correlation: 0.99998
Residual Std. Dev.: 14.63936
Formula: y = mx + b
m: 469.92865
b: 26.63216
x: Amount
y: Area

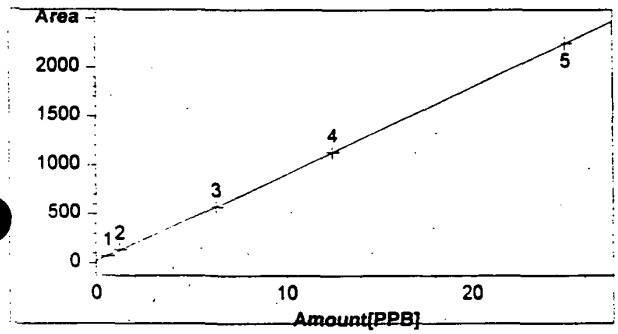


ANTHRACENE at exp. RT: 15.200
VWD1 A, Wavelength=254 nm
Correlation: 0.99983
Residual Std. Dev.: 46.21400
Formula: y = mx + b
m: 1083.67517
b: 55.22206
x: Amount
y: Area

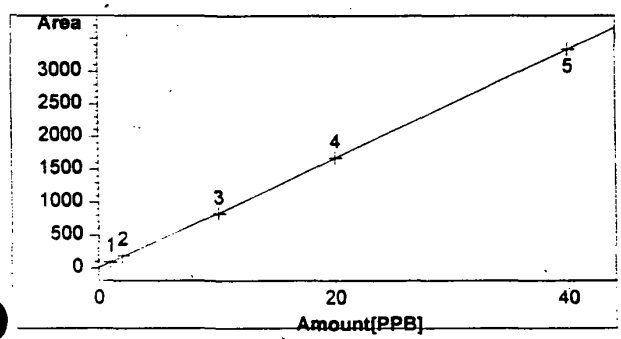
002313



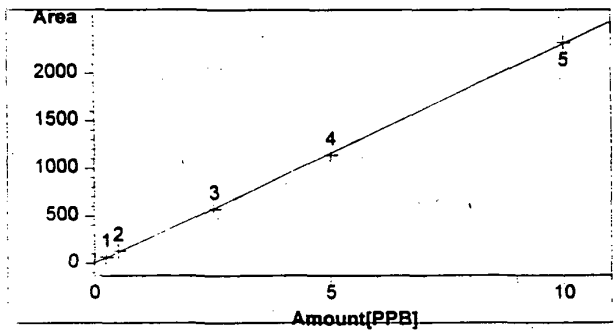
FLUORANTHENE at exp. RT: 15.991
VWD1 A, Wavelength=254 nm
Correlation: 0.99996
Residual Std. Dev.: 10.29423
Formula: y = mx + b
m: 101.01775
b: 9.01388
x: Amount
y: Area



PYRENE at exp. RT: 16.558
VWD1 A, Wavelength=254 nm
Correlation: 0.99998
Residual Std. Dev.: 5.95560
Formula: y = mx + b
m: 89.07327
b: 19.36412
x: Amount
y: Area

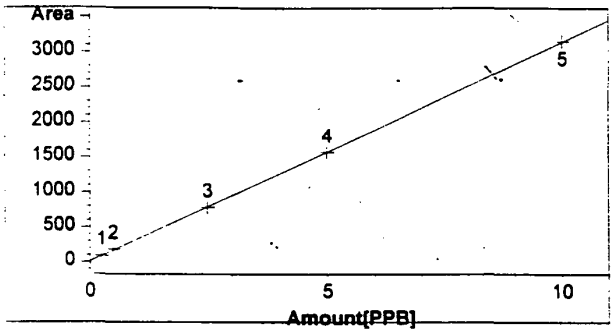


TERPHENYL at exp. RT: 17.493
VWD1 A, Wavelength=254 nm
Correlation: 0.99997
Residual Std. Dev.: 10.99116
Formula: y = mx + b
m: 83.16153
b: 14.78691
x: Amount
y: Area

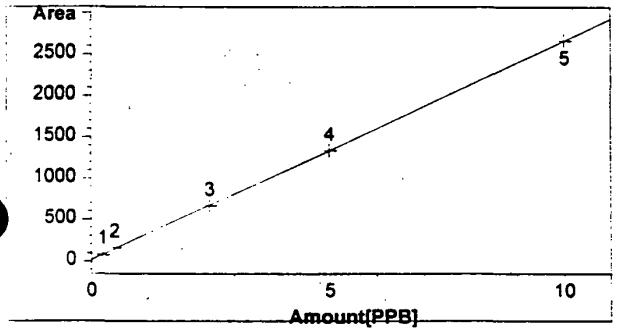


BENZO(A)ANTHRACENE at exp. RT: 18.295
VWD1 A, Wavelength=254 nm
Correlation: 0.99989
Residual Std. Dev.: 16.23285
Formula: y = mx + b
m: 231.32744
b: 4.54955
x: Amount
y: Area

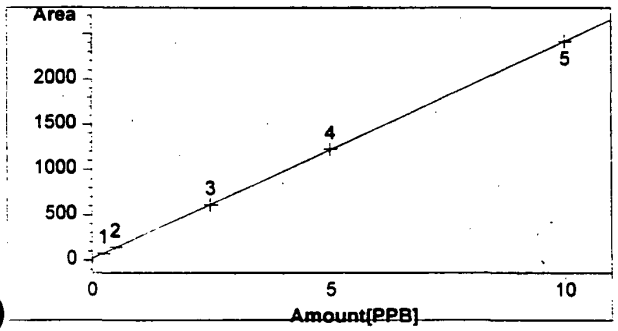
002314



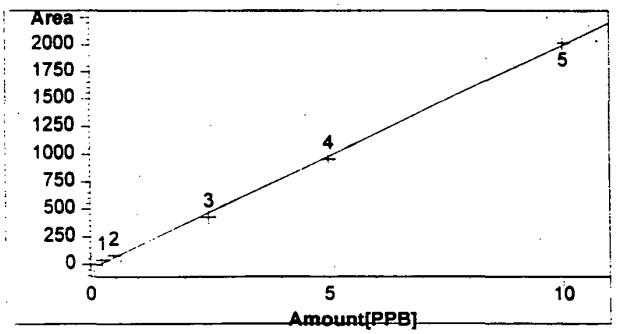
CHRYSENE at exp. RT: 18.688
VWD1 A, Wavelength=254 nm
Correlation: 0.99998
Residual Std. Dev.: 10.27704
Formula: y = mx + b
m: 313.37421
b: 13.57489
x: Amount
y: Area



BENZO(B)FLUORANTHE at exp. RT: 19.990
VWD1 A, Wavelength=254 nm
Correlation: 0.99997
Residual Std. Dev.: 8.96692
Formula: y = mx + b
m: 264.68066
b: 16.81769
x: Amount
y: Area

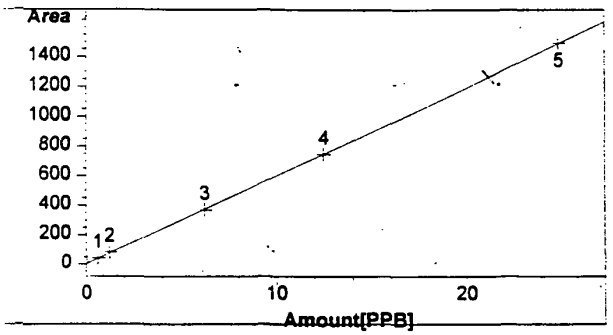


BENZO(K)FLUORANTHE at exp. RT: 20.575
VWD1 A, Wavelength=254 nm
Correlation: 0.99998
Residual Std. Dev.: 6.76702
Formula: y = mx + b
m: 240.20303
b: 19.10104
x: Amount
y: Area

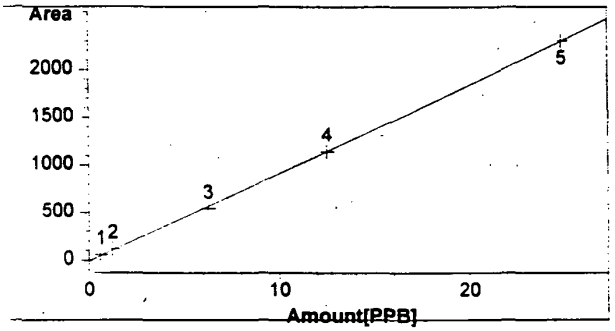


BENZO(A)PYRENE at exp. RT: 21.149
VWD1 A, Wavelength=254 nm
Correlation: 0.99927
Residual Std. Dev.: 36.26219
Formula: y = mx + b
m: 203.98056
b: -38.80044
x: Amount
y: Area

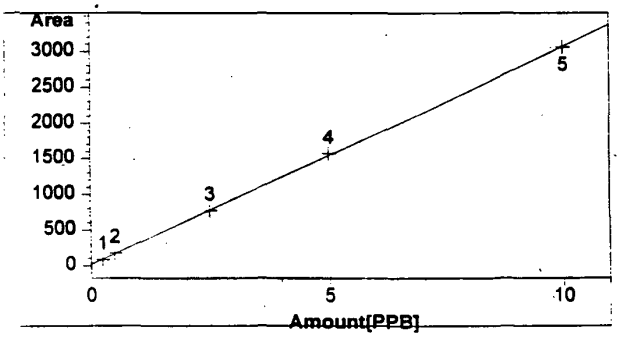
002315



DIBENZOANTHRACENE at exp. RT: 21.967
VWD1 A, Wavelength=254 nm
Correlation: 0.99997
Residual Std. Dev.: 5.15589
Formula: y = mx + b
m: 59.42434
b: 5.58615
x: Amount
y: Area



BENZO(GHI)PERYLENE at exp. RT: 22.814
VWD1 A, Wavelength=254 nm
Correlation: 0.99988
Residual Std. Dev.: 16.38755
Formula: y = mx + b
m: 92.37862
b: -8.67490
x: Amount
y: Area



INDENOPYRENE at exp. RT: 23.321
VWD1 A, Wavelength=254 nm
Correlation: 0.99991
Residual Std. Dev.: 19.51298
Formula: y = mx + b
m: 304.98169
b: 21.53078
x: Amount
y: Area

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002316

PERCENT RECOVERY FOR REFERENCE STANDARD :2ND SOURCE
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

ANALYSIS DATE: 4/10/98 JOB#:9800.564/.565/.640

NOTEBOOK: 1229-178 STD #: 1190-128-8 BATCH#:980410521R

VIAL:108-1 UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	75.0	73.7	98.3
ACENAPHTHYLENE	75.0	72.6	96.8
ACENAPHTHENE	75.0	75.0	100
FLUORENE	7.50	7.37	98.3
PHENANTHRENE	7.50	7.61	101
ANTHRACENE	3.50	3.61	103
FLUORANTHENE	20.0	22.4	112
PYRENE	20.0	22.5	113
BENZO(A)ANTHRACENE	7.50	8.20	109
CHRYSENE	7.50	7.67	102
BENZO(B)FLUORANTHENE	7.50	7.80	104
BENZO(K)FLUORANTHENE	7.50	7.50	100
BENZO(A)PYRENE	7.50	6.96	92.8
DIBENZO(AH)ANTHRACENE	20.0	18.4	92.0
BENZO(GHI)PERYLENE	20.0	19.7	98.5
INDENO(CD123)PYRENE	7.50	7.37	98.3

IN CONTROL AVERAGE = 101

Mc 4/13/98 Copy QA

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PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

INITIAL CAL NOTEBOOK:1229-178
INITIAL CAL. DATE:041098

ANALYSIS DATE: 4/11/98

JOB#:9800.564/.565/.611

NOTEBOOK:1229-178 STD#: 1190-128-4
STD TYPE: CONTINUING

BATCH#:980410521R

VIAL:104-2

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	50.3	101
ACENAPHTHYLENE	50.0	51.0	102
1-METHYLNAPHTHALENE	50.0	53	106
2-METHYLNAPHTHALENE	50.0	50.1	100
ACENAPHTHENE	50.0	51.4	103
FLUORENE	5.00	5.10	102
PHENANTHRENE	5.00	5.11	102
ANTHRACENE	2.50	2.57	103
FLUORANTHENE	12.5	13.7	110
PYRENE	12.5	14.1	113
P-TERPHENYL-D14	20.0	20.9	105
BENZO(A)ANTHRACENE	5.00	5.49	110
CHRYSENE	5.00	5.54	111
BENZO(B)FLUORANTHENE	5.00	5.63	113
BENZO(K)FLUORANTHENE	5.00	5.61	112
BENZO(A)PYRENE	5.00	5.38	108
DIBENZO(AH)ANTHRACENE	12.5	14.0	112
BENZO(GHI)PERYLENE	12.5	13.1	105
INDENO(CD123)PYRENE	5.00	5.31	106

IN CONTROL mc 4/13/98 AVERAGE = 106

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

INITIAL CAL NOTEBOOK:1229-178
INITIAL CAL. DATE:041098

ANALYSIS DATE: 4/11/98

JOB#:9800.564/.565/.611

NOTEBOOK:1229-178 STD#: 1190-128-4
STD TYPE: ENDING

BATCH#:980410521R

VIAL:104-4

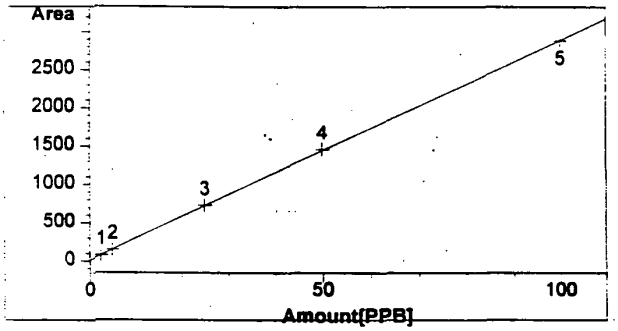
UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	50.2	100
ACENAPHTHYLENE	50.0	51.1	102
1-METHYLNAPHTHALENE	50.0	52.9	106
2-METHYLNAPHTHALENE	50.0	50.3	101
ACENAPHTHENE	50.0	51.2	102
FLUORENE	5.00	5.21	104
PHENANTHRENE	5.00	5.14	103
ANTHRACENE	2.50	2.60	104
FLUORANTHENE	12.5	14.0	112
PYRENE	12.5	14.0	112
P-TERPHENYL-D14	20.0	21.4	107
BENZO(A)ANTHRACENE	5.00	5.55	111
CHRYSENE	5.00	5.60	112
BENZO(B)FLUORANTHENE	5.00	5.48	110
BENZO(K)FLUORANTHENE	5.00	5.43	109
BENZO(A)PYRENE	5.00	5.28	106
DIBENZO(AH)ANTHRACENE	12.5	13.9	111
BENZO(GHI)PERYLENE	12.5	12.7	102
INDENO(CD123)PYRENE	5.00	5.24	105

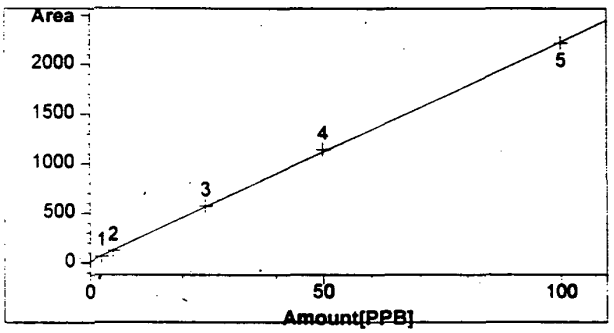
IN CONTROL MC 4/13/98 AVERAGE = 106

343

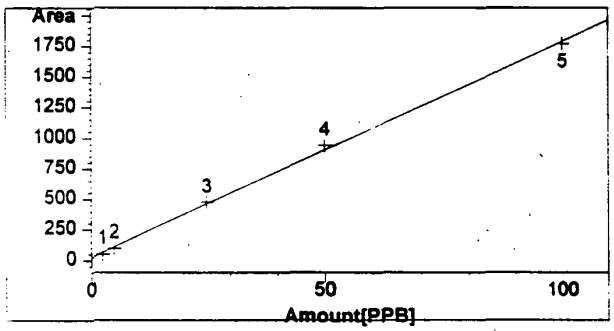
Calibration Curves



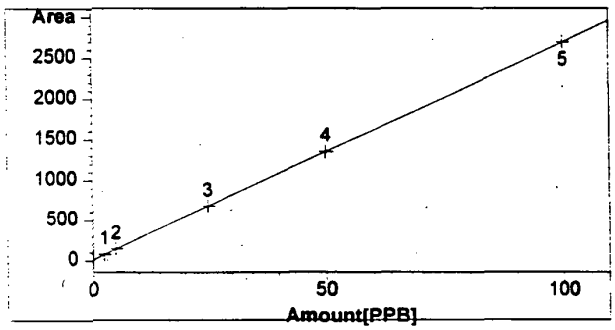
NAPHTHALENE at exp. RT: 10.326
VWD1 A, Wavelength=254 nm
Correlation: 0.99998
Residual Std. Dev.: 9.35419
Formula: y = mx + b
m: 28.79510
b: 8.23071
x: Amount
y: Area



ACENAPTHYLENE at exp. RT: 11.374
VWD1 A, Wavelength=254 nm
Correlation: 0.99989
Residual Std. Dev.: 15.49880
Formula: y = mx + b
m: 22.14003
b: 11.94546
x: Amount
y: Area



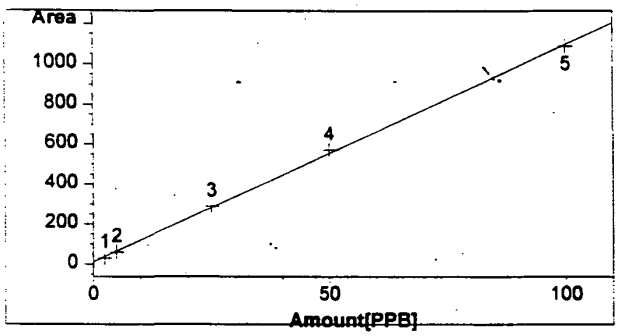
1-METHYLNAPHTHALENE at exp. RT: 12.066
VWD1 A, Wavelength=254 nm
Correlation: 0.99948
Residual Std. Dev.: 26.41903
Formula: y = mx + b
m: 17.68183
b: 19.96260
x: Amount
y: Area



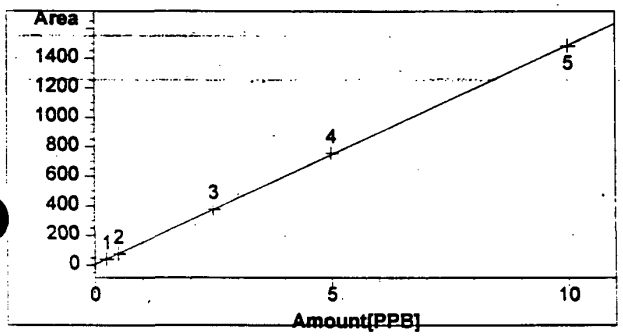
2-METHYLNAPHTHALENE at exp. RT: 12.427
VWD1 A, Wavelength=254 nm
Correlation: 1.00000
Residual Std. Dev.: 2.16417
Formula: y = mx + b
m: 26.88180
b: 2.31399
x: Amount
y: Area

E 371

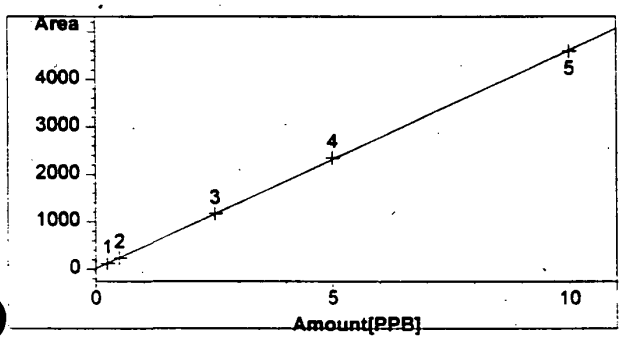
002320



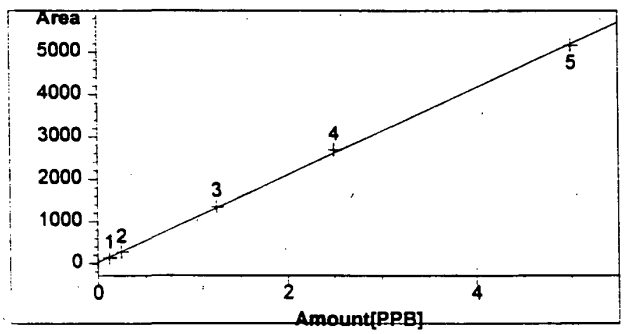
ACENAPHTHENE at exp. RT: 12.837
VWD1 A, Wavelength=254 nm
Correlation: 0.99970
Residual Std. Dev.: 12.40004
Formula: y = mx + b
m: 10.87429
b: 10.84167
x: Amount
y: Area



FLUORENE at exp. RT: 13.135
VWD1 A, Wavelength=254 nm
Correlation: 0.99994
Residual Std. Dev.: 7.73917
Formula: y = mx + b
m: 148.32066
b: 5.43912
x: Amount
y: Area

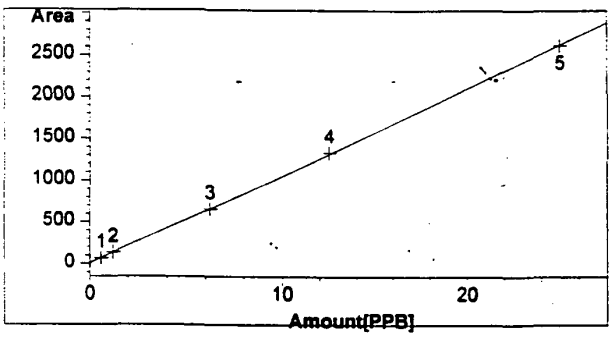


PHENANTHRENE at exp. RT: 14.112
VWD1 A, Wavelength=254 nm
Correlation: 0.99995
Residual Std. Dev.: 22.05206
Formula: y = mx + b
m: 459.51065
b: 16.38516
x: Amount
y: Area

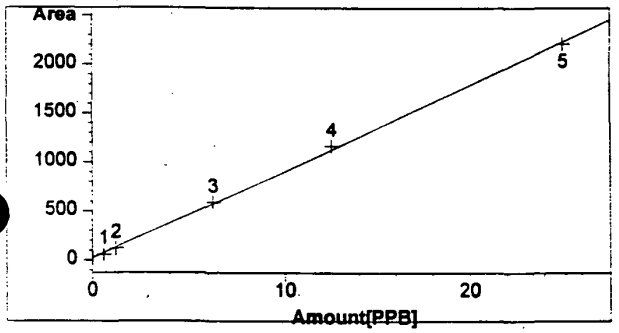


ANTHRACENE at exp. RT: 15.056
VWD1 A, Wavelength=254 nm
Correlation: 0.99977
Residual Std. Dev.: 51.27747
Formula: y = mx + b
m: 1032.39746
b: 34.42780
x: Amount
y: Area

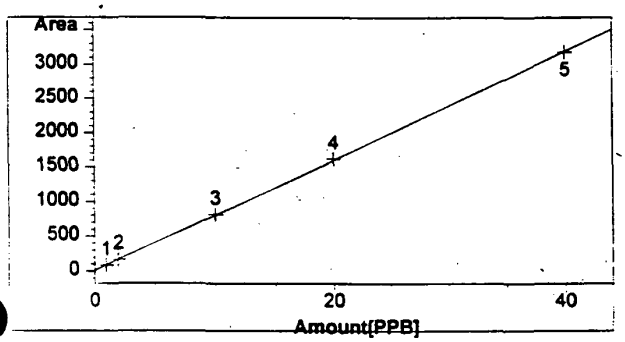
002321



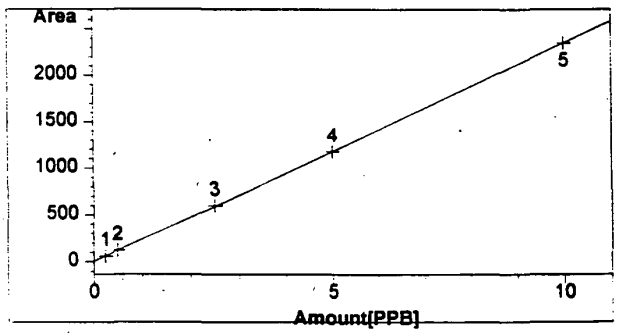
FLUORANTHENE at exp. RT: 16.110
VWD1 A, Wavelength=254 nm
Correlation: 0.99996
Residual Std. Dev.: 10.83279
Formula: y = mx + b
m: 105.08126
b: 5.69488
x: Amount
y: Area



PYRENE at exp. RT: 16.930
VWD1 A, Wavelength=254 nm
Correlation: 0.99960
Residual Std. Dev.: 29.23656
Formula: y = mx + b
m: 88.49943
b: 23.21814
x: Amount
y: Area



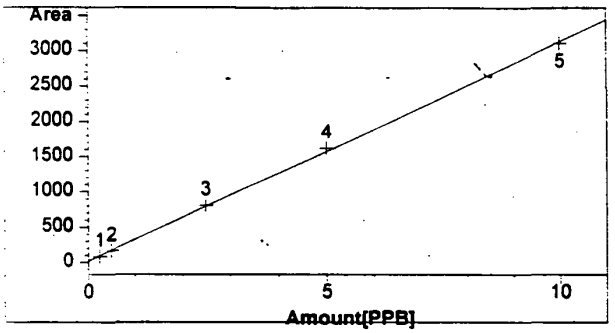
TERPHENYL at exp. RT: 18.099
VWD1 A, Wavelength=254 nm
Correlation: 0.99994
Residual Std. Dev.: 15.79841
Formula: y = mx + b
m: 79.49236
b: 11.78551
x: Amount
y: Area



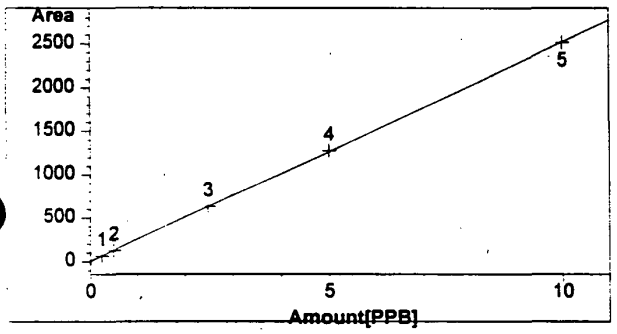
BENZO(A)ANTHRACENE at exp. RT: 19.323
VWD1 A, Wavelength=254 nm
Correlation: 0.99999
Residual Std. Dev.: 5.55763
Formula: y = mx + b
m: 234.81491
b: 5.33799
x: Amount
y: Area

E 373

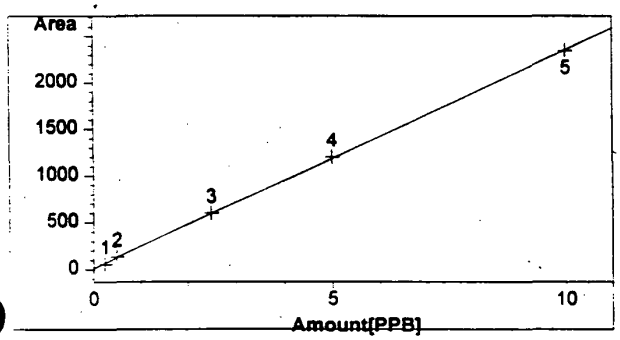
002322



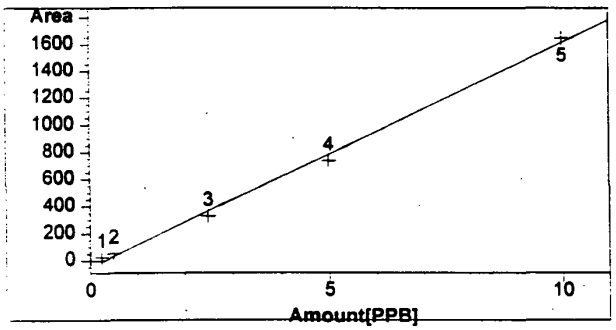
CHRYSENE at exp. RT: 19.896
VWD1 A, Wavelength=254 nm
Correlation: 0.99975
Residual Std. Dev.: 32.48157
Formula: y = mx + b
m: 311.10321
b: 21.94993
x: Amount
y: Area



BENZO(B)FLUORANTHE at exp. RT: 21.733
VWD1 A, Wavelength=254 nm
Correlation: 0.99998
Residual Std. Dev.: 7.99853
Formula: y = mx + b
m: 252.11150
b: 4.86495
x: Amount
y: Area

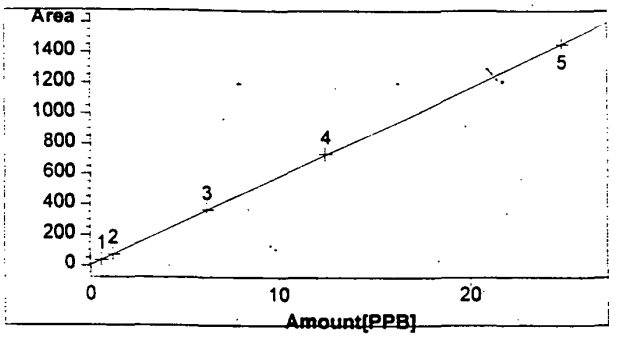


BENZO(K)FLUORANTHE at exp. RT: 22.546
VWD1 A, Wavelength=254 nm
Correlation: 0.99991
Residual Std. Dev.: 14.44068
Formula: y = mx + b
m: 234.43965
b: 12.69512
x: Amount
y: Area

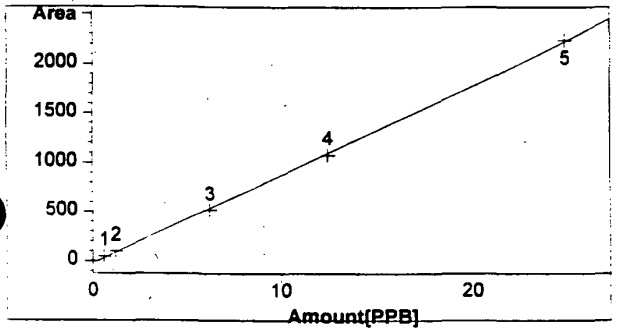


BENZO(A)PYRENE at exp. RT: 23.413
VWD1 A, Wavelength=254 nm
Correlation: 0.99845
Residual Std. Dev.: 43.38871
Formula: y = mx + b
m: 166.70459
b: -50.07952
x: Amount
y: Area

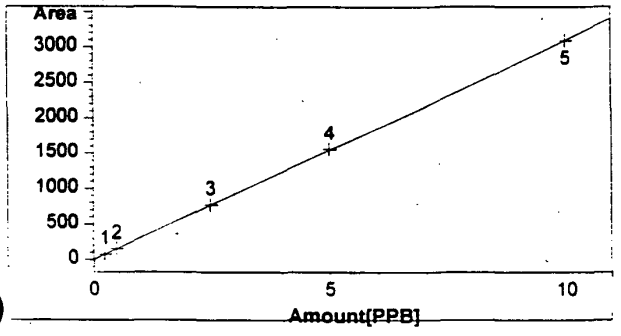
002323



DIBENZOANTHRACENE at exp. RT: 24.473
VWD1 A, Wavelength=254 nm
Correlation: 0.99998
Residual Std. Dev.: 4.34441
Formula: y = mx + b
m: 58.18977
b: 2.11533
x: Amount
y: Area



BENZO(GHI)PERYLENE at exp. RT: 25.789
VWD1 A, Wavelength=254 nm
Correlation: 0.99982
Residual Std. Dev.: 19.84039
Formula: y = mx + b
m: 89.99433
b: -24.96167
x: Amount
y: Area



INDENOPYRENE at exp. RT: 26.417
VWD1 A, Wavelength=254 nm
Correlation: 0.99998
Residual Std. Dev.: 8.37816
Formula: y = mx + b
m: 309.45309
b: 1.16986
x: Amount
y: Area

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002324

PERCENT RECOVERY FOR REFERENCE STANDARD :2ND SOURCE
METHOD/COLUMN/INSTRUMENT: PAH/HYPERPAH/LC-2

ANALYSIS DATE: 4/9/98

JOB # 9800 .564/565/566

NOTEBOOK:1229-171

STD. ID: STD # 1190-127-6
STD. TYPE: REFERENCE

BATCH#:980408521R

VIAL:108-3

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	75.0	77.4	103
ACENAPHTHYLENE	75.0	76.1	101
ACENAPHTHENE	75.0	78.5	105
FLUORENE	7.50	7.6	101
PHENANTHRENE	7.50	7.88	105
ANTHRACENE	3.50	3.67	105
FLUORANTHENE	20.0	21.4	107
PYRENE	20.0	21.7	109
BENZO(A)ANTHRACENE	7.50	7.96	106
CHRYSENE	7.50	7.61	101
BENZO(B)FLUORANTHENE	7.50	8.04	107
BENZO(K)FLUORANTHENE	7.50	7.56	101
BENZO(A)PYRENE	7.50	6.98	93
DIBENZO(AH)ANTHRACENE	20.0	19.1	96
BENZO(GHI)PERYLENE	20.0	20.1	101
INDENO(CD123)PYRENE	7.50	7.53	100

DWS 4/9/98

IN CONTROL

AVERAGE = 102.6

376

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

INITIAL CAL NOTEBOOK:1229-178
INITIAL CAL. DATE:041098

ANALYSIS DATE: 6/9/98

JOB#:9801.165/.181/.127/.170

NOTEBOOK:1263-47

STD#: 1190-140-9
STD TYPE: DAILY

BATCH#:980609521R

VIAL:102-02

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	47.2	94.4
ACENAPHTHYLENE	50.0	47.2	94.4
1-METHYLNAPHTHALENE	50.0	52.5	105
2-METHYLNAPHTHALENE	50.0	47.2	94.4
ACENAPHTHENE	50.0	50.9	102
FLUORENE	5.00	4.48	89.6
PHENANTHRENE	5.00	4.54	90.8
ANTHRACENE	2.50	2.29	91.6
FLUORANTHENE	12.5	12.0	96.0
PYRENE	12.5	11.1	88.8
P-TERPHENYL-D14	20.0	18.2	91.0
BENZO(A)ANTHRACENE	5.00	4.77	95.4
CHRYSENE	5.00	4.80	96.0
BENZO(B)FLUORANTHENE	5.00	4.53	90.6
BENZO(K)FLUORANTHENE	5.00	4.53	90.6
BENZO(A)PYRENE	5.00	5.27	105
DIBENZO(AH)ANTHRACENE	12.5	11.5	92.0
BENZO(GHI)PERYLENE	12.5	12.1	96.8
INDENO(CD123)PYRENE	5.00	4.64	92.8

IN CONTROL MC 6/9/98 AVERAGE = 94.6

PERCENT RECOVERY FOR REFERENCE STANDARD :2ND SOURCE
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

ANALYSIS DATE: 6/9/98 JOB#:9801.165/.181/.170/.127

NOTEBOOK: 1263-47 STD #: 1190-139-7 BATCH#:980609521R

VIAL:103-3 UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	75.0	72.3	96.4
ACENAPHTHYLENE	75.0	68.8	91.7
ACENAPHTHENE	75.0	76.5	102
FLUORENE	7.50	6.56	87.5
PHENANTHRENE	7.50	6.88	91.7
ANTHRACENE	3.50	3.21	91.7
FLUORANTHENE	20.0	20.3	102
PYRENE	20.0	18.7	93.5
BENZO(A)ANTHRACENE	7.50	7.28	97.1
CHRYSENE	7.50	7.15	95.3
BENZO(B)FLUORANTHENE	7.50	7.08	94.4
BENZO(K)FLUORANTHENE	7.50	6.75	90.0
BENZO(A)PYRENE	7.50	7.9	105
DIBENZO(AH)ANTHRACENE	20.0	17.4	87.0
BENZO(GHI)PERYLENE	20.0	19.4	97.0
INDENO(CD123)PYRENE	7.50	6.78	90.4

IN CONTROL mc 6-9-98 AVERAGE = 94.5

Copy QA

392

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

INITIAL CAL NOTEBOOK:1229-178
INITIAL CAL. DATE:041098

ANALYSIS DATE: 6/9/98

JOB#:9801.165/.181/.127/.170

NOTEBOOK:1263-47

STD#: 1190-140-9
STD TYPE: 1st CONTINUING

BATCH#:980609521R

VIAL:102-04

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	47.3	94.6
ACENAPHTHYLENE	50.0	47.1	94.2
1-METHYLNAPHTHALENE	50.0	52.4	105
2-METHYLNAPHTHALENE	50.0	47.2	94.4
ACENAPHTHENE	50.0	50.4	101
FLUORENE	5.00	4.42	88.4
PHENANTHRENE	5.00	4.55	91.0
ANTHRACENE	2.50	2.25	90.0
FLUORANTHENE	12.5	12.0	96.0
PYRENE	12.5	11.0	88.0
P-TERPHENYL-D14	20.0	18.2	91.0
BENZO(A)ANTHRACENE	5.00	4.63	92.6
CHRYSENE	5.00	4.64	92.8
BENZO(B)FLUORANTHENE	5.00	4.41	88.2
BENZO(K)FLUORANTHENE	5.00	4.34	86.8
BENZO(A)PYRENE	5.00	4.90	98.0
DIBENZO(AH)ANTHRACENE	12.5	11.3	90.4
BENZO(GHI)PERYLENE	12.5	12.0	96.0
INDENO(CD123)PYRENE	5.00	4.54	90.8

IN CONTROL

AVERAGE = 93.1

MC 6-10-98

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

INITIAL CAL NOTEBOOK:1229-178
INITIAL CAL. DATE:041098

ANALYSIS DATE: 6/10/98

JOB#:9801.165/.181/.127/.170

NOTEBOOK:1263-47

STD#: 1190-140-9
STD TYPE: 2nd CONTINUING

BATCH#:980609521R

VIAL:102-06

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	47.3	94.6
ACENAPHTHYLENE	50.0	47.5	95.0
1-METHYLNAPHTHALENE	50.0	52.8	106
2-METHYLNAPHTHALENE	50.0	47.5	95.0
ACENAPHTHENE	50.0	51.2	102
FLUORENE	5.00	4.52	90.4
PHENANTHRENE	5.00	4.58	91.6
ANTHRACENE	2.50	2.24	89.6
FLUORANTHENE	12.5	12.1	96.8
PYRENE	12.5	11.3	90.4
P-TERPHENYL-D14	20.0	18.3	91.5
BENZO(A)ANTHRACENE	5.00	4.73	94.6
CHRYSENE	5.00	4.78	95.6
BENZO(B)FLUORANTHENE	5.00	4.49	89.8
BENZO(K)FLUORANTHENE	5.00	4.50	90.0
BENZO(A)PYRENE	5.00	5.06	101
DIBENZO(AH)ANTHRACENE	12.5	11.7	93.6
BENZO(GHI)PERYLENE	12.5	12.0	96.0
INDENO(CD123)PYRENE	5.00	4.61	92.2

IN CONTROL MC 6-23-98

AVERAGE = 94.5

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

INITIAL CAL NOTEBOOK:1229-178
INITIAL CAL. DATE:041098

ANALYSIS DATE: 6/10/98

JOB#:9801.165/.181/.127/.170

NOTEBOOK:1263-47

STD#: 1190-140-9
STD TYPE: 3rd CONTINUING

BATCH#:980609521R

VIAL:102-08

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	48.0	96.0
ACENAPHTHYLENE	50.0	47.7	95.4
1-METHYLNAPHTHALENE	50.0	53.0	106
2-METHYLNAPHTHALENE	50.0	47.8	95.6
ACENAPHTHENE	50.0	51.6	103
FLUORENE	5.00	4.53	90.6
PHENANTHRENE	5.00	4.60	92.0
ANTHRACENE	2.50	2.24	89.6
FLUORANTHENE	12.5	12.2	97.6
PYRENE	12.5	11.4	91.2
P-TERPHENYL-D14	20.0	18.3	91.5
BENZO(A)ANTHRACENE	5.00	4.72	94.4
CHRYSENE	5.00	4.80	96.0
BENZO(B)FLUORANTHENE	5.00	4.60	92.0
BENZO(K)FLUORANTHENE	5.00	4.73	94.6
BENZO(A)PYRENE	5.00	5.04	101
DIBENZO(AH)ANTHRACENE	12.5	12.0	96.0
BENZO(GHI)PERYLENE	12.5	11.9	95.2
INDENO(CD123)PYRENE	5.00	4.66	93.2

IN CONTROL

AVERAGE = 95.3

MP - 6-10-98

401

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

INITIAL CAL NOTEBOOK:1229-178
INITIAL CAL. DATE:041098

ANALYSIS DATE: 6/10/98

JOB#:9801.165/.181/.127/.170

NOTEBOOK:1263-47

STD#: 1190-140-9
STD TYPE: ENDING

BATCH#:980609521R

VIAL:102-10

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	48.5	97.0
ACENAPHTHYLENE	50.0	48.4	96.8
1-METHYLNAPHTHALENE	50.0	53.7	107
2-METHYLNAPHTHALENE	50.0	48.4	96.8
ACENAPHTHENE	50.0	52.1	104
FLUORENE	5.00	4.59	91.8
PHENANTHRENE	5.00	4.66	93.2
ANTHRACENE	2.50	2.28	91.2
FLUORANTHENE	12.5	12.3	98.4
PYRENE	12.5	11.5	92.0
P-TERPHENYL-D14	20.0	18.7	93.5
BENZO(A)ANTHRACENE	5.00	4.82	96.4
CHRYSENE	5.00	4.87	97.4
BENZO(B)FLUORANTHENE	5.00	4.54	90.8
BENZO(K)FLUORANTHENE	5.00	4.54	90.8
BENZO(A)PYRENE	5.00	5.22	104
DIBENZO(AH)ANTHRACENE	12.5	12.0	96.0
BENZO(GHI)PERYLENE	12.5	12.3	98.4
INDENO(CD123)PYRENE	5.00	4.72	94.4

IN CONTROL JMC

AVERAGE = 96.4

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/HYPERPAH/LC-2

INITIAL CAL NOTEBOOK:1229-171
INITIAL CAL. DATE:04/08/98

ANALYSIS DATE:06/10/98

JOB#:9801.165/181/.127

NOTEBOOK:1263-51 STD. ID : STD #:1190-140-11
STD. TYPE: DAILY

BATCH#:980610521R

VIAL:102-02

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC	
NAPHTHALENE	50.0	50.5	101	
ACENAPHTHYLENE	50.0	50.0	100	
1-METHYLNAPHTHALENE	50.0	51.3	103	
2-METHYLNAPHTHALENE	50.0	48.6	97.2	
ACENAPHTHENE	50.0	51.4	103	
FLUORENE	5.00	4.93	98.6	
PHENANTHRENE	5.00	4.75	95.0	
ANTHRACENE	2.50	2.48	99.2	
FLUORANTHENE	12.50	11.7	93.6	
PYRENE	12.50	11.3	90.4	
P-TERPHENYL-D14	20.0	19.4	97.0	
BENZO(A)ANTHRACENE	5.00	4.79	95.8	
CHRYSENE	5.00	4.94	98.8	
BENZO(B)FLUORANTHENE	5.00	4.83	96.6	
BENZO(K)FLUORANTHENE	5.00	4.62	92.4	
BENZO(A)PYRENE	5.00	6.77	135	**
DIBENZO(AH)ANTHRACENE	12.5	12.2	97.6	
BENZO(GHI)PERYLENE	12.5	13.3	106	
INDENO(CD123)PYRENE	5.00	4.73	94.6	

** IN CONTROL using 15% average factor criteria AVERAGE = 99.7

MC 6-11-98

415

PERCENT RECOVERY FOR REFERENCE STANDARD :2ND SOURCE
METHOD/COLUMN/INSTRUMENT:

ANALYSIS DATE: 6/10/98 JOB#:9801.165/.181/.127

NOTEBOOK: 1263-51 STD #: 1190-139-7 BATCH#:980610521R

VIAL:103-3 UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	75.0	75.0	100
ACENAPHTHYLENE	75.0	71.0	94.7
ACENAPHTHENE	75.0	76.0	101
FLUORENE	7.50	7.07	94.3
PHENANTHRENE	7.50	7.04	93.9
ANTHRACENE	3.50	3.39	96.9
FLUORANTHENE	20.0	19.1	95.5
PYRENE	20.0	18.4	92.0
BENZO(A)ANTHRACENE	7.50	7.19	95.9
CHRYSENE	7.50	7.16	95.5
BENZO(B)FLUORANTHENE	7.50	7.40	98.7
BENZO(K)FLUORANTHENE	7.50	6.90	92.0
BENZO(A)PYRENE	7.50	10.1	135 **
DIBENZO(AH)ANTHRACENE	20.0	17.9	89.5
BENZO(GHI)PERYLENE	20.0	20.8	104
INDENO(CD123)PYRENE	7.50	6.74	89.9

AVERAGE = 98.0

** IN CONTROL USING 15% AVERAGE CRITERIA

MI 6-11-98

CWJ 6/11

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/HYPERPAH/LC-2

INITIAL CAL NOTEBOOK:1229-171
INITIAL CAL. DATE:04/08/98

ANALYSIS DATE:06/11/98

JOB#:9801.165/181/.127

NOTEBOOK:1263-51 STD. ID : STD #:1190-140-11
STD. TYPE: CONTINUING

BATCH#:980610521R

VIAL:102-04

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC	
NAPHTHALENE	50.0	50.3	101	
ACENAPHTHYLENE	50.0	49.8	100	
1-METHYLNAPHTHALENE	50.0	51.1	102	
2-METHYLNAPHTHALENE	50.0	48.6	97.2	
ACENAPHTHENE	50.0	51.2	102	
FLUORENE	5.00	4.94	98.8	
PHENANTHRENE	5.00	4.76	95.2	
ANTHRACENE	2.50	2.44	97.6	
FLUORANTHENE	12.50	11.7	93.6	
PYRENE	12.50	11.3	90.4	
P-TERPHENYL-D14	20.0	19.4	97.0	
BENZO(A)ANTHRACENE	5.00	4.75	95.0	
CHRYSENE	5.00	4.89	97.8	
BENZO(B)FLUORANTHENE	5.00	4.81	96.2	
BENZO(K)FLUORANTHENE	5.00	4.69	93.8	
BENZO(A)PYRENE	5.00	6.21	124	**
DIBENZO(AH)ANTHRACENE	12.5	12.4	99.2	
BENZO(GHI)PERYLENE	12.5	13.2	106	
INDENO(CD123)PYRENE	5.00	4.75	95.0	

** IN CONTROL using 15% average factor criteria AVERAGE = 99.0

6-11-98

423

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/HYPERPAH/LC-2

INITIAL CAL NOTEBOOK:1229-171
INITIAL CAL. DATE:04/08/98

ANALYSIS DATE:06/11/98

JOB#:9801.165/181/.127

NOTEBOOK:1263-51 STD. ID : STD #:1190-140-11
STD. TYPE: ENDING

BATCH#:980610521R

VIAL:102-06

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC	
NAPHTHALENE	50.0	50.9	102	
ACENAPHTHYLENE	50.0	50.5	101	
1-METHYLNAPHTHALENE	50.0	51.9	104	
2-METHYLNAPHTHALENE	50.0	49.2	98.4	
ACENAPHTHENE	50.0	52.0	104	
FLUORENE	5.00	4.98	99.6	
PHENANTHRENE	5.00	4.82	96.4	
ANTHRACENE	2.50	2.46	98.4	
FLUORANTHENE	12.50	11.9	95.2	
PYRENE	12.50	11.6	92.8	
P-TERPHENYL-D14	20.0	19.7	98.5	
BENZO(A)ANTHRACENE	5.00	4.86	97.2	
CHRYSENE	5.00	4.97	99.4	
BENZO(B)FLUORANTHENE	5.00	4.93	98.6	
BENZO(K)FLUORANTHENE	5.00	4.73	94.6	
BENZO(A)PYRENE	5.00	6.19	124	**
DIBENZO(AH)ANTHRACENE	12.5	12.4	99.2	
BENZO(GHI)PERYLENE	12.5	13.2	106	
INDENO(CD123)PYRENE	5.00	4.78	95.6	

** IN CONTROL using 15% average factor criteria AVERAGE = 100.2

MRG-11-98

TEST CODE :SPAH0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB :Method Blank 1339-17-1 MATRIX : SOLID

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		200
Acenaphthylene	ND		200
1-methylnaphthalene	ND		200
2-Methylnaphthalene	ND		200
Acenaphthene	ND		200
Fluorene	ND		20
Phenanthrene	ND		20
Anthracene	ND		20
Fluoranthene	ND		50
Pyrene	ND		50
Benzo(a)anthracene	ND		20
Chrysene	ND		20
Benzo(b)fluoranthene	ND		20
Benzo(k)fluoranthene	ND		20
Benzo(a)pyrene	ND		20
Dibenzo(a,h)anthracene	ND		50
Benzo(ghi)perylene	ND		50
Indeno(1,2,3-cd)pyrene	ND		20

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002336

PAH

6.0 CALCULATIONS

6.1 The instrument printout for processed samples is in µg/kg or µg/L. The equations below are based on quantitation versus the curve and are provided as a check.

6.1.1 Soil Samples

$$\mu g/g = \frac{[Ax - b]}{[M]} \quad \frac{V}{M}$$

where

A_x = Response of analyte in sample (area or peak height).
b = Curve intercept (area or peak height).
m = Slope of curve (area/conc.).
M = Mass of sample, g.
V = Final additive volume of supernatant plus water solution.

Bracketed term = Concentration (µg/mL) on curve associated with area A_x.
Typically, M = 30; V = 1.0

6.1.2 Water

$$\mu g/L = \frac{[A_x - b]}{[M]} \quad \frac{Vd}{Vs}$$

where

V_s = Volume of sample extracted, L.
V_d = Final additive volume of acetonitrile extract plus an (equal) amount of water.

Commonly, V_s = 1.000 mL; V_d = 1 mL.

6.1.3 Swipe

$$\frac{ug}{swipe} = \frac{[Ax - b]}{[M]} * \frac{V}{swipe}$$

002337

START - DALLAS

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.165 SAS No.: _____ SDG No.:12____

EPA Sample No.	Lab Sample ID
SB05-0102	7833
SB04-0405	7832
SB05-0405	7834
SB03-1.52	7831
SB02-12	7830
SB05-1415	7835
SB02-12S	7830S
SB02-12S1	7830S1

Were ICP interelement corrections applied ? Yes/No YES

Were ICP background corrections applied ? Yes/No YES
If yes - were raw data generated before application of background corrections ? Yes/No NO_

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Caryn Wojtowicz Name: Caryn Wojtowicz

Date: 6/22/98 Title: Project Manager

COVER PAGE - IN

002338

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

0102

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.165 SAS No.: _____ SDG No.: 12____

Matrix (soil/water): SOIL_ Lab Sample ID: 7833

Level (low/med.: LOW__ Date Received: 06/02/98

% Solids: _88.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1740			P
7440-36-0	Antimony	1.1	U		P
7440-38-2	Arsenic	2.4			P
7440-39-3	Barium	23.8			P
7440-41-7	Beryllium	0.56	U		P
7440-43-9	Cadmium	0.81			P
7440-70-2	Calcium	363			P
7440-47-3	Chromium	5.3			P
7440-48-4	Cobalt	2.3			P
7440-50-8	Copper	2.3	U		P
7439-89-6	Iron	5290			P
7439-92-1	Lead	7.0			P
7439-95-4	Magnesium	185			P
7439-96-5	Manganese	207		N*	P
7439-97-6	Mercury	0.02	U		CV
7440-02-0	Nickel	2.3	U		P
7440-09-7	Potassium	400			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	113			P
7440-28-0	Thallium	0.56	U		P
7440-62-2	Vanadium	7.6			P
7440-66-6	Zinc	11.8			P

Color Before: _____ Clarity Before: _____ Texture: SD/CY_

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID: SB05-0102

FORM I - IN

002339

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

0405

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.165 SAS No.: _____ SDG No.: 12____

Matrix (soil/water): SOIL_ Lab Sample ID: 7832

Level (low/med): LOW__ Date Received: 06/02/98

% Solids: _93.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1230			P
7440-36-0	Antimony	1.0	U		P
7440-38-2	Arsenic	0.97			P
7440-39-3	Barium	7.3			P
7440-41-7	Beryllium	0.52	U		P
7440-43-9	Cadmium	0.52	U		P
7440-70-2	Calcium	169			P
7440-47-3	Chromium	2.1			P
7440-48-4	Cobalt	2.1	U		P
7440-50-8	Copper	2.1	U		P
7439-89-6	Iron	2470			P
7439-92-1	Lead	1.1			P
7439-95-4	Magnesium	77.9			P
7439-96-5	Manganese	12.8		N*	P
7439-97-6	Mercury	0.02	U		CV
7440-02-0	Nickel	2.1	U		P
7440-09-7	Potassium	507			P
7782-49-2	Selenium	1.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	219			P
7440-28-0	Thallium	0.52	U		P
7440-62-2	Vanadium	4.0			P
7440-66-6	Zinc	1.6			P

Color Before: _____ Clarity Before: _____ Texture: SD____

Color After: CL_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID:__SB04-0405

FORM I - IN

002340

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

0405

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.165 SAS No.: _____ SDG No.: 12____

Matrix (soil/water): SOIL_ Lab Sample ID: 7834

Level (low/med): LOW__ Date Received: 06/02/98

% Solids: _80.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1930			P
7440-36-0	Antimony	1.2	U		P
7440-38-2	Arsenic	1.1			P
7440-39-3	Barium	51.0			P
7440-41-7	Beryllium	0.62	U		P
7440-43-9	Cadmium	0.62	U		P
7440-70-2	Calcium	631			P
7440-47-3	Chromium	5.4			P
7440-48-4	Cobalt	3.6			P
7440-50-8	Copper	2.5	U		P
7439-89-6	Iron	3500			P
7439-92-1	Lead	3.7			P
7439-95-4	Magnesium	305			P
7439-96-5	Manganese	26.8		N*	P
7439-97-6	Mercury	0.02	U		CV
7440-02-0	Nickel	3.9			P
7440-09-7	Potassium	408			P
7782-49-2	Selenium	1.2	U		P
7440-22-4	Silver	1.2	U		P
7440-23-5	Sodium	143			P
7440-28-0	Thallium	0.62	U		P
7440-62-2	Vanadium	9.7			P
7440-66-6	Zinc	6.4			P

Color Before: _____ Clarity Before: _____ Texture: SD/CY_

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID:__SB05-0405

FORM I - IN

002341

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

1.52

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 8301.165 SAS No.: _____ SDG No.: 12____

Matrix (soil/water): SOIL_ Lab Sample ID: 7831

Level (low/med): LOW__ Date Received: 06/02/98

% Solids: _94.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9211			P
7440-36-0	Antimony	1.0	U		P
7440-38-2	Arsenic	0.68			P
7440-39-3	Barium	7.5			P
7440-41-7	Beryllium	0.52	U		P
7440-43-9	Cadmium	0.52	U		P
7440-70-2	Calcium	160			P
7440-47-3	Chromium	1.7			P
7440-48-4	Cobalt	2.1	U		P
7440-50-8	Copper	2.1	U		P
7439-89-6	Iron	1840			P
7439-92-1	Lead	0.83			P
7439-95-4	Magnesium	52.0	U		P
7439-96-5	Manganese	49.9		N*	P
7439-97-6	Mercury	0.02	U		CV
7440-02-0	Nickel	2.1	U		P
7440-09-7	Potassium	648			P
7782-49-2	Selenium	1.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	104			P
7440-28-0	Thallium	0.52	U		P
7440-62-2	Vanadium	3.1			P
7440-66-6	Zinc	7.7			P

Color Before: _____ Clarity Before: _____ Texture: SD____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB03-1.52_____

FORM I - IN

002342

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

12

Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Code: EANDE_ Case No.:9801.165 SAS No.: _____ SDG No.: 12____

Matrix (soil/water): SOIL_ Lab Sample ID: 7830

Level (low/med): LOW__ Date Received: 06/02/98

Solids: _94.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1140			P
7440-36-0	Antimony	1.0	U		P
7440-38-2	Arsenic	0.99			P
7440-39-3	Barium	10.2			P
7440-41-7	Beryllium	0.51	U		P
7440-43-9	Cadmium	0.51	U		P
7440-70-2	Calcium	167			P
7440-47-3	Chromium	2.4			P
7440-48-4	Cobalt	2.4			P
7440-50-8	Copper	2.0	U		P
7439-89-6	Iron	2790			P
7439-92-1	Lead	1.1			P
7439-95-4	Magnesium	52.8			P
7439-96-5	Manganese	164		N*	P
7439-97-6	Mercury	0.02	U		CV
7440-02-0	Nickel	2.0	U		P
7440-09-7	Potassium	425			P
7782-49-2	Selenium	1.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	121			P
7440-28-0	Thallium	0.51	U		P
7440-62-2	Vanadium	3.9			P
7440-66-6	Zinc	3.4			P

Color Before: _____ Clarity Before: _____ Texture: SD____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID: SB02-12

FORM I - IN

440

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

1415

Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Code: EANDE_ Case No.:9801.165 SAS No.: _____ SDG No.: 12____

rix (soil/water): SOIL_ Lab Sample ID: 7835

el (low/med): LOW__ Date Received: 06/02/98

olids: _82.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3000			P
7440-36-0	Antimony	1.2	U		P
7440-38-2	Arsenic	4.0			P
7440-39-3	Barium	89.8			P
7440-41-7	Beryllium	0.58	U		P
7440-43-9	Cadmium	1.9			P
7440-70-2	Calcium	351			P
7440-47-3	Chromium	12.2			P
7440-48-4	Cobalt	7.7			P
7440-50-8	Copper	2.3	U		P
7439-89-6	Iron	13400			P
7439-92-1	Lead	4.9			P
7439-95-4	Magnesium	285			P
7439-96-5	Manganese	231		N*	P
7439-97-6	Mercury	0.02	U		CV
7440-02-0	Nickel	5.4			P
7440-09-7	Potassium	609			P
7782-49-2	Selenium	1.2	U		P
7440-22-4	Silver	1.2	U		P
7440-23-5	Sodium	116			P
7440-28-0	Thallium	0.58	U		P
7440-62-2	Vanadium	13.8			P
7440-66-6	Zinc	12.6			P

lor Before: _____ Clarity Before: _____ Texture: SD/CY_

lor After: Y_____ Clarity After: C_____ Artifacts: _____

mments:

_____CLIENT_SAMPLE_ID:__SB05-1415_____

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FORM I - IN

441

START - DALLAS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.165 SAS No.: _____ SDG No.: 12____

Initial Calibration Source: VHG_____

Continuing Calibration Source: VHG_____

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration				M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum	1000.0	1019.78	102.0	5000.0	5266.06	105.3	5371.63	107.4	P
Antimony	1000.0	1002.47	100.2	1000.0	1002.95	100.3	1025.95	102.6	P
Arsenic	1000.0	999.20	99.9	500.0	504.56	100.9	517.47	103.5	P
Barium	1000.0	993.21	99.3	500.0	469.87	94.0	479.62	95.9	P
Beryllium	400.0	412.43	103.1	500.0	502.23	100.4	514.28	102.9	P
Cadmium	500.0	499.42	99.9	500.0	479.26	95.9	487.90	97.6	P
Calcium	10000.0	10011.66	100.1	25000.0	24989.99	100.0	24612.57	98.5	P
Chromium	1000.0	991.41	99.1	500.0	479.13	95.8	491.27	98.3	P
Cobalt	1000.0	982.13	98.2	500.0	465.12	93.0	472.44	94.5	P
Copper	1000.0	985.36	98.5	500.0	485.54	97.1	486.01	97.2	P
Iron	1000.0	1018.95	101.9	5000.0	4640.66	92.8	4746.81	94.9	P
Lead	1000.0	989.50	98.9	1000.0	943.47	94.3	966.52	96.7	P
Magnesium	10000.0	9857.54	98.6	25000.0	24610.21	98.4	24505.44	98.0	P
Manganese	1000.0	1017.71	101.8	500.0	477.95	95.6	486.94	97.4	P
Mercury	5.0	5.03	100.6	5.0	4.99	99.8	5.07	101.4	CV
Nickel	1000.0	989.24	98.9	500.0	461.63	92.3	468.10	93.6	P
Potassium	10000.0	9224.82	92.2	25000.0	24551.66	98.2	24991.50	100.0	P
Selenium	1000.0	989.77	99.0	500.0	495.52	99.1	513.55	102.7	P
Silver	200.0	190.83	95.4	500.0	479.46	95.9	486.64	97.3	P
Sodium	10000.0	9587.64	95.9	25000.0	23705.31	94.8	23907.73	95.6	P
Thallium	1000.0	1002.38	100.2	500.0	484.08	96.8	493.43	98.7	P
Vanadium	1000.0	1015.30	101.5	500.0	500.74	100.1	510.24	102.0	P
Zinc	1000.0	1016.38	101.6	500.0	502.22	100.4	511.27	102.3	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

START - DALLAS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.165 SAS No.: _____ SDG No.: 12____

Initial Calibration Source: VHG_____

Continuing Calibration Source: VHG_____

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum				5000.0	5323.49	106.5	5342.81	106.9	P
Antimony				1000.0	1025.28	102.5	1030.02	103.0	P
Arsenic				500.0	520.38	104.1	517.52	103.5	P
Barium				500.0	478.05	95.6	475.82	95.2	P
Beryllium				500.0	510.08	102.0	510.41	102.1	P
Cadmium				500.0	488.29	97.7	483.39	96.7	P
Calcium				25000.0	25026.63	100.1			P
Chromium				500.0	491.76	98.4	490.87	98.2	P
Cobalt				500.0	472.31	94.5	469.44	93.9	P
Copper				500.0	479.67	95.9	488.21	97.6	P
Iron				5000.0	4745.96	94.9	4694.17	93.9	P
Lead				1000.0	962.41	96.2	958.89	95.9	P
Magnesium				25000.0	24502.17	98.0			P
Manganese				500.0	484.33	96.9	482.14	96.4	P
Mercury									NR
Nickel				500.0	468.58	93.7	464.84	93.0	P
Potassium				25000.0	24552.75	98.2			P
Selenium				500.0	513.12	102.6	507.03	101.4	P
Silver				500.0	483.47	96.7	482.90	96.6	P
Sodium				25000.0	23834.51	95.3			P
Thallium				500.0	498.23	99.6	500.83	100.2	P
Vanadium				500.0	510.03	102.0	504.89	101.0	P
Zinc				500.0	513.22	102.6	510.10	102.0	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

START - DALLAS

3
BLANKS

e: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

e: EANDE_ Case No.: 9801.165 SAS No.: _____ SDG No.: 12____

tion Blank Matrix (soil/water): SOIL_

tion Blank Concentration Units (ug/L or mg/kg : MG/KG

te	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
num	100.0	U	100.0	U	100.0	U	100.0	U	26.644		P
ony	10.0	U	10.0	U	10.0	U	10.0	U	1.000	U	P
ic	5.0	U	5.0	U	5.0	U	5.0	U	0.500	U	P
m	20.0	U	20.0	U	20.0	U	20.0	U	2.000	U	P
lium	5.0	U	5.0	U	5.0	U	5.0	U	0.500	U	P
um	5.0	U	5.0	U	5.0	U	5.0	U	0.500	U	P
um	500.0	U	500.0	U	500.0	U	500.0	U	50.000	U	P
ium	10.0	U	10.0	U	10.0	U	10.0	U	1.000	U	P
t	20.0	U	20.0	U	20.0	U	20.0	U	2.000	U	P
r	20.0	U	20.0	U	20.0	U	20.0	U	2.000	U	P
	50.0	U	50.0	U	50.0	U	50.0	U	10.662		P
	5.0	U	5.0	U	5.0	U	5.0	U	0.500	U	P
sium	500.0	U	500.0	U	500.0	U	500.0	U	50.000	U	P
nese	10.0	U	10.0	U	10.0	U	10.0	U	1.000	U	P
ry	0.1	U	0.1	U	0.1	U			0.050	U	CV
l	20.0	U	20.0	U	20.0	U	20.0	U	2.000	U	P
sium	1000.0	U	1000.0	U	1000.0	U	1000.0	U	100.000	U	P
ium	10.0	U	10.0	U	10.0	U	10.0	U	1.000	U	P
er	10.0	U	10.0	U	10.0	U	10.0	U	1.000	U	P
m	1000.0	U	1000.0	U	1000.0	U	1000.0	U	100.000	U	P
ium	5.0	U	5.0	U	5.0	U	5.0	U	0.500	U	P
dium	20.0	U	20.0	U	20.0	U	20.0	U	2.000	U	P
	10.0	U	10.0	U	10.0	U	10.0	U	1.000	U	P

FORM III - IN

002347

START - DALLAS

3
BLANKS

_AND_ENVIRONMENT__ Contract: _____

Case No.: 9801.165 SAS No.: _____ SDG No.: 12____

Matrix (soil/water): _____

Concentration Units (ug/L or mg/kg): _____

ial ib anl /L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
		100.0	U							P
		10.0	U							P
		5.0	U							P
		20.0	U							P
		5.0	U							P
		5.0	U							P
										NR
		10.0	U							P
		20.0	U							P
		20.0	U							P
		50.0	U							P
		5.0	U							P
										NR
		10.0	U							P
										NR
		20.0	U							P
										NR
		10.0	U							P
		10.0	U							P
										NR
		5.0	U							P
		20.0	U							P
		10.0	U							P

FORM III - IN

002348

START - DALLAS

4

ICP INTERFERENCE CHECK SAMPLE

Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Code: EANDE_ Case No.:9801.165 SAS No: _____ SDG No.: 12____

ID Number: OPTIMA_____ ICS Source: VHG_____

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	%R	Final Found Sol. A	Final Found Sol. AB	%R
Aluminum		469543		484040.4	103.1			
Antimony		906		909.1	100.3			
Arsenic		866		892.4	103.0			
Barium		409		417.1	102.0			
Beryllium		428		437.7	102.3			
Cadmium		798		826.7	103.6			
Calcium								
Chromium		411		415.8	101.2			
Cobalt		387		386.0	99.7			
Copper		484		464.9	96.1			
Iron		147514		148713.8	100.8			
Lead		787		807.0	102.5			
Magnesium								
Manganese		420		426.8	101.6			
Mercury								
Nickel		741		741.9	100.1			
Potassium								
Selenium		837		876.2	104.7			
Silver		988		941.4	95.3			
Sodium								
Thallium		743		744.2	100.2			
Vanadium		394		406.9	103.3			
Zinc		916		949.7	103.7			

FORM IV - IN

002349

START - DALLAS

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.165 SAS No: _____ SDG No.: 12____

ICP ID Number: OPTIMA_____ ICS Source: VHG_____

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Aluminum								
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium								
Calcium		384371		514780.7	133.9			
Chromium								
Cobalt								
Copper								
Iron								
Lead								
Magnesium		449914		520123.5	115.6			
Manganese								
Mercury								
Nickel								
Potassium		0		6150.0				
Selenium								
Silver								
Sodium		0		7551.3				
Thallium								
Vanadium								
Zinc								

START - DALLAS

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

12S

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.165 SAS No.: _____ SDG No.: 12____

Matrix (soil/water): SOIL__ Level low/med): LOW___

% Solids for Sample: _94.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony	75-125	51.8405		1.0132	U	52.66	98.4		P
Arsenic	75-125	212.6987		0.9851		210.66	100.5		P
Barium	75-125	219.5873		10.2355		210.66	99.4		P
Beryllium	75-125	5.2525		0.5066	U	5.27	99.7		P
Cadmium	75-125	5.7310		0.5066	U	5.27	108.7		P
Calcium									NR
Chromium	75-125	23.8812		2.3949		21.07	102.0		P
Cobalt	75-125	54.7639		2.3880		52.66	99.5		P
Copper	75-125	28.0093		2.0263	U	26.33	106.4		P
Iron									NR
Lead	75-125	53.9994		1.1050		52.66	100.4		P
Magnesium									NR
Manganese	75-125	206.6375		164.2259		52.66	80.5		P
Mercury									NR
Nickel	75-125	53.1123		2.0263	U	52.66	100.9		P
Potassium									NR
Selenium	75-125	206.6694		1.0132	U	210.66	98.1		P
Silver	75-125	5.2233		1.0132	U	5.27	99.1		P
Sodium									NR
Thallium	75-125	211.9851		0.5066	U	210.66	100.6		P
Vanadium	75-125	57.5801		3.9495		52.66	101.8		P
Zinc	75-125	57.1554		3.4359		52.66	102.0		P

Comments:

CLIENT_SAMPLE_ID: SB02-12

START - DALLAS

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

12S1

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.165 SAS No.: _____ SDG No.: 12____

Matrix (soil/water): SOIL__ Level (low/med): LOW___

% Solids for Sample: _94.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony	75-125	51.0101		1.0132	U	52.66	96.9		P
Arsenic	75-125	212.9950		0.9851		210.66	100.6		P
Barium	75-125	225.2018		10.2355		210.66	102.0		P
Beryllium	75-125	5.3178		0.5066	U	5.27	100.9		P
Cadmium	75-125	5.7605		0.5066	U	5.27	109.3		P
Calcium									NR
Chromium	75-125	23.7673		2.3949		21.07	101.4		P
Cobalt	75-125	55.2428		2.3880		52.66	100.4		P
Copper	75-125	27.8376		2.0263	U	26.33	105.7		P
Iron									NR
Lead	75-125	54.7945		1.1050		52.66	102.0		P
Magnesium									NR
Manganese	75-125	322.3498		164.2259		52.66	300.3	N	P
Mercury									NR
Nickel	75-125	53.4112		2.0263	U	52.66	101.4		P
Potassium									NR
Selenium	75-125	207.7138		1.0132	U	210.66	98.6		P
Silver	75-125	5.2340		1.0132	U	5.27	99.3		P
Sodium									NR
Thallium	75-125	213.5309		0.5066	U	210.66	101.4		P
Vanadium	75-125	58.7880		3.9495		52.66	104.2		P
Zinc	75-125	58.0136		3.4359		52.66	103.6		P

Comments:

CLIENT_SAMPLE_ID: SB02-12

FORM V (Part 1) - IN

002352

START - DALLAS

6
DUPLICATES

EPA SAMPLE NO.

12D

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.165 SAS No.: _____ SDG No.: 12____

Matrix (soil/water): SOIL_ Level (low/med): _LOW__

% Solids for Sample: _94.0 % Solids for Duplicate: __94.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		1721.5003		1831.4749		6.2		P
Antimony		51.8405		51.0101		1.6		P
Arsenic		212.6987		212.9950		0.1		P
Barium		219.5873		225.2018		2.5		P
Beryllium		5.2525		5.3178		1.2		P
Cadmium		5.7310		5.7605		0.5		P
Calcium	52.6650	187.9645		204.3133		8.3		P
Chromium		23.8812		23.7673		0.5		P
Cobalt		54.7639		55.2428		0.9		P
Copper		28.0093		27.8376		0.6		P
Iron		3250.2640		3344.3210		2.9		P
Lead		53.9994		54.7945		1.5		P
Magnesium	52.6650	67.7781		73.2141		7.7		P
Manganese		206.6375		322.3498		43.7	*	P
Mercury								NR
Nickel		53.1123		53.4112		0.6		P
Potassium	105.3300	452.6086		422.3058		6.9		P
Selenium		206.6694		207.7138		0.5		P
Silver	1.0530	5.2233		5.2340		0.2		P
Sodium	105.3300	137.8125		131.1066		5.0		P
Thallium		211.9851		213.5309		0.7		P
Vanadium		57.5801		58.7880		2.1		P
Zinc		57.1554		58.0136		1.5		P

START - DALLAS

7

LABORATORY CONTROL SAMPLE

ECOLOGY_AND_ENVIRONMENT__ Contract: _____

EANDE_ Case No.: 9801.165 SAS No.: _____ SDG No.: 12____

Source: ERA_____

CS Source: _____

	Aqueous (ug/L)			Solid (mg/kg)					
	True	Found	%R	True	Found	C	Limits		%R
				100.0	115.3		80.0	120.0	115.3
				100.0	107.6		80.0	120.0	107.6
				100.0	109.1		80.0	120.0	109.1
				100.0	105.5		80.0	120.0	105.5
m				100.0	109.9		80.0	120.0	109.9
				100.0	104.4		80.0	120.0	104.4
				1000.0	1074.4		800.0	1200.0	107.4
				100.0	106.5		80.0	120.0	106.5
				100.0	102.9		80.0	120.0	102.9
				100.0	104.1		80.0	120.0	104.1
				100.0	108.9		80.0	120.0	108.9
				100.0	103.9		80.0	120.0	103.9
m				1000.0	1063.9		800.0	1200.0	106.4
e				100.0	105.6		80.0	120.0	105.6
				100.0	102.4		80.0	120.0	102.4
m				1000.0	993.6		800.0	1200.0	99.4
				100.0	106.3		80.0	120.0	106.3
				5.0	5.1		4.0	6.0	102.0
				1000.0	1033.2		800.0	1200.0	103.3
				100.0	105.9		80.0	120.0	105.9
				100.0	106.8		80.0	120.0	106.8
				100.0	107.3		80.0	120.0	107.3

FORM VII - IN

START - DALLAS

7

LABORATORY CONTROL SAMPLE

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.165 SAS No.: _____ SDG No.: 12___

Solid LCS Source: ERA_____

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum									
Antimony									
Arsenic									
Barium									
Beryllium									
Cadmium									
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead									
Magnesium									
Manganese									
Mercury				4.4	4.0		3.0	5.8	90.9
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									

START - DALLAS

8

STANDARD ADDITION RESULTS

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract:_____

Lab Code: EANDE_ Case No.: 9801.165 SAS No.:_____ SDG No.:12____

Concentration Units: ug/L

EPA Sample No.	An	0 ADD ABS	1 ADD CON	1 ADD ABS	2 ADD CON	2 ADD ABS	3 ADD CON	3 ADD ABS	Final Conc.	r	2

START - DALLAS

9

ICP SERIAL DILUTION

EPA SAMPLE NO.

BATCHL

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.165 SAS No.: _____ SDG No.: 12____

Matrix (soil/water): SOIL_ Level (low/med): LOW__

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	19889.56		19961.60		0.4		P
Antimony	10.00	U	50.00	U			P
Arsenic	20.58		26.55		29.0		P
Barium	341.68		349.04		2.2		P
Beryllium	5.00	U	25.00	U			P
Cadmium	9.99		25.00	U	100.0		P
Calcium							NR
Chromium	64.88		636.88		881.6		P
Cobalt	31.40		100.00	U	100.0		P
Copper	27.84		100.00	U	100.0		P
Iron	69868.74		74341.45		6.4		P
Lead	30.05		42.34		40.9		P
Magnesium							NR
Manganese	452.24		880.13		94.6		P
Mercury							NR
Nickel	58.96		329.98		459.7		P
Potassium							NR
Selenium	10.00	U	50.00	U			P
Silver	10.00	U	50.00	U			P
Sodium							NR
Thallium	5.00	U	25.00	U			P
Vanadium	105.49		110.73		5.0		P
Zinc	75.99		140.62		85.1		P

FORM IX - IN

002357

START - DALLAS

9

ICP SERIAL DILUTION

EPA SAMPLE NO.

1.52L

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.165 SAS No.: _____ SDG No.: 12____

Matrix (soil/water): SOIL_ Level (low/med): LOW__

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum							NR
Antimony							NR
Arsenic							NR
Barium							NR
Beryllium							NR
Cadmium							NR
Calcium	1541.06		2500.00	U	100.0		P
Chromium							NR
Cobalt							NR
Copper							NR
Iron							NR
Lead	-						NR
Magnesium	500.00	U	2500.00	U			P
Manganese							NR
Mercury							NR
Nickel							NR
Potassium	6222.92		7935.09		27.5		P
Selenium							NR
Silver							NR
Sodium	1000.00		5000.00				P
Thallium							NR
Vanadium							NR
Zinc							NR

START - DALLAS

10
Instrument Detection Limits (Quarterly)

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.165 SAS No.: _____ SDG No.: 12____

ICP ID Number: OPTIMA_____

Flame AA ID Number : _____

Furnace AA ID Number : _____

Analyte	Wave-length (nm)	Back-ground	PQL (ug/L)	M
Aluminum	396.15		100.0	P
Antimony	206.83		10.0	P
Arsenic	188.98		5.0	P
Barium	233.53		20.0	P
Beryllium	313.11		5.0	P
Cadmium	226.50		5.0	P
Calcium	315.89		500.0	P
Chromium	205.55		10.0	P
Cobalt	228.62		20.0	P
Copper	324.75		20.0	P
Iron	259.94		50.0	P
Lead	220.35		5.0	P
Magnesium	279.08		500.0	P
Manganese	257.61		10.0	P
Mercury				NR
Nickel	231.60		20.0	P
Potassium	766.49		1000.0	P
Selenium	196.03		10.0	P
Silver	328.07		10.0	P
Sodium	589.59		1000.0	P
Thallium	190.80		5.0	P
Vanadium	292.40		20.0	P
Zinc	213.86		10.0	P

Comments:

FORM X - IN

002359

START - DALLAS

10
Instrument Detection Limits (Quarterly)

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.165 SAS No.: _____ SDG No.: 12____

ICP ID Number: _____

Flame AA ID Number : 2380_____

Furnace AA ID Number : _____

Analyte	Wave-length (nm)	Back-ground	PQL (ug/L)	M
Aluminum				NR
Antimony				NR
Arsenic				NR
Barium				NR
Beryllium				NR
Cadmium				NR
Calcium				NR
Chromium				NR
Cobalt				NR
Copper				NR
Iron				NR
Lead				NR
Magnesium				NR
Manganese				NR
Mercury	253.70		0.1	CV
Nickel				NR
Potassium				NR
Selenium				NR
Silver				NR
Sodium				NR
Thallium				NR
Vanadium				NR
Zinc				NR

Comments:

FORM X - IN

002360

START - DALLAS

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.165 SAS No.: _____ SDG No.: 12____

ICP ID Number: OPTIMA_____ Date: 03/20/98

Analyte	Wave-length (nm)	Interelement Correction Factors for : Al	Ca	Fe	Mg	
Aluminum	396.15	0.0000000	0.0000000	0.0000000	0.0000000	
Antimony	206.83	0.0430283	0.0000000	0.0000000	0.0000000	
Arsenic	188.98	0.0480027	0.0000000	0.0000000	0.0000000	
Barium	233.53	0.0000000	0.0000000	0.0000000	0.0000000	
Beryllium	313.11	0.0000000	0.0000000	0.0000000	0.0000000	
Cadmium	226.50	0.0000000	0.0000000	0.0001562	0.0000000	
Calcium	315.89	0.0000000	0.0000000	0.0000000	0.0000000	
Chromium	205.55	0.0000000	0.0000000	0.0000000	0.0000000	
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	
Copper	324.75	0.0000000	0.0000000	0.0000000	0.0000000	
Iron	259.94	0.0000000	0.0000000	0.0000000	0.0000000	
Lead	220.35	-0.0482720	0.0000000	0.0000000	0.0000000	
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000211	
Mercury						
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	
Selenium	196.03	-0.1642520	0.0000000	0.0000000	-0.0000167	
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	
Sodium	589.59	0.0000000	0.0000000	0.0000000	0.0000000	
Thallium	190.80	0.0000000	0.0000292	-0.0000820	0.0000000	
Vanadium	292.40	0.0000000	0.0000000	-0.0002010	0.0000000	
Zinc	213.86	0.0000000	0.0000000	0.0001255	0.0000315	

Comments:

FORM XI (Part 1) - IN

002361

START - DALLAS

12
ICP LINEAR RANGES (QUARTERLY)

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.165 SAS No.: _____ SDG No.: 12____

ICP ID Number: OPTIMA_____ Date: 05/09/98

Analyte	Integ. Time (sec.)	Concentration (ug/L)	M
Aluminum	10.00	500000.0	P
Antimony	10.00	50000.0	P
Arsenic	10.00	20000.0	P
Barium	10.00	10000.0	P
Beryllium	10.00	10000.0	P
Cadmium	10.00	10000.0	P
Calcium	10.00	50000.0	P
Chromium	10.00	10000.0	P
Cobalt	10.00	20000.0	P
Copper	10.00	50000.0	P
Iron	10.00	100000.0	P
Lead	10.00	10000.0	P
Magnesium	10.00	500000.0	P
Manganese	10.00	10000.0	P
Mercury			NR
Nickel	10.00	10000.0	P
Potassium	10.00	50000.0	P
Selenium	10.00	20000.0	P
Silver	10.00	5000.0	P
Sodium	10.00	50000.0	P
Thallium	10.00	20000.0	P
Vanadium	10.00	20000.0	P
Zinc	10.00	5000.0	P

Comments:

FORM XII - IN

002362

START - DALLAS

13
PREPARATION LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.165 SAS No.: _____ SDG No.:12____

Method: P_

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
0102	06/05/98	1.01	100
0405	06/05/98	1.00	100
0405	06/05/98	1.03	100
1.52	06/05/98	1.02	100
12	06/05/98	1.05	100
12D	06/05/98	1.01	100
12S	06/05/98	1.01	100
12S1	06/05/98	1.01	100
1415	06/05/98	1.05	100
LCSS	06/05/98	1.00	100
PBS	06/05/98	1.00	100

FORM XIII - IN

002363

START - DALLAS

13
PREPARATION LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.165 SAS No.: _____ SDG No.:12____

Method: CV

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
0102	06/09/98	0.62	100
0405	06/09/98	0.60	100
0405	06/09/98	0.60	100
1.52	06/09/98	0.60	100
12	06/09/98	0.60	100
1415	06/09/98	0.61	100
LCSS	06/09/98	0.20	100
PBS	06/09/98	0.20	100

FORM XIII - IN

002364

START - DALLAS

14

ANALYSIS RUN LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.165 SAS No.: _____ SDG No.:12___

Instrument ID Number: OPTIMA_____ Method: P_

Start Date: 06/09/98 End Date: 06/10/98

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	
S0	1.00	2244		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
S	1.00	2248			X	X	X	X	X		X	X	X		X		X		X		X	X		X	X	X	
S	1.00	2250		X										X													
	1.00	2253																									
ICV	1.00	2256		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
ICB	1.00	2300		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
CCV	1.00	2303		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
CCB	1.00	2306		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
ICSAB	1.00	2310		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
PBS	1.00	2313		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
LCSS	1.00	2317		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
12	1.00	2320		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
12S	1.00	2324			X	X	X	X	X		X	X	X		X		X		X		X	X		X	X	X	
12S1	1.00	2327			X	X	X	X	X		X	X	X		X		X		X		X	X		X	X	X	
1.52	1.00	2330		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
0405	1.00	2333		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
0102	1.00	2337		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
0405	1.00	2340		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
CCV	1.00	2344		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
CCB	1.00	2347		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
1415	1.00	2351		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
ZZZZZ	1.00	2354																									
ZZZZZZ	1.00	2358																									
ZZZZZZ	1.00	0001																									
ZZZZZZ	1.00	0004																									
ZZZZZZ	1.00	0008																									
ZZZZZZ	1.00	0012																									
ZZZZZZ	1.00	0015																									
ZZZZZZ	1.00	0018																									
ZZZZZZ	1.00	0022																									
CCV	1.00	0025		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
CCB	1.00	0028		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	

FORM XIV - IN

002365

START - DALLAS

14

ANALYSIS RUN LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.165 SAS No.: _____ SDG No.:12____

Instrument ID Number: OPTIMA_____ Method: P_

Start Date: 06/09/98 End Date: 06/10/98

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	
ZZZZZZ	1.00	0032																								
ZZZZZZ	1.00	0035																								
BATCH	1.00	0039		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
BATCHL	5.00	0042		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
ZZZZZZ	1.00	0045																								
ZZZZZZ	1.00	0049																								
ZZZZZZ	1.00	0052																								
ZZZZZZ	1.00	0056																								
ZZZZZZ	1.00	0059																								
ZZZZZZ	1.00	0102																								
CCV	1.00	0106		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	
CCB	1.00	0109		X	X	X	X	X	X		X	X	X	X	X		X		X		X	X		X	X	X	

FORM XIV - IN

002366

START - DALLAS

14
ANALYSIS RUN LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.165 SAS No.: _____ SDG No.:12____

Instrument ID Number: OPTIMA_____ Method: P_

Start Date: 06/12/98 End Date: 06/12/98

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	
S0	1.00	1250								X						X				X			X				
S	1.00	1250								X						X				X			X				
S	1.00	1250								X						X				X			X				
	1.00	1251								X						X				X			X				
ICV	1.00	1251								X						X				X			X				
ICB	1.00	1251								X						X				X			X				
CCV	1.00	1251								X						X				X			X				
CCB	1.00	1251								X						X				X			X				
ICSAB	10.00	1251								X						X				X			X				
PBS	1.00	1251								X						X				X			X				
LCSS	1.00	1251								X						X				X			X				
12	1.00	1251								X						X				X			X				
12S	1.00	1251																									
12S1	1.00	1251																									
1.52	1.00	1251								X						X				X			X				
1.52L	5.00	1251								X						X				X			X				
0405	1.00	1251								X						X				X			X				
0102	1.00	1251								X						X				X			X				
CCV	1.00	1251								X						X				X			X				
CCB	1.00	1251								X						X				X			X				
0405	1.00	1251								X						X				X			X				
15	1.00	1251								X						X				X			X				
ZZZZZZ	1.00	1251																									
ZZZZZZ	1.00	1251																									
ZZZZZZ	1.00	1251																									
ZZZZZZ	1.00	1251																									
ZZZZZZ	1.00	1252																									
CCV	1.00	1252								X						X				X			X				
CCB	1.00	1252								X						X				X			X				

FORM XIV - IN

002367

START - DALLAS

14
ANALYSIS RUN LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.165 SAS No.: _____ SDG No.:12____

Instrument ID Number: 2380_____ Method: CV

Start Date: 06/09/98 End Date: 06/09/98

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	
S0	1.00	1558																X									
S0.5	1.00	1600																X									
S1	1.00	1602																X									
[redacted]	1.00	1604																X									
S5	1.00	1606																X									
S10	1.00	1608																X									
ICV	1.00	1610																X									
ICB	1.00	1612																X									
CCV	1.00	1614																X									
CCB	1.00	1616																X									
PBS	1.00	1618																X									
LCSS	1.00	1620																X									
12	1.00	1622																X									
1.52	1.00	1624																X									
0405	1.00	1626																X									
0102	1.00	1628																X									
0405	1.00	1630																X									
1415	1.00	1632																X									
ZZZZZZ	1.00	1634																										
ZZZZZZ	1.00	1636																										
CCV	1.00	1638																X									
[redacted]B	1.00	1640																X									

FORM XIV - IN

453

002368

TEST CODE :SPH 1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : PH UNITS : S.U.
PARAMETER : pH

SAMPLE ID	RESULTS	Q	QNT. LIMIT
EE-98-07830			
SB02-12	6.1		0.10
EE-98-07831			
SB03-1.52	5.5		0.10
EE-98-07832			
SB04-0405	6.6		0.10
EE-98-07833			
SB05-0102	6.7		0.10
EE-98-07834			
SB05-0405	6.4		0.10
EE-98-07835			
SB05-1415	6.6		0.10

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE
NA = NOT APPLICABLE

QUALITY CONTROL FOR PRECISION
RESULTS OF ANALYSIS OF DUPLICATE
ANALYSES OF SOIL SAMPLES

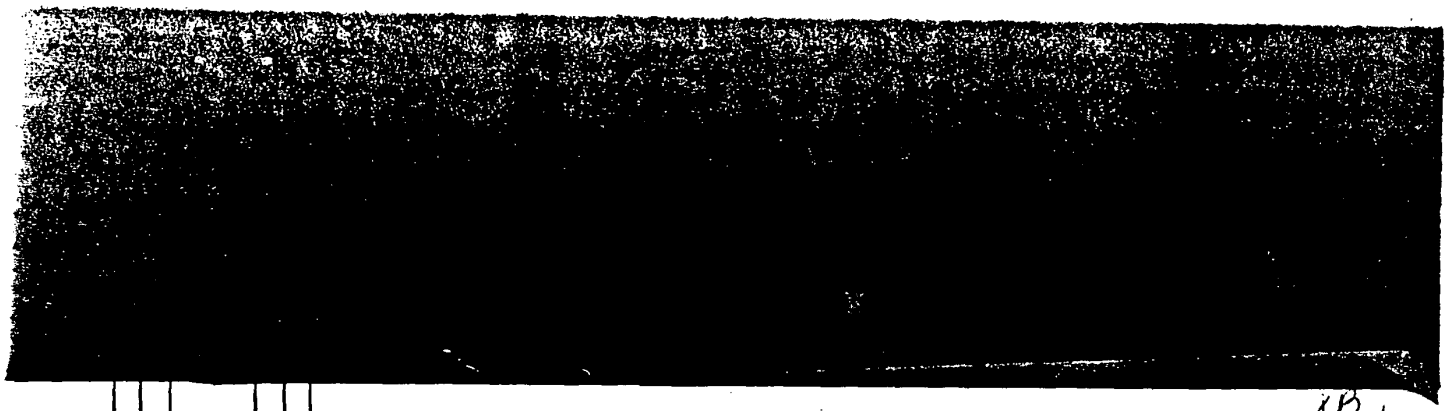
9801.165

(s.u.)

Parameter	E & E Laboratory No. 98-	Sample Result	Duplicate Result	Relative Percent Difference (RPD)
pH	Batch QC	8.03	8.06	0.4

THIS RPD IS WITHIN E & E, INC. QC TARGETS.

002370



KB 6/4/98

Project No.

TITLE

Book No. 1267

27

From Page No.

#980603121@

SOP 34 (HRO)

Test Performed: SpH/W.pH

Date Analyzed: 6-3-98

Work Performed by: K. Bernard

Job Number | ID Number | Secure Storage Area Received from

Solution 10.1

Instrument 82 pH MERL

Stock

Prepared

Stand.

Curve Date

Other:

Book Page

Expires

Job #	Sample ID #	Sample Amount	Temp °C	pH	Comments
Buffer	4.00 2nd run	—	20.9	3.99	Fisher # 973037-24 395
	7.02	—	21.6	7.02	972988-24 299
	10.00	—	22.2	10.07	973003-24 395
9801.165	7830.03	20.04	20.1	6.10	
	7831.03	20.01	19.9	5.52	
	7832.03	20.05	19.7	6.56	
	7833.03	20.07	19.6	6.68	
	7834.03	20.08	20.5	6.43	
	7835.03	20.02	20.7	6.58	
9801.166	7837.03	20.05	20.3	8.03	
	7837.03 dup	20.01	19.3	8.06	RPD = 0.4%
Buffer	7.02	—	21.9 ~~20.5~~ room temp	7.05	Fisher # 972988-24 299
9801.180	clar. inf INST 7924.01	—	10.3	6.92	
	clar eff 7925.01	—	10.2	7.93	
9801.179	pcm inf 7921.01	—	10.6	8.09	
	pcm eff 7922.01	—	9.70	6.79	
9801.182	ont inf 7926.01	—	10.9	8.44	
	ont eff 7927.01	—	11.5	8.64	
	ont eff 7927.01 dup		12.1	8.70	RPD = 0.7%
Buffer	7.02	—	21.1	7.05	Fisher # 972988-24 299

To Page No.

Witnessed & Understood by me, Paul F. Bernard

Date 6-4-98

Invented by

Recorded by

Date

To Page No.

002371

TEST CODE :STS 1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : SOLIDS TOTAL UNITS : %
PARAMETER : Solids-Total

SAMPLE ID	RESULTS	Q
EE-98-07830		
SB02-12	94	
EE-98-07831		
SB03-1.52	94	
EE-98-07832		
SB04-0405	94	
EE-98-07833		
SB05-0102	88	
EE-98-07834		
SB05-0405	81	
EE-98-07835		
SB05-1415	82	

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE

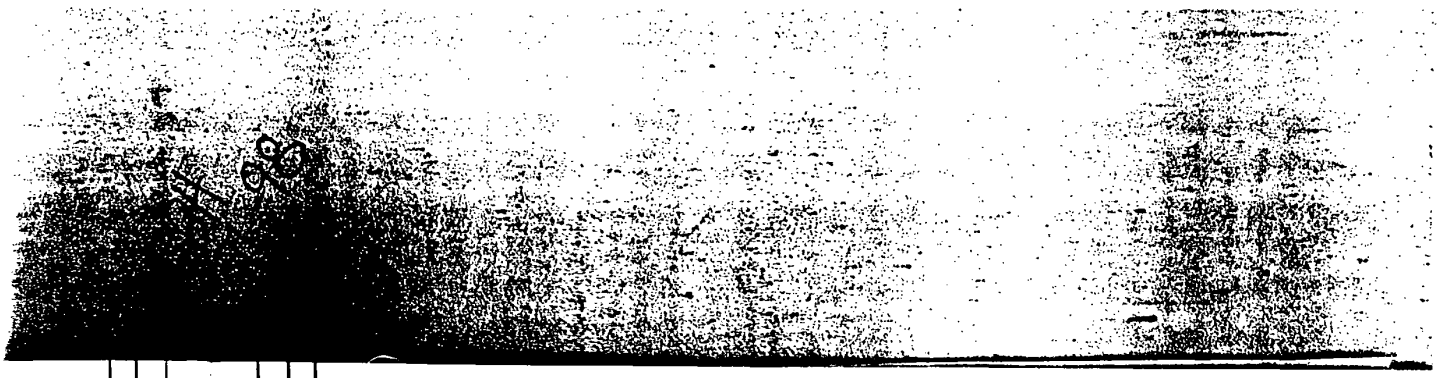
QUALITY CONTROL FOR PRECISION
RESULTS OF ANALYSIS OF DUPLICATE
ANALYSES OF SOLID SAMPLES

9801.165

(%)

Parameter	E & E Laboratory No. 98-	Sample Result	Duplicate Result	Relative Percent Difference (RPD)
Solids-Total	07835	82.4	82.6	0.2

THIS RPD IS WITHIN E & E, INC. QC TARGETS.



Project No.
TITLE _____ Book No. 1238 171

From Page No. ___

9806161172K

Test Performed: STS
Method Number:
Date: 6/16/98
Work Performed By: Marlin G. Hebert
Job No. ID No.

Balance: Gram C.14
Instrument: Mettler PM300
Block
Prepared
Dried
Curve Data
Other:
Book Page
Book Page
Sheets

In @ 9:45 @ 105°C 6/16/98 mo
out @ 11:15 @ 105°C 6/16/98 mo
reweight @ 12:45 @ 105°C 6-16-98 RB

Job #	Sample #	Dish #	Dish wt (g)	Wet wt Sample (g)	Dry wt. + Sample (g)	% Solid	% moisture
9801.165	7830.03	1	0.99	6.45	7.05	94.0	6.0
					7.05		
	7831.03	2	0.99	6.26	6.89	94.2	5.8
					6.90		
	7832.03	3	0.99	6.21	6.81	93.6	6.4
					6.80		
	7834.03	4	0.99	9.15	8.38	80.7	19.3
					8.37		
	7835.03	5	0.98	6.77	6.56	82.4	17.6
					6.56		RB + 0.2%
	7835.03dup	6	0.99	6.91	6.70	82.6	17.4
					6.70		
	7833.03	7	0.98	7.6 (5.1 6/16/98 MO)	7.60	88.0	12.0
					7.59		

6-16-98 RB

To Page No. ___

To Page No. ___

Witnessed & Understood by me. Paul J. Bernard
Date 6/16/98
Invented by
Recorded by
Date

002374

ecology and environment, inc.
International Specialists in the Environment

ANALYTICAL SERVICES CENTER
4493 Walden Avenue
Lancaster, New York 14086
Tel: (716) 685-8080, Fax: (716) 685-0852

MEMORANDUM

TO: Tom Beer - E & E Inc. Dallas

FROM: Caryn Wojtowicz - ASC Project Manager cwojtowicz

DATE: May 19, 1998

SUBJECT: START - Dallas
KJ6103.052601SFG1-56
Wilcox Refinery

RE: 9800.854

CC: Lab File

Attached is the laboratory report of the analyses conducted on samples received at the Analytical Services Center on April 29, 1998. Analysis was performed according to the procedures set forth in the "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Update III, Third Edition, U.S. EPA, June 1997.

The chain of custody form provided herein is integral to this report and must be included with the analytical results forms upon transferral to another data user.

All samples on which this report is based will be retained by E & E for a period of 30 days from the date of this report, unless otherwise instructed by the client. If additional storage of samples is requested by the client, a storage fee of $1.00 per sample container per month will be charged for each sample, with such charges accruing until destruction of the samples is authorized by the client.

CW/fal
Enclosure

1

recycled paper

Sample results were sent to you and David Anderson by facsimile on May 13, 1998.

BTEX

Sample SB0106 was analyzed by methanol extraction procedures and at a fifty-fold dilution based on the level of target compounds detected in the undiluted analysis. Sample SB011011 also required analysis at a five-fold dilution due to the level of target compounds. Quantitation limits have been adjusted accordingly.

TPH by Method TRNCC

Due to the level of target compounds present in sample SB0106, the sample was analyzed at a five-fold dilution. Quantitation limits have been adjusted accordingly.

PAH

Due to the level of target compounds present in sample SB0106, the sample required analysis at a ten-fold dilution. Quantitation limits have been adjusted accordingly. Surrogate recovery was not obtainable due to dilution effects. The associated method blank and laboratory control sample had acceptable surrogate recovery.

Metals

Sample SB0106 and its matrix spike/matrix spike duplicate (MS/MSD) exceeded the linear range for lead. The sample and MS/MSD were reanalyzed for lead at at a ten-fold dilution.

The MS analysis of sample SB0106 did not meet the spike recovery criterion for antimony, cadmium, chromium, copper, manganese, silver, or zinc. The MSD did not meet the spike recovery criterion for cadmium, chromium, manganese, or silver. The duplicate analysis did not meet RPD criterion for calcium, copper, lead, magnesium, manganese, or zinc. No further action is required. Reported sample results have been flagged accordingly.

All reported iron sample results have been flagged "E" based on the serial dilution. A chemical/physical interference is suspected.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Caryn Wojtowicz

Caryn Wojtowicz - Project Manager
Analytical Services Center
May 19, 1998

002377

ecology and environment, inc.
368 PLEASANTVIEW DRIVE, LANCASTER, NEW YORK 14086, TEL. 716/684-8060
International Specialists in the Environment

CHAIN-OF-CUSTODY RECORD

Project No.:	Project Name:	Project Manager:
05260015PXX	Wilcox Refinery	Tom Beer

Samplers: (Signatures) J. Beer, T. Beer

Field Team Leader: Tom Beer

STATION NUMBER	DATE	TIME	SAMPLE TYPE COMP	SAMPLE TYPE GRAB	SAMPLE TYPE AIR	SAMPLE INFORMATION — EXPECTED COMPOUNDS (Concentration)*	STATION LOCATION/Tag No.	NUMBER OF CONTAINERS	Metals (6010B)	PAHs (8310)	TPH (DWELL 1005)	pH	BTEX	REMARKS
SB0106	4/27/98	1754		X		Metals, TPH, PAHs, acidic	SB01 / 6006701	1	X	X	X	X		
SB0106	4/27/98	1758		X		BTEX	SB01 / 6006702	2					X	
SED1011	4/27/98	1823		X		Metals, TPH, PAHs, acidic	SB01 / 6006703	1	X	X	X	X		
SB01011	4/27/98	1825		X		BTEX	SB01 / 6006704	2					X	
SED12	4/28/98	1006		X		BTEX	SED12 / 6006705	2					X	
SED12	4/28/98	1012		X		Metals, TPH, PAH's, acidic	SED12 / 6006707	1	X	X	X	X		
SED11	4/28/98	1040		X		BTEX	SED11 / 6006708	2					X	
SED11	4/28/98	1040		X		Metals, TPH, PAH's, acidic	SED11 / 6006709	1	X	X	X	X		

Relinquished By: (Signature)	Date/Time:	Received By: (Signature)	Relinquished By: (Signature)	Date/Time:	Received By: (Signature)	Ship Via:
J. Beer	4/28/98					Federal Express
Relinquished By: (Signature)	Date/Time:	Received By: (Signature)	Relinquished By: (Signature)	Date/Time:	Received By: (Signature)	BL/Airbill Number: 8055 0003343
Relinquished By: (Signature) FedEx	Date/Time: 4-29-98 1012	Received For Laboratory By: (Signature)	Relinquished By: (Signature)	Date/Time:	Received For Laboratory By: (Signature)	Date:

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

*See CONCENTRATION RANGE on back of form.

234055

TEST CODE :STS 1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : SOLIDS TOTAL UNITS : %
PARAMETER : Solids-Total

SAMPLE ID	RESULTS	Q
EE-98-05713		
SB0106	92	
EE-98-05714		
SB011011	83	
EE-98-05715		
SED12	81	
EE-98-05716		
SED11	80	

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE

7

QUALITY CONTROL FOR PRECISION
RESULTS OF ANALYSIS OF DUPLICATE
ANALYSES OF SOLID SAMPLES

9800.854

(%)

Parameter	E & E Laboratory No. 98-	Sample Result	Duplicate Result	Relative Percent Difference (RPD)
Solids-Total	Batch QC	84.4	85.7	1.5

THIS RPD IS WITHIN E & E, INC. QC TARGETS.

8

TEST CODE :SPH 1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : PH UNITS : S.U.
PARAMETER : pH

SAMPLE ID	RESULTS	Q	QNT. LIMIT
EE-98-05713			
SB0106	8.0		0.10
EE-98-05714			
SB011011	8.8		0.10
EE-98-05715			
SED12	7.1		0.10
EE-98-05716			
SED11	7.1		0.10

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE
NA = NOT APPLICABLE

002381

QUALITY CONTROL FOR PRECISION
RESULTS OF ANALYSIS OF DUPLICATE
ANALYSES OF SOIL SAMPLES

9800.854

(s.u.)

Parameter	E & E Laboratory No. 98-	Sample Result	Duplicate Result	Relative Percent Difference (RPD)
pH	05716	7.07	7.09	0.3

THIS RPD IS WITHIN E & E, INC. QC TARGETS.

002382

BTEX
QUALITY CONTROL FOR ACCURACY: PERCENT
RECOVERY OF SURROGATE SPIKES
(MATRIX: SOLID)

9800.854

E & E Laboratory No.-98

(ug/L)

Compound	Amount Added	Amount Determined	Percent Recovery	E & E QC Targets
Trifluorotoluene				70 - 130
05713	40.0	35.3	88.2	
Method Blank (05/06)	40.0	39.9	99.8	
LCS (05/06)	40.0	42.2	106	

THESE RECOVERIES ARE WITHIN E & E, INC. QC TARGETS.

LCS = LABORATORY CONTROL SAMPLE

002383

BTEX
QUALITY CONTROL FOR ACCURACY: PERCENT
RECOVERY OF SURROGATE SPIKES
(MATRIX: SOLID)

9800.854

E & E Laboratory No.-98

(ug/kg)

Compound	Amount Added	Amount Determined	Percent Recovery	E & E QC Targets
Trifluorotoluene				26 - 139
05714	40.0	45.6	114	
05715	40.0	36.5	91.2	
05715 MS	40.0	34.4	86.1	
05715 MSD	40.0	38.8	97.1	
05716	40.0	30.6	76.5	
Method Blank (05/05)	40.0	40.0	100	
LCS (05/05)	40.0	40.2	101	

THESE RECOVERIES ARE WITHIN E & E, INC. QC TARGETS.

MS = MATRIX SPIKE
MSD = MATRIX SPIKE DUPLICATE
LCS = LABORATORY CONTROL SAMPLE

002384

QUALITY CONTROL FOR ACCURACY AND PRECISION:
PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)
OF SOLID MATRIX SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MSD)
(Sample # 05715)

9800.854

(ug/kg as received)

Compound	Original Value	Amount Added	Amount Determined MS	Amount Determined MSD	Percent Recovery MS	Percent Recovery MSD	RPD	E & E (RPD) Limits	E & E Percent Recovery Limits
Benzene	ND	20.0	18.7	18.2	94	91	2.7	<30	49 - 124
Toluene	ND	20.0	20.6	20.7	103	104	0.5	<30	46 - 117
Ethylbenzene	ND	20.0	18.5	18.6	93	93	0.5	<30	44 - 122
Total xylenes	ND	60.0	59.7	60.0	100	100	0.5	<30	54 - 118

THESE RECOVERIES AND RPDs ARE WITHIN E & E, INC. QC TARGETS.

ND = NOT DETECTED

QUALITY CONTROL FOR ACCURACY: PERCENT RECOVERY
FOR SPIKED SOLID SAMPLES
LABORATORY CONTROL SAMPLE (05/05)

9800.854

(ug/kg)

Compound	Amount Added	Amount Determined	Percent Recovery	E & E Percent Recovery Limits
Benzene	20.0	18.7	94	70 - 124
Toluene	20.0	20.0	100	73 - 117
Ethylbenzene	20.0	19.0	95	71 - 122
Total xylenes	60.0	62.5	104	75 - 118

THESE RECOVERIES ARE WITHIN E & E, INC. QC TARGETS.

002386

QUALITY CONTROL FOR ACCURACY: PERCENT RECOVERY
FOR SPIKED SOLID SAMPLES
LABORATORY CONTROL SAMPLE (05/06)

9800.854

(ug/L)

Compound	Amount Added	Amount Determined	Percent Recovery	E & E Percent Recovery Limits
Benzene	20.0	18.5	93	84 - 115
Toluene	20.0	18.8	94	83 - 115
Ethylbenzene	20.0	20.6	103	83 - 115
Total xylenes	60.0	65.4	109	82 - 115

THESE RECOVERIES ARE WITHIN E & E, INC. QC TARGETS.

002387

TEST CODE :SBTX0A1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 92 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-05713 MATRIX : SOLID
SAMPLE ID CLIENT: SB0106

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		4300
Toluene	410000		6500
Ethylbenzene	670000		4900
Total Xylenes	2600000		14000

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002388

TEST CODE :SBTX0A1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 83 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-05714 MATRIX : SOLID
SAMPLE ID CLIENT: SB011011

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	17		3.6
Toluene	230		5.4
Ethylbenzene	250		4.2
Total Xylenes	760		12

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :SBTX0A1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 81 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-05715 MATRIX : SOLID
SAMPLE ID CLIENT: SED12

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		0.74
Toluene	ND		1.1
Ethylbenzene	ND		0.86
Total Xylenes	ND		2.5

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002390

TEST CODE :SBTX0A1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 80 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-05716 MATRIX : SOLID
SAMPLE ID CLIENT: SED11

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		0.75
Toluene	ND		1.1
Ethylbenzene	ND		0.88
Total Xylenes	ND		2.5

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002391

8021B Retention Time Window Study

Instrument ID: VARIAN 3600 #1 CHARLIE Column: 30 M: 0.53mm; RTX-VOLATILES FSCC Run Dates: 04/27-4/29/98	Method: 8021B-Aromatics Spreadsheet: 8020RTW.WB1 (3600#1 RTW)

Aroclor		4/27/98 Mid Level RT	4/28/98 Mid Level RT	4/29/98 Mid Level RT	Mean RT	Std Dev	Calculated RTW (3x Std Dev)
MTBE		4.50	4.50	4.49	4.50	0.005	0.014
BENZENE		7.16	7.15	7.15	7.15	0.005	0.014
TOLUENE		10.46	10.45	10.45	10.45	0.005	0.014
CL-BENZENE		13.41	13.40	13.40	13.40	0.005	0.014
ETHLYBENZENE		13.65	13.64	13.63	13.64	0.008	0.024
M/P-XYLENE		13.85	13.83	13.83	13.84	0.009	0.028
O-XYLENE		14.77	14.76	14.76	14.76	0.005	0.014
1,3-DICHLOROBENZENE		18.69	18.69	18.69	18.69	0.000	0.000
1,4-DICHLOROBENZENE		18.94	18.94	18.93	18.94	0.005	0.014
1,2-DICHLOROBENZENE		19.77	19.78	19.77	19.77	0.005	0.014
TFT SURROGATE		8.35	8.36	8.38	8.36	0.012	0.037

50

TEST CODE :SBTX0A1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : Method Blank 05/05/98 MATRIX : SOLID

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		0.60
Toluene	ND		0.90
Ethylbenzene	ND		0.70
Total Xylenes	ND		2.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002393

TNRCC METHOD 1005- Total Petroleum Hydrocarbons

Ecology and Environment Inc.
Analytical Services Center

Units **mg/Kg**

Prep Batch No.: _____ Job No.: 9800.854

Run Batch : _____ LCS 855-126-2

COMPOUND	SPIKE ADDED (mg/Kg)	SAMPLE CONC. (mg/Kg)	LCS CONC. (mg/Kg)	LCS % REC	QC LIMITS REC.
C6 TO C28 HC	500	0	528	105.6	70 - 130

LCSD 855-126-3

COMPOUND	SPIKE ADDED (mg/Kg)	LCS CONC. (mg/Kg)	LCSD % REC	% RPD	QC LIMITS RPD	QC LIMITS REC
C6 TO C28 HC	500	502	100.4	5.1	35	70 - 130

* Values outside of QC limits

RPD: 0 out of 1 outside limits
Spike Recovery: 0 out of 2 outside limits

COMMENTS:

002394

TNRCC METHOD 1005- Total Petroleum Hydrocarbons

Ecology and Environment Inc.
Analytical Services Center

Units **mg/Kg**

Prep Batch No.: _____ Job No.: 9800.854

Run Batch : _____ MS/MSD 9800.854 5716

COMPOUND	SPIKE ADDED (mg/Kg)	SAMPLE CONC. (mg/Kg)	MS CONC. (mg/Kg)	MS % REC	QC LIMITS REC.
C6 TO C28 HC	500	0	351	70.2	70 - 130

COMPOUND	SPIKE ADDED (mg/Kg)	MSD CONC. (mg/Kg)	MSD % REC	% RPD	QC LIMITS RPD	QC LIMITS REC
C6 TO C28 HC	500	491	98.1	33.2	35	70 - 130

* Values outside of QC limits

RPD: 0 out of 1 outside limits
Spike Recovery: 0 out of 2 outside limits

COMMENTS:

002395

TEST CODE :S1050A1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 92 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-05713 MATRIX : SOLID
SAMPLE ID CLIENT: SB0106

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	2600		140
>C10 -> C28 Hydrocarbons	1500		140
C6 -> C28 Hydrocarbons	4100		270

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 83 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-05714 MATRIX : SOLID
SAMPLE ID CLIENT: SB011011

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	370		30
>C10 -> C28 Hydrocarbons	120		30
C6 -> C28 Hydrocarbons	490		60

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 81 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-05715 MATRIX : SOLID
SAMPLE ID CLIENT: SED12

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		31
>C10 -> C28 Hydrocarbons	ND		31
C6 -> C28 Hydrocarbons	ND		62

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 80 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-05716 MATRIX : SOLID
SAMPLE ID CLIENT: SED11

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		31
>C10 -> C28 Hydrocarbons	ND		31
C6 -> C28 Hydrocarbons	ND		62

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : Method Blank 855-126-1 MATRIX : SOLID

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		25
>C10 -> C28 Hydrocarbons	ND		25
C6 -> C28 Hydrocarbons	ND		50

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

QUALITY CONTROL FOR ACCURACY: PERCENT RECOVERY
OF SURROGATE SPIKES

9800.854

E & E Laboratory 98-

(ug/kg)

Parameter	Amount Added	Amount Determined	Percent Recovery
Terphenyl-d14			
05713	1000	--	DL
05714	1000	798	79.8
05714 MS	1000	770	77.0
05714 MSD	1000	808	80.8
05715	1000	988	98.8
05716	1000	1100	110
Method Blank (1339-1-1)	1000	900	90.0
LCS (1339-1-2)	1000	883	88.3

THESE RECOVERIES ARE WITHIN E & E, INC. QC TARGETS.

MS = MATRIX SPIKE
MSD = MATRIX SPIKE DUPLICATE
LCS = LABORATORY CONTROL SAMPLE
DL = DILUTED OUT

QUALITY CONTROL FOR ACCURACY AND PRECISION:
PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)
OF SOIL MATRIX SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MSD)
(Sample # 05714)

9800.854

(ug/kg as received)

Parameter	Original Value	Amount Added	Amount Determined MS	Amount Determined MSD	Percent Recovery MS	Percent Recovery MSD	RPD
Naphthalene	ND	2500	1870	1950	74.8	78.0	4.2
Acenaphthylene	ND	2500	1920	1970	76.8	78.8	2.6
Acenaphthene	ND	2500	1800	1910	72.0	76.4	5.9
Fluorene	ND	250	210	225	84.0	90.0	6.9
Phenanthrene	ND	250	242	248	79.6	82.0	3.0
Anthracene	ND	125	95.8	101	76.6	80.8	5.3
Fluoranthene	ND	670	662	695	85.8	90.7	5.6
Pyrene	ND	670	526	553	60.0	64.0	6.5
Benzo(a)anthracene	ND	250	192	201	76.8	80.4	4.6
Chrysene	ND	250	201	211	80.4	84.4	4.9
Benzo(b)fluoranthene	ND	250	198	206	79.2	82.4	4.0
Benzo(k)fluoranthene	ND	250	185	201	74.0	80.4	8.3
Benzo(a)pyrene	ND	250	253	263	101	105	3.9
Dibenzo(a,h)anthracene	ND	670	316	329	47.2	49.1	4.0
Benzo(ghi)perylene	ND	670	486	493	72.5	73.6	1.4
Indeno(1,2,3-cd)pyrene	ND	250	180	183	72.0	73.2	1.7

THESE RECOVERIES AND RPDs ARE WITHIN E & E, INC. QC TARGETS.

ND = NOT DETECTED

002402

QUALITY CONTROL FOR ACCURACY: PERCENT RECOVERY
FOR SPIKED SOIL SAMPLES
Laboratory Control Sample (1339-1-2)

9800.854

(ug/kg)

Parameter	Amount Added	Amount Determined	Percent Recovery
Naphthalene	2500	2200	88.0
Acenaphthylene	2500	2180	87.2
Acenaphthene	2500	2260	90.4
Fluorene	250	225	90.0
Phenanthrene	250	224	89.6
Anthracene	117	104	88.9
Fluoranthene	670	610	91.0
Pyrene	670	609	90.9
Benzo(a)anthracene	250	223	89.2
Chrysene	250	227	90.8
Benzo(b)fluoranthene	250	230	92.0
Benzo(k)fluoranthene	250	219	87.6
Benzo(a)pyrene	250	260	104
Dibenzo(a,h)anthracene	670	363	54.2
Benzo(ghi)perylene	670	505	75.4
Indeno(1,2,3-cd)pyrene	250	194	77.6

THESE RECOVERIES ARE WITHIN E & E, INC. QC TARGETS.

002403

TEST CODE :SPAH0A1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 92 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-05713 MATRIX : SOLID
SAMPLE ID CLIENT: SB0106

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		2200
Acenaphthylene	ND		2200
1-methylnaphthalene	ND		2200
2-Methylnaphthalene	3200		2200
Acenaphthene	ND		2200
Fluorene	ND		220
Phenanthrene	1900		220
Anthracene	ND		220
Fluoranthene	5100		540
Pyrene	7000		540
Benzo(a)anthracene	570		220
Chrysene	1400		220
Benzo(b)fluoranthene	1100		220
Benzo(k)fluoranthene	350		220
Benzo(a)pyrene	1400		220
Dibenzo(a,h)anthracene	ND		540
Benzo(ghi)perylene	ND		540
Indeno(1,2,3-cd)pyrene	ND		220

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :SPAH0A1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 83 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-05714 MATRIX : SOLID
SAMPLE ID CLIENT: SB011011

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		240
Acenaphthylene	ND		240
1-methylnaphthalene	ND		240
2-Methylnaphthalene	340		240
Acenaphthene	ND		240
Fluorene	ND		24
Phenanthrene	52		24
Anthracene	ND		24
Fluoranthene	73		60
Pyrene	140		60
Benzo(a)anthracene	ND		24
Chrysene	ND		24
Benzo(b)fluoranthene	ND		24
Benzo(k)fluoranthene	ND		24
Benzo(a)pyrene	ND		24
Dibenzo(a,h)anthracene	ND		60
Benzo(ghi)perylene	ND		60
Indeno(1,2,3-cd)pyrene	ND		24

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :SPAH0A1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 81 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-05715 MATRIX : SOLID
SAMPLE ID CLIENT: SED12

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		250
Acenaphthylene	ND		250
1-methylnaphthalene	ND		250
2-Methylnaphthalene	ND		250
Acenaphthene	ND		250
Fluorene	ND		25
Phenanthrene	ND		25
Anthracene	ND		25
Fluoranthene	ND		62
Pyrene	120		62
Benzo(a)anthracene	33		25
Chrysene	ND		25
Benzo(b)fluoranthene	95		25
Benzo(k)fluoranthene	ND		25
Benzo(a)pyrene	41		25
Dibenzo(a,h)anthracene	ND		62
Benzo(ghi)perylene	ND		62
Indeno(1,2,3-cd)pyrene	ND		25

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :SPAH0A1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 80 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-05716 MATRIX : SOLID
SAMPLE ID CLIENT: SED11

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		250
Acenaphthylene	ND		250
1-methylnaphthalene	ND		250
2-Methylnaphthalene	ND		250
Acenaphthene	ND		250
Fluorene	ND		25
Phenanthrene	40		25
Anthracene	ND		25
Fluoranthene	89		62
Pyrene	410		62
Benzo(a)anthracene	49		25
Chrysene	64		25
Benzo(b)fluoranthene	ND		25
Benzo(k)fluoranthene	ND		25
Benzo(a)pyrene	41		25
Dibenzo(a,h)anthracene	ND		62
Benzo(ghi)perylene	ND		62
Indeno(1,2,3-cd)pyrene	ND		25

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

PERCENT RECOVERY FOR REFERENCE STANDARD :2ND SOURCE
METHOD/COLUMN/INSTRUMENT: PAH/HYPERPAH/LC-2

ANALYSIS DATE: 4/9/98 JOB # 9800 .564/565/566

NOTEBOOK:1229-171 STD. ID: STD # 1190-127-6 BATCH#:980408521R
STD. TYPE: REFERENCE

VIAL:108-3 UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	75.0	77.4	103
ACENAPHTHYLENE	75.0	76.1	101
ACENAPHTHENE	75.0	78.5	105
FLUORENE	7.50	7.6	101
PHENANTHRENE	7.50	7.86	105
ANTHRACENE	3.50	3.67	105
FLUORANTHENE	20.0	21.4	107
PYRENE	20.0	21.7	109
BENZO(A)ANTHRACENE	7.50	7.96	106
CHRYSENE	7.50	7.61	101
BENZO(B)FLUORANTHENE	7.50	8.04	107
BENZO(K)FLUORANTHENE	7.50	7.56	101
BENZO(A)PYRENE	7.50	6.98	93
DIBENZO(AH)ANTHRACENE	20.0	19.1	96
BENZO(GHI)PERYLENE	20.0	20.1	101
INDENO(CD123)PYRENE	7.50	7.53	100

4/9/98

IN CONTROL AVERAGE = 102.6

PERCENT RECOVERY FOR REFERENCE STANDARD :2ND SOURCE
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

ANALYSIS DATE: 4/10/98 JOB#:9800.564/.565/.640

NOTEBOOK: 1229-178 STD #: 1190-128-8 BATCH#:980410521R

VIAL:108-1 UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	75.0	73.7	98.3
ACENAPHTHYLENE	75.0	72.6	96.8
ACENAPHTHENE	75.0	75.0	100
FLUORENE	7.50	7.37	98.3
PHENANTHRENE	7.50	7.61	101
ANTHRACENE	3.50	3.61	103
FLUORANTHENE	20.0	22.4	112
PYRENE	20.0	22.5	113
BENZO(A)ANTHRACENE	7.50	8.20	109
CHRYSENE	7.50	7.67	102
BENZO(B)FLUORANTHENE	7.50	7.80	104
BENZO(K)FLUORANTHENE	7.50	7.50	100
BENZO(A)PYRENE	7.50	6.96	92.8
DIBENZO(AH)ANTHRACENE	20.0	18.4	92.0
BENZO(GHI)PERYLENE	20.0	19.7	98.5
INDENO(CD123)PYRENE	7.50	7.37	98.3

IN CONTROL AVERAGE = 101

Ac 4/13/98 Corr QA

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

INITIAL CAL NOTEBOOK:1229-178
INITIAL CAL. DATE:041098

ANALYSIS DATE: 4/11/98

JOB#:9800.564/.565/.611

NOTEBOOK:1229-178 STD#: 1190-128-4
STD TYPE: CONTINUING

BATCH#:980410521R

VIAL:104-2

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	50.3	101
ACENAPHTHYLENE	50.0	51.0	102
1-METHYLNAPHTHALENE	50.0	53	106
2-METHYLNAPHTHALENE	50.0	50.1	100
ACENAPHTHENE	50.0	51.4	103
FLUORENE	5.00	5.10	102
PHENANTHRENE	5.00	5.11	102
ANTHRACENE	2.50	2.57	103
FLUORANTHENE	12.5	13.7	110
PYRENE	12.5	14.1	113
P-TERPHENYL-D14	20.0	20.9	105
BENZO(A)ANTHRACENE	5.00	5.49	110
CHRYSENE	5.00	5.54	111
BENZO(B)FLUORANTHENE	5.00	5.63	113
BENZO(K)FLUORANTHENE	5.00	5.61	112
BENZO(A)PYRENE	5.00	5.38	108
DIBENZO(AH)ANTHRACENE	12.5	14.0	112
BENZO(GHI)PERYLENE	12.5	13.1	105
INDENO(CD123)PYRENE	5.00	5.31	106

IN CONTROL MC 4/13/98 AVERAGE = 106

279

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

INITIAL CAL NOTEBOOK:1229-178
INITIAL CAL. DATE:041098

ANALYSIS DATE: 4/11/98

JOB#:9800.564/.565/.611

NOTEBOOK:1229-178

STD#: 1190-128-4
STD TYPE: ENDING

BATCH#:980410521R

VIAL:104-4

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	50.2	100
ACENAPHTHYLENE	50.0	51.1	102
1-METHYLNAPHTHALENE	50.0	52.9	106
2-METHYLNAPHTHALENE	50.0	50.3	101
ACENAPHTHENE	50.0	51.2	102
FLUORENE	5.00	5.21	104
PHENANTHRENE	5.00	5.14	103
ANTHRACENE	2.50	2.60	104
FLUORANTHENE	12.5	14.0	112
PYRENE	12.5	14.0	112
P-TERPHENYL-D14	20.0	21.4	107
BENZO(A)ANTHRACENE	5.00	5.55	111
CHRYSENE	5.00	5.60	112
BENZO(B)FLUORANTHENE	5.00	5.48	110
BENZO(K)FLUORANTHENE	5.00	5.43	109
BENZO(A)PYRENE	5.00	5.28	106
DIBENZO(AH)ANTHRACENE	12.5	13.9	111
BENZO(GHI)PERYLENE	12.5	12.7	102
INDENO(CD123)PYRENE	5.00	5.24	105

IN CONTROL MC 4/13/98 AVERAGE = 106

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/HYPERPAH/LC-2

INITIAL CAL NOTEBOOK:1229-171
INITIAL CAL. DATE:04/08/98

ANALYSIS DATE:05/07/98

JOB#:9800.808/.824

NOTEBOOK:1263-15

STD. ID :
STD. TYPE:

STD #:1190-134-3
DAILY

BATCH#:980507521R

VIAL:102-02

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	49.5	99.0
ACENAPHTHYLENE	50.0	48.7	97.4
1-METHYLNAPHTHALENE	50.0	50.5	101
2-METHYLNAPHTHALENE	50.0	49.2	98.4
ACENAPHTHENE	50.0	48.8	97.6
FLUORENE	5.00	4.95	99.0
PHENANTHRENE	5.00	4.69	93.8
ANTHRACENE	2.50	2.41	96.4
FLUORANTHENE	12.50	11.4	91.2
PYRENE	12.50	10.9	87.2
P-TERPHENYL-D14	20.0	19.0	95.0
BENZO(A)ANTHRACENE	5.00	4.72	94.4
CHRYSENE	5.00	4.80	96.0
BENZO(B)FLUORANTHENE	5.00	4.75	95.0
BENZO(K)FLUORANTHENE	5.00	4.58	91.6
BENZO(A)PYRENE	5.00	5.53	111
DIBENZO(AH)ANTHRACENE	12.5	12.1	96.8
BENZO(GHI)PERYLENE	12.5	12.3	98.4
INDENO(CD123)PYRENE	5.00	4.65	93.0

IN CONTROL MM 5/7/98

AVERAGE = 96.4

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/HYPERPAH/LC-2

INITIAL CAL NOTEBOOK:1229-171
INITIAL CAL. DATE:04/08/98

ANALYSIS DATE:05/07/98

JOB#:9800.808/.824

NOTEBOOK:1263-15

STD. ID :
STD. TYPE:

STD #:1190-134-3
CONTINUING

BATCH#:980507521R

VIAL:102-04

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	50.4	101
ACENAPHTHYLENE	50.0	49.8	99.6
1-METHYLNAPHTHALENE	50.0	51.0	102
2-METHYLNAPHTHALENE	50.0	49.6	99.2
ACENAPHTHENE	50.0	49.0	98.0
FLUORENE	5.00	5.02	100
PHENANTHRENE	5.00	4.74	94.8
ANTHRACENE	2.50	2.45	98.0
FLUORANTHENE	12.50	11.6	92.8
PYRENE	12.50	11.2	89.6
P-TERPHENYL-D14	20.0	19.4	97.0
BENZO(A)ANTHRACENE	5.00	4.79	95.8
CHRYSENE	5.00	4.90	98.0
BENZO(B)FLUORANTHENE	5.00	4.77	95.4
BENZO(K)FLUORANTHENE	5.00	4.59	91.8
BENZO(A)PYRENE	5.00	5.43	109
DIBENZO(AH)ANTHRACENE	12.5	12.2	97.6
BENZO(GHI)PERYLENE	12.5	12.6	101
INDENO(CD123)PYRENE	5.00	4.66	93.2

IN CONTROL

AVERAGE = 97.5

mc 5/8/98

PERCENT RECOVERY FOR REFERENCE STANDARD :2ND SOURCE
METHOD/COLUMN/INSTRUMENT: PAH/HYPERPAH/LC-2

ANALYSIS DATE: 5/8/98

JOB # 9800. 808/.824/.854

NOTEBOOK:1263-15

STD. ID: STD # 1190-135-1

STD. TYPE: REFERENCE

BATCH#:980507521R

VIAL:116-5

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	75.0	74.2	98.9
ACENAPHTHYLENE	75.0	69.8	93.1
ACENAPHTHENE	75.0	73.0	97.3
FLUORENE	7.50	7.00	93.3
PHENANTHRENE	7.50	6.94	92.5
ANTHRACENE	3.50	3.33	95.1
FLUORANTHENE	20.0	18.8	94.0
PYRENE	20.0	19.1	95.5
BENZO(A)ANTHRACENE	7.50	6.98	93.1
CHRYSENE	7.50	7.04	93.9
BENZO(B)FLUORANTHENE	7.50	7.26	97
BENZO(K)FLUORANTHENE	7.50	6.89	91.9
BENZO(A)PYRENE	7.50	8.19	109
DIBENZO(AH)ANTHRACENE	20.0	17.9	89.5
BENZO(GHI)PERYLENE	20.0	19.6	98.0
INDENO(CD123)PYRENE	7.50	6.65	88.7

IN CONTROL MC 5/8/98 AVERAGE = 95.1

Copy 2A

002414

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/HYPERPAH/LC-2

INITIAL CAL NOTEBOOK:1229-171
INITIAL CAL. DATE:04/08/98

ANALYSIS DATE:05/08/98

JOB#:9800.808/.824

NOTEBOOK:1263-15 STD. ID : STD #:1190-134-3
STD. TYPE: 2ND CONTINUING

BATCH#:980507521R

VIAL:102-06

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	50.5	101
ACENAPHTHYLENE	50.0	49.8	99.6
1-METHYLNAPHTHALENE	50.0	51.3	103
2-METHYLNAPHTHALENE	50.0	49.9	99.8
ACENAPHTHENE	50.0	49.1	98.2
FLUORENE	5.00	5.06	101
PHENANTHRENE	5.00	4.77	95.4
ANTHRACENE	2.50	2.33	93.2
FLUORANTHENE	12.50	11.6	92.8
PYRENE	12.50	11.7	93.6
P-TERPHENYL-D14	20.0	19.5	97.5
BENZO(A)ANTHRACENE	5.00	4.70	94.0
CHRYSENE	5.00	4.99	99.8
BENZO(B)FLUORANTHENE	5.00	4.84	96.8
BENZO(K)FLUORANTHENE	5.00	4.76	95.2
BENZO(A)PYRENE	5.00	5.28	106
DIBENZO(AH)ANTHRACENE	12.5	12.3	98.4
BENZO(GHI)PERYLENE	12.5	12.7	102
INDENO(CD123)PYRENE	5.00	4.70	94.0

IN CONTROL

5/8/98

AVERAGE = 97.9

002415

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/HYPERPAH/LC-2

INITIAL CAL NOTEBOOK:1229-171
INITIAL CAL. DATE:04/08/98

ANALYSIS DATE:05/08/98

JOB#:9800.808/.824

NOTEBOOK:1263-15 STD. ID : STD #:1190-134-3
STD. TYPE: ENDING

BATCH#:980507521R

VIAL:102-08

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	50.1	100
ACENAPHTHYLENE	50.0	50.1	100
1-METHYLNAPHTHALENE	50.0	51.3	103
2-METHYLNAPHTHALENE	50.0	50.1	100
ACENAPHTHENE	50.0	49.0	98.0
FLUORENE	5.00	5.03	101
PHENANTHRENE	5.00	4.75	95.0
ANTHRACENE	2.50	2.35	94.0
FLUORANTHENE	12.50	11.5	92.0
PYRENE	12.50	11.0	88.0
P-TERPHENYL-D14	20.0	19.4	97.0
BENZO(A)ANTHRACENE	5.00	4.71	94.2
CHRYSENE	5.00	4.96	99.2
BENZO(B)FLUORANTHENE	5.00	4.78	95.6
BENZO(K)FLUORANTHENE	5.00	4.69	93.8
BENZO(A)PYRENE	5.00	5.33	107
DIBENZO(AH)ANTHRACENE	12.5	12.3	98.4
BENZO(GHI)PERYLENE	12.5	12.6	101
INDENO(CD123)PYRENE	5.00	4.70	94.0

IN CONTROL AVERAGE = 97.4

AC 5/8/98

002416

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

INITIAL CAL NOTEBOOK:1229-178
INITIAL CAL. DATE:041098

ANALYSIS DATE: 5/11/98

JOB#:9800.824/.854

NOTEBOOK:1263-18

STD#: 1190-135-2
STD TYPE: DAILY

BATCH#:980511521R

VIAL:102-03

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	47.3	94.6
ACENAPHTHYLENE	50.0	47.1	94.2
1-METHYLNAPHTHALENE	50.0	51.4	103
2-METHYLNAPHTHALENE	50.0	45.9	91.8
ACENAPHTHENE	50.0	51.3	103
FLUORENE	5.00	4.44	88.8
PHENANTHRENE	5.00	4.53	90.6
ANTHRACENE	2.50	2.28	91.2
FLUORANTHENE	12.5	12.0	96.0
PYRENE	12.5	11.1	88.8
P-TERPHENYL-D14	20.0	18.2	91.0
BENZO(A)ANTHRACENE	5.00	4.70	94.0
CHRYSENE	5.00	4.79	95.8
BENZO(B)FLUORANTHENE	5.00	4.49	89.8
BENZO(K)FLUORANTHENE	5.00	4.45	89.0
BENZO(A)PYRENE	5.00	5.45	109
DIBENZO(AH)ANTHRACENE	12.5	11.7	93.6
BENZO(GHI)PERYLENE	12.5	12.3	98.4
INDENO(CD123)PYRENE	5.00	4.65	93.0

IN CONTROL MC 5/12/98 AVERAGE = 94.5

PERCENT RECOVERY FOR REFERENCE STANDARD :2ND SOURCE
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

ANALYSIS DATE: 5/11/98 JOB#:9800.824/.854

NOTEBOOK: 1263-18 STD #: 1190-135-1 BATCH#:980506521R

VIAL:103-4 UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	75.0	71.0	94.7
ACENAPHTHYLENE	75.0	67.5	90.0
ACENAPHTHENE	75.0	75.9	101
FLUORENE	7.50	6.40	85.3
PHENANTHRENE	7.50	6.74	89.9
ANTHRACENE	3.50	3.14	89.7
FLUORANTHENE	20.0	19.9	99.5
PYRENE	20.0	18.1	90.5
BENZO(A)ANTHRACENE	7.50	7.05	94.0
CHRYSENE	7.50	6.99	93.2
BENZO(B)FLUORANTHENE	7.50	6.86	91.5
BENZO(K)FLUORANTHENE	7.50	6.61	88.1
BENZO(A)PYRENE	7.50	8.16	109
DIBENZO(AH)ANTHRACENE	20.0	17.2	86.0
BENZO(GHI)PERYLENE	20.0	19.4	97.0
INDENO(CD123)PYRENE	7.50	6.72	89.6

IN CONTROL - kc 5/12/98 AVERAGE = 93.1

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PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

INITIAL CAL NOTEBOOK:1229-178
INITIAL CAL. DATE:041098

ANALYSIS DATE: 5/11/98

JOB#:9800.824/.854

NOTEBOOK:1263-18

STD#: 1190-135-2
STD TYPE: ENDING

BATCH#:980511521R

VIAL:102-05

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	48.2	96.4
ACENAPHTHYLENE	50.0	47.6	95.2
1-METHYLNAPHTHALENE	50.0	51.5	103
2-METHYLNAPHTHALENE	50.0	46.5	93.0
ACENAPHTHENE	50.0	51.7	103
FLUORENE	5.00	4.48	89.6
PHENANTHRENE	5.00	4.58	91.6
ANTHRACENE	2.50	2.30	92.0
FLUORANTHENE	12.5	12.0	96.0
PYRENE	12.5	11.3	90.4
P-TERPHENYL-D14	20.0	18.4	92.0
BENZO(A)ANTHRACENE	5.00	4.74	94.8
CHRYSENE	5.00	4.80	96.0
BENZO(B)FLUORANTHENE	5.00	4.50	90.0
BENZO(K)FLUORANTHENE	5.00	4.49	89.8
BENZO(A)PYRENE	5.00	5.49	110
DIBENZO(AH)ANTHRACENE	12.5	11.8	94.4
BENZO(GHI)PERYLENE	12.5	12.4	99.2
INDENO(CD123)PYRENE	5.00	4.71	94.2

IN CONTROL

AVERAGE = 95.3

MC 5/12/98

002419

TEST CODE :SPAH0A1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : Method Blank 1339-1-1 MATRIX : SOLID

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		200
Acenaphthylene	ND		200
1-methylnaphthalene	ND		200
2-Methylnaphthalene	ND		200
Acenaphthene	ND		200
Fluorene	ND		20
Phenanthrene	ND		20
Anthracene	ND		20
Fluoranthene	ND		50
Pyrene	ND		50
Benzo(a)anthracene	ND		20
Chrysene	ND		20
Benzo(b)fluoranthene	ND		20
Benzo(k)fluoranthene	ND		20
Benzo(a)pyrene	ND		20
Dibenzo(a,h)anthracene	ND		50
Benzo(ghi)perylene	ND		50
Indeno(1,2,3-cd)pyrene	ND		20

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

START - DALLAS

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9800.854 SAS No.: _____ SDG No.:SB0106

EPA Sample No.	Lab Sample ID
_SB0106_____	_5713_____
_SED11_____	_5716_____
_SED12_____	_5715_____
_SB011011_____	_5714_____
_SB0106S_____	_5713S_____
_SB0106S_____	_5713S1_____

Were ICP interelement corrections applied ? Yes/No YES

Were ICP background corrections applied ? Yes/No YES
If yes - were raw data generated before application of background corrections ? Yes/No NO_

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Caryn Wojtowicz Name: Caryn Wojtowicz

Date: 5/19/98 Title: Project Manager

COVER PAGE - IN

002421

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB0106

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9800.854 SAS No.: _____ SDG No.: SB0106

Matrix (soil/water): SOIL_ Lab Sample ID: 5713

Level (low/med): LOW__ Date Received: 04/29/98

% Solids: _92.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	727			P
7440-36-0	Antimony	6.3	U	N	P
7440-38-2	Arsenic	1.0			P
7440-39-3	Barium	19.1			P
7440-41-7	Beryllium	0.53	U		P
7440-43-9	Cadmium	5.1		N	P
7440-70-2	Calcium	2550		*	P
7440-47-3	Chromium	13.6		N	P
7440-48-4	Cobalt	2.8			P
7440-50-8	Copper	78.1		N*	P
7439-89-6	Iron	37300		E	P
7439-92-1	Lead	4980		*	P
7439-95-4	Magnesium	246		*	P
7439-96-5	Manganese	182		N*	P
7439-97-6	Mercury	0.06			CV
7440-02-0	Nickel	4.0			P
7440-09-7	Potassium	126			P
7782-49-2	Selenium	1.1			P
7440-22-4	Silver	1.1	U	N	P
7440-23-5	Sodium	268			P
7440-28-0	Thallium	0.53	U		P
7440-62-2	Vanadium	2.1	U		P
7440-66-6	Zinc	43.3		N*	P

Color Before: _____ Clarity Before: _____ Texture: SD____

Color After: Y_____ Clarity After: C_____ Artifacts: YES___

Comments:

FORM I - IN

002422

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SED11

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9800.854 SAS No.: _____ SDG No.: SB0106

Matrix (soil/water): SOIL_ Lab Sample ID: 5716

Level (low/med): LOW__ Date Received: 04/29/98

% Solids: _79.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1210			P
7440-36-0	Antimony	7.5	U	N	P
7440-38-2	Arsenic	1.4			P
7440-39-3	Barium	20.2			P
7440-41-7	Beryllium	0.62	U		P
7440-43-9	Cadmium	0.62	U	N	P
7440-70-2	Calcium	561		*	P
7440-47-3	Chromium	3.7		N	P
7440-48-4	Cobalt	2.5	U		P
7440-50-8	Copper	2.7		N*	P
7439-89-6	Iron	3520		E	P
7439-92-1	Lead	32.4		*	P
7439-95-4	Magnesium	311		*	P
7439-96-5	Manganese	104		N*	P
7439-97-6	Mercury	0.02	U		CV
7440-02-0	Nickel	2.6			P
7440-09-7	Potassium	253			P
7782-49-2	Selenium	0.62	U		P
7440-22-4	Silver	1.2	U	N	P
7440-23-5	Sodium	62.1	U		P
7440-28-0	Thallium	0.62	U		P
7440-62-2	Vanadium	5.4			P
7440-66-6	Zinc	9.8		N*	P

Color Before: _____ Clarity Before: _____ Texture: CY____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

FORM I - IN

002423

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SED12

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9800.854 SAS No.: _____ SDG No.: SB0106

Matrix (soil/water): SOIL_ Lab Sample ID: 5715

Level (low/med): LOW__ Date Received: 04/29/98

% Solids: _81.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	960			P
7440-36-0	Antimony	7.2	U	N	P
7440-38-2	Arsenic	1.6			P
7440-39-3	Barium	22.1			P
7440-41-7	Beryllium	0.60	U		P
7440-43-9	Cadmium	0.60	U	N	P
7440-70-2	Calcium	373		*	P
7440-47-3	Chromium	4.0		N	P
7440-48-4	Cobalt	2.4	U		P
7440-50-8	Copper	2.7		N*	P
7439-89-6	Iron	4050		E	P
7439-92-1	Lead	16.7		*	P
7439-95-4	Magnesium	226		*	P
7439-96-5	Manganese	142		N*	P
7439-97-6	Mercury	0.02	U		CV
7440-02-0	Nickel	2.4	U		P
7440-09-7	Potassium	221			P
7782-49-2	Selenium	0.60	U		P
7440-22-4	Silver	1.2	U	N	P
7440-23-5	Sodium	68.6			P
7440-28-0	Thallium	0.60	U		P
7440-62-2	Vanadium	7.5			P
7440-66-6	Zinc	5.3		N*	P

Color Before: _____ Clarity Before: _____ Texture: CY____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

FORM I - IN

002424

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

011011

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9800.854 SAS No.: _____ SDG No.: SB0106

Matrix (soil/water): SOIL_ Lab Sample ID: 5714

Level (low/med): LOW__ Date Received: 04/29/98

% Solids: _83.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3620			P
7440-36-0	Antimony	6.9	U	N	P
7440-38-2	Arsenic	2.8			P
7440-39-3	Barium	72.7			P
7440-41-7	Beryllium	0.57	U		P
7440-43-9	Cadmium	1.6		N	P
7440-70-2	Calcium	888		*	P
7440-47-3	Chromium	6.7		N	P
7440-48-4	Cobalt	5.6			P
7440-50-8	Copper	6.3		N*	P
7439-89-6	Iron	13000		E	P
7439-92-1	Lead	6.5		*	P
7439-95-4	Magnesium	565		*	P
7439-96-5	Manganese	426		N*	P
7439-97-6	Mercury	0.02	U		CV
7440-02-0	Nickel	14.5			P
7440-09-7	Potassium	386			P
7782-49-2	Selenium	0.65			P
7440-22-4	Silver	1.1	U	N	P
7440-23-5	Sodium	2620			P
7440-28-0	Thallium	0.57	U		P
7440-62-2	Vanadium	11.0			P
7440-66-6	Zinc	7.4		N*	P

Color Before: _____ Clarity Before: _____ Texture: CY____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID:__SB011011

FORM I - IN

002425

START - DALLAS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9800.854 SAS No.: _____ SDG No.: SB0106

Initial Calibration Source: VHG_____

Continuing Calibration Source: VHG_____

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum	1000.0	945.40	94.5	5000.0	4762.00	95.2	4764.00	95.3	P
Antimony	1000.0	987.91	98.8	1000.0	963.44	96.3	972.25	97.2	P
Arsenic	1000.0	986.68	98.7	500.0	482.88	96.6	484.48	96.9	P
Barium	1000.0	980.43	98.0	500.0	462.17	92.4	467.70	93.5	P
Beryllium	400.0	407.59	101.9	500.0	485.07	97.0	488.52	97.7	P
Cadmium	500.0	490.50	98.1	500.0	460.07	92.0	465.46	93.1	P
Calcium	10000.0	10460.00	104.6	50000.0	51540.00	103.1	51450.00	102.9	P
Chromium	1000.0	964.93	96.5	500.0	468.15	93.6	473.90	94.8	P
Cobalt	1000.0	961.54	96.2	500.0	461.76	92.4	465.29	93.1	P
Copper	1000.0	984.59	98.5	500.0	487.13	97.4	491.48	98.3	P
Iron	1000.0	970.30	97.0	5000.0	4633.00	92.7	4599.00	92.0	P
Lead	1000.0	975.97	97.6	1000.0	897.44	89.7	906.89	90.7	P
Magnesium	10000.0	10250.00	102.5	50000.0	50550.00	101.1	50490.00	101.0	P
Manganese	1000.0	999.24	99.9	500.0	473.63	94.7	479.30	95.9	P
Mercury	5.0	4.99	99.8	5.0	4.99	99.8	5.07	101.4	CV
Nickel	1000.0	979.02	97.9	500.0	450.28	90.1	455.29	91.1	P
Potassium	10000.0	10310.00	103.1	50000.0	50710.00	101.4	50850.00	101.7	P
Selenium	1000.0	989.98	99.0	500.0	483.33	96.7	489.88	98.0	P
Silver	200.0	193.86	96.9	500.0	464.36	92.9	470.59	94.1	P
Sodium	10000.0	10250.00	102.5	50000.0	50130.00	100.3	50310.00	100.6	P
Thallium	1000.0	993.78	99.4	500.0	487.40	97.5	494.25	98.8	P
Vanadium	1000.0	995.18	99.5	500.0	479.92	96.0	485.15	97.0	P
Zinc	1000.0	998.71	99.9	500.0	481.52	96.3	486.15	97.2	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

START - DALLAS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9800.854 SAS No.: _____ SDG No.: SB0106

Initial Calibration Source: VHG_____

Continuing Calibration Source: VHG_____

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum				5000.0	4865.00	97.3			P
Antimony				1000.0	976.60	97.7	978.77	97.9	P
Arsenic				500.0	487.35	97.5	489.36	97.9	P
Barium				500.0	464.57	92.9	471.65	94.3	P
Beryllium				500.0	488.24	97.6	491.22	98.2	P
Cadmium				500.0	463.43	92.7	465.81	93.2	P
Calcium				50000.0	52470.00	104.9			P
Chromium				500.0	471.14	94.2	476.61	95.3	P
Cobalt				500.0	465.05	93.0	469.49	93.9	P
Copper				500.0	483.59	96.7	498.01	99.6	P
Iron									NR
Lead				1000.0	910.06	91.0	913.52	91.4	P
Magnesium				50000.0	51290.00	102.6			P
Manganese				500.0	474.18	94.8	481.87	96.4	P
Mercury									NR
Nickel				500.0	452.65	90.5	454.64	90.9	P
Potassium				50000.0	51630.00	103.3			P
Selenium				500.0	491.67	98.3	483.98	96.8	P
Silver				500.0	464.48	92.9	473.41	94.7	P
Sodium				50000.0	51190.00	102.4			P
Thallium				500.0	495.06	99.0	493.55	98.7	P
Vanadium				500.0	479.69	95.9	487.88	97.6	P
Zinc				500.0	484.75	96.9	490.49	98.1	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

START - DALLAS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9800.854 SAS No.: _____ SDG No.: SB0106

Initial Calibration Source: VHG_____

Continuing Calibration Source: VHG_____

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum									NR
Antimony									NR
Arsenic									NR
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead	1000.0	970.89	97.1	1000.0	898.77	89.9	905.56	90.6	P
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium									NR
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

3
BLANKS

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9800.854 SAS No.: _____ SDG No.: SB0106

Preparation Blank Matrix (soil/water): SOIL_

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	100.0	U	100.0	U	100.0	U	100.0	U	10.000	U	P
Antimony	60.0	U	60.0	U	60.0	U	60.0	U	6.000	U	P
Arsenic	5.0	U	5.0	U	5.0	U	5.0	U	0.500	U	P
Barium	20.0	U	20.0	U	20.0	U	20.0	U	2.000	U	P
Beryllium	5.0	U	5.0	U	5.0	U	5.0	U	0.500	U	P
Cadmium	5.0	U	5.0	U	5.0	U	5.0	U	0.500	U	P
Calcium	500.0	U	500.0	U	500.0	U	500.0	U	50.000	U	P
Chromium	10.0	U	10.0	U	10.0	U	10.0	U	1.000	U	P
Cobalt	20.0	U	20.0	U	20.0	U	20.0	U	2.000	U	P
Copper	20.0	U	20.0	U	20.0	U	20.0	U	2.000	U	P
Iron	50.0	U	50.0	U	50.0	U			5.000	U	P
Lead	5.0	U	5.0	U	5.0	U	5.0	U	0.500	U	P
Magnesium	500.0	U	500.0	U	500.0	U	500.0	U	50.000	U	P
Manganese	10.0	U	10.0	U	10.0	U	10.0	U	1.000	U	P
Mercury	0.1	U	0.1	U	0.1	U			0.050	U	CV
Nickel	20.0	U	20.0	U	20.0	U	20.0	U	2.000	U	P
Potassium	1000.0	U	1000.0	U	1000.0	U	1000.0	U	100.000	U	P
Selenium	5.0	U	5.0	U	5.0	U	5.0	U	0.500	U	P
Silver	10.0	U	10.0	U	10.0	U	10.0	U	1.000	U	P
Sodium	500.0	U	500.0	U	500.0	U	500.0	U	50.000	U	P
Thallium	5.0	U	5.0	U	5.0	U	5.0	U	0.500	U	P
Vanadium	20.0	U	20.0	U	20.0	U	20.0	U	2.000	U	P
Zinc	10.0	U	10.0	U	10.0	U	10.0	U	1.000	U	P

002429

START - DALLAS

3
BLANKS

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9800.854 SAS No.: _____ SDG No.: SB0106

Preparation Blank Matrix (soil/water): _____

Preparation Blank Concentration Units (ug/L or mg/kg): _____

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											NR
Antimony			60.0	U							P
Arsenic			5.0	U							P
Barium			20.0	U							P
Beryllium			5.0	U							P
Cadmium			5.0	U							P
Calcium											NR
Chromium			10.0	U							P
Cobalt			20.0	U							P
Copper			20.0	U							P
Iron											NR
Lead			5.0	U							P
Magnesium											NR
Manganese			10.0	U							P
Mercury											NR
Nickel			20.0	U							P
Potassium											NR
Selenium			5.0	U							P
Silver			10.0	U							P
Sodium											NR
Thallium			5.0	U							P
Vanadium			20.0	U							P
Zinc			10.0	U							P

002430

START - DALLAS

3
BLANKS

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9800.854 SAS No.: _____ SDG No.: SB0106

Preparation Blank Matrix (soil/water): _____

Preparation Blank Concentration Units (ug/L or mg/kg): _____

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic											NR
Barium											NR
Beryllium											NR
Cadmium											NR
Calcium											NR
Chromium											NR
Cobalt											NR
Copper											NR
Iron											NR
Lead	5.0	U	5.0	U	5.0	U					P
Magnesium											NR
Manganese											NR
Mercury											NR
Nickel											NR
Potassium											NR
Selenium											NR
Silver											NR
Sodium											NR
Thallium											NR
Vanadium											NR
Zinc											NR

002431

START - DALLAS

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9800.854 SAS No: _____ SDG No.: SB0106

ICP ID Number: OPTIMA_____ ICS Source: VHG_____

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Aluminum								
Antimony		906		923.9	102.0		923.9	102.0
Arsenic		866		869.0	100.3		869.0	100.3
Barium		409		417.1	102.0		417.1	102.0
Beryllium		428		418.4	97.8		418.4	97.8
Cadmium		798		779.1	97.6		779.1	97.6
Calcium								
Chromium		411		404.6	98.4		404.6	98.4
Cobalt		387		404.3	104.5		404.3	104.5
Copper		484		474.1	98.0		474.1	98.0
Iron								
Lead		787		804.5	102.2		804.5	102.2
Magnesium								
Manganese		420		428.5	102.0		428.5	102.0
Mercury								
Nickel		741		732.8	98.9		732.8	98.9
Potassium								
Selenium		837		922.0	110.2		922.0	110.2
Silver		988		916.8	92.8		916.8	92.8
Sodium								
Thallium		743		834.7	112.3		834.7	112.3
Vanadium		394		377.4	95.8		377.4	95.8
Zinc		916		901.2	98.4		901.2	98.4

START - DALLAS

4
ICP INTERFERENCE CHECK SAMPLE

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9800.854 SAS No: _____ SDG No.: SB0106

ICP ID Number: OPTIMA_____ ICS Source: VHG_____

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Aluminum								
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead		787		803.8	102.1		803.8	102.1
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium								
Silver								
Sodium								
Thallium								
Vanadium								
Zinc								

START - DALLAS

4
ICP INTERFERENCE CHECK SAMPLE

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9800.854 SAS No: _____ SDG No.: SB0106

ICP ID Number: JY_____ ICS Source: VHG_____

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Aluminum		473043		459000.0	97.0		459000.0	97.0
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium								
Calcium		493386		463400.0	93.9		463400.0	93.9
Chromium								
Cobalt								
Copper								
Iron								
Lead								
Magnesium		496800		486100.0	97.8		486100.0	97.8
Manganese								
Mercury								
Nickel								
Potassium		0		-538.0			-538.0	
Selenium								
Silver								
Sodium		0		-1335.0			-1335.0	
Thallium								
Vanadium								
Zinc								

FORM IV - IN

002434

START - DALLAS

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9800.854 SAS No: _____ SDG No.: SB0106

ICP ID Number: JY_____ ICS Source: VHG_____

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Aluminum								
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron		178686		161000.0	90.1		161000.0	90.1
Lead								
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium								
Silver								
Sodium								
Thallium								
Vanadium								
Zinc								

002435

START - DALLAS

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

SB0106S

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9800.854 SAS No.: _____ SDG No.: SB0106

Matrix (soil/water): SOIL__ Level (low/med): LOW___

% Solids for Sample: _92.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony	75-125	36.2866		6.3181	U	53.17	68.2	N	P
Arsenic	75-125	210.6693		1.0392		212.67	98.6		P
Barium	75-125	216.7420		19.0881		212.67	92.9		P
Beryllium	75-125	5.1106		0.5265	U	5.32	96.1		P
Cadmium	75-125	7.4998		5.0569		5.32	45.9	N	P
Calcium									NR
Chromium	75-125	24.2346		13.5894		21.27	50.0	N	P
Cobalt	75-125	51.5214		2.7779		53.17	91.7		P
Copper	75-125	162.0210		78.0973		26.58	315.7	N	P
Iron									NR
Lead		6561.7573		4978.5671		53.17	2977.6		P
Magnesium									NR
Manganese	75-125	183.5776		181.8247		53.17	3.3	N	P
Mercury									NR
Nickel	75-125	53.0943		4.0004		53.17	92.3		P
Potassium									NR
Selenium	75-125	206.5854		1.1242		212.67	96.6		P
Silver	75-125	2.4424		1.0530	U	5.32	45.9	N	P
Sodium									NR
Thallium	75-125	204.1032		0.5265	U	212.67	96.0		P
Vanadium	75-125	54.5581		2.1060	U	53.17	102.6		P
Zinc	75-125	329.6689		43.3004		53.17	538.6	N	P

Comments:

FORM V (Part 1) - IN

002436

START - DALLAS

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

SB0106S1

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9800.854 SAS No.: _____ SDG No.: SB0106

Matrix (soil/water): SOIL__ Level (low/med): LOW___

% Solids for Sample: _92.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony	75-125	40.6628		6.3181	U	53.17	76.5		P
Arsenic	75-125	209.2961		1.0392		212.67	97.9		P
Barium	75-125	220.6272		19.0881		212.67	94.8		P
Beryllium	75-125	5.1380		0.5265	U	5.32	96.6		P
Cadmium	75-125	6.4857		5.0569		5.32	26.9	N	P
Calcium									NR
Chromium	75-125	25.2487		13.5894		21.27	54.8	N	P
Cobalt	75-125	52.3544		2.7779		53.17	93.2		P
Copper	75-125	108.2603		78.0973		26.58	113.5		P
Iron									NR
Lead		4981.5969		4978.5671		53.17	5.7		P
Magnesium									NR
Manganese	75-125	139.4950		181.8247		53.17	-79.6	N	P
Mercury									NR
Nickel	75-125	54.7425		4.0004		53.17	95.4		P
Potassium									NR
Selenium	75-125	205.7402		1.1242		212.67	96.2		P
Silver	75-125	2.3841		1.0530	U	5.32	44.8	N	P
Sodium									NR
Thallium	75-125	206.9973		0.5265	U	212.67	97.3		P
Vanadium	75-125	56.9517		2.1060	U	53.17	107.1		P
Zinc	75-125	95.7470		43.3004		53.17	98.6		P

Comments:

FORM V (Part 1) - IN

002437

START - DALLAS

6
DUPLICATES

EPA SAMPLE NO.

SB0106D

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9800.854 SAS No.: _____ SDG No.: SB0106

Matrix (soil/water): SOIL_ Level (low/med): _LOW__

% Solids for Sample: _92.2 % Solids for Duplicate: __92.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		1079.2820		1181.3619		9.0		P
Antimony		36.2866		40.6628		11.4		P
Arsenic		210.6693		209.2961		0.7		P
Barium		216.7420		220.6272		1.8		P
Beryllium		5.1106		5.1380		0.5		P
Cadmium		7.4998		6.4857		14.5		P
Calcium		7568.7976		2629.6202		96.9	*	P
Chromium		24.2346		25.2487		4.1		P
Cobalt		51.5214		52.3544		1.6		P
Copper		162.0210		108.2603		39.8	*	P
Iron		10505.7207		10244.1410		2.5		P
Lead		6561.7573		4981.5969		27.4	*	P
Magnesium		1262.1752		540.2790		80.1	*	P
Manganese		183.5776		139.4950		27.3	*	P
Mercury								NR
Nickel		53.0943		54.7425		3.1		P
Potassium	106.3330	150.3552		139.0838		7.8		P
Selenium		206.5854		205.7402		0.4		P
Silver	1.0630	2.4424		2.3841		2.4		P
Sodium		307.7283		293.2670		4.8		P
Thallium		204.1032		206.9973		1.4		P
Vanadium		54.5581		56.9517		4.3		P
Zinc		329.6689		95.7470		110.0	*	P

FORM VI - IN

002438

START - DALLAS

7

LABORATORY CONTROL SAMPLE

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9800.854 SAS No.: _____ SDG No.: SB0106

Solid LCS Source: ERA_____

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum				4530.0	105.3		2600.0	6460.0	2.3
Antimony				65.0	100.2		2.7	133.0	154.2
Arsenic				71.5	108.2		53.2	89.9	151.3
Barium				91.1	104.2		70.1	112.0	114.4
Beryllium				104.0	106.8		81.6	127.0	102.7
Cadmium				58.9	102.1		45.3	72.5	173.3
Calcium				2050.0	1117.0		800.0	2710.0	54.5
Chromium				90.2	103.4		72.1	108.0	114.6
Cobalt				123.0	101.9		97.8	148.0	82.8
Copper				178.0	100.7		143.0	213.0	56.6
Iron				8170.0	101.8		4260.0	12100.0	1.2
Lead				143.0	101.4		109.0	177.0	70.9
Magnesium				1140.0	1114.0		822.0	1460.0	97.7
Manganese				216.0	103.7		162.0	270.0	48.0
Mercury									
Nickel				73.6	99.9		57.6	89.6	135.7
Potassium				1430.0	1115.0		942.0	1920.0	78.0
Selenium				67.5	108.2		50.0	84.9	160.3
Silver				73.3	4.7		54.6	92.1	6.4
Sodium				632.0	1113.0		429.0	836.0	176.1
Thallium				81.2	105.2		46.5	116.0	129.6
Vanadium				121.0	104.4		82.6	159.0	86.3
Zinc				91.0	105.2		70.3	112.0	115.6

FORM VII - IN

002439

START - DALLAS

7
LABORATORY CONTROL SAMPLE

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9800.854 SAS No.: _____ SDG No.: SB0106

Solid LCS Source: ERA_____

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
[illegible]uminum									
[illegible]timony									
Arsenic									
Barium									
Beryllium									
Cadmium									
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead									
Magnesium									
Manganese									
Mercury				4.4	4.0		3.0	5.8	90.9
Nickel									
Potassium									
Selenium									
[illegible]lver									
[illegible]dium									
Thallium									
Vanadium									
Zinc									

START - DALLAS

8
STANDARD ADDITION RESULTS

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract:_____

Lab Code: EANDE_ Case No.: 9800.854 SAS No.:_____ SDG No.:SB0106

Concentration Units: ug/L

EPA Sample No.	An	0 ADD ABS	1 ADD CON	1 ADD ABS	2 ADD CON	2 ADD ABS	3 ADD CON	3 ADD ABS	Final Conc.	r	Q

START - DALLAS

9

ICP SERIAL DILUTION

EPA SAMPLE NO.

SB0106L

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9800.854 SAS No.: _____ SDG No.: SB0106

Matrix (soil/water): SOIL_ Level (low/med): LOW__

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	6900.00		6875.00		0.4		P
Antimony							NR
Arsenic							NR
Barium							NR
Beryllium							NR
Cadmium							NR
Calcium	24250.00		24575.00		1.3		P
Chromium							NR
Cobalt							NR
Copper							NR
Iron							NR
Lead							NR
Magnesium	2339.00		2500.00	U	100.0		P
Manganese							NR
Mercury							NR
Nickel							NR
Potassium	1200.00		5000.00	U	100.0		P
Selenium							NR
Silver							NR
Sodium	2541.00		3140.50		23.6		P
Thallium							NR
Vanadium							NR
Zinc							NR

FORM IX - IN

002442

START - DALLAS

9

ICP SERIAL DILUTION

EPA SAMPLE NO.

SED11L

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9800.854 SAS No.: _____ SDG No.: SB0106

Matrix (soil/water): SOIL_ Level (low/med): LOW__

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum							NR
Antimony	60.00	U	300.00	U			P
Arsenic	10.97		25.00	U	100.0		P
Barium	162.49		165.57		1.9		P
Beryllium	5.00	U	25.00	U			P
Cadmium	5.00	U	25.00	U			P
Calcium							NR
Chromium	29.79		50.00	U	100.0		P
Cobalt	20.00	U	100.00	U			P
Copper	21.72		100.00	U	100.0		P
Iron							NR
Lead	261.07		269.40		3.2		P
Magnesium							NR
Manganese	838.30		868.83		3.6		P
Mercury							NR
Nickel	20.62		100.00	U	100.0		P
Potassium							NR
Selenium	5.00	U	25.00	U			P
Silver	10.00	U	50.00	U			P
Sodium							NR
Thallium	5.00	U	25.00	U			P
Vanadium	43.35		100.00	U	100.0		P
Zinc	79.05		79.93		1.1		P

START - DALLAS

9

ICP SERIAL DILUTION

EPA SAMPLE NO.

011011L

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9800.854 SAS No.: _____ SDG No.: SB0106

Matrix (soil/water): SOIL_ Level (low/med): LOW__

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum							NR
Antimony							NR
Arsenic							NR
Barium							NR
Beryllium							NR
Cadmium							NR
Calcium							NR
Chromium							NR
Cobalt							NR
Copper							NR
Iron	113000.00		134350.00		18.9	E	P
Lead							NR
Magnesium							NR
Manganese							NR
Mercury							NR
Nickel							NR
Potassium							NR
Selenium							NR
Silver							NR
Sodium							NR
Thallium							NR
Vanadium							NR
Zinc							NR

FORM IX - IN

002444

START - DALLAS

10
Instrument Detection Limits (Quarterly)

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9800.854 SAS No.: _____ SDG No.: SB0106

ICP ID Number: OPTIMA_____ Date: 01/30/98

Flame AA ID Number : _____

Furnace AA ID Number : _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			100		NR
Antimony	206.83		60	60.0	P
Arsenic	188.98		5	5.0	P
Barium	233.53		20	20.0	P
Beryllium	313.11		5	5.0	P
Cadmium	226.50		5	5.0	P
Calcium			500		NR
Chromium	205.55		10	10.0	P
Cobalt	228.62		20	20.0	P
Copper	324.75		20	20.0	P
Iron			50		NR
Lead	220.35		5	5.0	P
Magnesium			500		NR
Manganese	257.61		10	10.0	P
Mercury			0.1		NR
Nickel	231.60		20	20.0	P
Potassium			1000		NR
Selenium	196.03		5	5.0	P
Silver	328.07		10	10.0	P
Sodium			500		NR
Thallium	190.80		5	5.0	P
Vanadium	292.40		20	20.0	P
Zinc	213.86		10	10.0	P

Comments:

START - DALLAS

10
Instrument Detection Limits (Quarterly)

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9800.854 SAS No.: _____ SDG No.: SB0106

ICP ID Number: _____ Date: 10/08/97

Flame AA ID Number : 2380_____

Furnace AA ID Number : _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			100		NR
Antimony			60		NR
Arsenic			5		NR
Barium			20		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			500		NR
Chromium			10		NR
Cobalt			20		NR
Copper			20		NR
Iron			50		NR
Lead			5		NR
Magnesium			500		NR
Manganese			10		NR
Mercury	253.70		0.1	0.1	CV
Nickel			20		NR
Potassium			1000		NR
Selenium			5		NR
Silver			10		NR
Sodium			500		NR
Thallium			5		NR
Vanadium			20		NR
Zinc			10		NR

Comments:

FORM X - IN

002446

START - DALLAS

10
Instrument Detection Limits (Quarterly)

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9800.854 SAS No.: _____ SDG No.: SB0106

ICP ID Number: JY_____ Date: 01/15/98

Flame AA ID Number : _____

Furnace AA ID Number : _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum	396.15		100	100.0	P
Antimony			60		NR
Arsenic			5		NR
Barium			20		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium	317.99		500	500.0	P
Chromium			10		NR
Cobalt			20		NR
Copper			20		NR
Iron	259.94		50	50.0	P
Lead			5		NR
Magnesium	279.08		500	500.0	P
Manganese			10		NR
Mercury			0.1		NR
Nickel			20		NR
Potassium	766.49		1000	1000.0	P
Selenium			5		NR
Silver			10		NR
Sodium	589.59		500	500.0	P
Thallium			5		NR
Vanadium			20		NR
Zinc			10		NR

Comments:

FORM X - IN

002447

START - DALLAS

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9800.854 SAS No.: _____ SDG No.: SB0106

ICP ID Number: OPTIMA_____ Date: 03/20/98

Analyte	Wave-length (nm)	Interelement Correction Factors for : Al	Ca	Fe	Mg	___
Aluminum	396.15	0.0000000	0.0000000	0.0000000	0.0000000	
Antimony	206.83	0.0430283	0.0000000	0.0000000	0.0000000	
Arsenic	188.98	0.0480027	0.0000000	0.0000000	0.0000000	
[illegible]rium	233.53	0.0000000	0.0000000	0.0000000	0.0000000	
[illegible]eryllium	313.11	0.0000000	0.0000000	0.0000000	0.0000000	
Cadmium	226.50	0.0000000	0.0000000	0.0001562	0.0000000	
Calcium	315.89	0.0000000	0.0000000	0.0000000	0.0000000	
Chromium	205.55	0.0000000	0.0000000	0.0000000	0.0000000	
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	
Copper	324.75	0.0000000	0.0000000	0.0000000	0.0000000	
Iron	259.94	0.0000000	0.0000000	0.0000000	0.0000000	
Lead	220.35	-0.0482720	0.0000000	0.0000000	0.0000000	
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000211	
Mercury						
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	
Selenium	196.03	-0.1642520	0.0000000	0.0000000	-0.0000167	
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	
Sodium	589.59	0.0000000	0.0000000	0.0000000	0.0000000	
Thallium	190.80	0.0000000	0.0000292	-0.0000820	0.0000000	
[illegible]nadium	292.40	0.0000000	0.0000000	-0.0002010	0.0000000	
[illegible]nc	213.86	0.0000000	0.0000000	0.0001255	0.0000315	

Comments:

FORM XI (Part 1) - IN

002448

START - DALLAS

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9800.854 SAS No.: _____ SDG No.: SB0106

ICP ID Number: JY_____ Date: 03/17/98

Analyte	Wave-length (nm)	Interelement Correction Factors for : Al	Ca	Fe	Mg	MN
Aluminum	396.15	0.0000000	-0.0006300	0.0000000	0.0000000	0.0000000
Antimony	217.58	0.0004100	0.0000000	-0.0012680	0.0000000	0.0000000
Arsenic	188.98	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
[illegible]rium	233.53	0.0000000	0.0000000	0.0000860	0.0000000	0.0000000
[illegible]ryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000170	0.0000000	0.0001660	0.0000000	0.0000000
Calcium	317.99	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	205.56	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.75	0.0000000	0.0000000	0.0000290	0.0000000	0.0000000
Iron	259.94	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.35	0.0013380	0.0000000	0.0000000	0.0000000	-0.0005290
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000510	0.0000340	0.0000000
Mercury						
Nickel	231.60	0.0000000	-0.0000150	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	-0.0002240	0.0000000	0.0006760	0.0000000	0.0000000
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	0.0001470
Sodium	589.59	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.80	0.0000000	0.0000000	0.0000000	0.0000000	-0.0163800
[illegible]nadium	292.40	0.0000000	0.0000000	0.0002500	0.0000000	-0.0005740
[illegible]nc	213.86	-0.0000330	0.0000000	0.0001200	0.0000310	0.0000000

Comments:

FORM XI (Part 1) - IN

002449

START - DALLAS

12
ICP LINEAR RANGES

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9800.854 SAS No.: _____ SDG No.: SB0106

ICP ID Number: OPTIMA_____ Date: 02/09/98

Analyte	Integ. Time (sec.)	Concentration (ug/L)	M
Aluminum	10.00	500000.0	P
Antimony	10.00	2000.0	P
Arsenic	10.00	10000.0	P
Barium	10.00	10000.0	P
Beryllium	10.00	1000.0	P
Cadmium	10.00	10000.0	P
Calcium	10.00	250000.0	P
Chromium	10.00	10000.0	P
Cobalt	10.00	10000.0	P
Copper	10.00	50000.0	P
Iron	10.00	50000.0	P
Lead	10.00	10000.0	P
Magnesium	10.00	500000.0	P
Manganese	10.00	10000.0	P
Mercury			NR
Nickel	10.00	10000.0	P
Potassium	10.00	50000.0	P
Selenium	10.00	10000.0	P
Silver	10.00	1000.0	P
Sodium	10.00	50000.0	P
Thallium	10.00	10000.0	P
Vanadium	10.00	10000.0	P
Zinc	10.00	10000.0	P

Comments:

FORM XII - IN

002450

START - DALLAS

12
ICP LINEAR RANGES

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9800.854 SAS No.: _____ SDG No.: SB0106

ICP ID Number: JY_____ Date: 01/21/98

Analyte	Integ. Time (sec.)	Concentration (ug/L)	M
Aluminum	10.00	500000.0	P
Antimony	10.00	100000.0	P
Arsenic	10.00	10000.0	P
Barium	10.00	10000.0	P
Beryllium	10.00	10000.0	P
Cadmium	10.00	10000.0	P
Calcium	10.00	500000.0	P
Chromium	10.00	10000.0	P
Cobalt	10.00	10000.0	P
Copper	10.00	10000.0	P
Iron	10.00	500000.0	P
Lead	10.00	10000.0	P
Magnesium	10.00	500000.0	P
Manganese	10.00	10000.0	P
Mercury			NR
Nickel	10.00	10000.0	P
Potassium	10.00	500000.0	P
Selenium	10.00	10000.0	P
Silver	10.00	1000000.0	P
Sodium	10.00	500000.0	P
Thallium	10.00	10000.0	P
Vanadium	10.00	50000.0	P
Zinc	10.00	50000.0	P

Comments:

FORM XII - IN

002451

START - DALLAS

13
PREPARATION LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9800.854 SAS No.: _____ SDG No.:SB0106

Method: P_

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
011011	05/06/98	1.05	100
LCSS	05/06/98	1.00	100
PBS	05/06/98	1.00	100
SB0106	05/06/98	1.03	100
SB0106D	05/06/98	1.02	100
SB0106S	05/06/98	1.02	100
SB0106S	05/06/98	1.02	100
SED11	05/06/98	1.01	100
SED12	05/06/98	1.03	100

FORM XIII - IN

002452

START - DALLAS

13
PREPARATION LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9800.854 SAS No.: _____ SDG No.:SB0106

Method: CV

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
011011	05/08/98	0.60	100
LCSS	05/08/98	0.20	100
PBS	05/08/98	0.20	100
SB0106	05/08/98	0.60	100
SED11	05/08/98	0.60	100
SED12	05/08/98	0.60	100

FORM XIII - IN

002453

START - DALLAS

14
ANALYSIS RUN LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9800.854 SAS No.: _____ SDG No.:SB0106

Instrument ID Number: OPTIMA_____ Method: P_

Start Date: 05/08/98 End Date: 05/08/98

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	
S0	1.00	1331			X	X	X	X	X		X	X	X		X		X		X		X	X		X	X	X	
S	1.00	1334			X	X	X	X	X		X	X	X		X		X		X		X	X		X	X	X	
S	1.00	1337																									
[redacted]	1.00	1339																									
CCV	1.00	1343			X	X	X	X	X		X	X	X		X		X		X		X	X		X	X	X	
ICB	1.00	1346			X	X	X	X	X		X	X	X		X		X		X		X	X		X	X	X	
CCV	1.00	1350			X	X	X	X	X		X	X	X		X		X		X		X	X		X	X	X	
CCB	1.00	1353			X	X	X	X	X		X	X	X		X		X		X		X	X		X	X	X	
ICSAB	1.00	1356			X	X	X	X	X		X	X	X		X		X		X		X	X		X	X	X	
ZZZZZZ	1.00	1359																									
ZZZZZZ	1.00	1403																									
ZZZZZZ	1.00	1406																									
ZZZZZZ	1.00	1409																									
ZZZZZZ	1.00	1413																									
ZZZZZZ	1.00	1416																									
ZZZZZZ	1.00	1420																									
ZZZZZZ	1.00	1423																									
ZZZZZZ	1.00	1427																									
CCV	1.00	1430			X	X	X	X	X		X	X	X		X		X		X		X	X		X	X	X	
CCB	1.00	1433			X	X	X	X	X		X	X	X		X		X		X		X	X		X	X	X	
ZZZZZZ	1.00	1437																									
[redacted]ZZZZ	1.00	1440																									
[redacted]ZZZZ	1.00	1444																									
ZZZZZZ	1.00	1447																									
ZZZZZZ	1.00	1451																									
ZZZZZZ	1.00	1454																									
ZZZZZZ	1.00	1458																									
PBS	1.00	1501			X	X	X	X	X		X	X	X		X		X		X		X	X		X	X	X	
LCSS	1.00	1504			X	X	X	X	X		X	X	X		X		X		X		X	X		X	X	X	
SB0106	1.00	1508			X	X	X	X	X		X	X	X				X		X		X	X		X	X	X	
CCV	1.00	1511			X	X	X	X	X		X	X	X		X		X		X		X	X		X	X	X	
CCB	1.00	1515			X	X	X	X	X		X	X	X		X		X		X		X	X		X	X	X	

FORM XIV - IN

002454

START - DALLAS

14
ANALYSIS RUN LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9800.854 SAS No.: _____ SDG No.:SB0106

Instrument ID Number: OPTIMA_____ Method: P_

Start Date: 05/08/98 End Date: 05/08/98

EPA Sample No.	D/F	Time	% R	Analytes																												
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN						
SB0106S_	1.00	1518			X	X	X	X	X		X	X	X				X		X		X	X		X	X	X						
SB0106S1	1.00	1521			X	X	X	X	X		X	X	X				X		X		X	X		X	X	X						
011011__	1.00	1525			X	X	X	X	X		X	X	X		X		X		X		X	X		X	X	X						
[redacted]D12__	1.00	1528			X	X	X	X	X		X	X	X		X		X		X		X	X		X	X	X						
[redacted]D11__	1.00	1532			X	X	X	X	X		X	X	X		X		X		X		X	X		X	X	X						
SED11L__	5.00	1535			X	X	X	X	X		X	X	X		X		X		X		X	X		X	X	X						
ZZZZZZ__	1.00	1538																														
ZZZZZZ__	1.00	1542																														
ZZZZZZ__	1.00	1545																														
CCV_____	1.00	1549			X	X	X	X	X		X	X	X		X		X		X		X	X		X	X	X						
CCB_____	1.00	1552			X	X	X	X	X		X	X	X		X		X		X		X	X		X	X	X						

FORM XIV - IN

002455

START - DALLAS

14
ANALYSIS RUN LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9800.854 SAS No.: _____ SDG No.:SB0106

Instrument ID Number: OPTIMA_____ Method: P_

Start Date: 05/08/98 End Date: 05/08/98

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	
S0	1.00	1900													X												
S	1.00	1903													X												
S	1.00	1906																									
	1.00	1909																									
CV	1.00	1912													X												
ICB	1.00	1915													X												
CCV	1.00	1919													X												
CCB	1.00	1922													X												
ICSAB	1.00	1925													X												
SB0106	10.00	1929													X												
SB0106S	10.00	1932													X												
SB0106SD	10.00	1935													X												
CCV	1.00	1939													X												
CCB	1.00	1942													X												

FORM XIV - IN

002456

START - DALLAS

14
ANALYSIS RUN LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9800.854 SAS No.: _____ SDG No.:SB0106

Instrument ID Number: JY_____ Method: P_

Start Date: 05/08/98 End Date: 05/08/98

EPA Sample No.	D/F	Time	% R	Analytes																												
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN						
S0	1.00	1434		X						X						X				X			X									
S	1.00	1439																														
S	1.00	1443		X																												
[redacted]	1.00	1447								X						X				X			X									
ICV	1.00	1450		X						X						X				X			X									
ICB	1.00	1454		X						X						X				X			X									
CCV	1.00	1459		X						X						X				X			X									
CCB	1.00	1503		X						X						X				X			X									
ICSAB	1.00	1508		X						X						X				X			X									
ZZZZZZ	1.00	1525																														
ZZZZZZ	1.00	1529																														
ZZZZZZ	1.00	1534																														
ZZZZZZ	1.00	1538																														
ZZZZZZ	1.00	1543																														
ZZZZZZ	1.00	1547																														
ZZZZZZ	1.00	1552																														
PBS	1.00	1556		X						X						X				X			X									
LCSS	1.00	1601		X						X						X				X			X									
CCV	1.00	1605		X						X						X				X			X									
CCB	1.00	1610		X						X						X				X			X									
SB0106	1.00	1614		X						X						X				X			X									
[redacted]0106L	5.00	1619		X						X						X				X			X									
SB0106S	1.00	1623																														
SB0106S1	1.00	1627																														
011011	1.00	1632		X						X						X				X			X									
SED12	1.00	1636		X						X						X				X			X									
SED11	1.00	1641		X						X						X				X			X									
CCV	1.00	1645		X						X						X				X			X									
CCB	1.00	1650		X						X						X				X			X									

FORM XIV - IN

002457

START - DALLAS

14
ANALYSIS RUN LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9800.854 SAS No.: _____ SDG No.:SB0106

Instrument ID Number: JY_____ Method: P_

Start Date: 05/11/98 End Date: 05/11/98

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN				
S0	1.00	1051												X																
S	1.00	1056																												
S	1.00	1100												X																
[redacted]	1.00	1104																												
ICV	1.00	1107												X																
ICB	1.00	1111												X																
CCV	1.00	1116												X																
CCB	1.00	1120												X																
ICSAB	1.00	1125												X																
PBS	1.00	1144												X																
LCSS	1.00	1148												X																
SB0106	1.00	1153												X																
SB0106S	1.00	1156																												
SB0106SI	1.00	1159												X																
011011	1.00	1202												X																
011011L	5.00	1206												X																
SED12	1.00	1209												X																
SED11	1.00	1212												X																
CCV	1.00	1215												X																
CCB	1.00	1220												X																
[redacted]																														

FORM XIV - IN

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002458

START - DALLAS

14
ANALYSIS RUN LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9800.854 SAS No.: _____ SDG No.:SB0106

Instrument ID Number: 2380_____ Method: CV

Start Date: 05/08/98 End Date: 05/08/98

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	
S0	1.00	1736																X									
S0.5	1.00	1738																X									
S1	1.00	1740																X									
[redacted]	1.00	1742																X									
[redacted]	1.00	1744																X									
S10	1.00	1746																X									
ICV	1.00	1748																X									
ICB	1.00	1750																X									
CCV	1.00	1752																X									
CCB	1.00	1754																X									
PBS	1.00	1756																X									
LCSS	1.00	1758																X									
SB0106	1.00	1800																X									
SB011011	1.00	1802																X									
SED12	1.00	1804																X									
SED11	1.00	1806																X									
ZZZZZZ	1.00	1808																									
ZZZZZZ	1.00	1810																									
ZZZZZZ	1.00	1812																									
ZZZZZZ	1.00	1814																									
CCV	1.00	1816																X									
[redacted]B	1.00	1818																X									

FORM XIV - IN

382

ecology and environment, inc.
International Specialists in the Environment

ANALYTICAL SERVICES CENTER
4493 Walden Avenue
Lancaster, New York 14086
Tel. (716) 685-8080, Fax: (716) 685-0852

MEMORANDUM

TO: Tom Beer - E & E Inc. Dallas

FROM: Caryn Wojtowicz - ASC Project Manager

DATE: June 25, 1998

SUBJECT: KJ6103.052601SFXX
START - Dallas

RE: 9801.203/9801.230

CC: Lab File

Attached is the laboratory report of the analyses conducted on samples received at the Analytical Services Center on June 4 and June 5, 1998. Analyses were performed according to the procedures set forth in the "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Update III, Third Edition, U.S. EPA, June 1997.

The chain of custody form provided herein is integral to this report and must be included with the analytical results forms upon transferral to another data user.

All samples on which this report is based will be retained by E & E for a period of 30 days from the date of this report, unless otherwise instructed by the client. If additional storage of samples is requested by the client, a storage fee of $1.00 per sample container per month will be charged for each sample, with such charges accruing until destruction of the samples is authorized by the client.

CW/bk
Enclosure

recycled paper

On June 4 and 5, 1998 a total of fifteen samples (4 waters, 11 soils) were received at Analytical Services Center. Results were provided by facsimile on June 18 and 19, 1998.

BETX

Project specified surrogate recovery (65-130) for waters was not met in the analysis of sample SB15-GW3. The surrogate recovery was 61%. The sample was not reanalyzed due to a scheduling error.

Surrogate recovery in soil sample SB19-0102 was artificially high due to a coeluting peak. This sample was not reanalyzed as visual evidence of matrix interference is seen in the sample chromatogram. Although within project limits, toluene recovery in the MSD exceeded in-house limits by 1%. Benzene slightly exceeded percent difference criteria (16.6%) in one of the continuing calibrations. As a corrective action another continuing calibration was analyzed shortly thereafter meeting criteria.

Several soil samples required analysis using methanol extraction due to the concentration of target analytes present in the samples.

Quantitation limits have been adjusted accordingly.

Confirmation analysis was not required for this project.

TNRCC

Aqueous samples SB17-GW4 and SB18-GW5 required analysis at a dilution due to the level of target compounds.

Soil sample SB15-0001 required analysis at a dilution due to the level of target compounds.

Quantitation limits have been adjusted accordingly.

PAH

Due to the consistently high percent difference for benzo(a)pyrene determined on continuing calibrations on the HYPER PAH column, this compound, if present, is reported from the ENV PAH column analysis. Benzo(a)pyrene recoveries were slightly high in the MS and MSD. All other spike recoveries were acceptable in the MS/MSD and all were acceptable in the laboratory control sample.

Some low level contamination was observed in the soil method blank. As the resulting concentrations were less than required reporting limits, the blank is reported as "ND", none detected.

Surrogate recoveries were not obtainable in samples SB15-0001, SB16-0506, SB18-0708, and SB19-0102 due to the dilution required for analysis.

Metals

Due to software limitations, the client identification codes have been truncated throughout this fraction of the report. The prefix "SB1" has been removed from all client IDs. The full client ID can be found in the comment section on Form I.

Batch QC is included in this report. The batch matrix spike duplicate analysis had a low spike recovery for antimony at 60.5%. The batch matrix had an acceptable recovery for this element at 83.1%. The RPD criteria was not met for antimony or silver. No corrective action is required. Sample results have been flagged based on the batch QC results.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in the hardcopy data package has been authorized by the Laboratory Manager's designee, as verified by the following signature.

Caryn Wojtowicz

Caryn Wojtowicz - Project Manager
Analytical Services Center
June 25, 1998

002462

OFFICIAL CHAIN OF CUSTODY RECORD

PROJ. NO. L-56103 052601SFXX | PROJECT NAME: Wilcox Refinery

SAMPLERS: (Signature) Shawn Moore

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Metals (6010B)	PAHs (8310)	TPH (Mod. 1005)	pH	BTEX (8021B/M)	REMARKS
SB14-0102	6/3/98	0835		✓	SB14 1-2' Sample	1	✓	✓	✓	✓		EPA Tag No. 6-009566
SB14-0102	6/3/98	0835		✓	SB14 1-2' Sample	2					✓	EPA Tag No. 6-009549
SB14-0506	6/3/98	0915		✓	SB14 5-6' sample	1	✓	✓	✓	✓		EPA Tag No. 6-009545
SB14-0506	6/3/98	0915		✓	SB14 5-6' sample	2					✓	EPA Tag No. 6-009546
SB14-GW3 (MS)	6/3/98	0957 1130		✓	SB14 Grandwater	2			✓			EPA Tag No. 6-009565
SB14-GW3 (MSD)	6/3/98	1130 0957		✓	SB14 Grandwater	2					✓	EPA Tag No. 6-009544
SB15DGW3	6/3/98	1145		✓	SB14/15 Grandwater dup.	1			✓			EPA Tag No. 6-009548
SB15D-GW3	6/3/98	1145		✓	SB14/15 Grandwater dup	4					✓	EPA Tag No. 6-009547
SB15-0001	6/3/98	1135		✓	SB14/15 0-1' sample	1	✓	✓	✓	✓		EPA Tag No. 6-009570
SB15-0001	6/3/98	1135		✓	SB14/15 0-1' Sample	2					✓	EPA Tag No. 6-009571
SB16-0506	6/3/98	1335		✓	SB16 5-6' Sample	1	✓	✓	✓	✓		EPA Tag No. 6-009573
SB16-0506	6/3/98	1335		✓	SB16 5-6' Sample	2					✓	EPA Tag No. 6-009574
SB17-0102	6/3/98	1453		✓	SB17 1-2' Sample	1	✓	✓	✓	✓		EPA Tag No. 6-009575
SB17-0102	6/3/98	1453		✓	SB17 1-2' Sample	2					✓	EPA Tag No. 6-009576
SB17D-0102	6/3/98	1500		✓	SB17 1-2' dup	1	✓	✓	✓	✓		EPA Tag No. 6-009578

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Shawn Moore	6/3/98 1830				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
FedEx	6-4-98 1030		6-4-98 1036	Fed Ex Airbill No. ~~805550003443~~ 805550003354	
Shipped by:		Airbill Number:			

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Returns with Warrant

EPA 7500-[illegible]

6- 09061

002463

OFFICIAL CHAIN OF CUSTODY RECORD

PROJ. NO. K5603 052601SFXX | PROJECT NAME: Wilcox Refining

SAMPLERS: (Signature)

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Metals (6010B)	PAH (8310)	TPH (TNRCC 1005)	pH	BTEX	REMARKS
SB17D-0102	6/3/98	1500		✓	SB17 1-2' dup	2					✓	EPA Tag No. 6-009577
SB17-GW4	6/3/98	1510		✓	SB17 Groundwater	1			✓			EPA Tag No. 6-009580
SB17-GW4	6/3/98	1510		✓	SB17 Groundwater	1					✓	EPA Tag No. 6-009579
SB17-0506	6/3/98	1515		✓	SB17 5.5-6.5' Sample	1	✓	✓	✓	✓		EPA Tag No. 6-009582
SB17-0506	6/3/98	1515		✓	SB17 5.5-6.5' Sample	2					✓	EPA Tag No. 6-009581
SB18-0102	6/3/98	1615		✓	SB18 1-2' Sample	1	✓	✓	✓	✓		EPA Tag No. 6-009584
SB18-0102	6/3/98	1615		✓	SB18 1-2' Sample	2					✓	EPA Tag No. 6-009583
TB.	6/3/98	1644		✓	Trip Blank	2					✓	EPA Tag No 6-009585
SB18-GW5	6/3/98	1730		✓	SB18 Groundwater	1			✓			EPA Tag No. 6-009586 Lo sample volume
SB18-GW5	6/3/98	1730		✓	SB18 Groundwater	1					✓	EPA Tag No 6-009587 Lo sample volume
SB18-0708	6/3/98	1735		✓	SB18 7-8' Sample	1	✓	✓	✓	✓		EPA Tag No.
SB18-0708	6/3/98	1735		✓	SB18 7-8' Sample	2					✓	EPA Tag No.

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	6/3/98 1830				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
	6-4-98 1030		6-4-98 1036	Fed Ex Airbill No. ~~805550003413~~ 805550003354	
Shipped by:		Airbill Number:			

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Returns with Warrant

EPA 7500-53J

6- 09062

002464

ENVIRONMENTAL PROTECTION AGENCY
Office of Enforcement

CHAIN OF CUSTODY RECORD

REGION 6
First International Bldg., 1201 Elm St.
Dallas, Texas 75270

PROJ. NO.: K J6103 / 052601SFXX
PROJECT NAME: Wilcox Refinery
SAMPLERS: (Signature) Sharon E Moore

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Metals (6010B)	PAH (8310)	TPH (GC/FID 1005)	PH	BTEX (8021B Mod)	REMARKS
SB19-0102	6/4/98	0850		✓	SB19 1-2' Sample	1	✓	✓	✓	✓		EPA Tag No. 6-009591
SB19-0102	6/4/98	0850		✓	SB19 1-2' sample	2					✓	EPA Tag No. 6-009590
SB19-0708	6/4/98	0910		✓	SB19 7-8' Sample	1	✓	✓	✓	✓		EPA Tag No. 6-009592
SB19-0708	6/4/98	0910		✓	SB19 7-8' Sample	2					✓	EPA Tag No. 6-009593

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Sharon Moore	6/4/98 0930				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		Tammy Childress	6/5/98	Fed Ex Airbill No. 805555000365	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

002465

JOB NUMBER : 9801.203

Ecology and Environment, Inc.
SAMPLE TRACKING REPORT

- SAMPLE NUMBER	CLIENT SAMPLE ID		DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED
PH		-S			
8034.03	SB14 0102		06/03/98		06/08/98
8035.03	SB14 0506		06/03/98		06/08/98
8036.03	SB15 0001		06/03/98		06/08/98
8037.03	SB16 0506		06/03/98		06/08/98
8038.03	SB17 0102		06/03/98		06/08/98
8039.03	SB17D 0102		06/03/98		06/08/98
8040.03	SB17 5565		06/03/98		06/08/98
8041.03	SB18 0102		06/03/98		06/08/98
8042.03	SB18 0708		06/03/98		06/08/98
SOLIDS TOTAL		-S			
8034.03	SB14 0102		06/03/98		06/10/98
8035.03	SB14 0506		06/03/98		06/10/98
8036.03	SB15 0001		06/03/98		06/10/98
8037.03	SB16 0506		06/03/98		06/10/98
8038.03	SB17 0102		06/03/98		06/10/98
8039.03	SB17D 0102		06/03/98		06/10/98
8040.03	SB17 5565		06/03/98		06/10/98
8041.03	SB18 0102		06/03/98		06/10/98
8042.03	SB18 0708		06/03/98		06/10/98
8021B BETX		-S			
8034.01	SB14 0102		06/03/98		06/11/98
8035.01	SB14 0506		06/03/98		06/11/98
8036.01	SB15 0001		06/03/98		06/11/98
8037.01	SB16 0506		06/03/98		06/11/98
8038.01	SB17 0102		06/03/98		06/10/98
8039.01	SB17D 0102		06/03/98		06/10/98
8040.01	SB17 5565		06/03/98		06/11/98
8041.01	SB18 0102		06/03/98		06/11/98
8042.01	SB18 0708		06/03/98		06/11/98
8021B BETX		-W			
8043.01	SB15 GW3		06/03/98		06/10/98
8044.01	SB15D GW3		06/03/98		06/10/98
8045.01	SB17 GW4		06/03/98		06/10/98
8046.01	TB		06/03/98		06/05/98
8047.01	SB18 GW5		06/03/98		06/05/98
TPH-TNRCC		-S			
8034.03	SB14 0102		06/03/98		06/10/98

002466

JOB NUMBER : 9801.203

Ecology and Environment, Inc.
SAMPLE TRACKING REPORT

SAMPLE NUMBER	CLIENT SAMPLE ID		DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED
TPH-TNRCC		-S			
8035.03	SB14 0506		06/03/98		06/10/98
8036.03	SB15 0001		06/03/98		06/10/98
8037.03	SB16 0506		06/03/98		06/10/98
8038.03	SB17 0102		06/03/98		06/10/98
8039.03	SB17D 0102		06/03/98		06/10/98
8040.03	SB17 5565		06/03/98		06/10/98
8041.03	SB18 0102		06/03/98		06/11/98
8042.03	SB18 0708		06/03/98		06/11/98
TPH-TNRCC		-W			
8043.03	SB15 GW3		06/03/98		06/06/98
8044.03	SB15D GW3		06/03/98		06/07/98
8045.03	SB17 GW4		06/03/98		06/07/98
8047.02	SB18 GW5		06/03/98		06/07/98
8310 PAH/LC		-S			
8034.03	SB14 0102		06/03/98	06/11/98	06/17/98
8035.03	SB14 0506		06/03/98	06/11/98	06/17/98
8036.03	SB15 0001		06/03/98	06/11/98	06/17/98
8037.03	SB16 0506		06/03/98	06/11/98	06/17/98
8038.03	SB17 0102		06/03/98	06/11/98	06/17/98
8039.03	SB17D 0102		06/03/98	06/11/98	06/17/98
8040.03	SB17 5565		06/03/98	06/11/98	06/18/98
8041.03	SB18 0102		06/03/98	06/11/98	06/18/98
8042.03	SB18 0708		06/03/98	06/11/98	06/18/98

002467

JOB NUMBER : 9801.230

Ecology and Environment, Inc.
SAMPLE TRACKING REPORT

- SAMPLE NUMBER	CLIENT SAMPLE ID		DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED
PH		-S			
8236.03	SB19-0102		06/04/98		06/08/98
8237.03	SB19-0708		06/04/98		06/08/98
SOLIDS TOTAL		-S			
8236.03	SB19-0102		06/04/98		06/10/98
8237.03	SB19-0708		06/04/98		06/10/98
MERCURY	(CVAP)	-S			
8236.03	SB19-0102		06/04/98		06/10/98
8237.03	SB19-0708		06/04/98		06/10/98
8021B BETX		-S			
8236.01	SB19-0102		06/04/98		06/10/98
8237.01	SB19-0708		06/04/98		06/10/98
TPH-TNRCC		-S			
8236.03	SB19-0102		06/04/98		06/09/98
8237.03	SB19-0708		06/04/98		06/09/98
8310 PAH/LC		-S			
8236.03	SB19-0102		06/04/98	06/11/98	06/16/98
8237.03	SB19-0708		06/04/98	06/11/98	06/16/98

Job Number: 9801. 203/230
Client: START - Dallas
Reviewer: Cyhoztowicz
Date: 6/24/98

GC
TABLE OF CONTENTS
BETX

A.	SURROGATE SUMMARY	✓
B.	MS/MSD SUMMARY	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
	LCS SUMMARY	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
C.	RESULT SUMMARY FOR EACH SAMPLE	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
	(PRIMARY RAW DATA PRECEDES CONFIRMATION RAW DATA)	conf not req'd
D.	EXTRACTION LOGBOOK PAGE(S)	NA
E.	RETENTION TIME WINDOW SUMMARY	✓
F.	INITIAL CALIBRATION SUMMARY AND CHROMATOGRAMS *	✓
G.	DAILY ANALYTICAL SEQUENCE INFORMATION AS FOLLOWS *	
	1. DAILY INJECTION LOGBOOK	✓
	2. CALIBRATION CHECK SUMMARY	✓
	3. CHROMATOGRAMS AND DATA SYSTEM PRINTOUTS FOR ALL STANDARDS IN THE DAILY SEQUENCE	✓
H.	BLANK RESULTS	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
I.	CALCULATION EXAMPLE	✓

* = ALL CALIBRATION INFORMATION IS ORGANIZED PER INSTRUMENT, CHRONOLOGICALLY

PURGEABLE AROMATICS
QUALITY CONTROL FOR ACCURACY: PERCENT
RECOVERY OF SURROGATE SPIKES
(MATRIX: WATER)

9801.203

E & E Laboratory No.-98

(ug/L)

Compound	Amount Added	Amount Determined	Percent Recovery	Project QC Targets
Trifluorotoluene				65 - 130
08043	10.0	6.1	61.0*	
08044	10.0	7.2	72.0	
08045	10.0	11.0	110	
Method Blank (06/09)	10.0	10.0	100	
08044 MS	10.0	6.6	66.0	
08044 MSD	10.0	6.5	65.0	
LCS (06/09)	10.0	11.0	110	

THESE RECOVERIES ARE WITHIN E & E, INC. QC TARGETS WITH THE EXCEPTION OF *.

LCS = LABORATORY CONTROL SAMPLE

002470

PURGEABLE AROMATICS
QUALITY CONTROL FOR ACCURACY: PERCENT
RECOVERY OF SURROGATE SPIKES
(MATRIX: WATER)

9801.203

E & E Laboratory No.-98

(ug/L)

Compound	Amount Added	Amount Determined	Percent Recovery	Project QC Targets
Trifluorotoluene				65 - 130
08046	10.0	9.7	97.0	
08047	10.0	10.1	101	
Method Blank (06/05)	10.0	10.0	100	
LCS (06/05)	40.0	44.5	111	

THESE RECOVERIES ARE WITHIN E & E, INC. QC TARGETS.

LCS = LABORATORY CONTROL SAMPLE

002471

ECOLOGY AND ENVIRONMET, INC.
ANALYTICAL SERVICES CENTER
QUALITY AND CONTROL FOR ACCURACY AND PRECISION
PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)
OF WATER SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MSD)

UNITS: UG/L
MATRIX -WATER
JOB# 9801.165 SAMPLE# 8044 MS/MSD
ANALYZED:
BATCH# 980605303R- BTEX VOLATILE

PARAMETER	AMOUNT ADDED	ORIGINA VALUE	AMOUNT DETERMINED		PERCENT RECOVERY		
			MS	MSD	MS	MSD	RPD
BENZENE	10		8.31	7.79	83%	78%	6.5%
TOLUENE	10		7.99	7.56	80%	76%	5.5%
ETHYLBENZENE	10		8.24	7.29	82%	73%	12.2%
TOTAL XYLENES	30		26.3	25.1	88%	84%	4.7%

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ECOLOGY AND ENVIRONMET, INC.
ANALYTICAL SERVICES CENTER
QUALITY AND CONTROL FOR ACCURACY AND PRECISION
PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)
OF WATER SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MSD)

UNITS: UG/L
MATRIX -WATER
JOB# 9801.165 SAMPLE# 8044 MS/MSD
ANALYZED:
BATCH# 980609303R- BTEX VOLATILE

PARAMETER	AMOUNT ADDED	ORIGINA VALUE	AMOUNT DETERMINED		PERCENT RECOVERY		
			MS	MSD	MS	MSD	RPD
BENZENE	20	12	40.8	40.8	144%	144%	0.0%
TOLUENE	20	8.7	35.3	35.3	133%	133%	0.0%
ETHYLBENZENE	20	8.3	22.2	21.3	70%	65%	6.7%
TOTAL XYLENES	60	18	84	80.4	110%	104%	5.6%
TFT SURR	10		6.6	6.5	66%	65%	1.5%
DILUTION	2.5X						

20

ECOLOGY AND ENVIRONMET, INC.
ANALYTICAL SERVICES CENTER
QUALITY AND CONTROL FOR ACCURACY AND PRECISION
PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)
OF WATER/SOIL MATRIX SPIKE (MS)

MATRIX --WATER

UNITS: UG/L
SAMPLE : WLCS 060598

JOB# 9801.203
DATE:
BATCH# 980605306R-
NOTEBOOK:

8021-BETX VOLATILE

	AMOUNT	ORIGINAL	AMOUNT		PERCENT	
PARAMETER	ADDED	VALUE	DETERMINED		RECOVERY	
					MS	
MTBE	20		16.9		99%	
BENZENE	20		17.1		86%	
TOLUENE	20		17.7		89%	
ETHYLBENZENE	20		17.7		89%	
TOTAL XYLENES	60		56.3		94%	
TFT SURROGATE(% REC)	40		44.5		111%	

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ECOLOGY AND ENVIRONMET, INC.
ANALYTICAL SERVICES CENTER
QUALITY AND CONTROL FOR ACCURACY AND PRECISION
PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)
OF WATER/SOIL MATRIX SPIKE (MS)

MATRIX --WATER

UNITS: UG/L
SAMPLE : WLCS 060998

JOB# 9801.165/.203
DATE:
BATCH# 980609306R-R
NOTEBOOK:

8021-BETX VOLATILE

	AMOUNT	ORIGINAL	AMOUNT		PERCENT	
PARAMETER	ADDED	VALUE	DETERMINED		RECOVERY	
					MS	
MTBE	10		8.67		99%	
BENZENE	10		9.21		92%	
TOLUENE	10		9.21		92%	
ETHYLBENZENE	10		9.03		90%	
TOTAL XYLENES	30		26.1		87%	
TFT SURROGATE(% REC)	10		11		110%	

30

TEST CODE :WBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8021B BETX UNITS : UG/L
SAMPLE ID LAB : EE-98-08043 MATRIX: WATER
SAMPLE ID CLIENT: SB15 GW3

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	49		5.0
Toluene	34		5.0
Ethylbenzene	11		5.0
Total Xylenes	64		5.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002476

TEST CODE :WBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8021B BETX UNITS : UG/L
SAMPLE ID LAB : EE-98-08044 MATRIX: WATER
SAMPLE ID CLIENT: SB15D GW3

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	12		5.0
Toluene	8.7		5.0
Ethylbenzene	8.3		5.0
Total Xylenes	18		5.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002477

TEST CODE :WBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8021B BETX UNITS : UG/L
SAMPLE ID LAB : EE-98-08045 MATRIX: WATER
SAMPLE ID CLIENT: SB17 GW4

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		50
Toluene	ND		50
Ethylbenzene	490		50
Total Xylenes	140		50

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002478

TEST CODE :WBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8021B BETX UNITS : UG/L
SAMPLE ID LAB : EE-98-08046 MATRIX: WATER
SAMPLE ID CLIENT: TB

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.0
Toluene	ND		2.0
Ethylbenzene	ND		2.0
Total Xylenes	ND		2.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :WBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8021B BETX UNITS : UG/L
SAMPLE ID LAB : EE-98-08047 MATRIX: WATER
SAMPLE ID CLIENT: SB18 GW5

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	8900		2000
Toluene	PRESENT		2000
Ethylbenzene	3300		2000
Total Xylenes	9100		2000

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002480

8020 Retention Time Window Study

Instrument ID: VARIAN 3400 #8
Column: RESTEK 502.2 30METER 0.53MM ID
Run Dates: 08/05/97 - 08/08/97

Aroclor	Pk #	08/05/97 Mid Level RT	08/06/97 Mid Level RT	08/08/97 Mid Level RT	Mean RT	Std Dev	Calculated RTW (3.14x Std Dev)
MTBE	1	4.475	4.499	4.497	4.490	0.0109	0.034
BENZENE	2	7.427	7.455	7.450	7.444	0.0122	0.038
TOLUENE	3	11.004	11.025	11.029	11.019	0.0110	0.034
ETHYLBENZENE	4	14.867	14.885	14.884	14.879	0.0083	0.026
M/P-XYLENE	5	15.092	15.110	15.108	15.103	0.0081	0.025
O-XYLENE	1	16.331	16.346	16.343	16.340	0.0065	0.020
CL-BENZENE	2	14.668	14.686	14.686	14.680	0.0085	0.027
1,3-DICHLOROBENZENE	3	21.737	21.757	21.750	21.748	0.0083	0.026
1,4-DICHLOROBENZENE	4	22.118	22.139	22.130	22.129	0.0086	0.027
1,2-DICHLOROBENZENE	5	23.324	23.340	23.334	23.333	0.0066	0.021

002481

Turbochrom Method File \\GCSRV1\TCDATA\V34008\8021BETX_060998WC.mth
Printed by : SAMSONR on: 06/17/98 02:04:07 PM
Created by : SAMSONR on: 06/09/98 01:34:51 PM
Edited by : SAMSONR on: 06/10/98 09:14:38 AM
Number of Times Edited : 16
Number of Times Calibrated : 296
Description:

Global Sample Information
Default Sample Volume : 1.000 L
Quantitation Units : ug
Void Time : 0.000 min
Correct amounts during calibration : No
Reject outliers during calibration : No

An External Standard calibration will be used
Unknown peaks will be quantitated using a response factor of 1.000000e+06

Component Information
BENZENE
Component Type : Single Peak Component
Retention Time : 12.979 min
Search Window : 6.00 s, 0.00 %
Reference Component :
Find peak closest to expected RT in window
Use Average Calibration Factor (Area / Amount)

User Values
Label :
Value 1 : 20.000000
Value 2 : 0.000000
Value 3 : 0.000000
Value 4 : 0.000000
Value 5 : 0.000000

Calibration Level

Level Name	Amount	Area	Height	ISTD Resp.	ISTD Amt.	# Replicates
10NG	2.0000	12874.23	1596.64	----------	----------	1
50NG	10.0000	57060.38	8828.30	----------	----------	1
100NG	20.0000	133290.81	21215.43	----------	----------	1
200NG	40.0000	264158.15	41646.71	----------	----------	1
250NG	50.0000	337447.69	52801.60	----------	----------	1

Average Calibration Factor = 6432.120401 (%RSD = 6.56)

TFT
Component Type : Single Peak Component
Retention Time : 14.272 min
Search Window : 6.00 s, 0.00 %
Reference Component :
Find peak closest to expected RT in window

60

)6/17/98 02:04:07 PM Method: \\GCSRV1\TCDATA\V34008\8021BETX_060998WC.mth

Use Average Calibration Factor (Area / Amount)

User Values
Label :
Value 1 : 40.000000
Value 2 : 0.000000
Value 3 : 0.000000
Value 4 : 0.000000
Value 5 : 0.000000

Calibration Level

Level Name	Amount	Area	Height	ISTD Resp.	ISTD Amt.	# Replicates
100NG	10.0000	15586.77	0.00	----------	----------	0

Average Calibration Factor = 1558.677000 (%RSD = 0.00)

[redacted]UENE
Component Type : Single Peak Component
Retention Time : 17.175 min
Search Window : 6.00 s, 0.00 %
Reference Component :
Find peak closest to expected RT in window
Use Average Calibration Factor (Area / Amount)

User Values
Label :
Value 1 : 20.000000
Value 2 : 0.000000
Value 3 : 0.000000
Value 4 : 0.000000
[redacted]alue 5 : 0.000000

Calibration Level

Level Name	Amount	Area	Height	ISTD Resp.	ISTD Amt.	# Replicates
10NG	2.0000	8556.63	1350.04	----------	----------	1
50NG	10.0000	52078.54	8954.26	----------	----------	1
100NG	20.0000	119087.46	21143.91	----------	----------	1
200NG	40.0000	247693.58	43508.57	----------	----------	1
250NG	50.0000	316814.88	55297.30	----------	----------	1

Average Calibration Factor = 5593.835567 (%RSD = 15.27)

ETHYLBENZENE
Component Type : Single Peak Component
Retention Time : 20.920 min
Search Window : 6.00 s, 0.00 %
Reference Component :
Find peak closest to expected RT in window
Use Average Calibration Factor (Area / Amount)

61

)6/17/98 02:04:07 PM Method: \\GCSRV1\TCDATA\V34008\8021BETX_060998WC.mth

User Values
Label :
Value 1 : 20.000000
Value 2 : 0.000000
Value 3 : 0.000000
Value 4 : 0.000000
Value 5 : 0.000000

Calibration Level

Level Name	Amount	Area	Height	ISTD Resp.	ISTD Amt.	# Replicates
10NG	2.0000	7453.62	1249.75	----------	----------	1
50NG	10.0000	48647.91	8583.09	----------	----------	1
100NG	20.0000	104367.12	19893.77	----------	----------	1
200NG	40.0000	221185.26	41623.20	----------	----------	1
250NG	50.0000	282412.65	52808.04	----------	----------	1

erage Calibration Factor = 4997.568011 (%RSD = 15.46)

M-P-XYLENE
Component Type : Single Peak Component
Retention Time : 21.121 min
Search Window : 6.00 s, 0.00 %
Reference Component :
Find peak closest to expected RT in window
Use Average Calibration Factor (Area / Amount)

User Values
Label :
Value 1 : 40.000000
Value 2 : 0.000000
Value 3 : 0.000000
Value 4 : 0.000000
Value 5 : 0.000000

Calibration Level

Level Name	Amount	Area	Height	ISTD Resp.	ISTD Amt.	# Replicates
10NG	4.0000	20643.89	3086.23	----------	----------	1
50NG	20.0000	133382.12	24091.35	----------	----------	1
100NG	40.0000	291657.37	52360.99	----------	----------	1
200NG	80.0000	587659.32	104302.08	----------	----------	1
250NG	100.0000	743266.13	131532.11	----------	----------	1

Average Calibration Factor = 6779.982832 (%RSD = 14.07)

62

O-XYLENE
Component Type : Single Peak Component
Retention Time : 22.272 min
Search Window : 6.00 s, 0.00 %
Reference Component :
Find peak closest to expected RT in window

06/17/98 02:04:07 PM Method: \\GCSRV1\TCDATA\V34008\8021BETX_060998WC.mth

Use Average Calibration Factor (Area / Amount)

User Values
Label :
Value 1 : 20.000000
Value 2 : 0.000000
Value 3 : 0.000000
Value 4 : 0.000000
Value 5 : 0.000000

Calibration Level

Level Name	Amount	Area	Height	ISTD Resp.	ISTD Amt.	# Replicates
10NG	2.0000	10715.55	1328.70	----------	----------	1
50NG	10.0000	56964.48	9001.63	----------	----------	1
100NG	20.0000	130388.93	21241.27	----------	----------	1
200NG	40.0000	266325.12	43632.74	----------	----------	1
250NG	50.0000	348704.92	56106.45	----------	----------	1

Average Calibration Factor = 6241.179612 (%RSD = 10.94)

TEST CODE :WBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8021B BETX UNITS : UG/L
SAMPLE ID LAB : Method Blank (06/05) MATRIX: WATER

Associated Samples: 8046; 8047

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.0
Toluene	ND		2.0
Ethylbenzene	ND		2.0
Total Xylenes	ND		2.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :WBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8021B BETX UNITS : UG/L
SAMPLE ID LAB : Method Blank (06/09) MATRIX: WATER

Associated Samples: 8043; 8044; 8045

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.0
Toluene	ND		2.0
Ethylbenzene	ND		2.0
Total Xylenes	ND		2.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

DATA REDUCTION/EVALUATION/REPORTING

Quantitate using the curve or mean calibration factor.

The data system prints results in µg/L or µg/kg. The following formulae are given as checks.

Water or soil samples when not quantitating from a curve.

$$\text{Concentration, } \mu g/kg \text{ or } \mu g/L = \frac{(A_x)\ (Df)}{(\overline{CF_x})}$$

Where,

Ax = Area of the peak for the compound to be measured

$\overline{CF_x}$ = mean calibration factor for compound (area / µg/L or area / µg/kg)

Df = Dilution factor. The dilution factor is defined as follows:

For waters:

$$\frac{\text{mL of sample used to make dilution + mL ASTM Type II Water}}{\text{mL of sample used to make dilution}}$$

For soils:

$$\frac{5g}{\text{grams of soil purged}}$$

Medium level (methanol extract) when not quantitating from a curve.

$$\textit{Soil Sample Concentration, } \mu g/kg = \frac{(A_x)}{(\overline{CF_x})}\left[\frac{5}{V_e}\frac{V_t}{S}\right]$$

Where,

A_x = area of the peak for the compound to be measured

$\overline{CF_x}$ = mean calibration factor for compound x (area / µg/L)

S = Mass of sample extracted (g) usually 4 g

5 = amount of water (mL) to which the method extract is added (to account for units of curve)

Vt = Volume (mL) of total methanol extract, usually 10 mL.

Ve = Volume (mL) of methanol extract added to 5 mL of water for purging, usually 0.100 mL.

002488

Job Number: 9801.203/230
Client: START - Dallas
Reviewer: CMontowicz
Date: 6/25/98

GC
TABLE OF CONTENTS
BETX- Heated P&T Soils

A.	SURROGATE SUMMARY	✓
B.	MS/MSD SUMMARY	NA
	FOLLOWED BY:	
	1. CHROMATOGRAM	↓
	2. DATA SYSTEM PRINTOUT	↓
	LCS SUMMARY	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
C.	RESULT SUMMARY FOR EACH SAMPLE	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT (PRIMARY RAW DATA PRECEDES CONFIRMATION RAW DATA)	✓ conf not req'd
D.	EXTRACTION LOGBOOK PAGE(S)	NA
E.	RETENTION TIME WINDOW SUMMARY	✓
F.	INITIAL CALIBRATION SUMMARY ~~AND CHROMATOGRAMS *~~	✓
G.	DAILY ANALYTICAL SEQUENCE INFORMATION AS FOLLOWS *	
	1. DAILY INJECTION LOGBOOK	✓
	2. CALIBRATION CHECK SUMMARY	✓
	3. CHROMATOGRAMS AND DATA SYSTEM PRINTOUTS FOR ALL STANDARDS IN THE DAILY SEQUENCE	✓
H.	BLANK RESULTS	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
I.	CALCULATION EXAMPLE	✓

* = ALL CALIBRATION INFORMATION IS ORGANIZED PER INSTRUMENT, CHRONOLOGICALLY

002489

PURGEABLE AROMATICS
QUALITY CONTROL FOR ACCURACY: PERCENT
RECOVERY OF SURROGATE SPIKES
(MATRIX: SOLID)

9801.203

E & E Laboratory No.-98

(ug/kg)

Compound	Amount Added	Amount Determined	Percent Recovery	Project QC Targets
Trifluorotoluene				50 - 150
08034	40.0	34.1	85.2	
08038	40.0	28.2	70.5	
08039	40.0	22.4	55.9	
08236	40.0	66.3	166*	
08237	40.0	26.4	66.0	
Method Blank (06/10)	40.0	40.0	100	
LCS (06/10)	40.0	40.2	101	

THESE RECOVERIES ARE WITHIN E & E, INC. QC TARGETS WITH THE EXCEPTION OF *.

MS = MATRIX SPIKE
MSD = MATRIX SPIKE DUPLICATE
LCS = LABORATORY CONTROL SAMPLE

002490

ECOLOGY AND ENVIRONMET, INC.
ANALYTICAL SERVICES CENTER
QUALITY AND CONTROL FOR ACCURACY AND PRECISION
PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)
OF SOIL MATRIX SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MSD)

MATRIX --SOIL

UNITS: UG/KG

JOB#: 9801.230
DATE:
BATCH# 980610301R-
NOTEBOOK:

SAMPLE # SLCS061098-
RUN#
8021B-AROMATIC VOLATILES

PARAMETER	AMOUNT ADDED	ORIGINAL VALUE	AMOUNT DETERMINED MS	PERCENT RECOVERY MS
BENZENE	20		21	105%
TOLUENE	20		21.5	108%
ETHYLBENZENE	20		21	105%
TOTAL XYLENES	60		63.6	106%
TFT SURR	40		40.2	101%

Software Version	: 6.0.2:G11	Date	: 06/11/98 12:27:50 PM
Operator	: FOURNIERD	Sample Name	: RLCS
Sample Number	: 004	Study	: 10ULLCS,5ULSS/5.0G/5ML
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: V3600_1	Channel	: A
Interface Serial #	: 7102273182	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 28.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 L	Area Reject	: 0.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/10/98 02:40:02 PM	Cycle	: 4

Raw Data File : \\GCSRV1\TCDATA\v36001\980610301r\v3601a_0610_004.raw
Result File : \\GCSRV1\TCDATA\V36001\980610301R\v3601a_0610_004.rst
Inst Method : \\GCSRV1\TCDATA\v36001\3601_acq_28_min from
\\GCSRV1\TCDATA\V36001\980610301R\v3601a_0610_004.rst
Proc Method : \\GCSRV1\TCDATA\v36001\pid_060998btexsc.mth from
\\GCSRV1\TCDATA\V36001\980610301R\v3601a_0610_004.rst
C[redacted] Method : \\GCSRV1\TCDATA\v36001\pid_060998btexsc.mth from
\\GCSRV1\TCDATA\V36001\980610301R\v3601a_0610_004.rst
Sequence File : \\GCSRV1\TCDATA\V36001\980610301R\V3601_061098.seq

LCS/LCSD REPORT

Instrument: V 3600 #1 Method: 8021B

Batch #: 980610301R

Job #: 9801.203, 230

Component Name	Time [min]	Area [µV·s]	Spike Amt. ug/L	Amount Determ. ug/L	% Recovery
BENZENE	7.08	426843.51	20.0	20.963	104.8
TFT (TRIFLUOROTOLUEN	8.28	263261.37	40.0	40.232	100.6
TOLUENE	10.37	402892.85	20.0	21.506	107.5
ETHYLBENZENE	13.55	334498.25	20.0	20.972	104.9
M/P-XYLENE	13.75	988577.73	40.0	42.765	106.9
O-XYLENE	14.67	375611.54	20.0	20.899	104.5
		2791685.25			

Control Limits:

Report stored in ASCII file: E:\V36001\980610301R\v3601a_0610_004.TX0

TEST CODE :SBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-08034 MATRIX : SOLID
SAMPLE ID CLIENT: SB14 0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		11
Toluene	PRESENT		11
Ethylbenzene	PRESENT		11
Total Xylenes	PRESENT		11

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :SBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 90 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-08038 MATRIX : SOLID
SAMPLE ID CLIENT: SB17 0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.2
Toluene	ND		2.2
Ethylbenzene	ND		2.2
Total Xylenes	ND		2.2

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :SBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 90 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-08039 MATRIX : SOLID
SAMPLE ID CLIENT: SB17D 0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.2
Toluene	ND		2.2
Ethylbenzene	ND		2.2
Total Xylenes	ND		2.2

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :SBTX0A1 JOB NUMBER :9801.230
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 90 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-08236 MATRIX : SOLID
SAMPLE ID CLIENT: SB19-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.2
Toluene	9.3		2.2
Ethylbenzene	17		2.2
Total Xylenes	61		2.2

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :SBTX0A1 JOB NUMBER :9801.230
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-08237 MATRIX : SOLID
SAMPLE ID CLIENT: SB19-0708

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.3
Toluene	ND		2.3
Ethylbenzene	ND		2.3
Total Xylenes	ND		2.3

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

8021B Retention Time Window Study

Instrument ID: VARIAN 3600 #1 CHARLIE
Column: 30 M: 0.53mm; RTX-VOLATILES FSCC
Run Dates: 04/27-4/29/98

Method: 8021B-Aromatics
Spreadsheet: 8020RTW.WB1 (3600#1 RTW)

Aroclor		4/27/98 Mid Level RT	4/28/98 Mid Level RT	4/29/98 Mid Level RT	Mean RT	Std Dev	Calculated RTW (3x Std Dev)
MTBE		4.50	4.50	4.49	4.50	0.005	0.014
BENZENE		7.16	7.15	7.15	7.15	0.005	0.014
TOLUENE		10.46	10.45	10.45	10.45	0.005	0.014
CL-BENZENE		13.41	13.40	13.40	13.40	0.005	0.014
ETHLYBENZENE		13.65	13.64	13.63	13.64	0.008	0.024
M/P-XYLENE		13.85	13.83	13.83	13.84	0.009	0.028
O-XYLENE		14.77	14.76	14.76	14.76	0.005	0.014
1,3-DICHLOROBENZENE		18.69	18.69	18.69	18.69	0.000	0.000
1,4-DICHLOROBENZENE		18.94	18.94	18.93	18.94	0.005	0.014
1,2-DICHLOROBENZENE		19.77	19.78	19.77	19.77	0.005	0.014
TFT SURROGATE		8.35	8.36	8.38	8.36	0.012	0.037

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Turbochrom Method File \\GCSRV1\TCDATA\V36001\PID_060998BTEXSC.mth

Printed by : SAMSONR on: 06/17/98 02:04:56 PM
Created by : FOURNIERD on: 06/09/98 03:46:50 PM
Edited by : FOURNIERD on: 06/10/98 05:23:32 PM
Number of Times Edited : 9
Number of Times Calibrated : 448
Description:

Global Sample Information
Default Sample Volume : 1.000 L
Quantitation Units : ug
Void Time : 0.000 min
Correct amounts during calibration : No
Reject outliers during calibration : No

An External Standard calibration will be used
Unknown peaks will be quantitated using a response factor of 1.000000e+06

Component Information
BENZENE
Component Type : Single Peak Component
Retention Time : 7.096 min
Search Window : 6.00 s, 0.00 %
Reference Component :
Find peak closest to expected RT in window
Use Average Calibration Factor (Area / Amount)

User Values
Label :
Value 1 : 20.000000
Value 2 : 0.000000
Value 3 : 0.000000
Value 4 : 0.000000
Value 5 : 0.000000

Calibration Level

Level Name	Amount	Area	Height	ISTD Resp.	ISTD Amt.	# Replicates
10NG	2.0000	31765.32	4806.13	----------	----------	1
50NG	10.0000	185320.25	31758.50	----------	----------	1
100NG	20.0000	412168.18	72596.91	----------	----------	1
150NG	30.0000	652436.61	115662.75	----------	----------	1
200NG	40.0000	888200.84	154417.54	----------	----------	1
250NG	50.0000	1159766.96	199275.89	----------	----------	1

Average Calibration Factor = 20361.890075 (%RSD = 13.33)

TFT (TRIFLUOROTOLUENE)
Component Type : Single Peak Component
Retention Time : 8.260 min
Search Window : 5.00 s, 1.00 %
Reference Component :
Find peak closest to expected RT in window

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06/17/98 02:04:56 PM Method: \\GCSRV1\TCDATA\V36001\PID_060998BTEXSC.mth

Use Average Calibration Factor (Area / Amount)

User Values
Label :
Value 1 : 40.000000
Value 2 : 0.000000
Value 3 : 0.000000
Value 4 : 0.000000
Value 5 : 0.000000

Calibration Level

Level Name	Amount	Area	Height	ISTD Resp.	ISTD Amt.	# Replicates
100NG	40.0000	261740.04	0.00	----------	----------	0

Average Calibration Factor = 6543.501000 (%RSD = 0.00)

TOLUENE
Component Type : Single Peak Component
Retention Time : 10.388 min
Search Window : 6.00 s, 0.00 %
Reference Component :
Find peak closest to expected RT in window
Use Average Calibration Factor (Area / Amount)

User Values
Label :
Value 1 : 20.000000
Value 2 : 0.000000
Value 3 : 0.000000
Value 4 : 0.000000
Value 5 : 0.000000

Calibration Level

Level Name	Amount	Area	Height	ISTD Resp.	ISTD Amt.	# Replicates
10NG	2.0000	27192.67	4681.16	----------	----------	1
50NG	10.0000	161212.97	30737.87	----------	----------	1
100NG	20.0000	390887.46	70702.73	----------	----------	1
150NG	30.0000	613497.12	113173.31	----------	----------	1
200NG	40.0000	837584.04	150616.74	----------	----------	1
250NG	50.0000	1087659.40	193881.75	----------	----------	1

Average Calibration Factor = 18734.116017 (%RSD = 17.01)

ETHYLBENZENE
Component Type : Single Peak Component
Retention Time : 13.567 min
Search Window : 6.00 s, 0.00 %
Reference Component :
Find peak closest to expected RT in window

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06/17/98 02:04:56 PM Method: \\GCSRV1\TCDATA\V36001\PID_060998BTEXSC.mth

Use Average Calibration Factor (Area / Amount)

User Values
Label :
Value 1 : 20.000000
Value 2 : 0.000000
Value 3 : 0.000000
Value 4 : 0.000000
Value 5 : 0.000000

Calibration Level

Level Name	Amount	Area	Height	ISTD Resp.	ISTD Amt.	# Replicates
10NG	2.0000	23776.01	4436.85	----------	----------	1
50NG	10.0000	141410.88	28555.14	----------	----------	1
100NG	20.0000	325965.73	67226.40	----------	----------	1
150NG	30.0000	514765.66	107941.76	----------	----------	1
[illegible]NG	40.0000	710167.23	144562.02	----------	----------	1
[illegible]NG	50.0000	922810.39	187465.48	----------	----------	1

Average Calibration Factor = 15949.437205 (%RSD = 15.58)

M/P-XYLENE
Component Type : Single Peak Component
Retention Time : 13.765 min
Search Window : 6.00 s, 0.00 %
Reference Component :
Find peak closest to expected RT in window
Use Average Calibration Factor (Area / Amount)

User Values
Label :
Value 1 : 40.000000
Value 2 : 0.000000
Value 3 : 0.000000
Value 4 : 0.000000
Value 5 : 0.000000

Calibration Level

Level Name	Amount	Area	Height	ISTD Resp.	ISTD Amt.	# Replicates
10NG	4.0000	66209.29	10466.57	----------	----------	1
50NG	20.0000	423141.43	73364.94	----------	----------	1
100NG	40.0000	982853.12	166889.93	----------	----------	1
150NG	60.0000	1501150.34	253027.78	----------	----------	1
200NG	80.0000	2030534.49	331348.68	----------	----------	1
250NG	100.0000	2601768.49	431619.14	----------	----------	1

Average Calibration Factor = 23116.543333 (%RSD = 15.74)

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06/17/98 02:04:56 PM Method: \\GCSRV1\TCDATA\V36001\PID_060998BTEXSC.mth

O-XYLENE
Component Type : Single Peak Component
Retention Time : 14.686 min
Search Window : 6.00 s, 0.00 %
Reference Component :
Find peak closest to expected RT in window
Use Average Calibration Factor (Area / Amount)

User Values
Label :
Value 1 : 20.000000
Value 2 : 0.000000
Value 3 : 0.000000
Value 4 : 0.000000
Value 5 : 0.000000

Calibration Level

Level Name	Amount	Area	Height	ISTD Resp.	ISTD Amt.	# Replicates
10NG	2.0000	29510.60	4123.81	----------	----------	1
50NG	10.0000	158638.72	26501.07	----------	----------	1
100NG	20.0000	368769.23	62518.16	----------	----------	1
150NG	30.0000	569860.14	99453.02	----------	----------	1
200NG	40.0000	781894.70	132219.24	----------	----------	1
250NG	50.0000	1011749.22	173101.32	----------	----------	1

Average Calibration Factor = 17972.554082 (%RSD = 12.10)

Software Version	: 6.0.2:G11	Date	: 06/11/98 10:35:40 AM
Operator	: PLEUTHNERG	Sample Name	: RCVS
Sample Number	: 017	Study	: 5ULSURR,10UL CVS/5G/5ML
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: V3600_1	Channel	: A
Interface Serial #	: 7102273182	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 28.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 L	Area Reject	: 0.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/11/98 04:05:04 AM	Cycle	: 17

Raw Data File : \\GCSRV1\TCDATA\v36001\980610301r\v3601a_0610_017.raw
Result File : \\GCSRV1\TCDATA\V36001\980610301R\v3601a_0610_017.rst
Inst Method : \\GCSRV1\TCDATA\v36001\3601_acq_28_min from
\\GCSRV1\TCDATA\V36001\980610301R\v3601a_0610_017.rst
Proc Method : \\GCSRV1\TCDATA\v36001\pid_060998btexsc.mth from
\\GCSRV1\TCDATA\V36001\980610301R\v3601a_0610_017.rst
C[redacted] Method : \\GCSRV1\TCDATA\v36001\pid_060998btexsc.mth from
\\GCSRV1\TCDATA\V36001\980610301R\v3601a_0610_017.rst
Sequence File : \\GCSRV1\TCDATA\V36001\980610301R\V3601_061098.seq

CONTINUING CALIBRATION STD / CVS REPORT

Instrument: V 3600 #1 Method: 8021B

Batch #: 980610301R

Job #: 9801. 203, 230

Peak	Component Name	Time [min]	Area [µV·s]	Amount Determ. ug/L	Expected Amt. ug/L	% Difference
21	BENZENE	7.10	409518.34	20.1	20.0	0.6
23	TFT (TRIFLUOROTOLUEN	8.30	219602.83	33.6	40.0	~~-16.1~~ % recovery DKJ 6/11/98
26	TOLUENE	10.39	382792.04	20.4	20.0	2.2
34	ETHYLBENZENE	13.57	323865.25	20.3	20.0	1.5
35	M/P-XYLENE	13.77	939524.26	40.6	40.0	1.6
38	O-XYLENE	14.69	366299.99	20.4	20.0	1.9
			2641602.70			

Control Limits:

Software Version	: 6.0.2:G11	Date	: 06/11/98 10:36:04 AM
Operator	: PLEUTHNERG	Sample Name	: RCVS
Sample Number	: 024	Study	: 5ULSURR,10ULCVS
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: V3600_1	Channel	: A
Interface Serial #	: 7102273182	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 28.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 L	Area Reject	: 0.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/11/98 08:54:28 AM	Cycle	: 24

Raw Data File : \\GCSRV1\TCDATA\v36001\980610301r\v3601a_0610_024.raw
Result File : \\GCSRV1\TCDATA\V36001\980610301R\v3601a_0610_024.rst
Inst Method : \\GCSRV1\TCDATA\v36001\3601_acq_28_min from
\\GCSRV1\TCDATA\V36001\980610301R\v3601a_0610_024.rst
Proc Method : \\GCSRV1\TCDATA\v36001\pid_060998btexsc.mth from
\\GCSRV1\TCDATA\V36001\980610301R\v3601a_0610_024.rst
C[redacted] Method : \\GCSRV1\TCDATA\v36001\pid_060998btexsc.mth from
\\GCSRV1\TCDATA\V36001\980610301R\v3601a_0610_024.rst
Sequence File : \\GCSRV1\TCDATA\V36001\980610301R\V3601_061098.seq

CONTINUING CALIBRATION STD / CVS REPORT

Instrument: V 3600 A 1 Method: 8021 B

Batch #: 980610301R

Job #: 9801.203,230

Peak	Component Name	Time [min]	Area [µV·s]	Amount Determ. ug/L	Expected Amt. ug/L	% Difference
16	BENZENE	7.10	422142.91	20.7	20.0	3.7
18	TFT (TRIFLUOROTOLUEN	8.30	236216.77	36.1	40.0	-9.8
22	TOLUENE	10.40	392962.79	21.0	20.0	4.9
31	ETHYLBENZENE	13.57	331284.85	20.8	20.0	3.9
32	M/P-XYLENE	13.77	965759.17	41.8	40.0	4.4
34	O-XYLENE	14.69	378136.60	21.0	20.0	5.2
			2726503.08			

Control Limits:

TEST CODE :SBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : Method Blank (06/10) MATRIX : SOLID

Associated Samples: 8034; 8038; 8039

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.0
Toluene	ND		2.0
Ethylbenzene	ND		2.0
Total Xylenes	ND		2.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

DATA REDUCTION/EVALUATION/REPORTING

Quantitate using the curve or mean calibration factor.

The data system prints results in µg/L or µg/kg. The following formulae are given as checks.

Water or soil samples when not quantitating from a curve.

$$\text{Concentration, } \mu g/kg \text{ or } \mu g/L = \frac{(A_x)\ (Df)}{(\overline{CF_x})}$$

Where,

Ax = Area of the peak for the compound to be measured

$\overline{CF_x}$ = mean calibration factor for compound (area / µg/L or area / µg/kg)

Df = Dilution factor. The dilution factor is defined as follows:

For waters:

$$\frac{\text{mL of sample used to make dilution + mL ASTM Type II Water}}{\text{mL of sample used to make dilution}}$$

For soils:

$$\frac{5g}{\text{grams of soil purged}}$$

Medium level (methanol extract) when not quantitating from a curve.

$$\textit{Soil Sample Concentration, } \mu g/kg = \frac{(A_x)}{(\overline{CF_x})}\left[\frac{5}{V_e}\frac{V_t}{S}\right]$$

Where,

A_x = area of the peak for the compound to be measured

$\overline{CF_x}$ = mean calibration factor for compound x (area / µg/L)

S = Mass of sample extracted (g) usually 4 g

5 = amount of water (mL) to which the method extract is added (to account for units of curve)

Vt = Volume (mL) of total methanol extract, usually 10 mL.

Ve = Volume (mL) of methanol extract added to 5 mL of water for purging, usually 0.100 mL.

002506

Job Number: 9801.203/230
Client: START - Dallas
Reviewer: C Wojtowicz
Date: 6/25/98

GC
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2. DATA SYSTEM PRINTOUT ✓

C. RESULT SUMMARY FOR EACH SAMPLE ✓
FOLLOWED BY:
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2. DATA SYSTEM PRINTOUT ✓
(PRIMARY RAW DATA PRECEDES CONFIRMATION RAW DATA) conf not req'd

D. EXTRACTION LOGBOOK PAGE(S) NA

E. RETENTION TIME WINDOW SUMMARY ✓

F. INITIAL CALIBRATION SUMMARY ~~AND CHROMATOGRAMS~~ * yes included for ✓

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I. CALCULATION EXAMPLE ✓

* = ALL CALIBRATION INFORMATION IS ORGANIZED PER INSTRUMENT, CHRONOLOGICALLY

PURGEABLE AROMATICS
QUALITY CONTROL FOR ACCURACY: PERCENT
RECOVERY OF SURROGATE SPIKES
(MATRIX: SOLID)

9801.203

E & E Laboratory No.-98

(ug/kg)

Compound	Amount Added	Amount Determined	Percent Recovery	Project QC Targets
Trifluorotoluene				50 - 150
08035	40.0	38.6	96.6	
08036	40.0	43.8	109.6	
08037	40.0	360.7	901.8*	
08040	40.0	34.7	86.8	
08041	40.0	58.8	146.9	
08042	40.0	58.6	146.5	
Method Blank (06/10)	40.0	40.0	100	
LCS (06/11)	40.0	47.1	117.8	
08035 MS	40.0	37.3	93.3	
08035 MSD	40.0	36.7	91.6	

THESE RECOVERIES ARE WITHIN E & E, INC. QC TARGETS WITH THE EXCEPTION OF *.

MS = MATRIX SPIKE
MSD = MATRIX SPIKE DUPLICATE
LCS = LABORATORY CONTROL SAMPLE

002508

ECOLOGY AND ENVIRONMET, INC.
ANALYTICAL SERVICES CENTER
QUALITY AND CONTROL FOR ACCURACY AND PRECISION
PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)
OF SOIL SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MSD)

MATRIX --SOIL

UNITS: UG/KG

JOB# 9801.203
ANALYZED: 6/12/98
BATCH# 980611301R-
NOTEBOOK: 1236-70

SAMPLE# 8035.01 MS/MSD
RUN# 20,21
8021B AROMATICS

PARAMETER	AMOUNT ADDED	ORIGINAL VALUE	AMOUNT DETERMINED		PERCENT RECOVERY		RPD	LCL	UCL
			MS	MSD	MS	MSD			
MTBE	40		33.5	33.4	84%	84%	0.3%	50.0%	150%
BENZENE	20		18.4	18.0	92%	90%	2.2%	49.3%	124%
TFT (TRIFLUOROTOLUEN	40		37.3	36.7	93%	92%	1.6%	26.4%	139%
TOLUENE	20		23.4	23.6	117%	118%	0.9%	46.0%	117%
CHLOROBENZENE	20		22.9	22.8	115%	114%	0.4%	70.0%	130%
ETHYLBENZENE	20		20.4	20.3	102%	102%	0.5%	43.9%	122%
TOTAL XYLENES	60		58.9	58.7	98%	98%	0.3%	53.5%	118%
1,3-DICHLOROBENZENE	20		20.9	20.6	105%	103%	1.4%	50.0%	141%
1,4-DICHLOROBENZENE	20		20.5	20.3	103%	102%	1.0%	42.0%	143%
1,2-DICHLOROBENZENE	20		20.7	20.6	104%	103%	0.5%	37.0%	154%

LCL=LOWER CONTROL LIMIT
UCL=UPPER CONTROL LIMIT

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ECOLOGY AND ENVIRONMET, INC.
ANALYTICAL SERVICES CENTER
QUALITY AND CONTROL FOR ACCURACY AND PRECISION
LABORATORY CONTROL SPIKE

MATRIX --SOIL

UNITS: UG/KG

JOB# 9801.203
ANALYZED: 6/11/98
BATCH# 980611301R
NOTEBOOK: 1236-70

SAMPLE# LCS (SOIL)
RUN# 9
8021B AROMATICS

PARAMETER	AMOUNT ADDED	ORIGINAL VALUE	AMOUNT DETERMINED LCS	PERCENT RECOVERY LCS	LCL	UCL
MTBE	40		41.2	103%	70.5%	115%
BENZENE	20		20.6	103%	70.4%	124%
TFT (TRIFLUOROTOLUEN	40		47.1	118%	26.4%	139%
TOLUENE	20		21.4	107%	73.2%	117%
CHLOROBENZENE	20		21.4	107%	72.0%	117%
ETHYLBENZENE	20		22.2	111%	71.2%	122%
TOTAL XYLENES	60		63.4	106%	75.5%	118%
1,3-DICHLOROBENZENE	20		21.9	109%	74.1%	115%
1,4-DICHLOROBENZENE	20		21.9	109%	68.9%	119%
1,2-DICHLOROBENZENE	20		22.2	111%	69.8%	118%

LCL=LOWER CONTROL LIMIT
UCL=UPPER CONTROL LIMIT

TEST CODE :SBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 83 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-08035 MATRIX : SOLID
SAMPLE ID CLIENT: SB14 0506

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		90
Toluene	260		130
Ethylbenzene	ND		110
Total Xylenes	ND		300

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :SBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 81 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-08036 MATRIX : SOLID
SAMPLE ID CLIENT: SB15 0001

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	310		92
Toluene	650		140
Ethylbenzene	950		110
Total Xylenes	9800		310

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :SBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 82 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-08037 MATRIX : SOLID
SAMPLE ID CLIENT: SB16 -

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	2200		91
Toluene	3000		130
Ethylbenzene	1600		110
Total Xylenes	3500		300

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :SBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-08040 MATRIX : SOLID
SAMPLE ID CLIENT: SB17 5565

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	130		85
Toluene	2800		120
Ethylbenzene	4000		100
Total Xylenes	15000		280

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

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TEST CODE :SBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 87 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-08041 MATRIX : SOLID
SAMPLE ID CLIENT: SB18 0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		86
Toluene	240		130
Ethylbenzene	1400		100
Total Xylenes	890		290

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :SBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 85 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-08042 MATRIX : SOLID
SAMPLE ID CLIENT: SB18 0708

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	360		88
Toluene	390		130
Ethylbenzene	7900		100
Total Xylenes	8900		290

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

8021B Retention Time Window Study

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Instrument ID: VARIAN 3600 #1 CHARLIE Column: 30 M: 0.53mm; RTX-VOLATILES FSCC Run Dates: 04/27-4/29/98	Method: 8021B-Aromatics Spreadsheet: 8020RTW.WB1 (3600#1 RTW)

Aroclor		4/27/98 Mid Level RT	4/28/98 Mid Level RT	4/29/98 Mid Level RT	Mean RT	Std Dev	Calculated RTW (3x Std Dev)
MTBE		4.50	4.50	4.49	4.50	0.005	0.014
BENZENE		7.16	7.15	7.15	7.15	0.005	0.014
TOLUENE		10.46	10.45	10.45	10.45	0.005	0.014
CL-BENZENE		13.41	13.40	13.40	13.40	0.005	0.014
ETHLYBENZENE		13.65	13.64	13.63	13.64	0.008	0.024
M/P-XYLENE		13.85	13.83	13.83	13.84	0.009	0.028
O-XYLENE		14.77	14.76	14.76	14.76	0.005	0.014
1,3-DICHLOROBENZENE		18.69	18.69	18.69	18.69	0.000	0.000
1,4-DICHLOROBENZENE		18.94	18.94	18.93	18.94	0.005	0.014
1,2-DICHLOROBENZENE		19.77	19.78	19.77	19.77	0.005	0.014
TFT SURROGATE		8.35	8.36	8.38	8.36	0.012	0.037

Turbochrom Method File \\GCSRV1\TCDATA\V36001\PID_061198WC.mth
Printed by : SAMSONR on: 06/17/98 02:05:30 PM
Created by : FOURNIERD on: 06/11/98 04:07:58 PM
Edited by : FOURNIERD on: 06/12/98 02:21:09 PM
Number of Times Edited : 29
Number of Times Calibrated : 440
Description:

Global Sample Information
Default Sample Volume : 1.000 L
Quantitation Units : ug
Void Time : 0.000 min
Correct amounts during calibration : No
Reject outliers during calibration : No

An External Standard calibration will be used
Unknown peaks will be quantitated using a response factor of 1.000000e+06

Component Information
MTBE
Component Type : Single Peak Component
Retention Time : 4.463 min
Search Window : 6.00 s, 0.00 %
Reference Component :
Find peak closest to expected RT in window
Use Average Calibration Factor (Area / Amount)

User Values
Label :
Value 1 : 40.000000
Value 2 : 0.000000
Value 3 : 0.000000
Value 4 : 0.000000
Value 5 : 0.000000

Calibration Level

Level Name	Amount	Area	Height	ISTD Resp.	ISTD Amt.	# Replicates
10NG	4.0000	15673.00	2295.47	----------	----------	1
50NG	20.0000	97198.75	14348.50	----------	----------	1
100NG	40.0000	277495.97	39216.56	----------	----------	1
200NG	80.0000	496744.00	76830.09	----------	----------	1
250NG	100.0000	631960.50	95720.93	----------	----------	1

Average Calibration Factor = 5648.898351 (%RSD = 21.76)

BENZENE
Component Type : Single Peak Component
Retention Time : 7.109 min
Search Window : 6.00 s, 0.00 %
Reference Component :
Find peak closest to expected RT in window

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6/17/98 02:05:30 PM Method: \\GCSRV1\TCDATA\V36001\PID_061198WC.mth

Use Average Calibration Factor (Area / Amount)

User Values
Label :
Value 1 : 20.000000
Value 2 : 0.000000
Value 3 : 0.000000
Value 4 : 0.000000
Value 5 : 0.000000

Calibration Level

Level Name	Amount	Area	Height	ISTD Resp.	ISTD Amt.	# Replicates
10NG	2.0000	36140.50	4921.34	----------	----------	1
50NG	10.0000	192676.00	32591.90	----------	----------	1
100NG	20.0000	462817.50	79361.77	----------	----------	1
200NG	40.0000	972976.59	164349.56	----------	----------	1
[illegible]NG	50.0000	1198607.00	199042.91	----------	----------	1

Average Calibration Factor = 21755.055963 (%RSD = 13.24)

FT (TRIFLUOROTOLUENE)
Component Type : Single Peak Component
Retention Time : 8.310 min
Search Window : 5.00 s, 1.00 %
Reference Component :
Find peak closest to expected RT in window
Use Average Calibration Factor (Area / Amount)

User Values
Label :
[illegible]alue 1 : 40.000000
[illegible]alue 2 : 0.000000
Value 3 : 0.000000
Value 4 : 0.000000
Value 5 : 0.000000

Calibration Level

Level Name	Amount	Area	Height	ISTD Resp.	ISTD Amt.	# Replicates
100NG	40.0000	215598.09	0.00	----------	----------	0

Average Calibration Factor = 5389.952250 (%RSD = 0.00)

TOLUENE
Component Type : Single Peak Component
Retention Time : 10.404 min
Search Window : 6.00 s, 0.00 %
Reference Component :
Find peak closest to expected RT in window
Use Average Calibration Factor (Area / Amount)

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)6/17/98 02:05:30 PM Method: \\GCSRV1\TCDATA\V36001\PID_061198WC.mth

User Values
Label :
Value 1 : 20.000000
Value 2 : 0.000000
Value 3 : 0.000000
Value 4 : 0.000000
Value 5 : 0.000000

Calibration Level

Level Name	Amount	Area	Height	ISTD Resp.	ISTD Amt.	# Replicates
10NG	2.0000	34249.00	4591.69	----------	----------	1
50NG	10.0000	159748.22	30394.65	----------	----------	1
100NG	20.0000	413701.00	75338.91	----------	----------	1
200NG	40.0000	884581.91	152581.77	----------	----------	1
250NG	50.0000	1094431.00	187004.53	----------	----------	1

erage Calibration Factor = 19557.507980 (%RSD = 14.46)

HLOROBENZENE
Component Type : Single Peak Component
Retention Time : 13.344 min
Search Window : 6.00 s, 0.00 %
Reference Component :
Find peak closest to expected RT in window
Use Average Calibration Factor (Area / Amount)

User Values
Label :
Value 1 : 20.000000
Value 2 : 0.000000
Value 3 : 0.000000
Value 4 : 0.000000
Value 5 : 0.000000

Calibration Level

Level Name	Amount	Area	Height	ISTD Resp.	ISTD Amt.	# Replicates
10NG	2.0000	28569.22	5170.21	----------	----------	1
50NG	10.0000	170330.22	35523.25	----------	----------	1
100NG	20.0000	404765.11	84779.39	----------	----------	1
200NG	40.0000	869323.97	175645.53	----------	----------	1
250NG	50.0000	1084367.06	217864.71	----------	----------	1

Average Calibration Factor = 18995.265182 (%RSD = 17.13)

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ETHYLBENZENE
Component Type : Single Peak Component
Retention Time : 13.583 min
Search Window : 6.00 s, 0.00 %
Reference Component :
Find peak closest to expected RT in window

)6/17/98 02:05:30 PM Method: \\GCSRV1\TCDATA\V36001\PID_061198WC.mth

Use Average Calibration Factor (Area / Amount)

User Values
Label :
Value 1 : 20.000000
Value 2 : 0.000000
Value 3 : 0.000000
Value 4 : 0.000000
Value 5 : 0.000000

Calibration Level

Level Name	Amount	Area	Height	ISTD Resp.	ISTD Amt.	# Replicates
10NG	2.0000	26736.50	4794.74	----------	----------	1
50NG	10.0000	167235.92	32388.15	----------	----------	1
100NG	20.0000	393952.10	77353.70	----------	----------	1
200NG	40.0000	820761.52	151637.33	----------	----------	1
[illegible]NG	50.0000	1017693.53	186081.94	----------	----------	1

Average Calibration Factor = 18132.471349 (%RSD = 16.95)

M/P-XYLENE
Component Type : Single Peak Component
Retention Time : 13.781 min
Search Window : 6.00 s, 0.00 %
Reference Component :
Find peak closest to expected RT in window
Use Average Calibration Factor (Area / Amount)

User Values
Label :
[illegible]alue 1 : 40.000000
[illegible]alue 2 : 0.000000
Value 3 : 0.000000
Value 4 : 0.000000
Value 5 : 0.000000

Calibration Level

Level Name	Amount	Area	Height	ISTD Resp.	ISTD Amt.	# Replicates
10NG	4.0000	78591.62	11655.68	----------	----------	1
50NG	20.0000	472400.51	76800.28	----------	----------	1
100NG	40.0000	1063275.74	176083.03	----------	----------	1
200NG	80.0000	2170227.59	332132.66	----------	----------	1
250NG	100.0000	2684129.44	416285.59	----------	----------	1

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Average Calibration Factor = 24763.792670 (%RSD = 12.88)

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)-XYLENE
Component Type : Single Peak Component
Retention Time : 14.702 min
Search Window : 6.00 s, 0.00 %
Reference Component :
Find peak closest to expected RT in window
Use Average Calibration Factor (Area / Amount)

User Values
Label :
Value 1 : 20.000000
Value 2 : 0.000000
Value 3 : 0.000000
Value 4 : 0.000000
Value 5 : 0.000000

Calibration Level

el Name	Amount	Area	Height	ISTD Resp.	ISTD Amt.	# Replicates
10NG	2.0000	37276.16	4314.60	----------	----------	1
50NG	10.0000	168768.23	28218.47	----------	----------	1
100NG	20.0000	414811.90	70009.24	----------	----------	1
200NG	40.0000	876901.75	139846.09	----------	----------	1
250NG	50.0000	1097987.53	173331.45	----------	----------	1

Average Calibration Factor = 20027.558608 (%RSD = 11.08)

,3-DICHLOROBENZENE
Component Type : Single Peak Component
Retention Time : 18.625 min
Search Window : 6.00 s, 0.00 %
ference Component :
d peak closest to expected RT in window
Use Average Calibration Factor (Area / Amount)

User Values
Label :
Value 1 : 20.000000
Value 2 : 0.000000
Value 3 : 0.000000
Value 4 : 0.000000
Value 5 : 0.000000

Calibration Level

Level Name	Amount	Area	Height	ISTD Resp.	ISTD Amt.	# Replicates
10NG	2.0000	25475.40	4659.89	----------	----------	1
50NG	10.0000	140755.38	28855.92	----------	----------	1
100NG	20.0000	357343.97	73982.04	----------	----------	1
200NG	40.0000	723541.58	146138.69	----------	----------	1
250NG	50.0000	910947.40	180252.75	----------	----------	1

220

06/17/98 02:05:30 PM Method: \\GCSRV1\TCDATA\V36001\PID_061198WC.mth

Average Calibration Factor = 16197.584777 (%RSD = 16.02)

1,4-DICHLOROBENZENE
Component Type : Single Peak Component
Retention Time : 18.871 min
Search Window : 6.00 s, 0.00 %
Reference Component :
Find peak closest to expected RT in window
Use Average Calibration Factor (Area / Amount)

User Values
Label :
Value 1 : 20.000000
Value 2 : 0.000000
Value 3 : 0.000000
Value 4 : 0.000000
Value 5 : 0.000000

Calibration Level

Level Name	Amount	Area	Height	ISTD Resp.	ISTD Amt.	# Replicates
10NG	2.0000	27011.60	4703.95	----------	----------	1
50NG	10.0000	163837.62	32121.36	----------	----------	1
100NG	20.0000	396431.53	76314.14	----------	----------	1
200NG	40.0000	799255.45	147876.65	----------	----------	1
250NG	50.0000	996109.65	187905.77	----------	----------	1

Average Calibration Factor = 17922.943554 (%RSD = 16.20)

1,2-DICHLOROBENZENE
Component Type : Single Peak Component
Retention Time : 19.707 min
Search Window : 6.00 s, 0.00 %
Reference Component :
Find peak closest to expected RT in window
Use Average Calibration Factor (Area / Amount)

User Values
Label :
Value 1 : 20.000000
Value 2 : 0.000000
Value 3 : 0.000000
Value 4 : 0.000000
Value 5 : 0.000000

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)6/17/98 02:05:30 PM Method: \\GCSRV1\TCDATA\V36001\PID_061198WC.mth

Calibration Level

Level Name	Amount	Area	Height	ISTD Resp.	ISTD Amt.	# Replicates
10NG	2.0000	21574.35	3805.88	----------	----------	1
50NG	10.0000	138576.35	24080.49	----------	----------	1
100NG	20.0000	306768.70	61993.64	----------	----------	1
200NG	40.0000	625132.73	123911.78	----------	----------	1
250NG	50.0000	783700.80	151433.59	----------	----------	1

Average Calibration Factor = 14257.115738 (%RSD = 14.57)

TEST CODE :SBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : Method Blank (06/10) MATRIX : SOLID

Associated Samples: 8035; 8036; 8037; 8040; 8041; 8042

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		75
Toluene	ND		110
Ethylbenzene	ND		90
Total Xylenes	ND		250

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

DATA REDUCTION/EVALUATION/REPORTING

Quantitate using the curve or mean calibration factor.

The data system prints results in µg/L or µg/kg. The following formulae are given as checks.

Water or soil samples when not quantitating from a curve.

$$\text{Concentration, } \mu g/kg \text{ or } \mu g/L = \frac{(A_x)\ (Df)}{(\overline{CF_x})}$$

Where,

Ax = Area of the peak for the compound to be measured

$\overline{CF_x}$ = mean calibration factor for compound (area / µg/L or area / µg/kg)

Df = Dilution factor. The dilution factor is defined as follows:

For waters:

$$\frac{\text{mL of sample used to make dilution + mL ASTM Type II Water}}{\text{mL of sample used to make dilution}}$$

For soils:

$$\frac{5g}{\text{grams of soil purged}}$$

Medium level (methanol extract) when not quantitating from a curve.

$$\text{Soil Sample Concentration, } \mu g/kg = \frac{(A_x)}{(\overline{CF_x})}\left[\frac{5}{V_e}\frac{V_t}{S}\right]$$

Where,

A_x = area of the peak for the compound to be measured

$\overline{CF_x}$ = mean calibration factor for compound x (area / µg/L)

S = Mass of sample extracted (g) usually 4 g

5 = amount of water (mL) to which the method extract is added (to account for units of curve)

Vt = Volume (mL) of total methanol extract, usually 10 mL.

Ve = Volume (mL) of methanol extract added to 5 mL of water for purging, usually 0.100 mL.

002526

Job Number: 9801.203/230
Client: START - Dallas
Reviewer: C Mayfield
Date: 6/25/98

GC
TABLE OF CONTENTS
TNRCC - Waters

A.	SURROGATE SUMMARY	NA
B.	MS/MSD SUMMARY	NA
	FOLLOWED BY:	
	1. CHROMATOGRAM	↓
	2. DATA SYSTEM PRINTOUT	
	LCS SUMMARY LCS/LCSD	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
C.	RESULT SUMMARY FOR EACH SAMPLE	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT (PRIMARY RAW DATA PRECEDES CONFIRMATION RAW DATA)	✓
D.	EXTRACTION LOGBOOK PAGE(S)	✓
E.	RETENTION TIME WINDOW SUMMARY	default windows
F.	INITIAL CALIBRATION SUMMARY AND CHROMATOGRAMS *	✓
G.	DAILY ANALYTICAL SEQUENCE INFORMATION AS FOLLOWS *	✓
	1. DAILY INJECTION LOGBOOK	✓
	2. CALIBRATION CHECK SUMMARY	✓
	3. CHROMATOGRAMS AND DATA SYSTEM PRINTOUTS FOR ALL STANDARDS IN THE DAILY SEQUENCE	✓
H.	BLANK RESULTS	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
I.	CALCULATION EXAMPLE	✓

* = ALL CALIBRATION INFORMATION IS ORGANIZED PER INSTRUMENT, CHRONOLOGICALLY

ECOLOGY & ENVIRONMENT, INC

TNRCC Method 1005 - Toatal Petroleum Hydrocarbons

Quality and Control for Accuracy and Precision:
Percent Recovery of Laboratory Control Sample (LCS)
and Duplicate (LCSD) for water matrix.

885-131-2
885-131-3

Units: mg/L

Job No: 9801.203

PARAMETER	Amount Added		Amount Determined		% Recovery				RPD
	LCS	LCSD	LCS	LCSD	LCS	Q	LCSD	Q	
C6 TO C10	35.7	35.7	38.0	34.7	106.6%		97.1%		9.3%
C10 TO C28	35.7	35.7	38.8	35.0	108.6%		98.1%		10.2%
C6 TO C28	71.4	71.4	76.8	69.7	107.6%		97.6%		9.8%

Recovery Limits: 70 - 130
RPD Limits: 30

* - Value is outside E & E QC limits.

002528

TEST CODE :W1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : TPH-TNRCC UNITS : MG/L
SAMPLE ID LAB : EE-98-08043 MATRIX: WATER
SAMPLE ID CLIENT: SB15 GW3

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		5.0
>C10 -> C28 Hydrocarbons	10		5.0
C6 -> C28 Hydrocarbons	10		5.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :W1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : TPH-TNRCC UNITS : MG/L
SAMPLE ID LAB : EE-98-08044 MATRIX: WATER
SAMPLE ID CLIENT: SB15D GW3

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		5.0
>C10 -> C28 Hydrocarbons	13		5.0
C6 -> C28 Hydrocarbons	13		5.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :W1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : TPH-TNRCC UNITS : MG/L
SAMPLE ID LAB : EE-98-08045 MATRIX: WATER
SAMPLE ID CLIENT: SB17 GW4

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	1400		100
>C10 -> C28 Hydrocarbons	PRESENT		100
C6 -> C28 Hydrocarbons	1800		100

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :W1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : TPH-TNRCC UNITS : MG/L
SAMPLE ID LAB : EE-98-08047 MATRIX: WATER
SAMPLE ID CLIENT: SB18 GW5

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	3300		100
>C10 -> C28 Hydrocarbons	5900		100
C6 -> C28 Hydrocarbons	9200		100

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

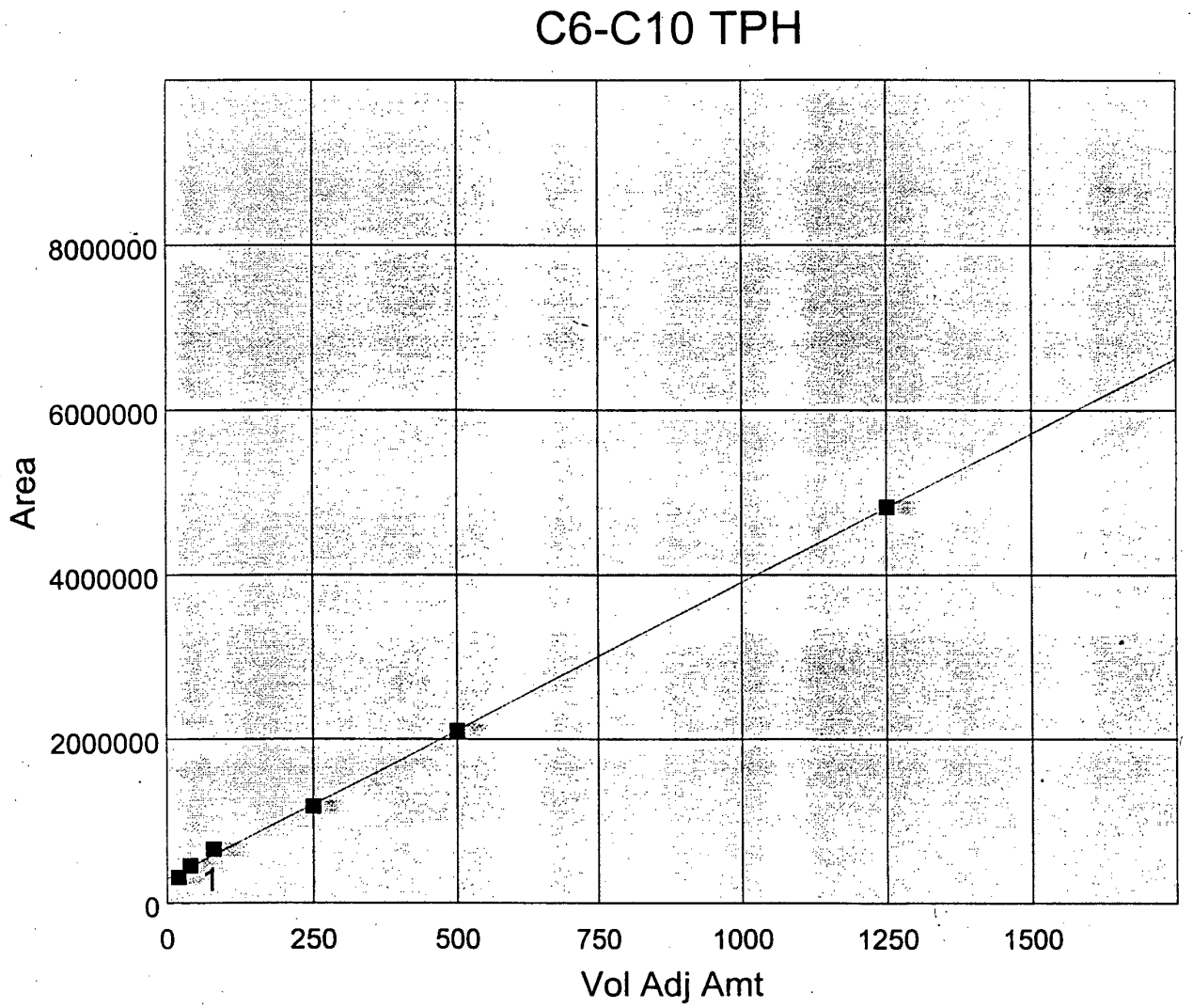
Fit Analysis Output For Method File: \\GCSRV1\TCDATA\HP58903\METHODS\3A TNRCC 0606.mth
Component Name : C6-C10 TPH
Date : 06/10/98 10:56:41 AM

Curve Parameters:

Curve #1 : 1st Order
Weighting Factor = 1 (No Weighting) R-Squared = 0.999400
Calibration Curve : Y = (304599.350915) +(3611.048040) X

Curve #1 :

Level Name	Observed X-Value	Calculated X-Value	Delta	%Diff.	Observed Y-Value	Calculated Y-Value	Delta	%Diff.
LOW	20.000000	4.695441	15.304559	325.945	321554.814458	376820.312	-55265.497	-14.666
MLOW	40.000000	43.918270	-3.918270	-8.922	463190.334282	449041.273	14149.062	3.151
MID	80.000000	99.190481	-19.190481	-19.347	662780.943803	593483.194	69297.750	11.676
MHIGH	250.000000	242.834852	7.165148	2.951	1181487.667760	1207361.361	-25873.693	-2.143
HIGH	500.000000	498.394380	1.605620	0.322	2104325.401857	2110123.371	-5797.969	-0.275
XHIGH	1250.000000	1250.966575	-0.966575	-0.077	4821899.749735	4818409.401	3490.348	0.072



recycled paper
ecology and environment

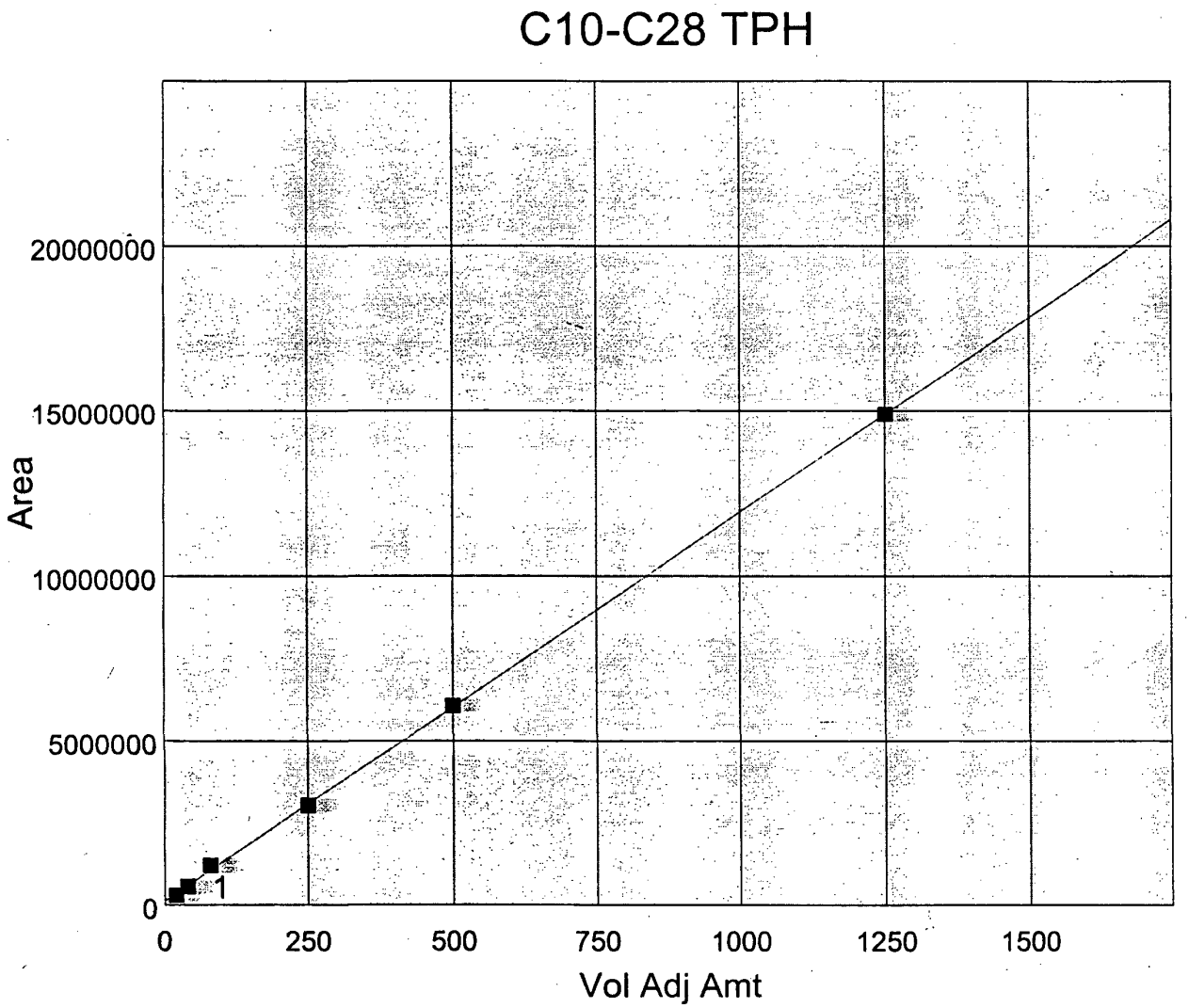
Fit Analysis Output For Method File: \\GCSRV1\TCDATA\HP58903\METHODS\3A TNRCC 0606.mth
Component Name : C10-C28 TPH
Date : 06/10/98 10:56:58 AM

Curve Parameters:

Curve #1 : 1st Order
Weighting Factor = 1 (No Weighting) R-Squared = 0.999821
Calibration Curve : Y = (139476.114742) +(11806.381617) X

Curve #1 :

Level Name	Observed X-Value	Calculated X-Value	Delta	%Diff.	Observed Y-Value	Calculated Y-Value	Delta	%Diff.
LOW	20.000000	14.471355	5.528645	38.204	310330.449585	375603.747	-65273.297	-17.378
MLOW	40.000000	36.956915	3.043085	8.234	575803.559906	611731.379	-35927.820	-5.873
MID	80.000000	91.145503	-11.145503	-12.228	1215574.700000	1083986.644	131588.056	12.139
MHIGH	250.000000	244.991488	5.008512	2.044	3031939.116018	3091071.519	-59132.403	-1.913
HIGH	500.000000	503.267520	-3.267520	-0.649	6081244.516852	6042666.923	38577.594	0.638
XHIGH	1250.000000	1249.167219	0.832781	0.067	14887621.006734	14897453.136	-9832.129	-0.066



272

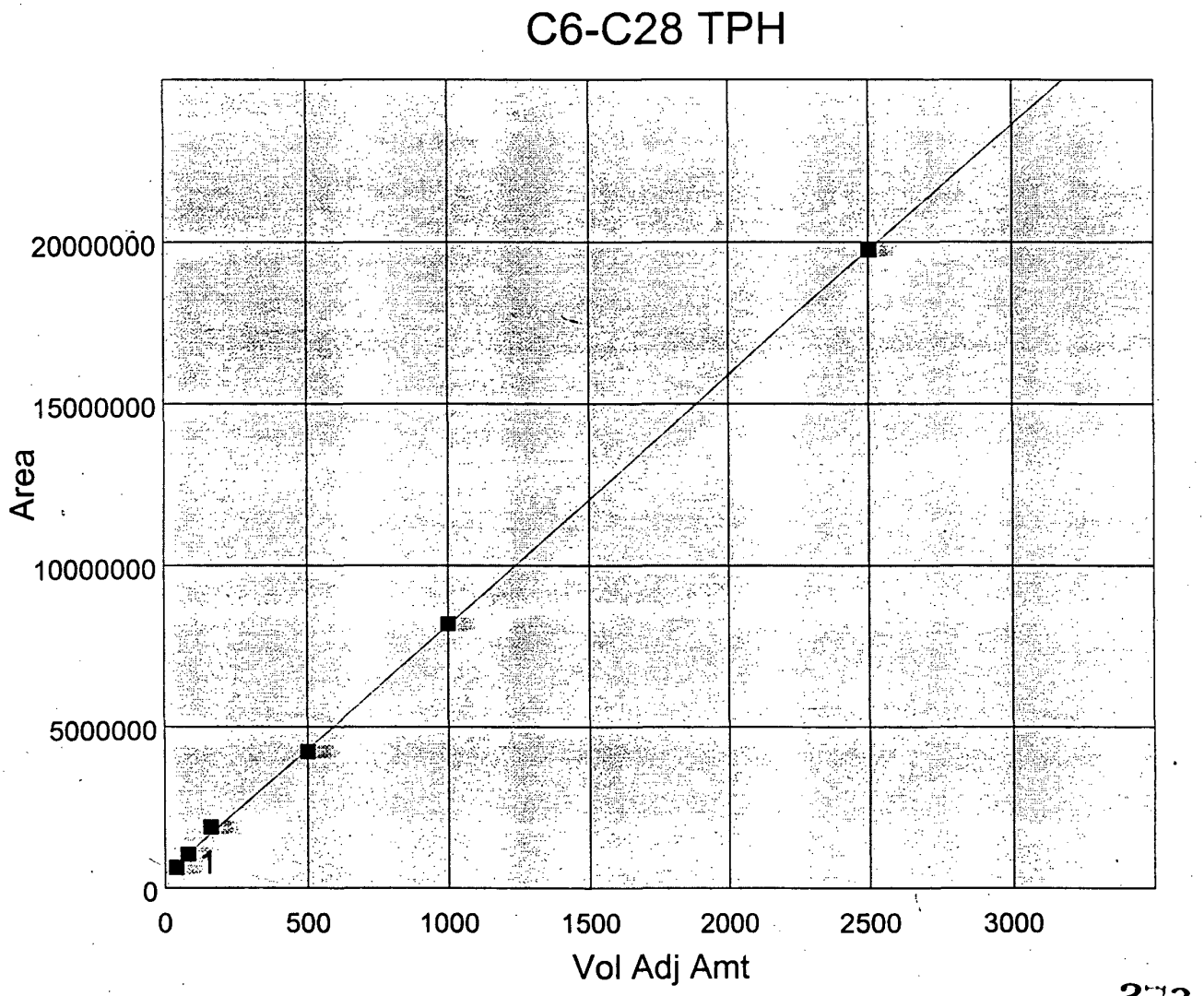
Fit Analysis Output For Method File: \\GCSRV1\TCDATA\HP58903\METHODS\3A TNRCC 0606.mth
Component Name : C6-C28 TPH
Date : 06/10/98 10:56:50 AM

Curve Parameters:

Curve #1 : 1st Order
Weighting Factor = 1 (No Weighting) R-Squared = 0.999766
Calibration Curve : Y = (443861.925369) +(7725.093380) X

Curve #1 :

Level Name	Observed X-Value	Calculated X-Value	Delta	%Diff.	Observed Y-Value	Calculated Y-Value	Delta	%Diff.
LOW	40.000000	24.339297	15.660703	64.343	631885.264043	752865.661	-120980.397	-16.069
MLOW	80.000000	77.038806	2.961194	3.844	1038993.894188	1061869.396	-22875.502	-2.154
MID	160.000000	185.692735	-25.692735	-13.836	1878355.643803	1679876.866	198478.778	11.815
MHIGH	500.000000	489.380539	10.619461	2.170	4224372.288242	4306408.616	-82036.327	-1.905
HIGH	1000.000000	1004.539561	-4.539561	-0.452	8204023.842052	8168955.306	35068.536	0.429
XHIGH	2500.000000	2499.009062	0.990938	0.040	19748940.287845	19756595.376	-7655.088	-0.039



recycled paper

Software Version	: 6.0.2:G11	Date	: 06/10/98 09:41:55 AM
Operator	: LEWANDOWSKIB	Sample Name	: M1005 80 UG/ML EA
Sample Number	: 036	Study	: M1005 CCV
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: HP58903A	Channel	: A
Interface Serial #	: 1092513053	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 35.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 ul	Area Reject	: 100.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/07/98 18:28:15 PM	Cycle	: 36

Raw Data File : \\gcsrv1\TCData\HP58903\JUNE\980606350R\3a_0606_036.raw
Result File : \\gcsrv1\TCData\HP58903\JUNE\980606350R\3a_0606_036.rst
Inst Method : \\gcsrv1\TCData\hp58903\methods\3a_trncc from
\\gcsrv1\TCData\HP58903\JUNE\980606350R\3a_0606_036.rst
Proc Method : \\gcsrv1\TCData\hp58903\methods\3a_tnrcc_0606.mth
Calib Method : \\gcsrv1\TCData\hp58903\methods\3a_tnrcc_0606.mth
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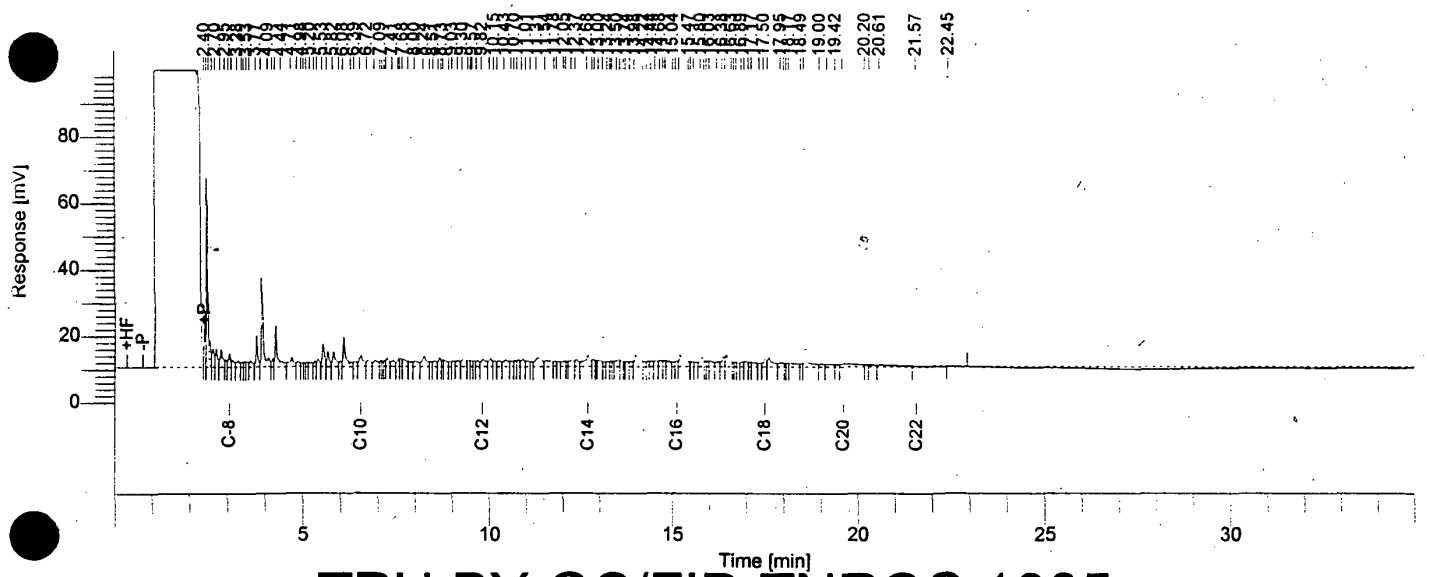


TPH BY GC/FID TNRCC 1005

Peak #	Ret. Time	Component Name	Area [µV·s]	Result ug/Ml	TV	% Drift
	4.63	C6-C10 TPH	613899	85.6538	80	7.06
	14.55	C6-C28 TPH	1863923	183.8244		
	16.70	C10-C28 TPH	1250023	94.0633	80	17.6

COLUMN: 30 M RTX-1 0.53mm ID 0.25 um Film

238

TEST CODE :W1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : TPH-TNRCC UNITS : MG/L
SAMPLE ID LAB : Method Blank 855-131-1 MATRIX: WATER

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		5.0
>C10 -> C28 Hydrocarbons	ND		5.0
C6 -> C28 Hydrocarbons	ND		5.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

EXAMPLE CALCULATION

C6- C10 FOR LCS

Curve Y= c0 + c1*x

c0= is the y intercept

c1= the slope of the line

Y =304599.350915 + 3611.048040*x

Area (y) for C6 to C10 = 1907000

$$\text{Amount (X)} = \frac{1907000-304599.350915}{3611.048040}$$

$$= \frac{443.7494688 \text{ ug/ml} * 3\text{ml FV}}{35 \text{ ml extraction volume}}$$

= 38.0357 mg/L

002538

Job Number: 9801.203/230
Client: START - Dallas
Reviewer: C Hoytowicz
Date: 6/25/98

GC
TABLE OF CONTENTS
TNRCC Soils

A.	SURROGATE SUMMARY	NA
B.	MS/MSD SUMMARY	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
	LCS SUMMARY	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
C.	RESULT SUMMARY FOR EACH SAMPLE	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT (PRIMARY RAW DATA PRECEDES CONFIRMATION RAW DATA)	✓
D.	EXTRACTION LOGBOOK PAGE(S)	✓
E.	RETENTION TIME WINDOW SUMMARY	default windows
F.	INITIAL CALIBRATION SUMMARY AND CHROMATOGRAMS *	✓
G.	DAILY ANALYTICAL SEQUENCE INFORMATION AS FOLLOWS *	
	1. DAILY INJECTION LOGBOOK	✓
	2. CALIBRATION CHECK SUMMARY	✓
	3. CHROMATOGRAMS AND DATA SYSTEM PRINTOUTS FOR ALL STANDARDS IN THE DAILY SEQUENCE	✓
H.	BLANK RESULTS	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
I.	CALCULATION EXAMPLE	✓

* = ALL CALIBRATION INFORMATION IS ORGANIZED PER INSTRUMENT, CHRONOLOGICALLY

ECOLOGY & ENVIRONMENT, INC

Quality and Control for Accuracy and Precision:
Percent Recovery and Relative Percent Difference (RPD)
of Matrix Spike (MS) and Matrix Spike Duplicate (MSD)

Sample: 8041

Batch#
980609351P
980609350R

Units: mg/kg

Job No: 9801.203

Parameter	Original Value	Amount Added		Amount Determined		Percent Recovery		RPD
		MS	MSD	MS	MSD	MS	MSD	
C6 TO C10	0	453	431	386	406	85.2%	94.2%	10.0%
C10 TO C28		453	431	371	433	81.9%	100%	20.4%
C6 TO C28		906	862	757	839	83.6%	97.3%	15.2%

Recovery Limits: 70 - 130
RPD Limits: 35

002540

ECOLOGY & ENVIRONMENT, INC

Quality and Control for Accuracy and Precision:
Percent Recovery of Laboratory Control Sample (LCS)
for soil matrix

855-133-2

Batch#
980609351P
980609350R

Units: mg/Kg

Job No: 9801.203

Parameter	Amount Added		Amount Determined		Percent Recovery		RPD
	LCS	LCSD	LCS	LCSD	LCS	LCSD	
C6 TO C10	500		420		84.0%		
C10 TO C28	500		417		83.4%		
C6 TO C28	1000		837		83.7%		

Recovery Limits: 70 - 130
RPD Limits:

002541

TEST CODE :S1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-08034 MATRIX : SOLID
SAMPLE ID CLIENT: SB14 0102

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		57
>C10 -> C28 Hydrocarbons	100		57
C6 -> C28 Hydrocarbons	100		57

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002542

TEST CODE :S1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 83 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-08035 MATRIX : SOLID
SAMPLE ID CLIENT: SB14 0506

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		60
>C10 -> C28 Hydrocarbons	170		60
C6 -> C28 Hydrocarbons	170		60

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

300

TEST CODE :S1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 81 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-08036 MATRIX : SOLID
SAMPLE ID CLIENT: SB15 0001

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	8600		6200
>C10 -> C28 Hydrocarbons	270000		6200
C6 -> C28 Hydrocarbons	280000		6200

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 82 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-08037 MATRIX : SOLID
SAMPLE ID CLIENT: SB16 -

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	350		61
>C10 -> C28 Hydrocarbons	2100		61
C6 -> C28 Hydrocarbons	2400		61

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 90 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-08038 MATRIX : SOLID
SAMPLE ID CLIENT: SB17 0102

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		56
>C10 -> C28 Hydrocarbons	ND		56
C6 -> C28 Hydrocarbons	ND		56

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002546

TEST CODE :S1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 90 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-08039 MATRIX : SOLID
SAMPLE ID CLIENT: SB17D 0102

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		56
>C10 -> C28 Hydrocarbons	ND		56
C6 -> C28 Hydrocarbons	ND		56

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002547

TEST CODE :S1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-08040 MATRIX : SOLID
SAMPLE ID CLIENT: SB17 5565

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	750		57
>C10 -> C28 Hydrocarbons	310		57
C6 -> C28 Hydrocarbons	1100		57

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 87 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-08041 MATRIX : SOLID
SAMPLE ID CLIENT: SB18 0102

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		57
>C10 -> C28 Hydrocarbons	ND		57
C6 -> C28 Hydrocarbons	ND		57

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002549

TEST CODE :S1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 85 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-08042 MATRIX : SOLID
SAMPLE ID CLIENT: SB18 0708

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	550		59
>C10 -> C28 Hydrocarbons	440		59
C6 -> C28 Hydrocarbons	990		59

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.230
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 90 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-08236 MATRIX : SOLID
SAMPLE ID CLIENT: SB19-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	200		56
>C10 -> C28 Hydrocarbons	3400		56
C6 -> C28 Hydrocarbons	3700		56

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.230
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-08237 MATRIX : SOLID
SAMPLE ID CLIENT: SB19-0708

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		57
>C10 -> C28 Hydrocarbons	ND		57
C6 -> C28 Hydrocarbons	ND		57

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002552

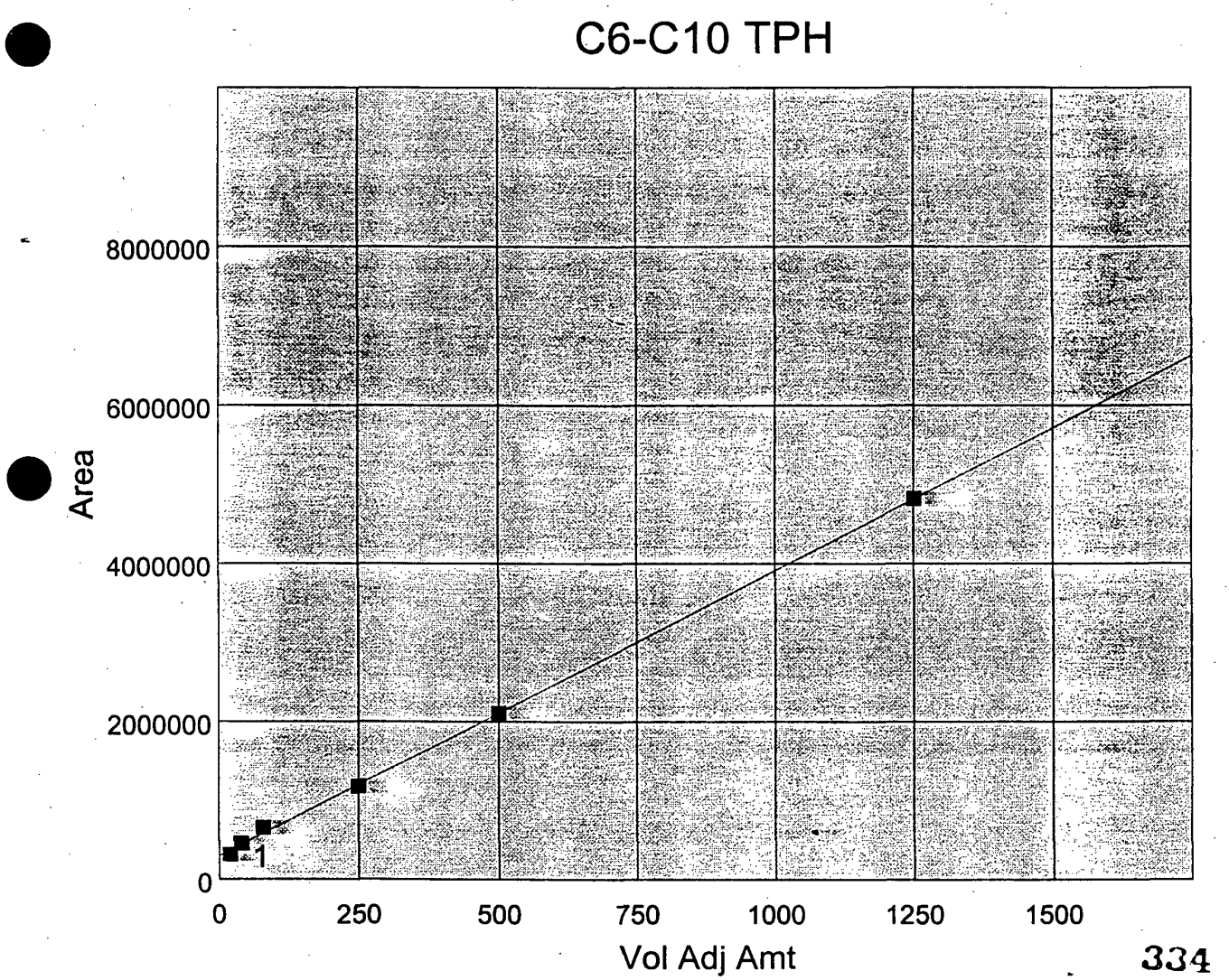
Fit Analysis Output For Method File: \\GCSRV1\TCDATA\HP58903\METHODS\3A TNRCC 0606.mth
Component Name : C6-C10 TPH
Date : 06/10/98 10:56:41 AM

Curve Parameters:

Curve #1 : 1st Order
Weighting Factor = 1 (No Weighting) R-Squared = 0.999400
Calibration Curve : Y = (304599.350915) +(3611.048040) X

Curve #1 :

Level Name	Observed X-Value	Calculated X-Value	Delta	%Diff.	Observed Y-Value	Calculated Y-Value	Delta	%Diff.
LOW	20.000000	4.695441	15.304559	325.945	321554.814458	376820.312	-55265.497	-14.666
MLOW	40.000000	43.918270	-3.918270	-8.922	463190.334282	449041.273	14149.062	3.151
MID	80.000000	99.190481	-19.190481	-19.347	662780.943803	593483.194	69297.750	11.676
MHIGH	250.000000	242.834852	7.165148	2.951	1181487.667760	1207361.361	-25873.693	-2.143
HIGH	500.000000	498.394380	1.605620	0.322	2104325.401857	2110123.371	-5797.969	-0.275
XHIGH	1250.000000	1250.966575	-0.966575	-0.077	4821899.749735	4818409.401	3490.348	0.072



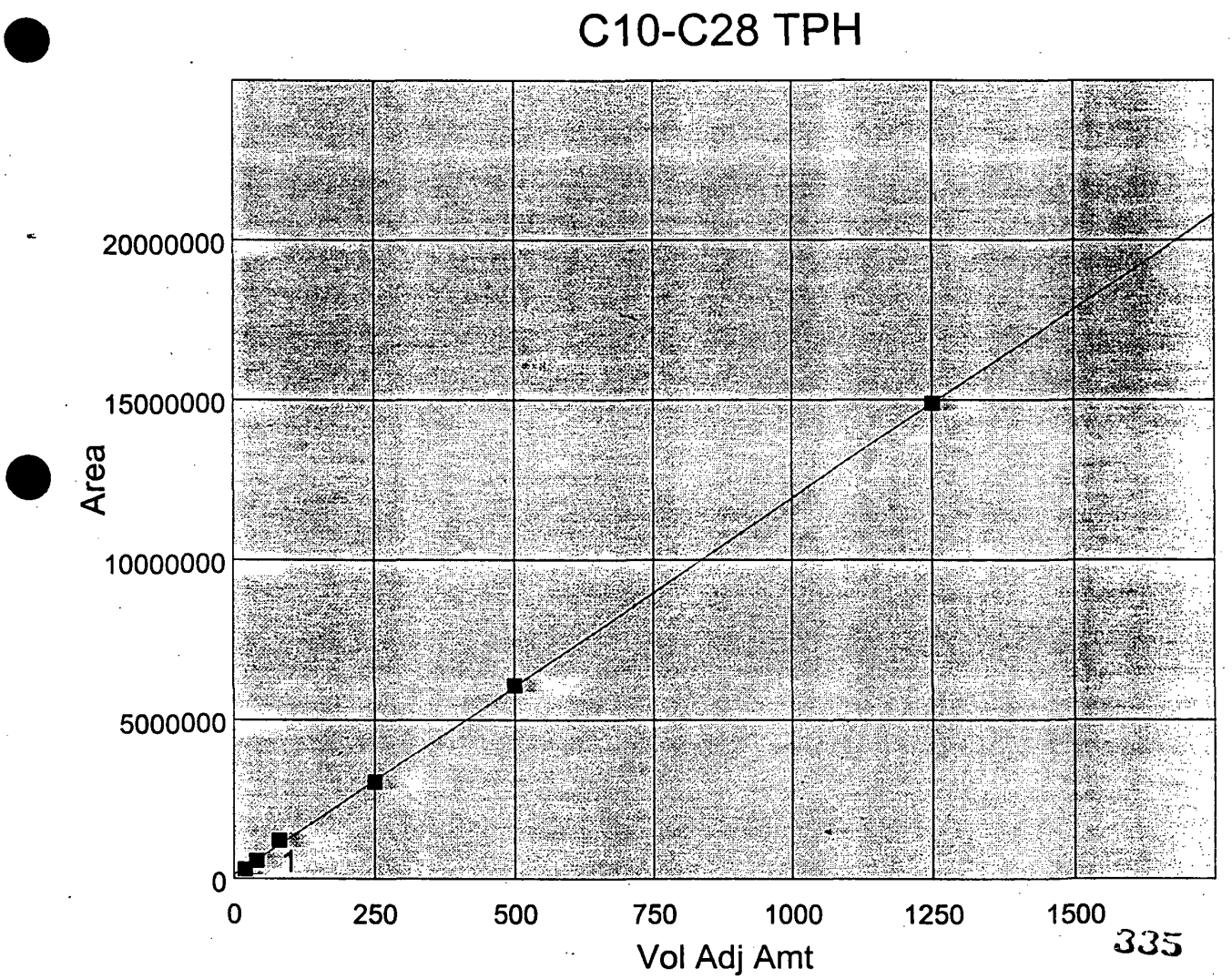
Fit Analysis Output For Method File: \\GCSRV1\TCDATA\HP58903\METHODS\3A TNRCC 0606.mth
Component Name : C10-C28 TPH
Date : 06/10/98 10:56:58 AM

Curve Parameters:

Curve #1 : 1st Order
Weighting Factor = 1 (No Weighting) R-Squared = 0.999821
Calibration Curve : Y = (139476.114742) +(11806.381617) X

Curve #1 :

Level Name	Observed X-Value	Calculated X-Value	Delta	%Diff.	Observed Y-Value	Calculated Y-Value	Delta	%Diff.
LOW	20.000000	14.471355	5.528645	38.204	310330.449585	375603.747	-65273.297	-17.378
MLOW	40.000000	36.956915	3.043085	8.234	575803.559906	611731.379	-35927.820	-5.873
MID	80.000000	91.145503	-11.145503	-12.228	1215574.700000	1083986.644	131588.056	12.139
MHIGH	250.000000	244.991488	5.008512	2.044	3031939.116018	3091071.519	-59132.403	-1.913
HIGH	500.000000	503.267520	-3.267520	-0.649	6081244.516852	6042666.923	38577.594	0.638
XHIGH	1250.000000	1249.167219	0.832781	0.067	14887621.006734	14897453.136	-9832.129	-0.066



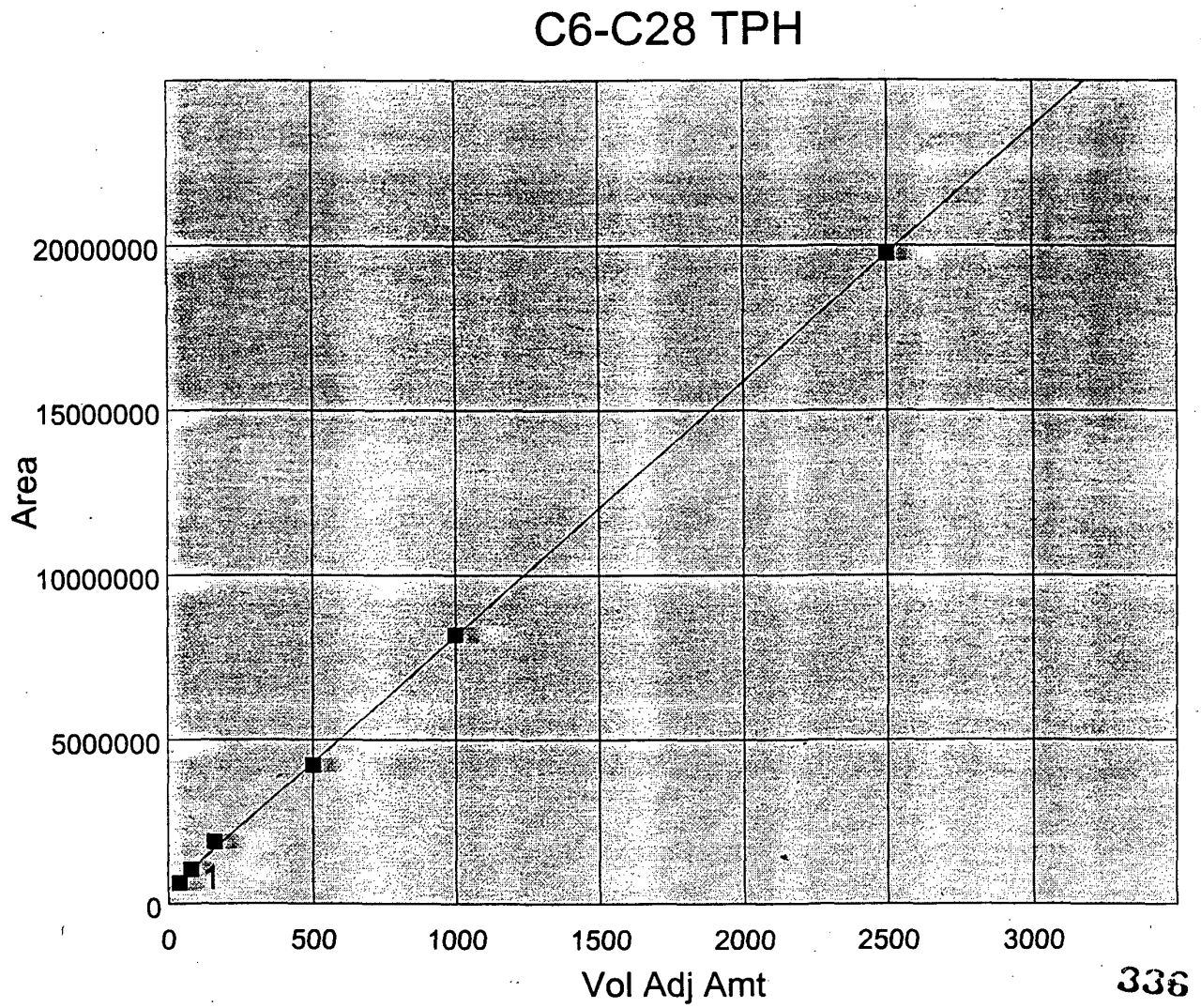
Fit Analysis Output For Method File: \\GCSRV1\TCDATA\HP58903\METHODS\3A TNRCC 0606.mth
Component Name : C6-C28 TPH
Date : 06/10/98 10:56:50 AM

Curve Parameters:

Curve #1 : 1st Order
Weighting Factor = 1 (No Weighting) R-Squared = 0.999766
Calibration Curve : Y = (443861.925369) +(7725.093380) X

Curve #1 :

Level Name	Observed X-Value	Calculated X-Value	Delta	%Diff.	Observed Y-Value	Calculated Y-Value	Delta	%Diff.
LOW	40.000000	24.339297	15.660703	64.343	631885.264043	752865.661	-120980.397	-16.069
MLOW	80.000000	77.038806	2.961194	3.844	1038993.894188	1061869.396	-22875.502	-2.154
MID	160.000000	185.692735	-25.692735	-13.836	1878355.643803	1679876.866	198478.778	11.815
MHIGH	500.000000	489.380539	10.619461	2.170	4224372.288242	4306408.616	-82036.327	-1.905
HIGH	1000.000000	1004.539561	-4.539561	-0.452	8204023.842052	8168955.306	35068.536	0.429
XHIGH	2500.000000	2499.009062	0.990938	0.040	19748940.287845	19756595.376	-7655.088	-0.039



Software Version	: 6.0.2:G11	Date	: 06/10/98 16:08:41 PM
Operator	: LEWANDOWSKIB	Sample Name	: M1005 250 UG/ML EA
Sample Number	: 015	Study	: M1005 CCV
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: HP58903A	Channel	: A
Interface Serial #	: 1092513053	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 35.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 ul	Area Reject	: 100.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/10/98 03:01:26 AM	Cycle	: 15

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Proc Method : \\gcsrv1\TCData\hp58903\methods\3a_tnrcc_0606.mth
Calib Method : \\gcsrv1\TCData\hp58903\methods\3a_tnrcc_0606.mth
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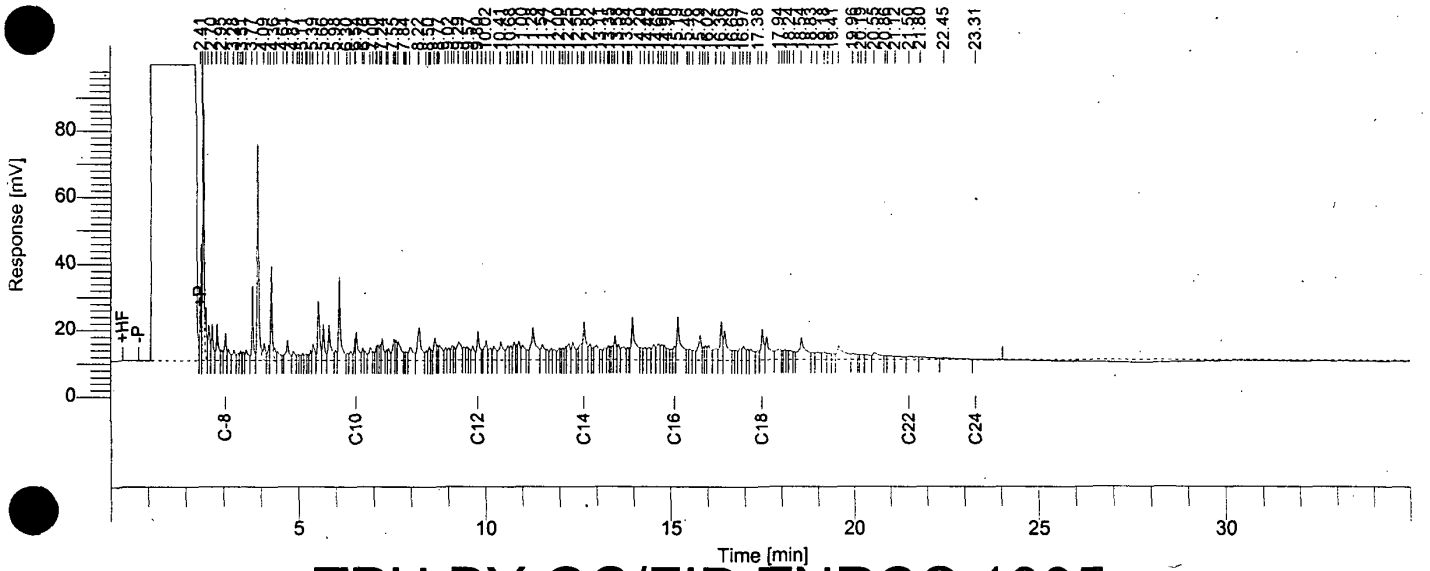

TPH BY GC/FID TNRCC 1005

Peak #	Ret. Time	Component Name	Area [µV·s]	Result ug/Ml	% DRIFT (LIMIT+/- 25%)
	4.63	C6-C10 TPH	1171154	239.9733	4.01
	14.55	C6-C28 TPH	4237146	491.0340	1.79
	16.70	C10-C28 TPH	3054107	246.8691	1.25

COLUMN: 30 M RTX-1 0.53mm ID 0.25 um Film

BG 6/10/98

351

Software Version	: 6.0.2:G11	Date	: 06/12/98 07:51:00 AM
Operator	: LEWANDOWSKIB	Sample Name	: M1005 250 UG/ML EA
Sample Number	: 049	Study	: M1005 CCV
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: HP58903A	Channel	: A
Interface Serial #	: 1092513053	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 35.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 ul	Area Reject	: 100.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/11/98 09:24:43 AM	Cycle	: 49

Raw Data File : \\gcsrv1\TCData\HP58903\JUNE\980609350R\3a_0609_049.raw
Result File : \\gcsrv1\TCData\HP58903\JUNE\980609350R\3a_0609_049.rst
Inst Method : \\gcsrv1\TCData\hp58903\methods\3a_trncc from
\\gcsrv1\TCData\HP58903\JUNE\980609350R\3a_0609_049.rst
Proc Method : \\gcsrv1\TCData\hp58903\methods\3a_tnrcc_0606.mth
Calib Method : \\gcsrv1\TCData\hp58903\methods\3a_tnrcc_0606.mth
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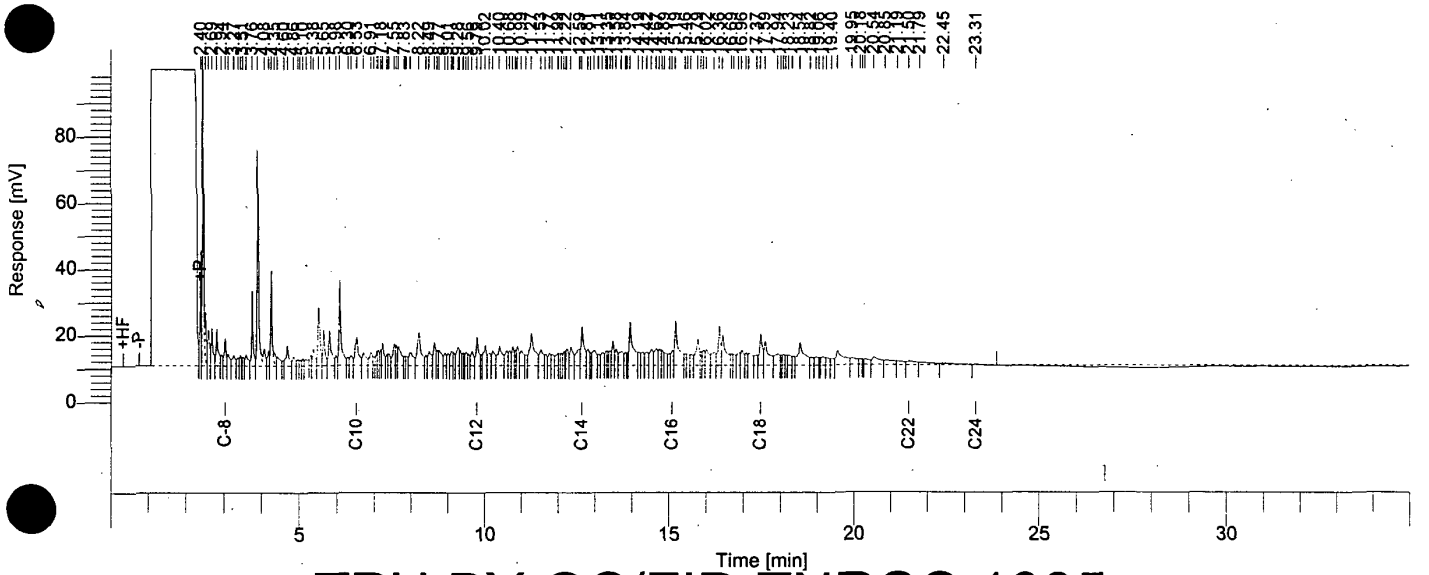

TPH BY GC/FID TNRCC 1005

Peak #	Ret. Time	Component Name	Area [µV·s]	Result ug/Ml	% DRIFT (LIMIT+/- 25%)
	4.63	C6-C10 TPH	1198628	247.5814	0.97
	14.55	C6-C28 TPH	4348991	505.5123	-1.10
	16.70	C10-C28 TPH	3150364	255.0220	-2.01

COLUMN: 30 M RTX-1 0.53mm ID 0.25 um Film

002557

Software Version	: 6.0.2:G11	Date	: 06/15/98 07:11:34 AM
Operator	: ATHERTOND	Sample Name	: M1005 250 UG/ML EA
Sample Number	: 008	Study	: CCV
AutoSampler	: NONE	Rack/Vial	: 0/0
Instrument Name	: HP58903A	Channel	: A
Interface Serial #	: 1092513053	A/D mV Range	: 1000
Delay Time	: 0.00 min	End Time	: 35.00 min
Sampling Rate	: 2.0000 pts/s		
Volume Injected	: 1.000000 ul	Area Reject	: 100.000000
Sample Amount	: 1.0000	Dilution Factor	: 1.00
Data Acquisition Time	: 06/12/98 14:50:40 PM	Cycle	: 8

Raw Data File : \\gcsrv1\TCData\HP58903\JUNE\980612350R\3a_0612_008.raw
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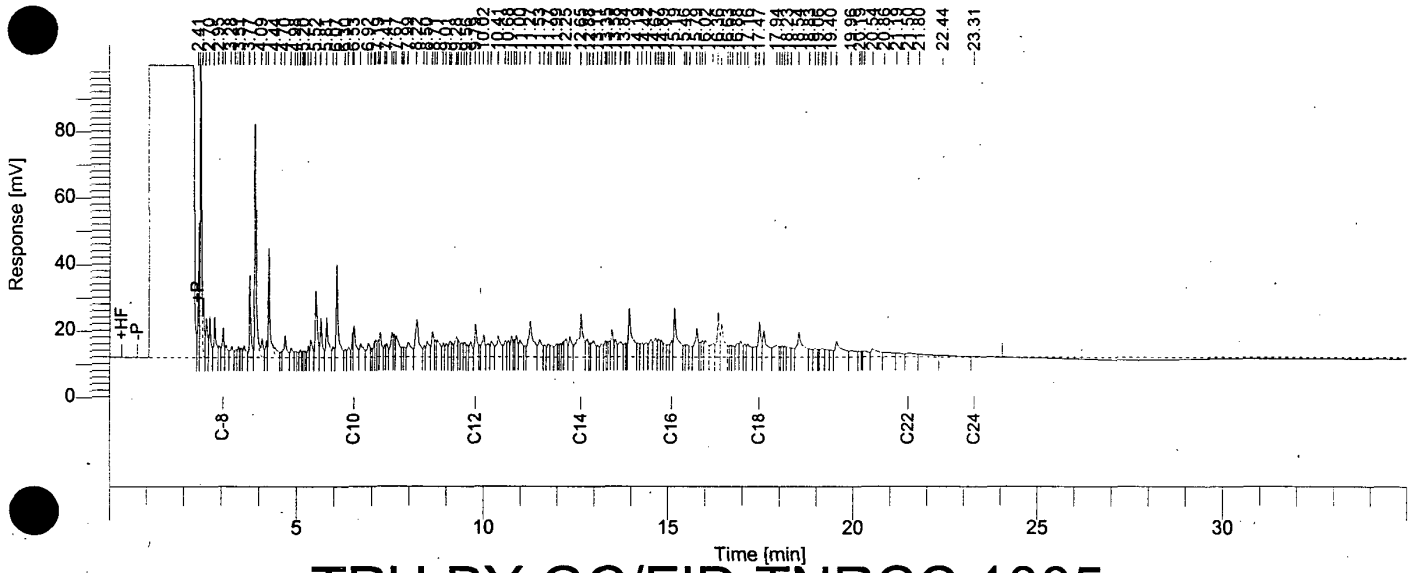
Inst Method : \\gcsrv1\TCData\hp58903\methods\3a_trncc from
\\gcsrv1\TCData\HP58903\JUNE\980612350R\3a_0612_008.rst
Proc Method : \\gcsrv1\TCData\hp58903\methods\3a_tnrcc_0606.mth
Calib Method : \\gcsrv1\TCData\hp58903\methods\3a_tnrcc_0606.mth
Sequence File : \\gcsrv1\TCData\HP58903\JUNE\980612350R\3A_0612R.seq



TPH BY GC/FID TNRCC 1005

Peak #	Ret. Time	Component Name	Area [µV·s]	Result ug/Ml	% DRIFT (LIMIT+/- 25%)
	4.63	C6-C10 TPH	1308255	277.9402	-11.18
	14.55	C6-C28 TPH	4779329	561.2187	-12.24
	16.70	C10-C28 TPH	3471074	282.1862	-12.87

COLUMN: 30 M RTX-1 0.53mm ID 0.25 um Film

TEST CODE :S1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : Method Blank 855-133-1 MATRIX : SOLID

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		50
>C10 -> C28 Hydrocarbons	ND		50
C6 -> C28 Hydrocarbons	ND		50

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002559

EXAMPLE CALCULATION - Soil

C6- C10 FOR MS

Curve Y= c0 + c1*x

c0= is the y intercept

c1= the slope of the line

Y =304599.350915 + 3611.048040*x

Area (y) for C6 to C10 = 1907000

$$\text{Amount (X)} = \frac{1845425 - 304599}{3611}$$

$$= \frac{426.7 \text{ ug/ml} * 10\text{mL FV}}{11.04 \text{ gr}}$$

$$= 386.5 \text{ mg/kg}$$

6/23/98

002560

Job Number: 9801.203/230
Client: START - Dallas
Reviewer: C Wightowicz
Date: 6/25/98

HPLC
TABLE OF CONTENTS

A.	SURROGATE SUMMARY	✓
B.	MS/MSD SUMMARY	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
	LCS SUMMARY	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
C.	RESULT SUMMARY FOR EACH SAMPLE	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT (PRIMARY RAW DATA PRECEDES CONFIRMATION RAW DATA)	✓
D.	EXTRACTION LOGBOOK PAGE(S)	✓
E.	RETENTION TIME WINDOW SUMMARY	✓
F.	INITIAL CALIBRATION SUMMARY AND CHROMATOGRAMS *	✓
G.	DAILY ANALYTICAL SEQUENCE INFORMATION AS FOLLOWS *	✓
	1. DAILY INJECTION LOGBOOK	✓
	2. CALIBRATION CHECK SUMMARY	✓
	3. CHROMATOGRAMS AND DATA SYSTEM PRINTOUTS FOR ALL STANDARDS IN THE DAILY SEQUENCE	✓
H.	BLANK RESULTS	✓
	FOLLOWED BY:	
	1. CHROMATOGRAM	✓
	2. DATA SYSTEM PRINTOUT	✓
I.	CALCULATION EXAMPLE	✓

* = ALL CALIBRATION INFORMATION IS ORGANIZED PER INSTRUMENT, CHRONOLOGICALLY

QUALITY CONTROL FOR ACCURACY: PERCENT RECOVERY
OF SURROGATE SPIKES

9801.203

E & E Laboratory 98-

(ug/kg)

Parameter	Amount Added	Amount Determined	Percent Recovery
Terphenyl-d14			
08034	1000	839	83.9
08035	1000	986	98.6
08036	1000	--	DL
08037	1000	--	DL
08038	1000	830	83.0
08039	1000	822	82.2
08040	1000	1100	110
08041	1000	1240	124
08042	1000	--	DL
08236	1000	--	DL
08237	1000	914	91.4
08237 MS	1000	966	96.6
08237 MSD	1000	900	90.0
Method Blank (1339-19-1)	1000	963	96.3
LCS (1339-19-2)	1000	864	86.4

THESE RECOVERIES ARE WITHIN E & E, INC. QC TARGETS.

LCS = LABORATORY CONTROL SAMPLE
DL = DILUTED OUT

002562

QUALITY CONTROL FOR ACCURACY;PERCENT RECOVERY FOR SPIKED SAMPLES

ANALYSIS DATE: 6/18/98 JOB#:9801.230/.203

NOTEBOOK: 1263-57 SAMPLE #: 8237 BATCH#:980617521R/980611580P

MATRIX::SOIL UNITS:UG/KG

PARAMETER	ORIGINAL VALUE	AMOUNT ADDED	AMT FOUND MS	AMT FOUND MSD	% REC MA	% REC MSD	RPD
NAPHTHALENE	0	2500	2259	1979	90.4	79.2	13.2
ACENAPHTHYLENE	0	2500	2170	1975	86.8	79.0	9.4
ACENAPHTHENE	0	2500	2324	2094	93.0	83.8	10.4
FLUORENE	0	250	233	211	93.2	84.4	9.9
PHENANTHRENE	0	250	277	232	110.8	92.8	17.7
ANTHRACENE	0	120	111	105	92.5	87.5	5.6
FLUORANTHENE	0	670	700	693	104.5	103.4	1.0
PYRENE	0	670	619	564	92.4	84.2	9.3
BENZO(A)ANTHRACENE	11	250	246	232	94.0	88.4	5.9
CHRYSENE	0	250	248	237	99.2	94.8	4.5
BENZO(B)FLUORANTHENE	0	250	241	240	96.4	96.0	0.42
BENZO(K)FLUORANTHENE	0	250	230	230	92.0	92.0	0.00
BENZO(A)PYRENE	0	250	324	321	129.6	128.4	0.93 **
DIBENZO(AH)ANTHRACENE	0	670	559	546	83.4	81.5	2.4
BENZO(GHI)PERYLENE	0	670	656	649	97.9	96.9	1.1
INDENO(CD123)PYRENE	0	250	213	210	85.2	84.0	1.4

** OUTSIDE QC LIMITS FOR RECOVERY FOR BOTH MS/MSD

CAF 1731

mc 6/19/98

WD QA

370

QUALITY CONTROL FOR ACCURACY;PERCENT RECOVERY FOR SPIKED SAMPLES

ANALYSIS DATE: 6/17/98 JOB#:9801.203/.230

NOTEBOOK: 1263-57 SAMPLE #:SLCS 1339-19-2 BATCH#:980617521R/980611580P

MATRIX:SOIL UNITS:UG/KG

PARAMETER	ORIGINAL VALUE	AMOUNT ADDED	AMT FOUND MS	% REC MA
NAPHTHALENE	0	2500	2219	88.8
ACENAPHTHYLENE	0	2500	2169	86.8
ACENAPHTHENE	0	2500	2324	93
FLUORENE	0	250	218	87.2
PHENANTHRENE	0	250	224	89.6
ANTHRACENE	0	117	101.0	86.3
FLUORANTHENE	0	670	601	89.7
PYRENE	0	670	584	87.2
BENZO(A)ANTHRACENE	0	250	220	88.0
CHRYSENE	0	250	220	88.0
BENZO(B)FLUORANTHENE	0	250	224	89.6
BENZO(K)FLUORANTHENE	0	250	209	83.6
BENZO(A)PYRENE	0	250	253	101
DIBENZO(AH)ANTHRACENE	0	670	521	77.8
BENZO(GHI)PERYLENE	0	670	576	86.0
INDENO(CD123)PYRENE	0	250	196	78.4

IN CONTROL

MC 6/18/98

MC Copy QA

002564

TEST CODE :SPAH0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-08034 MATRIX : SOLID
SAMPLE ID CLIENT: SB14 0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		230
Acenaphthylene	ND		230
1-methylnaphthalene	ND		230
2-Methylnaphthalene	2300		230
Acenaphthene	ND		230
Fluorene	ND		23
Phenanthrene	92		68
Anthracene	ND		23
Fluoranthene	650		57
Pyrene	ND		57
Benzo(a)anthracene	100		23
Chrysene	ND		23
Benzo(b)fluoranthene	8.8	J	23
Benzo(k)fluoranthene	ND		23
Benzo(a)pyrene	ND		23
Dibenzo(a,h)anthracene	ND		57
Benzo(ghi)perylene	ND		57
Indeno(1,2,3-cd)pyrene	ND		23

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002565

TEST CODE :SPAH0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 83 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-08035 MATRIX : SOLID
SAMPLE ID CLIENT: SB14 0506

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		240
Acenaphthylene	ND		240
1-methylnaphthalene	240		240
2-Methylnaphthalene	ND		240
Acenaphthene	ND		240
Fluorene	ND		24
Phenanthrene	ND		72
Anthracene	ND		24
Fluoranthene	ND		60
Pyrene	ND		60
Benzo(a)anthracene	12	J	24
Chrysene	ND		24
Benzo(b)fluoranthene	ND		24
Benzo(k)fluoranthene	ND		24
Benzo(a)pyrene	ND		24
Dibenzo(a,h)anthracene	ND		60
Benzo(ghi)perylene	ND		60
Indeno(1,2,3-cd)pyrene	ND		24

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002566

TEST CODE :SPAH0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 81 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-08036 MATRIX : SOLID
SAMPLE ID CLIENT: SB15 0001

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		2500000
Acenaphthylene	ND		2500000
1-methylnaphthalene	ND		2500000
2-Methylnaphthalene	7000000		2500000
Acenaphthene	ND		2500000
Fluorene	540000		250000
Phenanthrene	11000000		7400000
Anthracene	700000		250000
Fluoranthene	4000000		620000
Pyrene	2500000		620000
Benzo(a)anthracene	2800000		250000
Chrysene	2800000		250000
Benzo(b)fluoranthene	320000		250000
Benzo(k)fluoranthene	580000		250000
Benzo(a)pyrene	920000		250000
Dibenzo(a,h)anthracene	ND		620000
Benzo(ghi)perylene	ND		620000
Indeno(1,2,3-cd)pyrene	ND		250000

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002567

TEST CODE :SPAH0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 82 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-08037 MATRIX : SOLID
SAMPLE ID CLIENT: SB16 -

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		12000
Acenaphthylene	ND		12000
1-methylnaphthalene	17000		12000
2-Methylnaphthalene	28000		12000
Acenaphthene	ND		12000
Fluorene	3500		1200
Phenanthrene	12000		3600
Anthracene	1500		1200
Fluoranthene	16000		3000
Pyrene	3600		3000
Benzo(a)anthracene	3000		1200
Chrysene	ND		1200
Benzo(b)fluoranthene	720	J	1200
Benzo(k)fluoranthene	1200	J	1200
Benzo(a)pyrene	2000		1200
Dibenzo(a,h)anthracene	ND		3000
Benzo(ghi)perylene	ND		3000
Indeno(1,2,3-cd)pyrene	ND		1200

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002568

TEST CODE :SPAH0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 90 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-08038 MATRIX : SOLID
SAMPLE ID CLIENT: SB17 0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		220
Acenaphthylene	ND		220
1-methylnaphthalene	ND		220
2-Methylnaphthalene	ND		220
Acenaphthene	ND		220
Fluorene	ND		22
Phenanthrene	ND		67
Anthracene	ND		22
Fluoranthene	ND		56
Pyrene	ND		56
Benzo(a)anthracene	4.9	J	22
Chrysene	ND		22
Benzo(b)fluoranthene	ND		22
Benzo(k)fluoranthene	ND		22
Benzo(a)pyrene	37		22
Dibenzo(a,h)anthracene	ND		56
Benzo(ghi)perylene	ND		56
Indeno(1,2,3-cd)pyrene	ND		22

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002569

TEST CODE :SPAH0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 90 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-08039 MATRIX : SOLID
SAMPLE ID CLIENT: SB17D 0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		220
Acenaphthylene	ND		220
1-methylnaphthalene	ND		220
2-Methylnaphthalene	ND		220
Acenaphthene	ND		220
Fluorene	ND		22
Phenanthrene	ND		67
Anthracene	ND		22
Fluoranthene	ND		56
Pyrene	ND		56
Benzo(a)anthracene	ND		22
Chrysene	ND		22
Benzo(b)fluoranthene	ND		22
Benzo(k)fluoranthene	ND		22
Benzo(a)pyrene	ND		22
Dibenzo(a,h)anthracene	ND		56
Benzo(ghi)perylene	ND		56
Indeno(1,2,3-cd)pyrene	ND		22

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002570

TEST CODE :SPAH0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-08040 MATRIX : SOLID
SAMPLE ID CLIENT: SB17 5565

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	590		230
Acenaphthylene	ND		230
1-methylnaphthalene	520		230
2-Methylnaphthalene	690		230
Acenaphthene	780		230
Fluorene	48		23
Phenanthrene	74		68
Anthracene	ND		23
Fluoranthene	110		57
Pyrene	ND		57
Benzo(a)anthracene	49		23
Chrysene	ND		23
Benzo(b)fluoranthene	ND		23
Benzo(k)fluoranthene	ND		23
Benzo(a)pyrene	ND		23
Dibenzo(a,h)anthracene	ND		57
Benzo(ghi)perylene	ND		57
Indeno(1,2,3-cd)pyrene	ND		23

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002571

TEST CODE :SPAH0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 87 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-08041 MATRIX : SOLID
SAMPLE ID CLIENT: SB18 0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		230
Acenaphthylene	ND		230
1-methylnaphthalene	ND		230
2-Methylnaphthalene	410		230
Acenaphthene	ND		230
Fluorene	44		23
Phenanthrene	180		69
Anthracene	ND		23
Fluoranthene	280		57
Pyrene	130		57
Benzo(a)anthracene	33		23
Chrysene	ND		23
Benzo(b)fluoranthene	6.6	J	23
Benzo(k)fluoranthene	ND		23
Benzo(a)pyrene	26		23
Dibenzo(a,h)anthracene	ND		57
Benzo(ghi)perylene	ND		57
Indeno(1,2,3-cd)pyrene	ND		23

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002572

TEST CODE :SPAH0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 85 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-08042 MATRIX : SOLID
SAMPLE ID CLIENT: SB18 0708

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		4700
Acenaphthylene	ND		4700
1-methylnaphthalene	13000		4700
2-Methylnaphthalene	16000		4700
Acenaphthene	ND		4700
Fluorene	1400		470
Phenanthrene	4400		1400
Anthracene	540		470
Fluoranthene	5400		1200
Pyrene	2200		1200
Benzo(a)anthracene	450	J	470
Chrysene	ND		470
Benzo(b)fluoranthene	ND		470
Benzo(k)fluoranthene	ND		470
Benzo(a)pyrene	ND		470
Dibenzo(a,h)anthracene	ND		1200
Benzo(ghi)perylene	ND		1200
Indeno(1,2,3-cd)pyrene	ND		470

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002573

TEST CODE :SPAH0A1

JOB NUMBER :9801.230
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT
TEST NAME : 8310 PAH/LC
SAMPLE ID LAB : EE-98-08236
SAMPLE ID CLIENT: SB19-0102

%SOLIDS : 90 %
UNITS : UG/KG
MATRIX : SOLID

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		22000
Acenaphthylene	ND		22000
1-methylnaphthalene	ND		22000
2-Methylnaphthalene	ND		22000
Acenaphthene	ND		22000
Fluorene	ND		2200
Phenanthrene	ND		6700
Anthracene	ND		2200
Fluoranthene	ND		5600
Pyrene	ND		5600
Benzo(a)anthracene	2800		2200
Chrysene	ND		2200
Benzo(b)fluoranthene	730	J	2200
Benzo(k)fluoranthene	ND		2200
Benzo(a)pyrene	1200	J	2200
Dibenzo(a,h)anthracene	ND		5600
Benzo(ghi)perylene	ND		5600
Indeno(1,2,3-cd)pyrene	ND		2200

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002574

TEST CODE :SPAH0A1

JOB NUMBER :9801.230
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT
TEST NAME : 8310 PAH/LC
SAMPLE ID LAB : EE-98-08237
SAMPLE ID CLIENT: SB19-0708

%SOLIDS : 88 %
UNITS : UG/KG
MATRIX : SOLID

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		230
Acenaphthylene	ND		230
1-methylnaphthalene	ND		230
2-Methylnaphthalene	ND		230
Acenaphthene	ND		230
Fluorene	ND		23
Phenanthrene	ND		68
Anthracene	ND		23
Fluoranthene	ND		57
Pyrene	ND		57
Benzo(a)anthracene	12	J	23
Chrysene	ND		23
Benzo(b)fluoranthene	ND		23
Benzo(k)fluoranthene	ND		23
Benzo(a)pyrene	ND		23
Dibenzo(a,h)anthracene	ND		57
Benzo(ghi)perylene	ND		57
Indeno(1,2,3-cd)pyrene	ND		23

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

PAH RETENTION TIME WINDOWS
HYPERPAH 100x4.6

	1/7/97 RT	1/10/97 RT	1/14/97 RT	AVE RT	3X STDEV
NAPHTHALENE	9.060	9.055	9.047	9.054	0.020
ACENAPHTHALENE	10.075	10.071	10.063	10.070	0.018
ACENAPHTHENE	11.537	11.534	11.528	11.533	0.014
FLUORENE	11.796	11.795	11.789	11.793	0.011
PHENANTHRENE	12.749	12.748	12.744	12.747	0.008
ANTHRACENE	13.654	13.655	13.652	13.654	0.005
FLUORANTHENE	14.692	14.695	14.696	14.694	0.006
PYRENE	15.482	15.487	15.489	15.486	0.011
TERPHENYL D-14	16.649	16.660	16.662	16.657	0.021
BENZO(A)ANTHRACENE	17.840	17.852	17.857	17.850	0.026
CHRYSENE	18.367	18.382	18.388	18.379	0.032
BENZO(B)FLUORANTHENE	20.313	20.335	20.338	20.329	0.041
BENZO(K)FLUORANTHENE	21.167	21.198	21.201	21.189	0.056
BENZO(A)PYRENE	22.045	22.075	22.076	22.065	0.053
DIBENZO(AH)ANTHRACENE	23.124	23.156	23.160	23.147	0.059
BENZO(GHI)PERYLENE	24.230	24.234	24.238	24.234	0.012
INDENO(CD123)PYRENE	24.717	24.759	24.768	24.748	0.082

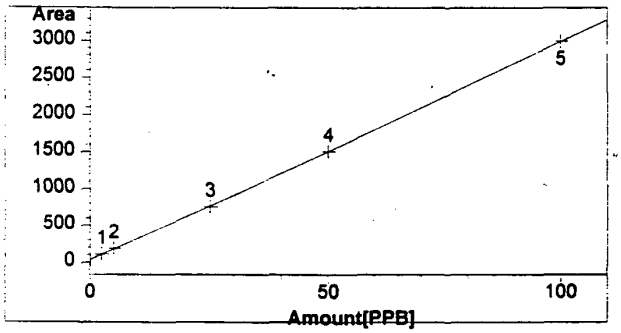
002576

RETENTION TIME WINDOWS
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH586-21-2/LC-2

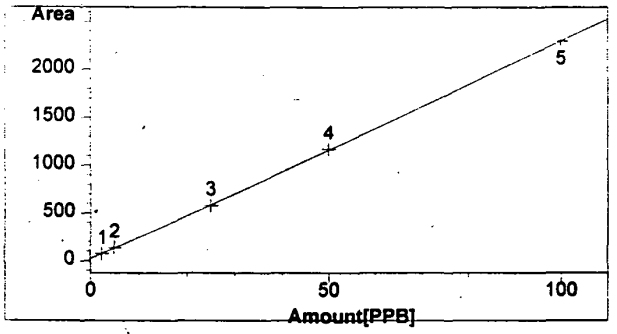
	STD#	1190-140-1	1190-140-5	1190-140-5			
	VIAL	102-8	102-2	102-8			
	DATE	6/2/98	6/4/98	6/5/98			
PARAMETER		RETENTION TIME	RETENTION TIME	RETETION TIME	AVERAGE R T	STANDARD DEVIATION	3 X STD DEV.
NAPHTHALENE		9.417	9.924	9.889	9.743	0.283	0.849
ACENAPHTHYLENE		10.453	10.993	10.961	10.802	0.303	0.909
1-METHYLNAPHTHALENE		11.053	11.592	11.567	11.404	0.304	0.913
2-METHYLNAPHTHALENE		11.362	11.900	11.881	11.714	0.305	0.916
ACENAPHTHENE		11.709	12.250	12.233	12.064	0.308	0.923
FLUORENE		11.984	12.528	12.517	12.343	0.311	0.933
PHENANTHRENE		12.756	13.307	13.301	13.121	0.316	0.949
ANTHRACENE		13.465	14.023	14.020	13.836	0.321	0.964
FLUORANTHENE		14.283	14.852	14.851	14.662	0.328	0.985
PYRENE		14.845	15.419	15.415	15.226	0.330	0.991
P-TERPHENYL-D14		15.876	16.449	16.455	16.260	0.333	0.999
BENZO(A)ANTHRACENE		16.678	17.269	17.260	17.069	0.339	1.016
CHRYSENE		17.081	17.676	17.663	17.473	0.340	1.019
BENZO(B)FLUORANTHENE		18.499	19.124	19.081	18.901	0.349	1.047
BENZO(K)FLUORANTHENE		19.138	19.776	19.725	19.546	0.355	1.064
BENZO(A)PYRENE		19.712	20.361	20.311	20.128	0.361	1.083
DIBENZO(AH)ANTHRACENE		20.500	21.207	21.137	20.948	0.390	1.169
BENZO(GHI)PERYLENE		21.214	21.967	21.877	21.686	0.411	1.234
INDENO(CD123)PYRENE		21.673	22.473	23.360	22.502	0.844	2.532

002577

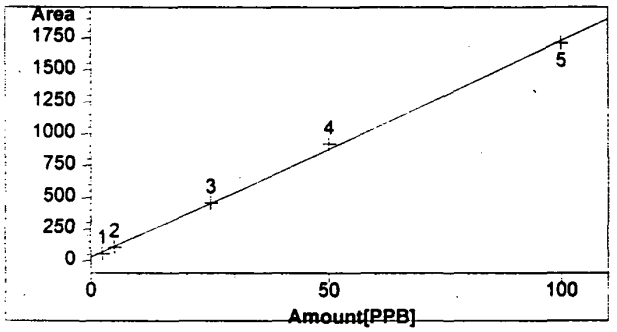
Calibration Curves



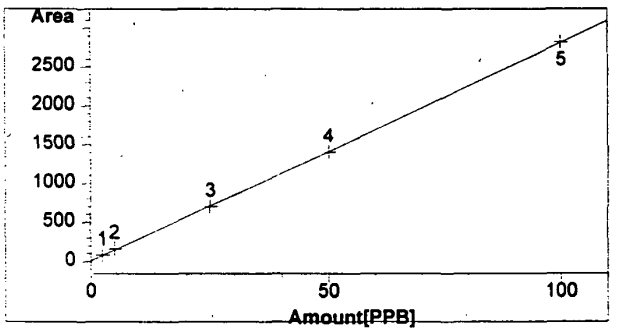
NAPHTHALENE at exp. RT: 11.368
VWD1 A, Wavelength=254 nm
Correlation: 0.99998
Residual Std. Dev.: 8.61906
Formula: y = mx + b
m: 29.60375
b: 29.84070
x: Amount
y: Area



ACENAPTHYLENE at exp. RT: 12.334
VWD1 A, Wavelength=254 nm
Correlation: 0.99997
Residual Std. Dev.: 8.29213
Formula: y = mx + b
m: 22.81496
b: 18.25920
x: Amount
y: Area

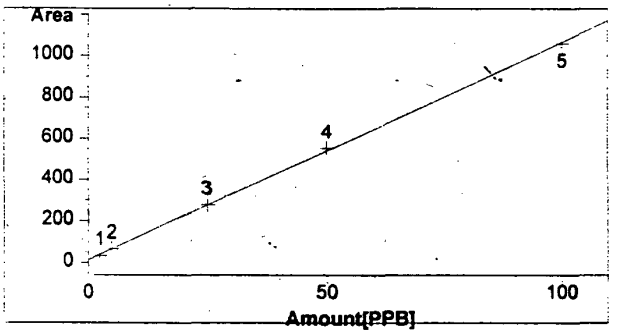


1-METHYLNAPHTHALENE at exp. RT: 12.900
VWD1 A, Wavelength=254 nm
Correlation: 0.99937
Residual Std. Dev.: 28.01689
Formula: y = mx + b
m: 16.99461
b: 28.60273
x: Amount
y: Area

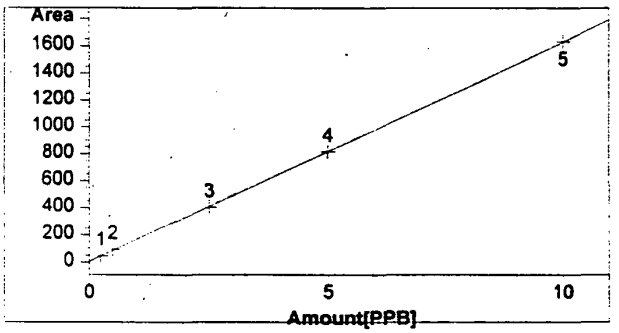


2-METHYLNAPHTHALENE at exp. RT: 13.191
VWD1 A, Wavelength=254 nm
Correlation: 0.99996
Residual Std. Dev.: 11.69282
Formula: y = mx + b
m: 28.00910
b: 10.92825
x: Amount
y: Area

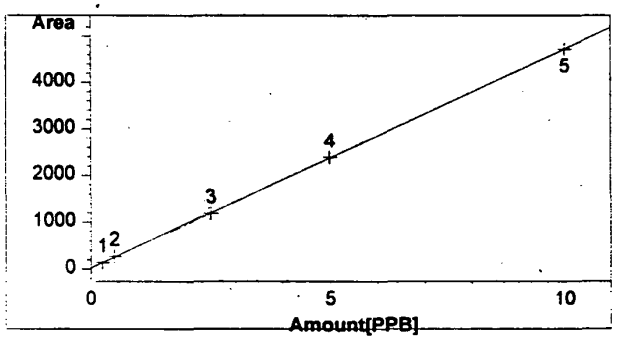
002578



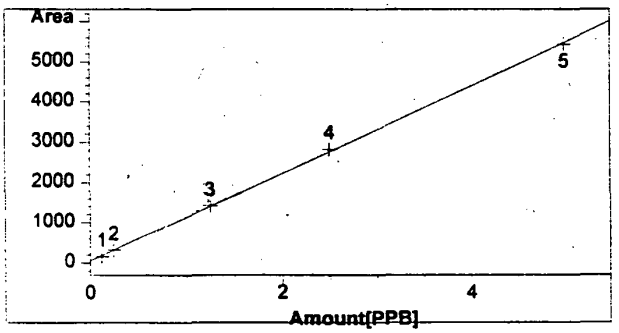
ACENAPHTHENE at exp. RT: 13.524
VWD1 A, Wavelength=254 nm
Correlation: 0.99981
Residual Std. Dev.: 9.48577
Formula: y = mx + b
m: 10.51838
b: 13.83540
x: Amount
y: Area



FLUORENE at exp. RT: 13.768
VWD1 A, Wavelength=254 nm
Correlation: 0.99997
Residual Std. Dev.: 5.64776
Formula: y = mx + b
m: 162.39955
b: 5.64926
x: Amount
y: Area

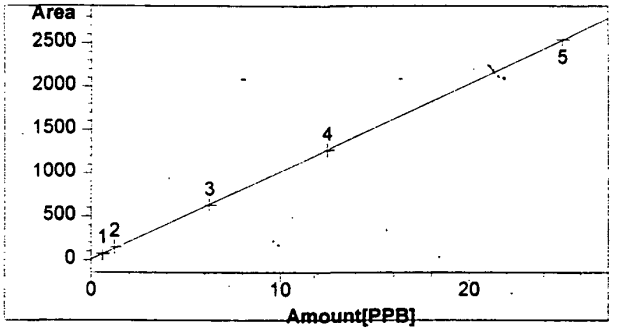


PHENANTHRENE at exp. RT: 14.511
VWD1 A, Wavelength=254 nm
Correlation: 0.99998
Residual Std. Dev.: 14.63936
Formula: y = mx + b
m: 469.92865
b: 26.63216
x: Amount
y: Area

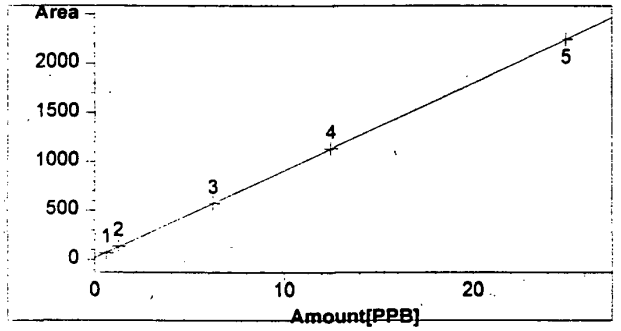


ANTHRACENE at exp. RT: 15.200
VWD1 A, Wavelength=254 nm
Correlation: 0.99983
Residual Std. Dev.: 46.21400
Formula: y = mx + b
m: 1083.67517
b: 55.22206
x: Amount
y: Area

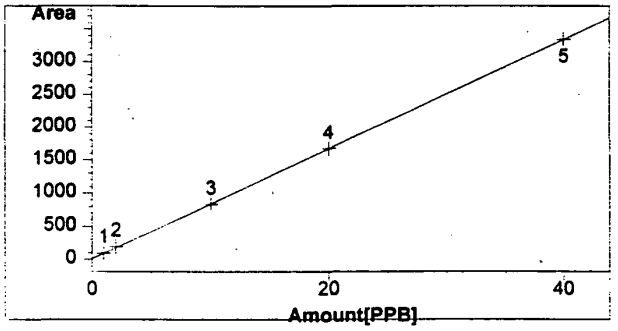
002579



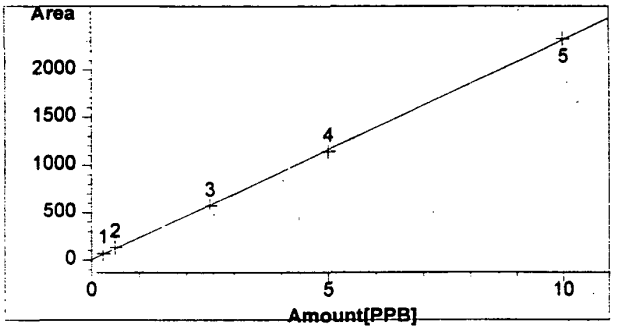
FLUORANTHENE at exp. RT: 15.991
VWD1 A, Wavelength=254 nm
Correlation: 0.99996
Residual Std. Dev.: 10.29423
Formula: y = mx + b
m: 101.01775
b: 9.01388
x: Amount
y: Area



PYRENE at exp. RT: 16.558
VWD1 A, Wavelength=254 nm
Correlation: 0.99998
Residual Std. Dev.: 5.95560
Formula: y = mx + b
m: 89.07327
b: 19.36412
x: Amount
y: Area

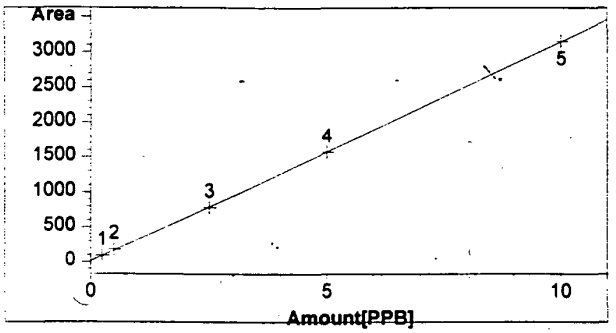


TERPHENYL at exp. RT: 17.493
VWD1 A, Wavelength=254 nm
Correlation: 0.99997
Residual Std. Dev.: 10.99116
Formula: y = mx + b
m: 83.16153
b: 14.78691
x: Amount
y: Area

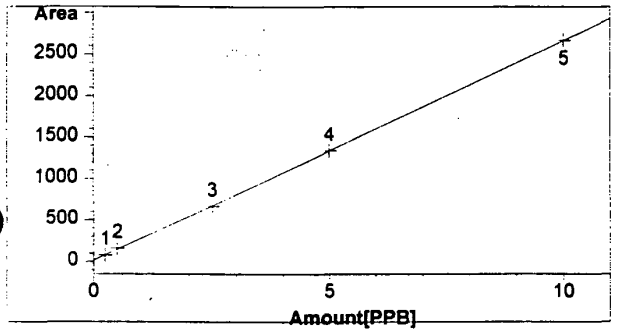


BENZO(A)ANTHRACENE at exp. RT: 18.295
VWD1 A, Wavelength=254 nm
Correlation: 0.99989
Residual Std. Dev.: 16.23285
Formula: y = mx + b
m: 231.32744
b: 4.54955
x: Amount
y: Area

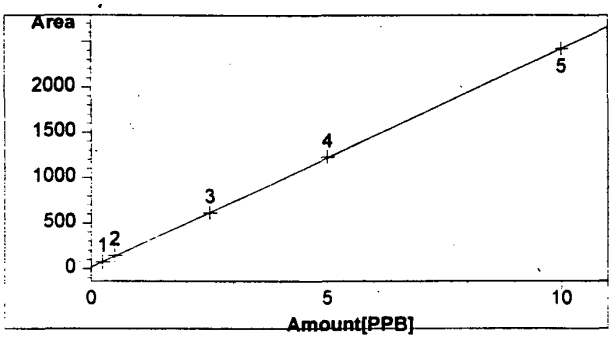
002580



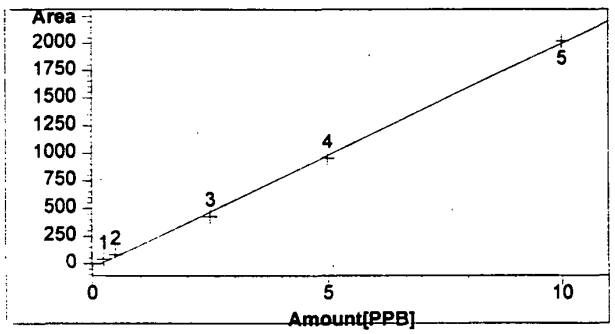
CHRYSENE at exp. RT: 18.688
VWD1 A, Wavelength=254 nm
Correlation: 0.99998
Residual Std. Dev.: 10.27704
Formula: y = mx + b
m: 313.37421
b: 13.57489
x: Amount
y: Area



BENZO(B)FLUORANTHE at exp. RT: 19.990
VWD1 A, Wavelength=254 nm
Correlation: 0.99997
Residual Std. Dev.: 8.96692
Formula: y = mx + b
m: 264.68066
b: 16.81769
x: Amount
y: Area

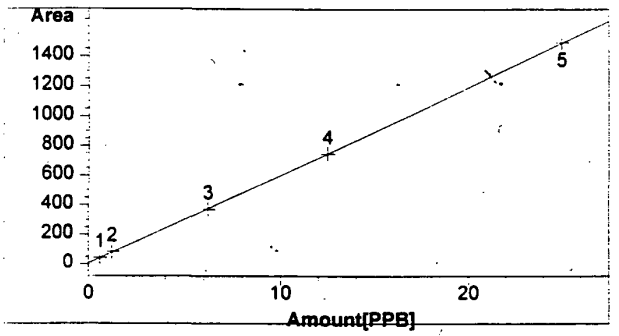


BENZO(K)FLUORANTHE at exp. RT: 20.575
VWD1 A, Wavelength=254 nm
Correlation: 0.99998
Residual Std. Dev.: 6.76702
Formula: y = mx + b
m: 240.20303
b: 19.10104
x: Amount
y: Area

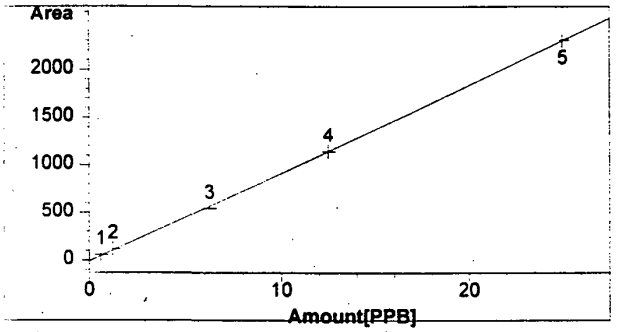


BENZO(A)PYRENE at exp. RT: 21.149
VWD1 A, Wavelength=254 nm
Correlation: 0.99927
Residual Std. Dev.: 36.26219
Formula: y = mx + b
m: 203.98056
b: -38.80044
x: Amount
y: Area

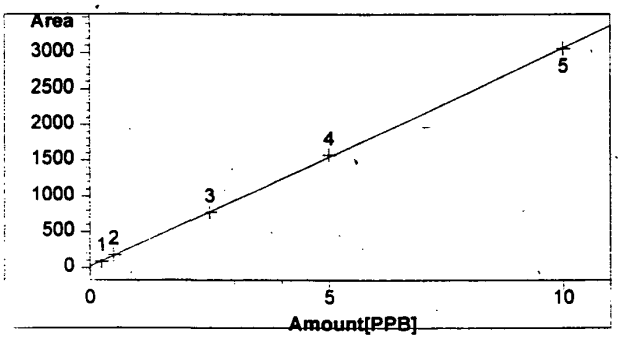
002581



DIBENZOANTHRACENE at exp. RT: 21.967
VWD1 A, Wavelength=254 nm
Correlation: 0.99997
Residual Std. Dev.: 5.15589
Formula: y = mx + b
m: 59.42434
b: 5.58615
x: Amount
y: Area



BENZO(GHI)PERYLENE at exp. RT: 22.814
VWD1 A, Wavelength=254 nm
Correlation: 0.99988
Residual Std. Dev.: 16.38755
Formula: y = mx + b
m: 92.37862
b: -8.67490
x: Amount
y: Area



INDENOPYRENE at exp. RT: 23.321
VWD1 A, Wavelength=254 nm
Correlation: 0.99991
Residual Std. Dev.: 19.51298
Formula: y = mx + b
m: 304.98169
b: 21.53078
x: Amount
y: Area

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002582

PERCENT RECOVERY FOR REFERENCE STANDARD :2ND SOURCE
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

ANALYSIS DATE: 4/10/98 JOB#:9800.564/.565/.640

NOTEBOOK: 1229-178 STD #: 1190-128-8 BATCH#:980410521R

VIAL:108-1 UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	75.0	73.7	98.3
ACENAPHTHYLENE	75.0	72.6	96.8
ACENAPHTHENE	75.0	75.0	100
FLUORENE	7.50	7.37	98.3
PHENANTHRENE	7.50	7.61	101
ANTHRACENE	3.50	3.61	103
FLUORANTHENE	20.0	22.4	112
PYRENE	20.0	22.5	113
BENZO(A)ANTHRACENE	7.50	8.20	109
CHRYSENE	7.50	7.67	102
BENZO(B)FLUORANTHENE	7.50	7.80	104
BENZO(K)FLUORANTHENE	7.50	7.50	100
BENZO(A)PYRENE	7.50	6.96	92.8
DIBENZO(AH)ANTHRACENE	20.0	18.4	92.0
BENZO(GHI)PERYLENE	20.0	19.7	98.5
INDENO(CD123)PYRENE	7.50	7.37	98.3

IN CONTROL AVERAGE = 101

Acc 4/13/98 Comp QA

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

INITIAL CAL NOTEBOOK:1229-178
INITIAL CAL. DATE:041098

ANALYSIS DATE: 4/11/98

JOB#:9800.564/.565/.611

NOTEBOOK:1229-178 STD#: 1190-128-4
STD TYPE: CONTINUING

BATCH#:980410521R

VIAL:104-2

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	50.3	101
ACENAPHTHYLENE	50.0	51.0	102
1-METHYLNAPHTHALENE	50.0	53	106
2-METHYLNAPHTHALENE	50.0	50.1	100
ACENAPHTHENE	50.0	51.4	103
FLUORENE	5.00	5.10	102
PHENANTHRENE	5.00	5.11	102
ANTHRACENE	2.50	2.57	103
FLUORANTHENE	12.5	13.7	110
PYRENE	12.5	14.1	113
P-TERPHENYL-D14	20.0	20.9	105
BENZO(A)ANTHRACENE	5.00	5.49	110
CHRYSENE	5.00	5.54	111
BENZO(B)FLUORANTHENE	5.00	5.63	113
BENZO(K)FLUORANTHENE	5.00	5.61	112
BENZO(A)PYRENE	5.00	5.38	108
DIBENZO(AH)ANTHRACENE	12.5	14.0	112
BENZO(GHI)PERYLENE	12.5	13.1	105
INDENO(CD123)PYRENE	5.00	5.31	106

IN CONTROL mcu 4/13/98 AVERAGE = 106

488

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

INITIAL CAL NOTEBOOK:1229-178
INITIAL CAL. DATE:041098

ANALYSIS DATE: 4/11/98

JOB#:9800.564/.565/.611

NOTEBOOK:1229-178 STD#: 1190-128-4
STD TYPE: ENDING

BATCH#:980410521R

VIAL:104-4

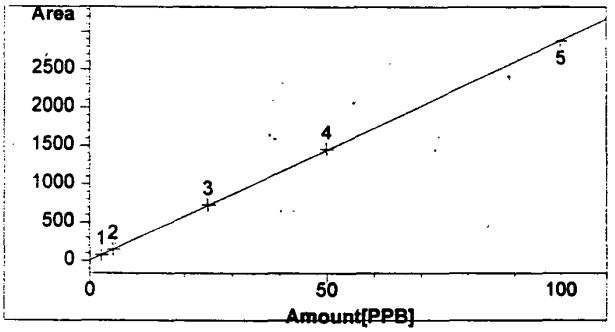
UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	50.2	100
ACENAPHTHYLENE	50.0	51.1	102
1-METHYLNAPHTHALENE	50.0	52.9	106
2-METHYLNAPHTHALENE	50.0	50.3	101
ACENAPHTHENE	50.0	51.2	102
FLUORENE	5.00	5.21	104
PHENANTHRENE	5.00	5.14	103
ANTHRACENE	2.50	2.60	104
FLUORANTHENE	12.5	14.0	112
PYRENE	12.5	14.0	112
P-TERPHENYL-D14	20.0	21.4	107
BENZO(A)ANTHRACENE	5.00	5.55	111
CHRYSENE	5.00	5.60	112
BENZO(B)FLUORANTHENE	5.00	5.48	110
BENZO(K)FLUORANTHENE	5.00	5.43	109
BENZO(A)PYRENE	5.00	5.28	106
DIBENZO(AH)ANTHRACENE	12.5	13.9	111
BENZO(GHI)PERYLENE	12.5	12.7	102
INDENO(CD123)PYRENE	5.00	5.24	105

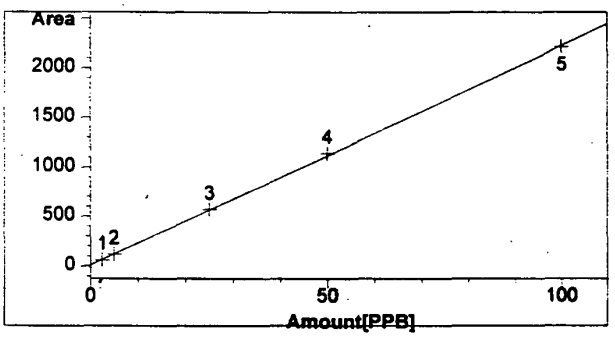
IN CONTROL MC 4/13/98 AVERAGE = 106

Method C:\HPCHEM\2\METHODS\HYPERPAH.M

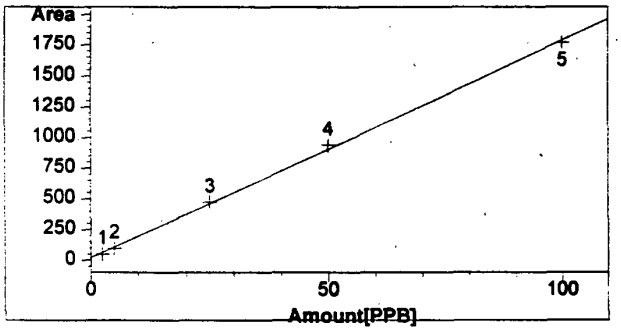
Calibration Curves



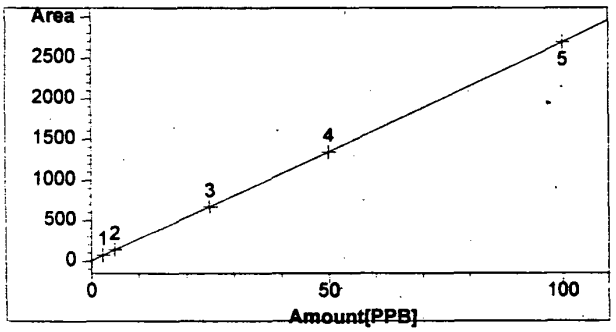
NAPHTHALENE at exp. RT: 10.326
VWD1 A, Wavelength=254 nm
Correlation: 0.99998
Residual Std. Dev.: 9.35419
Formula: y = mx + b
m: 28.79510
b: 8.23071
x: Amount
y: Area



ACENAPTHYLENE at exp. RT: 11.374
VWD1 A, Wavelength=254 nm
Correlation: 0.99989
Residual Std. Dev.: 15.49880
Formula: y = mx + b
m: 22.14003
b: 11.94546
x: Amount
y: Area

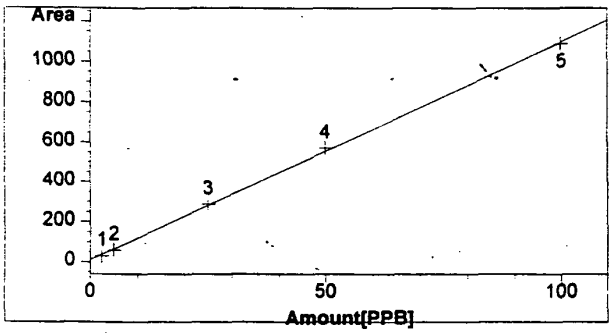


1-METHYLNAPHTHALENE at exp. RT: 12.066
VWD1 A, Wavelength=254 nm
Correlation: 0.99948
Residual Std. Dev.: 26.41903
Formula: y = mx + b
m: 17.68183
b: 19.96260
x: Amount
y: Area

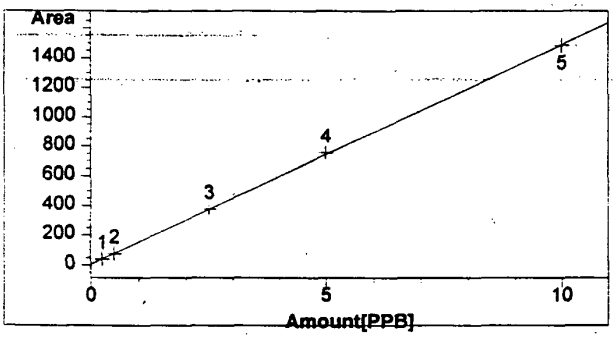


2-METHYLNAPHTHALENE at exp. RT: 12.427
VWD1 A, Wavelength=254 nm
Correlation: 1.00000
Residual Std. Dev.: 2.16417
Formula: y = mx + b
m: 26.88180
b: 2.31399
x: Amount
y: Area

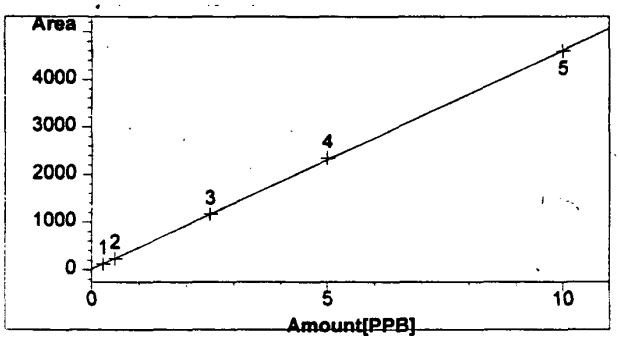
002586



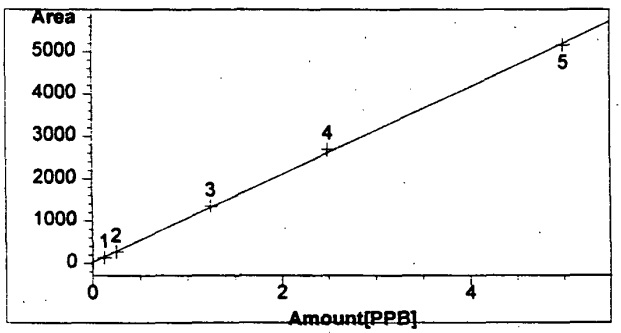
ACENAPHTHENE at exp. RT: 12.837
VWD1 A, Wavelength=254 nm
Correlation: 0.99970
Residual Std. Dev.: 12.40004
Formula: y = mx + b
m: 10.87429
b: 10.84167
x: Amount
y: Area



FLUORENE at exp. RT: 13.135
VWD1 A, Wavelength=254 nm
Correlation: 0.99994
Residual Std. Dev.: 7.73917
Formula: y = mx + b
m: 148.32066
b: 5.43912
x: Amount
y: Area

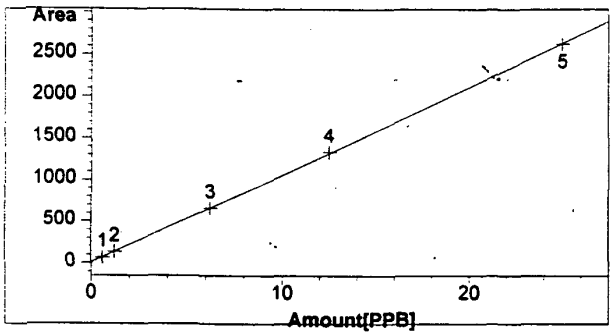


PHENANTHRENE at exp. RT: 14.112
VWD1 A, Wavelength=254 nm
Correlation: 0.99995
Residual Std. Dev.: 22.05206
Formula: y = mx + b
m: 459.51065
b: 16.38516
x: Amount
y: Area

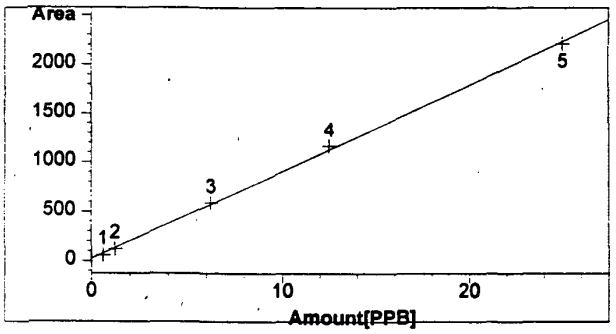


ANTHRACENE at exp. RT: 15.056
VWD1 A, Wavelength=254 nm
Correlation: 0.99977
Residual Std. Dev.: 51.27747
Formula: y = mx + b
m: 1032.39746
b: 34.42780
x: Amount
y: Area

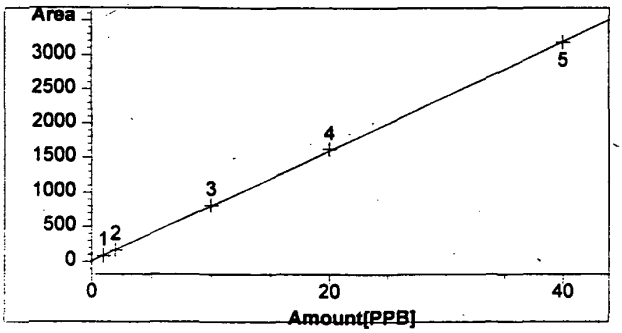
002587



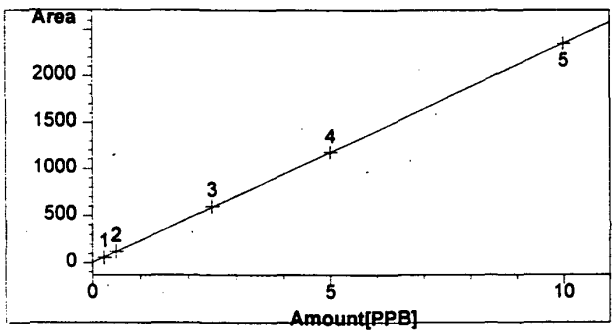
FLUORANTHENE at exp. RT: 16.110
VWD1 A, Wavelength=254 nm
Correlation: 0.99996
Residual Std. Dev.: 10.83279
Formula: y = mx + b
m: 105.08126
b: 5.69488
x: Amount
y: Area



PYRENE at exp. RT: 16.930
VWD1 A, Wavelength=254 nm
Correlation: 0.99960
Residual Std. Dev.: 29.23656
Formula: y = mx + b
m: 88.49943
b: 23.21814
x: Amount
y: Area

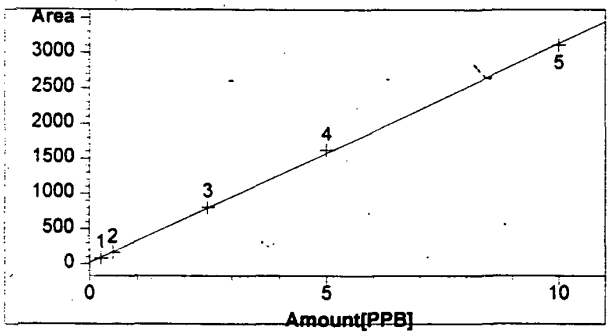


TERPHENYL at exp. RT: 18.099
VWD1 A, Wavelength=254 nm
Correlation: 0.99994
Residual Std. Dev.: 15.79841
Formula: y = mx + b
m: 79.49236
b: 11.78551
x: Amount
y: Area

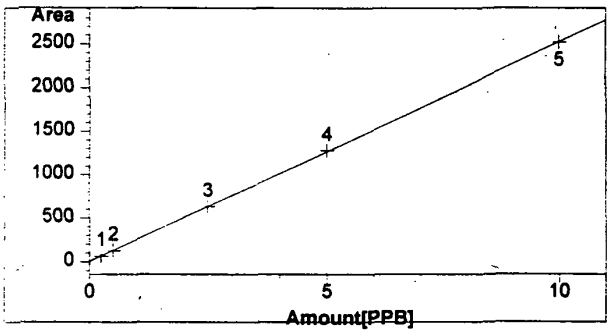


BENZO(A)ANTHRACENE at exp. RT: 19.323
VWD1 A, Wavelength=254 nm
Correlation: 0.99999
Residual Std. Dev.: 5.55763
Formula: y = mx + b
m: 234.81491
b: 5.33799
x: Amount
y: Area

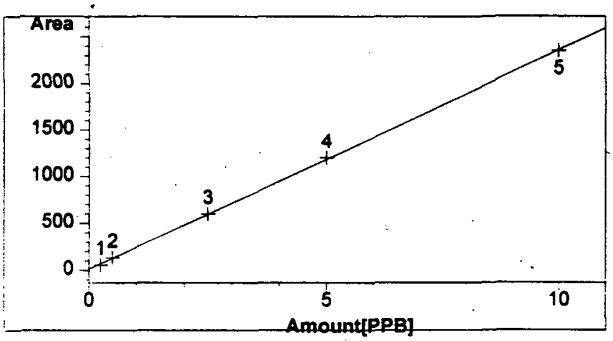
002588



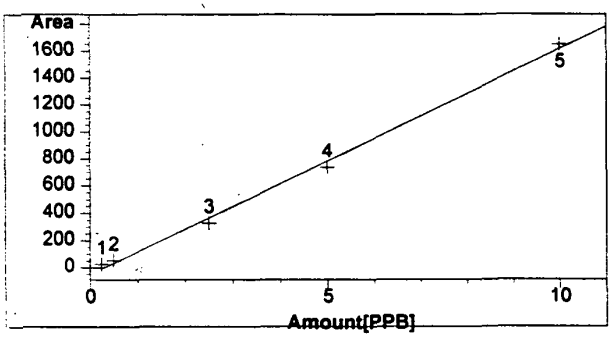
CHRYSENE at exp. RT: 19.896
VWD1 A, Wavelength=254 nm
Correlation: 0.99975
Residual Std. Dev.: 32.48157
Formula: y = mx + b
m: 311.10321
b: 21.94993
x: Amount
y: Area



BENZO(B)FLUORANTHE at exp. RT: 21.733
VWD1 A, Wavelength=254 nm
Correlation: 0.99998
Residual Std. Dev.: 7.99853
Formula: y = mx + b
m: 252.11150
b: 4.86495
x: Amount
y: Area

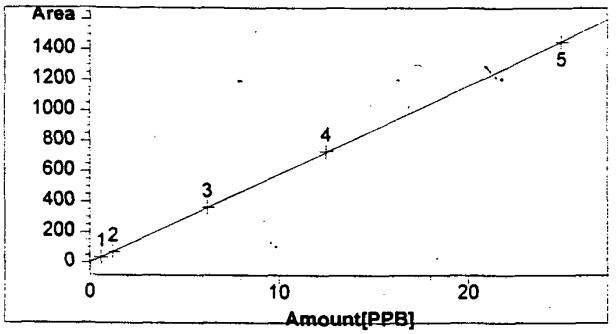


BENZO(K)FLUORANTHE at exp. RT: 22.546
VWD1 A, Wavelength=254 nm
Correlation: 0.99991
Residual Std. Dev.: 14.44068
Formula: y = mx + b
m: 234.43965
b: 12.69512
x: Amount
y: Area

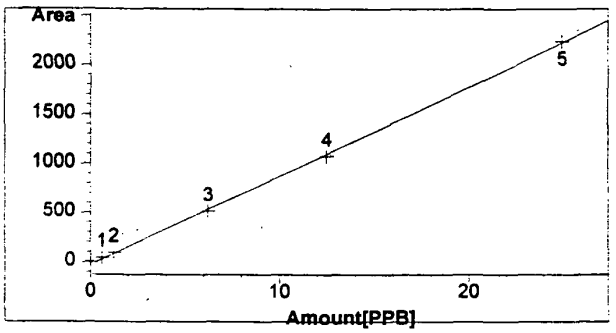


BENZO(A)PYRENE at exp. RT: 23.413
VWD1 A, Wavelength=254 nm
Correlation: 0.99845
Residual Std. Dev.: 43.38871
Formula: y = mx + b
m: 166.70459
b: -50.07952
x: Amount
y: Area

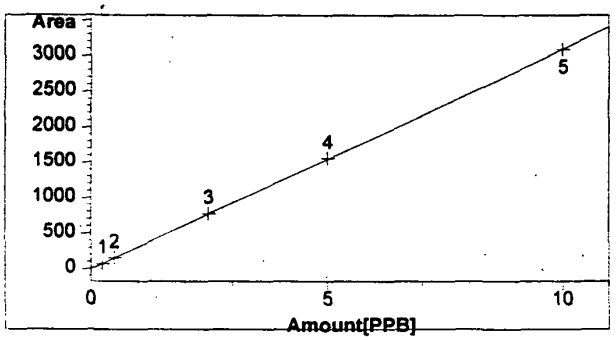
002589



DIBENZOANTHRACENE at exp. RT: 24.473
VWD1 A, Wavelength=254 nm
Correlation: 0.99998
Residual Std. Dev.: 4.34441
Formula: y = mx + b
m: 58.18977
b: 2.11533
x: Amount
y: Area



BENZO(GHI)PERYLENE at exp. RT: 25.789
VWD1 A, Wavelength=254 nm
Correlation: 0.99982
Residual Std. Dev.: 19.84039
Formula: y = mx + b
m: 89.99433
b: -24.96167
x: Amount
y: Area



INDENOPYRENE at exp. RT: 26.417
VWD1 A, Wavelength=254 nm
Correlation: 0.99998
Residual Std. Dev.: 8.37816
Formula: y = mx + b
m: 309.45309
b: 1.16986
x: Amount
y: Area

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002590

PERCENT RECOVERY FOR REFERENCE STANDARD :2ND SOURCE
METHOD/COLUMN/INSTRUMENT: PAH/HYPERPAH/LC-2

ANALYSIS DATE: 4/9/98 JOB # 9800 .564/565/566

NOTEBOOK:1229-171 STD. ID: STD # 1190-127-6 BATCH#:980408521R
STD. TYPE: REFERENCE

VIAL:108-3 UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	75.0	77.4	103
ACENAPHTHYLENE	75.0	76.1	101
ACENAPHTHENE	75.0	78.5	105
FLUORENE	7.50	7.6	101
PHENANTHRENE	7.50	7.86	105
ANTHRACENE	3.50	3.67	105
FLUORANTHENE	20.0	21.4	107
PYRENE	20.0	21.7	109
BENZO(A)ANTHRACENE	7.50	7.96	106
CHRYSENE	7.50	7.61	101
BENZO(B)FLUORANTHENE	7.50	8.04	107
BENZO(K)FLUORANTHENE	7.50	7.56	101
BENZO(A)PYRENE	7.50	6.98	93
DIBENZO(AH)ANTHRACENE	20.0	19.1	96
BENZO(GHI)PERYLENE	20.0	20.1	101
INDENO(CD123)PYRENE	7.50	7.53	100

DWS 4/9/98

IN CONTROL AVERAGE = 102.6

500

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/HYPERPAH/LC-2

INITIAL CAL NOTEBOOK:1229-171
INITIAL CAL. DATE:04/08/98

ANALYSIS DATE:06/17/98

JOB#:9801.203/.230/.254/.280

5751 STD. ID : STD #:1190-142-3
STD. TYPE: DAILY

BATCH#:980617521R

VIAL:102-02

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC	
NAPHTHALENE	50.0	49.5	99.0	
ACENAPHTHYLENE	50.0	49.2	98.4	
1-METHYLNAPHTHALENE	50.0	51.0	102	
2-METHYLNAPHTHALENE	50.0	48.3	96.6	
ACENAPHTHENE	50.0	50.8	102	
FLUORENE	5.00	4.89	97.8	
PHENANTHRENE	5.00	4.74	94.8	
ANTHRACENE	2.50	2.40	96.0	
FLUORANTHENE	12.50	11.8	94.4	
PYRENE	12.50	11.7	93.6	
P-TERPHENYL-D14	20.0	19.7	98.5	
BENZO(A)ANTHRACENE	5.00	4.94	98.8	
CHRYSENE	5.00	4.99	99.8	
BENZO(B)FLUORANTHENE	5.00	4.84	96.8	
BENZO(K)FLUORANTHENE	5.00	4.56	91.2	
BENZO(A)PYRENE	5.00	5.92	118	**
DIBENZO(AH)ANTHRACENE	12.5	12.0	96.0	
BENZO(GHI)PERYLENE	12.5	12.8	102	
INDENO(CD123)PYRENE	5.00	4.70	94.0	

** IN CONTROL using 15% average factor criteria AVERAGE = 98.4

Benzo a pyrene quantitation reported off other column. OSV 6/19/98

503

PERCENT RECOVERY FOR REFERENCE STANDARD :2ND SOURCE
METHOD/COLUMN/INSTRUMENT:

ANALYSIS DATE: 6/17/98 JOB#:9801.203/.230/.254/.280

NOTEBOOK: 1263-57 STD #: 1190-139-7 BATCH#:980617521R

VIAL:103-3 UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	75.0	75.9	101
ACENAPHTHYLENE	75.0	72.2	96.3
ACENAPHTHENE	75.0	76.5	102
FLUORENE	7.50	7.15	95.3
PHENANTHRENE	7.50	7.21	96.1
ANTHRACENE	3.50	3.42	97.7
FLUORANTHENE	20.0	19.6	98.0
PYRENE	20.0	19.4	97.0
BENZO(A)ANTHRACENE	7.50	7.34	97.9
CHRYSENE	7.50	7.29	97.2
BENZO(B)FLUORANTHENE	7.50	7.59	101.2
BENZO(K)FLUORANTHENE	7.50	7.04	93.9
BENZO(A)PYRENE	7.50	9.21	123 **
DIBENZO(AH)ANTHRACENE	20.0	18.1	90.5
BENZO(GHI)PERYLENE	20.0	20.8	104
INDENO(CD123)PYRENE	7.50	7.05	94.0

AVERAGE = 99.1

** IN CONTROL USING 15% AVERAGE CRITERIA

MC 6-17-98

QA

511

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/HYPERPAH/LC-2

INITIAL CAL NOTEBOOK:1229-171
INITIAL CAL. DATE:04/08/98

ANALYSIS DATE:06/17/98

JOB#:9801.203/.230/.254/.280

STD. ID : STD #:1190-142-3
STD. TYPE: CONTINUING

BATCH#:980617521R

VIAL:102-04

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC	
NAPHTHALENE	50.0	49.9	99.8	
ACENAPHTHYLENE	50.0	49.8	99.6	
1-METHYLNAPHTHALENE	50.0	51.5	103	
2-METHYLNAPHTHALENE	50.0	48.9	97.8	
ACENAPHTHENE	50.0	51.0	102	
FLUORENE	5.00	4.92	98.4	
PHENANTHRENE	5.00	4.74	94.8	
ANTHRACENE	2.50	2.40	96.0	
FLUORANTHENE	12.50	11.6	92.8	
PYRENE	12.50	11.4	91.2	
P-TERPHENYL-D14	20.0	19.3	96.5	
BENZO(A)ANTHRACENE	5.00	4.70	94.0	
CHRYSENE	5.00	4.83	96.6	
BENZO(B)FLUORANTHENE	5.00	4.79	95.8	
BENZO(K)FLUORANTHENE	5.00	4.72	94.4	
BENZO(A)PYRENE	5.00	6.10	122	**
DIBENZO(AH)ANTHRACENE	12.5	12.1	96.8	
BENZO(GHI)PERYLENE	12.5	13.0	104	
INDENO(CD123)PYRENE	5.00	4.71	94.2	

** IN CONTROL using 15% average factor criteria AVERAGE = 98.4

MC 6-18-98

514

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/HYPERPAH/LC-2

INITIAL CAL NOTEBOOK:1229-171
INITIAL CAL. DATE:04/08/98

ANALYSIS DATE:06/18/98

JOB#:9801.203/.230/.254/.280

STD. ID : STD #:1190-142-3
STD. TYPE: ENDING

BATCH#:980617521R

VIAL:102-06

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC	
NAPHTHALENE	50.0	50.4	101	
ACENAPHTHYLENE	50.0	50.1	100	
1-METHYLNAPHTHALENE	50.0	51.9	104	
2-METHYLNAPHTHALENE	50.0	49.3	98.6	
ACENAPHTHENE	50.0	51.4	103	
FLUORENE	5.00	4.96	99.2	
PHENANTHRENE	5.00	4.80	96.0	
ANTHRACENE	2.50	2.41	96.4	
FLUORANTHENE	12.50	11.7	93.6	
PYRENE	12.50	11.6	92.8	
P-TERPHENYL-D14	20.0	19.5	97.5	
BENZO(A)ANTHRACENE	5.00	4.75	95.0	
CHRYSENE	5.00	4.94	98.8	
BENZO(B)FLUORANTHENE	5.00	4.84	96.8	
BENZO(K)FLUORANTHENE	5.00	4.69	93.8	
BENZO(A)PYRENE	5.00	5.85	117	**
DIBENZO(AH)ANTHRACENE	12.5	12.3	98.4	
BENZO(GHI)PERYLENE	12.5	13.0	104	
INDENO(CD123)PYRENE	5.00	4.76	95.2	

** IN CONTROL using 15% average factor criteria AVERAGE = 99.0

MC 6/18/98

517

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

INITIAL CAL NOTEBOOK:1229-178
INITIAL CAL. DATE:041098

ANALYSIS DATE: 6/18/98

JOB#:9801.203/.230

NOTEBOOK:1263-60

STD#: 1190-142-10
STD TYPE: DAILY

BATCH#:980618521R

VIAL:102-02

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	46.1	92.2
ACENAPHTHYLENE	50.0	46.2	92.4
1-METHYLNAPHTHALENE	50.0	51.6	103
2-METHYLNAPHTHALENE	50.0	46.5	93.0
ACENAPHTHENE	50.0	50.4	101
FLUORENE	5.00	4.38	87.6
PHENANTHRENE	5.00	4.48	89.6
ANTHRACENE	2.50	2.22	88.8
FLUORANTHENE	12.5	11.8	94.4
PYRENE	12.5	11.0	88.0
P-TERPHENYL-D14	20.0	17.9	89.5
BENZO(A)ANTHRACENE	5.00	4.70	94.0
CHRYSENE	5.00	4.75	95.0
BENZO(B)FLUORANTHENE	5.00	4.76	95.2
BENZO(K)FLUORANTHENE	5.00	4.68	93.6
BENZO(A)PYRENE	5.00	4.69	94
DIBENZO(AH)ANTHRACENE	12.5	11.5	92.0
BENZO(GHI)PERYLENE	12.5	11.9	95.2
INDENO(CD123)PYRENE	5.00	4.67	93.4

IN CONTROL mc 6/19/98

AVERAGE = 93.2

525

PERCENT RECOVERY FOR REFERENCE STANDARD :2ND SOURCE
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

ANALYSIS DATE: 6/18/98 JOB#:9801.203/.230

NOTEBOOK: 1263-47 STD #: 1190-142-8 BATCH#:980618521R

VIAL:103-3 UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	75.0	71.8	95.7
ACENAPHTHYLENE	75.0	68.5	91.3
ACENAPHTHENE	75.0	76.4	102
FLUORENE	7.50	6.49	86.5
PHENANTHRENE	7.50	6.90	92.0
ANTHRACENE	3.50	3.2	91.4
FLUORANTHENE	20.0	20.4	102
PYRENE	20.0	18.6	93.0
BENZO(A)ANTHRACENE	7.50	7.24	96.5
CHRYSENE	7.50	7.16	95.5
BENZO(B)FLUORANTHENE	7.50	7.20	96.0
BENZO(K)FLUORANTHENE	7.50	6.93	92.4
BENZO(A)PYRENE	7.50	7.27	96.9
DIBENZO(AH)ANTHRACENE	20.0	17.2	86.0
BENZO(GHI)PERYLENE	20.0	19.1	95.5
INDENO(CD123)PYRENE	7.50	6.77	90.3

IN CONTROL AVERAGE = 93.9

Copy QA
mc 6-18-98

523

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

INITIAL CAL NOTEBOOK:1229-178
INITIAL CAL. DATE:041098

ANALYSIS DATE: 6/18/98

JOB#:9801.203/.230

NOTEBOOK:1263-60

STD#: 1190-142-10
STD TYPE: CONTINUING

BATCH#:980618521R

VIAL:102-04

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	46.5	93.0
ACENAPHTHYLENE	50.0	46.5	93.0
1-METHYLNAPHTHALENE	50.0	51.9	104
2-METHYLNAPHTHALENE	50.0	46.6	93.2
ACENAPHTHENE	50.0	50.7	101
FLUORENE	5.00	4.41	88.2
PHENANTHRENE	5.00	4.52	90.4
ANTHRACENE	2.50	2.20	88.0
FLUORANTHENE	12.5	11.9	95.2
PYRENE	12.5	11.0	88.0
P-TERPHENYL-D14	20.0	17.8	89.0
BENZO(A)ANTHRACENE	5.00	4.65	93.0
CHRYSENE	5.00	4.69	93.8
BENZO(B)FLUORANTHENE	5.00	4.45	89.0
BENZO(K)FLUORANTHENE	5.00	4.63	92.6
BENZO(A)PYRENE	5.00	5.01	100
DIBENZO(AH)ANTHRACENE	12.5	11.4	91.2
BENZO(GHI)PERYLENE	12.5	11.9	95.2
INDENO(CD123)PYRENE	5.00	4.57	91.4

IN CONTROL mc 6/19/98 AVERAGE = 93.1

531

PERCENT RECOVERY FOR CALIBRATION STANDARDS
METHOD/COLUMN/INSTRUMENT: PAH/ENVPAH/LC-2

INITIAL CAL NOTEBOOK:1229-178
INITIAL CAL. DATE:041098

ANALYSIS DATE: 6/19/98

JOB#:9801.203/.230

NOTEBOOK:1263-60

STD#: 1190-142-10
STD TYPE: ENDING

BATCH#:980618521R

VIAL:102-06

UNITS:UG/ML

PARAMETER	STD ADDED	AMT FOUND	% REC
NAPHTHALENE	50.0	47.1	94.2
ACENAPHTHYLENE	50.0	47.2	94.4
1-METHYLNAPHTHALENE	50.0	52.6	105
2-METHYLNAPHTHALENE	50.0	47.2	94.4
ACENAPHTHENE	50.0	51.4	103
FLUORENE	5.00	4.46	89.2
PHENANTHRENE	5.00	4.54	90.8
ANTHRACENE	2.50	2.18	87.2
FLUORANTHENE	12.5	11.9	95.2
PYRENE	12.5	11.2	89.6
P-TERPHENYL-D14	20.0	18.1	90.5
BENZO(A)ANTHRACENE	5.00	4.85	97.0
CHRYSENE	5.00	4.77	95.4
BENZO(B)FLUORANTHENE	5.00	4.49	89.8
BENZO(K)FLUORANTHENE	5.00	4.50	90.0
BENZO(A)PYRENE	5.00	4.63	92.6
DIBENZO(AH)ANTHRACENE	12.5	11.6	92.8
BENZO(GHI)PERYLENE	12.5	11.7	93.6
INDENO(CD123)PYRENE	5.00	4.61	92.2

IN CONTROL mc 6/19/98 AVERAGE = 93.5

534

TEST CODE :SPAH0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB :Method Blank 1339-19-1 MATRIX : SOLID

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		200
Acenaphthylene	ND		200
1-methylnaphthalene	ND		200
2-Methylnaphthalene	ND		200
Acenaphthene	ND		200
Fluorene	ND		20
Phenanthrene	ND		60
Anthracene	ND		20
Fluoranthene	ND		50
Pyrene	ND		50
Benzo(a)anthracene	ND		20
Chrysene	ND		20
Benzo(b)fluoranthene	ND		20
Benzo(k)fluoranthene	ND		20
Benzo(a)pyrene	ND		20
Dibenzo(a,h)anthracene	ND		50
Benzo(ghi)perylene	ND		50
Indeno(1,2,3-cd)pyrene	ND		20

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

6.0 CALCULATIONS PAH

6.1 The instrument printout for processed samples is in µg/kg or µg/L. The equations below are based on quantitation versus the curve and are provided as a check.

6.1.1 Soil Samples

$$\mu g/g = \frac{[Ax - b]}{[M]} \quad \frac{V}{M}$$

where

A_x = Response of analyte in sample (area or peak height).
b = Curve intercept (area or peak height).
m = Slope of curve (area/conc.).
M = Mass of sample, g.
V = Final additive volume of supernatant plus water solution.

Bracketed term = Concentration (µg/mL) on curve associated with area A_x.
Typically, M = 30; V = 1.0

6.1.2 Water

$$\mu g/L = \frac{[A_x - b]}{[M]} \quad \frac{Vd}{Vs}$$

where

V_s = Volume of sample extracted, L.
V_d = Final additive volume of acetonitrile extract plus an (equal) amount of water.

Commonly, V_s = 1.000 mL; V_d = 1 mL.

6.1.3 Swipe

$$\frac{ug}{swipe} = \frac{[Ax - b]}{[M]} * \frac{V}{swipe}$$

002601

START - DALLAS

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.203 SAS No.: _____ SDG No.:4_0102

EPA Sample No.	Lab Sample ID
SB14_0102	_8034
SB14_0506	_8035
SB15_0001	_8036
SB16_0506	_8037
SB17D_0102	_8039
SB17_0102	_8038
SB17_5565	_8040
SB18_0102	_8041
SB18_0708	_8042

Were ICP interelement corrections applied ? Yes/No YES

Were ICP background corrections applied ? Yes/No YES
If yes - were raw data generated before application of background corrections ? Yes/No NO_

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Caryn Wojtowicz Name: Caryn Wojtowicz

Date: 6/19/98 Title: Project Manager

COVER PAGE - IN

002602

START - DALLAS

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.230 SAS No.: _____ SDG No.:9-0102

EPA Sample No.	Lab Sample ID
_SB19-0102____	_8236_____
_SB19-0708____	_8237_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Were ICP interelement corrections applied ? Yes/No YES

Were ICP background corrections applied ? Yes/No YES
If yes - were raw data generated before application of background corrections ? Yes/No NO_

Comments:

_____

_____

_____

_____

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Caryn Wojtowicz Name: Caryn Wojtowicz

Date: 6/25/98 Title: Project Manager

COVER PAGE - IN

002603

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

4_0102

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.203 SAS No.: _____ SDG No.: 4_0102

Matrix (soil/water): SOIL_ Lab Sample ID: 8034

Level (low/med): LOW__ Date Received: 06/04/98

% Solids: _88.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1700			P
7440-36-0	Antimony	1.1	U	N*	P
7440-38-2	Arsenic	0.95			P
7440-39-3	Barium	23.5			P
7440-41-7	Beryllium	0.55	U		P
7440-43-9	Cadmium	0.58			P
7440-70-2	Calcium	264			P
7440-47-3	Chromium	4.3			P
7440-48-4	Cobalt	2.3			P
7440-50-8	Copper	2.2	U		P
7439-89-6	Iron	3810			P
7439-92-1	Lead	114			P
7439-95-4	Magnesium	241			P
7439-96-5	Manganese	86.2			P
7439-97-6	Mercury	0.04			CV
7440-02-0	Nickel	3.1			P
7440-09-7	Potassium	412			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U	*	P
7440-23-5	Sodium	1620			P
7440-28-0	Thallium	0.55	U		P
7440-62-2	Vanadium	5.1			P
7440-66-6	Zinc	5.8			P

Color Before: _____ Clarity Before: _____ Texture: G_____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB14_0102_____

FORM I - IN

002604

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

4_0506

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.203 SAS No.: _____ SDG No.: 4_0102

Matrix (soil/water): SOIL_ Lab Sample ID: 8035

Level (low/med): LOW__ Date Received: 06/04/98

% Solids: _83.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9190			P
7440-36-0	Antimony	1.4		N*	P
7440-38-2	Arsenic	5.4			P
7440-39-3	Barium	107			P
7440-41-7	Beryllium	0.81			P
7440-43-9	Cadmium	2.8			P
7440-70-2	Calcium	445			P
7440-47-3	Chromium	15.2			P
7440-48-4	Cobalt	9.8			P
7440-50-8	Copper	12.7			P
7439-89-6	Iron	18100			P
7439-92-1	Lead	7.4			P
7439-95-4	Magnesium	1510			P
7439-96-5	Manganese	103			P
7439-97-6	Mercury	0.04			CV
7440-02-0	Nickel	13.1			P
7440-09-7	Potassium	1040			P
7782-49-2	Selenium	1.2	U		P
7440-22-4	Silver	1.2	U	*	P
7440-23-5	Sodium	4690			P
7440-28-0	Thallium	0.60	U		P
7440-62-2	Vanadium	27.7			P
7440-66-6	Zinc	18.7			P

Color Before: _____ Clarity Before: _____ Texture: CY____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID: SB14_0506

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

5_0001

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.203 SAS No.: _____ SDG No.: 4_0102

Matrix (soil/water): SOIL_ Lab Sample ID: 8036

Level (low/med): LOW__ Date Received: 06/04/98

% Solids: _81.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	24.8			P
7440-36-0	Antimony	1.2	U	N*	P
7440-38-2	Arsenic	0.62	U		P
7440-39-3	Barium	2.5	U		P
7440-41-7	Beryllium	0.62	U		P
7440-43-9	Cadmium	0.62	U		P
7440-70-2	Calcium	87.3			P
7440-47-3	Chromium	1.2	U		P
7440-48-4	Cobalt	2.5	U		P
7440-50-8	Copper	2.5	U		P
7439-89-6	Iron	262			P
7439-92-1	Lead	2.5			P
7439-95-4	Magnesium	61.5	U		P
7439-96-5	Manganese	3.0			P
7439-97-6	Mercury	0.02	U		CV
7440-02-0	Nickel	2.5	U		P
7440-09-7	Potassium	123	U		P
7782-49-2	Selenium	1.2	U		P
7440-22-4	Silver	1.2	U	*	P
7440-23-5	Sodium	123	U		P
7440-28-0	Thallium	0.62	U		P
7440-62-2	Vanadium	2.5	U		P
7440-66-6	Zinc	1.2	U		P

Color Before: _____ Clarity Before: _____ Texture: TAR___

Color After: Y_____ Clarity After: CL____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB15_0001_____

FORM I - IN

002606

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

6_0506

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.203 SAS No.: _____ SDG No.: 4_0102

Matrix (soil/water): SOIL_ Lab Sample ID: 8037

Level (low/med): LOW__ Date Received: 06/04/98

% Solids: _82.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3370			P
7440-36-0	Antimony	1.2	U	N*	P
7440-38-2	Arsenic	1.9			P
7440-39-3	Barium	21.3			P
7440-41-7	Beryllium	0.58	U		P
7440-43-9	Cadmium	0.82			P
7440-70-2	Calcium	334			P
7440-47-3	Chromium	6.8			P
7440-48-4	Cobalt	2.3			P
7440-50-8	Copper	3.9			P
7439-89-6	Iron	5490			P
7439-92-1	Lead	2.6			P
7439-95-4	Magnesium	279			P
7439-96-5	Manganese	44.2			P
7439-97-6	Mercury	0.04			CV
7440-02-0	Nickel	3.5			P
7440-09-7	Potassium	546			P
7782-49-2	Selenium	1.2	U		P
7440-22-4	Silver	1.2	U	*	P
7440-23-5	Sodium	115	U		P
7440-28-0	Thallium	0.58	U		P
7440-62-2	Vanadium	10.4			P
7440-66-6	Zinc	4.8			P

Color Before: _____ Clarity Before: _____ Texture: SD____

Color After: CL_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID:__SB16_0506

FORM I - IN

543

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

7_0102

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.203 SAS No.: _____ SDG No.: 4_0102

Matrix (soil/water): SOIL_ Lab Sample ID: 8038

Level (low/med): LOW__ Date Received: 06/04/98

% Solids: _89.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9700			P
7440-36-0	Antimony	1.1	U	N*	P
7440-38-2	Arsenic	2.7			P
7440-39-3	Barium	60.5			P
7440-41-7	Beryllium	0.54	U		P
7440-43-9	Cadmium	1.5			P
7440-70-2	Calcium	1470			P
7440-47-3	Chromium	11.2			P
7440-48-4	Cobalt	2.9			P
7440-50-8	Copper	6.1			P
7439-89-6	Iron	10100			P
7439-92-1	Lead	10.3			P
7439-95-4	Magnesium	728			P
7439-96-5	Manganese	56.0			P
7439-97-6	Mercury	0.04			CV
7440-02-0	Nickel	5.5			P
7440-09-7	Potassium	1110			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U	*	P
7440-23-5	Sodium	108	U		P
7440-28-0	Thallium	0.54	U		P
7440-62-2	Vanadium	20.0			P
7440-66-6	Zinc	15.2			P

Color Before: _____ Clarity Before: _____ Texture: CY____

Color After: CL_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID:__SB17_0102

FORM I - IN

002608

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

7D_0102

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.203 SAS No.: _____ SDG No.: 4_0102

Matrix (soil/water): SOIL_ Lab Sample ID: 8039

Level (low/med): LOW__ Date Received: 06/04/98

% Solids: _90.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7840			P
7440-36-0	Antimony	1.1	U	N*	P
7440-38-2	Arsenic	1.5			P
7440-39-3	Barium	53.9			P
7440-41-7	Beryllium	0.54	U		P
7440-43-9	Cadmium	0.98			P
7440-70-2	Calcium	1420			P
7440-47-3	Chromium	10.5			P
7440-48-4	Cobalt	2.4			P
7440-50-8	Copper	4.9			P
7439-89-6	Iron	6400			P
7439-92-1	Lead	6.0			P
7439-95-4	Magnesium	628			P
7439-96-5	Manganese	37.5			P
7439-97-6	Mercury	0.03			CV
7440-02-0	Nickel	5.0			P
7440-09-7	Potassium	932			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U	*	P
7440-23-5	Sodium	108	U		P
7440-28-0	Thallium	0.54	U		P
7440-62-2	Vanadium	17.4			P
7440-66-6	Zinc	10.2			P

Color Before: _____ Clarity Before: _____ Texture: CY____

Color After: CL_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID:__SB17D_0102

FORM I - IN

002609

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

7_5565

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.203 SAS No.: _____ SDG No.: 4_0102

Matrix (soil/water): SOIL_ Lab Sample ID: 8040

Level (low/med): LOW__ Date Received: 06/04/98

% Solids: _88.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4110			P
7440-36-0	Antimony	1.1	U	N*	P
7440-38-2	Arsenic	1.7			P
7440-39-3	Barium	31.6			P
7440-41-7	Beryllium	0.55	U		P
7440-43-9	Cadmium	1.2			P
7440-70-2	Calcium	342			P
7440-47-3	Chromium	6.8			P
7440-48-4	Cobalt	2.8			P
7440-50-8	Copper	5.3			P
7439-89-6	Iron	7910			P
7439-92-1	Lead	3.7			P
7439-95-4	Magnesium	478			P
7439-96-5	Manganese	130			P
7439-97-6	Mercury	0.04			CV
7440-02-0	Nickel	4.1			P
7440-09-7	Potassium	552			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U	*	P
7440-23-5	Sodium	109	U		P
7440-28-0	Thallium	0.55	U		P
7440-62-2	Vanadium	10			P
7440-66-6	Zinc	8.4			P

Color Before: _____ Clarity Before: _____ Texture: CY____

Color After: CL_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID:__SB17_5565

FORM I - IN

002610

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

8_0102

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.203 SAS No.: _____ SDG No.: 4_0102

Matrix (soil/water): SOIL_ Lab Sample ID: 8041

Level (low/med): LOW__ Date Received: 06/04/98

% Solids: _86.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2510			P
7440-36-0	Antimony	1.1	U	N*	P
7440-38-2	Arsenic	2.1			P
7440-39-3	Barium	50.3			P
7440-41-7	Beryllium	0.56	U		P
7440-43-9	Cadmium	0.79			P
7440-70-2	Calcium	924			P
7440-47-3	Chromium	6.8			P
7440-48-4	Cobalt	2.6			P
7440-50-8	Copper	6.3			P
7439-89-6	Iron	5010			P
7439-92-1	Lead	24.8			P
7439-95-4	Magnesium	351			P
7439-96-5	Manganese	128			P
7439-97-6	Mercury	0.11			CV
7440-02-0	Nickel	3.6			P
7440-09-7	Potassium	388			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U	*	P
7440-23-5	Sodium	113	U		P
7440-28-0	Thallium	0.56	U		P
7440-62-2	Vanadium	10.1			P
7440-66-6	Zinc	16.0			P

Color Before: _____ Clarity Before: _____ Texture: CY____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB18_0102_____

FORM I - IN

552

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

8_0708

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.203 SAS No.: _____ SDG No.: 4_0102

Matrix (soil/water): SOIL_ Lab Sample ID: 8042

Level (low/med): LOW__ Date Received: 06/04/98

% Solids: _84.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5300			P
7440-36-0	Antimony	1.2	U	N*	P
7440-38-2	Arsenic	3.3			P
7440-39-3	Barium	68.1			P
7440-41-7	Beryllium	0.58	U		P
7440-43-9	Cadmium	1.6			P
7440-70-2	Calcium	678			P
7440-47-3	Chromium	9.4			P
7440-48-4	Cobalt	5.3			P
7440-50-8	Copper	6.1			P
7439-89-6	Iron	10300			P
7439-92-1	Lead	10.7			P
7439-95-4	Magnesium	606			P
7439-96-5	Manganese	111			P
7439-97-6	Mercury	0.05			CV
7440-02-0	Nickel	6.3			P
7440-09-7	Potassium	504			P
7782-49-2	Selenium	1.2	U		P
7440-22-4	Silver	1.2	U	*	P
7440-23-5	Sodium	115	U		P
7440-28-0	Thallium	0.58	U		P
7440-62-2	Vanadium	16.2			P
7440-66-6	Zinc	8.2			P

Color Before: _____ Clarity Before: _____ Texture: CY____

Color After: Y_____. Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID:__SB18_0708

FORM I - IN

553

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

9-0102

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.230 SAS No.: _____ SDG No.: 9-0102

Matrix (soil/water): SOIL_ Lab Sample ID: 8236

Level (low/med): LOW__ Date Received: 06/05/98

% Solids: _90.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1570			P
7440-36-0	Antimony	1.1	U	N*	P
7440-38-2	Arsenic	1.5			P
7440-39-3	Barium	25.6			P
7440-41-7	Beryllium	0.53	U		P
7440-43-9	Cadmium	0.63			P
7440-70-2	Calcium	1480			P
7440-47-3	Chromium	5.8			P
7440-48-4	Cobalt	2.3			P
7440-50-8	Copper	3.5			P
7439-89-6	Iron	3750			P
7439-92-1	Lead	14.7			P
7439-95-4	Magnesium	550			P
7439-96-5	Manganese	138			P
7439-97-6	Mercury	0.11			CV
7440-02-0	Nickel	4.4			P
7440-09-7	Potassium	286			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U	*	P
7440-23-5	Sodium	106	U		P
7440-28-0	Thallium	0.53	U		P
7440-62-2	Vanadium	6.6			P
7440-66-6	Zinc	25.6			P

Color Before: _____ Clarity Before: _____ Texture: G_____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB19-0102_____

FORM I - IN

002613

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

9-0708

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.230 SAS No.: _____ SDG No.: 9-0102

Matrix (soil/water): SOIL_ Lab Sample ID: 8237

Level (low/med): LOW__ Date Received: 06/05/98

% Solids: _88.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4110			P
7440-36-0	Antimony	1.1	U	N*	P
7440-38-2	Arsenic	0.83			P
7440-39-3	Barium	33.6			P
7440-41-7	Beryllium	0.57	U		P
7440-43-9	Cadmium	0.57	U		P
7440-70-2	Calcium	754			P
7440-47-3	Chromium	8.6			P
7440-48-4	Cobalt	2.3	U		P
7440-50-8	Copper	3.5			P
7439-89-6	Iron	2930			P
7439-92-1	Lead	1.9			P
7439-95-4	Magnesium	785			P
7439-96-5	Manganese	34.5			P
7439-97-6	Mercury	0.05			CV
7440-02-0	Nickel	2.8			P
7440-09-7	Potassium	500			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U	*	P
7440-23-5	Sodium	174			P
7440-28-0	Thallium	0.57	U		P
7440-62-2	Vanadium	3.8			P
7440-66-6	Zinc	3.1			P

Color Before: _____ Clarity Before: _____ Texture: CY____

Color After: CL_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID: SB19-0708

FORM I - IN

002614

START - DALLAS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.203 SAS No.: _____ SDG No.: 4_0102

Initial Calibration Source: VHG_____

Continuing Calibration Source: VHG_____

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
[redacted]minum	1000.0	954.87	95.5	5000.0	5157.50	103.1	5133.01	102.7	P
Antimony	1000.0	1042.82	104.3	1000.0	997.16	99.7	998.50	99.8	P
Arsenic	1000.0	1006.39	100.6	500.0	496.68	99.3	501.30	100.3	P
Barium	1000.0	1063.30	106.3	500.0	507.10	101.4	503.73	100.7	P
Beryllium	400.0	406.96	101.7	500.0	492.79	98.6	495.82	99.2	P
Cadmium	500.0	526.49	105.3	500.0	508.52	101.7	502.82	100.6	P
Calcium	10000.0	10263.01	102.6	50000.0	49689.79	99.4	49954.66	99.9	P
Chromium	1000.0	1034.27	103.4	500.0	493.24	98.6	494.02	98.8	P
Cobalt	1000.0	1061.16	106.1	500.0	506.57	101.3	500.21	100.0	P
Copper	1000.0	1025.82	102.6	500.0	518.44	103.7	513.43	102.7	P
Iron	1000.0	990.35	99.0	5000.0	4577.82	91.6	4540.49	90.8	P
Lead	1000.0	1053.79	105.4	1000.0	1001.42	100.1	1000.77	100.1	P
Magnesium	10000.0	9965.61	99.7	50000.0	49284.95	98.5	49582.47	99.2	P
Manganese	1000.0	1059.64	106.0	500.0	505.59	101.1	501.46	100.3	P
Mercury	5.0	5.04	100.8	5.0	5.00	100.0	5.00	100.0	CV
Nickel	1000.0	1071.81	107.2	500.0	505.91	101.2	500.89	100.2	P
Potassium	10000.0	9381.47	93.8	25000.0	24307.91	97.2	24576.20	98.3	P
[redacted]lenium	1000.0	1003.84	100.4	500.0	501.18	100.2	502.49	100.5	P
[redacted]ver	200.0	200.40	100.2	500.0	521.99	104.4	517.94	103.6	P
Sodium	10000.0	9318.74	93.2	25000.0	23151.94	92.6	23963.09	95.9	P
Thallium	1000.0	961.11	96.1	500.0	452.48	90.5	453.96	90.8	P
Vanadium	1000.0	1033.06	103.3	500.0	509.76	102.0	503.45	100.7	P
Zinc	1000.0	1027.17	102.7	500.0	508.79	101.8	507.15	101.4	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

START - DALLAS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.203 SAS No.: _____ SDG No.: 4_0102

Initial Calibration Source: VHG_____

Continuing Calibration Source: VHG_____

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum				5000.0	5046.68	100.9	5107.76	102.2	P
Antimony				1000.0	998.95	99.9	999.41	99.9	P
Arsenic				500.0	501.32	100.3	498.74	99.7	P
Barium				500.0	500.34	100.1	506.37	101.3	P
Beryllium				500.0	493.17	98.6	495.29	99.1	P
Cadmium				500.0	498.08	99.6	503.73	100.7	P
Calcium				50000.0	49579.46	99.2	49795.90	99.6	P
Chromium				500.0	491.95	98.4	492.42	98.5	P
Cobalt				500.0	499.34	99.9	502.53	100.5	P
Copper				500.0	504.53	100.9	511.25	102.2	P
Iron				5000.0	4500.00	90.0	4545.92	90.9	P
Lead				1000.0	998.80	99.9	999.36	99.9	P
Magnesium				50000.0	49491.09	99.0	49639.02	99.3	P
Manganese				500.0	497.06	99.4	502.55	100.5	P
Mercury				5.0	4.93	98.6	5.08	101.6	CV
Nickel				500.0	493.54	98.7	499.97	100.0	P
Potassium				25000.0	24744.54	99.0	24359.36	97.4	P
Selenium				500.0	500.15	100.0	501.87	100.4	P
Silver				500.0	511.02	102.2	515.96	103.2	P
Sodium				25000.0	22711.80	90.8	23715.34	94.9	P
Thallium				500.0	459.27	91.9			P
Vanadium				500.0	496.66	99.3	502.70	100.5	P
Zinc				500.0	503.80	100.8	508.39	101.7	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

FORM II (PART 1) - IN

START - DALLAS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.203 SAS No.: _____ SDG No.: 4_0102

Initial Calibration Source: VHG_____

Continuing Calibration Source: VHG_____

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum				5000.0	5147.46	102.9	5057.46	101.1	P
Antimony				1000.0	997.78	99.8	1002.66	100.3	P
Arsenic				500.0	498.83	99.8	498.67	99.7	P
Barium				500.0	505.82	101.2	505.94	101.2	P
Beryllium				500.0	489.30	97.9	490.62	98.1	P
Cadmium				500.0	505.60	101.1	505.93	101.2	P
Calcium				50000.0	49251.60	98.5	49402.24	98.8	P
Chromium				500.0	492.19	98.4	491.83	98.4	P
Cobalt				500.0	505.88	101.2	505.44	101.1	P
Copper				500.0	513.77	102.8	504.50	100.9	P
Iron				5000.0	4568.49	91.4	4545.38	90.9	P
Lead				1000.0	999.48	99.9	1002.09	100.2	P
Magnesium				50000.0	49096.41	98.2	49214.76	98.4	P
Manganese				500.0	504.74	100.9	502.83	100.6	P
Mercury				5.0	4.89	97.8	5.00	100.0	CV
Nickel				500.0	501.82	100.4	502.75	100.5	P
Potassium									NR
Selenium				500.0	494.24	98.8	501.49	100.3	P
Silver				500.0	519.57	103.9	515.00	103.0	P
Sodium									NR
Thallium									NR
Vanadium				500.0	505.81	101.2	503.75	100.7	P
Zinc				500.0	508.11	101.6	508.08	101.6	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

START - DALLAS

3
BLANKS

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.203 SAS No.: _____ SDG No.: 4_0102

Preparation Blank Matrix (soil/water): SOIL_

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	100.0	U	100.0	U	100.0	U	100.0	U	10.000	U	P
Antimony	10.0	U	10.0	U	10.0	U	10.0	U	1.000	U	P
Arsenic	5.0	U	5.0	U	5.0	U	5.0	U	0.500	U	P
Barium	20.0	U	20.0	U	20.0	U	20.0	U	2.000	U	P
Beryllium	5.0	U	5.0	U	5.0	U	5.0	U	0.500	U	P
Cadmium	5.0	U	5.0	U	5.0	U	5.0	U	0.500	U	P
Calcium	500.0	U	500.0	U	500.0	U	500.0	U	50.000	U	P
Chromium	10.0	U	10.0	U	10.0	U	10.0	U	1.000	U	P
Cobalt	20.0	U	20.0	U	20.0	U	20.0	U	2.000	U	P
Copper	20.0	U	20.0	U	20.0	U	20.0	U	2.000	U	P
Iron	50.0	U	50.0	U	50.0	U	50.0	U	5.000	U	P
Lead	5.0	U	5.0	U	5.0	U	5.0	U	0.500	U	P
Magnesium	500.0	U	500.0	U	500.0	U	500.0	U	50.000	U	P
Manganese	10.0	U	10.0	U	10.0	U	10.0	U	1.000	U	P
Mercury	0.1	U	0.1	U	0.1	U	0.1	U	0.050	U	CV
Nickel	20.0	U	20.0	U	20.0	U	20.0	U	2.000	U	P
Potassium	1000.0	U	1000.0	U	1000.0	U	1000.0	U	100.000	U	P
Selenium	10.0	U	10.0	U	10.0	U	10.0	U	1.000	U	P
Silver	10.0	U	10.0	U	10.0	U	10.0	U	1.000	U	P
Sodium	1000.0	U	1000.0	U	1000.0	U	1000.0	U	100.000	U	P
Thallium	5.0	U	5.0	U	5.0	U	5.0	U	0.500	U	P
Vanadium	20.0	U	20.0	U	20.0	U	20.0	U	2.000	U	P
Zinc	10.0	U	10.0	U	10.0	U	10.0	U	1.000	U	P

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START - DALLAS

3
BLANKS

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.203 SAS No.: _____ SDG No.: 4_0102

Preparation Blank Matrix (soil/water): _____

Preparation Blank Concentration Units (ug/L or mg/kg): _____

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum			100.0	U	100.0	U	100.0	U			P
Antimony			10.0	U	10.0	U	10.0	U			P
Arsenic			5.0	U	5.0	U	5.0	U			P
Barium			20.0	U	20.0	U	20.0	U			P
Beryllium			5.0	U	5.0	U	5.0	U			P
Cadmium			5.0	U	5.0	U	5.0	U			P
Calcium			500.0	U	500.0	U	500.0	U			P
Chromium			10.0	U	10.0	U	10.0	U			P
Cobalt			20.0	U	20.0	U	20.0	U			P
Copper			20.0	U	20.0	U	20.0	U			P
Iron			50.0	U	50.0	U	50.0	U			P
Lead			5.0	U	5.0	U	5.0	U			P
Magnesium			500.0	U	500.0	U	500.0	U			P
Manganese			10.0	U	10.0	U	10.0	U			P
Mercury			0.1	U	0.1	U	0.1	U			CV
Nickel			20.0	U	20.0	U	20.0	U			P
Potassium			1000.0	U							P
Selenium			10.0	U	10.0	U	10.0	U			P
Silver			10.0	U	10.0	U	10.0	U			P
Sodium			1000.0	U							P
Thallium											NR
Vanadium			20.0	U	20.0	U	20.0	U			P
Zinc			10.0	U	10.0	U	10.0	U			P

START - DALLAS

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.203 SAS No: _____ SDG No.: 4_0102

ICP ID Number: OPTIMA_____ ICS Source: VHG_____

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Aluminum		469543		470548.2	100.2			
Antimony		906		942.1	104.0			
Arsenic		866		877.3	101.3			
Barium		409		444.8	108.8			
Beryllium		428		442.7	103.4			
Cadmium		798		872.0	109.3			
Calcium		384371		396494.2	103.2			
Chromium		411		428.3	104.2			
Cobalt		387		421.3	108.9			
Copper		484		497.9	102.9			
Iron		147514		148447.4	100.6			
Lead		787		859.4	109.2			
Magnesium		449914		449977.1	100.0			
Manganese		420		451.8	107.6			
Mercury								
Nickel		741		806.8	108.9			
Potassium								
Selenium		837		881.8	105.4			
Silver		988		1015.5	102.8			
Sodium								
Thallium								
Vanadium		394		407.3	103.4			
Zinc		916		959.2	104.7			

FORM IV - IN

561

002620

START - DALLAS

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.203 SAS No: _____ SDG No.: 4_0102

ICP ID Number: OPTIMA_____ ICS Source: VHG_____

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Aluminum								
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead								
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium								
Silver								
Sodium								
Thallium		743		727.9	98.0			
Vanadium								
Zinc								

START - DALLAS

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.203 SAS No: _____ SDG No.: 4_0102

ICP ID Number: OPTIMA_____ ICS Source: VHG_____

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Aluminum								
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead								
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium		0		962.6				
Selenium								
Silver								
Sodium		0		466.7				
Thallium								
Vanadium								
Zinc								

FORM IV - IN

563

002622

START - DALLAS

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

BATCHS

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.203 SAS No.: _____ SDG No.: 4_0102

Matrix (soil/water): SOIL__ Level (low/med): LOW___

% Solids for Sample: _95.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony									NR
[illegible]genic									NR
[illegible]rium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead									NR
Magnesium									NR
Manganese									NR
Mercury	75-125	0.4615		0.0980		0.34	106.9		CV
Nickel									NR
Potassium									NR
Selenium									NR
Silver									NR
Sodium									NR
[illegible]allium									NR
[illegible]nadium									NR
Zinc									NR

Comments:

FORM V (Part 1) - IN

554

002623

START - DALLAS

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

BATCHS

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.203 SAS No.: _____ SDG No.: 4_0102

Matrix (soil/water): SOIL__ Level (low/med): LOW___

% Solids for Sample: _88.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony	75-125	45.4985		1.1162	U	54.73	83.1		P
Arsenic	75-125	203.8097		1.0430		218.91	92.6		P
Barium	75-125	241.9526		12.7863		218.91	104.7		P
Beryllium	75-125	5.3447		0.5581	U	5.47	97.7		P
Cadmium	75-125	6.0070		0.5581	U	5.47	109.8		P
Calcium									NR
Chromium	75-125	28.3103		8.4981		21.89	90.5		P
Cobalt	75-125	58.2645		2.2325	U	54.73	106.5		P
Copper	75-125	31.8510		2.6781		27.36	106.6		P
Iron									NR
Lead	75-125	60.7350		2.2804		54.73	106.8		P
Magnesium									NR
Manganese	75-125	69.6145		16.0239		54.73	97.9		P
Mercury									NR
Nickel	75-125	59.3032		2.2325	U	54.73	108.4		P
Potassium									NR
Selenium	75-125	205.4618		1.1162	U	218.91	93.9		P
Silver	75-125	5.6276		1.1162	U	5.47	102.9		P
Sodium									NR
Thallium	75-125	211.3274		0.5581	U	218.91	96.5		P
Vanadium	75-125	63.8314		14.5463		54.73	90.1		P
Zinc	75-125	58.7124		2.2259		54.73	103.2		P

Comments:

FORM V (Part 1) - IN

002624

START - DALLAS

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

BATCHS1

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.203 SAS No.: _____ SDG No.: 4_0102

Matrix (soil/water): SOIL__ Level (low/med): LOW___

% Solids for Sample: _88.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony	75-125	33.7607		1.1162	U	55.81	60.5	N	P
Arsenic	75-125	204.1813		1.0430		223.25	91.0		P
Barium	75-125	246.5534		12.7863		223.25	104.7		P
Beryllium	75-125	5.3673		0.5581	U	5.58	96.2		P
Cadmium	75-125	5.9644		0.5581	U	5.58	106.9		P
Calcium									NR
Chromium	75-125	28.4052		8.4981		22.32	89.2		P
Cobalt	75-125	58.4120		2.2325	U	55.81	104.7		P
Copper	75-125	32.1597		2.6781		27.91	105.6		P
Iron									NR
Lead	75-125	60.8333		2.2804		55.81	104.9		P
Magnesium									NR
Manganese	75-125	71.9273		16.0239		55.81	100.2		P
Mercury									NR
Nickel	75-125	60.1470		2.2325	U	55.81	107.8		P
Potassium									NR
Selenium	75-125	207.2504		1.1162	U	223.25	92.8		P
Silver	75-125	4.5277		1.1162	U	5.58	81.1		P
Sodium									NR
Thallium	75-125	208.4565		0.5581	U	223.25	93.4		P
Vanadium	75-125	62.6605		14.5463		55.81	86.2		P
Zinc	75-125	59.4135		2.2259		55.81	102.5		P

Comments:

_____

_____

_____

_____

FORM V (Part 1) - IN

002625

START - DALLAS

6
DUPLICATES

EPA SAMPLE NO.

BATCHD

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.203 SAS No.: _____ SDG No.: 4_0102

Matrix (soil/water): SOIL_ Level (low/med): _LOW__

% Solids for Sample: _95.2 % Solids for Duplicate: __95.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum								NR
Antimony								NR
Arsenic								NR
Barium								NR
Beryllium								NR
Cadmium								NR
Calcium								NR
Chromium								NR
Cobalt								NR
Copper								NR
Iron								NR
Lead								NR
Magnesium								NR
Manganese								NR
Mercury	0.0180	0.0980		0.0813		18.6		CV
Nickel								NR
Potassium								NR
Selenium								NR
Silver								NR
Sodium								NR
Thallium								NR
Vanadium								NR
Zinc								NR

START - DALLAS

6
DUPLICATES

EPA SAMPLE NO.

BATCHD

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.203 SAS No.: _____ SDG No.: 4_0102

Matrix (soil/water): SOIL_ Level (low/med): _LOW__

% Solids for Sample: _88.7 % Solids for Duplicate: __88.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		3387.9131		3372.1139		0.5		P
Antimony		45.4985		33.7607		29.6	*	P
Arsenic		203.8097		204.1813		0.2		P
Barium		241.9526		246.5534		1.9		P
Beryllium		5.3447		5.3673		0.4		P
Cadmium		6.0070		5.9644		0.7		P
Calcium		54.7279	U	55.8117	U			P
Chromium		28.3103		28.4052		0.3		P
Cobalt		58.2645		58.4120		0.3		P
Copper		31.8510		32.1597		1.0		P
Iron		1346.2236		1296.2506		3.8		P
Lead		60.7350		60.8333		0.2		P
Magnesium		54.7279	U	55.8117	U			P
Manganese		69.6145		71.9273		3.3		P
Mercury								NR
Nickel		59.3032		60.1470		1.4		P
Potassium								NR
Selenium		205.4618		207.2504		0.9		P
Silver	1.0950	5.6276		4.5277		21.7	*	P
Sodium								NR
Thallium		211.3274		208.4565		1.4		P
Vanadium		63.8314		62.6605		1.9		P
Zinc		58.7124		59.4135		1.2		P

FORM VI - IN

002627

START - DALLAS

7
LABORATORY CONTROL SAMPLE

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.203 SAS No.: _____ SDG No.: 4_0102

Solid LCS Source: ERA_____

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum				100.0	103.3		80.0	120.0	103.3
Antimony				100.0	106.1		80.0	120.0	106.1
Arsenic				100.0	105.9		80.0	120.0	105.9
Barium				100.0	113.8		80.0	120.0	113.8
Beryllium				100.0	106.9		80.0	120.0	106.9
Cadmium				100.0	108.7		80.0	120.0	108.7
Calcium				1000.0	1103.9		800.0	1200.0	110.4
Chromium				100.0	109.8		80.0	120.0	109.8
Cobalt				100.0	110.7		80.0	120.0	110.7
Copper				100.0	106.9		80.0	120.0	106.9
Iron				100.0	106.7		80.0	120.0	106.7
Lead				100.0	109.0		80.0	120.0	109.0
Magnesium				1000.0	1046.6		800.0	1200.0	104.7
Manganese				100.0	111.0		80.0	120.0	111.0
Mercury									
Nickel				100.0	109.3		80.0	120.0	109.3
Potassium				1000.0	940.2		800.0	1200.0	94.0
Selenium				100.0	102.3		80.0	120.0	102.3
Silver				5.0	5.1		4.0	6.0	102.0
Sodium				1000.0	958.2		800.0	1200.0	95.8
Thallium				100.0	99.5		80.0	120.0	99.5
Vanadium				100.0	107.4		80.0	120.0	107.4
Zinc				100.0	106.0		80.0	120.0	106.0

FORM VII - IN

002628

START - DALLAS

7

LABORATORY CONTROL SAMPLE

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.203 SAS No.: _____ SDG No.: 4_0102

Solid LCS Source: ERA_____

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum									
Antimony									
Arsenic									
Barium									
Beryllium									
Cadmium									
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead									
Magnesium									
Manganese									
Mercury				4.4	4.3		3.0	5.8	97.7
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									

START - DALLAS

8
STANDARD ADDITION RESULTS

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract:_____

Lab Code: EANDE_ Case No.: 9801.203 SAS No.:_____ SDG No.:4_0102

Concentration Units: ug/L

EPA Sample No.	An	0 ADD ABS	1 ADD CON	1 ADD ABS	2 ADD CON	2 ADD ABS	3 ADD CON	3 ADD ABS	Final Conc.	r	Q

START - DALLAS

9

ICP SERIAL DILUTION

EPA SAMPLE NO.

4_0102L

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.203 SAS No.: _____ SDG No.: 4_0102

Matrix (soil/water): SOIL_ Level (low/med): LOW__

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum							NR
Antimony							NR
Arsenic							NR
Barium							NR
Beryllium							NR
Cadmium							NR
Calcium							NR
Chromium							NR
Cobalt							NR
Copper							NR
Iron							NR
Lead							NR
Magnesium							NR
Manganese							NR
Mercury							NR
Nickel							NR
Potassium	3754.38		7568.99		101.6		P
Selenium							NR
Silver							NR
Sodium	14777.58		17390.93		17.7		P
Thallium	5.00	U	25.00	U			P
Vanadium							NR
Zinc							NR

FORM IX - IN

572

002631

START - DALLAS

9

ICP SERIAL DILUTION

EPA SAMPLE NO.

5_0001L

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.203 SAS No.: _____ SDG No.: 4_0102

Matrix (soil/water): SOIL_ Level (low/med): LOW__

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	201.37		500.00	U	100.0		P
Antimony	10.00	U	50.00	U			P
Arsenic	5.00	U	25.00	U			P
Barium	20.00	U	100.00	U			P
Beryllium	5.00	U	25.00	U			P
Cadmium	5.00	U	25.00	U			P
Calcium	709.57		2500.00	U	100.0		P
Chromium	10.00	U	50.00	U			P
Cobalt	20.00	U	100.00	U			P
Copper	20.00	U	100.00	U			P
Iron	2133.62		2250.61		5.5		P
Lead	20.32		25.00	U	100.0		P
Magnesium	500.00	U	2500.00	U			P
Manganese	24.75		50.00	U	100.0		P
Mercury							NR
Nickel	20.00	U	100.00	U			P
Potassium							NR
Selenium	10.00	U	50.00	U			P
Silver	10.00	U	50.00	U			P
Sodium							NR
Thallium							NR
Vanadium	20.00	U	100.00	U			P
Zinc	10.00	U	50.00	U			P

FORM IX - IN

002632

START - DALLAS

10
Instrument Detection Limits (Quarterly)

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.203 SAS No.: _____ SDG No.: 4_0102

ICP ID Number: OPTIMA_____

Flame AA ID Number : _____

Furnace AA ID Number : _____

Analyte	Wave-length (nm)	Back-ground	PQL (ug/L)	M
Aluminum	396.15		100.0	P
Antimony	206.83		10.0	P
Arsenic	188.98		5.0	P
Barium	233.53		20.0	P
Beryllium	313.11		5.0	P
Cadmium	226.50		5.0	P
Calcium	315.89		500.0	P
Chromium	205.55		10.0	P
Cobalt	228.62		20.0	P
Copper	324.75		20.0	P
Iron	259.94		50.0	P
Lead	220.35		5.0	P
Magnesium	279.08		500.0	P
Manganese	257.61		10.0	P
Mercury				NR
Nickel	231.60		20.0	P
Potassium	766.49		1000.0	P
Selenium	196.03		10.0	P
Silver	328.07		10.0	P
Sodium	589.59		1000.0	P
Thallium	190.80		5.0	P
Vanadium	292.40		20.0	P
Zinc	213.86		10.0	P

Comments:

002633

START - DALLAS

10
Instrument Detection Limits (Quarterly)

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.203 SAS No.: _____ SDG No.: 4_0102

ICP ID Number: _____

Flame AA ID Number : 2380_____

Furnace AA ID Number : _____

Analyte	Wave-length (nm)	Back-ground	PQL (ug/L)	M
Aluminum				NR
Antimony				NR
Arsenic				NR
Barium				NR
Beryllium				NR
Cadmium				NR
Calcium				NR
Chromium				NR
Cobalt				NR
Copper				NR
Iron				NR
Lead				NR
Magnesium				NR
Manganese				NR
Mercury	253.70		0.1	CV
Nickel				NR
Potassium				NR
Selenium				NR
Silver				NR
Sodium				NR
Thallium				NR
Vanadium				NR
Zinc				NR

Comments:

002634

START - DALLAS

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.203 SAS No.: _____ SDG No.: 4_0102

ICP ID Number: OPTIMA_____ Date: 03/20/98

Analyte	Wave-length (nm)	Interelement Correction Factors for : Al	Ca	Fe	Mg	___
Aluminum	396.15	0.0000000	0.0000000	0.0000000	0.0000000	
Antimony	206.83	0.0430283	0.0000000	0.0000000	0.0000000	
Arsenic	188.98	0.0480027	0.0000000	0.0000000	0.0000000	
Barium	233.53	0.0000000	0.0000000	0.0000000	0.0000000	
Beryllium	313.11	0.0000000	0.0000000	0.0000000	0.0000000	
Cadmium	226.50	0.0000000	0.0000000	0.0001562	0.0000000	
Calcium	315.89	0.0000000	0.0000000	0.0000000	0.0000000	
Chromium	205.55	0.0000000	0.0000000	0.0000000	0.0000000	
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	
Copper	324.75	0.0000000	0.0000000	0.0000000	0.0000000	
Iron	259.94	0.0000000	0.0000000	0.0000000	0.0000000	
Lead	220.35	-0.0482720	0.0000000	0.0000000	0.0000000	
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000211	
Mercury						
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	
Selenium	196.03	-0.1642520	0.0000000	0.0000000	-0.0000167	
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	
Sodium	589.59	0.0000000	0.0000000	0.0000000	0.0000000	
Thallium	190.80	0.0000000	0.0000292	-0.0000820	0.0000000	
Vanadium	292.40	0.0000000	0.0000000	-0.0002010	0.0000000	
Zinc	213.86	0.0000000	0.0000000	0.0001255	0.0000315	

Comments:

FORM XI (Part 1) - IN

002635

START - DALLAS

12
ICP LINEAR RANGES (QUARTERLY)

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.203 SAS No.: _____ SDG No.: 4_0102

ICP ID Number: OPTIMA_____ Date: 05/09/98

Analyte	Integ. Time (sec.)	Concentration (ug/L)	M
Aluminum	10.00	500000.0	P
Antimony	10.00	50000.0	P
Arsenic	10.00	20000.0	P
Barium	10.00	10000.0	P
Beryllium	10.00	10000.0	P
Cadmium	10.00	10000.0	P
Calcium	10.00	50000.0	P
Chromium	10.00	10000.0	P
Cobalt	10.00	20000.0	P
Copper	10.00	50000.0	P
Iron	10.00	100000.0	P
Lead	10.00	10000.0	P
Magnesium	10.00	500000.0	P
Manganese	10.00	10000.0	P
Mercury			NR
Nickel	10.00	10000.0	P
Potassium	10.00	50000.0	P
Selenium	10.00	20000.0	P
Silver	10.00	5000.0	P
Sodium	10.00	50000.0	P
Thallium	10.00	20000.0	P
Vanadium	10.00	20000.0	P
Zinc	10.00	5000.0	P

Comments:

START - DALLAS

13
PREPARATION LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.203 SAS No.: _____ SDG No.:4_0102

Method: P_

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
4_0102	06/09/98	1.03	100
4_0506	06/09/98	1.00	100
5_0001	06/09/98	1.00	100
6_0506	06/09/98	1.05	100
7D_0102	06/09/98	1.03	100
7_0102	06/09/98	1.03	100
7_5565	06/09/98	1.04	100
8_0102	06/09/98	1.02	100
8_0708	06/09/98	1.02	100
9_0102	06/09/98	1.04	100
9_0708	06/09/98	1.00	100
LCSS	06/09/98	1.00	100
PBS	06/09/98	1.00	100

FORM XIII - IN

002637

START - DALLAS

13
PREPARATION LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.203 SAS No.: _____ SDG No.:4_0102

Method: CV

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
4_0102	06/10/98	0.61	100
4_0506	06/10/98	0.60	100
5_0001	06/10/98	0.60	100
6_0506	06/10/98	0.60	100
7D_0102	06/10/98	0.62	100
7_0102	06/10/98	0.61	100
7_5565	06/10/98	0.61	100
8_0102	06/10/98	0.61	100
8_0708	06/10/98	0.60	100
9_0102	06/10/98	0.60	100
9_0708	06/10/98	0.60	100
LCSS	06/10/98	0.20	100
PBS	06/10/98	0.20	100

FORM XIII - IN

002638

START - DALLAS

14
ANALYSIS RUN LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.203 SAS No.: _____ SDG No.:4_0102

Instrument ID Number: OPTIMA_____ Method: P_

Start Date: 06/16/98 End Date: 06/17/98

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	
S0	1.00	2216		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	_	X	X	_	_	X	X	_
S	1.00	2219			X	X	X	X	X	_	X	X	X	_	X	_	X	_	X	_	X	X	_	_	X	X	_
S	1.00	2222		X	_	_	_	_	_	_	_	_	_	X	_	_	_	_	_	_	_	_	_	_	_	_	_
C	1.00	2225		_	_	_	_	_	_	X	_	_	_	_	_	X	_	_	_	_	_	_	_	_	_	_	_
[redacted]V	1.00	2228		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	_	X	X	_	_	X	X	_
ICB	1.00	2231		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	_	X	X	_	_	X	X	_
CCV	1.00	2235		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	_	X	X	_	_	X	X	_
CCB	1.00	2238		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	_	X	X	_	_	X	X	_
ICSAB	1.00	2242		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	_	X	X	_	_	X	X	_
ZZZZZZ	1.00	2245		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
ZZZZZZ	1.00	2249		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
ZZZZZZ	1.00	2252		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
ZZZZZZ	1.00	2255		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
ZZZZZZ	1.00	2259		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
ZZZZZZ	1.00	2302		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
ZZZZZZ	1.00	2306		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
ZZZZZZ	1.00	2309		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
ZZZZZZ	1.00	2312		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
CCV	1.00	2316		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	_	X	X	_	_	X	X	_
CCB	1.00	2319		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	_	X	X	_	_	X	X	_
ZZZZZZ	1.00	2323																									
ZZZZZZ	1.00	2326		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
[redacted]ZZZ	1.00	2330		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
ZZZZZZ	1.00	2333		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
ZZZZZZ	1.00	2337		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
ZZZZZZ	1.00	2340		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
ZZZZZZ	1.00	2344		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
ZZZZZZ	1.00	2347		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
ZZZZZZ	1.00	2351		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
ZZZZZZ	1.00	2354		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
CCV	1.00	2358		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	_	X	X	_	_	X	X	_
CCB	1.00	0001		X	X	X	X	X	X	X	X	X	X	X	X	X	X	_	X	_	X	X	_	_	X	X	_
				_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_

FORM XIV - IN

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002639

START - DALLAS

14
ANALYSIS RUN LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.203 SAS No.: _____ SDG No.:4_0102

Instrument ID Number: OPTIMA_____ Method: P_

Start Date: 06/16/98 End Date: 06/17/98

EPA Sample No.	D/F	Time	% R	Analytes																						
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	
ZZZZZZ	1.00	0005																								
ZZZZZZ	1.00	0008																								
ZZZZZZ	1.00	0012																								
ZZZZZZ	1.00	0015																								
ZZZZZZ	1.00	0018																								
ZZZZZZ	1.00	0022																								
ZZZZZZ	1.00	0025																								
PBS	1.00	0029		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X			X	X	
LCSS	1.00	0032		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X			X	X	
4_0102	1.00	0036		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X			X	X	
CCV	1.00	0039		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X			X	X	
CCB	1.00	0043		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X			X	X	
4_0506	1.00	0046		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X			X	X	
5_0001	1.00	0049		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X			X	X	
5_0001L	5.00	0053		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X			X	X	
6_0506	1.00	0056		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X			X	X	
7_0102	1.00	0100		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X			X	X	
7D_0102	1.00	0103		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X			X	X	
7_5565	1.00	0106		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X			X	X	
8_0102	1.00	0110		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X			X	X	
CCV	1.00	0113		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X			X	X	
CCB	1.00	0117		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X			X	X	
0708	1.00	0120		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X			X	X	
9_0102	1.00	0124		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X			X	X	
9_0708	1.00	0127		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X			X	X	
BATCH	1.00	0131		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X			X	X	
BATCHS	1.00	0134			X	X	X	X	X		X	X	X		X		X		X		X	X			X	X	
BATCHS1	1.00	0137			X	X	X	X	X		X	X	X		X		X		X		X	X			X	X	
CCV	1.00	0141		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X			X	X	
CCB	1.00	0144		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X			X	X	

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002640

START - DALLAS

14

ANALYSIS RUN LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.203 SAS No.: _____ SDG No.:4_0102

Instrument ID Number: OPTIMA_____ Method: P_

Start Date: 06/18/98 End Date: 06/18/98

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	
S0	1.00	1437																					X			
S	1.00	1440																					X			
S	1.00	1443																								
S	1.00	1445																								
[redacted]V	1.00	1449																					X			
ICB	1.00	1452																					X			
CCV	1.00	1456																					X			
CCB	1.00	1459																					X			
ICSAB	1.00	1502																					X			
PBS	1.00	1506																					X			
LCSS	1.00	1509																					X			
4_0102	1.00	1512																					X			
4_0102L	5.00	1516																					X			
4_0506	1.00	1519																					X			
5_0001	1.00	1523																					X			
6_0506	1.00	1526																					X			
7_0102	1.00	1529																					X			
7D_0102	1.00	1533																					X			
CCV	1.00	1536																					X			
CCB	1.00	1539																					X			
7_5565	1.00	1543																					X			
8_0102	1.00	1546																					X			
[redacted]0708	1.00	1550																					X			
9_0102	1.00	1553																					X			
9_0708	1.00	1557																					X			
BATCH	1.00	1559																					X			
BATCHS	1.00	1602																					X			
BATCHS1	1.00	1605																					X			
CCV	1.00	1608																					X			
CCB	1.00	1612																					X			

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002641

START - DALLAS

14
ANALYSIS RUN LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.203 SAS No.: _____ SDG No.:4_0102

Instrument ID Number: OPTIMA_____ Method: P_

Start Date: 06/18/98 End Date: 06/18/98

EPA Sample No.	D/F	Time	% R	Analytes																						
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	
S0	1.00	1638																	X			X				
S	1.00	1641																	X			X				
S	1.00	1643																	X			X				
S	1.00	1646																	X			X				
[redacted]	1.00	1649																	X			X				
ICB	1.00	1651																	X			X				
CCV	1.00	1654																	X			X				
CCB	1.00	1657																	X			X				
ICSAB	1.00	1659																	X			X				
PBS	1.00	1702																	X			X				
LCSS	1.00	1704																	X			X				
4_0102	1.00	1707																	X			X				
4_0102L	5.00	1710																	X			X				
4_0506	1.00	1713																	X			X				
5_0001	1.00	1715																	X			X				
6_0506	1.00	1718																	X			X				
CCV	1.00	1721																	X			X				
CCB	1.00	1723																	X			X				
7_0102	1.00	1726																								
7D_0102	1.00	1729																								
7_5565	1.00	1732																								
8_0102	1.00	1734																								
[redacted]0708	1.00	1737																								
CCV	1.00	1816																	X			X				
CCB	1.00	1818																	X			X				
7_0102	1.00	1821																	X			X				
7D_0102	1.00	1824																	X			X				
7_5565	1.00	1826																	X			X				
8_0102	1.00	1829																	X			X				
8_0708	1.00	1832																	X			X				
9_0102	1.00	1835																	X			X				
9_0708	1.00	1837																	X			X				

FORM XIV - IN

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002642

START - DALLAS

14
ANALYSIS RUN LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.203 SAS No.: _____ SDG No.:4_0102

Instrument ID Number: OPTIMA_____ Method: P_

Start Date: 06/18/98 End Date: 06/18/98

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	
CCV	1.00	1840																		X			X				
CCB	1.00	1843																		X			X				

FORM XIV - IN

002643

START - DALLAS

14

ANALYSIS RUN LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.203 SAS No.: _____ SDG No.:4_0102

Instrument ID Number: 2380_____ Method: CV

Start Date: 06/10/98 End Date: 06/10/98

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	
S0	1.00	1448																X									
S0.5	1.00	1450																X									
S1	1.00	1452																X									
S2	1.00	1454																X									
[redacted]	1.00	1456																X									
S10	1.00	1458																X									
ICV	1.00	1500																X									
ICB	1.00	1502																X									
CCV	1.00	1504																X									
CCB	1.00	1506																X									
PBS	1.00	1508																X									
LCSS	1.00	1510																X									
ZZZZZZ	1.00	1512																										
ZZZZZZ	1.00	1514																										
ZZZZZZ	1.00	1516																										
ZZZZZZ	1.00	1518																										
ZZZZZZ	1.00	1520																										
ZZZZZZ	1.00	1522																										
ZZZZZZ	1.00	1524																										
ZZZZZZ	1.00	1526																										
CCV	1.00	1528																X									
CCB	1.00	1530																X									
[redacted]ZZZZ	1.00	1532																										
ZZZZZZ	1.00	1534																										
ZZZZZZ	1.00	1536																										
ZZZZZZ	1.00	1538																										
ZZZZZZ	1.00	1540																										
ZZZZZZ	1.00	1542																										
ZZZZZZ	1.00	1544																										
ZZZZZZ	1.00	1546																										
ZZZZZZ	1.00	1548																										
ZZZZZZ	1.00	1550																										

FORM XIV - IN

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002644

START - DALLAS

14
ANALYSIS RUN LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.203 SAS No.: _____ SDG No.:4_0102

Instrument ID Number: 2380_____ Method: CV

Start Date: 06/10/98 End Date: 06/10/98

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	
CCV_____	1.00	1552																X								
CCB_____	1.00	1554																X								
ZZZZZZ__	1.00	1556																								
ZZZZZZ__	1.00	1558																								
[redacted]ZZZ__	1.00	1600																								
ZZZZZZ__	1.00	1602																								
ZZZZZZ__	1.00	1604																								
ZZZZZZ__	1.00	1606																								
ZZZZZZ__	1.00	1608																								
4_0102__	1.00	1610																X								
4_0506__	1.00	1612																X								
5_0001__	1.00	1614																X								
CCV_____	1.00	1616																X								
CCB_____	1.00	1618																X								
6_0506__	1.00	1620																X								
7_0102__	1.00	1622																X								
7D_0102_	1.00	1624																X								
7_5565__	1.00	1626																X								
8_0102__	1.00	1628																X								
8_0708__	1.00	1630																X								
9_0102__	1.00	1632																X								
9_0708__	1.00	1634																X								
[redacted]CH___	1.00	1636																X								
BATCHD__	1.00	1638																X								
CCV_____	1.00	1640																X								
CCB_____	1.00	1642																X								
BATCHS__	1.00	1644																X								
ZZZZZZ__	1.00	1646																								
ZZZZZZ__	1.00	1648																								
ZZZZZZ__	1.00	1650																								
ZZZZZZ__	1.00	1652																								
ZZZZZZ__	1.00	1654																								

FORM XIV - IN

002645

START - DALLAS

14
ANALYSIS RUN LOG

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.203 SAS No.: _____ SDG No.:4_0102

Instrument ID Number: 2380_____ Method: CV

Start Date: 06/10/98 End Date: 06/10/98

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	
ZZZZZZ	1.00	1656																								
CCV	1.00	1658																X								
CCB	1.00	1700																X								

FORM XIV - IN

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002646

TEST CODE :SPH 1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : PH UNITS : S.U.
PARAMETER : pH

SAMPLE ID	RESULTS	Q	QNT. LIMIT
EE-98-08034			
SB14 0102	9.5		0.10
EE-98-08035			
SB14 0506	9.4		0.10
EE-98-08036			
SB15 0001	8.1		0.10
EE-98-08037			
SB16 -	6.6		0.10
EE-98-08038			
SB17 0102	7.4		0.10
EE-98-08039			
SB17D 0102	7.3		0.10
EE-98-08040			
SB17 5565	5.6		0.10
EE-98-08041			
SB18 0102	7.7		0.10
EE-98-08042			
SB18 0708	6.1		0.10

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE
NA = NOT APPLICABLE

662

TEST CODE :SPH 1 JOB NUMBER :9801.230
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : PH UNITS : S.U.
PARAMETER : pH

SAMPLE ID	RESULTS	Q	QNT. LIMIT
EE-98-08236			
SB19-0102	7.4		0.10
EE-98-08237			
SB19-0708	6.3		0.10

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE
NA = NOT APPLICABLE

QUALITY CONTROL FOR PRECISION
RESULTS OF ANALYSIS OF DUPLICATE
ANALYSES OF SOIL SAMPLES

9801.203

(s.u.)

Parameter	E & E Laboratory No. 98-	Sample Result	Duplicate Result	Relative Percent Difference (RPD)
pH	8042	6.11	6.13	0.3

THIS RPD IS WITHIN E & E, INC. QC TARGETS.

002649

QUALITY CONTROL FOR PRECISION
RESULTS OF ANALYSIS OF DUPLICATE
ANALYSES OF SOIL SAMPLES

9801.230

(s.u.)

Parameter	E & E Laboratory No. 98-	Sample Result	Duplicate Result	Relative Percent Difference (RPD)
pH	8237	6.29	6.32	0.5

THIS RPD IS WITHIN E & E, INC. QC TARGETS.

TEST CODE :STS 1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : SOLIDS TOTAL UNITS : %
PARAMETER : Solids-Total

SAMPLE ID	RESULTS	Q
EE-98-08034		
SB14 0102	88	
EE-98-08035		
SB14 0506	83	
EE-98-08036		
SB15 0001	81	
EE-98-08037		
SB16 -	82	
EE-98-08038		
SB17 0102	90	
EE-98-08039		
SB17D 0102	90	
EE-98-08040		
SB17 5565	88	
EE-98-08041		
SB18 0102	87	
EE-98-08042		
SB18 0708	85	

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE

G07

TEST CODE :STS 1 JOB NUMBER :9801.230
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : SOLIDS TOTAL UNITS : %
PARAMETER : Solids-Total

SAMPLE ID	RESULTS	Q
EE-98-08236		
SB19-0102	90	
EE-98-08237		
SB19-0708	88	

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE

QUALITY CONTROL FOR PRECISION
RESULTS OF ANALYSIS OF DUPLICATE
ANALYSES OF SOLID SAMPLES

9801.203

(%)

Parameter	E & E Laboratory No. 98-	Sample Result	Duplicate Result	Relative Percent Difference (RPD)
Solids-Total	Batch QC	97.2	97.1	0.1

THIS RPD IS WITHIN E & E, INC. QC TARGETS.

Appendix J
Data Validation Reports

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APPENDIX J

SUMMARY OF DATA QUALITY PARAMETERS
WILCOX REFINERY, BRISTOW, OKLAHOMA

Parameter	Control Limits	Data Assessment		Qualifier	No. Of Results Qualified (Soil/Water)
PRECISION	**RPD**	**RPD**			
Field Duplicates	Soil/Sed. <100%	Manganese	127%	None[1]	0
	Water <50%	Benzene	121%	None[1]	0
		Toluene	118%	None[1]	0
		Xylenes	112%	None[1]	0
MS/MSD	Soil/Sed. <35%	Aluminum	37.5%	JK	17
		Calcium	96.9%	JK	4
		Copper	39.8%	JK	4
		Iron	44.6%	JK	10
		Lead	48.2%	JK	10
		Magnesium	80.1%	JK	4
		Manganese	43.7%	JK	6
		Potassium	62.3%	JK	17
		Zinc	110%	JK	4
	<30%	Benzo(ghi)perylene	71.1%	JK	1
		Dibenz(ah)anthracene	54.8%	JK	1
		Indeno(1,2,3-cd)pyrene	50.2%	JK	1
	Water <20%	All Analytes	<20%		

Key at end of the table.

APPENDIX J (Cont.)

SUMMARY OF DATA QUALITY PARAMETERS
WILCOX REFINERY, BRISTOW, OKLAHOMA

Parameter	Control Limits	Data Assessment		Qualifier	No. Of Results Qualified (Soil/Water)
ACCURACY	**%R**	**%R**			
Organic MS	Soil/Sed./Water 70% - 117%	Ethylbenzene	68%	None[2]	0
		Toluene	118%	None[2]	0
		Xylenes	69%	None[2]	0
		Benzo(a)pyrene	129.6%	None[3]	0
	Soil/Sed./Water 31% - 137%	All PAHs	<31% or >137%	JL or JH	10
Inorganic MS	Soil/Sed./Water 75% - 125%	Antimony	30.2%, 68.2%	JL	21
		Antimony	193.3%	R[4]	10
		Arsenic	6.8%	R[4]	10
		Beryllium	125.8%	R[4]	10
		Cadmium	45.9%	JL	4
		Cadmium	166.5%	R[4]	10
		Chromium	50.0%	JL	4
		Cobalt	71.3	R[4]	10
		Copper	315.7%	JH	4
		Lead	2,977.6%	None[5]	0
		Manganese	3.3%, 54.6%, 74.5%	JL	31/1
		Silver	45.9%	JL	4
		Zinc	538.6%	JH	4
		Other Metals	<75%	None[5]	0

Key at end of the table.

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APPENDIX J (Cont.)

SUMMARY OF DATA QUALITY PARAMETERS
WILCOX REFINERY, BRISTOW, OKLAHOMA

Parameter	Control Limits	Data Assessment		Qualifier	No. Of Results Qualified (Soil/Water)
ACCURACY	**%R**	**%R**			
Organic Surrogates	Soil/Sed. 70% - 130%	Terphenyl-d14	0%	None[6]	0
	50% - 150%	Trifluorotoluene (TFT)	166%	JH	5
	50% - 150%	TFT	901.8%	JH	5
	70% - 130%	TFT	44% - 68%	JL	7
	18% - 137%	Terphenyl-d14	138% - 725%	JH	5
	Water 65% - 130%	TFT	960%	None[7]	0
	65% - 130%	TFT	61.0%	JL	4
LCS	Organics 31% - 137%	Benzo(a)anthracene	0%	JL	20
		Benzo(k)fluoranthene	138%	JH	7
		Chrysene	145%	JH	7
		Fluoranthene	175%	JH	7
	Inorganics 80% - 120%	Aluminum	2.3%	JL	4
		Antimony	154.2%	JH	4
		Arsenic	151.3%	JH	4
		Cadmium	173.3%	JH	4
		Calcium	54.5%	JL	4
		Copper	56.6%	JL	4
		Iron	1.2%	JL	4
		Manganese	48.0%	JL	4
		Nickel	135.7%	JH	4

Key at end of the table.

APPENDIX J (Cont.)

SUMMARY OF DATA QUALITY PARAMETERS
WILCOX REFINERY, BRISTOW, OKLAHOMA

Parameter	Control Limits	Data Assessment		Qualifier	No. Of Results Qualified (Soil/Water)
ACCURACY	**%R**	**%R**			
LCS (Cont.)	Inorganics 80% - 120%	Selenium	160.3%	JH	4
		Silver	6.4%	JL	4
		Sodium	176.1%	JH	4
ICP Checks	80% - 120%	Calcium	133.9%	JH	16
REPRESENTATIVENESS	**%D**	**%D**			
ICP Serial Dilution	<10%	Chromium	20.7%, 881.6%	JK	20/1
		Iron	18.9%	JK	4
		Lead	40.9%	JK	10/1
		Sodium	17.7%	JK	10/4
		Vanadium	18.6%	JK	10
		Zinc	37.7%, 85.1%	JK	20/1
Internal Standards Area	-50% - +100%A	All PAHs	<-50%A	JH	27
Blanks	Calibration	Cobalt	4.1B	UB	1
		Copper	10.3B, 15.6B	UB	2
		Lead	14.9B	UB	1
		Silver	6.5B	UB	1
	Preparation	Copper	0.359B, 0.288B	UB	3
		Lead	0.789, 0.401	UB	5
		Nickel	0.364B	UB	1
		Silver	0.756B	UB	10
		Vanadium	0.167B	UB	1
		Zinc	0.106B	UB	1

Key at end of the table.

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APPENDIX J (Cont.)

SUMMARY OF DATA QUALITY PARAMETERS
WILCOX REFINERY, BRISTOW, OKLAHOMA

Parameter	Control Limits	Data Assessment		Qualifier	No. Of Results Qualified (Soil/Water)
COMPLETENESS	%	%			
	Analyte >90%	**TPH in water**	**87.5%**		
		Antimony	**82.5%**		
		Arsenic	**82.5%**		
		Beryllium	**81%**		
		Cadmium	**81%**		
		Cobalt	**82.5%**		
		Mercury	98%		
		Thallium	96.5%		
	Analytical Method >90%	BTEX	100%		
		PAHs	100%		
		TPH	98.5%		
		Metals	96%		

Key:

Completeness results in **bold** for individual analytes fail analytical method completeness goals.

1 - Not used for data qualification
2 - Marginal exceedance of control limits due to matrix effects
3 - Data reported is from a different column
4 - Post spike acceptable indicating possible digestion problem
5 - Sample concentration exceeds spike concentration by greater than 4 times (4x rule)
6 - Surrogate diluted out
7 - Artificially high due to coeluting peak in an incorrect spike mix

%A - Percent GC peak area of internal standards recovery
%R - Percent recovery

H - The bias in the estimated value is high
J - Concentration is estimated
K - The bias in the estimated value is unknown
L - The bias in the estimated value is low
LCS - Laboratory control sample
MS - Matrix spike
MSD - Matrix spike duplicate
R - Unusable data
R&D - Relative percent difference
UB - Not detected due to presence of analyte in associated blanks

DATA QUALITY ASSURANCE REVIEW

SITE NAME Wilcox Refinery

CERCLIS

PAN 052601SFXX TDD NUMBER 06-98-03-0009

CASE NUMBER/WORK ORDER 6S180 SDG/PROJ. NUMBER 4798 & 4802

E & E has completed a QA review for Case No. 6S180, SDG No. 4798 & 4802, Wilcox Refinery. Thirty soil samples and ten water samples were analyzed for BTEX and TPH by PDP Analytical Services. Sample numbers are listed below.

SAMPLE NUMBERS

SB20-0030	SB27-0030	SB40-3040
SB21-0030	SB28-0020	SB40-GW06
SB22-0030	SB29-0010	SB39-3040
SB23-0030	SB30-0030	SB43-6070
SB24-0020	SW01	SB44-4050
SB25-0030	SB31-0030	AB45-0010
SB26-0020	SW02	SB35-0030
SB36-6070	SW02D	SB41-2030
SB37-6070	SB32-0010	SB41-2030D
SB38-0010	SB32-0010D	SB42-GW07
SW03	SB33-0010	SB42-2030
TB0804	SB34-0010	SW04
SB37-GW08	SB46-0612	SB46-0612D
		TB0806

This data package was validated to determine if Quality Control (QC) specifications were achieve, following *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (February, 1994), *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (February, 1994), *Quality Assurance/Quality Control Guidance for Removal Activities* (April, 1990), and the Regional Protocol for Holding Times, Blanks, and VOA Preservation (April 13, 1989). Specific data qualifications are listed in the following discussion.

REVIEWER Michelle Brown DATE 10/8/98

Data Qualifiers

Data Qualifier Definitions were supplied by the Office of Solid Waste and Emergency Response (September 1989) and are included in the Functional Guidelines. Data qualifiers may be combined (UJ, QJ) with the corresponding combination of meanings. Additional qualifier may be added to provide additional, more specific information (JL, UB, QJK), modifying the meaning of the primary qualifier. Addition qualifiers utilized by E & E are H, L, K, B, Q, and D.

U - The material was analyzed for, but was not detected. The associated numerical value is the sample quantitation or detection limit, which has been adjusted for sample weight/sample volume, extraction volume, percent solids, sample dilution or other analysis specific parameters.

An additional qualifier, "B", may be appended to indicated that while the analyte was detected in the sample, the presence of the analyte may be attributable to blank contamination and the analyte is therefore considered undetected with the sample detection or quantitation limit for the analyte being elevated.

J - The analyte was analyzed for, but the associated numerical value may not be consistent with the amount actually present in the environmental sample or may not be consistent with the sample detection or quantitation limit. The value is an estimated quantity. The data should be seriously considered for decision-making and are usable for many purposes.

An additional qualifier will be appended to the "J" qualifier that indicates the bias in the reported results:

L Low bias

H High bias

K Unknown bias

Q The reported concentration is less than the sample quantitation limit for the specific analyte in the sample.

The L and H qualifier will only be employed when a single qualification is required. When more than one quality control parameter affects the analytical result and a conflict results in assigning a bias, the result will be flagged JK.

R - Quality Control indicates that data are unusable for all purposes. The analyte was analyzed for, but the presence or absence of the analyte has not been verified. Resampling and reanalysis are necessary for verification to confirm or deny the presence of an analyte.

N - The analysis indicates the presence of analyte for which there is presumptive evidence to make a "tentative identification."

D - The concentration reported was determined in the re-analysis of the sample at a secondary dilution.

BTEX DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in SW846 method 8021B.

2. Holding Time:

All samples were extracted and analyzed within the required holding time of less than 14 days after collection. Samples were maintained at less than 4°C. No qualifications are placed on the data.

3. Initial Calibration:

Initial calibration criteria were met: 5 point calibration for single component analytes, retention time windows established, adequate resolution (90%) between adjacent peaks, and Percent Relative Standard Deviations (%RSD) of the calibration factors less than or equal to 20% (30% for the surrogates)

4. Calibration Verification:

Calibration verification criteria: verification sample frequency of every 12 hours; analyte within retention time (RT) window; resolution (RES%) between adjacent peaks greater than or equal to 90%; and the percent difference (%D) between the calculated amount and the true amount for target analytes and surrogates not exceeding ± 25%; were met.

5. Blanks:

A method blank was prepared at the required frequency of every time samples were extracted for the matrix or every 20 samples, whichever is greater. Target analytes were not detected in associated blank(s) analyzed.

6. Surrogates:

Control limits for the recovery of surrogates are listed below.

SURROGATE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
a,a,a-Trifluorotoluene	75-125	70-130	

Recoveries of the following surrogates were outside of control limits.

SAMPLE #	MATRIX	SURROGATE OUT	SURROGATE RECOVERY	QUALIFIER FLAG
SB20-0030	SOIL	a,a,a-Trifluorotoluene	65%	JL
*SB20-0030RA	SOIL	a,a,a-Trifluorotoluene	39%	JL

SAMPLE #	MATRIX	SURROGATE OUT	SURROGATE RECOVERY	QUALIFIER FLAG
SB23-0030	SOIL	a,a,a-Trifluorotoluene	46%	JL
*SB23-0030RA	SOIL	a,a,a-Trifluorotoluene	49%	JL
SB24-0020	SOIL	a,a,a-Trifluorotoluene	47%	JL
*SB24-0020RA	SOIL	a,a,a-Trifluorotoluene	65%	JL
SB25-0030	SOIL	a,a,a-Trifluorotoluene	46%	JL
*SB25-0030RA	SOIL	a,a,a-Trifluorotoluene	54%	JL
SB26-0020	SOIL	a,a,a-Trifluorotoluene	49%	JL
*SB26-0020RA	SOIL	a,a,a-Trifluorotoluene	58%	JL
SB36-6070	SOIL	a,a,a-Trifluorotoluene	68%	JL
*SB36-6070RA	SOIL	a,a,a-Trifluorotoluene	67%	JL
SB28-0020	SOIL	a,a,a-Trifluorotoluene	44%	JL
*SB28-0020RA	SOIL	a,a,a-Trifluorotoluene	57%	JL

* - No data was taken from the re-analysis of samples (for confirmation only)

7. Matrix Spikes:

Sample SW03 underwent matrix spike analysis for the water matrix. Samples SB21-0030, SB38-0010, SB-46-0612, and SB29-0010 underwent matrix spike analysis for the soil matrix. Control limits for matrix spike recoveries are listed in the following table.

ANALYTE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
Benzene	75-125	70-130	
Ethylbenzene	75-125	70-130	
Toluene	75-125	70-130	
Xylene (total)	75-125	70-130	

Recoveries of the following spiked analytes were outside of the required control limits.

SAMPLE NO./MATRIX	ANALYTE	RECOVERY %	AFFECTED SAMPLES	QUALIFIER FLAG
SB21-0030/ soil	Ethylbenzene	68	NONE	No Flag - matrix effect
SB21-0030/ soil	Xylene (total)	69	NONE	No Flag - matrix effect

8. Duplicates:

Sample SW03 underwent matrix spike duplicate analysis for the water matrix. Samples SB21-0030, SB38-0010, SB46-0612, and SB29-0010 underwent matrix spike duplicate analysis for the soil matrix. Relative percent differences (RPDs) of all spiked analytes were within the required control limits listed below.

ANALYTE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
Benzene	25%	30%	
Ethylbenzene	25%	30%	
Toluene	25%	30%	
Xylene (total)	25%	30%	

9. Target Compound Identification:

All reported target analytes met identification criteria of retention times within the calculated retention time windows (±0.5 minutes) for both columns and percent differences (%D) between the quantitation on the two columns of less than 25%.

10. Target Compound Quantitation and CRQLs:

Concentrations of all reported analytes were correctly calculated.

Sample quantitation limits (SQLs) varied from CRQLs 95 ug/kg) in the following samples due to the factors listed as follows.

SAMPLE NO.	LEVEL	% SOLID moisture	SAMPLE WT/VOL (gm/ml)	SEV (ul)	SAV (ul)	SQL FACTOR
SB20-0030	LOW	7.9				1.086
SB21-0030	LOW	2.2				1.022
SB22-0030	LOW	5.4				1.057
SB23-0030	LOW	2.1				1.021
SB24-0020	LOW	14.4				1.168

SAMPLE NO.	LEVEL	% SOLID moisture	SAMPLE WT/VOL (gm/ml)	SEV (ul)	SAV (ul)	SQL FACTOR
SB25-0030	LOW	1.7				1.017
SB26-0020	LOW	2.8				1.029
SB36-6070	LOW	2.5				1.026
SB37-6070	LOW	6.8				1.073
SB38-0010	LOW	16.2				1.193
SB27-0030	LOW	4.8				1.050
SB28-0020	LOW	4.5				1.047
SB29-0010	LOW	2.4				1.024
SB30-0030	LOW	10.9				1.122
SB31-0030	LOW	15.8				1.188
SB32-0010	LOW	42.7				1.745
Sb32-0010D	LOW	42.1				1.727
SB33-0010	LOW	22.2				1.285
SB34-0010	LOW	22.6				1.292
SB40-3040	LOW	15.1				1.178
SB39-3040	LOW	16.7				1.200
SB43-6070	LOW	7.8				1.084
SB44-4050	LOW	9.3				1.102
SB45-0010	LOW	20.4				1.256
SB35-0030	LOW	12.4				1.142
SB41-2030	LOW	17.7				1.215
SB41-2030D	LOW	10.2				1.114
SB42-2030	LOW	14.9				1.175
SN46-06012	LOW	15				1.176
SB46-0612d	LOW	12				1.136

DF = dilution factor, SEV = soil extract volume, SAV = soil aliquot volume

11. Laboratory Control Sample:

The laboratory analyzed a laboratory control sample and recoveries for this analysis were within the control limits provided.

12. Laboratory Contact:

No laboratory contact was required.

13. Overall Assessment:

Several soil samples had surrogates out of control limits. These samples were re-analyzed with similar results. This showed matrix effect. All results for these samples are considered estimated, baised low.
The Matrix Spike of sample SB21-0030 for soils had benzene and xylene out of control limits. This was again caused by matrix effect and no qualifiers were necessary.
Many re-analysis of the samples were ran. Data should only be taken from the original analysis.
The soil samples all contained moisture. Detection limits were adjusted accordingly.
The analytical data is acceptable for use with the qualifications listed above.

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB20-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.001
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:38

% MOISTURE	: 7.9	ANALYST	: BP
DATE ANALYZED	: 08/06/98	INSTRUMENT FILE	: B06049
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 14:03		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.4 UG/KG	ND UG/KG	J L
Ethylbenzene	5.4 UG/KG	ND UG/KG	
Toluene	5.4 UG/KG	ND UG/KG	
Xylene (total)	5.4 UG/KG	ND UG/KG	J

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	54.3 UG/KG	70 - 130	65

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB047A	PREP BLANK ID :BTXB047	LCS ID :BTXL044
MS ID :4798.002MS	MSD ID :4798.002MSD	

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB21-0030
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4798.002
PROJECT NUMBER	:		METHOD REFERENCE	:	SW846-8021B
DATE SAMPLED	:	8/4/98	DATE RECEIVED	:	8/5/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 14:38

% MOISTURE	: 2.2	ANALYST	: BP
DATE ANALYZED	: 08/06/98	INSTRUMENT FILE	: B06050
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 14:25		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.1 UG/KG	ND UG/KG	
Ethylbenzene	5.1 UG/KG	ND UG/KG	
Toluene	5.1 UG/KG	ND UG/KG	
Xylene (total)	5.1 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	51.1 UG/KG	70 - 130	70

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB047A	PREP BLANK ID :BTXB047	LCS ID :BTXL044
MS ID :4798.002MS	MSD ID :4798.002MSD	

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PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB22-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.003
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:38

% MOISTURE	: 5.4	ANALYST	: BP
DATE ANALYZED	: 08/06/98	INSTRUMENT FILE	: B06051
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 14:48		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.3 UG/KG	ND UG/KG	
Ethylbenzene	5.3 UG/KG	ND UG/KG	
Toluene	5.3 UG/KG	ND UG/KG	
Xylene (total)	5.3 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	52.8 UG/KG	70 - 130	70

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB047A	PREP BLANK ID :BTXB047	LCS ID :BTXL044
MS ID :4798.002MS	MSD ID :4798.002MSD	

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1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB23-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.004
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:38

% MOISTURE	: 2.1	ANALYST	: BP
DATE ANALYZED	: 08/06/98	INSTRUMENT FILE	: B06052
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 15:10		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.1 UG/KG	ND UG/KG	JL
Ethylbenzene	5.1 UG/KG	ND UG/KG	"
Toluene	5.1 UG/KG	ND UG/KG	"
Xylene (total)	5.1 UG/KG	ND UG/KG	"

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	51.1 UG/KG	70 - 130	46

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB047A	PREP BLANK ID :BTXB047	LCS ID :BTXL044
MS ID :4798.002MS	MSD ID :4798.002MSD	

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB24-0020
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.005
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:39

% MOISTURE	: 14.4	ANALYST	: BP
DATE ANALYZED	: 08/17/98	INSTRUMENT FILE	: B06132
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 13:23		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.8 UG/KG	ND UG/KG	JL
Ethylbenzene	5.8 UG/KG	ND UG/KG	↓
Toluene	5.8 UG/KG	ND UG/KG	↓
Xylene (total)	5.8 UG/KG	ND UG/KG	↓

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	58.4 UG/KG	70 - 130	47

BATCH QUALITY CONTROL SAMPLE IDs:

QC BATCH ID :BTXB051	PREP BLANK ID :BTXB051	LCS ID :BTXL049
MS ID :4798.010MS	MSD ID :4798.010MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB25-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.006
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:39

% MOISTURE	: 1.7	ANALYST	: BP
DATE ANALYZED	: 08/06/98	INSTRUMENT FILE	: B06053
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 15:32		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.1 UG/KG	ND UG/KG	JL
Ethylbenzene	5.1 UG/KG	ND UG/KG	
Toluene	5.1 UG/KG	ND UG/KG	
Xylene (total)	5.1 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50.9 UG/KG	70 - 130	46

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB047A	PREP BLANK ID :BTXB047	LCS ID :BTXL044
MS ID :4798.002MS	MSD ID :4798.002MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB26-0020		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.007		
PROJECT NUMBER	:	METHOD REFERENCE	: SW846-8021B		
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:39	

% MOISTURE	: 2.8	ANALYST	: BP
DATE ANALYZED	: 08/06/98	INSTRUMENT FILE	: B06054
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 15:55		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.1 UG/KG	ND UG/KG	UL
Ethylbenzene	5.1 UG/KG	ND UG/KG	
Toluene	5.1 UG/KG	ND UG/KG	
Xylene (total)	5.1 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	51.4 UG/KG	70 - 130	49

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB047A	PREP BLANK ID :BTXB047	LCS ID :BTXL044
MS ID :4798.002MS	MSD ID :4798.002MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB36-6070
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.008
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:39

% MOISTURE	: 2.5	ANALYST	: BP
DATE ANALYZED	: 08/06/98	INSTRUMENT FILE	: B06055
INSTRUMENT ID	: B-HP58908	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 16:17		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.1 UG/KG	ND UG/KG	JL
Ethylbenzene	5.1 UG/KG	ND UG/KG	"
Toluene	5.1 UG/KG	ND UG/KG	"
Xylene (total)	5.1 UG/KG	ND UG/KG	"

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	51.3 UG/KG	70 - 130	68

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB047A	PREP BLANK ID :BTXB047	LCS ID :BTXL044
MS ID :4798.002MS	MSD ID :4798.002MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB37-6070		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.009		
PROJECT NUMBER	:	METHOD REFERENCE	: SW846-8021B		
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:39	

% MOISTURE	: 6.8	ANALYST	: BP
DATE ANALYZED	: 08/16/98	INSTRUMENT FILE	: B06122
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 15:36		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.4 UG/KG	ND UG/KG	
Ethylbenzene	5.4 UG/KG	ND UG/KG	
Toluene	5.4 UG/KG	ND UG/KG	
Xylene (total)	5.4 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	53.6 UG/KG	70 - 130	85

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB050	PREP BLANK ID :BTXB050	LCS ID :BTXL047
MS ID :4802.026MS	MSD ID :4802.026MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB38-0010
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.010
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:39

% MOISTURE	: 16.2	ANALYST	: BP
DATE ANALYZED	: 08/17/98	INSTRUMENT FILE	: B06129
INSTRUMENT ID	: B-HP58908	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 12:02		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	6.0 UG/KG	ND UG/KG	
Ethylbenzene	6.0 UG/KG	ND UG/KG	
Toluene	6.0 UG/KG	ND UG/KG	
Xylene (total)	6.0 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	59.7 UG/KG	70 - 130	93

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB051	PREP BLANK ID :BTXB051	LCS ID :BTXL049
MS ID :4798.010MS	MSD ID :4798.010MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SW03
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.011
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	WATER	PRINTED ON :	8/21/98 14:40

ANALYST	: BP	DATE ANALYZED	: 08/14/98
DILUTION	: 1	INSTRUMENT FILE	: B06073
INSTRUMENT ID	: B-HP5890B	PURGE VOLUME	: 5 mL
TIME ANALYZED	: 09:47		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.00 UG/L	ND UG/L	
Ethyl benzene	5.00 UG/L	ND UG/L	
Toluene	5.00 UG/L	ND UG/L	
Xylene (total)	5.00 UG/L	ND UG/L	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/L	75 - 125	99

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB048	PREP BLANK ID :BTXB048	LCS ID :BTXL045
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	TB0804
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4798.012
PROJECT NUMBER	:		METHOD REFERENCE	:	SW846-8021B
DATE SAMPLED	:	8/4/98	DATE RECEIVED	:	8/5/98
SAMPLE MATRIX	:	WATER	PRINTED ON	:	8/21/98 14:40

ANALYST	: BP	DATE ANALYZED	: 08/14/98
DILUTION	: 1	INSTRUMENT FILE	: B06074
INSTRUMENT ID	: B-HP5890B	PURGE VOLUME	: 5 mL
TIME ANALYZED	: 10:12		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.00 UG/L	ND UG/L	
Ethyl benzene	5.00 UG/L	ND UG/L	
Toluene	5.00 UG/L	ND UG/L	
Xylene (total)	5.00 UG/L	ND UG/L	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/L	75 - 125	101

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB048	PREP BLANK ID :BTXB048	LCS ID :BTXL045
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB27-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.001
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:49

% MOISTURE	: 4.8	ANALYST	: BP
DATE ANALYZED	: 08/16/98	INSTRUMENT FILE	: B06111
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 11:01		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.2 UG/KG	ND UG/KG	
Ethylbenzene	5.2 UG/KG	ND UG/KG	
Toluene	5.2 UG/KG	ND UG/KG	
Xylene (total)	5.2 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	52.6 UG/KG	70 - 130	73

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB050	PREP BLANK ID :BTXB050	LCS ID :BTXL047
MS ID :4802.026MS	MSD ID :4802.026MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB28-0020
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.002
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:49

% MOISTURE	: 4.5	ANALYST	: BP
DATE ANALYZED	: 08/15/98	INSTRUMENT FILE	: B06091
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 14:13		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.2 UG/KG	ND UG/KG	JL
Ethylbenzene	5.2 UG/KG	ND UG/KG	
Toluene	5.2 UG/KG	ND UG/KG	
Xylene (total)	5.2 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	52.3 UG/KG	70 - 130	44

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB049	PREP BLANK ID :BTXB049	LCS ID :BTXL046
MS ID :4802.003MS	MSD ID :4802.003MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB29-0010
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.003
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:49

% MOISTURE	: 2.4	ANALYST	: BP
DATE ANALYZED	: 08/15/98	INSTRUMENT FILE	: 806092
INSTRUMENT ID	: 8-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 14:38		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.1 UG/KG	ND UG/KG	
Ethylbenzene	5.1 UG/KG	ND UG/KG	
Toluene	5.1 UG/KG	ND UG/KG	
Xylene (total)	5.1 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	51.2 UG/KG	70 - 130	71

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB049	PREP BLANK ID :BTXB049	LCS ID :BTXL046
MS ID :4802.003MS	MSD ID :4802.003MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB30-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.004
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:49

% MOISTURE	: 10.9	ANALYST	: BP
DATE ANALYZED	: 08/15/98	INSTRUMENT FILE	: B06093
INSTRUMENT ID	: B-HP58908	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 15:03		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.6 UG/KG	ND UG/KG	
Ethylbenzene	5.6 UG/KG	ND UG/KG	
Toluene	5.6 UG/KG	ND UG/KG	
Xylene (total)	5.6 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	56.1 UG/KG	70 - 130	81

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB049	PREP BLANK ID :BTXB049	LCS ID :BTXL046
MS ID :4802.003MS	MSD ID :4802.003MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SW01
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.005
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	WATER	PRINTED ON :	8/21/98 14:49

ANALYST	: BP	DATE ANALYZED	: 08/14/98
DILUTION	: 1	INSTRUMENT FILE	: B06075
INSTRUMENT ID	: B-HP5890B	PURGE VOLUME	: 5 mL
TIME ANALYZED	: 10:37		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.00 UG/L	ND UG/L	
Ethyl benzene	5.00 UG/L	ND UG/L	
Toluene	5.00 UG/L	ND UG/L	
Xylene (total)	5.00 UG/L	ND UG/L	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/L	75 - 125	101

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB048	PREP BLANK ID :BTXB048	LCS ID :BTXL045
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB31-0030
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.006
PROJECT NUMBER	:	METHOD REFERENCE	: SW846-8021B
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98 14:49

% MOISTURE	: 15.8	ANALYST	: BP
DATE ANALYZED	: 08/15/98	INSTRUMENT FILE	: B06099
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 17:33		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.9 UG/KG	ND UG/KG	
Ethylbenzene	5.9 UG/KG	ND UG/KG	
Toluene	5.9 UG/KG	ND UG/KG	
Xylene (total)	5.9 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	59.4 UG/KG	70 - 130	75

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTX8049	PREP BLANK ID :BTX8049	LCS ID :BTXL046
MS ID :4802.003MS	MSD ID :4802.003MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SW02
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.007
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	WATER	PRINTED ON :	8/21/98 14:50

ANALYST	: BP	DATE ANALYZED	: 08/14/98
DILUTION	: 1	INSTRUMENT FILE	: B06076
INSTRUMENT ID	: B-HP5890B	PURGE VOLUME	: 5 mL
TIME ANALYZED	: 11:02		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.00 UG/L	ND UG/L	
Ethyl benzene	5.00 UG/L	ND UG/L	
Toluene	5.00 UG/L	ND UG/L	
Xylene (total)	5.00 UG/L	ND UG/L	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/L	75 - 125	81

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB048	PREP BLANK ID :BTXB048	LCS ID :BTXL045
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SW02D
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.008
PROJECT NUMBER	:	METHOD REFERENCE	: SW846-8021B
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98
SAMPLE MATRIX	: WATER	PRINTED ON	: 8/21/98 14:50

ANALYST	: BP	DATE ANALYZED	: 08/14/98
DILUTION	: 1	INSTRUMENT FILE	: B06077
INSTRUMENT ID	: B-HP5890B	PURGE VOLUME	: 5 mL
TIME ANALYZED	: 11:27		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.00 UG/L	ND UG/L	
Ethyl benzene	5.00 UG/L	ND UG/L	
Toluene	5.00 UG/L	ND UG/L	
Xylene (total)	5.00 UG/L	ND UG/L	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/L	75 - 125	91

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB048	PREP BLANK ID :BTXB048	LCS ID :BTXL045
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB32-0010
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.009
PROJECT NUMBER	:		METHOD REFERENCE	:	SW846-8021B
DATE SAMPLED	:	8/5/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 14:50

% MOISTURE	: 42.7	ANALYST	: BP
DATE ANALYZED	: 08/15/98	INSTRUMENT FILE	: B06100
INSTRUMENT ID	: B-HP58908	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 17:58		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	8.7 UG/KG	ND UG/KG	
Ethylbenzene	8.7 UG/KG	ND UG/KG	
Toluene	8.7 UG/KG	ND UG/KG	
Xylene (total)	8.7 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	87.3 UG/KG	70 - 130	79

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB049	PREP BLANK ID :BTXB049	LCS ID :BTXL046
MS ID :4802.003MS	MSD ID :4802.003MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB32-0010D
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.010
PROJECT NUMBER	:	METHOD REFERENCE	: SW846-8021B
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98 14:50

% MOISTURE	: 42.1	ANALYST	: BP
DATE ANALYZED	: 08/15/98	INSTRUMENT FILE	: 806101
INSTRUMENT ID	: 8-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 18:23		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	8.6 UG/KG	ND UG/KG	
Ethylbenzene	8.6 UG/KG	ND UG/KG	
Toluene	8.6 UG/KG	ND UG/KG	
Xylene (total)	8.6 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	86.3 UG/KG	70 - 130	76

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB049	PREP BLANK ID :BTXB049	LCS ID :BTXL046
MS ID :4802.003MS	MSD ID :4802.003MSD	

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1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB33-0010
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.011
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:50

% MOISTURE	: 22.2	ANALYST	: BP
DATE ANALYZED	: 08/16/98	INSTRUMENT FILE	: B06118
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 13:56		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	6.4 UG/KG	ND UG/KG	
Ethylbenzene	6.4 UG/KG	ND UG/KG	
Toluene	6.4 UG/KG	ND UG/KG	
Xylene (total)	6.4 UG/KG	82 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	64.3 UG/KG	70 - 130	123

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB050	PREP BLANK ID :BTXB050	LCS ID :BTXL047
MS ID :4802.026MS	MSD ID :4802.026MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB34-0010
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.012
PROJECT NUMBER	:	METHOD REFERENCE	: SW846-8021B
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98 14:50

% MOISTURE	: 22.6	ANALYST	: BP
DATE ANALYZED	: 08/16/98	INSTRUMENT FILE	: 806117
INSTRUMENT ID	: 8-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 13:31		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	6.4 UG/KG	ND UG/KG	
Ethylbenzene	6.4 UG/KG	140 UG/KG	
Toluene	6.4 UG/KG	ND UG/KG	
Xylene (total)	6.4 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	64.6 UG/KG	70 - 130	77

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB050	PREP BLANK ID :BTXB050	LCS ID :BTXL047
MS ID :4802.026MS	MSD ID :4802.026MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB40-3040
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.013
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:50

% MOISTURE	: 15.1	ANALYST	: BP
DATE ANALYZED	: 08/15/98	INSTRUMENT FILE	: B06094
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 15:28		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.9 UG/KG	ND UG/KG	
Ethylbenzene	5.9 UG/KG	ND UG/KG	
Toluene	5.9 UG/KG	ND UG/KG	
Xylene (total)	5.9 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	58.9 UG/KG	70 - 130	72

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB049	PREP BLANK ID :BTXB049	LCS ID :BTXL046
MS ID :4802.003MS	MSD ID :4802.003MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB40-GW06
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.014
PROJECT NUMBER	:		METHOD REFERENCE	:	SW846-8021B
DATE SAMPLED	:	8/5/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	WATER	PRINTED ON	:	8/21/98 14:50

ANALYST	: BP	DATE ANALYZED	: 08/14/98
DILUTION	: 1	INSTRUMENT FILE	: B06078
INSTRUMENT ID	: B-HP5890B	PURGE VOLUME	: 5 mL
TIME ANALYZED	: 11:52		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.00 UG/L	ND UG/L	
Ethyl benzene	5.00 UG/L	ND UG/L	
Toluene	5.00 UG/L	ND UG/L	
Xylene (total)	5.00 UG/L	ND UG/L	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/L	75 - 125	99

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB048	PREP BLANK ID :BTXB048	LCS ID :BTXL045
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB39-3040
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.015
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:50

% MOISTURE	: 16.7	ANALYST	: BP
DATE ANALYZED	: 08/15/98	INSTRUMENT FILE	: 806095
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 15:53		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	6.0 UG/KG	ND UG/KG	
Ethylbenzene	6.0 UG/KG	ND UG/KG	
Toluene	6.0 UG/KG	ND UG/KG	
Xylene (total)	6.0 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	60 UG/KG	70 - 130	77

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB049	PREP BLANK ID :BTXB049	LCS ID :BTXL046
MS ID :4802.003MS	MSD ID :4802.003MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB43-6070
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.016
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:50

% MOISTURE	: 7.8	ANALYST	: BP
DATE ANALYZED	: 08/16/98	INSTRUMENT FILE	: 806113
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 11:51		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.4 UG/KG	ND UG/KG	
Ethylbenzene	5.4 UG/KG	ND UG/KG	
Toluene	5.4 UG/KG	ND UG/KG	
Xylene (total)	5.4 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	54.2 UG/KG	70 - 130	77

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB050	PREP BLANK ID :BTXB050	LCS ID :BTXL047
MS ID :4802.026MS	MSD ID :4802.026MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB44-4050
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.017
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:50

% MOISTURE	: 9.3	ANALYST	: BP
DATE ANALYZED	: 08/15/98	INSTRUMENT FILE	: B06097
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 16:43		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.6 UG/KG	ND UG/KG	
Ethylbenzene	5.6 UG/KG	ND UG/KG	
Toluene	5.6 UG/KG	ND UG/KG	
Xylene (total)	5.6 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	55.1 UG/KG	70 - 130	70

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB049	PREP BLANK ID :BTXB049	LCS ID :BTXL046
MS ID :4802.003MS	MSD ID :4802.003MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB45-0010
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.018
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:50

% MOISTURE	: 20.4	ANALYST	: BP
DATE ANALYZED	: 08/15/98	INSTRUMENT FILE	: 806102
INSTRUMENT ID	: 8-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 18:48		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	6.3 UG/KG	ND UG/KG	
Ethylbenzene	6.3 UG/KG	ND UG/KG	
Toluene	6.3 UG/KG	ND UG/KG	
Xylene (total)	6.3 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	62.8 UG/KG	70 - 130	83

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB049	PREP BLANK ID :BTXB049	LCS ID :BTXL046
MS ID :4802.003MS	MSD ID :4802.003MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB35-0030
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.019
PROJECT NUMBER	:	METHOD REFERENCE	: SW846-8021B
DATE SAMPLED	: 8/6/98	DATE RECEIVED	: 8/7/98
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98 14:51

% MOISTURE	: 12.4	ANALYST	: BP
DATE ANALYZED	: 08/16/98	INSTRUMENT FILE	: B06114
INSTRUMENT ID	: 8-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 12:16		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.7 UG/KG	ND UG/KG	
Ethylbenzene	5.7 UG/KG	ND UG/KG	
Toluene	5.7 UG/KG	ND UG/KG	
Xylene (total)	5.7 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	57.1 UG/KG	70 - 130	92

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB050	PREP BLANK ID :BTXB050	LCS ID :BTXL047
MS ID :4802.026MS	MSD ID :4802.026MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB41-2030
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.020
PROJECT NUMBER	:	METHOD REFERENCE	: SW846-8021B
DATE SAMPLED	: 8/6/98	DATE RECEIVED	: 8/7/98
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98 14:51

% MOISTURE	: 17.7	ANALYST	: BP
DATE ANALYZED	: 08/15/98	INSTRUMENT FILE	: B06103
INSTRUMENT ID	: B-HP58908	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 19:13		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	6.1 UG/KG	ND UG/KG	
Ethylbenzene	6.1 UG/KG	ND UG/KG	
Toluene	6.1 UG/KG	ND UG/KG	
Xylene (total)	6.1 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	60.7 UG/KG	70 - 130	70

BATCH QUALITY CONTROL SAMPLE IDs:

QC BATCH ID :BTXB049	PREP BLANK ID :BTXB049	LCS ID :BTXL046
MS ID :4802.003MS	MSD ID :4802.003MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB41-2030D
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.021
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:51

% MOISTURE	: 10.2	ANALYST	: BP
DATE ANALYZED	: 08/15/98	INSTRUMENT FILE	: B06104
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 19:38		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.6 UG/KG	ND UG/KG	
Ethylbenzene	5.6 UG/KG	ND UG/KG	
Toluene	5.6 UG/KG	ND UG/KG	
Xylene (total)	5.6 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	55.7 UG/KG	70 - 130	93

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB049	PREP BLANK ID :BTXB049	LCS ID :BTXL046
MS ID :4802.003MS	MSD ID :4802.003MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB42-GW07
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.022
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	WATER	PRINTED ON :	8/21/98 14:51

ANALYST	: BP	DATE ANALYZED	: 08/14/98
DILUTION	: 1	INSTRUMENT FILE	: B06079
INSTRUMENT ID	: B-HP58908	PURGE VOLUME	: 5 mL
TIME ANALYZED	: 12:17		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.00 UG/L	ND UG/L	
Ethyl benzene	5.00 UG/L	ND UG/L	
Toluene	5.00 UG/L	ND UG/L	
Xylene (total)	5.00 UG/L	ND UG/L	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/L	75 - 125	101

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB048	PREP BLANK ID :BTXB048	LCS ID :BTXL045
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB42-2030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.023
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:51

% MOISTURE	: 14.9	ANALYST	: BP
DATE ANALYZED	: 08/16/98	INSTRUMENT FILE	: B06115
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 12:41		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.9 UG/KG	ND UG/KG	
Ethylbenzene	5.9 UG/KG	ND UG/KG	
Toluene	5.9 UG/KG	ND UG/KG	
Xylene (total)	5.9 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	58.7 UG/KG	70 - 130	106

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB050	PREP BLANK ID :BTXB050	LCS ID :BTXL047
MS ID :4802.026MS	MSD ID :4802.026MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SW04
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.024
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	WATER	PRINTED ON :	8/21/98 14:51

ANALYST	: BP	DATE ANALYZED	: 08/14/98
DILUTION	: 1	INSTRUMENT FILE	: B06080
INSTRUMENT ID	: B-HP5890B	PURGE VOLUME	: 5 mL
TIME ANALYZED	: 12:42		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.00 UG/L	ND UG/L	
Ethyl benzene	5.00 UG/L	ND UG/L	
Toluene	5.00 UG/L	ND UG/L	
Xylene (total)	5.00 UG/L	ND UG/L	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/L	75 - 125	102

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB048	PREP BLANK ID :BTXB048	LCS ID :BTXL045
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB37-GW08
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.025
PROJECT NUMBER	:	METHOD REFERENCE	: SW846-8021B
DATE SAMPLED	: 8/6/98	DATE RECEIVED	: 8/7/98
SAMPLE MATRIX	: WATER	PRINTED ON	: 8/21/98 14:51

ANALYST	: BP	DATE ANALYZED	: 08/14/98
DILUTION	: 1	INSTRUMENT FILE	: B06082
INSTRUMENT ID	: B-HP5890B	PURGE VOLUME	: 5 mL
TIME ANALYZED	: 14:00		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.00 UG/L	ND UG/L	
Ethyl benzene	5.00 UG/L	ND UG/L	
Toluene	5.00 UG/L	ND UG/L	
Xylene (total)	5.00 UG/L	ND UG/L	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/L	75 - 125	99

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB048	PREP BLANK ID :BTXB048	LCS ID :BTXL045
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB46-0612
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.026
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:51

% MOISTURE	: 15	ANALYST	: BP
DATE ANALYZED	: 08/16/98	INSTRUMENT FILE	: B06116
INSTRUMENT ID	: B-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 13:06		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.9 UG/KG	ND UG/KG	
Ethylbenzene	5.9 UG/KG	ND UG/KG	
Toluene	5.9 UG/KG	ND UG/KG	
Xylene (total)	5.9 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	58.8 UG/KG	70 - 130	113

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB050	PREP BLANK ID :BTXB050	LCS ID :BTXL047
MS ID :4802.026MS	MSD ID :4802.026MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB46-0612D
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.027
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:51

% MOISTURE	: 12	ANALYST	: BP
DATE ANALYZED	: 08/16/98	INSTRUMENT FILE	: 806121
INSTRUMENT ID	: 8-HP5890B	SAMPLE WEIGHT	: 5 g
TIME ANALYZED	: 15:11		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.7 UG/KG	ND UG/KG	
Ethylbenzene	5.7 UG/KG	ND UG/KG	
Toluene	5.7 UG/KG	ND UG/KG	
Xylene (total)	5.7 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	56.8 UG/KG	70 - 130	124

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :BTXB050	PREP BLANK ID :BTXB050	LCS ID :BTXL047
MS ID :4802.026MS	MSD ID :4802.026MSD	

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LABORATORY REPORT

BTEX BY GC/PID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	TB-0806
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.028
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8021B
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	WATER	PRINTED ON :	8/21/98 14:51

ANALYST	: BP	DATE ANALYZED	: 08/14/98
DILUTION	: 1	INSTRUMENT FILE	: B06083
INSTRUMENT ID	: B-HP5890B	PURGE VOLUME	: 5 mL
TIME ANALYZED	: 14:25		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Benzene	5.00 UG/L	ND UG/L	
Ethyl benzene	5.00 UG/L	ND UG/L	
Toluene	5.00 UG/L	ND UG/L	
Xylene (total)	5.00 UG/L	ND UG/L	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
a,a,a-Trifluorotoluene	50 UG/L	75 - 125	96

BATCH QUALITY CONTROL SAMPLE IDs:

QC BATCH ID :BTXB048	PREP BLANK ID :BTXB048	LCS ID :BTXL045
MS ID :4798.011MS	MSD ID :4798.011MSD	

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002706

TPH DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in NIOSH method 1005.

2. Holding Time:

All samples were extracted and analyzed within the required holding time of less than 14 days . Samples were maintained at less than 4°C. No qualifications are placed on the data.

3. Initial Calibration:

Initial calibration criteria were met: Five point calibration for single component analytes, retention time windows established, adequate resolution (90%) between adjacent peaks, and Percent Relative Standard Deviations (%RSD) of the calibration factors less than or equal to 20% (30% for the surrogates)

4. Calibration Verification:

Calibration verification criteria: verification sample frequency of every 12 hours; analyte within retention time (RT) window; resolution (RES%) between adjacent peaks greater than or equal to 90%; and the percent difference (%D) between the calculated amount and the true amount for target analytes and surrogates not exceeding ± 25%; were met.

5. Blanks:

A method blank was prepared at the required frequency of every time samples were extracted for the matrix or every 20 samples, whichever is greater. Target analytes were not detected in associated blank(s) analyzed.

6. Surrogates:

No surrogates were added to the samples analyzed for this method.

7. Matrix Spikes:

Samples SB22-0030 and SB31-0030 underwent matrix spike analysis for the soil matrix. Sample SW03 underwent matrix spike analysis for the water matrix. Recoveries of all spiked analytes were within the required control limits in both the matrix spike and matrix spike duplicate.

ANALYTE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
TPH (C10-C28)	70-130	70-130	
TPH (C6-C10)	70-130	70-130	

8. Duplicates:

Samples SB22-0030 and SB31-0031 underwent matrix spike duplicate analysis for the soil matrix. Sample SW03 underwent matrix spike duplicate analysis for the water matrix. Relative percent differences (RPDs) of all spiked analytes were within the required control limits listed below.

ANALYTE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
TPH (>C10-C28)	50	50	
TPH (C6-C10)	50	50	

9. Target Compound Identification:

All reported target analytes met identification criteria of retention times within the calculated retention time windows (±0.50 minutes) for both columns and percent differences (%D) between the quantitation on the two columns of less than 25%.

10. Target Compound Quantitation and CRQLs:

Concentrations of all reported analytes were correctly calculated.

Sample quantitation limits (SQLs) varied from the CRQLs (5 mg/L, 50 mg/kg) in the following samples due to the factors listed below.

SAMPLE NO.	LEVEL	% SOLID moisture	SAMPLE WT/VOL (gm/ml)	DF	SAV (ul)	SEV (ul)	SQL FACTOR
SB20-0030	LOW	7.9					1.056
SB22-0030	LOW	2.2					1.022
SB21-0030	LOW	5.4					1.057
SB23-0030	LOW	2.1					1.021
SB24-0020	LOW	14.4					1.167
SB25-0030	LOW	1.7					1.017
SB26-0020	LOW	2.8					1.029
SB36-6070	LOW	2.5					1.026
SB37-6070	LOW	6.8					1.073
SB38-0010	LOW	16.2					1.193
SB27-0030	LOW	4.8					1.050
SB28-0020	LOW	4.5					1.047

SAMPLE NO.	LEVEL	% SOLID moisture	SAMPLE WT/VOL (gm/ml)	DF	SAV (ul)	SEV (ul)	SQL FACTOR
SB29-0010	LOW	2.4					1.024
SB30-0030	LOW	10.9					1.122
SB31-0030	LOW	15.8					1.188
SB32-0010	LOW	42.7					1.745
SB32-0010D	LOW	42.1					1.727
SB33-0010	LOW	22.2					1.285
SB34-0010	LOW	22.6					1.292
SB40-3040	LOW	15.1					1.178
SB39-3040	LOW	16.7					1.200
SB43-6070	LOW	7.8					1.084
SB44-4050	LOW	9.3					1.102
SB45-0010	LOW	20.4					1.256
SB35-0030	LOW	12.4					1.142
SB41-2030	LOW	17.7					1.215
SB41-2030D	LOW	10.2					1.114
SB42-2030	LOW	14.9					1.175
SB46-0612	LOW	15					1.176
SB46-0612D	LOW	12					1.136

DF = dilution factor, SEV = soil extract volume, SAV = soil aliquot volume

11. Laboratory Control Sample:

The laboratory analyzed a laboratory control sample and recoveries for this analysis were within the control limits provided.

12. Laboratory Contact:

No laboratory contact was required.

13. Overall Assessment:

All of the soil samples analyzed contained moisture. Detection limits were adjusted accordingly. No qualifications were placed on the data. The analytical data is acceptable for use.

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB20-0030		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.001		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	15:02	

% MOISTURE	: 7.9	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03134
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 15:32		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	54.3 MG/KG	70.2 MG/KG	
TPH-(C6-C10)	54.3 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB21-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.002
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 15:02

% MOISTURE	: 2.2	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03135
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 16:16		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	51.1 MG/KG	ND MG/KG	
TPH-(C6-C10)	51.1 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB22-0030		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.003		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	15:02	

% MOISTURE	: 5.4	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03136
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 16:59		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	52.8 MG/KG	ND MG/KG	
TPH-(C6-C10)	52.8 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB23-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.004
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 15:02

% MOISTURE	: 2.1	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03137
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 17:43		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	51.1 MG/KG	ND MG/KG	
TPH-(C6-C10)	51.1 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB24-0020		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.005		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	15:03	

% MOISTURE	: 14.4	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03141
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 20:36		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	58.4 MG/KG	1140 MG/KG	
TPH-(C6-C10)	58.4 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs:

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB25-0030
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.006
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98 15:03

% MOISTURE	: 1.7	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03138
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 18:26		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	50.9 MG/KG	ND MG/KG	
TPH-(C6-C10)	50.9 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB26-0020		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4798.007		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/4/98	DATE RECEIVED	: 8/5/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	15:03	

% MOISTURE	: 2.8	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03139
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 19:10		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	51.4 MG/KG	ND MG/KG	
TPH-(C6-C10)	51.4 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB36-6070
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4798.008
PROJECT NUMBER	:		METHOD REFERENCE	:	TNRCC-1005
DATE SAMPLED	:	8/4/98	DATE RECEIVED	:	8/5/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 15:03

% MOISTURE	: 2.5	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03140
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 19:53		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	51.3 MG/KG	ND MG/KG	
TPH-(C6-C10)	51.3 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB37-6070
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.009
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 15:03

% MOISTURE	: 6.8	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03143
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 22:01		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	53.6 MG/KG	ND MG/KG	
TPH-(C6-C10)	53.6 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB38-0010
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4798.010
PROJECT NUMBER	:		METHOD REFERENCE	:	TNRCC-1005
DATE SAMPLED	:	8/4/98	DATE RECEIVED	:	8/5/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 15:03

% MOISTURE	: 16.2	ANALYST	: BP
DATE ANALYZED	: 08/11/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03144
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 22:44		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	59.7 MG/KG	ND MG/KG	
TPH-(C6-C10)	59.7 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SW03
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.011
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	WATER	PRINTED ON :	8/21/98 15:03

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03156	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 08:58

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	ND MG/L	
TPH-(C6-C10)	5.0 MG/L	ND MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs:

QC BATCH ID :TPHTB020	PREP BLANK ID :TPHTB020	LCS ID :TPHTL020
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB27-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.001
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:57

% MOISTURE	: 4.8	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03147
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 00:52		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	52.6 MG/KG	ND MG/KG	
TPH-(C6-C10)	52.6 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB28-0020
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.002
PROJECT NUMBER	:		METHOD REFERENCE	:	TNRCC-1005
DATE SAMPLED	:	8/5/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 14:57

% MOISTURE	: 4.5	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03148
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 01:34		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	52.3 MG/KG	ND MG/KG	
TPH-(C6-C10)	52.3 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB29-0010
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.003
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:57

% MOISTURE	: 2.4	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03149
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 02:16		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	51.2 MG/KG	ND MG/KG	
TPH-(C6-C10)	51.2 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB30-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.004
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:57

% MOISTURE	: 10.9	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03150
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 02:59		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	56.1 MG/KG	ND MG/KG	
TPH-(C6-C10)	56.1 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SW01
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.005
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	WATER	PRINTED ON :	8/21/98 14:57

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03159	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 11:05

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	ND MG/L	
TPH-(C6-C10)	5.0 MG/L	ND MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB020	PREP BLANK ID :TPHTB020	LCS ID :TPHTL020
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB31-0030
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.006
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98 14:57

% MOISTURE	: 15.8	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03168
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 17:37		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	59.4 MG/KG	ND MG/KG	
TPH-(C6-C10)	59.4 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SW02
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.007
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98
SAMPLE MATRIX	: WATER	PRINTED ON	: 8/21/98 14:57

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03160	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 11:49

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	ND MG/L	
TPH-(C6-C10)	5.0 MG/L	ND MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB020	PREP BLANK ID :TPHTB020	LCS ID :TPHTL020
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SW02D
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.008
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98
SAMPLE MATRIX	: WATER	PRINTED ON	: 8/21/98 14:58

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03161	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 12:32

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	ND MG/L	
TPH-(C6-C10)	5.0 MG/L	ND MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB020	PREP BLANK ID :TPHTB020	LCS ID :TPHTL020
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB32-0010
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.009
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:58

% MOISTURE	: 42.7	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03169
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 18:21		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	87.3 MG/KG	ND MG/KG	
TPH-(C6-C10)	87.3 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB32-0010D
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.010
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:58

% MOISTURE	: 42.1	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03170
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 19:05		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	86.3 MG/KG	ND MG/KG	
TPH-(C6-C10)	86.3 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB33-0010
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.011
PROJECT NUMBER	:		METHOD REFERENCE	:	TNRCC-1005
DATE SAMPLED	:	8/5/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 14:58

% MOISTURE	: 22.2	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03171
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 19:49		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	64.3 MG/KG	125 MG/KG	
TPH-(C6-C10)	64.3 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB34-0010
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.012
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98 14:58

% MOISTURE	: 22.6	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03172
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 20:32		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	64.6 MG/KG	1370 MG/KG	
TPH-(C6-C10)	64.6 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB40-3040		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.013		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:58	

% MOISTURE	: 15.1	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03151
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 03:41		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	58.9 MG/KG	ND MG/KG	
TPH-(C6-C10)	58.9 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB40-GW06		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.014		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: WATER	PRINTED ON	: 8/21/98	14:58	

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03164	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 14:43

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	ND MG/L	
TPH-(C6-C10)	5.0 MG/L	ND MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB020	PREP BLANK ID :TPHTB020	LCS ID :TPHTL020
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB39-3040
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.015
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:58

% MOISTURE	: 16.7	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03152
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 04:23		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	60.0 MG/KG	ND MG/KG	
TPH-(C6-C10)	60.0 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB019	PREP BLANK ID :TPHTB019	LCS ID :TPHTL019
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB43-6070
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.016
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98 14:58

% MOISTURE	: 7.8	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03173
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 21:16		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	54.2 MG/KG	ND MG/KG	
TPH-(C6-C10)	54.2 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB44-4050
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.017
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:58

% MOISTURE	: 9.3	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03174
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 21:58		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	55.1 MG/KG	ND MG/KG	
TPH-(C6-C10)	55.1 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB45-0010
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.018
PROJECT NUMBER	:		METHOD REFERENCE	:	TNRCC-1005
DATE SAMPLED	:	8/5/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 14:58

% MOISTURE	: 20.4	ANALYST	: BP
DATE ANALYZED	: 08/12/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03175
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 22:41		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	62.8 MG/KG	ND MG/KG	
TPH-(C6-C10)	62.8 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB35-0030		
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.019		
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005		
DATE SAMPLED	: 8/6/98	DATE RECEIVED	: 8/7/98		
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98	14:58	

% MOISTURE	: 12.4	ANALYST	: BP
DATE ANALYZED	: 08/13/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03177
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 00:05		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	57.1 MG/KG	ND MG/KG	
TPH-(C6-C10)	57.1 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB41-2030
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.020
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005
DATE SAMPLED	: 8/6/98	DATE RECEIVED	: 8/7/98
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98 14:59

% MOISTURE	: 17.7	ANALYST	: BP
DATE ANALYZED	: 08/13/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03178
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 00:47		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	60.7 MG/KG	ND MG/KG	
TPH-(C6-C10)	60.7 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB41-2030D
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.021
PROJECT NUMBER	:		METHOD REFERENCE	:	TNRCC-1005
DATE SAMPLED	:	8/6/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	8/21/98 14:59

% MOISTURE	: 10.2	ANALYST	: BP
DATE ANALYZED	: 08/13/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03179
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 01:29		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	55.7 MG/KG	ND MG/KG	
TPH-(C6-C10)	55.7 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB42-GW07
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.022
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005
DATE SAMPLED	: 8/6/98	DATE RECEIVED	: 8/7/98
SAMPLE MATRIX	: WATER	PRINTED ON	: 8/21/98 14:59

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03162	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 13:15

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	ND MG/L	
TPH-(C6-C10)	5.0 MG/L	ND MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB020	PREP BLANK ID :TPHTB020	LCS ID :TPHTL020
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB42-2030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.023
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:59

% MOISTURE	: 14.9	ANALYST	: BP
DATE ANALYZED	: 08/13/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03180
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 02:12		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	58.7 MG/KG	ND MG/KG	
TPH-(C6-C10)	58.7 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

000172

002743

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SW04
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.024
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005
DATE SAMPLED	: 8/6/98	DATE RECEIVED	: 8/7/98
SAMPLE MATRIX	: WATER	PRINTED ON	: 8/21/98 14:59

ANALYST	: BP	DATE ANALYZED	: 08/12/98
DILUTION	: 1	EXTRACT VOLUME	: 3 ML
INSTRUMENT FILE	: C03163	INSTRUMENT ID	: C-HP5890
SAMPLE VOLUME	: 30 ML	TIME ANALYZED	: 13:59

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	5.0 MG/L	ND MG/L	
TPH-(C6-C10)	5.0 MG/L	ND MG/L	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB020	PREP BLANK ID :TPHTB020	LCS ID :TPHTL020
MS ID :4798.011MS	MSD ID :4798.011MSD	

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB46-0612
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.026
PROJECT NUMBER :		METHOD REFERENCE :	TNRCC-1005
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	8/21/98 14:59

% MOISTURE	: 15	ANALYST	: BP
DATE ANALYZED	: 08/13/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03181
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 02:54		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	58.8 MG/KG	ND MG/KG	
TPH-(C6-C10)	58.8 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

000160

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LABORATORY REPORT

TPH EXTRACTABLES BY GC/FID

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB46-0612D
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.027
PROJECT NUMBER	:	METHOD REFERENCE	: TNRCC-1005
DATE SAMPLED	: 8/6/98	DATE RECEIVED	: 8/7/98
SAMPLE MATRIX	: SOIL	PRINTED ON	: 8/21/98 14:59

% MOISTURE	: 12	ANALYST	: BP
DATE ANALYZED	: 08/13/98	DILUTION	: 1
EXTRACT VOLUME	: 10 ML	INSTRUMENT FILE	: C03184
INSTRUMENT ID	: C-HP5980	SAMPLE SIZE	: 10 G
TIME ANALYZED	: 04:59		

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
TPH-(>C10-C28)	56.8 MG/KG	ND MG/KG	
TPH-(C6-C10)	56.8 MG/KG	ND MG/KG	

QUALITY CONTROL DATA

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :TPHTB021	PREP BLANK ID :TPHTB021	LCS ID :TPHTL021
MS ID :4802.006MS	MSD ID :4802.006MSD	

DATA QUALITY ASSURANCE REVIEW

SITE NAME Wilcox Refinery

CERCLIS

PAN 052601SFXX TDD NUMBER 06-98-03-0009

CASE NUMBER/WORK ORDER 6S180 SDG/PROJ. NUMBER 4798 & 4802 JWB

E & E has completed a QA review for Case No. 6S180, SDG No. 4798, Wilcox Refinery. Thirty soil and one water samples were analyzed for PAH by PDP Analytical Services. Sample numbers are listed below.

SAMPLE NUMBERS

SB20-0030	SB29-0010	SB35-0030
SB21-0030	SB30-0030	SB41-2030
SB22-0030	SB31-0030	SB41-2030D
SB23-0030	SB32-0010	SB42-2030
SB24-0030	SB32-0010D	SB46-0612
SB25-0030	SB33-0010	SB46-0612D
SB26-0020	SB34-0010	SB39-3040
SB36-6070	SB40-3040	
SB37-6070	SB40-GW06	
SB38-0010	SB43-6070	
SB27-0030	SB44-4050	
SB28-0020	SB45-0010	

This data package was validated to determine if Quality Control (QC) specifications were achieved, following *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (February, 1994), *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (February, 1994), *Quality Assurance/Quality Control Guidance for Removal Activities* (April, 1990), and the Regional Protocol for Holding Times, Blanks, and VOA Preservation (April 13, 1989). Specific data qualifications are listed in the following discussion.

REVIEWER Michelle Brown DATE 10/08/98

Data Qualifiers

Data Qualifier Definitions were supplied by the Office of Solid Waste and Emergency Response (September 1989) and are included in the Functional Guidelines. Data qualifiers may be combined (UJ, QJ) with the corresponding combination of meanings. Additional qualifier may be added to provide additional, more specific information (JL, UB, QJK), modifying the meaning of the primary qualifier. Addition qualifiers utilized by E & E are H, L, K, B, Q, and D.

U - The material was analyzed for, but was not detected. The associated numerical value is the sample quantitation or detection limit, which has been adjusted for sample weight/sample volume, extraction volume, percent solids, sample dilution or other analysis specific parameters.

An additional qualifier, "B", may be appended to indicated that while the analyte was detected in the sample, the presence of the analyte may be attributable to blank contamination and the analyte is therefore considered undetected with the sample detection or quantitation limit for the analyte being elevated.

J - The analyte was analyzed for, but the associated numerical value may not be consistent with the amount actually present in the environmental sample or may not be consistent with the sample detection or quantitation limit. The value is an estimated quantity. The data should be seriously considered for decision-making and are usable for many purposes.

An additional qualifier will be appended to the "J" qualifier that indicates the bias in the reported results:

L Low bias

H High bias

K Unknown bias

Q The reported concentration is less than the sample quantitation limit for the specific analyte in the sample.

The L and H qualifier will only be employed when a single qualification is required. When more than one quality control parameter affects the analytical result and a conflict results in assigning a bias, the result will be flagged JK.

R - Quality Control indicates that data are unusable for all purposes. The analyte was analyzed for, but the presence or absence of the analyte has not been verified. Resampling and reanalysis are necessary for verification to confirm or deny the presence of an analyte.

N - The analysis indicates the presence of analyte for which there is presumptive evidence to make a "tentative identification."

D - The concentration reported was determined in the re-analysis of the sample at a secondary dilution.

PAH FRACTION EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in SW846 method 8270C.

2. Holding Time:

All samples were extracted within the required holding time of less than 14 days after collection. Analysis of the sample was conducted within 40 days of extraction. Samples were maintained at less than 4°C. No qualifications are placed on the data.

3. Tuning/Performance:

DFTPP tuning of the mass spectrometer(s) was conducted at the required frequency and results were within the required criteria.

4. Initial Calibration:

Target analytes with individual relative response factions (RRFs) or average RRFs less than 0.05, or percent relative standard deviations (%RSDs) greater than 30% were noted and are detailed below.

ANALYTE	RRF	AVG RRF	%RSD	ASSOCIATED SAMPLES	QUALIFIER FLAG
*2,4-Dinitrophenol			36.07	NONE	JK
*3-Nitroaniline			73.37	NONE	JK
*4-Nitroaniline			40.10	NONE	JK
*3-Nitroaniline			51.03	NONE	JK

* - Compounds included in the standards but not part of the required PAH target list.

5. Continuing Calibration:

Target analytes with individual RRFs less than 0.05 or percent differences (%Ds) greater than 25% were noted and are detailed as follows.

ANALYTE	RRF	%D	ASSOCIATED SAMPLES	QUALIFIER FLAG
*N-Nitrosodimethylamine		-37.0	NONE	JK
*Pyridine		-43.9	NONE	JK
*4-Nitroaniline		39.5	NONE	JK
*3,3'-Dichlorobenzidine		-59.9	NONE	JK

* - Compounds included in the standards but not part of the required PAH target list.

6. Blanks:

A method blank was prepared at the required frequency of every time samples were extracted for each matrix and concentration or every 20 samples whichever is greater. A method blank was analyzed at the proper frequency of every 12 hours beginning with the DFTPP injection. Method blanks analyzed for the appropriate type of analysis. Target analytes were not detected in associated blank(s) analyzed.

7. Surrogates:

Control limits for the recovery of surrogates are listed below.

SURROGATE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
Terphenyl-d14		18-137	

Recoveries of the following surrogates were outside of control limits.

SAMPLE #	MATRIX	SURROGATE OUT	SURROGATE RECOVERY	QUALIFIER FLAG
SB31-0030	Soil	Terphenyl-d14	725%	No Flag - caused by diluted analysis
SB34-0010	Soil	Terphenyl-d14	157%	No Flag - caused by low internal std.
SB40-3040	Soil	Terphenyl-d14	163%	JH
SB43-6070	Soil	Terphenyl-d14	146%	JH
SB44-4050	Soil	Terphenyl-d14	138%	JH
SB35-0030	Soil	Terphenyl-d14	141%	No Flag - caused by low internal std.
SB41-2030D	Soil	Terphenyl-d14	181%	JH
SB46-0612	Soil	Terphenyl-d14	172%	JH

8. Matrix Spikes:

Sample SB27-0030 underwent matrix spike analysis for the soil matrix. Control limits for matrix spike recoveries are listed in the following table.

ANALYTE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
Acenaphthene		31-137	
Acenaphthylene		31-137	

ANALYTE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
Anthracene		31-137	
Benzo(a)anthracene		31-137	
Benzo(a)pyrene		31-137	
Benzo(g,h,i)perylene		31-137	
Benzo(k)fluoranthene		31-137	
Chrysene		31-137	
Dibenzo(a,h)anthracene		31-137	
Fluoranthene		31-137	
Indeno(1,2,3-cd)pyrene		31-137	
Naphthalene		31-137	
Phenanthrene		31-137	
Pyrene		31-137	

Recoveries of all of the spiked compounds were outside of the required control limits due to the sample matrix, the low internal standard recoveries and the diluted analysis.

9. Duplicates:

Sample SB27-0030 underwent matrix spike duplicate analysis for the soil matrix. Control limits for relative percent differences (RPDs) are listed in the following table.

ANALYTE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
Acenaphthene		50	
Acenaphthylene		50	
Anthracene		50	
Benzo(a)anthracene		50	
Benzo(a)pyrene		50	
Benzo(b)fluoranthene		50	
Benzo(g,h,i)perylene		50	
Benzo(k)fluoranthene		50	
Chrysene		50	
Dibenzo(a,h)anthracene		50	
Fluoranthene		50	

ANALYTE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
Fluorene		50	
Indeno(1,2,3-cd)pyrene		50	
Naphthalene		50	
Phenanthrene		50	
Pyrene		50	

RPDs of the following spiked analytes were outside of the required control limits.

SAMPLE NO. MATRIX	ANALYTE	RPD	AFFECTED SAMPLES	QUALIFIER FLAG
SB27-0030/soil	Benzo(g,h,i)perylene	71.1	SB27-0030	JK
SB27-0030/soil	Dibenzo(a,h)anthracene	54.8	SB27-0030	JK
SB27-0030/soil	Indeno(1,2,3-cd)pyrene	50.2	SB27-0030	JK

10. Internal Standards:

Areas of the following internal standards were outside of the control limit of a factor of 2 (-50% to +100%) and retention times within 30 seconds from the associated 12 hour calibration standard.

SAMPLE NO.	INTERNAL STANDARD	% AREA OF 12 HR STD	RT SHIFT MIN.	QUALIFIER FLAG *
SB20-0030	IS2	-55.9		JH or UJK
SB21-0030	IS1	-106.6		JH or UJK
SB21-0030	IS2	-58.5		JH or UJK
SB22-0030	IS1	-121.3		JH or UJK
SB22-0030	IS2	-77.3		JH or UJK
SB23-0030	IS1	-121.4		JH or UJK
SB24-0020	IS1	-119.5		JH or UJK
SB25-0030	IS1	-134.9		JH or UJK
SB25-0030	IS2	-76.1		JH or UJK
SB26-0020	IS1	-208.3		JH or UJK
SB26-0020	IS2	-80.6		JH or UJK
SB36-6070	IS1	-188.4		JH or UJK

SAMPLE NO.	INTERNAL STANDARD	% AREA OF 12 HR STD	RT SHIFT MIN.	QUALIFIER FLAG *
SB36-6070	IS2	-80.0		JH or UJK
SB37-6070	IS1	-202.6		JH or UJK
SB37-6070	IS2	-95.5		JH or UJK
SB38-0010	IS1	-200.7		JH or UJK
SB38-0010	IS2	-79.8		JH or UJK
SB27-0030	IS1	-125		JH or UJK
SB27-0030	IS2	-83.3		JH or UJK
SB27-0030	IS3	-61.8		JH or UJK
SB29-0010	IS1	-127.8		JH or UJK
SB29-0010	IS2	-71.8		JH or UJK
SB29-0010	IS3	-56.4		JH or UJK
SB29-0010	IS6	-57.7		JH or UJK
SB30-0030	IS1	-101.7		JH or UJK
SB30-0030	IS2	-88.6		JH or UJK
SB30-0030	IS3	-78.9		JH or UJK
SB30-0030	IS6	-65.2		JH or UJK
SB31-0030	IS1	-118.1		JH or UJK
SB31-0030	IS2	-95.8		JH or UJK
SB31-0030	IS3	-78.9		JH or UJK
SB31-0030	IS6	-65.2		JH or UJK
SB32-0010	IS1	-77.8		JH or UJK
SB32-0010D	IS1	-87.2		JH or UJK
SB33-0010	IS1	-101.4		JH or UJK
SB34-0010	IS1	-93.4		JH or UJK
SB34-0010	IS2	-69.4		JH or UJK
SB34-0010	IS5	-81.6		JH or UJK
SB34-0010	IS6	-119.3		JH or UJK
SB40-3040	IS1	-116.6		JH or UJK
SB40-3040	IS2	-85.0		JH or UJK

SAMPLE NO.	INTERNAL STANDARD	% AREA OF 12 HR STD	RT SHIFT MIN.	QUALIFIER FLAG *
SB40-3040	IS3	-55.0		JH or UJK
SB39-3040	IS1	-98.3		JH or UJK
SB39-3040	IS2	-67.1		JH or UJK
SB43-6070	IS1	-141.6		JH or UJK
SB43-6070	IS2	-70.9		JH or UJK
SB45-0010	IS1	-89.0		JH or UJK
SB35-0030	IS1	-115.1		JH or UJK
SB35-0030	IS5	-75.0		JH or UJK
SB35-0030	IS6	-76.4		JH or UJK
SB41-2030	IS1	-113.7		JH or UJK
SB41-2030	IS2	-55.6		JH or UJK
SB41-2030D	IS1	-184		JH or UJK
SB41-2030D	IS2	-83.3		JH or UJK
SB42-2030	IS1	159.8		JH or UJK
SB42-2030	IS2	-89.7		JH or UJK
SB46-0612	IS1	-239.1		JH or UJK
SB46-0612	IS2	-107.3		JH or UJK
SB46-0612	IS3	-56.7		JH or UJK
SB46-0612D	IS1	-184.3		JH or UJK
SB46-0612D	IS2	-95.1		JH or UJK
SB46-0612D	IS3	-64.5		JH or UJK
SB44-4050	IS1	-101.6		JH or UJK
SB44-4050	IS2	-70.9		JH or UJK
SB28-0020	IS1	-132.6		JH or UJK
SB28-0020	IS2	-94.6		JH or UJK
SB28-0020	IS3	-71.7		JH or UJK
SB28-0020	IS6	-79.5		JH or UJK

IS1 (DCB) = 1,4-Dichlorobenzene-d4
IS2 (NPT) = Naphthalene-d8

IS3 (ANT) = Acenaphthene-d10
IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene-d12
* Specific analytes qualified are listed in the following table(s).

IS1 - DCB
Phenol
bis(2-Chloroethyl)ether
2-Chlorophenol
1,3-Dichlorobenzene
1,4-Dichlorobenzene
1,2-Dichlorobenzene
2-Methylphenol
2,2'-oxybis-(1-Chloropropane)
4-Methylphenol
N-Nitroso-di-n-propylamine
Hexachloroethane
2-Fluorophenol (surr)
Phenol-d5 (surr)
2-Chlorophenol-d4 (surr)
1,2-Dichlorobenzene-d4 (surr)

IS2 - NPT
Nitrobenzene
Isophorone
2-Nitrophenol
2,4-Dimethylphenol
bis(2-Chloroethoxy)methane
2,4-Dichlorophenol
1,2,4-Trichlorobenzene
Naphthalene
4-Chloroaniline

IS2 - NPT
Hexachlorobutadiene
4-Chloro-3-methylphenol
2-Methylnaphthalene
Nitrobenzene-d5 (surr)

IS3 - ANT
Hexachlorocyclopentadiene
2,4,6-Trichlorophenol
2,4,5-Trichlorophenol
2-Chloronaphthalene
2-Nitroaniline
Dimethylphthalate
Acenaphthylene
3-Nitroaniline
Acenaphthene
2,4-Dinitrophenol
4-Nitrophenol
Dibenzofuran
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Diethylphthalate
4-Chlorophenyl-phenylether
Fluorene
4-Nitroaniline
2-Fluorobiphenyl (surr)

IS4 - PHN
4,6-Dinitro-2-methylphenol
N-Nitroso-diphenylamine

IS4 - PHN
4-Bromophenyl-phenylether
Hexachlorobenzene
Pentachlorophenol
Carbazole
Phenanthrene
Anthracene
Di-n-butylphthalate
Fluoranthene
2,4,6-Tribromophenol (surr)

IS5 - CRY
Pyrene
Butylbenzylphthalate
3,3'-Dichlorobenzidine
Benzo(a)anthracene
bis(2-Ethylhexyl)phthalate
Chrysene
Terphenyl-d14 (surr)

IS6 - PRY
Di-n-octylphthalate
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(a)pyrene
Indeno(1,2,3-cd)pyrene
Benzo(g,h,i)perylene
Dibenzo(a,h)anthracene

11. Target Compound Identification:

All target compounds reported by the laboratory met identification criteria of relative retention times (RRT) within 0.06 RRT units of the 12 hour standard and that all ions present in the standard mass

spectrum were present in the sample mass spectrum and the abundance of these ions agreed within ± 20% between the standard and sample spectrum.

12. Target Compound Quantitation and CRQLs:

Concentrations of all reported analytes were correctly calculated.

Sample quantitation limits (SQLs) varied from CRQLs in the following samples due to the factors listed below.

SAMPLE NO.	LEVEL	% SOLID moisture	SAMPLE WT/VOL (gm/ml)	GPC y/n	DF	CEV (ul)	SQL FACTOR
SB20-0030	LOW	7.9					1.086
SB21-0030	LOW	2.2					1.022
SB22-0030	LOW	5.4					1.057
SB23-0030	LOW	2.1					1.021
SB24-0020	LOW	14.4					1.168
SB25-0030	LOW	1.7					1.017
SB26-0020	LOW	2.8					1.029
SB36-6070	LOW	10.125					1.113
SB37-6070	LOW	6.8					1.073
SB38-0010	LOW	16.2					1.193
SB27-0030	LOW	4.8			10		10.504
SB28-0020	LOW	4.8			10		10.504
SB29-0010	LOW	2.4			10		10.246
SB30-0030	LOW	10.9			10		11.223
SB31-0030	LOW	15.8			10		11.876
SB32-0010	LOW	42.7					1.745
SB32-0010D	LOW	42.1					1.727
SB33-0010	LOW	22.2					1.285
SB34-0010	LOW	15.8			10		11.876
SB40-3040	LOW	15.1					1.178
SB39-3040	LOW	15.1					1.178
SB43-6070	LOW	7.8					1.084

SAMPLE NO.	LEVEL	% SOLID moisture	SAMPLE WT/VOL (gm/ml)	GPC y/n	DF	CEV (ul)	SQL FACTOR
SB44-4050	LOW	9.3					1.102
SB45-0010	LOW	20.4					1.256
SB35-0030	LOW	12.4					1.142
SB41-2030	LOW	17.7					11.215
SB41-2030D	LOW	10.2					1.114
SB42-2030	LOW	14.9					1.175
SB46-0612	LOW	15					1.176
SB46-0612D	LOW	12					1.136

DF = dilution factor, CEV = concentrated extract volume

13. Laboratory Control Sample:

Recoveries of the following analytes were outside of control limits in the laboratory control sample.

ANALYTE	RECOVERY %	CONTROL LIMIT	AFFECTED SAMPLES	QUALIFIER FLAG
Benzo(a)anthracene	0	31-137	All PAHB004 samples	JL
Benzo(k)fluoranthene	138	31-137	All PAHB002 samples	JH
Chrysene	145	31-137	All PAHB002 samples	JH
Fluoranthene	175	31-137	All PAHB002 samples	JH

14. Laboratory Contact:

The laboratory was contacted on October 7th and 8th, 1998 regarding missing data from the package (see attached Laboratory Contact Log).

15. Overall Assessment:

The samples in this sample delivery group all had problems with recoveries. One or more of the internal standards recovered below control limits in every sample analyzed. All affected compounds were qualified as either estimated biased high if there was a reported concentration or their quantitation limits were qualified as estimated, unknown bias.

These low internal standards, the sample matrix and the diluted analysis caused the matrix spike and matrix spike duplicate to fail all quality control (QC) limits. Most of the spike compounds recovered high and were qualified as estimated, biased low in all the affected samples.
Benzo(a)anthracene did not recover at all. There was also no recovery of this compound in the laboratory control sample (LCS) prepped with the QC (batch PAHB004). This compound was qualified as estimated, biased low in all the affected samples.
The LCS prepped with batch PAHB002 had high recovery of a few compounds. These were qualified as estimated, biased high.
Samples AB34-0010 had chrysene, phenanthrene and pyrene quantitated above calibration range. No secondary dilution was ran for this sample. These compounds should be considered estimated values only and were qualified as estimated, unknown bias.
All of the samples analyzed contained moisture and some had dilutions. Calculations and quantitation limits were adjusted accordingly.
The analytical data is acceptable for use with the qualifications listed above.

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB20-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.001
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/17/98 8:41

% MOISTURE	: 7.9	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/6/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4491.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 15:15

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	360 UG/KG	ND UG/KG	
Acenaphthylene	360 UG/KG	ND UG/KG	
Anthracene	360 UG/KG	ND UG/KG	
Benzo(a)anthracene	360 UG/KG	ND UG/KG	
Benzo(a)pyrene	360 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	360 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	360 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	360 UG/KG	ND UG/KG	
Chrysene	360 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	360 UG/KG	ND UG/KG	
Fluoranthene	360 UG/KG	ND UG/KG	
Fluorene	360 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	360 UG/KG	ND UG/KG	
Naphthalene	360 UG/KG	ND UG/KG	UJK
Phenanthrene	360 UG/KG	ND UG/KG	
Pyrene	360 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	724 UG/KG	18 - 137	21

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB002	PREP BLANK ID :PAHB002	LCS ID :PAHL002
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB21-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.002
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/17/98 8:41

% MOISTURE	: 2.2	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/6/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4492.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 15:52

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	340 UG/KG	ND UG/KG	
Acenaphthylene	340 UG/KG	ND UG/KG	
Anthracene	340 UG/KG	ND UG/KG	
Benzo(a)anthracene	340 UG/KG	ND UG/KG	
Benzo(a)pyrene	340 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	340 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	340 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	340 UG/KG	ND UG/KG	
Chrysene	340 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	340 UG/KG	ND UG/KG	
Fluoranthene	340 UG/KG	ND UG/KG	
Fluorene	340 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	340 UG/KG	ND UG/KG	
Naphthalene	340 UG/KG	ND UG/KG	JJK
Phenanthrene	340 UG/KG	ND UG/KG	
Pyrene	340 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	682 UG/KG	18 - 137	98

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB002	PREP BLANK ID :PAHB002	LCS ID :PAHL002
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB22-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.003
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/17/98 8:41

% MOISTURE	: 5.4	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/6/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4493.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 16:29

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	350 UG/KG	ND UG/KG	
Acenaphthylene	350 UG/KG	ND UG/KG	
Anthracene	350 UG/KG	ND UG/KG	
Benzo(a)anthracene	350 UG/KG	ND UG/KG	
Benzo(a)pyrene	350 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	350 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	350 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	350 UG/KG	ND UG/KG	
Chrysene	350 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	350 UG/KG	ND UG/KG	
Fluoranthene	350 UG/KG	ND UG/KG	
Fluorene	350 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	350 UG/KG	ND UG/KG	
Naphthalene	350 UG/KG	ND UG/KG	UJK
Phenanthrene	350 UG/KG	ND UG/KG	
Pyrene	350 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	705 UG/KG	18 - 137	102

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB002	PREP BLANK ID :PAHB002	LCS ID :PAHL002
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB23-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.004
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/17/98 8:41

% MOISTURE	: 2.1	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/6/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4489.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 14:02

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	340 UG/KG	ND UG/KG	
Acenaphthylene	340 UG/KG	ND UG/KG	
Anthracene	340 UG/KG	ND UG/KG	
Benzo(a)anthracene	340 UG/KG	380 UG/KG	
Benzo(a)pyrene	340 UG/KG	340 UG/KG	
Benzo(b)fluoranthene	340 UG/KG	260 UG/KG	
Benzo(g,h,i)perylene	340 UG/KG	570 UG/KG	
Benzo(k)fluoranthene	340 UG/KG	ND UG/KG	
Chrysene	340 UG/KG	850 UG/KG	JH
Dibenzo(a,h)anthracene	340 UG/KG	ND UG/KG	
Fluoranthene	340 UG/KG	ND UG/KG	
Fluorene	340 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	340 UG/KG	ND UG/KG	
Naphthalene	340 UG/KG	180 UG/KG	JH
Phenanthrene	340 UG/KG	1500 UG/KG	
Pyrene	340 UG/KG	1200 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	681 UG/KG	18 - 137	104

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB002 PREP BLANK ID :PAHB002 LCS ID :PAHL002
MS ID :4798.003MS MSD ID :4798.003MSD

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB24-0020
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.005
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/17/98 8:41

% MOISTURE	: 14.4	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/6/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4490.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 14:38

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	390 UG/KG	ND UG/KG	
Acenaphthylene	390 UG/KG	ND UG/KG	
Anthracene	390 UG/KG	ND UG/KG	
Benzo(a)anthracene	390 UG/KG	610 UG/KG	
Benzo(a)pyrene	390 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	390 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	390 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	390 UG/KG	ND UG/KG	
Chrysene	390 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	390 UG/KG	ND UG/KG	
Fluoranthene	390 UG/KG	ND UG/KG	
Fluorene	390 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	390 UG/KG	ND UG/KG	
Naphthalene	390 UG/KG	ND UG/KG	
Phenanthrene	390 UG/KG	760 UG/KG	
Pyrene	390 UG/KG	1500 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	779 UG/KG	18 - 137	76

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB002	PREP BLANK ID :PAHB002	LCS ID :PAHL002
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB25-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.006
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/17/98 8:41

% MOISTURE	: 1.7	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/6/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4487.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 12:13

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	340 UG/KG	ND UG/KG	
Acenaphthylene	340 UG/KG	ND UG/KG	
Anthracene	340 UG/KG	ND UG/KG	
Benzo(a)anthracene	340 UG/KG	610 UG/KG	
Benzo(a)pyrene	340 UG/KG	410 UG/KG	
Benzo(b)fluoranthene	340 UG/KG	520 UG/KG	
Benzo(g,h,i)perylene	340 UG/KG	270 UG/KG	
Benzo(k)fluoranthene	340 UG/KG	ND UG/KG	
Chrysene	340 UG/KG	810 UG/KG	JH
Dibenzo(a,h)anthracene	340 UG/KG	ND UG/KG	
Fluoranthene	340 UG/KG	850 UG/KG	JH
Fluorene	340 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	340 UG/KG	210 UG/KG	
Naphthalene	340 UG/KG	ND UG/KG	UJH
Phenanthrene	340 UG/KG	1300 UG/KG	
Pyrene	340 UG/KG	1200 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	678 UG/KG	18 - 137	50

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB002 PREP BLANK ID :PAHB002 LCS ID :PAHL002
MS ID :4798.003MS MSD ID :4798.003MSD

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB26-0020
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.007
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/17/98 8:41

% MOISTURE	: 2.8	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/6/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4488.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 13:25

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	340 UG/KG	ND UG/KG	
Acenaphthylene	340 UG/KG	ND UG/KG	
Anthracene	340 UG/KG	ND UG/KG	
Benzo(a)anthracene	340 UG/KG	300 UG/KG	
Benzo(a)pyrene	340 UG/KG	230 UG/KG	
Benzo(b)fluoranthene	340 UG/KG	260 UG/KG	
Benzo(g,h,i)perylene	340 UG/KG	300 UG/KG	
Benzo(k)fluoranthene	340 UG/KG	ND UG/KG	
Chrysene	340 UG/KG	650 UG/KG	JH
Dibenzo(a,h)anthracene	340 UG/KG	ND UG/KG	
Fluoranthene	340 UG/KG	ND UG/KG	
Fluorene	340 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	340 UG/KG	ND UG/KG	
Naphthalene	340 UG/KG	ND UG/KG	UJH
Phenanthrene	340 UG/KG	1100 UG/KG	
Pyrene	340 UG/KG	720 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	686 UG/KG	18 - 137	114

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB002	PREP BLANK ID :PAHB002	LCS ID :PAHL002
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB36-6070
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.008
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/17/98 8:42

% MOISTURE	: 10.125	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/6/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4494.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 17:06

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	370 UG/KG	ND UG/KG	
Acenaphthylene	370 UG/KG	ND UG/KG	
Anthracene	370 UG/KG	ND UG/KG	
Benzo(a)anthracene	370 UG/KG	ND UG/KG	
Benzo(a)pyrene	370 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	370 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	370 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	370 UG/KG	ND UG/KG	
Chrysene	370 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	370 UG/KG	ND UG/KG	
Fluoranthene	370 UG/KG	ND UG/KG	
Fluorene	370 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	370 UG/KG	ND UG/KG	
Naphthalene	370 UG/KG	ND UG/KG	UJK
Phenanthrene	370 UG/KG	ND UG/KG	
Pyrene	370 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	742 UG/KG	18 - 137	98

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB002	PREP BLANK ID :PAHB002	LCS ID :PAHL002
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB37-6070
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.009
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/17/98 8:42

% MOISTURE	: 6.8	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/6/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4495.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 17:43

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	360 UG/KG	ND UG/KG	
Acenaphthylene	360 UG/KG	ND UG/KG	
Anthracene	360 UG/KG	ND UG/KG	
Benzo(a)anthracene	360 UG/KG	ND UG/KG	
Benzo(a)pyrene	360 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	360 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	360 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	360 UG/KG	ND UG/KG	
Chrysene	360 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	360 UG/KG	ND UG/KG	
Fluoranthene	360 UG/KG	ND UG/KG	
Fluorene	360 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	360 UG/KG	ND UG/KG	
Naphthalene	360 UG/KG	ND UG/KG	UJ5
Phenanthrene	360 UG/KG	ND UG/KG	
Pyrene	360 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	715 UG/KG	18 - 137	45

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB002	PREP BLANK ID :PAHB002	LCS ID :PAHL002
MS ID :4798.003MS	MSD ID :4798.003MSD	

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB38-0010
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4798.010
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/4/98	DATE RECEIVED :	8/5/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/17/98 8:42

% MOISTURE	: 16.2	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/6/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4496.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 18:20

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	400 UG/KG	ND UG/KG	
Acenaphthylene	400 UG/KG	ND UG/KG	
Anthracene	400 UG/KG	ND UG/KG	
Benzo(a)anthracene	400 UG/KG	ND UG/KG	
Benzo(a)pyrene	400 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	400 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	400 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	400 UG/KG	ND UG/KG	
Chrysene	400 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	400 UG/KG	ND UG/KG	
Fluoranthene	400 UG/KG	ND UG/KG	
Fluorene	400 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	400 UG/KG	ND UG/KG	
Naphthalene	400 UG/KG	ND UG/KG	UJK
Phenanthrene	400 UG/KG	ND UG/KG	
Pyrene	400 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	796 UG/KG	18 - 137	98

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB002 PREP BLANK ID :PAHB002 LCS ID :PAHL002
MS ID :4798.003MS MSD ID :4798.003MSD

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB27-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.001
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:40

% MOISTURE	: 4.8	ANALYST	: CW
DATE ANALYZED	: 9/1/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 10 mL
INSTRUMENT FILE	: A4534.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 14:53

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	3500 UG/KG	ND UG/KG	UJK
Acenaphthylene	3500 UG/KG	ND UG/KG	UJK
Anthracene	3500 UG/KG	ND UG/KG	
Benzo(a)anthracene	3500 UG/KG	ND UG/KG	UJL
Benzo(a)pyrene	3500 UG/KG	570 UG/KG	JH
Benzo(b)fluoranthene	3500 UG/KG	500 UG/KG	JH
Benzo(g,h,i)perylene	3500 UG/KG	540 UG/KG	JH
Benzo(k)fluoranthene	3500 UG/KG	ND UG/KG	
Chrysene	3500 UG/KG	1700 UG/KG	JH
Dibenzo(a,h)anthracene	3500 UG/KG	ND UG/KG	UJK
Fluoranthene	3500 UG/KG	400 UG/KG	JH
Fluorene	3500 UG/KG	ND UG/KG	UJK
Indeno(1,2,3-c,d)pyrene	3500 UG/KG	ND UG/KG	UJK
Naphthalene	3500 UG/KG	ND UG/KG	UJK
Phenanthrene	3500 UG/KG	1700 UG/KG	JH
Pyrene	3500 UG/KG	1900 UG/KG	JH

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	700 UG/KG	18 - 137	94

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004 PREP BLANK ID :PAHB004 LCS ID :PAHL004
MS ID :4802.001MS MSD ID :4802.001MSD

000170

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB28-002~~0SE~~
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.002~~DE~~
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:40

% MOISTURE	: 4.8	ANALYST	: CW
DATE ANALYZED	: 9/1/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 10 mL
INSTRUMENT FILE	: A4537.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 16:44

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	3500 UG/KG	ND UG/KG	UJK
Acenaphthylene	3500 UG/KG	ND UG/KG	UJK
Anthracene	3500 UG/KG	4900 UG/KG	
Benzo(a)anthracene	3500 UG/KG	ND UG/KG	UJL
Benzo(a)pyrene	3500 UG/KG	2900 UG/KG	JH
Benzo(b)fluoranthene	3500 UG/KG	1500 UG/KG	JH
Benzo(g,h,i)perylene	3500 UG/KG	1100 UG/KG	JH
Benzo(k)fluoranthene	3500 UG/KG	ND UG/KG	UJK
Chrysene	3500 UG/KG	5400 UG/KG	
Dibenzo(a,h)anthracene	3500 UG/KG	530 UG/KG	JH
Fluoranthene	3500 UG/KG	1500 UG/KG	
Fluorene	3500 UG/KG	ND UG/KG	UJK
Indeno(1,2,3-c,d)pyrene	3500 UG/KG	510 UG/KG	JH
Naphthalene	3500 UG/KG	370 UG/KG	JH
Phenanthrene	3500 UG/KG	4800 UG/KG	
Pyrene	3500 UG/KG	6600 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	700 UG/KG	18 - 137	102

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004 PREP BLANK ID :PAHB004 LCS ID :PAHL004
MS ID :4802.001MS MSD ID :4802.001MSD

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB29-0010
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.003
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:41

% MOISTURE	: 2.4	ANALYST	: CW
DATE ANALYZED	: 9/1/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 10 mL
INSTRUMENT FILE	: A4538.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 17:21

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	3400 UG/KG	ND UG/KG	UJK
Acenaphthylene	3400 UG/KG	ND UG/KG	UJK
Anthracene	3400 UG/KG	ND UG/KG	
Benzo(a)anthracene	3400 UG/KG	ND UG/KG	UJL
Benzo(a)pyrene	3400 UG/KG	750 UG/KG	JH
Benzo(b)fluoranthene	3400 UG/KG	400 UG/KG	JH
Benzo(g,h,i)perylene	3400 UG/KG	ND UG/KG	UJK
Benzo(k)fluoranthene	3400 UG/KG	480 UG/KG	JH
Chrysene	3400 UG/KG	1200 UG/KG	
Dibenzo(a,h)anthracene	3400 UG/KG	ND UG/KG	UJK
Fluoranthene	3400 UG/KG	340 UG/KG	
Fluorene	3400 UG/KG	ND UG/KG	UJK
Indeno(1,2,3-c,d)pyrene	3400 UG/KG	360 UG/KG	JH
Naphthalene	3400 UG/KG	ND UG/KG	UJK
Phenanthrene	3400 UG/KG	1500 UG/KG	
Pyrene	3400 UG/KG	1300 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	683 UG/KG	18 - 137	88

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004	PREP BLANK ID :PAHB004	LCS ID :PAHL004
MS ID :4802.001MS	MSD ID :4802.001MSD	

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB30-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.004
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:41

% MOISTURE	: 10.9	ANALYST	: CW
DATE ANALYZED	: 9/1/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 10 mL
INSTRUMENT FILE	: A4539.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 17:59

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	3700 UG/KG	ND UG/KG	UJK
Acenaphthylene	3700 UG/KG	ND UG/KG	UJK
Anthracene	3700 UG/KG	ND UG/KG	
Benzo(a)anthracene	3700 UG/KG	ND UG/KG	UJL
Benzo(a)pyrene	3700 UG/KG	ND UG/KG	UJK
Benzo(b)fluoranthene	3700 UG/KG	ND UG/KG	UJK
Benzo(g,h,i)perylene	3700 UG/KG	ND UG/KG	UJK
Benzo(k)fluoranthene	3700 UG/KG	ND UG/KG	UJK
Chrysene	3700 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	3700 UG/KG	ND UG/KG	UJK
Fluoranthene	3700 UG/KG	ND UG/KG	
Fluorene	3700 UG/KG	ND UG/KG	UJK
Indeno(1,2,3-c,d)pyrene	3700 UG/KG	ND UG/KG	UJK
Naphthalene	3700 UG/KG	ND UG/KG	UJK
Phenanthrene	3700 UG/KG	ND UG/KG	
Pyrene	3700 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	748 UG/KG	18 - 137	101

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004 PREP BLANK ID :PAHB004 LCS ID :PAHL004
MS ID :4802.001MS MSD ID :4802.001MSD

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB31-0030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.006
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:41

% MOISTURE	: 15.8	ANALYST	: CW
DATE ANALYZED	: 9/1/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 10 mL
INSTRUMENT FILE	: A4540.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 18:36

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	4000 UG/KG	ND UG/KG	UJK
Acenaphthylene	4000 UG/KG	ND UG/KG	UJK
Anthracene	4000 UG/KG	ND UG/KG	
Benzo(a)anthracene	4000 UG/KG	ND UG/KG	UJL
Benzo(a)pyrene	4000 UG/KG	ND UG/KG	UJK
Benzo(b)fluoranthene	4000 UG/KG	ND UG/KG	UJK
Benzo(g,h,i)perylene	4000 UG/KG	ND UG/KG	UJK
Benzo(k)fluoranthene	4000 UG/KG	ND UG/KG	UJK
Chrysene	4000 UG/KG	770 UG/KG	
Dibenzo(a,h)anthracene	4000 UG/KG	ND UG/KG	UJK
Fluoranthene	4000 UG/KG	ND UG/KG	
Fluorene	4000 UG/KG	ND UG/KG	UJK
Indeno(1,2,3-c,d)pyrene	4000 UG/KG	ND UG/KG	UJK
Naphthalene	4000 UG/KG	ND UG/KG	UJK
Phenanthrene	4000 UG/KG	700 UG/KG	
Pyrene	4000 UG/KG	700 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	792 UG/KG	18 - 137	725

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004 PREP BLANK ID :PAHB004 LCS ID :PAHL004
MS ID :4802.001MS MSD ID :4802.001MSD

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB32-0010
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.009
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:41

% MOISTURE	: 42.7	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4498.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 19:34

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	580 UG/KG	ND UG/KG	
Acenaphthylene	580 UG/KG	ND UG/KG	
Anthracene	580 UG/KG	ND UG/KG	
Benzo(a)anthracene	580 UG/KG	ND UG/KG	UJL
Benzo(a)pyrene	580 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	580 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	580 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	580 UG/KG	ND UG/KG	
Chrysene	580 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	580 UG/KG	ND UG/KG	
Fluoranthene	580 UG/KG	ND UG/KG	
Fluorene	580 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	580 UG/KG	ND UG/KG	
Naphthalene	580 UG/KG	ND UG/KG	
Phenanthrene	580 UG/KG	ND UG/KG	
Pyrene	580 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	1160 UG/KG	18 - 137	113

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004	PREP BLANK ID :PAHB004	LCS ID :PAHL004
MS ID :4802.001MS	MSD ID :4802.001MSD	

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB32-0010D
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.010
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:41

% MOISTURE	: 42.1	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4499.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 20:10

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	580 UG/KG	ND UG/KG	
Acenaphthylene	580 UG/KG	ND UG/KG	
Anthracene	580 UG/KG	ND UG/KG	
Benzo(a)anthracene	580 UG/KG	ND UG/KG	UJL
Benzo(a)pyrene	580 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	580 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	580 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	580 UG/KG	ND UG/KG	
Chrysene	580 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	580 UG/KG	ND UG/KG	
Fluoranthene	580 UG/KG	ND UG/KG	
Fluorene	580 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	580 UG/KG	ND UG/KG	
Naphthalene	580 UG/KG	ND UG/KG	
Phenanthrene	580 UG/KG	310 UG/KG	
Pyrene	580 UG/KG	290 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	1150 UG/KG	18 - 137	123

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004 PREP BLANK ID :PAHB004 LCS ID :PAHL004
MS ID :4802.001MS MSD ID :4802.001MSD

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB33-0010
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.011
PROJECT NUMBER	:	METHOD REFERENCE	: SW846-8270C
DATE SAMPLED	: 8/5/98	DATE RECEIVED	: 8/7/98
SAMPLE MATRIX	: SOIL	PRINTED ON	: 9/16/98 18:41

% MOISTURE	: 22.2	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4501.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 21:24

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	430 UG/KG	ND UG/KG	
Acenaphthylene	430 UG/KG	ND UG/KG	
Anthracene	430 UG/KG	ND UG/KG	
Benzo(a)anthracene	430 UG/KG	350 UG/KG	JL
Benzo(a)pyrene	430 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	430 UG/KG	290 UG/KG	
Benzo(g,h,i)perylene	430 UG/KG	240 UG/KG	
Benzo(k)fluoranthene	430 UG/KG	ND UG/KG	
Chrysene	430 UG/KG	1000 UG/KG	
Dibenzo(a,h)anthracene	430 UG/KG	ND UG/KG	
Fluoranthene	430 UG/KG	ND UG/KG	
Fluorene	430 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	430 UG/KG	ND UG/KG	
Naphthalene	430 UG/KG	ND UG/KG	
Phenanthrene	430 UG/KG	970 UG/KG	
Pyrene	430 UG/KG	1100 UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	857 UG/KG	18 - 137	118

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004	PREP BLANK ID :PAHB004	LCS ID :PAHL004
MS ID :4802.001MS	MSD ID :4802.001MSD	

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB34-0010
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.012
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:41

% MOISTURE	: 15.8	ANALYST	: CW
DATE ANALYZED	: 9/1/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 10 mL
INSTRUMENT FILE	: A4541.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 19:13

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	4000 UG/KG	2300 UG/KG	
Acenaphthylene	4000 UG/KG	ND UG/KG	
Anthracene	4000 UG/KG	19000 UG/KG	
Benzo(a)anthracene	4000 UG/KG	ND UG/KG	UJL
Benzo(a)pyrene	4000 UG/KG	44000 UG/KG	JH
Benzo(b)fluoranthene	4000 UG/KG	27000 UG/KG	JH
Benzo(g,h,i)perylene	4000 UG/KG	12000 UG/KG	JH
Benzo(k)fluoranthene	4000 UG/KG	ND UG/KG	UJK
Chrysene	4000 UG/KG	120000 UG/KG	JH
Dibenzo(a,h)anthracene	4000 UG/KG	5400 UG/KG	JH
Fluoranthene	4000 UG/KG	34000 UG/KG	
Fluorene	4000 UG/KG	24000 UG/KG	
Indeno(1,2,3-c,d)pyrene	4000 UG/KG	11000 UG/KG	JH
Naphthalene	4000 UG/KG	2400 UG/KG	JH
Phenanthrene	4000 UG/KG	220000 UG/KG	JK
Pyrene	4000 UG/KG	240000 UG/KG	JH

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	792 UG/KG	18 - 137	157

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004	PREP BLANK ID :PAHB004	LCS ID :PAHL004
MS ID :4802.001MS	MSD ID :4802.001MSD	

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB40-3040
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.013
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:41

% MOISTURE	: 15.1	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: D4465.D	INSTRUMENT ID	: D-HP5971A
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 18:18

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	390 UG/KG	ND UG/KG	UJK
Acenaphthylene	390 UG/KG	ND UG/KG	UJK
Anthracene	390 UG/KG	ND UG/KG	
Benzo(a)anthracene	390 UG/KG	ND UG/KG	UJL
Benzo(a)pyrene	390 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	390 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	390 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	390 UG/KG	ND UG/KG	
Chrysene	390 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	390 UG/KG	ND UG/KG	
Fluoranthene	390 UG/KG	ND UG/KG	
Fluorene	390 UG/KG	ND UG/KG	UJK
Indeno(1,2,3-c,d)pyrene	390 UG/KG	ND UG/KG	
Naphthalene	390 UG/KG	ND UG/KG	UJK
Phenanthrene	390 UG/KG	490 UG/KG	JH
Pyrene	390 UG/KG	200 UG/KG	JH

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	785 UG/KG	18 - 137	163

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004 PREP BLANK ID :PAHB004 LCS ID :PAHL004
MS ID :4802.001MS MSD ID :4802.001MSD

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB39-3040
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.015
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:41

% MOISTURE	: 15.1	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: D4466.D	INSTRUMENT ID	: D-HP5971A
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 19:04

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	390 UG/KG	ND UG/KG	
Acenaphthylene	390 UG/KG	ND UG/KG	
Anthracene	390 UG/KG	ND UG/KG	
Benzo(a)anthracene	390 UG/KG	ND UG/KG	UJL
Benzo(a)pyrene	390 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	390 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	390 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	390 UG/KG	ND UG/KG	
Chrysene	390 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	390 UG/KG	ND UG/KG	
Fluoranthene	390 UG/KG	ND UG/KG	
Fluorene	390 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	390 UG/KG	ND UG/KG	
Naphthalene	390 UG/KG	ND UG/KG	UJK
Phenanthrene	390 UG/KG	ND UG/KG	
Pyrene	390 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	785 UG/KG	18 - 137	103

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004	PREP BLANK ID :PAHB004	LCS ID :PAHL004
MS ID :4802.001MS	MSD ID :4802.001MSD	

PDP Analytical Services
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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB43-6070
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.016
PROJECT NUMBER	:		METHOD REFERENCE	:	SW846-8270C
DATE SAMPLED	:	8/5/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	9/16/98 18:41

% MOISTURE	: 7.8	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: D4467.D	INSTRUMENT ID	: D-HP5971A
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 19:50

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	360 UG/KG	ND UG/KG	
Acenaphthylene	360 UG/KG	ND UG/KG	
Anthracene	360 UG/KG	ND UG/KG	
Benzo(a)anthracene	360 UG/KG	ND UG/KG	UJL
Benzo(a)pyrene	360 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	360 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	360 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	360 UG/KG	ND UG/KG	
Chrysene	360 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	360 UG/KG	ND UG/KG	
Fluoranthene	360 UG/KG	ND UG/KG	
Fluorene	360 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	360 UG/KG	ND UG/KG	
Naphthalene	360 UG/KG	ND UG/KG	UJK
Phenanthrene	360 UG/KG	ND UG/KG	
Pyrene	360 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	723 UG/KG	18 - 137	146

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004 PREP BLANK ID :PAHB004 LCS ID :PAHL004
MS ID :4802.001MS MSD ID :4802.001MSD

PDP Analytical Services
1680 Lake Front Circle, Suite B, The Woodlands, TX 77380

LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB44-4050
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.017
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/5/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:41

% MOISTURE	: 9.3	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: D4468.D	INSTRUMENT ID	: D-HP5971A
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 20:37

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	370 UG/KG	ND UG/KG	
Acenaphthylene	370 UG/KG	ND UG/KG	
Anthracene	370 UG/KG	ND UG/KG	
Benzo(a)anthracene	370 UG/KG	ND UG/KG	UJL
Benzo(a)pyrene	370 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	370 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	370 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	370 UG/KG	ND UG/KG	
Chrysene	370 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	370 UG/KG	ND UG/KG	
Fluoranthene	370 UG/KG	ND UG/KG	
Fluorene	370 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	370 UG/KG	ND UG/KG	
Naphthalene	370 UG/KG	ND UG/KG	UJK
Phenanthrene	370 UG/KG	ND UG/KG	
Pyrene	370 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	735 UG/KG	18 - 137	138

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004 PREP BLANK ID :PAHB004 LCS ID :PAHL004
MS ID :4802.001MS MSD ID :4802.001MSD

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB45-0010
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.018
PROJECT NUMBER	:		METHOD REFERENCE	:	SW846-8270C
DATE SAMPLED	:	8/5/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	9/16/98 18:42

% MOISTURE	: 20.4	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: D4469.D	INSTRUMENT ID	: D-HP5971A
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 21:23

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	420 UG/KG	ND UG/KG	
Acenaphthylene	420 UG/KG	ND UG/KG	
Anthracene	420 UG/KG	ND UG/KG	
Benzo(a)anthracene	420 UG/KG	ND UG/KG	UJL
Benzo(a)pyrene	420 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	420 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	420 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	420 UG/KG	ND UG/KG	
Chrysene	420 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	420 UG/KG	ND UG/KG	
Fluoranthene	420 UG/KG	ND UG/KG	
Fluorene	420 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	420 UG/KG	ND UG/KG	
Naphthalene	420 UG/KG	ND UG/KG	
Phenanthrene	420 UG/KG	ND UG/KG	
Pyrene	420 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	838 UG/KG	18 - 137	117

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004 PREP BLANK ID :PAHB004 LCS ID :PAHL004
MS ID :4802.001MS MSD ID :4802.001MSD

PDP Analytical Services
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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME	: ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	: SB35-0030
PROJECT NAME	: E&E- WILCOX REFINERY	LAB SAMPLE ID	: 4802.019
PROJECT NUMBER	:	METHOD REFERENCE	: SW846-8270C
DATE SAMPLED	: 8/6/98	DATE RECEIVED	: 8/7/98
SAMPLE MATRIX	: SOIL	PRINTED ON	: 9/16/98 18:42

% MOISTURE	: 12.4	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4502.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 22:01

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	380 UG/KG	ND UG/KG	
Acenaphthylene	380 UG/KG	ND UG/KG	
Anthracene	380 UG/KG	ND UG/KG	
Benzo(a)anthracene	380 UG/KG	ND UG/KG	UJL
Benzo(a)pyrene	380 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	380 UG/KG	ND UG/KG	UJK
Benzo(g,h,i)perylene	380 UG/KG	ND UG/KG	UJK
Benzo(k)fluoranthene	380 UG/KG	ND UG/KG	UJK
Chrysene	380 UG/KG	ND UG/KG	UJK
Dibenzo(a,h)anthracene	380 UG/KG	ND UG/KG	UJK
Fluoranthene	380 UG/KG	ND UG/KG	
Fluorene	380 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	380 UG/KG	ND UG/KG	UJK
Naphthalene	380 UG/KG	ND UG/KG	
Phenanthrene	380 UG/KG	ND UG/KG	
Pyrene	380 UG/KG	360 UG/KG	JH

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	761 UG/KG	18 - 137	141

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004	PREP BLANK ID :PAHB004	LCS ID :PAHL004
MS ID :4802.001MS	MSD ID :4802.001MSD	

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB41-2030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.020
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:42

% MOISTURE	: 17.7	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: D4470.D	INSTRUMENT ID	: D-HP5971A
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 22:10

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	410 UG/KG	ND UG/KG	
Acenaphthylene	410 UG/KG	ND UG/KG	
Anthracene	410 UG/KG	ND UG/KG	
Benzo(a)anthracene	410 UG/KG	ND UG/KG	UJL
Benzo(a)pyrene	410 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	410 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	410 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	410 UG/KG	ND UG/KG	
Chrysene	410 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	410 UG/KG	ND UG/KG	
Fluoranthene	410 UG/KG	ND UG/KG	
Fluorene	410 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	410 UG/KG	ND UG/KG	
Naphthalene	410 UG/KG	ND UG/KG	UJK
Phenanthrene	410 UG/KG	ND UG/KG	
Pyrene	410 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	810 UG/KG	18 - 137	112

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004	PREP BLANK ID :PAHB004	LCS ID :PAHL004
MS ID :4802.001MS	MSD ID :4802.001MSD	

PDP Analytical Services
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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB41-2030D
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.021
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:42

% MOISTURE	: 10.2	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: D4471.D	INSTRUMENT ID	: D-HP5971A
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 22:57

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	370 UG/KG	ND UG/KG	
Acenaphthylene	370 UG/KG	ND UG/KG	
Anthracene	370 UG/KG	ND UG/KG	
Benzo(a)anthracene	370 UG/KG	ND UG/KG	UJL
Benzo(a)pyrene	370 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	370 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	370 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	370 UG/KG	ND UG/KG	
Chrysene	370 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	370 UG/KG	ND UG/KG	
Fluoranthene	370 UG/KG	ND UG/KG	
Fluorene	370 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	370 UG/KG	ND UG/KG	
Naphthalene	370 UG/KG	ND UG/KG	UJK
Phenanthrene	370 UG/KG	ND UG/KG	
Pyrene	370 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	742 UG/KG	18 - 137	181

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004	PREP BLANK ID :PAHB004	LCS ID :PAHL004
MS ID :4802.001MS	MSD ID :4802.001MSD	

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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB42-2030
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.023
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:42

% MOISTURE	: 14.9	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: A4497.D	INSTRUMENT ID	: A-HP5970B
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 18:57

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	390 UG/KG	ND UG/KG	
Acenaphthylene	390 UG/KG	ND UG/KG	
Anthracene	390 UG/KG	ND UG/KG	
Benzo(a)anthracene	390 UG/KG	ND UG/KG	UJL
Benzo(a)pyrene	390 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	390 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	390 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	390 UG/KG	ND UG/KG	
Chrysene	390 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	390 UG/KG	ND UG/KG	
Fluoranthene	390 UG/KG	ND UG/KG	
Fluorene	390 UG/KG	ND UG/KG	
Indeno(1,2,3-c,d)pyrene	390 UG/KG	ND UG/KG	
Naphthalene	390 UG/KG	ND UG/KG	UJK
Phenanthrene	390 UG/KG	ND UG/KG	
Pyrene	390 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	783 UG/KG	18 - 137	98

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004 PREP BLANK ID :PAHB004 LCS ID :PAHL004
MS ID :4802.001MS MSD ID :4802.001MSD

PDP Analytical Services
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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME :	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID :	SB46-0612
PROJECT NAME :	E&E- WILCOX REFINERY	LAB SAMPLE ID :	4802.026
PROJECT NUMBER :		METHOD REFERENCE :	SW846-8270C
DATE SAMPLED :	8/6/98	DATE RECEIVED :	8/7/98
SAMPLE MATRIX :	SOIL	PRINTED ON :	9/16/98 18:42

% MOISTURE	: 15	ANALYST	: CW
DATE ANALYZED	: 8/30/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: D4472.D	INSTRUMENT ID	: D-HP5971A
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 23:43

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	390 UG/KG	ND UG/KG	UJK
Acenaphthylene	390 UG/KG	ND UG/KG	UJK
Anthracene	390 UG/KG	ND UG/KG	
Benzo(a)anthracene	390 UG/KG	ND UG/KG	UJL
Benzo(a)pyrene	390 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	390 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	390 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	390 UG/KG	ND UG/KG	
Chrysene	390 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	390 UG/KG	ND UG/KG	
Fluoranthene	390 UG/KG	ND UG/KG	
Fluorene	390 UG/KG	ND UG/KG	UJK
Indeno(1,2,3-c,d)pyrene	390 UG/KG	ND UG/KG	
Naphthalene	390 UG/KG	ND UG/KG	UJK
Phenanthrene	390 UG/KG	ND UG/KG	
Pyrene	390 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	784 UG/KG	18 - 137	172

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004	PREP BLANK ID :PAHB004	LCS ID :PAHL004
MS ID :4802.001MS	MSD ID :4802.001MSD	

PDP Analytical Services
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LABORATORY REPORT

SEMIVOLATILE ORGANICS BY GC/MS

CLIENT NAME	:	ECOLOGY & ENVIRONMENT, INC.	CLIENT SAMPLE ID	:	SB46-0612D
PROJECT NAME	:	E&E- WILCOX REFINERY	LAB SAMPLE ID	:	4802.027
PROJECT NUMBER	:		METHOD REFERENCE	:	SW846-8270C
DATE SAMPLED	:	8/6/98	DATE RECEIVED	:	8/7/98
SAMPLE MATRIX	:	SOIL	PRINTED ON	:	9/16/98 18:42

% MOISTURE	: 12	ANALYST	: CW
DATE ANALYZED	: 8/31/98	DATE EXTRACTED	: 8/17/98
DILUTION	: 1	EXTRACT VOLUME	: 1 mL
INSTRUMENT FILE	: D4473.D	INSTRUMENT ID	: D-HP5971A
SAMPLE WEIGHT	: 30 g	TIME ANALYZED	: 00:30

PARAMETER	QUANTITATION LIMIT	RESULTS	QUALIFIER
Acenaphthene	380 UG/KG	ND UG/KG	UJK
Acenaphthylene	380 UG/KG	ND UG/KG	UJK
Anthracene	380 UG/KG	ND UG/KG	
Benzo(a)anthracene	380 UG/KG	ND UG/KG	UJL
Benzo(a)pyrene	380 UG/KG	ND UG/KG	
Benzo(b)fluoranthene	380 UG/KG	ND UG/KG	
Benzo(g,h,i)perylene	380 UG/KG	ND UG/KG	
Benzo(k)fluoranthene	380 UG/KG	ND UG/KG	
Chrysene	380 UG/KG	ND UG/KG	
Dibenzo(a,h)anthracene	380 UG/KG	ND UG/KG	
Fluoranthene	380 UG/KG	ND UG/KG	
Fluorene	380 UG/KG	ND UG/KG	UJK
Indeno(1,2,3-c,d)pyrene	380 UG/KG	ND UG/KG	
Naphthalene	380 UG/KG	ND UG/KG	UJK
Phenanthrene	380 UG/KG	ND UG/KG	
Pyrene	380 UG/KG	ND UG/KG	

QUALITY CONTROL DATA

SURROGATE COMPOUND	SPIKE ADDED	QC RECOVERY LIMITS	%RECOVERY
Terphenyl-d14	758 UG/KG	18 - 137	136

BATCH QUALITY CONTROL SAMPLE IDs

QC BATCH ID :PAHB004 PREP BLANK ID :PAHB004 LCS ID :PAHL004
MS ID :4802.001MS MSD ID :4802.001MSD

DATA QUALITY ASSURANCE REVIEW

SITE NAME Wilcox Refinery

CERCLIS

PAN 052601SFXX TDD NUMBER 06-98-03-0009

CASE NUMBER/WORK ORDER 6S180 SDG/PROJ. NUMBER 4798

E & E has completed a QA review for Case No. 6S180, SDG No. 4798, Wilcox Refinery. Ten soil were analyzed for TAL metals by PDP Analytical. Sample numbers are listed below.

SAMPLE NUMBERS

SB20-0030		
SB21-0030		
SB22-0030		
SB23-0030		
SB24-0020		
SB25-0030		
SB26-0020		
SB36-6070		
SB37-6070		
SB38-0010		

This data package was validated to determine if Quality Control (QC) specifications were achieved, following *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (February, 1994), *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (February, 1994), *Quality Assurance/Quality Control Guidance for Removal Activities* (April, 1990), and the Regional Protocol for Holding Times, Blanks, and VOA Preservation (April 13, 1989). Specific data qualifications are listed in the following discussion.

REVIEWER Brendan Lowrey DATE 12 / 10 / 98

Data Qualifiers

Data Qualifier Definitions were supplied by the Office of Solid Waste and Emergency Response (September 1989) and are included in the Functional Guidelines. Data qualifiers may be combined (UJ, QJ) with the corresponding combination of meanings. Additional qualifiers may be added to provide additional, more specific information (JL, UB, QJK), modifying the meaning of the primary qualifier. Addition qualifiers utilized by E & E are H, L, K, B, Q, and D.

U - The material was analyzed for, but was not detected. The associated numerical value is the sample quantitation or detection limit, which has been adjusted for sample weight/sample volume, extraction volume, percent solids, sample dilution or other analysis specific parameters.

An additional qualifier, "B", may be appended to indicated that while the analyte was detected in the sample, the presence of the analyte may be attributable to blank contamination and the analyte is therefore considered undetected with the sample detection or quantitation limit for the analyte being elevated.

J - The analyte was analyzed for, but the associated numerical value may not be consistent with the amount actually present in the environmental sample or may not be consistent with the sample detection or quantitation limit. The value is an estimated quantity. The data should be seriously considered for decision-making and are usable for many purposes.

An additional qualifier will be appended to the "J" qualifier that indicates the bias in the reported results:

L Low bias

H High bias

K Unknown bias

Q The reported concentration is less than the sample quantitation limit for the specific analyte in the sample.

The L and H qualifier will only be employed when a single qualification is required. When more than one quality control parameter affects the analytical result and a conflict results in assigning a bias, the result will be flagged JK.

R - Quality Control indicates that data are unusable for all purposes. The analyte was analyzed for, but the presence or absence of the analyte has not been verified. Resampling and reanalysis are necessary for verification to confirm or deny the presence of an analyte.

N - The analysis indicates the presence of analyte for which there is presumptive evidence to make a "tentative identification."

D - The concentration reported was determined in the re-analysis of the sample at a secondary dilution.

INORGANIC DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in SW846 methods 6010B and 7471 per the 12/95 E&E SOW.

2. Holding Times:

All samples met established holding time criteria of 28 days for mercury and 180 days for metals.

3. Initial Calibration:

ICP initial calibration included a blank and one standard and initial calibration verification results fell within the control limits of 90 to 110 percent of the true values. Mercury initial calibration included a blank and five to eight standards and initial calibration verification results fell within the control limits of 80 to 120 percent of the true value. Correlation coefficients (CC) for AA (including furnace, flame and cold vapor Hg) were greater than 0.995.

4. Continuing Calibration:

All ICP results fell within the control limits of 90 to 110 percent of the true values. Mercury results fell within the control limits of 80 to 120 percent of the true value.

5. Blanks:

Target analytes were detected in the following calibration blanks. Sample concentrations less than five times the highest analyte concentration reported in associated blanks are flagged **UB** (not detected, detection limit raised due to possible blank contamination).

CALIBRATION SEQUENCE INST ID DATE	ANALYTE/BLANK #	CONC. µg/L	QUALIFIED SAMPLES
SEQ 1 ICAP3000XL 8/19/98	Al, CCB2	38.1B	
SEQ 1 ICAP3000XL 8/19/98	Sb, ICB	14.5B	
SEQ 1 ICAP3000XL 8/19/98	Ba, CCB3	17.1B	

CALIBRATION SEQUENCE INST ID DATE	ANALYTE/BLANK #	CONC. µg/L	QUALIFIED SAMPLES
SEQ 1 ICAP3000XL 8/19/98	Be, CCB2	1.1B	
SEQ 1 ICAP3000XL 8/19/98	Cd, CCB3	0.9B	
SEQ 1 ICAP3000XL 8/19/98	Ca, CCB2	119.6B	
SEQ 1 ICAP3000XL 8/19/98	Cr, CCB3	1.1B	
SEQ 1 ICAP3000XL 8/19/98	Co, CCB3	4.1B	SB38-0010
SEQ 1 ICAP3000XL 8/19/98	Cu, CCB2	15.6B	SB38-0010
SEQ 1 ICAP3000XL 8/19/98	Fe, CCB3	11.0B	
SEQ 1 ICAP3000XL 8/19/98	Pb, CCB4	14.9	SB38-0010
SEQ 1 ICAP3000XL 8/19/98	Mg, CCB2	116.6B	
SEQ 1 ICAP3000XL 8/19/98	Mn, CCB3	3.0B	
SEQ 1 ICAP3000XL 8/19/98	Ni, CCB3	5.8B	
SEQ 1 ICAP3000XL 8/19/98	K, CCB1	1473.5B	

CALIBRATION SEQUENCE INST ID DATE	ANALYTE/BLANK #	CONC. µg/L	QUALIFIED SAMPLES
SEQ 1 ICAP3000XL 8/19/98	Ag, CCB4	15.4	SB38-0010
SEQ 1 ICAP3000XL 8/19/98	Na, CCB4	293.6B	SB38-0010
SEQ 1 ICAP3000XL 8/19/98	V, CCB2	12.4B	

ICB = Initial Calibration Blank; CCB = Continuing Calibration Blank.

Target analytes were detected in the following preparation blanks. Sample concentrations less than five times the highest analyte concentration reported in associated blanks are flagged **UB** (not detected, detection limit raised due to possible blank contamination).

PREPARATION BLANK/MATRIX	ANALYTE	CONC. <mg/kg>	QUALIFIED SAMPLES
PBS1	Cu	0.359B	SB37-6070, SB38-0010
PBS1	Pb	0.789	SB36-6070, SB37-6070, SB38-0010
PBS1	Ni	0.364B	SB38-0010
PBS1	Ag	0.756B	All
PBS1	V	0.167B	SB38-0010

6. ICP Interference Check:

All results for the Interference Check Sample were within the control limits of 80 to 120 percent of the true values.

7. Laboratory Control Sample (LCS):

The recoveries for the solid LCS were within the established control limits.

8. Duplicate Sample Analysis:

Sample SB20-0030 underwent duplicate analysis for the soil matrix. QC criteria are that the Relative Percent Difference (RPD) values for the duplicate sample analysis be less than 20 percent for aqueous samples and 35% for solid samples for concentrations greater than five times the CRDL. For sample

concentrations less than five times the CRDL, the QC criteria are within ± the CRDL for the water matrix or ± two times the CRDL for the soil matrix. QC criteria were not met for the following analytes:

ANALYTE	MATRIX	RPD or CONC	ASSOCIATED SAMPLES	QUALIFIER FLAG
Iron	soil	44.6	All	JK, UJK
lead	soil	48.2	All	JK, UJK

9. Spiked Sample Analysis:

Sample SB20-0030S underwent spike analysis for the soil matrix. The spike recoveries for the following analytes were outside of the 75-125% recovery QC limits:

ANALYTE	MATRIX	RECOVERY %	ASSOCIATED SAMPLES	QUALIFIER FLAG
antimony	soil	-193.3	All	R
beryllium	soil	-125.8	All	R
arsenic	soil	-6.8	All	R
cadmium	soil	-166.5	All	R
cobalt	soil	-71.3	All	R
barium, copper, manganese, nickel, silver, vanadium, zinc	soil		All	none, 4X rule

Post spike recoveries were acceptable, indicating a possible digestion problem(s).

10. ICP Serial Dilution:

Sample SB20-0030L underwent serial dilution. The Percent Difference values (%D) for the following analytes exceeded QC limits of 10 percent for analytes with concentrations greater than 50 times their IDL.

ANALYTE	MATRIX	%D	ASSOCIATE SAMPLES	QUALIFIER FLAG
Chromium	soil	20.7	All	JK
Vanadium	soil	18.6	All	JK
Zinc	soil	35.7	All	JK

11. Sample Quantitation and CRDLs

Concentrations of all reported analytes were incorrectly calculated. The laboratory calculated all results using % moisture instead of % solids. See 12. Corrected data report forms were submitted.

Sample quantitation limits (SQLs) varied from CRDLs in the following samples due to the factors listed below.

SAMPLE NO	ANALYTE	DF	ASV OR ASW	% SOLIDS	ADV	SQL FACTOR
SB20-0030	Hg All others			92.1	 100 ml	0.54 0.11
SB21-0030	Hg All others			97.8	 100 ml	0.51 0.10
SB22-0030	Hg All others			94.6	 100 ml	0.53 0.11
SB23-0030	Hg All others			97.9	 100 ml	0.51 0.10
SB24-0020	Hg All others			85.6	 100 ml	0.58 0.12
SB25-0030	Hg All others			98.3	 100 ml	0.51 0.10
SB26-0020	Hg All others			97.2	 100 ml	0.51 0.10
SB36-6070	Hg All others			97.5	 100 ml	0.51 0.10
SB37-6070	Hg All others			93.2	 100 ml	0.53 0.11
SB38-0010	Hg All others			85.8	 100 ml	0.58 0.12

DF = Dilution Factor, ASV = Actual sample volume, ASW = Actual sample weight, ADV = Actual digestate or distillate volume

12. Laboratory Contact

The laboratory was contacted on 09/21/98 regarding a missing ICP Interference Check (FORM IV), why no duplicates were run, and to request a case narrative. The laboratory was again contacted on 09/25/98 to request the same. A FORM IV was received mid-October. The laboratory was contacted on November 5 regarding the improper calculation of results. Corrected results were received on 12/9/98.

13. Overall Assessment:

Antimony, beryllium, arsenic, cadmium and cobalt results are considered unusable due to unacceptable matrix spike recoveries. Iron, lead, chromium, vanadium and zinc results are considered estimates, unknown bias, due to duplicate or serial dilution results out of control limits.

The analytical data is acceptable for use with the qualifications listed above.

BRENDAN LOWREY
Print Originator's Name
Ecology and Environment, Inc.

RECORD OF COMMUNICATION

Conversation with: PDP Analytical Services	Date 09 / 21 / 98 (Mo) (Day) (Year)
Name: Sasha	Time: 2:00 AM/PM
Address: 1680 Lakefront Circle, Suite B, The Woodlands, Tx. 77380	[X] Originator Placed Call
Phone: (281) 292-7090	[] Originator Received Call
Subject: Analytical Lab Report	

Discussion:

- START missing a Form IV (ICP Interference Check) from a sample data package (SDG: 4798)
- From the sample run log, an ICP Interference Check was done, but not reported.
- They will check their files for the Form IV and fax to START
- Additionally, on the group of samples in question, no duplicates were run. Again, they will check their files and call back START to explain why.

Follow-Up-Action:

Wait for fax and call back.

Originator's Signature

06:FORMS-ROC:WOMERGE-05/02/97-D1

ecology and environment, inc.
1999 Bryan St., Suite 2000
Dallas, TX 75201
(214) 245-1000

International Specialists in the Environment
FAX: (214) 245-1001

FAX TRANSMISSION FORM

Date: December 22, 1998	**Time:**
Job Charge: 608KJ06040000-052601SFXX	**Total pages: 2** (including transmission form)

To: Mark Bourgeois Reddy P.

Company: PDP Analytical

Fax phone: 281-298-5784

From: David Anderson

IF THIS FAX IS INCOMPLETELY RECEIVED OR IS ILLEGIBLE, PLEASE CALL FOR RETRANSMISSION.

Mark and Reddy,

We have encountered some deficiencies during our validation of the analytical data from PDP for our Case number 6S188, PDP project ID Q1073-E&E6S188. Please supply the necessary data ASAP.

SDG 4960V
1. Summary report for MS/MSD (CLP form 3) of sample ST-15 (PDP 4960.034) was missing from the data package.
2. The Run Logs supplies instead of CLP forms 4 and 5 to associate samples with specific method blanks, tunings and calibrations are confusing without run times being entered. Multiple standards and tunings may be listed on the log and correlation with the data reported in the package is difficult. The Run Log which includes the tuning and initial calibration conducted on 10/20 to 10/21 was missing from the data package.
3. A CLP form 8 or equivalent (Internal Standard Area and Retention Time Summary was not included in the data package.
4. PDP utilized a 5 ppb standard as the lowest point on the calibration and the quantitation limit reported, however the RRFs for this standard are not included in the average RRF or %RSD calculations for the calibration. E&E has no problem with the laboratory utilizing this lower quantitation limit but the laboratory must demonstrate that the standard meets the linearity criteria.

SDG SVOAS
1. A CLP form 8 or equivalent (Internal Standard Area and Retention Time Summary was not included in the data package.
2. Run logs as a substitute for CLP form 5 were not included in the data package.
3. Raw data in the package indicates that samples ST-10, NT-02, NT-05, NT-04 and NT-07 (PDP sample numbers 4960.017 thru 4960.021) and preparation blank SVOB247 were analyzed between 2256 on 10/20/98 and 0321 on 10/21/98. No instrument tunings, initial or continuing

calibrations which correspond to these analyses were found in the data package. The earliest initial calibration reported occured after the analysis of these samples.

SDG SVOAS2
1. A CLP form 8 or equivalent (Internal Standard Area and Retention Time Summary was not included in the data package.
2. Raw data in the package indicates that preparation blank SVOB247 was analyzed at 2256 on 10/20/98. No instrument tunings, initial or continuing calibrations which correspond to these analyses were found in the data package. The earliest initial calibration reported occured after the analysis of these samples.
3. SDG narrative should indicate that no MS/MSD was conducted for the water matrix due to insufficient sample supplied.

For Case 6S180, PDP jobs 4798 and 4802, I am still awaiting the additional corrections that I requested on 12/11/98, specifically correction of the mercury results for 4802.002, correction to soil instead of water concentrations for sample 4802.027, and a new Form 5 for 4798 which will correspond with the flags on the Form 1s resubmitted on 12/9/98.

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB20-0030

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4798.001

Level (low/med): _____ Date Received: 08/05/98

% Solids: _92.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	1770			P	
7440-36-0	Antimony	1.3	B	N	P	JE R
7440-38-2	Arsenic	2.7		N	P	R
7440-39-3	Barium	37.7			P	
7440-41-7	Beryllium	0.12	B	N	P	R
7440-43-9	Cadmium	0.14	B	N	P	R
7440-70-2	Calcium	594			P	
7440-47-3	Chromium	6.1		E	P	JK
7440-48-4	Cobalt	1.0	B	N	P	R
7440-50-8	Copper	15.7			P	
7439-89-6	Iron	4800			P	JK
7439-92-1	Lead	1960			P	JK
7439-95-4	Magnesium	327	B		P	
7439-96-5	Manganese	27.1			P	
7439-97-6	Mercury	0.39			CV	
7440-02-0	Nickel	3.9	B		P	
7440-09-7	Potassium	356	B		P	
7782-49-2	Selenium	0.49	U		P	
7440-22-4	Silver	1.2			P	uB
7440-23-5	Sodium	67.8	B		P	
7440-28-0	Thallium	0.27	U		P	
7440-62-2	Vanadium	6.6		E	P	JK
7440-66-6	Zinc	15.4		E	P	JK
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB21-0030

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4798.002

Level (low/med): _____ Date Received: 08/05/98

% Solids: _97.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	1260			P	
7440-36-0	Antimony	0.50	U	N	P	~~JK~~ R
7440-38-2	Arsenic	2.7		N	P	R
7440-39-3	Barium	15.5	B		P	
7440-41-7	Beryllium	0.08	B	N	P	R
7440-43-9	Cadmium	0.07	B	N	P	R
7440-70-2	Calcium	18400			P	
7440-47-3	Chromium	4.1		E	P	JK
7440-48-4	Cobalt	1.0	B	N	P	R
7440-50-8	Copper	3.6			P	
7439-89-6	Iron	4000			P	JK
7439-92-1	Lead	61.6			P	JK
7439-95-4	Magnesium	9910			P	
7439-96-5	Manganese	424			P	
7439-97-6	Mercury				NR	
7440-02-0	Nickel	2.7	B		P	
7440-09-7	Potassium	475	B		P	
7782-49-2	Selenium	0.46	U		P	
7440-22-4	Silver	1.4			P	
7440-23-5	Sodium	97.3	B		P	
7440-28-0	Thallium	0.26	U		P	
7440-62-2	Vanadium	4.9	B	E	P	JK
7440-66-6	Zinc	14.1		E	P	JK
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
SB22-0030

ab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

ab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

atrix (soil/water): SOIL_ Lab Sample ID: 4798.003

evel (low/med): _____ Date Received: 08/05/98

Solids: _94.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	4290			P	
7440-36-0	Antimony	1.00	B	N	P	JR
7440-38-2	Arsenic	2.2		N	P	R
7440-39-3	Barium	58.8			P	
7440-41-7	Beryllium	0.25	B	N	P	R
7440-43-9	Cadmium	0.10	B	N	P	R
7440-70-2	Calcium	471	B		P	
7440-47-3	Chromium	6.2		E	P	JK
7440-48-4	Cobalt	3.2	B	N	P	JR
7440-50-8	Copper	7.9			P	
7439-89-6	Iron	5120			P	JK
7439-92-1	Lead	4.2			P	JK
7439-95-4	Magnesium	490	B		P	
7439-96-5	Manganese	165			P	
7439-97-6	Mercury	0.11	U		CV	
7440-02-0	Nickel	4.9			P	
7440-09-7	Potassium	679			P	
7782-49-2	Selenium	0.48	U		P	
7440-22-4	Silver	0.99	B		P	uB
7440-23-5	Sodium	57.1	B		P	
7440-28-0	Thallium	0.26	U		P	
7440-62-2	Vanadium	9.2		E	P	JK
7440-66-6	Zinc	6.2		E	P	JK
	Cyanide				NR	

olor Before: _____ Clarity Before: _____ Texture: _____

olor After: _____ Clarity After: _____ Artifacts: _____

omments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB23-0030

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4798.004

Level (low/med): _____ Date Received: 08/05/98

% Solids: _97.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	1350			P	
7440-36-0	Antimony	0.50	U	N	P	JF R
7440-38-2	Arsenic	1.8		N	P	R
7440-39-3	Barium	20.9			P	
7440-41-7	Beryllium	0.12	B	N	P	R
7440-43-9	Cadmium	0.17	B	N	P	R
7440-70-2	Calcium	619			P	
7440-47-3	Chromium	3.5		E	P	JK
7440-48-4	Cobalt	1.4	B	N	P	R
7440-50-8	Copper	8.4			P	
7439-89-6	Iron	4960			P	JK
7439-92-1	Lead	181			P	JK
7439-95-4	Magnesium	300	B		P	
7439-96-5	Manganese	127			P	
7439-97-6	Mercury	0.13			CV	
7440-02-0	Nickel	3.3	B		P	
7440-09-7	Potassium	339	B		P	
7782-49-2	Selenium	0.46	U		P	
7440-22-4	Silver	1.1			P	UB
7440-23-5	Sodium	69.5	B		P	
7440-28-0	Thallium	0.26	U		P	
7440-62-2	Vanadium	5.0	B	E	P	JK
7440-66-6	Zinc	18.3		E	P	JK
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
SB24-0020

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4798.005

Level (low/med): _____ Date Received: 08/05/98

% Solids: _85.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	1140			P	
7440-36-0	Antimony	1.1	B	N	P	JK/R
7440-38-2	Arsenic	2.7		N	P	R
7440-39-3	Barium	31.4			P	
7440-41-7	Beryllium	0.13	B	N	P	R
7440-43-9	Cadmium	0.25	B	N	P	R
7440-70-2	Calcium	4190			P	
7440-47-3	Chromium	5.2		E	P	JK
7440-48-4	Cobalt	2.3	B	N	P	R
7440-50-8	Copper	122			P	
7439-89-6	Iron	7840			P	JK
7439-92-1	Lead	724			P	JK
7439-95-4	Magnesium	2140			P	
7439-96-5	Manganese	223			P	
7439-97-6	Mercury	0.12	U		CV	
7440-02-0	Nickel	6.4			P	
7440-09-7	Potassium	256	B		P	
7782-49-2	Selenium	0.53	U		P	
7440-22-4	Silver	1.3			P	uB
7440-23-5	Sodium	164	B		P	
7440-28-0	Thallium	0.29	U		P	
7440-62-2	Vanadium	5.7	B	E	P	JK
7440-66-6	Zinc	61.9		E	P	JK
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB25-0030

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4798.006

Level (low/med): _____ Date Received: 08/05/98

% Solids: _98.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	1280			P	
7440-36-0	Antimony	0.50	U	N	P	FE R
7440-38-2	Arsenic	2.2		N	P	R
7440-39-3	Barium	16.0	B		P	
7440-41-7	Beryllium	0.10	B	N	P	R
7440-43-9	Cadmium	0.44	B	N	P	R
7440-70-2	Calcium	10700			P	
7440-47-3	Chromium	4.9		E	P	JK
7440-48-4	Cobalt	1.3	B	N	P	R
7440-50-8	Copper	12.9			P	
7439-89-6	Iron	6140			P	JK
7439-92-1	Lead	125			P	JK
7439-95-4	Magnesium	5890			P	
7439-96-5	Manganese	208			P	
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	4.5			P	
7440-09-7	Potassium	342	B		P	
7782-49-2	Selenium	0.46	U		P	
7440-22-4	Silver	1.5			P	WB
7440-23-5	Sodium	192	B		P	
7440-28-0	Thallium	0.25	U		P	
7440-62-2	Vanadium	4.8	B	E	P	JK
7440-66-6	Zinc	83.8		E	P	JK
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB26-0020

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4798.007

Level (low/med): _____ Date Received: 08/05/98

% Solids: _97.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	3010			P	
7440-36-0	Antimony	0.50	U	N	P	R
7440-38-2	Arsenic	1.7		N	P	R
7440-39-3	Barium	24.8			P	
7440-41-7	Beryllium	0.17	B	N	P	R
7440-43-9	Cadmium	0.11	B	N	P	R
7440-70-2	Calcium	898			P	
7440-47-3	Chromium	5.4		E	P	JK
7440-48-4	Cobalt	1.8	B	N	P	R
7440-50-8	Copper	4.9			P	
7439-89-6	Iron	4100			P	JK
7439-92-1	Lead	72.2			P	JK
7439-95-4	Magnesium	595			P	
7439-96-5	Manganese	98.7			P	
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	4.4			P	
7440-09-7	Potassium	595			P	
7782-49-2	Selenium	0.46	U		P	
7440-22-4	Silver	1.0	B		P	uB
7440-23-5	Sodium	119	B		P	
7440-28-0	Thallium	0.26	U		P	
7440-62-2	Vanadium	6.8		E	P	JK
7440-66-6	Zinc	14.3		E	P	JK
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB36-6070

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4798.008

Level (low/med): _____ Date Received: 08/05/98

% Solids: _97.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	1290			P	
7440-36-0	Antimony	0.50	U	N	P	JK R
7440-38-2	Arsenic	1.0		N	P	R
7440-39-3	Barium	10.9	B		P	
7440-41-7	Beryllium	0.09	B	N	P	R
7440-43-9	Cadmium	0.05	U	N	P	R
7440-70-2	Calcium	211	B		P	
7440-47-3	Chromium	3.3		E	P	JK
7440-48-4	Cobalt	1.1	B	N	P	R
7440-50-8	Copper	2.0	B		P	
7439-89-6	Iron	2330			P	JK
7439-92-1	Lead	3.2			P	UB JK
7439-95-4	Magnesium	201	B		P	
7439-96-5	Manganese	50.9			P	
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	18.3			P	
7440-09-7	Potassium	350	B		P	
7782-49-2	Selenium	0.46	U		P	
7440-22-4	Silver	1.0			P	UB
7440-23-5	Sodium	53.2	B		P	
7440-28-0	Thallium	0.26	U		P	
7440-62-2	Vanadium	4.2	B	E	P	JK
7440-66-6	Zinc	4.0		E	P	JK
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
SB37-6070

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4798.009

Level (low/med): _____ Date Received: 08/05/98

% Solids: _93.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	915			P	
7440-36-0	Antimony	0.53	U	N	P	JR R
7440-38-2	Arsenic	0.45	B	N	P	R
7440-39-3	Barium	9.4	B		P	
7440-41-7	Beryllium	0.05	B	N	P	R
7440-43-9	Cadmium	0.05	U	N	P	R
7440-70-2	Calcium	148	B		P	
7440-47-3	Chromium	1.6		E	P	JK
7440-48-4	Cobalt	0.29	B	N	P	R
7440-50-8	Copper	1.5	B		P	UB
7439-89-6	Iron	769			P	JK
7439-92-1	Lead	2.8			P	UBJK
7439-95-4	Magnesium	151	B		P	
7439-96-5	Manganese	4.1			P	
7439-97-6	Mercury	0.11	U		CV	
7440-02-0	Nickel	1.9	B		P	
7440-09-7	Potassium	360	B		P	
7782-49-2	Selenium	0.48	U		P	
7440-22-4	Silver	1.7			P	UB
7440-23-5	Sodium	55.6	B		P	
7440-28-0	Thallium	0.27	U		P	
7440-62-2	Vanadium	2.6	B	E	P	JK
7440-66-6	Zinc	0.75	B	E	P	JK
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
SB38-0010

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB20-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4798.010

Level (low/med): _____ Date Received: 08/05/98

% Solids: _83.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	4460 ~~44.6~~			P	
7440-36-0	Antimony	0.58 ~~0.01~~	U	N	P	R
7440-38-2	Arsenic	1.0 ~~0.01~~	B	N	P	R
7440-39-3	Barium	27.9 ~~0.28~~			P	
7440-41-7	Beryllium	0.25 ~~0.00~~	B	N	P	R
7440-43-9	Cadmium	0.0~~3~~~~0.0~~6 ~~0.00~~	U	N	P	R
7440-70-2	Calcium	386. ~~3.9~~	B		P	
7440-47-3	Chromium	6.2 ~~0.06~~		E	P	JK
7440-48-4	Cobalt	1.5 ~~0.01~~	B	N	P	uBR
7440-50-8	Copper	2.7 ~~0.03~~	B		P	uB
7439-89-6	Iron	3160 ~~31.7~~			P	JK
7439-92-1	Lead	3.9 ~~0.04~~			P	uBJK
7439-95-4	Magnesium	673 ~~6.7~~			P	
7439-96-5	Manganese	23.4 ~~0.23~~			P	
7439-97-6	Mercury	~~0.12~~	U		CV	
7440-02-0	Nickel	5.0 ~~0.05~~			P	uB
7440-09-7	Potassium	907 ~~9.1~~			P	
7782-49-2	Selenium	0.54 ~~0.01~~	U		P	
7440-22-4	Silver	1.2 ~~0.01~~			P	uB
7440-23-5	Sodium	66.0 ~~0.65~~	B		P	uB
7440-28-0	Thallium	0.30 ~~0.00~~	U		P	
7440-62-2	Vanadium	11.1 ~~0.11~~		E	P	uBJK
7440-66-6	Zinc	6.3 ~~0.06~~		E	P	JK
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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DATA QUALITY ASSURANCE REVIEW

SITE NAME Wilcox Refinery

CERCLIS

PAN 052601SFXX TDD NUMBER 06-98-03-0009

CASE NUMBER/WORK ORDER 6S180 SDG/PROJ. NUMBER 4802

E & E has completed a QA review for Case No. 6S180, SDG No. 4802, Wilcox Refinery. Twenty soil samples were analyzed for TAL metals by PDP Analytical. Sample numbers are listed below.

SAMPLE NUMBERS

SB27-0030	SB41-2030D	
SB28-0020	SB42-2030	
SB29-0010	SB43-6070	
SB30-0030	SB44-4050	
SB31-0030	SB45-0010	
SB32-0010	SB46-0612	
SB32-0010D	SB46-0612D	
SB33-0010		
SB34-0010		
SB35-0030		
SB39-3040		
SB40-3040		
SB41-2030		

This data package was validated to determine if Quality Control (QC) specifications were achieved, following *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (February, 1994), *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (February, 1994), *Quality Assurance/Quality Control Guidance for Removal Activities* (April, 1990), and the Regional Protocol for Holding Times, Blanks, and VOA Preservation (April 13, 1989). Specific data qualifications are listed in the following discussion.

REVIEWER Brendan Lowrey DATE 12 / 10 / 98

Data Qualifiers

Data Qualifier Definitions were supplied by the Office of Solid Waste and Emergency Response (September 1989) and are included in the Functional Guidelines. Data qualifiers may be combined (UJ, QJ) with the corresponding combination of meanings. Additional qualifiers may be added to provide additional, more specific information (JL, UB, QJK), modifying the meaning of the primary qualifier. Addition qualifiers utilized by E & E are H, L, K, B, Q, and D.

U - The material was analyzed for, but was not detected. The associated numerical value is the sample quantitation or detection limit, which has been adjusted for sample weight/sample volume, extraction volume, percent solids, sample dilution or other analysis specific parameters.

An additional qualifier, "B", may be appended to indicated that while the analyte was detected in the sample, the presence of the analyte may be attributable to blank contamination and the analyte is therefore considered undetected with the sample detection or quantitation limit for the analyte being elevated.

J - The analyte was analyzed for, but the associated numerical value may not be consistent with the amount actually present in the environmental sample or may not be consistent with the sample detection or quantitation limit. The value is an estimated quantity. The data should be seriously considered for decision-making and are usable for many purposes.

An additional qualifier will be appended to the "J" qualifier that indicates the bias in the reported results:

L Low bias

H High bias

K Unknown bias

Q The reported concentration is less than the sample quantitation limit for the specific analyte in the sample.

The L and H qualifier will only be employed when a single qualification is required. When more than one quality control parameter affects the analytical result and a conflict results in assigning a bias, the result will be flagged JK.

R - Quality Control indicates that data are unusable for all purposes. The analyte was analyzed for, but the presence or absence of the analyte has not been verified. Resampling and reanalysis are necessary for verification to confirm or deny the presence of an analyte.

N - The analysis indicates the presence of analyte for which there is presumptive evidence to make a "tentative identification."

D - The concentration reported was determined in the re-analysis of the sample at a secondary dilution.

INORGANIC DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in SW846 methods 6010B and 7471 per the E&E 12/95 SOW.

2. Holding Times:

All samples met established holding time criteria of 28 days for mercury and 180 days for metals.

3. Initial Calibration:

ICP initial calibration included a blank and one standard and initial calibration verification results fell within the control limits of 90 to 110 percent of the true values. Mercury initial calibration included a blank and five to eight standards and initial calibration verification results fell within the control limits of 80 to 120 percent of the true value. Correlation coefficients (CC) for AA (including furnace, flame and cold vapor Hg) were greater than 0.995.

4. Continuing Calibration:

All ICP results fell within the control limits of 90 to 110 percent of the true values. Mercury results fell within the control limits of 80 to 120 percent of the true value.

5. Blanks:

Target analytes were detected in the following calibration blanks. Sample concentrations less than five times the highest analyte concentration reported in associated blanks are flagged **UB** (not detected, detection limit raised due to possible blank contamination).

CALIBRATION SEQUENCE INST ID DATE	ANALYTE/BLANK #	CONC. µg/L	QUALIFIED SAMPLES
SEQ 1 ICAP3000XL 8/20/98	Sb, CCB2	5.1B	
SEQ 1 ICAP3000XL 8/20/98	Cu, CCB2	6.3B	SB46-0612D
SEQ 1 ICAP3000SXL 8/20/98	Pb, CB2	4.2	

CALIBRATION SEQUENCE INST ID DATE	ANALYTE/BLANK #	CONC. µg/L	QUALIFIED SAMPLES
SEQ 2, ICAP3000XL 8/21/98	Sb, ICB	5.9B	
SEQ 2, ICAP3000XL 8/21/98	Ba, CCB4	0.8B	
SEQ 2, ICAP3000XL 8/21/98	Cu, CCB3	10.3B	SB46-0612D
SEQ 2, ICAP3000XL 8/21/98	Pb, CCB4	10.8	
SEQ 2, ICAP3000XL 8/21/98	Ni, CCB4	5.8B	
SEQ 2, ICAP3000XL 8/21/98	Ag, CCB3	6.5B	SB46-0612D
SEQ 2, ICAP3000XL 8/21/98	Na, CCB4	319.2B	
SEQ 2, ICAP3000XL 8/21/98	Tl, CCB3	3.5B	
SEQ 2, ICAP3000XL 8/21/98	V, CCB4	2.1B	

ICB = Initial Calibration Blank; CCB = Continuing Calibration Blank.

Target analytes were detected in the following preparation blanks. Sample concentrations less than five times the highest analyte concentration reported in associated blanks are flagged **UB** (not detected, detection limit raised due to possible blank contamination).

PREPARATION BLANK/MATRIX	ANALYTE	CONC. <mg/kg>	QUALIFIED SAMPLES
PBS1 soil	As	0.390B	
PBS1 soil	Cu	0.288B	~~SB46-0612D~~
PBS1 soil	Pb	0.401	SB44-4050, ~~SB46-0612D~~
PBS1 soil	Ag	0.215B	
PBS1 soil	Tl	0.323B	
PBS1 soil	Zn	0.106B	~~SB46-0612D~~

6. ICP Interference Check:

All results for the Interference Check Sample were within the control limits of 80 to 120 percent of the true values.

7. Laboratory Control Sample (LCS):

The recoveries for the solid LCS were within the established control limits.

8. Duplicate Sample Analysis:

Sample SB28-0020 underwent matrix spike/matrix spike duplicate analysis for the soil matrix. QC criteria are that the Relative Percent Difference (RPD) values for the duplicate sample analysis be less than 20 percent for aqueous samples and 35% for solid samples for concentrations greater than five times the CRDL. For sample concentrations less than five times the CRDL, the QC criteria are within ± the CRDL for the water matrix or ± two times the CRDL for the soil matrix. QC criteria were not met for the following analytes:

ANALYTE	MATRIX	RPD or CONC	ASSOCIATED SAMPLES	QUALIFIER FLAG
Al	soil	37.5	All	JK, UJK
K	sol	62.3	All	JK, UJK

Samples SB32-0010, SB41-2030 and SB46-0612 were all field duplicates for the soil matrix. RPDs for most analytes were generally less than 50%. This indicated that the soil sampled and the sampling techniques utilized provided relatively homogeneous samples for analysis.

9. Spiked Sample Analysis:

Sample SB20-0030S underwent spike analysis for the soil matrix. The spike recoveries for the following analytes were outside of the 75-125% recovery QC limits:

ANALYTE	MATRIX	RECOVERY %	ASSOCIATED SAMPLES	QUALIFIER FLAG
Aluminum	soil	-390.4	All	none, 4X rule
Antimony	soil	30.2	All	JL
Manganese	soil	54.6	All	JL

Post digestion spike recovery were acceptable, indicating a possible digestion problem(s).

10. ICP Serial Dilution:

Sample SB27-0030 underwent serial dilution. The Percent Difference (%D) values for ICP serial dilution analysis were within the QC limits of 10 percent for all analytes with concentrations greater than 50 times their IDL.

11. Sample Quantitation and CRDLs

Concentrations of all reported analytes were incorrectly calculated. The laboratory calculated results using the % moisture instead of the % solids. For sample SB32-0010, the laboratory neglected to convert the raw data results to soil units in the original submission. See item 12.

Sample quantitation limits (SQLs) varied from CRDLs in the following samples due to the factors listed below.

SAMPLE NO	ANALYTE	DF	ASV OR ASW	% SOLIDS	ADV	SQL FACTOR
SB27-0030	Hg All others			95.2	 100	0.53 0.11
SB28-0020	Hg All others			95.5	 100	0.52 0.10
SB29-0010	Hg All others			97.6	 100	0.51 0.10
SB30-0030	Hg All others			89.1	 100	0.56 0.11
SB31-0030	Hg All others			84.2	 100	0.59 0.12
SB32-0010	Hg All others			57.6	 100	0.87 0.17

SAMPLE NO	ANALYTE	DF	ASV OR ASW	% SOL-IDS	ADV	SQL FAC-TOR
SB32-0010D	Hg All others			57.9	 100	0.86 0.17
SB33-0010	Hg All others			78.8	 100	0.63 0.13
SB34-0010	Hg All others			78.4	 100	0.64 0.13
SB35-0030	Hg Pb All others	10		87.6	 100	0.57 1.1 0.11
SB39-3040	Hg All others			83.3	 100	0.60 0.12
SB40-3040	Hg All others			84.9	 100	0.59 0.12
SB41-2030	Hg All others			82.3	 100	0.61 0.12
SB41-2030D	Hg All others			89.8	 100	0.56 0.11
SB42-2030	Hg All others			85.1	 100	0.59 0.12
SB43-6070	Hg All others			92.2	 100	0.54 0.11
SB44-4050	Hg All others			90.7	 100	0.55 0.11
SB45-0010	Hg All others			79.6	 100	0.63 0.13
SB46-0612	Hg All others			85.0	 100	0.59 0.12
SB46-0612D	Hg All others			88.0	 100	0.57 0.11

DF = Dilution Factor, ASV = Actual sample volume, ASW = Actual sample weight, ADV = Actual digestate or distillate volume

12. Laboratory Contact

The laboratory was contacted on November 5 regarding the improper calculation of results.

13. Overall Assessment:

Reported results for antimony and manganese are considered estimates, biased low, due to matrix spike results out of control limits. Reported results of aluminum and potassium are considered estimates, unknown bias, due to duplicate results out of control limits.

The analytical data is acceptable for use with the qualifications listed above.

BRENDAN LOWREY
Print Originator's Name
Ecology and Environment, Inc.

RECORD OF COMMUNICATION

Conversation with: PDP Analytical Services	Date 09 / 25 / 98 (Mo) (Day) (Year)
Name: Randy	Time: 3:00 AM/PM
Address:	[X] Originator Placed Call
Phone:	[ ] Originator Received Call

Subject:

Discussion:

- same as ROC for 9/21/98
- said Monday he would get the info and fax it or call with information.

Follow-Up-Action:

Originator's Signature _____

BRENDAN LOWREY
Print Originator's Name
Ecology and Environment, Inc.

RECORD OF COMMUNICATION

Conversation with: PDP Analytical Services	Date 09 / 21 / 98 (Mo) (Day) (Year)
Name: Sasha	Time: 2:00 AM/PM
Address: 1680 Lakefront Circle, Suite B, The Woodlands, Tx. 77380	☒ Originator Placed Call
Phone: (281) 292-7090	☐ Originator Received Call

Subject: Analytical Lab Report

Discussion:

- START missing a Form IV (ICP Interference Check) from a sample data package (SDG: 4798)
- From the sample run log, an ICP Interference Check was done, but not reported.
- They will check their files for the Form III and fax to START
- Additionally, on the group of samples in question, no duplicates were run. Again, they will check their files and call back START to explain why.

Follow-Up-Action:

Wait for fax and call back.

Originator's Signature

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB27-0030

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.001

Level (low/med): _____ Date Received: 08/07/98

% Solids: _95.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	3220			P	JK
7440-36-0	Antimony	0.51	U	N	P	JL
7440-38-2	Arsenic	2.3			P	
7440-39-3	Barium	51.8			P	
7440-41-7	Beryllium	0.21	B		P	
7440-43-9	Cadmium	0.19	B		P	
7440-70-2	Calcium	3460			P	
7440-47-3	Chromium	6.1			P	
7440-48-4	Cobalt	2.5	B		P	
7440-50-8	Copper	8.1			P	
7439-89-6	Iron	5310			P	
7439-92-1	Lead	141			P	
7439-95-4	Magnesium	1890			P	
7439-96-5	Manganese	176		N	P	JL
7439-97-6	Mercury	0.11	U		CV	
7440-02-0	Nickel	4.9			P	
7440-09-7	Potassium	704			P	JK
7782-49-2	Selenium	0.47	U		P	
7440-22-4	Silver	0.59	B		P	
7440-23-5	Sodium	142	B		P	
7440-28-0	Thallium	0.26	U		P	
7440-62-2	Vanadium	9.1			P	
7440-66-6	Zinc	29.6			P	
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB27-0030MSD

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.001MSD

Level (low/med): _____ Date Received: 08/10/98

% Solids: _95.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	3510			P	JK
7440-36-0	Antimony	15.1		N	P	JL
7440-38-2	Arsenic	226			P	
7440-39-3	Barium	276			P	
7440-41-7	Beryllium	5.5			P	
7440-43-9	Cadmium	5.5			P	
7440-70-2	Calcium	3310			P	
7440-47-3	Chromium	27.0			P	
7440-48-4	Cobalt	56.5			P	
7440-50-8	Copper	34.2			P	
7439-89-6	Iron	5810			P	
7439-92-1	Lead	227			P	
7439-95-4	Magnesium	1790			P	
7439-96-5	Manganese	263		N	P	JL
7439-97-6	Mercury	0.74			CV	
7440-02-0	Nickel	57.9			P	
7440-09-7	Potassium	614			P	JK
7782-49-2	Selenium	203			P	
7440-22-4	Silver	4.7			P	
7440-23-5	Sodium	197	B		P	
7440-28-0	Thallium	211			P	
7440-62-2	Vanadium	61.7			P	
7440-66-6	Zinc	80.5			P	
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
SB28-0020

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.002

Level (low/med): _____ Date Received: 08/07/98

% Solids: _95.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	2240			P	JK
7440-36-0	Antimony	0.76	B	N	P	JL
7440-38-2	Arsenic	3.0			P	
7440-39-3	Barium	42.6			P	
7440-41-7	Beryllium	0.28	B		P	
7440-43-9	Cadmium	0.20	B		P	
7440-70-2	Calcium	951			P	
7440-47-3	Chromium	15.0			P	
7440-48-4	Cobalt	3.0	B		P	
7440-50-8	Copper	7.3			P	
7439-89-6	Iron	8630			P	
7439-92-1	Lead	450			P	
7439-95-4	Magnesium	443	B		P	
7439-96-5	Manganese	213		N	P	JL
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	3.9	B		P	
7440-09-7	Potassium	243	B		P	JK
7782-49-2	Selenium	0.47	U		P	
7440-22-4	Silver	0.13	U		P	
7440-23-5	Sodium	89.7	B		P	
7440-28-0	Thallium	0.26	U		P	
7440-62-2	Vanadium	9.2			P	
7440-66-6	Zinc	29.6			P	
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
SB29-0010

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.003

Level (low/med): _____ Date Received: 08/07/98

% Solids: _97.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	1460			P	JK
7440-36-0	Antimony	0.80	B	N	P	JL
7440-38-2	Arsenic	1.4			P	
7440-39-3	Barium	21.9			P	
7440-41-7	Beryllium	0.11	B		P	
7440-43-9	Cadmium	0.10	B		P	
7440-70-2	Calcium	1560			P	
7440-47-3	Chromium	3.5			P	
7440-48-4	Cobalt	1.6	B		P	
7440-50-8	Copper	4.5			P	
7439-89-6	Iron	2690			P	
7439-92-1	Lead	162			P	
7439-95-4	Magnesium	796			P	
7439-96-5	Manganese	157		N	P	JL
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	2.4	B		P	
7440-09-7	Potassium	168	B		P	JK
7782-49-2	Selenium	0.46	U		P	
7440-22-4	Silver	0.12	U		P	
7440-23-5	Sodium	70.6	B		P	
7440-28-0	Thallium	0.26	U		P	
7440-62-2	Vanadium	4.2	B		P	
7440-66-6	Zinc	13.7			P	
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB30-0030

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.004

Level (low/med): _____ Date Received: 08/07/98

% Solids: _89.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	2350			P	JK
7440-36-0	Antimony	0.55	U	N	P	JL
7440-38-2	Arsenic	1.2			P	
7440-39-3	Barium	32.7			P	
7440-41-7	Beryllium	0.19	B		P	
7440-43-9	Cadmium	0.12	B		P	
7440-70-2	Calcium	828			P	
7440-47-3	Chromium	4.6			P	
7440-48-4	Cobalt	2.2	B		P	
7440-50-8	Copper	4.5			P	
7439-89-6	Iron	3920			P	
7439-92-1	Lead	77.2			P	
7439-95-4	Magnesium	401	B		P	
7439-96-5	Manganese	338		N	P	JL
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	2.8	B		P	
7440-09-7	Potassium	472	B		P	JK
7782-49-2	Selenium	0.51	U		P	
7440-22-4	Silver	0.20	B		P	
7440-23-5	Sodium	86.6	B		P	
7440-28-0	Thallium	0.28	U		P	
7440-62-2	Vanadium	7.2			P	
7440-66-6	Zinc	22.3			P	
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB31-0030

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.006

Level (low/med): _____ Date Received: 08/07/98

% Solids: _84.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	2190			P	JK
7440-36-0	Antimony	0.58	U	N	P	JL
7440-38-2	Arsenic	0.73	B		P	
7440-39-3	Barium	28.7			P	
7440-41-7	Beryllium	0.15	B		P	
7440-43-9	Cadmium	0.07	B		P	
7440-70-2	Calcium	321	B		P	
7440-47-3	Chromium	3.8			P	
7440-48-4	Cobalt	2.0	B		P	
7440-50-8	Copper	19.0			P	
7439-89-6	Iron	3180			P	
7439-92-1	Lead	811			P	
7439-95-4	Magnesium	271	B		P	
7439-96-5	Manganese	78.7		N	P	JL
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	3.2	B		P	
7440-09-7	Potassium	588	B		P	JK
7782-49-2	Selenium	0.53	U		P	
7440-22-4	Silver	0.35	B		P	
7440-23-5	Sodium	98.5	B		P	
7440-28-0	Thallium	0.30	U		P	
7440-62-2	Vanadium	6.6			P	
7440-66-6	Zinc	12.2			P	
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB32-0010

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.009

Level (low/med): _____ Date Received: 08/07/98

% Solids: _57.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	2090			P	JK
7440-36-0	Antimony	0.86	U	N	P	JL
7440-38-2	Arsenic	8.3			P	
7440-39-3	Barium	84.6			P	
7440-41-7	Beryllium	0.12	B		P	
7440-43-9	Cadmium	0.15	B		P	
7440-70-2	Calcium	1370			P	
7440-47-3	Chromium	3.9			P	
7440-48-4	Cobalt	3.8	B		P	
7440-50-8	Copper	4.0	B		P	
7439-89-6	Iron	25300			P	
7439-92-1	Lead	194			P	
7439-95-4	Magnesium	392	B		P	
7439-96-5	Manganese	921		N	P	JL
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	0.94	B		P	
7440-09-7	Potassium	691	B		P	JK
7782-49-2	Selenium	0.79	U		P	
7440-22-4	Silver	2.3			P	
7440-23-5	Sodium	202	B		P	
7440-28-0	Thallium	0.44	U		P	
7440-62-2	Vanadium	6.1	B		P	
7440-66-6	Zinc	7.7			P	
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB32-0010D

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.010

Level (low/med): _____ Date Received: 08/10/98

% Solids: _57.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	1870			P	JK
7440-36-0	Antimony	0.85	U	N	P	JL
7440-38-2	Arsenic	11.4			P	
7440-39-3	Barium	104			P	
7440-41-7	Beryllium	0.14	B		P	
7440-43-9	Cadmium	0.25	B		P	
7440-70-2	Calcium	1630			P	
7440-47-3	Chromium	3.6			P	
7440-48-4	Cobalt	3.0	B		P	
7440-50-8	Copper	3.8	B		P	
7439-89-6	Iron	31500			P	
7439-92-1	Lead	245			P	
7439-95-4	Magnesium	421	B		P	
7439-96-5	Manganese	1100		N	P	JL
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	0.52	U		P	
7440-09-7	Potassium	218	B		P	JK
7782-49-2	Selenium	0.78	U		P	
7440-22-4	Silver	2.0			P	
7440-23-5	Sodium	112	B		P	
7440-28-0	Thallium	0.43	U		P	
7440-62-2	Vanadium	5.7	B		P	
7440-66-6	Zinc	8.0			P	
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB33-0010

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.011

Level (low/med): _____ Date Received: 08/07/98

% Solids: _77.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	11300			P	JK
7440-36-0	Antimony	0.63	U	N	P	JL
7440-38-2	Arsenic	4.0			P	
7440-39-3	Barium	171			P	
7440-41-7	Beryllium	0.73			P	
7440-43-9	Cadmium	0.13	B		P	
7440-70-2	Calcium	1110			P	
7440-47-3	Chromium	14.1			P	
7440-48-4	Cobalt	5.1	B		P	
7440-50-8	Copper	5.8			P	
7439-89-6	Iron	14600			P	
7439-92-1	Lead	15.3			P	
7439-95-4	Magnesium	1580			P	
7439-96-5	Manganese	179		N	P	JL
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	10.7			P	
7440-09-7	Potassium	1820			P	JK
7782-49-2	Selenium	0.58	U		P	
7440-22-4	Silver	0.15	U		P	
7440-23-5	Sodium	190	B		P	
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	23.9			P	
7440-66-6	Zinc	19.4			P	
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
SB34-0010

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.012

Level (low/med): _____ Date Received: 08/07/98

% Solids: _77.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	3410			P	JK
7440-36-0	Antimony	0.63	U	N	P	JL
7440-38-2	Arsenic	3.5			P	
7440-39-3	Barium	53.0			P	
7440-41-7	Beryllium	0.23	B		P	
7440-43-9	Cadmium	0.08	B		P	
7440-70-2	Calcium	717			P	
7440-47-3	Chromium	6.7			P	
7440-48-4	Cobalt	3.9	B		P	
7440-50-8	Copper	11.7			P	
7439-89-6	Iron	8990			P	
7439-92-1	Lead	1080			P	
7439-95-4	Magnesium	628	B		P	
7439-96-5	Manganese	301		N	P	JL
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	5.1	B		P	
7440-09-7	Potassium	764			P	JK
7782-49-2	Selenium	0.58	U		P	
7440-22-4	Silver	0.88	B		P	
7440-23-5	Sodium	159	B		P	
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	10.1			P	
7440-66-6	Zinc	14.7			P	
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB35-0030

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.019

Level (low/med): _____ Date Received: 08/07/98

% Solids: _87.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	4180			P	JK
7440-36-0	Antimony	0.56	U	N	P	JL
7440-38-2	Arsenic	1.0	B		P	
7440-39-3	Barium	36.7			P	
7440-41-7	Beryllium	0.20	B		P	
7440-43-9	Cadmium	0.24	B		P	
7440-70-2	Calcium	6590			P	
7440-47-3	Chromium	4.5			P	
7440-48-4	Cobalt	1.3	B		P	
7440-50-8	Copper	8.9			P	
7439-89-6	Iron	4260			P	
7439-92-1	Lead	15200			P	
7439-95-4	Magnesium	2120			P	
7439-96-5	Manganese	87.4		N	P	JL
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	3.1	B		P	
7440-09-7	Potassium	495	B		P	JK
7782-49-2	Selenium	0.51	U		P	
7440-22-4	Silver	0.27	B		P	
7440-23-5	Sodium	143	B		P	
7440-28-0	Thallium	0.29	U		P	
7440-62-2	Vanadium	6.1			P	
7440-66-6	Zinc	7.6			P	
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB39-3040

b Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

b Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

trix (soil/water): SOIL_ Lab Sample ID: 4802.015

vel (low/med): _____ Date Received: 08/07/98

Solids: _83.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	4570			P	JK
7440-36-0	Antimony	0.59	U	N	P	JL
7440-38-2	Arsenic	3.0			P	
7440-39-3	Barium	27.2			P	
7440-41-7	Beryllium	0.36	B		P	
7440-43-9	Cadmium	0.06	U		P	
7440-70-2	Calcium	606			P	
7440-47-3	Chromium	8.4			P	
7440-48-4	Cobalt	3.2	B		P	
7440-50-8	Copper	3.1			P	
7439-89-6	Iron	8820			P	
7439-92-1	Lead	3.6			P	
7439-95-4	Magnesium	653			P	
7439-96-5	Manganese	60.9		N	P	JL
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	6.9			P	
7440-09-7	Potassium	917			P	JK
7782-49-2	Selenium	0.54	U		P	
7440-22-4	Silver	0.19	B		P	
7440-23-5	Sodium	63.3	B		P	
7440-28-0	Thallium	0.30	U		P	
7440-62-2	Vanadium	13.6			P	
7440-66-6	Zinc	6.2			P	
	Cyanide				NR	

lor Before: _____ Clarity Before: _____ Texture: _____

lor After: _____ Clarity After: _____ Artifacts: _____

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
SB40-3040

ab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

ab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

atrix (soil/water): SOIL_ Lab Sample ID: 4802.013

evel (low/med): _____ Date Received: 08/07/98

Solids: _84.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	3020			P	JK
7440-36-0	Antimony	0.58	U	N	P	JL
7440-38-2	Arsenic	5.7			P	
7440-39-3	Barium	48.4			P	
7440-41-7	Beryllium	0.29	B		P	
7440-43-9	Cadmium	0.06	B		P	
7440-70-2	Calcium	528	B		P	
7440-47-3	Chromium	5.6			P	
7440-48-4	Cobalt	3.2	B		P	
7440-50-8	Copper	2.2	B		P	
7439-89-6	Iron	10400			P	
7439-92-1	Lead	3.2			P	
7439-95-4	Magnesium	483	B		P	
7439-96-5	Manganese	312		N	P	JL
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	4.3	B		P	
7440-09-7	Potassium	514	B		P	JK
7782-49-2	Selenium	0.53	U		P	
7440-22-4	Silver	0.47	B		P	
7440-23-5	Sodium	60.9	B		P	
7440-28-0	Thallium	0.29	U		P	
7440-62-2	Vanadium	10.3			P	
7440-66-6	Zinc	4.2			P	
	Cyanide				NR	

olor Before: _____ Clarity Before: _____ Texture: _____

olor After: _____ Clarity After: _____ Artifacts: _____

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
SB41-2030

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.020

Level (low/med): _____ Date Received: 08/10/98

% Solids: _82.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	2760			P	JK
7440-36-0	Antimony	0.60	U	N	P	JL
7440-38-2	Arsenic	1.5			P	
7440-39-3	Barium	33.1			P	
7440-41-7	Beryllium	0.24	B		P	
7440-43-9	Cadmium	0.06	U		P	
7440-70-2	Calcium	536	B		P	
7440-47-3	Chromium	4.6			P	
7440-48-4	Cobalt	2.7	B		P	
7440-50-8	Copper	3.3			P	
7439-89-6	Iron	5250			P	
7439-92-1	Lead	6.6			P	
7439-95-4	Magnesium	476	B		P	
7439-96-5	Manganese	40.0		N	P	JL
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	5.6			P	
7440-09-7	Potassium	501	B		P	JK
7782-49-2	Selenium	0.55	U		P	
7440-22-4	Silver	0.35	B		P	
7440-23-5	Sodium	76.1	B		P	
7440-28-0	Thallium	0.30	U		P	
7440-62-2	Vanadium	8.5			P	
7440-66-6	Zinc	5.8			P	
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB41-230D

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.021

Level (low/med): _____ Date Received: 08/07/98

% Solids: _89.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	1800			P	JK
7440-36-0	Antimony	0.55	U	N	P	JL
7440-38-2	Arsenic	1.1	B		P	
7440-39-3	Barium	15.5	B		P	
7440-41-7	Beryllium	0.12	B		P	
7440-43-9	Cadmium	0.06	U		P	
7440-70-2	Calcium	324	B		P	
7440-47-3	Chromium	3.7			P	
7440-48-4	Cobalt	1.3	B		P	
7440-50-8	Copper	2.1	B		P	
7439-89-6	Iron	3260			P	
7439-92-1	Lead	3.8			P	
7439-95-4	Magnesium	271	B		P	
7439-96-5	Manganese	45.1		N	P	JL
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	3.2	B		P	
7440-09-7	Potassium	569			P	JK
7782-49-2	Selenium	0.50	U		P	
7440-22-4	Silver	0.71	B		P	
7440-23-5	Sodium	105	B		P	
7440-28-0	Thallium	0.28	U		P	
7440-62-2	Vanadium	5.5	B		P	
7440-66-6	Zinc	4.0			P	
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
SB42-2030

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.023

Level (low/med): _____ Date Received: 08/07/98

Solids: _85.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	2280			P	JK
7440-36-0	Antimony	0.58	U	N	P	JL
7440-38-2	Arsenic	4.2			P	
7440-39-3	Barium	22.6	B		P	
7440-41-7	Beryllium	0.25	B		P	
7440-43-9	Cadmium	0.06	U		P	
7440-70-2	Calcium	333	B		P	
7440-47-3	Chromium	6.4			P	
7440-48-4	Cobalt	2.4	B		P	
7440-50-8	Copper	2.7	B		P	
7439-89-6	Iron	8180			P	
7439-92-1	Lead	4.4			P	
7439-95-4	Magnesium	370	B		P	
7439-96-5	Manganese	114		N	P	JL
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	3.9	B		P	
7440-09-7	Potassium	547	B		P	JK
7782-49-2	Selenium	0.53	U		P	
7440-22-4	Silver	0.91	B		P	
7440-23-5	Sodium	129	B		P	
7440-28-0	Thallium	0.29	U		P	
7440-62-2	Vanadium	11.3			P	
7440-66-6	Zinc	4.0			P	
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
SB43-6070

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.016

Level (low/med): _____ Date Received: 08/07/98

% Solids: _92.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	2410			P	JK
7440-36-0	Antimony	0.53	U	N	P	JL
7440-38-2	Arsenic	1.6			P	
7440-39-3	Barium	28.0			P	
7440-41-7	Beryllium	0.21	B		P	
7440-43-9	Cadmium	0.07	B		P	
7440-70-2	Calcium	292	B		P	
7440-47-3	Chromium	5.4			P	
7440-48-4	Cobalt	2.1	B		P	
7440-50-8	Copper	2.0	B		P	
7439-89-6	Iron	5990			P	
7439-92-1	Lead	2.2			P	
7439-95-4	Magnesium	369	B		P	
7439-96-5	Manganese	84.4		N	P	JL
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	12.5			P	
7440-09-7	Potassium	387	B		P	JK
7782-49-2	Selenium	0.49	U		P	
7440-22-4	Silver	0.13	U		P	
7440-23-5	Sodium	41.1	B		P	
7440-28-0	Thallium	0.27	U		P	
7440-62-2	Vanadium	8.5			P	
7440-66-6	Zinc	4.1			P	
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB44-4050

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.017

Level (low/med): _____ Date Received: 08/07/98

% Solids: _90.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	1420			P	JK
7440-36-0	Antimony	0.54	U	N	P	JL
7440-38-2	Arsenic	0.73	B		P	
7440-39-3	Barium	14.3	B		P	
7440-41-7	Beryllium	0.11	B		P	
7440-43-9	Cadmium	0.06	U		P	
7440-70-2	Calcium	199	B		P	
7440-47-3	Chromium	3.0			P	
7440-48-4	Cobalt	0.95	B		P	
7440-50-8	Copper	4.1			P	
7439-89-6	Iron	2430			P	
7439-92-1	Lead	1.6			P	UB
7439-95-4	Magnesium	215	B		P	
7439-96-5	Manganese	32.4		N	P	JL
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	7.8			P	
7440-09-7	Potassium	311	B		P	JK
7782-49-2	Selenium	0.50	U		P	
7440-22-4	Silver	0.50	B		P	
7440-23-5	Sodium	61.7	B		P	
7440-28-0	Thallium	0.28	U		P	
7440-62-2	Vanadium	4.0	B		P	
7440-66-6	Zinc	3.4			P	
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
SB45-0010

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.018

Level (low/med): _____ Date Received: 08/07/98

% Solids: _79.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	2660			P	JK
7440-36-0	Antimony	0.62	U	N	P	JL
7440-38-2	Arsenic	2.2			P	
7440-39-3	Barium	27.1			P	
7440-41-7	Beryllium	0.19	B		P	
7440-43-9	Cadmium	0.06	U		P	
7440-70-2	Calcium	289	B		P	
7440-47-3	Chromium	4.5			P	
7440-48-4	Cobalt	2.0	B		P	
7440-50-8	Copper	3.8			P	
7439-89-6	Iron	5830			P	
7439-92-1	Lead	38.9			P	
7439-95-4	Magnesium	402	B		P	
7439-96-5	Manganese	39.5		N	P	JL
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	4.5	B		P	
7440-09-7	Potassium	700			P	JK
7782-49-2	Selenium	0.57	U		P	
7440-22-4	Silver	0.82	B		P	
7440-23-5	Sodium	123	B		P	
7440-28-0	Thallium	0.31	U		P	
7440-62-2	Vanadium	7.2			P	
7440-66-6	Zinc	8.0			P	
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
SB46-0612

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.026

Level (low/med): _____ Date Received: 08/07/98

% Solids: _85.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	5640			P	JK
7440-36-0	Antimony	0.58	U	N	P	JL
7440-38-2	Arsenic	3.0			P	
7440-39-3	Barium	43.7			P	
7440-41-7	Beryllium	0.39	B		P	
7440-43-9	Cadmium	0.06	B		P	
7440-70-2	Calcium	463	B		P	
7440-47-3	Chromium	7.6			P	
7440-48-4	Cobalt	3.0	B		P	
7440-50-8	Copper	5.7			P	
7439-89-6	Iron	9260			P	
7439-92-1	Lead	142			P	
7439-95-4	Magnesium	688			P	
7439-96-5	Manganese	95.7		N	P	JL
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	9.1			P	
7440-09-7	Potassium	894			P	JK
7782-49-2	Selenium	0.53	U		P	
7440-22-4	Silver	0.67	B		P	
7440-23-5	Sodium	573	B		P	
7440-28-0	Thallium	0.29	U		P	
7440-62-2	Vanadium	16.2			P	
7440-66-6	Zinc	6.7			P	
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB46-0612D

Lab Name: PDP_ANALYTICAL_SERVICES__ Contract: _____

Lab Code: PDP___ Case No.: E&E___ SAS No.: _____ SDG No.: SB27-0

Matrix (soil/water): SOIL_ Lab Sample ID: 4802.027

Level (low/med): _____ Date Received: 08/07/98

% Solids: _88.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	2640 ~~26.4~~			P	JK
7440-36-0	Antimony	0.56 ~~0.01~~	U	N	P	JL
7440-38-2	Arsenic	0.84 ~~0.01~~	B		P	
7440-39-3	Barium	41.7 ~~0.42~~			P	
7440-41-7	Beryllium	0.14 ~~0.00~~	B		P	
7440-43-9	Cadmium	0.06 ~~0.00~~	U		P	
7440-70-2	Calcium	233 ~~2.3~~	B		P	
7440-47-3	Chromium	4.5 ~~0.04~~			P	
7440-48-4	Cobalt	0.11 ~~0.02~~	B		P	
7440-50-8	Copper	2.6 ~~0.03~~	B		P	~~UB~~ 4B
7439-89-6	Iron	2630 ~~26.3~~			P	
7439-92-1	Lead	183 ~~1.8~~			P	~~UB~~
7439-95-4	Magnesium	356 ~~3.6~~	B		P	
7439-96-5	Manganese	16.3 ~~0.16~~		N	P	JL
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	5.0 ~~0.05~~			P	
7440-09-7	Potassium	653 ~~5.9~~			P	JK
7782-49-2	Selenium	0.51 ~~0.01~~	U		P	
7440-22-4	Silver	0.60 ~~0.01~~	B		P	UB
7440-23-5	Sodium	432 ~~4.3~~	B		P	
7440-28-0	Thallium	0.29 ~~0.00~~	U		P	
7440-62-2	Vanadium	46 ~~0.05~~	B		P	
7440-66-6	Zinc	3.7 ~~0.04~~			P	
	Cyanide				NR	

Color Before: _____ Clarity Before: _____ pc Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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DATA QUALITY ASSURANCE REVIEW

SITE NAME Wilcox Refinery

CERCLIS

PAN 052601SFXX TDD NUMBER 06-98-03-0009

CASE NUMBER/WORK ORDER 6S154 SDG/PROJ. NUMBER 9801.181

E & E has completed a QA review for Case No. 6S154, SDG No.9801.181, Wilcox Refinery. Twelve soil samples were analyzed for PAH, TPH, Metals, BTEX, pH and Total Solids and two water samples were analyzed for BTEX and one for TPH by Ecology and Environment, Inc. Analytical Services Center. Sample numbers are listed below.

SAMPLE NUMBERS

SB06-0102	SB13-GW-2	
SB07-0405	TB	
SB07D-0405		
SB08-0102		
SB09-0102		
SB10-0304		
SB11-0203		
SB12-0102		
SB12-0809		
SB13-0102		
SB13-6575		
SB13D-6575		

This data package was validated to determine if Quality Control (QC) specifications were achieved, following *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (February, 1994), *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (February, 1994), *Quality Assurance/Quality Control Guidance for Removal Activities* (April, 1990), and the Regional Protocol for Holding Times, Blanks, and VOA Preservation (April 13, 1989). Specific data qualifications are listed in the following discussion.

REVIEWER Michelle Brown DATE 10/27/98 JMB

Data Qualifiers

Data Qualifier Definitions were supplied by the Office of Solid Waste and Emergency Response (September 1989) and are included in the Functional Guidelines. Data qualifiers may be combined (UJ, QJ) with the corresponding combination of meanings. Additional qualifier may be added to provide additional, more specific information (JL, UB, QJK), modifying the meaning of the primary qualifier. Addition qualifiers utilized by E & E are H, L, K, B, Q, and D.

U - The material was analyzed for, but was not detected. The associated numerical value is the sample quantitation or detection limit, which has been adjusted for sample weight/sample volume, extraction volume, percent solids, sample dilution or other analysis specific parameters.

An additional qualifier, "B", may be appended to indicated that while the analyte was detected in the sample, the presence of the analyte may be attributable to blank contamination and the analyte is therefore considered undetected with the sample detection or quantitation limit for the analyte being elevated.

J - The analyte was analyzed for, but the associated numerical value may not be consistent with the amount actually present in the environmental sample or may not be consistent with the sample detection or quantitation limit. The value is an estimated quantity. The data should be seriously considered for decision-making and are usable for many purposes.

An additional qualifier will be appended to the "J" qualifier that indicates the bias in the reported results:

L Low bias

H High bias

K Unknown bias

Q The reported concentration is less than the sample quantitation limit for the specific analyte in the sample.

The L and H qualifier will only be employed when a single qualification is required. When more than one quality control parameter affects the analytical result and a conflict results in assigning a bias, the result will be flagged JK.

R - Quality Control indicates that data are unusable for all purposes. The analyte was analyzed for, but the presence or absence of the analyte has not been verified. Resampling and reanalysis are necessary for verification to confirm or deny the presence of an analyte.

N - The analysis indicates the presence of analyte for which there is presumptive evidence to make a "tentative identification."

D - The concentration reported was determined in the re-analysis of the sample at a secondary dilution.

BTEX DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in SW846 method 8021B.

2. Holding Time:

All samples were analyzed within the required holding time of less than 14 days after collection. Samples were maintained at less than 4°C. No qualifications are placed on the data.

3. Initial Calibration:

Initial calibration criteria were met: Five point calibration for single component analytes, retention time windows established, adequate resolution (90%) between adjacent peaks, and Percent Relative Standard Deviations (%RSD) of the calibration factors less than or equal to 20% (30% for the surrogates)

4. Calibration Verification:

Calibration verification criteria: verification sample frequency of every 12 hours; analyte within retention time (RT) window; resolution (RES%) between adjacent peaks greater than or equal to 90%; and the percent difference (%D) between the calculated amount and the true amount for target analytes and surrogates not exceeding ± 25%; were met.

5. Blanks:

A method blank was prepared at the required frequency of every time samples were extracted for the matrix or every 20 samples, whichever is greater. Target analytes were not detected in associated blank(s) analyzed.

6. Surrogates:

Control limits for the surrogates are listed below.

SURROGATE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
Trifluorotoluene	65-130%	26-139%	

Recoveries of the following surrogates were outside control limits.

LCS 06/08	WATER	Trifluorotoluene	960%	No flag

7. Matrix Spikes:

Sample SB06-0102 underwent matrix spike analysis for the soil matrix. Sample 8044 (Batch QC) underwent matrix spike analysis for the water matrix. Recoveries of all spiked analytes were within the required control limits in both the matrix spike and matrix spike duplicate.

ANALYTE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
Benzene	49-124%	49-124%	
Toluene	46-117%	46-117%	
Ethylbenzene	44-122%	44-122%	
Total Xylenes	54-118%	54-118%	

8. Duplicates:

Sample SB06-0102 underwent matrix spike duplicate analysis for the soil matrix. Sample 8044 (Batch QC) underwent spike duplicate analysis for the water matrix. Relative percent differences (RPDs) of all spiked analytes were within the required control limits listed below.

ANALYTE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
Benzene	30%	30%	
Toluene	30%	30%	
Ethylbenzene	30%	30%	
Total Xylenes	30%	30%	

9. Target Compound Identification:

All reported target analytes met identification criteria of retention times within the calculated retention time windows (3x Std. Dev.).

10. Target Compound Quantitation and CRQLs:

Concentrations of all reported analytes were correctly calculated.

Sample quantitation limits (SQLs) varied from CRQLs (2 ug/kg) in the following samples due to the factors listed below.

SAMPLE NO.	LEVEL	% SOLID moisture	SAMPLE WT/VOL (gm/ml)	DF	CEV (ul)	SQL FACTOR
SB06-0102	LOW	12				1.13
SB07-0405	LOW	13				1.15
SB07D-0405	LOW	11				1.12
SB08-0102	LOW	8				1.09
SB09-0102	LOW	12				1.13
SB10-0304	LOW	10				1.11
SB11-0203	LOW	15				1.18
SB12-0102	LOW	13				1.15
SB12-0809	LOW	14				1.16
SB13-0102	LOW	11				1.12
SB13-6575	LOW	14		5		5.81
SB13D-6575	LOW	13		5		5.75
SB13-GW-2	LOW			25		25

DF = dilution factor, CEV = concentrated extract volume

11. Laboratory Control Sample:

The laboratory analyzed a laboratory control sample and recoveries for this analysis were within the control limits provided.

12. Laboratory Contact:

No laboratory contact was required.

13. Overall Assessment:

The Laboratory Control Sample (LCS) analyzed on 06/08 had an artificially high recovery due to a co-eluting peak contained in the spike mix (the wrong mix was used).
All of the soil sample calculations were dry weight corrected. Samples SB13-6575, its duplicate SB13D-6575 and SB13-GW-2 all required dilutions due to the high level of target and non-target compounds present. Quantitation limits were adjusted accordingly. Sample SB13-GW-2 was diluted to a point were benzene and total xylenes quantitated below the adjusted quantitation limits, but these compounds were present at lower concentrations.

The analytical data is acceptable for use with the qualifications listed above.

TEST CODE :SBTX0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07928 MATRIX : SOLID
SAMPLE ID CLIENT: SE06-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.3
Toluene	ND		2.3
Ethylbenzene	ND		2.3
Total Xylenes	ND		2.3

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002848

TEST CODE :SBTX0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 87 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07929 MATRIX : SOLID
SAMPLE ID CLIENT: SB07-0405

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.3
Toluene	ND		2.3
Ethylbenzene	ND		2.3
Total Xylenes	ND		2.3

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002849

TEST CODE :SBTX8A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 89 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07930 MATRIX : SOLID
SAMPLE ID CLIENT: SB07D-0405

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND	UJC	2.2
Toluene	ND	E	2.2
Ethylbenzene	ND	E	2.2
Total Xylenes	ND	E	2.2

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

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002850

TEST CODE : SBTX0A1 JOB NUMBER : 9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN: DRY WEIGHT %SOLIDS : 92 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07931 MATRIX : SOLID
SAMPLE ID CLIENT: SB08-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.2
Toluene	ND		2.2
Ethylbenzene	ND		2.2
Total Xylenes	ND		2.2

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002851

TEST CODE :SBTX0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07932 MATRIX : SOLID
SAMPLE ID CLIENT: SB09-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.3
Toluene	ND		2.3
Ethylbenzene	ND		2.3
Total Xylenes	ND		2.3

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

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002852

TEST CODE :SBTX0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 90 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07933 MATRIX : SOLID
SAMPLE ID CLIENT: SB10-0304

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.2
Toluene	ND		2.2
Ethylbenzene	ND		2.2
Total Xylenes	ND		2.2

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002853

TEST CODE :SBTX0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 85 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07934 MATRIX : SOLID
SAMPLE ID CLIENT: SB11-0203

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.4
Toluene	ND		2.4
Ethylbenzene	ND		2.4
Total Xylenes	ND		2.4

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

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002854

TEST CODE : SBTX0A1 JOB NUMBER : 9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 87 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07935 MATRIX : SOLID
SAMPLE ID CLIENT: SB12-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.3
Toluene	ND		2.3
Ethylbenzene	ND		2.3
Total Xylenes	ND		2.3

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :SBTX0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 86 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07936 MATRIX : SOLID
SAMPLE ID CLIENT: SB12-0809

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.3
Toluene	ND		2.3
Ethylbenzene	ND		2.3
Total Xylenes	ND		2.3

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

recycled paper

002856

TEST CODE :SBTX0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 89 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07937 MATRIX : SOLID
SAMPLE ID CLIENT: SB13-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.2
Toluene	ND		2.2
Ethylbenzene	ND		2.2
Total Xylenes	ND		2.2

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002857

TEST CODE :SBTX0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 86 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07938 MATRIX : SOLID
SAMPLE ID CLIENT: SB13-6575

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		12
Toluene	ND		12
Ethylbenzene	ND		12
Total Xylenes	13		12

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

recycled paper ecology and environment

002858

TEST CODE :SBTX0A1 JOB NUMBER :9801.131
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 87 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07939 MATRIX : SOLID
SAMPLE ID CLIENT: SB13D-6575

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		11
Toluene	ND		11
Ethylbenzene	23		11
Total Xylenes	91		11

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002859

TEST CODE :WBTX0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8021B BETX UNITS : UG/L
SAMPLE ID LAB : EE-98-07940 MATRIX: WATER
SAMPLE ID CLIENT: SB13-GW-2

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	PRESENT		50
Toluene	ND		50
Ethylbenzene	210		50
Total Xylenes	PRESENT		50

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

recycled paper ecology and environment

002860

TEST CODE :NBTX0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8021B BETX UNITS : UG/L
SAMPLE ID LAB : EE-98-07941 MATRIX: WATER
SAMPLE ID CLIENT: TB

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.0
Toluene	ND		2.0
Ethylbenzene	ND		2.0
Total Xylenes	ND		2.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002861

PAH DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in SW846 method 8310.

2. Holding Time:

All samples were extracted within the required holding time of less than 14 days after collection. Analysis of the sample was conducted within 40 days of extraction. Samples were maintained at less than 4°C. No qualifications are placed on the data.

3. Initial Calibration:

Initial calibration criteria were met: Five point calibration for single component analytes, retention time windows established, adequate resolution (90%) between adjacent peaks, and Percent Relative Standard Deviations (%RSD) of the calibration factors less than or equal to 20% (30% for the surrogates)

4. Calibration Verification:

Calibration verification criteria: verification sample frequency of every 12 hours; analyte within RT window; resolution (RES%) between adjacent peaks greater than or equal to 90%; and the percent difference (%D) between the calculated amount and the true amount for target analytes and surrogates not exceeding ± 25%; were not met.

INST ID	COL ID	FREQ	ANALYTE	RES%	RT	%D	AFFECTED SAMPLES	QUALIFIER FLAG
HPLC-2	HYPER-PAH		Benzo(a)pyrene			135	NONE	No flag-results taken from alternative column

5. Blanks:

A method blank was prepared at the required frequency of every time samples were extracted for the matrix or every 20 samples, whichever is greater. Target analytes were not detected in associated blank(s) analyzed.

6. Surrogates:

All recoveries of the surrogates were within control limits.

7. Matrix Spikes:

Sample SB10-0304 underwent matrix spike analysis for the soil matrix. Recoveries of all spiked analytes were within the required control limits in both the matrix spike and matrix spike duplicate.

8. Duplicates:

Sample SB10-0304 underwent matrix spike duplicate analysis for the soil matrix. Relative percent differences (RPDs) of all spiked analytes were within the required control limits.

9. Target Compound Identification:

All reported target analytes met identification criteria of retention times within the calculated retention time windows (3X Std. Dev.) for both columns and percent differences (%D) between the quantitation on the two columns of less than 25%.

10. Target Compound Quantitation and CRQLs:

Concentrations of all reported analytes were correctly calculated.

Sample quantitation limits (SQLs) varied from the CRQLs below in the following samples due to the factors listed below.

20 ug/kg - fluorene, anthracene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene
50 ug/kg - fluoranthene, pyrene, dibenzo(a,h)anthracene, dibenzo(ghi)perylene
60 ug/kg - phenanthrene
200 ug/kg - naphthalene, acenaphthylene, 1-methylnaphthalene, 2-methylnaphthalene, acenaphthene

SAMPLE NO.	LEVEL	% SOLID moisture	SAMPLE WT/VOL (gm/ml)	DF	CEV (ul)	SQL FACTOR
SB06-0102	LOW	12				1.14
SB07-0405	LOW	13				1.15
SB07D-0405	LOW	11				1.12
SB08-0102	LOW	8				1.09
SB09-0102	LOW	12				1.14
SB10-0304	LOW	10				1.11
SB11-0203	LOW	15				1.18
SB12-0102	LOW	13				1.15
SB12-0809	LOW	14				1.16
SB13-0102	LOW	11				1.12

SAMPLE NO.	LEVEL	% SOLID moisture	SAMPLE WT/VOL (gm/ml)	DF	CEV (ul)	SQL FACTOR
SB13-6575	LOW	14				1.16
SB13D-6575	LOW	13				1.15

DF = dilution factor, CEV = concentrated extract volume

11. Laboratory Control Sample:

The laboratory analyzed a laboratory control sample and recoveries for this analysis were within the control limits provided.

12. Laboratory Contact:

No laboratory contact was required.

13. Overall Assessment:

In the continuing calibrations ran for the HYPERPAH column analysis, benzo(a)pyrene had a consistently high recovery. The results for this compound were taken from the ENVPAH column analysis, so no qualification of data was necessary.
Although the blank contained some low level contamination, none of the concentrations were greater than the reporting limits. All of the contamination compounds in the blank were therefore reported not detected and no qualification of the data was necessary.
The sample calculations were dry weight corrected and the quantitation limits were adjusted accordingly. The concentrations reported in the final report were the lowest quantitated result from the three columns used for analysis (with the exception of Benzo(a)pyrene as stated above).

The analytical data is acceptable for use and no qualifications were placed on it.

TEST CODE :SPAH0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07928 MATRIX : SOLID
SAMPLE ID CLIENT: SB06-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		230
Acenaphthylene	ND		230
1-methylnaphthalene	ND		230
2-Methylnaphthalene	ND		230
Acenaphthene	ND		230
Fluorene	ND		23
Phenanthrene	31		23
Anthracene	ND		23
Fluoranthene	66		57
Pyrene	ND		57
Benzo(a)anthracene	15	J K	23
Chrysene	25		23
Benzo(b)fluoranthene	25		23
Benzo(k)fluoranthene	ND		23
Benzo(a)pyrene	31		23
Dibenzo(a,h)anthracene	ND		57
Benzo(ghi)perylene	28	J K	57
Indeno(1,2,3-cd)pyrene	ND		23

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
K = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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002865

TEST CODE :SPAH0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 87 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07929 MATRIX : SOLID
SAMPLE ID CLIENT: SB07-0405

PARAMETER	RESULTS	Q	CNT. LIMIT
Naphthalene	ND		230
Acenaphthylene	ND		230
1-methylnaphthalene	ND		230
2-Methylnaphthalene	ND		230
Acenaphthene	ND		230
Fluorene	ND		23
Phenanthrene	ND		23
Anthracene	ND		23
Fluoranthene	ND		57
Pyrene	ND		57
Benzo(a)anthracene	ND		23
Chrysene	ND		23
Benzo(b)fluoranthene	ND		23
Benzo(k)fluoranthene	ND		23
Benzo(a)pyrene	ND		23
Dibenzo(a,h)anthracene	ND		57
Benzo(ghi)perylene	ND		57
Indeno(1,2,3-cd)pyrene	ND		23

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002866

TEST CODE :SPAH0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 89 %
TEST NAME : 8310 PAH LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07930 MATRIX : SOLID
SAMPLE ID CLIENT: SB07D-0405

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		220
Acenaphthylene	ND		220
1-methylnaphthalene	ND		220
2-Methylnaphthalene	ND		220
Acenaphthene	ND		220
Fluorene	ND		22
Phenanthrene	ND		22
Anthracene	ND		22
Fluoranthene	56		56
Pyrene	84		56
Benzo(a)anthracene	31		22
Chrysene	ND		22
Benzo(b)fluoranthene	64		22
Benzo(k)fluoranthene	17	JK	22
Benzo(a)pyrene	70		22
Dibenzo(a,h)anthracene	ND		56
Benzo(ghi)perylene	ND		56
Indeno(1,2,3-cd)pyrene	ND		22

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
K = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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002867

TEST CODE :SPAH0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 92 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07931 MATRIX : SOLID
SAMPLE ID CLIENT: SB08-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		220
Acenaphthylene	ND		220
1-methylnaphthalene	ND		220
2-Methylnaphthalene	ND		220
Acenaphthene	ND		220
Fluorene	ND		22
Phenanthrene	ND		22
Anthracene	ND		22
Fluoranthene	ND		54
Pyrene	ND		54
Benzo(a)anthracene	ND		22
Chrysene	ND		22
Benzo(b)fluoranthene	ND		22
Benzo(k)fluoranthene	ND		22
Benzo(a)pyrene	ND		22
Dibenzo(a,h)anthracene	ND		54
Benzo(ghi)perylene	ND		54
Indeno(1,2,3-cd)pyrene	ND		22

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002868

TEST CODE :SPAH0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07932 MATRIX : SOLID
SAMPLE ID CLIENT: SB09-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		230
Acenaphthylene	ND		230
1-methylnaphthalene	ND		230
2-Methylnaphthalene	ND		230
Acenaphthene	ND		230
Fluorene	ND		23
Phenanthrene	68		23
Anthracene	ND		23
Fluoranthene	61		57
Pyrene	ND		57
Benzo(a)anthracene	39		23
Chrysene	56		23
Benzo(b)fluoranthene	16	JK	23
Benzo(k)fluoranthene	24		23
Benzo(a)pyrene	44		23
Dibenzo(a,h)anthracene	ND		57
Benzo(ghi)perylene	ND		57
Indeno(1,2,3-cd)pyrene	ND		23

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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002869

TEST CODE :SPAH0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 90 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07933 MATRIX : SOLID
SAMPLE ID CLIENT: SB10-0304

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		220
Acenaphthylene	ND		220
1-methylnaphthalene	ND		220
2-Methylnaphthalene	ND		220
Acenaphthene	ND		220
Fluorene	ND		22
Phenanthrene	ND		22
Anthracene	ND		22
Fluoranthene	ND		56
Pyrene	ND		56
Benzo(a)anthracene	ND		22
Chrysene	ND		22
Benzo(b)fluoranthene	ND		22
Benzo(k)fluoranthene	ND		22
Benzo(a)pyrene	ND		22
Dibenzo(a,h)anthracene	ND		56
Benzo(ghi)perylene	ND		56
Indeno(1,2,3-cd)pyrene	ND		22

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002870

TEST CODE :SPAH0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 85 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07934 MATRIX : SOLID
SAMPLE ID CLIENT: SB11-0203

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		240
Acenaphthylene	ND		240
1-methylnaphthalene	ND		240
2-Methylnaphthalene	ND		240
Acenaphthene	ND		240
Fluorene	ND		24
Phenanthrene	42		24
Anthracene	ND		24
Fluoranthene	140		59
Pyrene	120		59
Benzo(a)anthracene	72		24
Chrysene	120		24
Benzo(b)fluoranthene	88		24
Benzo(k)fluoranthene	59		24
Benzo(a)pyrene	110		24
Dibenzo(a,h)anthracene	ND		59
Benzo(ghi)perylene	39	JK	59
Indeno(1,2,3-cd)pyrene	28		24

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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002871

TEST CODE :SPAH0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 87 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07935 MATRIX : SOLID
SAMPLE ID CLIENT: SB12-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		230
Acenaphthylene	ND		230
1-methylnaphthalene	ND		230
2-Methylnaphthalene	ND		230
Acenaphthene	ND		230
Fluorene	ND		23
Phenanthrene	ND		23
Anthracene	ND		23
Fluoranthene	ND		57
Pyrene	ND		57
Benzo(a)anthracene	ND		23
Chrysene	ND		23
Benzo(b)fluoranthene	ND		23
Benzo(k)fluoranthene	ND		23
Benzo(a)pyrene	ND		23
Dibenzo(a,h)anthracene	ND		57
Benzo(ghi)perylene	ND		57
Indeno(1,2,3-cd)pyrene	ND		23

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002872

TEST CODE :SPAH0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 86 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07936 MATRIX : SOLID
SAMPLE ID CLIENT: SB12-0809

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		230
Acenaphthylene	ND		230
1-methylnaphthalene	ND		230
2-Methylnaphthalene	ND		230
Acenaphthene	ND		230
Fluorene	ND		23
Phenanthrene	ND		23
Anthracene	ND		23
Fluoranthene	ND		58
Pyrene	ND		58
Benzo(a)anthracene	ND		23
Chrysene	ND		23
Benzo(b)fluoranthene	ND		23
Benzo(k)fluoranthene	ND		23
Benzo(a)pyrene	ND		23
Dibenzo(a,h)anthracene	ND		58
Benzo(ghi)perylene	ND		58
Indeno(1,2,3-cd)pyrene	ND		23

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

327

002873

TEST CODE :SPAH0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 89 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07937 MATRIX : SOLID
SAMPLE ID CLIENT: SB13-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		220
Acenaphthylene	ND		220
1-methylnaphthalene	ND		220
2-Methylnaphthalene	ND		220
Acenaphthene	ND		220
Fluorene	ND		22
Phenanthrene	38		22
Anthracene	ND		22
Fluoranthene	76		56
Pyrene	ND		56
Benzo(a)anthracene	21	JK	22
Chrysene	43		22
Benzo(b)fluoranthene	56		22
Benzo(k)fluoranthene	18	JK	22
Benzo(a)pyrene	74		22
Dibenzo(a,h)anthracene	ND		56
Benzo(ghi)perylene	40	JK	56
Indeno(1,2,3-cd)pyrene	27		22

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
K = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002874

TEST CODE :SPAH0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 86 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07938 MATRIX : SOLID
SAMPLE ID CLIENT: SB13-6575

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		230
Acenaphthylene	ND		230
1-methylnaphthalene	ND		230
2-Methylnaphthalene	ND		230
Acenaphthene	ND		230
Fluorene	ND		23
Phenanthrene	ND		23
Anthracene	ND		23
Fluoranthene	ND		58
Pyrene	ND		58
Benzo(a)anthracene	ND		23
Chrysene	ND		23
Benzo(b)fluoranthene	ND		23
Benzo(k)fluoranthene	ND		23
Benzo(a)pyrene	ND		23
Dibenzo(a,h)anthracene	ND		58
Benzo(ghi)perylene	ND		58
Indeno(1,2,3-cd)pyrene	ND		23

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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002875

TEST CODE :SPAH0A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 87 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07939 MATRIX : SOLID
SAMPLE ID CLIENT: SB13D-6575

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		230
Acenaphthylene	ND		230
1-methylnaphthalene	ND		230
2-Methylnaphthalene	ND		230
Acenaphthene	ND		230
Fluorene	ND		23
Phenanthrene	ND		23
Anthracene	ND		23
Fluoranthene	ND		57
Pyrene	ND		57
Benzo(a)anthracene	ND		23
Chrysene	ND		23
Benzo(b)fluoranthene	ND		23
Benzo(k)fluoranthene	ND		23
Benzo(a)pyrene	ND		23
Dibenzo(a,h)anthracene	ND		57
Benzo(ghi)perylene	ND		57
Indeno(1,2,3-cd)pyrene	ND		23

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002876

TPH DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in TNRCC method 1005.

2. Holding Time:

All samples were extracted within the required holding time of less than 7 days for water and 14 days for soil after collection. Analysis of the sample was conducted within 7 days for water and 14 days for soil of extraction. Samples were maintained at less than 4°C. No qualifications are placed on the data.

3. Initial Calibration:

Initial calibration criteria were met: Five point calibration for single component analytes, retention time windows established, adequate resolution (90%) between adjacent peaks, and Percent Relative Standard Deviations (%RSD) of the calibration factors less than or equal to 20%.

4. Calibration Verification:

Calibration verification criteria: verification sample frequency of every 12 hours; analyte within retention time (RT) window; resolution (RES%) between adjacent peaks greater than or equal to 90%; and the percent difference (%D) between the calculated amount and the true amount for target analytes.

5. Blanks:

A method blank was prepared at the required frequency of every time samples were extracted for the matrix or every 20 samples, whichever is greater. Target analytes were not detected in associated blank(s) analyzed.

6. Surrogates:

No surrogates were added to the samples for this method.

7. Matrix Spikes:

No matrix spike was analyzed for the water matrix. Sample SB12-0102 underwent matrix spike analysis for the soil matrix. Recoveries of all spiked analytes were within the required control limits in both the matrix spike and matrix spike duplicate.

ANALYTE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
C6 to C10		70-130%	
C10 to C28		70-130%	
C6 to C28		70-130%	

8. Duplicates:

No matrix spike duplicate was analyzed for the water matrix. Sample SB12-0102 underwent matrix spike duplicate analysis for the soil matrix. Relative percent differences (RPDs) of all spiked analytes were within the required control limits listed below.

ANALYTE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
C6 to C10		30%	
C10 to C28		30%	
C6 to C28		30%	

9. Target Compound Identification:

All reported target analytes met identification criteria of retention times within the calculated retention time windows (3X Std. Dev.) or within the default windows..

10. Target Compound Quantitation and CRQLs:

Concentrations of all reported analytes were correctly calculated.

Sample quantitation limits (SQLs) varied from CRQLs (50 ug/kg) in the following samples due to the factors listed below.

SAMPLE NO.	LEVEL	% SOLID moisture	SAMPLE WT/VOL (gm/ml)	DF	CEV (ul)	SQL FAC-TOR
SB06-0102	LOW	12				1.14
SB07-0405	LOW	13				1.15
SB07D-0405	LOW	11				1.12
SB08-0102	LOW	8				1.09
SB09-0102	LOW	12				1.14
SB10-0304	LOW	10				1.11
SB11-0203	LOW	15				1.18
SB12-0102	LOW	13				1.15
SB12-0809	LOW	14				1.16
SB13-0102	LOW	11				1.12
SB13-6575	LOW	14				1.16
SB13D-6575	LOW	13				1.15

DF = dilution factor, CEV = concentrated extract volume

11. Laboratory Control Sample:

The laboratory analyzed a laboratory control sample and recoveries for this analysis were within the control limits provided.

12. Laboratory Contact:

No laboratory contact was required.

13. Overall Assessment:

The soil sample concentrations and quantitation limits were corrected for moisture.

No qualifications were placed on the analytical data and it is acceptable for use.

TEST CODE :W1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : TPH-TNRCC UNITS : MG/L
SAMPLE ID LAB : EE-98-07940 MATRIX: WATER
SAMPLE ID CLIENT: SB13-GW-2

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	140		5.0
>C10 -> C28 Hydrocarbons	530		5.0
C6 -> C28 Hydrocarbons	680		5.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

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002880

TEST CODE :S1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07928 MATRIX : SOLID
SAMPLE ID CLIENT: SB06-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		57
>C10 -> C28 Hydrocarbons	ND		57
C6 -> C28 Hydrocarbons	ND		57

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 87 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07929 MATRIX : SOLID
SAMPLE ID CLIENT: SB07-0405

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		57
>C10 -> C28 Hydrocarbons	ND		57
C6 -> C28 Hydrocarbons	ND		57

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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002882

TEST CODE :S1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 89 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07930 MATRIX : SOLID
SAMPLE ID CLIENT: SB07D-0405

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		56
>C10 -> C28 Hydrocarbons	ND		56
C6 -> C28 Hydrocarbons	ND		56

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002883

TEST CODE :S1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 82 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07931 MATRIX : SOLID
SAMPLE ID CLIENT: SB08-0102

PARAMETER	RESULTS	Q	CNT. LIMIT
C6 -> C10 Hydrocarbons	ND		54
>C10 -> C28 Hydrocarbons	ND		54
C6 -> C28 Hydrocarbons	ND		54

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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002884

TEST CODE :S1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07932 MATRIX : SOLID
SAMPLE ID CLIENT: SB09-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		57
>C10 -> C28 Hydrocarbons	ND		57
C6 -> C28 Hydrocarbons	ND		57

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 90 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07933 MATRIX : SOLID
SAMPLE ID CLIENT: SB10-0304

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		56
>C10 -> C28 Hydrocarbons	ND		56
C6 -> C28 Hydrocarbons	ND		56

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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002886

TEST CODE :S1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 85 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07934 MATRIX : SOLID
SAMPLE ID CLIENT: SB11-0203

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		59
>C10 -> C28 Hydrocarbons	ND		59
C6 -> C28 Hydrocarbons	ND		59

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002887

TEST CODE :S1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 87 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07935 MATRIX : SOLID
SAMPLE ID CLIENT: SB12-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		57
>C10 -> C28 Hydrocarbons	ND		57
C6 -> C28 Hydrocarbons	ND		57

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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002888

TEST CODE :S1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 86 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07936 MATRIX : SOLID
SAMPLE ID CLIENT: SB12-0809

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		58
>C10 -> C28 Hydrocarbons	ND		58
C6 -> C28 Hydrocarbons	ND		58

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 89 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07937 MATRIX : SOLID
SAMPLE ID CLIENT: SB13-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		56
>C10 -> C28 Hydrocarbons	ND		56
C6 -> C28 Hydrocarbons	ND		56

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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002890

TEST CODE :S1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 86 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07938 MATRIX : SOLID
SAMPLE ID CLIENT: SB13-6575

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	PRESENT		58
>C10 -> C28 Hydrocarbons	ND		58
C6 -> C28 Hydrocarbons	ND		58

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 87 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07939 MATRIX : SOLID
SAMPLE ID CLIENT: SB13D-6575

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		57
>C10 -> C28 Hydrocarbons	ND		57
C6 -> C28 Hydrocarbons	ND		57

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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METALS DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in SW846 methods 6010B and 7471A.

2. Holding Times:

All samples met established holding time criteria of 28 days for mercury and 180 days for metals.

3. Initial Calibration:

ICP initial calibration included a blank and one standard and initial calibration verification results fell within the control limits of 90 to 110 percent of the true values. Mercury initial calibration included a blank and five to eight standards and initial calibration verification results fell within the control limits of 80 to 120 percent of the true value. Correlation coefficients (CC) for AA (including furnace, flame and cold vapor Hg) were greater than 0.995.

4. Continuing Calibration:

All ICP results fell within the control limits of 90 to 110 percent of the true values. Mercury results fell within the control limits of 80 to 120 percent of the true value.

5. Blanks:

No target analytes were detected in calibration blanks associated with this case.

Target analytes were detected in the following preparation blanks. Sample concentrations less than five times the highest analyte concentration reported in associated blanks are flagged **UB** (not detected, detection limit raised due to possible blank contamination).

PREPARATION BLANK/MATRIX	ANALYTE	CONC. mg/Kg	QUALIFIED SAMPLES
PBS828-189-1	Aluminum	26.644	NONE
PBS828-189-1	Iron	10.662	NONE

6. ICP Interference Check:

The recoveries for the following analytes were outside QC limits of 80% to 120% for the Interference Check Sample:

ANALYTE	INITIAL/ FINAL RUN	PERCENT RECOVERY	ASSOCIATED SAMPLES	QUALIFIER FLAG
Calcium	Initial	133.9%	SB06-0102,SB07-0405,SB07D-0405,SB08-0102,SB09-0102, SB10-0304,SB11-0203, SB12-0102,SB12-0809,SB13-0102,SB13-6575,SB13D-6575	JH

7. Laboratory Control Sample (LCS):

The recoveries for the solid LCS were within the established control limits.

8. Duplicate Sample Analysis:

Sample 7830 (Batch QC) underwent duplicate analysis for the soil matrix. QC criteria are that the Relative Percent Difference (RPD) values for the duplicate sample analysis be less than 20 percent for aqueous samples and 35% for solid samples for concentrations greater than five times the CRDL. For sample concentrations less than five times the CRDL, the QC criteria are within ± the CRDL for the water matrix or ± two times the CRDL for the soil matrix. QC criteria were not met for the following analytes:

ANALYTE	MATRIX	RPD or CONC	ASSOCIATED SAMPLES	QUALIFIER FLAG
Manganese	soil	43.7%	SB06-0102,SB07-0405,SB07D-0405,SB08-0102,SB09-0102, SB10-0304,SB11-0203, SB12-0102,SB12-0809,SB13-0102,SB13-6575,SB13D-6575	JK

9. Spiked Sample Analysis:

Sample 7830 (Batch QC) underwent spike analysis for the soil matrix. The spike recoveries for the following analytes were outside of the 75-125% recovery QC limits:

ANALYTE	MATRIX	RECOVERY %	ASSOCIATED SAMPLES	QUALIFIER FLAG
Manganese	soil	74.5	SB06-0102,SB07-0405,SB07D-0405,SB08-0102,SB09-0102, SB10-0304,SB11-0203, SB12-0102,SB12-0809,SB13-0102,SB13-6575,SB13D-6575	JL

10. ICP Serial Dilution:

Sample SB13D-6575 underwent serial dilution. The Percent Difference values (%D) for the following analytes exceeded QC limits of 10 percent for analytes with concentrations greater than 50 times their IDL.

ANALYTE	MATRIX	%D	ASSOCIATE SAMPLES	QUALIFIER FLAG
Chromium	soil	881.6	SB06-0102,SB07-0405,SB07D-0405,SB08-0102,SB09-0102, SB10-0304,SB11-0203, SB12-0102,SB12-0809,SB13-0102,SB13-6575,SB13D-6575	JK
Lead	soil	40.9	SAME AS ABOVE	JK
Zinc	soil	85.1	SAME AS ABOVE	JK

11. Sample Quantitation and CRDLs

Concentrations of all reported analytes were correctly calculated.

Sample quantitation limits (SQLs) varied from CRDLs in the following samples due to the factors listed below.

SAMPLE NO	LEVEL	DF	ASV OR ASW	% SOLIDS	ADV	SQL FACTOR
SB10-0304	LOW			89.6		0.179
SB11-0203	LOW			85.0		0.170
SB12-0102	LOW			86.8		0.173
SB12-0809	LOW			86.2		0.172
SB13-0102	LOW			89.1		0.178
SB13-6575	LOW			86.3		0.173
SB13D-6575	LOW			86.9		0.174
SB06-0102	LOW			87.7		0.175
SB07-0405	LOW			86.5		0.173
SB07D-0405	LOW			88.9		0.178
SB08-0102	LOW			92.3		0.173
SB09-0102	LOW			88.0		0.176

DF = Dilution Factor, ASV = Actual sample volume, ASW = Actual sample weight, ADV = Actual digestate or distillate volume

13. Laboratory Contact

No laboratory contact was required.

14. Overall Assessment:

The preparation blank contained aluminum and iron contamination. All of the samples had these compounds present at concentrations greater than five times the blank value, therefore no qualification of data was necessary.
Calcium recovered above control limits in the Interference Check Sample. This compound was qualified as estimated, biased high in all of the samples.
Manganese results are qualified as estimates, unknown bias due to duplicate and matrix spike results out of control limits.
The ICP Serial Dilution contained three compounds out of QC limits. These compounds were qualified as estimated, unknown bias.
All of the sample calculations were dry weight corrected and the quantitation limits were adjusted accordingly.

The analytical data is acceptable for use with the qualifications listed above.

START - DALLAS

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

10-0304

ab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

ab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.: 6-0102

atrix (soil/water): SOIL_ Lab Sample ID: 7933

evel (low/med): LOW__ Date Received: 06/03/98

Solids: _89.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2110			P
7440-36-0	Antimony	1.1	U		P
7440-38-2	Arsenic	1.3			P
7440-39-3	Barium	15.1			P
7440-41-7	Beryllium	0.53	U		P
7440-43-9	Cadmium	0.59			P
7440-70-2	Calcium	522		JH	P
7440-47-3	Chromium	6.5		JK	P
7440-48-4	Cobalt	2.1	U		P
7440-50-8	Copper	2.2			P
7439-89-6	Iron	4270			P
7439-92-1	Lead	2.0		JK	P
7439-95-4	Magnesium	431			P
7439-96-5	Manganese	43.4		N*JK	P
7439-97-6	Mercury	0.04			CV
7440-02-0	Nickel	2.2			P
7440-09-7	Potassium	340			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	232			P
7440-28-0	Thallium	0.53	U		P
7440-62-2	Vanadium	7.0			P
7440-66-6	Zinc	4.7		JK	P

olor Before: _____ Clarity Before: _____ Texture: SD____

olor After: Y_____ Clarity After: C_____ Artifacts: _____

omments:

_____CLIENT_SAMPLE_ID:__SB10-0304_____

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

11-0203

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL_ Lab Sample ID: 7934

Level (low/med): LOW__ Date Received: 06/03/98

% Solids: _85.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3600			P
7440-36-0	Antimony	1.2	U		P
7440-38-2	Arsenic	2.3			P
7440-39-3	Barium	54.8			P
7440-41-7	Beryllium	0.59	U		P
7440-43-9	Cadmium	0.99			P
7440-70-2	Calcium	798		JH	P
7440-47-3	Chromium	8.4		JK	P
7440-48-4	Cobalt	2.8			P
7440-50-8	Copper	6.4			P
7439-89-6	Iron	6770			P
7439-92-1	Lead	20.9		JK	P
7439-95-4	Magnesium	582			P
7439-96-5	Manganese	59.9		N*JK	P
7439-97-6	Mercury	0.03			CV
7440-02-0	Nickel	3.3			P
7440-09-7	Potassium	487			P
7782-49-2	Selenium	1.2	U		P
7440-22-4	Silver	1.2	U		P
7440-23-5	Sodium	118	U		P
7440-28-0	Thallium	0.59	U		P
7440-62-2	Vanadium	12.8			P
7440-66-6	Zinc	13.3		JK	P

Color Before: _____ Clarity Before: _____ Texture: CY____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID: SB11-0203

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START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

12-0102

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL_ Lab Sample ID: 7935

Level (low/med): LOW__ Date Received: 06/03/98

% Solids: _86.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4480			P
7440-36-0	Antimony	1.1	U		P
7440-38-2	Arsenic	3.0			P
7440-39-3	Barium	77.0			P
7440-41-7	Beryllium	0.56	U		P
7440-43-9	Cadmium	1.4			P
7440-70-2	Calcium	818		JH	P
7440-47-3	Chromium	8.6		JK	P
7440-48-4	Cobalt	4.1			P
7440-50-8	Copper	4.5			P
7439-89-6	Iron	9530			P
7439-92-1	Lead	4.7		JK	P
7439-95-4	Magnesium	634			P
7439-96-5	Manganese	156		N*JK	P
7439-97-6	Mercury	0.05			CV
7440-02-0	Nickel	5.6			P
7440-09-7	Potassium	562			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	254			P
7440-28-0	Thallium	0.56	U		P
7440-62-2	Vanadium	14.5			P
7440-66-6	Zinc	8.4		JK	P

Color Before: _____ Clarity Before: _____ Texture: SD/CY_

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB12-0102_____

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START - DALLAS

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

12-0809

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL_ Lab Sample ID: 7936

Level (low/med): LOW__ Date Received: 06/03/98

% Solids: _86.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1600			P
7440-36-0	Antimony	1.1	U		P
7440-38-2	Arsenic	0.88			P
7440-39-3	Barium	16.5			P
7440-41-7	Beryllium	0.56	U		P
7440-43-9	Cadmium	0.56	U		P
7440-70-2	Calcium	512		JH	P
7440-47-3	Chromium	4.0		JK	P
7440-48-4	Cobalt	2.3	U		P
7440-50-8	Copper	2.3	U		P
7439-89-6	Iron	1870			P
7439-92-1	Lead	1.7		JK	P
7439-95-4	Magnesium	337			P
7439-96-5	Manganese	24.0		N*JK	P
7439-97-6	Mercury	0.05			CV
7440-02-0	Nickel	2.3	U		P
7440-09-7	Potassium	299			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	156			P
7440-28-0	Thallium	0.56	U		P
7440-62-2	Vanadium	3.5			P
7440-66-6	Zinc	4.0		JK	P

Color Before: _____ Clarity Before: _____ Texture: SD____

Color After: CL_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID: SB12-0809

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START - DALLAS

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

13-0102

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL_ Lab Sample ID: 7937

Level (low/med): LOW__ Date Received: 06/03/98

% Solids: _89.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3600			P
7440-36-0	Antimony	1.1	U		P
7440-38-2	Arsenic	4.5			P
7440-39-3	Barium	23.2			P
7440-41-7	Beryllium	0.54	U		P
7440-43-9	Cadmium	1.4			P
7440-70-2	Calcium	585		JH	P
7440-47-3	Chromium	7.8		JK	P
7440-48-4	Cobalt	2.6			P
7440-50-8	Copper	2.9			P
7439-89-6	Iron	9930			P
7439-92-1	Lead	48.0		JK	P
7439-95-4	Magnesium	414			P
7439-96-5	Manganese	25.3		N*JK	P
7439-97-6	Mercury	0.04			CV
7440-02-0	Nickel	3.2			P
7440-09-7	Potassium	568			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	108	U		P
7440-28-0	Thallium	0.54	U		P
7440-62-2	Vanadium	13.7			P
7440-66-6	Zinc	9.2		JK	P

Color Before: _____ Clarity Before: _____ Texture: SD____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB13-0102_____

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1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

13-6575

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL_ Lab Sample ID: 7938

Level (low/med): LOW__ Date Received: 06/03/98

% Solids: _86.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3160			P
7440-36-0	Antimony	1.1	U		P
7440-38-2	Arsenic	3.9			P
7440-39-3	Barium	45.4			P
7440-41-7	Beryllium	0.57	U		P
7440-43-9	Cadmium	1.8			P
7440-70-2	Calcium	1010		JH	P
7440-47-3	Chromium	10.3		JK	P
7440-48-4	Cobalt	4.3			P
7440-50-8	Copper	4.7			P
7439-89-6	Iron	12700			P
7439-92-1	Lead	5.5		JK	P
7439-95-4	Magnesium	763			P
7439-96-5	Manganese	76.7		N*JK	P
7439-97-6	Mercury	0.05			CV
7440-02-0	Nickel	8.1			P
7440-09-7	Potassium	506			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	114	U		P
7440-28-0	Thallium	0.57	U		P
7440-62-2	Vanadium	21.4			P
7440-66-6	Zinc	10.5		JK	P

Color Before: _____ Clarity Before: _____ Texture: SD/CY_

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB13-6575_____

_____

_____

_____

FORM I - IN

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ecology and environment

002902

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

13D-657

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL_ Lab Sample ID: 7939

Level (low/med): LOW__ Date Received: 06/03/98

% Solids: _86.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2290			P
7440-36-0	Antimony	1.2	U		P
7440-38-2	Arsenic	2.4			P
7440-39-3	Barium	39.3			P
7440-41-7	Beryllium	0.58	U		P
7440-43-9	Cadmium	1.1			P
7440-70-2	Calcium	786		JH	P
7440-47-3	Chromium	7.5		JK	P
7440-48-4	Cobalt	3.6			P
7440-50-8	Copper	3.2			P
7439-89-6	Iron	8040			P
7439-92-1	Lead	3.5		JK	P
7439-95-4	Magnesium	615			P
7439-96-5	Manganese	52.0		N*JK	P
7439-97-6	Mercury	0.05			CV
7440-02-0	Nickel	6.8			P
7440-09-7	Potassium	500			P
7782-49-2	Selenium	1.2	U		P
7440-22-4	Silver	1.2	U		P
7440-23-5	Sodium	115	U		P
7440-28-0	Thallium	0.58	U		P
7440-62-2	Vanadium	12.1			P
7440-66-6	Zinc	8.7		JK	P

Color Before: _____ Clarity Before: _____ Texture: SD/CY_

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB13D-6575_____

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START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

6-0102

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL_ Lab Sample ID: 7928

Level (low/med): LOW__ Date Received: 06/03/98

% Solids: _87.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2590			P
7440-36-0	Antimony	1.1	U		P
7440-38-2	Arsenic	2.1			P
7440-39-3	Barium	28.8			P
7440-41-7	Beryllium	0.56	U		P
7440-43-9	Cadmium	0.75			P
7440-70-2	Calcium	380		JH	P
7440-47-3	Chromium	5.8		JK	P
7440-48-4	Cobalt	2.3	U		P
7440-50-8	Copper	2.3	U		P
7439-89-6	Iron	5130			P
7439-92-1	Lead	3.0		JK	P
7439-95-4	Magnesium	210			P
7439-96-5	Manganese	112		N*JK	P
7439-97-6	Mercury	0.04			CV
7440-02-0	Nickel	2.3	U		P
7440-09-7	Potassium	412			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	113	U		P
7440-28-0	Thallium	0.56	U		P
7440-62-2	Vanadium	9.2			P
7440-66-6	Zinc	5.0		JK	P

Color Before: _____ Clarity Before: _____ Texture: SD____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID: SB06-0102

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1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

7-0405

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL_ Lab Sample ID: 7929

Level (low/med): LOW__ Date Received: 06/03/98

% Solids: _86.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4760			P
7440-36-0	Antimony	1.2	U		P
7440-38-2	Arsenic	4.1			P
7440-39-3	Barium	31.9			P
7440-41-7	Beryllium	0.58	U		P
7440-43-9	Cadmium	1.2			P
7440-70-2	Calcium	745		JH	P
7440-47-3	Chromium	13.2		JK	P
7440-48-4	Cobalt	2.7			P
7440-50-8	Copper	3.3			P
7439-89-6	Iron	8400			P
7439-92-1	Lead	6.1		JK	P
7439-95-4	Magnesium	378			P
7439-96-5	Manganese	47.5		N*JK	P
7439-97-6	Mercury	0.06			CV
7440-02-0	Nickel	2.7			P
7440-09-7	Potassium	601			P
7782-49-2	Selenium	1.2	U		P
7440-22-4	Silver	1.2	U		P
7440-23-5	Sodium	123			P
7440-28-0	Thallium	0.58	U		P
7440-62-2	Vanadium	14.4			P
7440-66-6	Zinc	7.6		JK	P

Color Before: _____ Clarity Before: _____ Texture: SD/CY_

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB07-0405_____

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START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

7D-0405

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL_ Lab Sample ID: 7930

Level (low/med): LOW__ Date Received: 06/03/98

% Solids: _88.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3780			P
7440-36-0	Antimony	1.1	U		P
7440-38-2	Arsenic	3.4			P
7440-39-3	Barium	26.9			P
7440-41-7	Beryllium	0.55	U		P
7440-43-9	Cadmium	1.2			P
7440-70-2	Calcium	531		JH	P
7440-47-3	Chromium	11.6		JK	P
7440-48-4	Cobalt	2.6			P
7440-50-8	Copper	3.7			P
7439-89-6	Iron	7870			P
7439-92-1	Lead	17.9		JK	P
7439-95-4	Magnesium	289			P
7439-96-5	Manganese	87.1		N*JK	P
7439-97-6	Mercury	0.07			CV
7440-02-0	Nickel	2.2	U		P
7440-09-7	Potassium	529			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	164			P
7440-28-0	Thallium	0.55	U		P
7440-62-2	Vanadium	13.2			P
7440-66-6	Zinc	10.2		JK	P

Color Before: _____ Clarity Before: _____ Texture: SD/CY_

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB07D-0405_____

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1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

8-0102

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL_ Lab Sample ID: 7931

Level (low/med): LOW__ Date Received: 06/03/98

% Solids: _92.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1250			P
7440-36-0	Antimony	1.1	U		P
7440-38-2	Arsenic	1.8			P
7440-39-3	Barium	20.0			P
7440-41-7	Beryllium	0.53	U		P
7440-43-9	Cadmium	0.53			P
7440-70-2	Calcium	189		JH	P
7440-47-3	Chromium	3.6		JK	P
7440-48-4	Cobalt	2.1	U		P
7440-50-8	Copper	2.1	U		P
7439-89-6	Iron	3430			P
7439-92-1	Lead	10.5		JK	P
7439-95-4	Magnesium	110			P
7439-96-5	Manganese	134		N*JK	P
7439-97-6	Mercury	0.06			CV
7440-02-0	Nickel	2.1	U		P
7440-09-7	Potassium	264			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	105	U		P
7440-28-0	Thallium	0.53	U		P
7440-62-2	Vanadium	5.9			P
7440-66-6	Zinc	5.0		JK	P

Color Before: _____ Clarity Before: _____ Texture: SD____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB08-0102_____

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1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

9-0102

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.181 SAS No.: _____ SDG No.: 6-0102

Matrix (soil/water): SOIL_ Lab Sample ID: 7932

Level (low/med): LOW__ Date Received: 06/03/98

% Solids: _88.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3540			P
7440-36-0	Antimony	1.1	U		P
7440-38-2	Arsenic	2.8			P
7440-39-3	Barium	27.4			P
7440-41-7	Beryllium	0.56	U		P
7440-43-9	Cadmium	1.1			P
7440-70-2	Calcium	646		JH	P
7440-47-3	Chromium	8.3		JK	P
7440-48-4	Cobalt	2.2	U		P
7440-50-8	Copper	2.2	U		P
7439-89-6	Iron	7820			P
7439-92-1	Lead	5.0		JK	P
7439-95-4	Magnesium	318			P
7439-96-5	Manganese	103		N*JK	P
7439-97-6	Mercury	0.05			CV
7440-02-0	Nickel	3.2			P
7440-09-7	Potassium	466			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	111	U		P
7440-28-0	Thallium	0.56	U		P
7440-62-2	Vanadium	12.6			P
7440-66-6	Zinc	5.6		JK	P

Color Before: _____ Clarity Before: _____ Texture: SD/CY_

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB09-0102_____

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PH DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in SW846 method 9045C.

2. Holding Times:

The samples were analyzed within the holding time of 24 hours of receipt.

3. Initial Calibration:

The initial calibration included at least two points and recovery results were within control limits of ± 0.05pH units of the buffer solution value.

4. Continuing Calibration:

A buffer solution at midrange was analyzed and results were within control limits of its true value..

5. Blanks:

No blank was analyzed with this sample delivery group..

6. Laboratory Control Sample (LCS):

No LCS was analyzed with this sample delivery group.

7. Duplicate Sample Analysis:

Sample SB13D-6575 underwent duplicate analysis. The Relative Percent Difference (RPD) values for the duplicate sample analysis were within QC criteria.

8. Spiked Sample Analysis:

No spiked sample analysis was performed for this method.

9. Sample Quantitation:

No quantitation was necessary for this method.

10.Laboratory Contact:

No laboratory contact was necessary.

11. Overall Assessment:

The data is acceptable and no qualifications have been placed on it.

TEST CODE :SPH 1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : PH UNITS : S.U.
PARAMETER : pH

SAMPLE ID	RESULTS	Q	QNT. LIMIT
EE-98-07928			
SB06-0102	3.2		0.10
EE-98-07929			
SB07-0405	3.1		0.10
EE-98-07930			
SB07D-0405	3.3		0.10
EE-98-07931			
SB08-0102	2.3		0.10
EE-98-07932			
SB09-0102	3.0		0.10
EE-98-07933			
SB10-0304	2.8		0.10
EE-98-07934			
SB11-0203	4.7		0.10
EE-98-07935			
SB12-0102	3.8		0.10
EE-98-07936			
SB12-0809	5.9		0.10
EE-98-07937			
SB13-0102	3.9		0.10
EE-98-07938			
SB13-6575	6.0		0.10
EE-98-07939			
SB13D-6575	5.9		0.10

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE
NA = NOT APPLICABLE

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TOTAL SOLIDS DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in CLP methodology.

2. Holding Times:

No holding time was established for this method.

3. Initial Calibration:

No initial calibration was necessary for this method.

4. Continuing Calibration:

No continuing calibration was necessary for this method.

5. Blanks:

No blank was analyzed with this method.

6. Laboratory Control Sample (LCS):

No LCS was analyzed with this method.

7. Duplicate Sample Analysis:

Sample SB13D-6575 underwent duplicate analysis. The Relative Percent Difference (RPD) value for the duplicate sample analysis was within QC criteria.

8. Spiked Sample Analysis:

No spiked sample analysis was performed for this method.

9. Sample Quantitation

Concentrations were correctly calculated.

10.Laboratory Contact:

No laboratory contact was necessary.

11. Overall Assessment:

The data is acceptable and no qualifications have been placed on it.

TEST CODE :STS 1 JOB NUMBER :9801.181
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : SOLIDS TOTAL UNITS : %
PARAMETER : Solids-Total

SAMPLE ID	RESULTS	Q
EE-98-07928		
SB06-0102	88	
EE-98-07929		
SB07-0405	86	
EE-98-07930		
SB07D-0405	89	
EE-98-07931		
SB08-0102	92	
EE-98-07932		
SB09-0102	88	
EE-98-07933		
SB10-0304	90	
EE-98-07934		
SB11-0203	85	
EE-98-07935		
SB12-0102	87	
EE-98-07936		
SB12-0809	86	
EE-98-07937		
SB13-0102	89	
EE-98-07938		
SB13-6575	86	
EE-98-07939		
SB13D-6575	87	

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE

002912

DATA QUALITY ASSURANCE REVIEW

SITE NAME Wilcox Refinery

CERCLIS

PAN 052601SFXX TDD NUMBER 06-98-03-0009

CASE NUMBER/WORK ORDER 6S154 SDG/PROJ. NUMBER 9801.165

E & E has completed a QA review for Case No. 6S154, SDG No. 9801.165, Wilcox Refinery. Six soil samples were analyzed for PAH, TPH, Metals, BTEX, pH and Total Solids by Ecology and Environment, Inc. Analytical Services Center. Sample numbers are listed below.

SAMPLE NUMBERS

SB02-12		
SB03-1.52		
SB04-0405		
SB05-0102		
SB05-0405		
SB05-1415		

This data package was validated to determine if Quality Control (QC) specifications were achieved, following *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (February, 1994), *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (February, 1994), *Quality Assurance/Quality Control Guidance for Removal Activities* (April, 1990), and the Regional Protocol for Holding Times, Blanks, and VOA Preservation (April 13, 1989). Specific data qualifications are listed in the following discussion.

REVIEWER Michelle Brown DATE 10/27/98 MWB

Data Qualifiers

Data Qualifier Definitions were supplied by the Office of Solid Waste and Emergency Response (September 1989) and are included in the Functional Guidelines. Data qualifiers may be combined (UJ, QJ) with the corresponding combination of meanings. Additional qualifier may be added to provide additional, more specific information (JL, UB, QJK), modifying the meaning of the primary qualifier. Addition qualifiers utilized by E & E are H, L, K, B, Q, and D.

U - The material was analyzed for, but was not detected. The associated numerical value is the sample quantitation or detection limit, which has been adjusted for sample weight/sample volume, extraction volume, percent solids, sample dilution or other analysis specific parameters.

An additional qualifier, "B", may be appended to indicated that while the analyte was detected in the sample, the presence of the analyte may be attributable to blank contamination and the analyte is therefore considered undetected with the sample detection or quantitation limit for the analyte being elevated.

J - The analyte was analyzed for, but the associated numerical value may not be consistent with the amount actually present in the environmental sample or may not be consistent with the sample detection or quantitation limit. The value is an estimated quantity. The data should be seriously considered for decision-making and are usable for many purposes.

An additional qualifier will be appended to the "J" qualifier that indicates the bias in the reported results:

L Low bias

H High bias

K Unknown bias

Q The reported concentration is less than the sample quantitation limit for the specific analyte in the sample.

The L and H qualifier will only be employed when a single qualification is required. When more than one quality control parameter affects the analytical result and a conflict results in assigning a bias, the result will be flagged JK.

R - Quality Control indicates that data are unusable for all purposes. The analyte was analyzed for, but the presence or absence of the analyte has not been verified. Resampling and reanalysis are necessary for verification to confirm or deny the presence of an analyte.

N - The analysis indicates the presence of analyte for which there is presumptive evidence to make a "tentative identification."

D - The concentration reported was determined in the re-analysis of the sample at a secondary dilution.

BTEX DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in SW846 method 8021B.

2. Holding Time:

All samples were analyzed within the required holding time of less than 14 days after collection. Samples were maintained at less than 4°C. No qualifications are placed on the data.

3. Initial Calibration:

Initial calibration criteria were met: Five point calibration for single component analytes, retention time windows established, adequate resolution (90%) between adjacent peaks, and Percent Relative Standard Deviations (%RSD) of the calibration factors less than or equal to 20% (30% for the surrogates)

4. Calibration Verification:

Calibration verification criteria: verification sample frequency of every 12 hours; analyte within retention time (RT) window; resolution (RES%) between adjacent peaks greater than or equal to 90%; and the percent difference (%D) between the calculated amount and the true amount for target analytes and surrogates not exceeding ± 25%; were met.

5. Blanks:

A method blank was prepared at the required frequency of every time samples were extracted for the matrix or every 20 samples, whichever is greater. Target analytes were not detected in associated blank(s) analyzed.

6. Surrogates:

All recoveries of the surrogates were within the following control limits.

SURROGATE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
Trifluorotoluene	65-130%	50-150%	

7. Matrix Spikes:

Sample 8044.02 (Batch QC) underwent matrix spike analysis for the water matrix. Samples SB02-12 and 7837.01 (Batch QC) underwent matrix spike analysis for the soil matrix. Recoveries of all spiked analytes were within the required control limits in both the matrix spike and matrix spike duplicate.

ANALYTE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
Benzene	49-124%	49-124%	
Toluene	46-117%	46-117%	
Ethylbenzene	44-122%	44-122%	
Total Xylenes	54-118%	54-118%	

8. Duplicates:

Sample 8044.02 (Batch QC) underwent matrix spike duplicate analysis for the water matrix. Samples SB02-12 and 7837.01 (Batch QC) underwent spike duplicate analysis for the soil matrix. Relative percent differences (RPDs) of all spiked analytes were within the required control limits listed below.

ANALYTE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
Benzene	30%	30%	
Toluene	30%	30%	
Ethylbenzene	30%	30%	
Total Xylenes	30%	30%	

9. Target Compound Identification:

All reported target analytes met identification criteria of retention times within the calculated retention time windows (3x Std. Dev.).

10. Target Compound Quantitation and CRQLs:

Concentrations of all reported analytes were correctly calculated.

Sample quantitation limits (SQLs) varied from CRQLs of 2 ug/kg in the following samples due to the factors listed below.

SAMPLE NO.	LEVEL	% SOLID moisture	SAMPLE WT/VOL (gm/ml)	DF	CEV (ul)	SQL FACTOR
SB02-12	LOW	6				1.06
SB03-1.52	LOW	6				1.06
SB04-0405	LOW	6				1.06
SB05-0102	LOW	12				1.14
SB05-0405	LOW	19		5		6.17
SB05-1415	LOW	18				1.22

DF = dilution factor, CEV = concentrated extract volume

11. Laboratory Control Sample:

The laboratory analyzed a laboratory control sample and recoveries for this analysis were within the control limits provided.

12. Laboratory Contact:

No laboratory contact was required.

13. Overall Assessment:

The water Matrix Spike/Matrix Spike Duplicate had recoveries of benzene and toluene outside of the project QC limits. This only affects the method blank since all samples were soil and no qualifications were placed on the data.
The soil samples were dry weight corrected. Sample SB05-0405 required a dilution due to the high concentration of target compounds detected. Concentrations of ethylbenzene and xylenes and were taken from the secondary dilution.

The analytical data is acceptable for use with the qualifications listed above.

TEST CODE :WBTX0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8021B BETX UNITS : UG/L
SAMPLE ID LAB : EE-98-07836 MATRIX: WATER
SAMPLE ID CLIENT: SB05-GW1

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.0
Toluene	ND		2.0
Ethylbenzene	190		2.0
Total Xylenes	35		4.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

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002918

TEST CODE :SBTX0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 94 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07830 MATRIX : SOLID
SAMPLE ID CLIENT: SB02-12

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.1
Toluene	ND		2.1
Ethylbenzene	ND		2.1
Total Xylenes	ND		2.1

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :SBTX0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 94 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07831 MATRIX : SOLID
SAMPLE ID CLIENT: SB03-1.52

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.1
Toluene	ND		2.1
Ethylbenzene	ND		2.1
Total Xylenes	ND		2.1

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

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002920

TEST CODE :SBTX0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 94 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07832 MATRIX : SOLID
SAMPLE ID CLIENT: SB04-0405

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.1
Toluene	ND		2.1
Ethylbenzene	ND		2.1
Total Xylenes	ND		2.1

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :SBTX0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07833 MATRIX : SOLID
SAMPLE ID CLIENT: SB05-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.3
Toluene	34		2.3
Ethylbenzene	ND		2.3
Total Xylenes	ND		2.3

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

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002922

TEST CODE :SBTX0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 81 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07834 MATRIX : SOLID
SAMPLE ID CLIENT: SB05-0405

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	40		12
Toluene	18		12
Ethylbenzene	840	X ok mg	12
Total Xylenes	1100	X	12

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
X = EXCEEDS CALIBRATED RANGE

002923

TEST CODE :SBTX0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 82 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-07835 MATRIX : SOLID
SAMPLE ID CLIENT: SB05-1415

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	4.3		2.4
Toluene	ND		2.4
Ethylbenzene	23		2.4
Total Xylenes	78		2.4

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

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002924

PAH DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in SW846 method 8310.

2. Holding Time:

All samples were extracted within the required holding time of less than 14 days after collection. Analysis of the sample was conducted within 40 days of extraction. Samples were maintained at less than 4°C. No qualifications are placed on the data.

3. Initial Calibration:

Initial calibration criteria were met: Five point calibration for single component analytes, retention time windows established, adequate resolution (90%) between adjacent peaks, and Percent Relative Standard Deviations (%RSD) of the calibration factors less than or equal to 20% (30% for the surrogates)

4. Calibration Verification:

Calibration verification criteria: verification sample frequency of every 12 hours; analyte within RT window; resolution (RES%) between adjacent peaks greater than or equal to 90%; and the percent difference (%D) between the calculated amount and the true amount for target analytes and surrogates not exceeding ± 25%; were not met.

INST ID	COL ID	F R E Q	ANALYTE	RES%	RT	%D	AFFECTED SAMPLES	QUALIFIER FLAG
HPLC -2	1263-47		Benzo(a)pyrene			135		No flag-results taken from confirmation column

5. Blanks:

A method blank was prepared at the required frequency of every time samples were extracted for the matrix or every 20 samples, whichever is greater. Target analytes were not detected in associated blank(s) analyzed.

6. Surrogates:

All recoveries of the surrogates were within laboratory control limits.

7. Matrix Spikes:

Sample 7933 (Batch QC) underwent matrix spike analysis for the soil matrix. Recoveries of all spiked analytes were within the laboratory control limits in both the matrix spike and matrix spike duplicate.

8. Duplicates:

Sample 7933 (Batch QC) underwent matrix spike duplicate analysis for the soil matrix. Relative percent differences (RPDs) of all spiked analytes were within the laboratory control limits.

9. Target Compound Identification:

All reported target analytes met identification criteria of retention times within the calculated retention time windows (3X Std. Dev.) for both columns and percent differences (%D) between the quantitation on the two columns of less than 25%.

10. Target Compound Quantitation and CRQLs:

Concentrations of all reported analytes were correctly calculated.

Sample quantitation limits (SQLs) varied from the CRQLs (listed below) in the following samples due to the factors listed below.

20 ug/kg - fluorene, anthracene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene
50 ug/kg - fluoranthene, pyrene, dibenzo(a,h)anthracene, dibenzo(ghi)perylene
60 ug/kg - phenanthrene
200 ug/kg - naphthalene, acenaphthylene, 1-methylnaphthalene, 2-methylnaphthalene, acenaphthene

SAMPLE NO.	LEVEL	% SOLID moisture	SAMPLE WT/VOL (gm/ml)	DF	CEV (ul)	SQL FACTOR
SB02-12	LOW	6				1.06
SB03-1.52	LOW	6				1.06
SB04-0405	LOW	6				1.06
SB05-0102	LOW	12			5	5.68
SB05-0405	LOW	19			10	12.34
SB05-1415	LOW	18			5	6.09

DF = dilution factor, CEV = concentrated extract volume

11. Laboratory Control Sample:

The laboratory analyzed a laboratory control sample and recoveries for this analysis were within the control limits provided.

12. Laboratory Contact:

No laboratory contact was required.

13. Overall Assessment:

In the continuing calibration, benzo(a)pyrene had a consistently high percent difference on the primary column. If the compound was detected in the samples, the value was taken from the confirmation column analysis. No qualification of this compound was necessary.
The calculations were all dry weight corrected. Several samples required dilution because the concentration of target compounds exceeded calibration range. Quantitation limits were adjusted accordingly.
Although the blank contained some low level contamination, none of the concentrations were greater than the reporting limits. All of the contamination compounds in the blank were therefore reported not detected and no qualification of the data was necessary.

The analytical data is acceptable for use and no qualifications were placed on it.

TEST CODE :SPAH0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 94 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07830 MATRIX : SOLID
SAMPLE ID CLIENT: SB02-12

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		210
Acenaphthylene	ND		210
1-methylnaphthalene	ND		210
2-Methylnaphthalene	ND		210
Acenaphthene	ND		210
Fluorene	ND		21
Phenanthrene	ND		21
Anthracene	ND		21
Fluoranthene	ND		53
Pyrene	ND		53
Benzo(a)anthracene	ND		21
Chrysene	ND		21
Benzo(b)fluoranthene	ND		21
Benzo(k)fluoranthene	ND		21
Benzo(a)pyrene	ND		21
Dibenzo(a,h)anthracene	ND		53
Benzo(ghi)perylene	ND		53
Indeno(1,2,3-cd)pyrene	ND		21

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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002928

TEST CODE :SPAH0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 94 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07831 MATRIX : SOLID
SAMPLE ID CLIENT: SB03-1.52

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		210
Acenaphthylene	ND		210
1-methylnaphthalene	ND		210
2-Methylnaphthalene	ND		210
Acenaphthene	ND		210
Fluorene	ND		21
Phenanthrene	ND		21
Anthracene	ND		21
Fluoranthene	ND		53
Pyrene	ND		53
Benzo(a)anthracene	ND		21
Chrysene	ND		21
Benzo(b)fluoranthene	ND		21
Benzo(k)fluoranthene	ND		21
Benzo(a)pyrene	ND		21
Dibenzo(a,h)anthracene	ND		53
Benzo(ghi)perylene	ND		53
Indeno(1,2,3-cd)pyrene	ND		21

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :SPAH0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 94 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07832 MATRIX : SOLID
SAMPLE ID CLIENT: SB04-0405

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		210
Acenaphthylene	ND		210
1-methylnaphthalene	ND		210
2-Methylnaphthalene	ND		210
Acenaphthene	ND		210
Fluorene	ND		21
Phenanthrene	ND		21
Anthracene	ND		21
Fluoranthene	ND		53
Pyrene	ND		53
Benzo(a)anthracene	ND		21
Chrysene	ND		21
Benzo(b)fluoranthene	ND		21
Benzo(k)fluoranthene	ND		21
Benzo(a)pyrene	ND		21
Dibenzo(a,h)anthracene	ND		53
Benzo(ghi)perylene	ND		53
Indeno(1,2,3-cd)pyrene	ND		21

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002930

TEST CODE :SPAH0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07833 MATRIX : SOLID
SAMPLE ID CLIENT: SB05-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		1100
Acenaphthylene	ND		1100
1-methylnaphthalene	ND		1100
2-Methylnaphthalene	ND		1100
Acenaphthene	ND		1100
Fluorene	ND		110
Phenanthrene	ND		110
Anthracene	ND		110
Fluoranthene	350		280
Pyrene	ND		280
Benzo(a)anthracene	140		110
Chrysene	ND		110
Benzo(b)fluoranthene	80	J X	110
Benzo(k)fluoranthene	91	J K	110
Benzo(a)pyrene	110		110
Dibenzo(a,h)anthracene	ND		280
Benzo(ghi)perylene	ND		280
Indeno(1,2,3-cd)pyrene	ND		110

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :SPAH0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 81 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07834 MATRIX : SOLID
SAMPLE ID CLIENT: SB05-0405

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		2500
Acenaphthylene	ND		2500
1-methylnaphthalene	4600		2500
2-Methylnaphthalene	5300		2500
Acenaphthene	ND		2500
Fluorene	ND		250
Phenanthrene	1200		250
Anthracene	ND		250
Fluoranthene	2500		620
Pyrene	ND		620
Benzo(a)anthracene	670		250
Chrysene	ND		250
Benzo(b)fluoranthene	250		250
Benzo(k)fluoranthene	170	J K	250
Benzo(a)pyrene	200	J K	250
Dibenzo(a,h)anthracene	ND		620
Benzo(ghi)perylene	ND		620
Indeno(1,2,3-cd)pyrene	ND		250

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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002932

TEST CODE :SPAH0A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 82 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-07835 MATRIX : SOLID
SAMPLE ID CLIENT: SB05-1415

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		1200
Acenaphthylene	ND		1200
1-methylnaphthalene	1800		1200
2-Methylnaphthalene	2300		1200
Acenaphthene	ND		1200
Fluorene	120		120
Phenanthrene	740		120
Anthracene	ND		120
Fluoranthene	1500	J K	610
Pyrene	ND		300
Benzo(a)anthracene	430		240
Chrysene	130	J K	240
Benzo(b)fluoranthene	150	J K	240
Benzo(k)fluoranthene	120	J K	120
Benzo(a)pyrene	150		120
Dibenzo(a,h)anthracene	ND		300
Benzo(ghi)perylene	ND		300
Indeno(1,2,3-cd)pyrene	ND		120

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TPH DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in TNRCC method 1005.

2. Holding Time:

All samples were extracted within the required holding time of less than 7 days for water and 14 days for soil after collection. Analysis of the sample was conducted within 7 days for water and 14 days for soil of extraction. Samples were maintained at less than 4°C. No qualifications are placed on the data.

3. Initial Calibration:

Initial calibration criteria were met: Five point calibration for single component analytes, retention time windows established, adequate resolution (90%) between adjacent peaks, and Percent Relative Standard Deviations (%RSD) of the calibration factors less than or equal to 20%.

4. Calibration Verification:

Calibration verification criteria: verification sample frequency of every 12 hours; analyte within retention time (RT) window; resolution (RES%) between adjacent peaks greater than or equal to 90%; and the percent difference (%D) between the calculated amount and the true amount for target analytes.

5. Blanks:

A method blank was prepared at the required frequency of every time samples were extracted for the matrix or every 20 samples, whichever is greater. Target analytes were not detected in associated blank(s) analyzed.

6. Surrogates:

No surrogates were added to the samples for this method.

7. Matrix Spikes:

No matrix spike was analyzed for the water matrix. Sample 7935 (Batch QC) underwent matrix spike analysis for the soil matrix. Recoveries of all spiked analytes were within the required control limits in both the matrix spike and matrix spike duplicate.

ANALYTE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
C6 to C10		70-130%	
C10 to C28		70-130%	
C6 to C28		70-130%	

8. Duplicates:

No matrix spike duplicate was analyzed for the water matrix. Sample 7935 (Batch QC) underwent matrix spike duplicate analysis for the soil matrix. Relative percent differences (RPDs) of all spiked analytes were within the required control limits listed below.

ANALYTE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
C6 to C10		30%	
C10 to C28		30%	
C6 to C28		30%	

9. Target Compound Identification:

All reported target analytes met identification criteria of retention times within the calculated retention time windows (3X Std. Dev.) or within the default windows..

10. Target Compound Quantitation and CRQLs:

Concentrations of all reported analytes were correctly calculated.

Sample quantitation limits (SQLs) varied from CRQLs (5 ug/L or 50 ug/kg) in the following samples due to the factors listed below.

SAMPLE NO.	LEVEL	% SOLID moisture	SAMPLE WT/VOL (gm/ml)	DF	CEV (ul)	SQL FAC-TOR
SB02-12	LOW	6				1.06
SB03-1.52	LOW	6				1.06
SB04-0405	LOW	6				1.06
SB05-0102	LOW	12				1.14
SB05-0405	LOW	19				1.23
SB05-1415	LOW	18				1.22

DF = dilution factor, CEV = concentrated extract volume

11. Laboratory Control Sample:

The laboratory analyzed a laboratory control sample and recoveries for this analysis were within the control limits provided.

12. Laboratory Contact:

No laboratory contact was required.

13. Overall Assessment:

No qualifications were placed on the analytical data and it is acceptable for use.

TEST CODE :W1050A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : TPH-TNRCC UNITS : MG/L
SAMPLE ID LAB : EE-98-07836 MATRIX: WATER
SAMPLE ID CLIENT: SB05-GW1

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	100		5.0
>C10 -> C28 Hydrocarbons	20		5.0
C6 -> C28 Hydrocarbons	120		5.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

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002937

TEST CODE :S1050A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 94 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07830 MATRIX : SOLID
SAMPLE ID CLIENT: SB02-12

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		53
>C10 -> C28 Hydrocarbons	ND		53
C6 -> C28 Hydrocarbons	ND		53

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002938

TEST CODE :S1050A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 94 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07831 MATRIX : SOLID
SAMPLE ID CLIENT: SB03-1.52

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		53
>C10 -> C28 Hydrocarbons	ND		53
C6 -> C28 Hydrocarbons	ND		53

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

recycled paper ecology and environment

002939

TEST CODE :S1050A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 94 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07832 MATRIX : SOLID
SAMPLE ID CLIENT: SB04-0405

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		53
>C10 -> C28 Hydrocarbons	ND		53
C6 -> C28 Hydrocarbons	ND		53

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07833 MATRIX : SOLID
SAMPLE ID CLIENT: SB05-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		57
>C10 -> C28 Hydrocarbons	ND		57
C6 -> C28 Hydrocarbons	ND		57

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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002941

TEST CODE :S1050A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 81 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07834 MATRIX : SOLID
SAMPLE ID CLIENT: SB05-0405

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	700		62
>C10 -> C28 Hydrocarbons	2600		62
C6 -> C28 Hydrocarbons	3400		62

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 82 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-07835 MATRIX : SOLID
SAMPLE ID CLIENT: SB05-1415

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	260		61
>C10 -> C28 Hydrocarbons	730		61
C6 -> C28 Hydrocarbons	990		61

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

METALS DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in SW846 methods 6010B and 7471A.

2. Holding Times:

All samples met established holding time criteria of 28 days for mercury and 180 days for metals.

3. Initial Calibration:

ICP initial calibration included a blank and one standard and initial calibration verification results fell within the control limits of 90 to 110 percent of the true values. Mercury initial calibration included a blank and five to eight standards and initial calibration verification results fell within the control limits of 80 to 120 percent of the true value. Correlation coefficients (CC) for AA (including furnace, flame and cold vapor Hg) were greater than 0.995.

4. Continuing Calibration:

All ICP results fell within the control limits of 90 to 110 percent of the true values. Mercury results fell within the control limits of 80 to 120 percent of the true value.

5. Blanks:

No target analytes were detected in the calibration blanks associated with this case.

Target analytes were detected in the following preparation blanks. Sample concentrations less than five times the highest analyte concentration reported in associated blanks are flagged **UB** (not detected, detection limit raised due to possible blank contamination).

PREPARATION BLANK/MATRIX	ANALYTE	CONC. mg/Kg	QUALIFIED SAMPLES
PBS828-189-1	Aluminum	26.644	NONE
PBS828-189-1	Iron	10.662	NONE

6. ICP Interference Check:

The recoveries for the following analytes were outside QC limits of 80% to 120% for the Interference Check Sample:

ANALYTE	INITIAL/ FINAL RUN	PERCENT RECOVERY	ASSOCIATED SAMPLES	QUALIFIER FLAG
Calcium	Initial	133.9%	SB02-12, SB03-1.52, SB04-0405 SB05-0102, SB05-0405, SB05-1415	JH

7. Laboratory Control Sample (LCS):

The recoveries for the solid LCS were within the established control limits.

8. Duplicate Sample Analysis:

Sample SB02-12 underwent duplicate analysis for the soil matrix. QC criteria are that the Relative Percent Difference (RPD) values for the duplicate sample analysis be less than 20 percent for aqueous samples and 35% for solid samples for concentrations greater than five times the CRDL. For sample concentrations less than five times the CRDL, the QC criteria are within ± the CRDL for the water matrix or ± two times the CRDL for the soil matrix. QC criteria were not met for the following analytes:

ANALYTE	MATRIX	RPD or CONC	ASSOCIATED SAMPLES	QUALIFIER FLAG
Manganese	soil	43.7%	SB02-12, SB03-1.52, SB04-0405, SB05-0102, SB05-0405, SB05-1415	JK

9. Spiked Sample Analysis:

Sample SB02-12 underwent spike analysis for the soil matrix. The spike recoveries for all analytes were within the control limit of 75 to 125 percent.

10. ICP Serial Dilution:

Samples 7939 (Batch QC) and SB03-1.52 underwent serial dilution. The Percent Difference (%D) values for ICP serial dilution analysis were within the QC limits of 10 percent for all analytes with concentrations greater than 50 times their IDL.

11. Sample Quantitation and CRDLs

Concentrations of all reported analytes were correctly calculated.

Sample quantitation limits (SQLs) varied from CRDLs in the following samples due to the factors listed below.

SAMPLE NO	LEVEL	DF	ASV OR ASW	% SOLIDS	ADV	SQL FACTOR
SB02-12	LOW			97.0		0.194

SAMPLE NO	LEVEL	DF	ASV OR ASW	% SOLIDS	ADV	SQL FACTOR
SB03-1.52	LOW			94.2		0.188
SB04-0405	LOW			93.6		0.188
SB05-0102	LOW			88.0		0.176
SB05-0405	LOW			80.7		0.162
SB05-1415	LOW			82.7		0.166

DF = Dilution Factor, ASV = Actual sample volume, ASW = Actual sample weight, ADV = Actual digestate or distillate volume

12. Laboratory Contact

No laboratory contact was required.

14. Overall Assessment:

The preparation blank contained aluminum and iron contamination. All the samples had these compounds at concentrations greater than five times the blank value, therefore no qualification of data was necessary.
Calcium recovered above control limits in the Interference Check Sample. This compound was qualified as estimated, biased high in all the samples.
Recovery of manganese was high in the Matrix Spike Duplicate analysis of sample SB02-12. The resulting Relative Percent Difference was out of QC limits and caused this compound in all the samples to be qualified as estimated, unknown bias.
All calculations were all dry weight corrected and the quantitation limits were adjusted accordingly.
The analytical data is acceptable for use with the qualifications listed above.

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

0102

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.165 SAS No.: _____ SDG No.: 12____

Matrix (soil/water): SOIL_ Lab Sample ID: 7833

Level (low/med): LOW__ Date Received: 06/02/98

% Solids: _88.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1740			P
7440-36-0	Antimony	1.1	U		P
7440-38-2	Arsenic	2.4			P
7440-39-3	Barium	23.8			P
7440-41-7	Beryllium	0.56	U		P
7440-43-9	Cadmium	0.81			P
7440-70-2	Calcium	363		JH	P
7440-47-3	Chromium	5.3			P
7440-48-4	Cobalt	2.3			P
7440-50-8	Copper	2.3	U		P
7439-89-6	Iron	5290			P
7439-92-1	Lead	7.0			P
7439-95-4	Magnesium	185			P
7439-96-5	Manganese	207		N*JK	P
7439-97-6	Mercury	0.02	U		CV
7440-02-0	Nickel	2.3	U		P
7440-09-7	Potassium	400			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	213			P
7440-28-0	Thallium	0.56	U		P
7440-62-2	Vanadium	7.6			P
7440-66-6	Zinc	11.8			P

Color Before: _____ Clarity Before: _____ Texture: SD/CY_

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB05-0102_____

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START - DALLAS

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

0405

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.: 9801.165 SAS No.: _____ SDG No.: 12____

Matrix (soil/water): SOIL_ Lab Sample ID: 7832

Level (low/med.): LOW__ Date Received: 06/02/98

% Solids: _93.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1230			P
7440-36-0	Antimony	1.0	U		P
7440-38-2	Arsenic	0.97			P
7440-39-3	Barium	7.3			P
7440-41-7	Beryllium	0.52	U		P
7440-43-9	Cadmium	0.52	U		P
7440-70-2	Calcium	169		JH	P
7440-47-3	Chromium	2.1			P
7440-48-4	Cobalt	2.1	U		P
7440-50-8	Copper	2.1	U		P
7439-89-6	Iron	2470			P
7439-92-1	Lead	1.1			P
7439-95-4	Magnesium	77.9			P
7439-96-5	Manganese	12.8		N*JH	P
7439-97-6	Mercury	0.02	U		CV
7440-02-0	Nickel	2.1	U		P
7440-09-7	Potassium	507			P
7782-49-2	Selenium	1.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	219			P
7440-28-0	Thallium	0.52	U		P
7440-62-2	Vanadium	4.0			P
7440-66-6	Zinc	1.6			P

Color Before: _____ Clarity Before: _____ Texture: SD____

Color After: CL_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID: SB04-0405

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START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

0405

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.165 SAS No.: _____ SDG No.: 12____

Matrix (soil/water): SOIL_ Lab Sample ID: 7834

Level (low/med): LOW__ Date Received: 06/02/98

% Solids: 80.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1930			P
7440-36-0	Antimony	1.2	U		P
7440-38-2	Arsenic	1.1			P
7440-39-3	Barium	51.0			P
7440-41-7	Beryllium	0.62	U		P
7440-43-9	Cadmium	0.62	U		P
7440-70-2	Calcium	631		JH	P
7440-47-3	Chromium	5.4			P
7440-48-4	Cobalt	3.6			P
7440-50-8	Copper	2.5	U		P
7439-89-6	Iron	3500			P
7439-92-1	Lead	3.7			P
7439-95-4	Magnesium	305			P
7439-96-5	Manganese	26.8		N*JK	P
7439-97-6	Mercury	0.02	U		CV
7440-02-0	Nickel	3.9			P
7440-09-7	Potassium	408			P
7782-49-2	Selenium	1.2	U		P
7440-22-4	Silver	1.2	U		P
7440-23-5	Sodium	143			P
7440-28-0	Thallium	0.62	U		P
7440-62-2	Vanadium	9.7			P
7440-66-6	Zinc	6.4			P

Color Before: _____ Clarity Before: _____ Texture: SD/CY_

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID: SB05-0405

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START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

1.52

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.165 SAS No.: _____ SDG No.: 12____

Matrix (soil/water): SOIL_ Lab Sample ID: 7831

Level (low/med): LOW__ Date Received: 06/02/98

% Solids: _94.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	911			P
7440-36-0	Antimony	1.0	U		P
7440-38-2	Arsenic	0.68			P
7440-39-3	Barium	7.5			P
7440-41-7	Beryllium	0.52	U		P
7440-43-9	Cadmium	0.52	U		P
7440-70-2	Calcium	160		JH	P
7440-47-3	Chromium	1.7			P
7440-48-4	Cobalt	2.1	U		P
7440-50-8	Copper	2.1	U		P
7439-89-6	Iron	1840			P
7439-92-1	Lead	0.83			P
7439-95-4	Magnesium	52.0	U		P
7439-96-5	Manganese	49.9		N*JK	P
7439-97-6	Mercury	0.02	U		CV
7440-02-0	Nickel	2.1	U		P
7440-09-7	Potassium	648			P
7782-49-2	Selenium	1.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	104			P
7440-28-0	Thallium	0.52	U		P
7440-62-2	Vanadium	3.1			P
7440-66-6	Zinc	1.7			P

Color Before: _____ Clarity Before: _____ Texture: SD____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID: SB03-1.52

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START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

12

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.165 SAS No.: _____ SDG No.: 12____

Matrix (soil/water): SOIL_ Lab Sample ID: 7830

Level (low/med): LOW__ Date Received: 06/02/98

% Solids: _94.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1140			P
7440-36-0	Antimony	1.0	U		P
7440-38-2	Arsenic	0.99			P
7440-39-3	Barium	10.2			P
7440-41-7	Beryllium	0.51	U		P
7440-43-9	Cadmium	0.51	U		P
7440-70-2	Calcium	167		JH	P
7440-47-3	Chromium	2.4			P
7440-48-4	Cobalt	2.4			P
7440-50-8	Copper	2.0	U		P
7439-89-6	Iron	2790			P
7439-92-1	Lead	1.1			P
7439-95-4	Magnesium	52.8			P
7439-96-5	Manganese	164		N*JK	P
7439-97-6	Mercury	0.02	U		CV
7440-02-0	Nickel	2.0	U		P
7440-09-7	Potassium	425			P
7782-49-2	Selenium	1.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	121			P
7440-28-0	Thallium	0.51	U		P
7440-62-2	Vanadium	3.9			P
7440-66-6	Zinc	3.4			P

Color Before: _____ Clarity Before: _____ Texture: SD____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID:__SB02-12

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START - DALLAS

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

1415

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.165 SAS No.: _____ SDG No.: 12____

Matrix (soil/water): SOIL_ Lab Sample ID: 7835

Level (low/med): LOW__ Date Received: 06/02/98

% Solids: _82.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3003			P
7440-36-0	Antimony	1.2	U		P
7440-38-2	Arsenic	4.3			P
7440-39-3	Barium	89.8			P
7440-41-7	Beryllium	0.58	U		P
7440-43-9	Cadmium	1.9			P
7440-70-2	Calcium	351		JH	P
7440-47-3	Chromium	12.2			P
7440-48-4	Cobalt	7.1			P
7440-50-8	Copper	2.3	U		P
7439-89-6	Iron	13403			P
7439-92-1	Lead	4.3			P
7439-95-4	Magnesium	285			P
7439-96-5	Manganese	231		N*JK	P
7439-97-6	Mercury	0.02	U		CV
7440-02-0	Nickel	5.4			P
7440-09-7	Potassium	603			P
7782-49-2	Selenium	1.2	U		P
7440-22-4	Silver	1.2	U		P
7440-23-5	Sodium	116			P
7440-28-0	Thallium	0.58	U		P
7440-62-2	Vanadium	13.8			P
7440-66-6	Zinc	12.6			P

Color Before: _____ Clarity Before: _____ Texture: SD/CY_

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID: SB05-1415

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002952

PH DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in SW846 method 9045C.

2. Holding Times:

The samples were analyzed within the holding time of 24 hours of receipt.

3. Initial Calibration:

The initial calibration included at least two points and recovery results were within control limits of ± 0.05pH units of the buffer solution value.

4. Continuing Calibration:

A buffer solution at midrange was analyzed and results were within control limits of its true value..

5. Blanks:

No blank was analyzed with this sample delivery group..

6. Laboratory Control Sample (LCS):

No LCS was analyzed with this sample delivery group.

7. Duplicate Sample Analysis:

Sample 7837.03 (Batch QC) underwent duplicate analysis. The Relative Percent Difference (RPD) values for the duplicate sample analysis were within QC criteria of ± 0.1 units.

8. Spiked Sample Analysis:

No spiked sample analysis was performed for this method.

9. Sample Quantitation:

No quantitation was necessary for this method.

10.Laboratory Contact:

No laboratory contact was necessary.

11. Overall Assessment:

The data is acceptable and no qualifications have been placed on it.

TEST CODE :SPH 1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : PH UNITS : S.U.
PARAMETER : pH

SAMPLE ID	RESULTS	Q	QNT. LIMIT
EE-98-07830			
SB02-12	6.1		0.10
EE-98-07831			
SB03-1.52	5.5		0.10
EE-98-07832			
SB04-0405	6.6		0.10
EE-98-07833			
SB05-0102	6.7		0.10
EE-98-07834			
SB05-0405	6.4		0.10
EE-98-07835			
SB05-1415	6.6		0.10

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE
NA = NOT APPLICABLE

002954

TOTAL SOLIDS DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in CLP methodology.

2. Holding Times:

No holding time was established for this method.

3. Initial Calibration:

No initial calibration was necessary for this method.

4. Continuing Calibration:

No continuing calibration was necessary for this method.

5. Blanks:

No blank was analyzed with this method.

6. Laboratory Control Sample (LCS):

No LCS was analyzed with this method.

7. Duplicate Sample Analysis:

Sample SB05-1415 underwent duplicate analysis. The Relative Percent Difference (RPD) value for the duplicate sample analysis was within QC criteria.

8. Spiked Sample Analysis:

No spiked sample analysis was performed for this method.

9. Sample Quantitation

Concentrations were correctly calculated.

10.Laboratory Contact:

No laboratory contact was necessary.

11. Overall Assessment:

The data is acceptable and no qualifications have been placed on it.

TEST CODE :STS 1 JOB NUMBER :9801.165
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : SOLIDS TOTAL UNITS : %
PARAMETER : Solids-Total

SAMPLE ID	RESULTS	Q
EE-98-07830		
SB02-12	94	
EE-98-07831		
SB03-1.52	94	
EE-98-07832		
SB04-0405	94	
EE-98-07833		
SB05-0102	88	
EE-98-07834		
SB05-0405	81	
EE-98-07835		
SB05-1415	82	

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE

002956

DATA QUALITY ASSURANCE REVIEW

SITE NAME Wilcox Refinery

CERCLIS

PAN 052601SFXX TDD NUMBER 06-98-03-0009

CASE NUMBER/WORK ORDER 6S154 SDG/PROJ. NUMBER 9800.854

E & E has completed a QA review for Case No. 6S154, SDG No. 9800.854, Wilcox Refinery. Four solid samples were analyzed for PAH, TPH, Metals, pH, BTU, and Total Solids by Ecology and Environment, Inc. Analytical Services Center. Sample numbers are listed below.

SAMPLE NUMBERS

SB0106		
SB011011		
SED12		
SED11		

This data package was validated to determine if Quality Control (QC) specifications were achieved, following *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (February, 1994), *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (February, 1994), *Quality Assurance/Quality Control Guidance for Removal Activities* (April, 1990), and the Regional Protocol for Holding Times, Blanks, and VOA Preservation (April 13, 1989). Specific data qualifications are listed in the following discussion.

REVIEWER Michelle Brown DATE 10/27/98

Data Qualifiers

Data Qualifier Definitions were supplied by the Office of Solid Waste and Emergency Response (September 1989) and are included in the Functional Guidelines. Data qualifiers may be combined (UJ, QJ) with the corresponding combination of meanings. Additional qualifier may be added to provide additional, more specific information (JL, UB, QJK), modifying the meaning of the primary qualifier. Addition qualifiers utilized by E & E are H, L, K, B, Q, and D.

U - The material was analyzed for, but was not detected. The associated numerical value is the sample quantitation or detection limit, which has been adjusted for sample weight/sample volume, extraction volume, percent solids, sample dilution or other analysis specific parameters.

An additional qualifier, "B", may be appended to indicated that while the analyte was detected in the sample, the presence of the analyte may be attributable to blank contamination and the analyte is therefore considered undetected with the sample detection or quantitation limit for the analyte being elevated.

J - The analyte was analyzed for, but the associated numerical value may not be consistent with the amount actually present in the environmental sample or may not be consistent with the sample detection or quantitation limit. The value is an estimated quantity. The data should be seriously considered for decision-making and are usable for many purposes.

An additional qualifier will be appended to the "J" qualifier that indicates the bias in the reported results:

L Low bias

H High bias

K Unknown bias

Q The reported concentration is less than the sample quantitation limit for the specific analyte in the sample.

The L and H qualifier will only be employed when a single qualification is required. When more than one quality control parameter affects the analytical result and a conflict results in assigning a bias, the result will be flagged JK.

R - Quality Control indicates that data are unusable for all purposes. The analyte was analyzed for, but the presence or absence of the analyte has not been verified. Resampling and reanalysis are necessary for verification to confirm or deny the presence of an analyte.

N - The analysis indicates the presence of analyte for which there is presumptive evidence to make a "tentative identification."

D - The concentration reported was determined in the re-analysis of the sample at a secondary dilution.

BTEX DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in SW846 method 8021B.

2. Holding Time:

All samples were analyzed within the required holding time of less than 14 days after collection. Samples were maintained at less than 4°C. No qualifications are placed on the data.

3. Initial Calibration:

Initial calibration criteria were met: Five point calibration for single component analytes, retention time windows established, adequate resolution (90%) between adjacent peaks, and Percent Relative Standard Deviations (%RSD) of the calibration factors less than or equal to 20% (30% for the surrogates)

4. Calibration Verification:

Calibration verification criteria: verification sample frequency of every 12 hours; analyte within retention time (RT) window; resolution (RES%) between adjacent peaks greater than or equal to 90%; and the percent difference (%D) between the calculated amount and the true amount for target analytes and surrogates not exceeding ± 25%; were met.

5. Blanks:

A method blank was prepared at the required frequency of every time samples were extracted for the matrix or every 20 samples, whichever is greater. Target analytes were not detected in associated blank(s) analyzed.

6. Surrogates:

All recoveries of the surrogates were within the following control limits.

SURROGATE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
Trifluorotoluene		70-130%	

7. Matrix Spikes:

Sample SED12 underwent matrix spike analysis for the solid matrix. Recoveries of all spiked analytes were within the required control limits in both the matrix spike and matrix spike duplicate.

ANALYTE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
Benzene		49-124%	
Toluene		46-117%	
Ethylbenzene		44-122%	
Total Xylenes		54-118%	

8. Duplicates:

Sample SED12 underwent matrix spike duplicate analysis for the solid matrix. Relative percent differences (RPDs) of all spiked analytes were within the required control limits listed below.

ANALYTE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
Benzene		30%	
Toluene		30%	
Ethylbenzene		30%	
Total Xylenes		30%	

9. Target Compound Identification:

All reported target analytes met identification criteria of retention times within the calculated retention time windows (3x Std. Dev.) for both columns and percent differences (%D) between the quantitation on the two columns of less than 25%.

10. Target Compound Quantitation and CRQLs:

Concentrations of all reported analytes were correctly calculated.

Sample quantitation limits (SQLs) varied from the CRQLs (2 ug/kg) in the following samples due to the factors listed below.

SAMPLE NO.	LEVEL	% SOLID moisture	SAMPLE WT/VOL (gm/ml)	DF	CEV (ul)	SQL FACTOR
SB0106	MED	8		50		54
SB011011	LOW	17		5		6
SED12	LOW	19				1.23
SED11	LOW	20				1.25

DF = dilution factor, CEV = concentrated extract volume

11. Laboratory Control Sample:

The laboratory analyzed a laboratory control sample and recoveries for this analysis were within the control limits provided.

12. Laboratory Contact:

No laboratory contact was required.

13. Overall Assessment:

The sample results were dry weight corrected. Samples SB0106 and SB11011 had high concentrations of analytes and required dilutions. Quantitation limits were adjusted accordingly.

The analytical data is acceptable for use with the qualifications listed above.

TEST CODE :SBTX0A1 JOB NUMBER :9800.354
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 92 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-05713 MATRIX : SOLID
SAMPLE ID CLIENT: SB0106

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		4300
Toluene	410000		6500
Ethylbenzene	670000		4900
Total Xylenes	2600000		14000

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

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002962

TEST CODE :SBTX0A1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 83 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-05714 MATRIX : SOLID
SAMPLE ID CLIENT: SB011011

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	17		3.6
Toluene	230		5.4
Ethylbenzene	250		4.2
Total Xylenes	760		12

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002963

TEST CODE :SBTX0A1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 81 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-05715 MATRIX : SOLID
SAMPLE ID CLIENT: SED12

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		0.74
Toluene	ND		1.1
Ethylbenzene	ND		0.86
Total Xylenes	ND		2.5

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

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002964

TEST CODE :SBTX0A1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 80 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-05716 MATRIX : SOLID
SAMPLE ID CLIENT: SED11

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		0.75
Toluene	ND		1.1
Ethylbenzene	ND		0.88
Total Xylenes	ND		2.5

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002965

PAH DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in SW846 method 8310.

2. Holding Time:

All samples were extracted within the required holding time of less than 14 days after collection. Analysis of the sample was conducted within 40 days of extraction. Samples were maintained at less than 4°C. No qualifications are placed on the data.

3. Initial Calibration:

Initial calibration criteria were met: Five point calibration for single component analytes, retention time windows established, adequate resolution (90%) between adjacent peaks, and Percent Relative Standard Deviations (%RSD) of the calibration factors less than or equal to 20% (30% for the surrogates)

4. Calibration Verification:

Calibration verification criteria: verification sample frequency of every 12 hours; analyte within retention time (RT) window; resolution (RES%) between adjacent peaks greater than or equal to 90%; and the percent difference (%D) between the calculated amount and the true amount for target analytes and surrogates not exceeding $\pm$ 25%; were met.

5. Blanks:

A method blank was prepared at the required frequency of every time samples were extracted for the matrix or every 20 samples, whichever is greater. Target analytes were not detected in associated blank(s) analyzed.

6. Surrogates:

Recoveries of the following surrogates were outside of control limits.

SAMPLE #	MATRIX	SURROGATE OUT	SURROGATE RECOVERY	QUALIFIER FLAG
SB0106	SOILD	Terphenyl-d14	0%	None- surrogate diluted out

7. Matrix Spikes:

Sample SB011011 underwent matrix spike analysis for the solid. Recoveries of all spiked analytes were within the required control limits in both the matrix spike and matrix spike duplicate.

8. Duplicates:

Sample SB011011 underwent matrix spike duplicate analysis for the solid. Relative percent differences (RPDs) of all spiked analytes were within the required control limits.

9. Target Compound Identification:

All reported target analytes met identification criteria of retention times within the calculated retention time windows (3X Std. Dev.) for both columns and percent differences (%D) between the quantitation on the two columns of less than 25%.

10. Target Compound Quantitation and CRQLs:

Concentrations of all reported analytes were correctly calculated.

Sample quantitation limits (SQLs) varied from the following CRQLs in the following samples due to the factors listed below.

20 ug/kg - fluorene, anthracene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene
50 ug/kg - fluoranthene, pyrene, dibenzo(a,h)anthracene, dibenzo(ghi)perylene
60 ug/kg - phenanthrene
200 ug/kg - naphthalene, acenaphthylene, 1-methylnaphthalene, 2-methylnaphthalene, acenaphthene

SAMPLE NO.	LEVEL	% SOLID moisture	SAMPLE WT/VOL (gm/ml)	DF	CEV (ul)	SQL FAC-TOR
SB0106	LOW	8		10		10.87
SB011011	LOW	17				1.20
SED12	LOW	19				1.23
SED11	LOW	20				1.25

DF = dilution factor, CEV = concentrated extract volume

11. Laboratory Control Sample:

The laboratory analyzed a laboratory control sample and recoveries for this analysis were within the control limits provided.

12. Laboratory Contact:

No laboratory contact was required.

13. Overall Assessment:

The sample results were dry weight corrected. Quantitation limits were adjusted accordingly. Sample SB0106 had a high concentration of analytes and required a dilution. The surrogate for this sample did not recover and was diluted out. No qualifications were placed on the data.

The analytical data is acceptable for use with the qualifications listed above.

TEST CODE :SPAH0A1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 80 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-05716 MATRIX : SOLID
SAMPLE ID CLIENT: SED11

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		250
Acenaphthylene	ND		250
1-methylnaphthalene	ND		250
2-Methylnaphthalene	ND		250
Acenaphthene	ND		250
Fluorene	ND		25
Phenanthrene	40		25
Anthracene	ND		25
Fluoranthene	89		62
Pyrene	410		62
Benzo(a)anthracene	49		25
Chrysene	64		25
Benzo(b)fluoranthene	ND		25
Benzo(k)fluoranthene	ND		25
Benzo(a)pyrene	41		25
Dibenzo(a,h)anthracene	ND		62
Benzo(ghi)perylene	ND		62
Indeno(1,2,3-cd)pyrene	ND		25

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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002969

TEST CODE :SPAH0A1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 92 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-05713 MATRIX : SOLID
SAMPLE ID CLIENT: SB0106

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		2200
Acenaphthylene	ND		2200
1-methylnaphthalene	ND		2200
2-Methylnaphthalene	3200		2200
Acenaphthene	ND		2200
Fluorene	ND		220
Phenanthrene	1900		220
Anthracene	ND		220
Fluoranthene	5100		540
Pyrene	7000		540
Benzo(a)anthracene	570		220
Chrysene	1400		220
Benzo(b)fluoranthene	1100		220
Benzo(k)fluoranthene	350		220
Benzo(a)pyrene	1400		220
Dibenzo(a,h)anthracene	ND		540
Benzo(ghi)perylene	ND		540
Indeno(1,2,3-cd)pyrene	ND		220

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002970

TEST CODE :SPAH0A1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 83 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-05714 MATRIX : SOLID
SAMPLE ID CLIENT: SB011011

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		240
Acenaphthylene	ND		240
1-methylnaphthalene	ND		240
2-Methylnaphthalene	340		240
Acenaphthene	ND		240
Fluorene	ND		24
Phenanthrene	52		24
Anthracene	ND		24
Fluoranthene	73		60
Pyrene	140		60
Benzo(a)anthracene	ND		24
Chrysene	ND		24
Benzo(b)fluoranthene	ND		24
Benzo(k)fluoranthene	ND		24
Benzo(a)pyrene	ND		24
Dibenzo(a,h)anthracene	ND		60
Benzo(ghi)perylene	ND		60
Indeno(1,2,3-cd)pyrene	ND		24

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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002971

TEST CODE :SPAH0A1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 81 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-05715 MATRIX : SOLID
SAMPLE ID CLIENT: SED12

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		250
Acenaphthylene	ND		250
1-methylnaphthalene	ND		250
2-Methylnaphthalene	ND		250
Acenaphthene	ND		250
Fluorene	ND		25
Phenanthrene	ND		25
Anthracene	ND		25
Fluoranthene	ND		62
Pyrene	120		62
Benzo(a)anthracene	33		25
Chrysene	ND		25
Benzo(b)fluoranthene	95		25
Benzo(k)fluoranthene	ND		25
Benzo(a)pyrene	41		25
Dibenzo(a,h)anthracene	ND		62
Benzo(ghi)perylene	ND		62
Indeno(1,2,3-cd)pyrene	ND		25

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002972

TPH DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in TNRCC method 1005.

2. Holding Time:

All samples were analyzed within the required holding time of less than 14 days after collection. Samples were maintained at less than 4°C. No qualifications are placed on the data.

3. Initial Calibration:

Initial calibration criteria were met: Five point calibration for single component analytes, retention time windows established, adequate resolution (90%) between adjacent peaks, and Percent Relative Standard Deviations (%RSD) of the calibration factors less than or equal to 20%.

4. Calibration Verification:

Calibration verification criteria: verification sample frequency of every 12 hours; analyte within retention time (RT) window; resolution (RES%) between adjacent peaks greater than or equal to 90%; and the percent difference (%D) between the calculated amount and the true amount for target analytes and surrogates not exceeding $\pm$ 25%; were met.

5. Blanks:

A method blank was prepared at the required frequency of every time samples were extracted for the matrix or every 20 samples, whichever is greater. Target analytes were not detected in associated blank(s) analyzed.

6. Surrogates:

No surrogates were added to the samples for this analysis.

7. Matrix Spikes:

Sample SED11 underwent matrix spike analysis for the solid matrix. Recoveries of all spiked analytes were within the required control limits in both the matrix spike and matrix spike duplicate.

ANALYTE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
C6 to C28 H		70-130%	

8. Duplicates:

Sample SED11 underwent matrix spike duplicate analysis for the solid matrix. Relative percent differences (RPDs) of all spiked analytes were within the required control limits listed below.

ANALYTE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
C6 to C28 H		<35%	

9. Target Compound Identification:

All reported target analytes met identification criteria of retention times within the calculated retention time windows.

10. Target Compound Quantitation and CRQLs:

Concentrations of all reported analytes were correctly calculated.

Sample quantitation limits (SQLs) varied from CRQLs (25 mg/kg) in the following samples due to the factors listed below.

SAMPLE NO.	LEVEL	% SOLID moisture	SAMPLE WT/VOL (gm/ml)	DF	CEV (ul)	SQL FAC-TOR
SB0106	LOW	8		5		5.43
SB011011	LOW	17				1.20
SED12	LOW	19				1.23
SED11	LOW	20				1.25

DF = dilution factor, CEV = concentrated extract volume

11. Laboratory Control Sample:

The laboratory analyzed a laboratory control sample and recoveries for this analysis were within the control limits provided.

12. Laboratory Contact:

No laboratory contact was required.

13. Overall Assessment:

The sample results were dry weight corrected. Sample SB0106 had high concentrations of hydrocarbons and required a dilution. Quantitation limits were adjusted accordingly.

The analytical data is acceptable for use with the qualifications listed above.

TEST CODE :S1050A1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 92 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-05713 MATRIX : SOLID
SAMPLE ID CLIENT: SB0106

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	2600		140
>C10 -> C28 Hydrocarbons	1500		140
C6 -> C28 Hydrocarbons	4100		270

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 83 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-05714 MATRIX : SOLID
SAMPLE ID CLIENT: SB011011

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	370		30
>C10 -> C28 Hydrocarbons	120		30
C6 -> C28 Hydrocarbons	490		60

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

151

TEST CODE :S1050A1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 81 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-05715 MATRIX : SOLID
SAMPLE ID CLIENT: SED12

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		31
>C10 -> C28 Hydrocarbons	ND		31
C6 -> C28 Hydrocarbons	ND		62

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

002977

TEST CODE :S1050A1 JOB NUMBER :0800.354
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 80 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-05716 MATRIX : SOLID
SAMPLE ID CLIENT: SED11

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		31
>C10 -> C28 Hydrocarbons	ND		31
C6 -> C28 Hydrocarbons	ND		62

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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002978

METALS DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in SW846 methods 6010B and 7471A.

2. Holding Times:

All samples met established holding time criteria of 28 days for mercury and 180 days for metals.

3. Initial Calibration:

ICP initial calibration included a blank and one standard and initial calibration verification results fell within the control limits of 90 to 110 percent of the true values. Mercury initial calibration included a blank and five to eight standards and initial calibration verification results fell within the control limits of 80 to 120 percent of the true value. Correlation coefficients (CC) for AA (including furnace, flame and cold vapor Hg) were greater than 0.995.

4. Continuing Calibration:

All ICP results fell within the control limits of 90 to 110 percent of the true values. Mercury results fell within the control limits of 80 to 120 percent of the true value.

5. Blanks:

No target analytes were detected in the calibration and preparation blanks associated with this case.

6. ICP Interference Check:

All results for the Interference Check Sample were within the control limits of 80 to 120 percent of the true values.

7. Laboratory Control Sample (LCS):

Recoveries for the following analytes were outside of the control limits of 80-120% for the aqueous LCS or the control limit established for the solid LCS.

ANALYTE	MATRIX	RECOVERY %	ASSOCIATED SAMPLES	QUALIFIER FLAG
Aluminum	Solid	2.3	BB0106,SB011011,SED12,SED11	JL
Antimony	Solid	154.2	BB0106,SB011011,SED12,SED11	JH
Arsenic	Solid	151.3	BB0106,SB011011,SED12,SED11	JH

ANALYTE	MATRIX	RECOVERY %	ASSOCIATED SAMPLES	QUALIFIER FLAG
Cadmium	Solid	173.3	BB0106,SB011011,SED12,SED11	JH
Calcium	Solid	54.5	BB0106,SB011011,SED12,SED11	JL
Copper	Solid	56.6	BB0106,SB011011,SED12,SED11	JL
Iron	Solid	1.2	BB0106,SB011011,SED12,SED11	JL
Manganese	Solid	48.0	BB0106,SB011011,SED12,SED11	JL
Nickel	Solid	135.7	BB0106,SB011011,SED12,SED11	JH
Selenium	Solid	160.3	BB0106,SB011011,SED12,SED11	JH
Silver	Solid	6.4	BB0106,SB011011,SED12,SED11	JL
Sodium	Solid	176.1	BB0106,SB011011,SED12,SED11	JH

8. Duplicate Sample Analysis:

Sample SB0106 underwent duplicate analysis for the solid matrix. QC criteria are that the Relative Percent Difference (RPD) values for the duplicate sample analysis be less than 20 percent for aqueous samples and 35% for solid samples for concentrations greater than five times the CRDL. For sample concentrations less than five times the CRDL, the QC criteria are within ± the CRDL for the water matrix or ± two times the CRDL for the soil matrix. QC criteria were not met for the following analytes:

ANALYTE	MATRIX	RPD or CONC	ASSOCIATED SAMPLES	QUALIFIER FLAG
Calcium	Solid	96.9%	SB0106,SB011011,SED12,SED11	JK
Copper	Solid	39.8%	SB0106,SB011011,SED12,SED11	JK
Lead	Solid	24.7%	SB0106,SB011011,SED12,SED11	None
Magnesium	Solid	80.1%	SB0106,SB011011,SED12,SED11	JK
Manganese	Solid	27.3%	SB0106,SB011011,SED12,SED11	None
Zinc	Solid	110.0%	SB0106,SB011011,SED12,SED11	JK

9. Spiked Sample Analysis:

Sample SB0106 underwent spike analysis for the solid matrix. The spike recoveries for the following analytes were outside of the 75-125% recovery QC limits:

ANALYTE	MATRIX	RECOVERY %	ASSOCIATED SAMPLES	QUALIFIER FLAG
Antimony	Solid	68.2	SB0106,SB011011,SED12,SED11	JL
Cadmium	Solid	45.9	SB0106,SB011011,SED12,SED11	JL
Chromium	Solid	50.0	SB0106,SB011011,SED12,SED11	JL
Copper	Solid	315.7	SB0106,SB011011,SED12,SED11	JH
Manganese	Solid	3.3	SB0106,SB011011,SED12,SED11	JL
Silver	Solid	45.9	SB0106,SB011011,SED12,SED11	JL
Zinc	Solid	538.6	SB0106,SB011011,SED12,SED11	JH
Lead	Solid	2977.6	NONE	No flag- 4x rule

10. ICP Serial Dilution:

Sample SB0106 underwent serial dilution. The Percent Difference values (%D) for the following analytes exceeded QC limits of 10 percent for analytes with concentrations greater than 50 times their IDL.

ANALYTE	MATRIX	%D	ASSOCIATE SAMPLES	QUALIFIER FLAG
Iron	Solid	18.9	SB0106,SB011011,SED12,SED11	JK

11. Sample Quantitation and CRDLs

Concentrations of all reported analytes were correctly calculated.

Sample quantitation limits (SQLs) varied from CRDLs in the following samples due to the factors listed below.

SAMPLE NO	DF	ASV OR ASW	% SOLIDS	ADV	SQL FACTOR
SB0106		1.03	92.2		0.184
SED11		1.01	79.7		0.159
SED12		1.03	81.4		0.163
SB011011		1.05	83.1		0.166

DF = Dilution Factor, ASV = Actual sample volume, ASW = Actual sample weight, ADV = Actual digestate or distillate volume

12. Laboratory Contact

No laboratory contact was required.

13. Overall Assessment:

The quality control samples ran for this analysis had several compounds out of QC criteria. The compounds out of criteria were qualified as estimated, biased low if they had low spike recoveries or as estimated, biased high if they had high spike recoveries. Lead was not qualified due to its high spike recovery because spike recovery limits do not apply when the sample concentration exceeds the spike concentration by a factor of 4 times or more (4x rule).
The duplicate analysis had a few compounds outside of the Relative Percent Difference (RPD) criteria. These compounds were qualified as estimated, unknown bias.
The ICP Serial Dilution had iron out of percent difference criteria. This compound was qualified as estimated, unknown bias in the samples.
Sample SB0106 and its Matrix Spike/Matrix Spike Duplicate had a recovery of Lead above the calibration range. These were reanalyzed at a ten-fold dilution and the values for lead were taken from this secondary dilution and qualified "D" or diluted run.
All of the samples contained moisture and were dry weight corrected. Quantitation limits were adjusted accordingly.
The analytical data is acceptable for use with the qualifications listed above.

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SB0106

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9800.854 SAS No.: _____ SDG No.: SB0106

Matrix (soil/water): SOIL_ Lab Sample ID: 5713

Level (low/med): LOW__ Date Received: 04/29/98

% Solids: _92.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	727		JL	P
7440-36-0	Antimony	6.3	U	N JK	P
7440-38-2	Arsenic	1.0		JH	P
7440-39-3	Barium	19.1			P
7440-41-7	Beryllium	0.53	U		P
7440-43-9	Cadmium	5.1		N JK	P
7440-70-2	Calcium	2550		* JK	P
7440-47-3	Chromium	13.6		N	P
7440-48-4	Cobalt	2.8			P
7440-50-8	Copper	78.1		N* JK	P
7439-89-6	Iron	37300		E JK	P
7439-92-1	Lead	4980		* DJK	P
7439-95-4	Magnesium	246		* JK	P
7439-96-5	Manganese	182		N* JKL	P
7439-97-6	Mercury	0.06			CV
7440-02-0	Nickel	4.0		JH	P
7440-09-7	Potassium	126			P
7782-49-2	Selenium	1.1		JH	P
7440-22-4	Silver	1.1	U	N JL	P
7440-23-5	Sodium	268		JH	P
7440-28-0	Thallium	0.53	U		P
7440-62-2	Vanadium	2.1	U		P
7440-66-6	Zinc	43.3		N* JK	P

Color Before: _____ Clarity Before: _____ Texture: SD____

Color After: Y_____ Clarity After: C_____ Artifacts: YES___

Comments:

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START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SED11

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9800.854 SAS No.: _____ SDG No.: SB0106

Matrix (soil/water): SOIL_ Lab Sample ID: 5716

Level (low/med): LOW__ Date Received: 04/29/98

% Solids: _79.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1210		JL	P
7440-36-0	Antimony	7.5	U	N JK	P
7440-38-2	Arsenic	1.4		JH	P
7440-39-3	Barium	20.2			P
7440-41-7	Beryllium	0.62	U		P
7440-43-9	Cadmium	0.62	U	N JK	P
7440-70-2	Calcium	561		* JK	P
7440-47-3	Chromium	3.7		N	P
7440-48-4	Cobalt	2.5	U		P
7440-50-8	Copper	2.7		N* JK	P
7439-89-6	Iron	3520		E JK	P
7439-92-1	Lead	32.4		* JK	P
7439-95-4	Magnesium	311		* JK	P
7439-96-5	Manganese	104		N* JK L	P
7439-97-6	Mercury	0.02	U		CV
7440-02-0	Nickel	2.6		JH	P
7440-09-7	Potassium	253			P
7782-49-2	Selenium	0.62	U		P
7440-22-4	Silver	1.2	U	N JL	P
7440-23-5	Sodium	62.1	U		P
7440-28-0	Thallium	0.62	U		P
7440-62-2	Vanadium	5.4			P
7440-66-6	Zinc	9.8		N* JK	P

Color Before: _____ Clarity Before: _____ Texture: CY____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

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START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SED12

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9800.854 SAS No.: _____ SDG No.: SB0106

Matrix (soil/water): SOIL_ Lab Sample ID: 5715

Level (low/med): LOW__ Date Received: 04/29/98

% Solids: _81.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	960		JL	P
7440-36-0	Antimony	7.2	U	N JK	P
7440-38-2	Arsenic	1.6		JH	P
7440-39-3	Barium	22.1			P
7440-41-7	Beryllium	0.60	U		P
7440-43-9	Cadmium	0.60	U	N JK	P
7440-70-2	Calcium	373		* JK	P
7440-47-3	Chromium	4.0		N	P
7440-48-4	Cobalt	2.4	U		P
7440-50-8	Copper	2.7		N* JK	P
7439-89-6	Iron	4050		E JK	P
7439-92-1	Lead	16.7		* JK	P
7439-95-4	Magnesium	226		* JK	P
7439-96-5	Manganese	142		N* JK L	P
7439-97-6	Mercury	0.02	U		CV
7440-02-0	Nickel	2.4	U		P
7440-09-7	Potassium	221			P
7782-49-2	Selenium	0.60	U		P
7440-22-4	Silver	1.2	U	N JL	P
7440-23-5	Sodium	68.6		JH	P
7440-28-0	Thallium	0.60	U		P
7440-62-2	Vanadium	7.5			P
7440-66-6	Zinc	5.3		N* JK	P

Color Before: _____ Clarity Before: _____ Texture: CY____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

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START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

011011

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9800.854 SAS No.: _____ SDG No.: SB0106

Matrix (soil/water): SOIL_ Lab Sample ID: 5714

Level (low/med): LOW__ Date Received: 04/29/98

% Solids: _83.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3620		J	P
7440-36-0	Antimony	6.9	U	NJK	P
7440-38-2	Arsenic	2.8		JH	P
7440-39-3	Barium	72.7			P
7440-41-7	Beryllium	0.57	U		P
7440-43-9	Cadmium	1.6		NJK	P
7440-70-2	Calcium	888		*JK	P
7440-47-3	Chromium	6.7		N	P
7440-48-4	Cobalt	5.6			P
7440-50-8	Copper	6.3		N*JK	P
7439-89-6	Iron	13000		E JK	P
7439-92-1	Lead	6.5		*	P
7439-95-4	Magnesium	565		*JK	P
7439-96-5	Manganese	426		N*	P
7439-97-6	Mercury	0.02	U		CV
7440-02-0	Nickel	14.5		JH	P
7440-09-7	Potassium	386			P
7782-49-2	Selenium	0.65		JH	P
7440-22-4	Silver	1.1	U	NJL	P
7440-23-5	Sodium	2620		JH	P
7440-28-0	Thallium	0.57	U		P
7440-62-2	Vanadium	11.0			P
7440-66-6	Zinc	7.4		N*JK	P

Color Before: _____ Clarity Before: _____ Texture: CY____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB011011_____

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PH DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in SW846 method 9045C.

2. Holding Times:

The samples were analyzed within the holding time of within 24 hours of receipt.

3. Initial Calibration:

The initial calibration included at least two points and recovery results were within control limits of ± 0.05pH units of the buffer solution value.

4. Continuing Calibration:

A buffer solution at midrange was analyzed and results were within control limits of its true value..

5. Blanks:

No blank was analyzed with this sample delivery group..

6. Laboratory Control Sample (LCS):

No LCS was analyzed with this sample delivery group.

7. Duplicate Sample Analysis:

Sample SED11 underwent duplicate analysis. The Relative Percent Difference (RPD) values for the duplicate sample analysis were within QC criteria of ± 0.1 units.

8. Spiked Sample Analysis:

No spiked sample analysis was performed for this method.

9. Sample Quantitation:

No quantitation was necessary for this method.

10.Laboratory Contact:

No laboratory contact was necessary.

11. Overall Assessment:

The data is acceptable and no qualifications have been placed on it.

TEST CODE :SPH 1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : PH UNITS : S.U.
PARAMETER : pH

SAMPLE ID	RESULTS	Q	QNT. LIMIT
EE-98-05713			
SB0106	8.0		0.10
EE-98-05714			
SB011011	8.8		0.10
EE-98-05715			
SED12	7.1		0.10
EE-98-05716			
SED11	7.1		0.10

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE
NA = NOT APPLICABLE

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TOTAL SOLIDS DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in CLP methodology.

2. Holding Times:

No holding time was established for this method.

3. Initial Calibration:

No initial calibration was necessary for this method.

4. Continuing Calibration:

No continuing calibration was necessary for this method.

5. Blanks:

No blank was analyzed with this method.

6. Laboratory Control Sample (LCS):

No LCS was analyzed with this method.

7. Duplicate Sample Analysis:

Sample 5631.01 (Batch QC) underwent duplicate analysis. The Relative Percent Difference (RPD) value for the duplicate sample analysis was within QC criteria.

8. Spiked Sample Analysis:

No spiked sample analysis was performed for this method.

9. Sample Quantitation

Concentrations were correctly calculated.

10. Laboratory Contact:

No laboratory contact was necessary.

11. Overall Assessment:

The data is acceptable and no qualifications have been placed on it.

TEST CODE :STS 1 JOB NUMBER :9800.854
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : SOLIDS TOTAL UNITS : %
PARAMETER : Solids-Total

SAMPLE ID	RESULTS	Q
EE-98-05713		
SB0106	92	
EE-98-05714		
SB011011	83	
EE-98-05715		
SED12	81	
EE-98-05716		
SED11	80	

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE

7

002990

DATA QUALITY ASSURANCE REVIEW

SITE NAME Wilcox Refinery

CERCLIS

PAN 052601SFXX TDD NUMBER 06-98-03-0009

CASE NUMBER/WORK ORDER 6S154 SDG/PROJ. NUMBER 9801.203/230

E & E has completed a QA review for Case No. 6S154, SDG No.9801.203/230, Wilcox Refinery. Eleven soil samples were analyzed for PAH, TPH, Metals, BTEX, pH and Total Solids and five water samples were analyzed for BTEX and TPH by Ecology and Environment, Inc. Analytical Services Center. Sample numbers are listed below.

SAMPLE NUMBERS

DB14-0102	SB15D-GW3	
SB14-0506	SB17-GW4	
SB15-0001	TB	
SB16-0506	SB18-GW5	
SB17-0102		
SB17D-0102		
SB17-5565		
SB18-0102		
SB18-0708		
SB19-0102		
SB19-0708		
SB15-GW3		

This data package was validated to determine if Quality Control (QC) specifications were achieved, following *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (February, 1994), *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (February, 1994), *Quality Assurance/Quality Control Guidance for Removal Activities* (April, 1990), and the Regional Protocol for Holding Times, Blanks, and VOA Preservation (April 13, 1989). Specific data qualifications are listed in the following discussion.

REVIEWER Michelle Brown DATE 11/27/98 JW8

Data Qualifiers

Data Qualifier Definitions were supplied by the Office of Solid Waste and Emergency Response (September 1989) and are included in the Functional Guidelines. Data qualifiers may be combined (UJ, QJ) with the corresponding combination of meanings. Additional qualifier may be added to provide additional, more specific information (JL, UB, QJK), modifying the meaning of the primary qualifier. Addition qualifiers utilized by E & E are H, L, K, B, Q, and D.

U - The material was analyzed for, but was not detected. The associated numerical value is the sample quantitation or detection limit, which has been adjusted for sample weight/sample volume, extraction volume, percent solids, sample dilution or other analysis specific parameters.

An additional qualifier, "B", may be appended to indicated that while the analyte was detected in the sample, the presence of the analyte may be attributable to blank contamination and the analyte is therefore considered undetected with the sample detection or quantitation limit for the analyte being elevated.

J - The analyte was analyzed for, but the associated numerical value may not be consistent with the amount actually present in the environmental sample or may not be consistent with the sample detection or quantitation limit. The value is an estimated quantity. The data should be seriously considered for decision-making and are usable for many purposes.

An additional qualifier will be appended to the "J" qualifier that indicates the bias in the reported results:

L Low bias

H High bias

K Unknown bias

Q The reported concentration is less than the sample quantitation limit for the specific analyte in the sample.

The L and H qualifier will only be employed when a single qualification is required. When more than one quality control parameter affects the analytical result and a conflict results in assigning a bias, the result will be flagged JK.

R - Quality Control indicates that data are unusable for all purposes. The analyte was analyzed for, but the presence or absence of the analyte has not been verified. Resampling and reanalysis are necessary for verification to confirm or deny the presence of an analyte.

N - The analysis indicates the presence of analyte for which there is presumptive evidence to make a "tentative identification."

D - The concentration reported was determined in the re-analysis of the sample at a secondary dilution.

BTEX DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in SW846 method 8021B.

2. Holding Time:

All samples were analyzed within the required holding time of less than 14 days after collection. Samples were maintained at less than 4°C. No qualifications are placed on the data.

3. Initial Calibration:

Initial calibration criteria were met: Five point calibration for single component analytes, retention time windows established, adequate resolution (90%) between adjacent peaks, and Percent Relative Standard Deviations (%RSD) of the calibration factors less than or equal to 20% (30% for the surrogates)

4. Calibration Verification:

Calibration verification criteria: verification sample frequency of every 12 hours; analyte within retention time (RT) window; resolution (RES%) between adjacent peaks greater than or equal to 90%; and the percent difference (%D) between the calculated amount and the true amount for target analytes and surrogates not exceeding ± 25%; were met.

5. Blanks:

A method blank was prepared at the required frequency of every time samples were extracted for the matrix or every 20 samples, whichever is greater. Target analytes were not detected in associated blank(s) analyzed.

6. Surrogates:

Control limits for the recovery of surrogates are listed below.

SURROGATE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
Trifluorotoluene	65-130%	50-150%	

Recoveries of the following surrogates were outside of control limits.

SAMPLE #	MATRIX	SURROGATE OUT	SURROGATE RECOVERY	QUALIFIER FLAG
SB15-GW3	water	Trifluorotoluene	61.0%	JL
SB19-0102	soil	Trifluorotoluene	166%	JH
SB16-0506	soil	Trifluorotoluene	901.8%	JH

7. Matrix Spikes:

Sample SB15D-GW3 underwent matrix spike analysis for the water matrix. Sample SB14-0506 underwent matrix spike analysis for the soil matrix. Control limits for matrix spike recoveries are listed in the following table.

ANALYTE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
Benzene	49-124%	46-124%	
Toluene	46-117%	46-117%	
Ethylbenzene	44-122%	44-122%	
Total Xylenes	54-118%	54-118%	

Recoveries of the following spiked analytes were outside of the required control limits.

SAMPLE NO./MATRIX	ANALYTE	RECOVERY %	AFFECTED SAMPLES	QUALIFIER FLAG
SB14-0506 / soil	Toluene	118	NONE	No flag

8. Duplicates:

Sample SB15D-GW3 underwent matrix spike duplicate analysis for the water matrix. Sample SB14-0506 underwent matrix spike duplicate analysis for the soil matrix. Relative percent differences (RPDs) of all spiked analytes were within the required control limits listed below.

ANALYTE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
Benzene	30%	30%	
Toluene	30%	30%	
Ethylbenzene	30%	30%	
Total Xylenes	30%	30%	

9. Target Compound Identification:

All reported target analytes met identification criteria of retention times within the calculated retention time windows (3x Std Dev).

10. Target Compound Quantitation and CRQLs:

Concentrations of all reported analytes were correctly calculated.

Sample quantitation limits (SQLs) varied from the CRQLs of 2 ug/L or 2 ug/kg in the following samples due to the factors listed below.

SAMPLE NO.	LEVEL	% SOLID moisture	SAMPLE WT/VOL (gm/ml)	DF	CEV (ul)	SQL FAC-TOR
SB15-GW3	LOW			2.5		2.5
SB15D-GW3	LOW			2.5		2.5
SB17-GW4	LOW			25		25
SB18-GW5	LOW			1000		1000
SB14-0102	LOW	12		5		5.68
SB17-0102	LOW	10				1.11
SB17D-0102	LOW	10				1.11
SB19-0102	LOW	10				1.11
SB19-0708	LOW	12				1.14
SB14-0506	MED	17				1.20
SB15-0001	MED	19				1.23
SB16-0506	MED	18				1.22
SB17-5565	MED	12				1.14
SB18-0102	MED	13				1.15
SB18-0708	MED	15				1.18

DF = dilution factor, CEV = concentrated extract volume

11. Laboratory Control Sample:

The laboratory analyzed laboratory control samples and recoveries for these analysis were within the control limits provided.

12. Laboratory Contact:

No laboratory contact was required.

13. Overall Assessment:

Sample SB15-GW3 had low surrogate recovery. All the compounds in this sample were qualified as estimated, biased low. Samples SB19-0102 and SB16-0506 had very high surrogate recoveries due to coeluting peaks. Heavy hydrocarbon elution caused interference. This matrix effect can be visually

confirmed by the sample chromatograms. All compounds in these samples were qualified as estimated, biased high. In the matrix spike on soil sample SB14-0506, toluene recovered slightly above QC limits. In the reviewer's professional opinion, this did not affect the sample data and qualifications based on it were not necessary. All of the soil samples calculations were dry weight corrected. Several soil samples required analysis using methanol extraction and several samples required dilutions. Quantitation limits were adjusted accordingly.

The analytical data is acceptable for use with the qualifications listed above.

TEST CODE :WBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8021B BETX UNITS : UG/L
SAMPLE ID LAB : EE-98-08043 MATRIX: WATER
SAMPLE ID CLIENT: SB15 GW3

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	49	JL	5.0
Toluene	34		5.0
Ethylbenzene	11		5.0
Total Xylenes	64		5.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002997

TEST CODE :WBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8021B BETX UNITS : UG/L
SAMPLE ID LAB : EE-98-08044 MATRIX: WATER
SAMPLE ID CLIENT: SB15D GW3

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	12		5.0
Toluene	8.7		5.0
Ethylbenzene	8.3		5.0
Total Xylenes	18		5.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

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002998

TEST CODE :WBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8021B BETX UNITS : UG/L
SAMPLE ID LAB : EE-98-08045 MATRIX: WATER
SAMPLE ID CLIENT: SB17 GW4

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		50
Toluene	ND		50
Ethylbenzene	490		50
Total Xylenes	140		50

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

002999

TEST CODE :WBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8021B BETX UNITS : UG/L
SAMPLE ID LAB : EE-98-08046 MATRIX: WATER
SAMPLE ID CLIENT: TB

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.0
Toluene	ND		2.0
Ethylbenzene	ND		2.0
Total Xylenes	ND		2.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

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003000

TEST CODE :WBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : 8021B BETX UNITS : UG/L
SAMPLE ID LAB : EE-98-08047 MATRIX: WATER
SAMPLE ID CLIENT: SB18 GW5

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	8900		2000
Toluene	PRESENT		2000
Ethylbenzene	3300		2000
Total Xylenes	9100		2000

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :SBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-08034 MATRIX : SOLID
SAMPLE ID CLIENT: SB14 0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		11
Toluene	PRESENT		11
Ethylbenzene	PRESENT		11
Total Xylenes	PRESENT		11

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

recycled paper ecology and environment

003002

TEST CODE :SBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 90 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-08038 MATRIX : SOLID
SAMPLE ID CLIENT: SB17 0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.2
Toluene	ND		2.2
Ethylbenzene	ND		2.2
Total Xylenes	ND		2.2

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :SBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 90 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-08039 MATRIX : SOLID
SAMPLE ID CLIENT: SB17D 0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.2
Toluene	ND		2.2
Ethylbenzene	ND		2.2
Total Xylenes	ND		2.2

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

recycled paper ecology and environment

003004

TEST CODE :SBTX0A1 JOB NUMBER :9801.230
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 90 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-08236 MATRIX : SOLID
SAMPLE ID CLIENT: SB19-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.2
Toluene	9.3	JH	2.2
Ethylbenzene	17		2.2
Total Xylenes	61		2.2

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :SBTX0A1 JOB NUMBER :9801.230
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-08237 MATRIX : SOLID
SAMPLE ID CLIENT: SB19-0708

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.3
Toluene	ND		2.3
Ethylbenzene	ND		2.3
Total Xylenes	ND		2.3

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

recycled paper ecology and environment

003006

TEST CODE :SBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 83 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-08035 MATRIX : SOLID
SAMPLE ID CLIENT: SB14 0506

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		90
Toluene	260		130
Ethylbenzene	ND		110
Total Xylenes	ND		300

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :SBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 81 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-08036 MATRIX : SOLID
SAMPLE ID CLIENT: SB15 0001

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	310		92
Toluene	650		140
Ethylbenzene	950		110
Total Xylenes	9800		310

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

recycled paper ecology and environment

003008

TEST CODE :SBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 82 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-08037 MATRIX : SOLID
SAMPLE ID CLIENT: SB16 - 05016

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	2200	JH	91
Toluene	3000	↓	130
Ethylbenzene	1600	↓	110
Total Xylenes	3500	↓	300

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :SBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-08040 MATRIX : SOLID
SAMPLE ID CLIENT: SB17 5565

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	130		85
Toluene	2800		120
Ethylbenzene	4000		100
Total Xylenes	15000		280

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

200

TEST CODE :SBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 87 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-08041 MATRIX : SOLID
SAMPLE ID CLIENT: SB18 0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		86
Toluene	240		130
Ethylbenzene	1400		100
Total Xylenes	890		290

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :SBTX0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 85 %
TEST NAME : 8021B BETX UNITS : UG/KG
SAMPLE ID LAB : EE-98-08042 MATRIX : SOLID
SAMPLE ID CLIENT: SB18 0708

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	360		88
Toluene	390		130
Ethylbenzene	7900		100
Total Xylenes	8900		290

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

210

PAH DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in SW846 method 8310.

2. Holding Time:

All samples were extracted within the required holding time of less than 14 days after collection. Analysis of the sample was conducted within 40 days of extraction. Samples were maintained at less than 4°C. No qualifications are placed on the data.

3. Initial Calibration:

Initial calibration criteria were met: Five point calibration for single component analytes, retention time windows established, adequate resolution (90%) between adjacent peaks, and Percent Relative Standard Deviations (%RSD) of the calibration factors less than or equal to 20% (30% for the surrogates)

4. Calibration Verification:

Calibration verification criteria: verification sample frequency of every 12 hours; analyte within retention time (RT) window; resolution (RES%) between adjacent peaks greater than or equal to 90%; and the percent difference (%D) between the calculated amount and the true amount for target analytes and surrogates not exceeding ± 25%; were met.

5. Blanks:

A method blank was prepared at the required frequency of every time samples were extracted for the matrix or every 20 samples, whichever is greater. Target analytes were not detected in associated blank(s) analyzed.

6. Surrogates:

Recoveries of the following surrogates were outside of control limits.

SAMPLE #	MATRIX	SURROGATE OUT	SURROGATE RECOVERY	QUALIFIER FLAG
SB15-0001	SOIL	Terphenyl-d14	0%	No flag - surrogate diluted out
SB16-0506	SOIL	Terphenyl-d14	0%	No flag - surrogate diluted out
SB18-0708	SOIL	Terphenyl-d14	0%	No flag - surrogate diluted out
SB19-0102	SOIL	Terphenyl-d14	0%	No flag - surrogate diluted out

7. Matrix Spikes:

Sample SB19-0708 underwent matrix spike analysis for the soil matrix.

Recoveries of the following spiked analytes were outside of the required control limits.

SAMPLE NO./MATRIX	ANALYTE	RECOVERY %	AFFECTED SAMPLES	QUALIFIER FLAG
SB19-0708 / soil	Benzo(a)pyrene	129.6	NONE	No flag - values taken from other column

8. Duplicates:

Sample SB19-0708 underwent matrix spike duplicate analysis for the soil matrix. Relative percent differences (RPDs) of all spiked analytes were within the required control limits.

9. Target Compound Identification:

All reported target analytes met identification criteria of retention times within the calculated retention time windows (3x Std Dev) for both columns and percent differences (%D) between the quantitation on the two columns of less than 25%.

10. Target Compound Quantitation and CRQLs:

Concentrations of all reported analytes were correctly calculated.

Sample quantitation limits (SQLs) varied from CRQLs listed below in the following samples due to the factors listed below.

20 ug/kg - fluorene, anthracene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene
50 ug/kg - fluoranthene, pyrene, dibenzo(a,h)anthracene, dibenzo(ghi)perylene
60 ug/kg - phenanthrene
200 ug/kg - naphthalene, acenaphthylene, 1-methylnaphthalene, 2-methylnaphthalene, acenaphthene

SAMPLE NO.	LEVEL	% SOLID moisture	SAMPLE WT/VOL (gm/ml)	DF	CEV (ul)	SQL FACTOR
SB14-0102	LOW	12				1.14
SB14-0506	LOW	17				1.20
SB15-0001	LOW	19		10000		12300
SB16-0506	LOW	18		50		61

SAMPLE NO.	LEVEL	% SOLID moisture	SAMPLE WT/VOL (gm/ml)	DF	CEV (ul)	SQL FACTOR
SB17-0102	LOW	10				1.11
SB17D-0102	LOW	10				1.11
SB17-5565	LOW	12				1.14
SB18-0102	LOW	13				1.15
SB18-0708	LOW	15		20		23.5
SB19-0102	LOW	10		100		111
SB19-0708	LOW	12				1.14

DF = dilution factor, CEV = concentrated extract volume

11. Laboratory Control Sample:

The laboratory analyzed a laboratory control sample and recoveries for this analysis were within the control limits provided.

12. Laboratory Contact:

No laboratory contact was required.

13. Overall Assessment:

Several samples had surrogates diluted out. No qualification of data was necessary.
Benzo(a)pyrene quantitated high in the matrix spike and the matrix spike duplicate. It was also consistently high in the continuing calibrations ran on the HYPERPAH column. No qualification of this compound was necessary because all data for this compound was taken from the ENVPAH column analysis.
Although the blank contained some low level contamination, none of the compound concentrations were greater than the reporting limits. All of the contamination compounds were therefore reported as not detected and no qualification of data was necessary.
The samples calculations were dry weight corrected. It was also necessary to dilute several samples due to the high level of target compounds present. Quantitation limits were adjusted accordingly.
Several of the samples (diluted and not diluted) had compounds present in them that did not quantitate above the reporting limits. These compounds were qualified as estimated, unknown bias.
The concentrations reported in the final report were the lowest found from the two columns used for analysis (with the exception of Benzo(a)pyrene as stated above).

The analytical data is acceptable for use with the qualifications listed above.

TEST CODE :SPAH0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-08034 MATRIX : SOLID
SAMPLE ID CLIENT: SB14 0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		230
Acenaphthylene	ND		230
1-methylnaphthalene	ND		230
2-Methylnaphthalene	2300		230
Acenaphthene	ND		230
Fluorene	ND		23
Phenanthrene	92		68
Anthracene	ND		23
Fluoranthene	650		57
Pyrene	ND		57
Benzo(a)anthracene	100		23
Chrysene	ND		23
Benzo(b)fluoranthene	8.8	JX	23
Benzo(k)fluoranthene	ND		23
Benzo(a)pyrene	ND		23
Dibenzo(a,h)anthracene	ND		57
Benzo(ghi)perylene	ND		57
Indeno(1,2,3-cd)pyrene	ND		23

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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003016

TEST CODE :SPAH0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 83 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-08035 MATRIX : SOLID
SAMPLE ID CLIENT: SB14 0506

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		240
Acenaphthylene	ND		240
1-methylnaphthalene	240		240
2-Methylnaphthalene	ND		240
Acenaphthene	ND		240
Fluorene	ND		24
Phenanthrene	ND		72
Anthracene	ND		24
Fluoranthene	ND		60
Pyrene	ND		60
Benzo(a)anthracene	12	JK	24
Chrysene	ND		24
Benzo(b)fluoranthene	ND		24
Benzo(k)fluoranthene	ND		24
Benzo(a)pyrene	ND		24
Dibenzo(a,h)anthracene	ND		60
Benzo(ghi)perylene	ND		60
Indeno(1,2,3-cd)pyrene	ND		24

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :SPAH0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 81 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-08036 MATRIX : SOLID
SAMPLE ID CLIENT: SB15 0001

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		2500000
Acenaphthylene	ND		2500000
1-methylnaphthalene	ND		2500000
2-Methylnaphthalene	7000000		2500000
Acenaphthene	ND		2500000
Fluorene	540000		250000
Phenanthrene	11000000		7400000
Anthracene	700000		250000
Fluoranthene	4000000		620000
Pyrene	2500000		620000
Benzo(a)anthracene	2800000		250000
Chrysene	2800000		250000
Benzo(b)fluoranthene	320000		250000
Benzo(k)fluoranthene	580000		250000
Benzo(a)pyrene	920000		250000
Dibenzo(a,h)anthracene	ND		620000
Benzo(ghi)perylene	ND		620000
Indeno(1,2,3-cd)pyrene	ND		250000

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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003018

TEST CODE :SPAH0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 82 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-08037 MATRIX : SOLID
SAMPLE ID CLIENT: SB16 -

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		12000
Acenaphthylene	ND		12000
1-methylnaphthalene	17000		12000
2-Methylnaphthalene	28000		12000
Acenaphthene	ND		12000
Fluorene	3500		1200
Phenanthrene	12000		3600
Anthracene	1500		1200
Fluoranthene	16000		3000
Pyrene	3600		3000
Benzo(a)anthracene	3000		1200
Chrysene	ND		1200
Benzo(b)fluoranthene	720	JK	1200
Benzo(k)fluoranthene	1200	JK	1200
Benzo(a)pyrene	2000		1200
Dibenzo(a,h)anthracene	ND		3000
Benzo(ghi)perylene	ND		3000
Indeno(1,2,3-cd)pyrene	ND		1200

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

003019

TEST CODE :SPAH0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 90 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-08038 MATRIX : SOLID
SAMPLE ID CLIENT: SB17 0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		220
Acenaphthylene	ND		220
1-methylnaphthalene	ND		220
2-Methylnaphthalene	ND		220
Acenaphthene	ND		220
Fluorene	ND		22
Phenanthrene	ND		67
Anthracene	ND		22
Fluoranthene	ND		56
Pyrene	ND		56
Benzo(a)anthracene	4.9	JK	22
Chrysene	ND		22
Benzo(b)fluoranthene	ND		22
Benzo(k)fluoranthene	ND		22
Benzo(a)pyrene	37		22
Dibenzo(a,h)anthracene	ND		56
Benzo(ghi)perylene	ND		56
Indeno(1,2,3-cd)pyrene	ND		22

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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003020

TEST CODE :SPAH0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 90 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-08039 MATRIX : SOLID
SAMPLE ID CLIENT: SB17D 0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		220
Acenaphthylene	ND		220
1-methylnaphthalene	ND		220
2-Methylnaphthalene	ND		220
Acenaphthene	ND		220
Fluorene	ND		22
Phenanthrene	ND		67
Anthracene	ND		22
Fluoranthene	ND		56
Pyrene	ND		56
Benzo(a)anthracene	ND		22
Chrysene	ND		22
Benzo(b)fluoranthene	ND		22
Benzo(k)fluoranthene	ND		22
Benzo(a)pyrene	ND		22
Dibenzo(a,h)anthracene	ND		56
Benzo(ghi)perylene	ND		56
Indeno(1,2,3-cd)pyrene	ND		22

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

003021

TEST CODE :SPAH0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-08040 MATRIX : SOLID
SAMPLE ID CLIENT: SB17 5565

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	590		230
Acenaphthylene	ND		230
1-methylnaphthalene	520		230
2-Methylnaphthalene	690		230
Acenaphthene	780		230
Fluorene	48		23
Phenanthrene	74		68
Anthracene	ND		23
Fluoranthene	110		57
Pyrene	ND		57
Benzo(a)anthracene	49		23
Chrysene	ND		23
Benzo(b)fluoranthene	ND		23
Benzo(k)fluoranthene	ND		23
Benzo(a)pyrene	ND		23
Dibenzo(a,h)anthracene	ND		57
Benzo(ghi)perylene	ND		57
Indeno(1,2,3-cd)pyrene	ND		23

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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003022

TEST CODE :SPAH0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 87 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-08041 MATRIX : SOLID
SAMPLE ID CLIENT: SB18 .0102

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		230
Acenaphthylene	ND		230
1-methylnaphthalene	ND		230
2-Methylnaphthalene	410		230
Acenaphthene	ND		230
Fluorene	44		23
Phenanthrene	180		69
Anthracene	ND		23
Fluoranthene	280		57
Pyrene	130		57
Benzo(a)anthracene	33		23
Chrysene	ND		23
Benzo(b)fluoranthene	6.6	JK	23
Benzo(k)fluoranthene	ND		23
Benzo(a)pyrene	26		23
Dibenzo(a,h)anthracene	ND		57
Benzo(ghi)perylene	ND		57
Indeno(1,2,3-cd)pyrene	ND		23

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

003023

TEST CODE :SPAH0A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 85 %
TEST NAME : 8310 PAH/LC UNITS : UG/KG
SAMPLE ID LAB : EE-98-08042 MATRIX : SOLID
SAMPLE ID CLIENT: SB18 0708

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		4700
Acenaphthylene	ND		4700
1-methylnaphthalene	13000		4700
2-Methylnaphthalene	16000		4700
Acenaphthene	ND		4700
Fluorene	1400		470
Phenanthrene	4400		1400
Anthracene	540		470
Fluoranthene	5400		1200
Pyrene	2200		1200
Benzo(a)anthracene	450	JK	470
Chrysene	ND		470
Benzo(b)fluoranthene	ND		470
Benzo(k)fluoranthene	ND		470
Benzo(a)pyrene	ND		470
Dibenzo(a,h)anthracene	ND		1200
Benzo(ghi)perylene	ND		1200
Indeno(1,2,3-cd)pyrene	ND		470

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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003024

TEST CODE :SPAH0A1

JOB NUMBER :9801.230
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT
TEST NAME : 8310 PAH/LC
SAMPLE ID LAB : EE-98-08236
SAMPLE ID CLIENT: SB19-0102

%SOLIDS : 90 %
UNITS : UG/KG
MATRIX : SOLID

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		22000
Acenaphthylene	ND		22000
1-methylnaphthalene	ND		22000
2-Methylnaphthalene	ND		22000
Acenaphthene	ND		22000
Fluorene	ND		2200
Phenanthrene	ND		6700
Anthracene	ND		2200
Fluoranthene	ND		5600
Pyrene	ND		5600
Benzo(a)anthracene	2800		2200
Chrysene	ND		2200
Benzo(b)fluoranthene	730	JK	2200
Benzo(k)fluoranthene	ND		2200
Benzo(a)pyrene	1200	JK	2200
Dibenzo(a,h)anthracene	ND		5600
Benzo(ghi)perylene	ND		5600
Indeno(1,2,3-cd)pyrene	ND		2200

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

003025

TEST CODE :SPAH0A1

JOB NUMBER :9801.230
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT
TEST NAME : 8310 PAH/LC
SAMPLE ID LAB : EE-98-08237
SAMPLE ID CLIENT: SB19-0708

%SOLIDS : 88 %
UNITS : UG/KG
MATRIX : SOLID

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		230
Acenaphthylene	ND		230
1-methylnaphthalene	ND		230
2-Methylnaphthalene	ND		230
Acenaphthene	ND		230
Fluorene	ND		23
Phenanthrene	ND		68
Anthracene	ND		23
Fluoranthene	ND		57
Pyrene	ND		57
Benzo(a)anthracene	12	JK	23
Chrysene	ND		23
Benzo(b)fluoranthene	ND		23
Benzo(k)fluoranthene	ND		23
Benzo(a)pyrene	ND		23
Dibenzo(a,h)anthracene	ND		57
Benzo(ghi)perylene	ND		57
Indeno(1,2,3-cd)pyrene	ND		23

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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003026

TPH DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in TNRCC method 1005.

2. Holding Time:

All samples were extracted within the required holding time of less than 7 days(water) and 14 days(soil) after collection. Analysis of the sample was conducted within 7 days(water) and 14 days(soil) of extraction. Samples were maintained at less than 4°C. No qualifications are placed on the data.

3. Initial Calibration:

Initial calibration criteria were met: Five point calibration for single component analytes, retention time windows established, adequate resolution (90%) between adjacent peaks, and Percent Relative Standard Deviations (%RSD) of the calibration factors less than or equal to 20% (30% for the surrogates)

4. Calibration Verification:

Calibration verification criteria: verification sample frequency of every 12 hours; analyte within retention time (RT) window; resolution (RES%) between adjacent peaks greater than or equal to 90%; and the percent difference (%D) between the calculated amount and the true amount for target analytes and surrogates not exceeding $\pm$ 25%; were met.

5. Blanks:

A method blank was prepared at the required frequency of every time samples were extracted for the matrix or every 20 samples, whichever is greater. Target analytes were not detected in associated blank(s) analyzed.

6. Surrogates:

No surrogates were added to the samples for this method.

7. Matrix Spikes:

No matrix spike was analyzed for the liquid matrix. Sample SB18-0102 underwent matrix spike analysis for the soil matrix. Recoveries of all spiked analytes were within the required control limits in both the matrix spike and matrix spike duplicate.

ANALYTE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
C6-C10		70-130%	
C10-C28		70-130%	
C6-C28		70-130%	

8. Duplicates:

No matrix spike duplicate was analyzed for the water matrix. Sample SB18-0102 underwent matrix spike duplicate analysis for the soil matrix. Relative percent differences (RPDs) of all spiked analytes were within the required control limits listed below.

ANALYTE	WATER MATRIX	SOIL MATRIX	HIGH MATRIX
C6-C10		35%	
C10-C28		35%	
C6-C28		35%	

9. Target Compound Identification:

All reported target analytes met identification criteria of retention times within the calculated retention time windows (3x Std Dev) or within default window parameters.

10. Target Compound Quantitation and CRQLs:

Concentrations of all reported analytes were correctly calculated.

Sample quantitation limits (SQLs) varied from CRQLs of 5 mg/L in water and 50 mg/kg in soil in the following samples due to the factors listed below.

SAMPLE NO.	LEVEL	% SOLID moisture	SAMPLE WT/VOL (gm/ml)	DF	CEV (ul)	SQL FACTOR
SB17-GW4	LOW			20		20
SB18-GW5	LOW			20		20
SB14-0102	LOW	12				1.14
SB14-0506	LOW	17				1.20
SB15-0001	LOW	19		100		123
SB16-0506	LOW	18				1.22
SB17-0102	LOW	10				1.11
SB17D-0102	LOW	10				1.11
SB17-5565	LOW	12				1.14
SB18-0102	LOW	13				1.15
SB18-0708	LOW	15				1.18
SB19-0102	LOW	10				1.11
SB19-0708	LOW	12				1.14

DF = dilution factor, CEV = concentrated extract volume

11. Laboratory Control Sample:

The laboratory analyzed laboratory control samples and recoveries for these analysis were within the control limits provided.

12. Laboratory Contact:

No laboratory contact was required.

13. Overall Assessment:

The soil sample calculations were dry weight corrected. A few dilutions were necessary due to the high level of target compounds present. Quantitation limits were adjusted accordingly.
Sample SB17-GW4 contained C10 to C28 hydrocarbons, but they were diluted below the adjusted quantitation limit.

No qualifications were placed on the data and it is acceptable for use.

TEST CODE :W1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : TPH-TNRCC UNITS : MG/L
SAMPLE ID LAB : EE-98-08043 MATRIX: WATER
SAMPLE ID CLIENT: SB15 GW3

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		5.0
>C10 -> C28 Hydrocarbons	10		5.0
C6 -> C28 Hydrocarbons	10		5.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

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003030

TEST CODE :W1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : TPH-TNRCC UNITS : MG/L
SAMPLE ID LAB : EE-98-08044 MATRIX: WATER
SAMPLE ID CLIENT: SB15D GW3

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		5.0
>C10 -> C28 Hydrocarbons	13		5.0
C6 -> C28 Hydrocarbons	13		5.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

TEST CODE :W1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : TPH-TNRCC UNITS : MG/L
SAMPLE ID LAB : EE-98-08045 MATRIX: WATER
SAMPLE ID CLIENT: SB17 GW4

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	1400		100
>C10 -> C28 Hydrocarbons	PRESENT		100
C6 -> C28 Hydrocarbons	1800		100

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

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003032

TEST CODE :W1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : TPH-TNRCC UNITS : MG/L
SAMPLE ID LAB : EE-98-08047 MATRIX: WATER
SAMPLE ID CLIENT: SB18 GW5

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	3300		100
>C10 -> C28 Hydrocarbons	5900		100
C6 -> C28 Hydrocarbons	9200		100

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

003033

TEST CODE :S1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-08034 MATRIX : SOLID
SAMPLE ID CLIENT: SB14 0102

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		57
>C10 -> C28 Hydrocarbons	100		57
C6 -> C28 Hydrocarbons	100		57

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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003034

TEST CODE :S1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 83 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-08035 MATRIX : SOLID
SAMPLE ID CLIENT: SB14 0506

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		60
>C10 -> C28 Hydrocarbons	170		60
C6 -> C28 Hydrocarbons	170		60

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 81 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-08036 MATRIX : SOLID
SAMPLE ID CLIENT: SB15 0001

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	8600		6200
>C10 -> C28 Hydrocarbons	270000		6200
C6 -> C28 Hydrocarbons	280000		6200

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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003036

TEST CODE :S1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 82 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-08037 MATRIX : SOLID
SAMPLE ID CLIENT: SB16 -

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	350		61
>C10 -> C28 Hydrocarbons	2100		61
C6 -> C28 Hydrocarbons	2400		61

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 90 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-08038 MATRIX : SOLID
SAMPLE ID CLIENT: SB17 0102

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		56
>C10 -> C28 Hydrocarbons	ND		56
C6 -> C28 Hydrocarbons	ND		56

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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003038

TEST CODE :S1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 90 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-08039 MATRIX : SOLID
SAMPLE ID CLIENT: SB17D 0102

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		56
>C10 -> C28 Hydrocarbons	ND		56
C6 -> C28 Hydrocarbons	ND		56

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-08040 MATRIX : SOLID
SAMPLE ID CLIENT: SB17 5565

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	750		57
>C10 -> C28 Hydrocarbons	310		57
C6 -> C28 Hydrocarbons	1100		57

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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003040

TEST CODE :S1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 87 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-08041 MATRIX : SOLID
SAMPLE ID CLIENT: SB18 0102

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		57
>C10 -> C28 Hydrocarbons	ND		57
C6 -> C28 Hydrocarbons	ND		57

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :S1050A1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 85 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-08042 MATRIX : SOLID
SAMPLE ID CLIENT: SB18 0708

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	550		59
>C10 -> C28 Hydrocarbons	440		59
C6 -> C28 Hydrocarbons	990		59

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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003042

TEST CODE :S1050A1 JOB NUMBER :9801.230
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 90 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-08236 MATRIX : SOLID
SAMPLE ID CLIENT: SB19-0102

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	200		56
>C10 -> C28 Hydrocarbons	3400		56
C6 -> C28 Hydrocarbons	3700		56

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

003043

TEST CODE :S1050A1 JOB NUMBER :9801.230
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
RESULTS IN DRY WEIGHT %SOLIDS : 88 %
TEST NAME : TPH-TNRCC UNITS : MG/KG
SAMPLE ID LAB : EE-98-08237 MATRIX : SOLID
SAMPLE ID CLIENT: SB19-0708

PARAMETER	RESULTS	Q	QNT. LIMIT
C6 -> C10 Hydrocarbons	ND		57
>C10 -> C28 Hydrocarbons	ND		57
C6 -> C28 Hydrocarbons	ND		57

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

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003044

METALS DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in SW846 methods 6010B and 7471A.

2. Holding Times:

All samples met established holding time criteria of 28 days for mercury and 180 days for metals.

3. Initial Calibration:

ICP initial calibration included a blank and one standard and initial calibration verification results fell within the control limits of 90 to 110 percent of the true values. Mercury initial calibration included a blank and five to eight standards and initial calibration verification results fell within the control limits of 80 to 120 percent of the true value. Correlation coefficients (CC) for AA (including furnace, flame and cold vapor Hg) were greater than 0.995.

4. Continuing Calibration:

All ICP results fell within the control limits of 90 to 110 percent of the true values. Mercury results fell within the control limits of 80 to 120 percent of the true value.

5. Blanks:

No target analytes were detected in the calibration and preparation blanks associated with this case.

6. ICP Interference Check:

All results for the Interference Check Sample were within the control limits of 80 to 120 percent of the true values.

7. Laboratory Control Sample (LCS):

The recoveries for the solid LCS were within the established control limits.

8. Duplicate Sample Analysis:

Sample 8177 (Batch QC) underwent duplicate analysis for the soil matrix. The Relative Percent Difference (RPD) values for the duplicate sample analysis were within QC criteria of less than 20 percent for aqueous samples and 35% for solid samples for concentrations greater than five times the CRDL. For sample concentrations less than five times the CRDL, the QC criteria are within ± the CRDL for the water matrix or ± two times the CRDL for the soil matrix.

9. Spiked Sample Analysis:

Sample 8177 (Batch QC) underwent spike analysis for the soil matrix. The spike recoveries for all analytes were within the control limit of 75 to 125 percent.

10. ICP Serial Dilution:

Sample SB14-0102 underwent serial dilution. The Percent Difference values (%D) for the following analytes exceeded QC limits of 10 percent for analytes with concentrations greater than 50 times their IDL.

ANALYTE	MATRIX	%D	ASSOCIATE SAMPLES	QUALIFIER FLAG
Sodium	soil	17.7	SB14-0102,SB14-0506,SB15-0001,SB16-0506,SB17-0102,SB17D-0102,SB17-5565 SB18-0102,SB18-0708,SB19-0102, SB19-0708	JK

12. Sample Quantitation and CRDLs

Concentrations of all reported analytes were correctly calculated.

Sample quantitation limits (SQLs) varied form CRDLs in the following samples due to the factors listed below.

SAMPLE NO	LEVEL	DF	ASV OR ASW	% SOLIDS	ADV	SQL FACTOR
SB14-0102	LOW			88.4		0.177
SB14-0506	LOW			83.1		0.166
SB15-0001	LOW			81.3		0.167
SB16-0506	LOW			82.5		0.163
SB17-0102	LOW			89.6		0.179
SB17D-0102	LOW			90.3		0.181
SB17-5565	LOW			88.2		0.176
SB18-0102	LOW			86.8		0.174
SB18-0708	LOW			84.9		0.170
SB19-0102	LOW			90.5		0.181
SB19-0708	LOW			88.1		0.176

DF = Dilution Factor, ASV = Actual sample volume, ASW = Actual sample weight, ADV = Actual digestate or distillate volume

13. Laboratory Contact

No laboratory contact was required.

14. Overall Assessment:

Sample SB14-0102 underwent serial dilution. The percent difference value for Sodium was above QC limits. This compound was qualified as estimated, unknown bias in the samples.
All of the soil sample calculations were dry weight corrected and quantitation limits were adjusted accordingly.
The analytical data is acceptable for use with the qualifications listed above.

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

4_0102

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.203 SAS No.: _____ SDG No.: 4_0102

Matrix (soil/water): SOIL_ Lab Sample ID: 8034

Level (low/med): LOW__ Date Received: 06/04/98

% Solids: _88.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1700			P
7440-36-0	Antimony	1.1	U	N*	P
7440-38-2	Arsenic	0.95			P
7440-39-3	Barium	23.5			P
7440-41-7	Beryllium	0.55	U		P
7440-43-9	Cadmium	0.58			P
7440-70-2	Calcium	264			P
7440-47-3	Chromium	4.3			P
7440-48-4	Cobalt	2.3			P
7440-50-8	Copper	2.2	U		P
7439-89-6	Iron	3810			P
7439-92-1	Lead	114			P
7439-95-4	Magnesium	241			P
7439-96-5	Manganese	86.2			P
7439-97-6	Mercury	0.04			CV
7440-02-0	Nickel	3.1			P
7440-09-7	Potassium	412			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U	*	P
7440-23-5	Sodium	1620		JK	P
7440-28-0	Thallium	0.55	U		P
7440-62-2	Vanadium	5.1			P
7440-66-6	Zinc	5.8			P

Color Before: _____ Clarity Before: _____ Texture: G_____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID:__SB14_0102

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START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

4_0506

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.203 SAS No.: _____ SDG No.: 4_0102

Matrix (soil/water): SOIL_ Lab Sample ID: 8035

Level (low/med): LOW__ Date Received: 06/04/98

% Solids: _83.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9190			P
7440-36-0	Antimony	1.4		N*	P
7440-38-2	Arsenic	5.4			P
7440-39-3	Barium	107			P
7440-41-7	Beryllium	0.81			P
7440-43-9	Cadmium	2.8			P
7440-70-2	Calcium	445			P
7440-47-3	Chromium	15.2			P
7440-48-4	Cobalt	9.8			P
7440-50-8	Copper	12.7			P
7439-89-6	Iron	18100			P
7439-92-1	Lead	7.4			P
7439-95-4	Magnesium	1510			P
7439-96-5	Manganese	103			P
7439-97-6	Mercury	0.04			CV
7440-02-0	Nickel	13.1			P
7440-09-7	Potassium	1040			P
7782-49-2	Selenium	1.2	U		P
7440-22-4	Silver	1.2	U	*	P
7440-23-5	Sodium	4690		JK	P
7440-28-0	Thallium	0.60	U		P
7440-62-2	Vanadium	27.7			P
7440-66-6	Zinc	18.7			P

Color Before: _____ Clarity Before: _____ Texture: CY____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB14_0506_____

FORM I - IN

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START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

5_0001

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.203 SAS No.: _____ SDG No.: 4_0102

Matrix (soil/water): SOIL_ Lab Sample ID: 8036

Level (low/med): LOW__ Date Received: 06/04/98

% Solids: _81.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	24.8			P
7440-36-0	Antimony	1.2	U	N*	P
7440-38-2	Arsenic	0.62	U		P
7440-39-3	Barium	2.5	U		P
7440-41-7	Beryllium	0.62	U		P
7440-43-9	Cadmium	0.62	U		P
7440-70-2	Calcium	87.3			P
7440-47-3	Chromium	1.2	U		P
7440-48-4	Cobalt	2.5	U		P
7440-50-8	Copper	2.5	U		P
7439-89-6	Iron	262			P
7439-92-1	Lead	2.5	U		P
7439-95-4	Magnesium	61.5	U		P
7439-96-5	Manganese	3.0			P
7439-97-6	Mercury	0.02	U		CV
7440-02-0	Nickel	2.5	U		P
7440-09-7	Potassium	123	U		P
7782-49-2	Selenium	1.2	U		P
7440-22-4	Silver	1.2	U	*	P
7440-23-5	Sodium	123	U	UJK	P
7440-28-0	Thallium	0.62	U		P
7440-62-2	Vanadium	2.5	U		P
7440-66-6	Zinc	1.2	U		P

Color Before: _____ Clarity Before: _____ Texture: TAR___

Color After: Y_____ Clarity After: CL____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID: SB15_0001

FORM I - IN

547

START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

6_0506

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.203 SAS No.: _____ SDG No.: 4_0102

Matrix (soil/water): SOIL_ Lab Sample ID: 8037

Level (low/med): LOW__ Date Received: 06/04/98

% Solids: _82.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3370			P
7440-36-0	Antimony	1.2	U	N*	P
7440-38-2	Arsenic	1.9			P
7440-39-3	Barium	21.3			P
7440-41-7	Beryllium	0.58	U		P
7440-43-9	Cadmium	0.82			P
7440-70-2	Calcium	334			P
7440-47-3	Chromium	6.8			P
7440-48-4	Cobalt	2.3			P
7440-50-8	Copper	3.9			P
7439-89-6	Iron	5490			P
7439-92-1	Lead	2.6			P
7439-95-4	Magnesium	279			P
7439-96-5	Manganese	44.2			P
7439-97-6	Mercury	0.04			CV
7440-02-0	Nickel	3.5			P
7440-09-7	Potassium	546			P
7782-49-2	Selenium	1.2	U		P
7440-22-4	Silver	1.2	U	*	P
7440-23-5	Sodium	115	U	UJK	P
7440-28-0	Thallium	0.58	U		P
7440-62-2	Vanadium	10.4			P
7440-66-6	Zinc	4.8			P

Color Before: _____ Clarity Before: _____ Texture: SD____

Color After: CL_____ Clarity After: C_____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB16_0506_____

FORM I - IN

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START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

7_0102

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.203 SAS No.: _____ SDG No.: 4_0102

Matrix (soil/water): SOIL_ Lab Sample ID: 8038

Level (low/med): LOW__ Date Received: 06/04/98

% Solids: _89.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9700			P
7440-36-0	Antimony	1.1	U	N*	P
7440-38-2	Arsenic	2.7			P
7440-39-3	Barium	60.5			P
7440-41-7	Beryllium	0.54	U		P
7440-43-9	Cadmium	1.5			P
7440-70-2	Calcium	1470			P
7440-47-3	Chromium	11.2			P
7440-48-4	Cobalt	2.9			P
7440-50-8	Copper	6.1			P
7439-89-6	Iron	10100			P
7439-92-1	Lead	10.3			P
7439-95-4	Magnesium	728			P
7439-96-5	Manganese	56.0			P
7439-97-6	Mercury	0.04			CV
7440-02-0	Nickel	5.5			P
7440-09-7	Potassium	1110			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U	*	P
7440-23-5	Sodium	108	U	UJK	P
7440-28-0	Thallium	0.54	U		P
7440-62-2	Vanadium	20.0			P
7440-66-6	Zinc	15.2			P

Color Before: _____ Clarity Before: _____ Texture: CY____

Color After: CL_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID:__SB17_0102

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START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

7D_0102

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.203 SAS No.: _____ SDG No.: 4_0102

Matrix (soil/water): SOIL_ Lab Sample ID: 8039

Level (low/med): LOW__ Date Received: 06/04/98

% Solids: _90.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7840			P
7440-36-0	Antimony	1.1	U	N*	P
7440-38-2	Arsenic	1.5			P
7440-39-3	Barium	53.9			P
7440-41-7	Beryllium	0.54	U		P
7440-43-9	Cadmium	0.98			P
7440-70-2	Calcium	1420			P
7440-47-3	Chromium	10.5			P
7440-48-4	Cobalt	2.4			P
7440-50-8	Copper	4.9			P
7439-89-6	Iron	6400			P
7439-92-1	Lead	6.0			P
7439-95-4	Magnesium	628			P
7439-96-5	Manganese	37.5			P
7439-97-6	Mercury	0.03			CV
7440-02-0	Nickel	5.0			P
7440-09-7	Potassium	932			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U	*	P
7440-23-5	Sodium	108	U	UJK	P
7440-28-0	Thallium	0.54	U		P
7440-62-2	Vanadium	17.4			P
7440-66-6	Zinc	10.2			P

Color Before: _____ Clarity Before: _____ Texture: CY____

Color After: CL_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID: SB17D_0102

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START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

7_5565

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.203 SAS No.: _____ SDG No.: 4_0102

Matrix (soil/water): SOIL_ Lab Sample ID: 8040

Level (low/med): LOW__ Date Received: 06/04/98

% Solids: _88.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4110			P
7440-36-0	Antimony	1.1	U	N*	P
7440-38-2	Arsenic	1.7			P
7440-39-3	Barium	31.6			P
7440-41-7	Beryllium	0.55	U		P
7440-43-9	Cadmium	1.2			P
7440-70-2	Calcium	342			P
7440-47-3	Chromium	6.8			P
7440-48-4	Cobalt	2.8			P
7440-50-8	Copper	5.3			P
7439-89-6	Iron	7910			P
7439-92-1	Lead	3.7			P
7439-95-4	Magnesium	478			P
7439-96-5	Manganese	130			P
7439-97-6	Mercury	0.04			CV
7440-02-0	Nickel	4.1			P
7440-09-7	Potassium	552			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U	*	P
7440-23-5	Sodium	109	U	UJK	P
7440-28-0	Thallium	0.55	U		P
7440-62-2	Vanadium	10			P
7440-66-6	Zinc	8.4			P

Color Before: _____ Clarity Before: _____ Texture: CY____

Color After: CL_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID: SB17_5565

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START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

8_0102

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.203 SAS No.: _____ SDG No.: 4_0102

Matrix (soil/water): SOIL_ Lab Sample ID: 8041

Level (low/med): LOW__ Date Received: 06/04/98

% Solids: _86.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2510			P
7440-36-0	Antimony	1.1	U	N*	P
7440-38-2	Arsenic	2.1			P
7440-39-3	Barium	50.3			P
7440-41-7	Beryllium	0.56	U		P
7440-43-9	Cadmium	0.79			P
7440-70-2	Calcium	924			P
7440-47-3	Chromium	6.8			P
7440-48-4	Cobalt	2.6			P
7440-50-8	Copper	6.3			P
7439-89-6	Iron	5010			P
7439-92-1	Lead	24.8			P
7439-95-4	Magnesium	351			P
7439-96-5	Manganese	128			P
7439-97-6	Mercury	0.11			CV
7440-02-0	Nickel	3.6			P
7440-09-7	Potassium	388			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U	*	P
7440-23-5	Sodium	113	U	UJK	P
7440-28-0	Thallium	0.56	U		P
7440-62-2	Vanadium	10.1			P
7440-66-6	Zinc	16.0			P

Color Before: _____ Clarity Before: _____ Texture: CY____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

_____CLIENT_SAMPLE_ID:__SB18_0102_____

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START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

8_0708

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.203 SAS No.: _____ SDG No.: 4_0102

Matrix (soil/water): SOIL_ Lab Sample ID: 8042

Level (low/med): LOW__ Date Received: 06/04/98

% Solids: _84.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5300			P
7440-36-0	Antimony	1.2	U	N*	P
7440-38-2	Arsenic	3.3			P
7440-39-3	Barium	68.1			P
7440-41-7	Beryllium	0.58	U		P
7440-43-9	Cadmium	1.6			P
7440-70-2	Calcium	678			P
7440-47-3	Chromium	9.4			P
7440-48-4	Cobalt	5.3			P
7440-50-8	Copper	6.1			P
7439-89-6	Iron	10300			P
7439-92-1	Lead	10.7			P
7439-95-4	Magnesium	606			P
7439-96-5	Manganese	111			P
7439-97-6	Mercury	0.05			CV
7440-02-0	Nickel	6.3			P
7440-09-7	Potassium	504			P
7782-49-2	Selenium	1.2	U		P
7440-22-4	Silver	1.2	U	*	P
7440-23-5	Sodium	115	U	UJK	P
7440-28-0	Thallium	0.58	U		P
7440-62-2	Vanadium	16.2			P
7440-66-6	Zinc	8.2			P

Color Before: _____ Clarity Before: _____ Texture: CY____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID:__SB18_0708

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START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

9-0102

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.230 SAS No.: _____ SDG No.: 9-0102

Matrix (soil/water): SOIL_ Lab Sample ID: 8236

Level (low/med): LOW__ Date Received: 06/05/98

% Solids: _90.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1570			P
7440-36-0	Antimony	1.1	U	N*	P
7440-38-2	Arsenic	1.5			P
7440-39-3	Barium	25.6			P
7440-41-7	Beryllium	0.53	U		P
7440-43-9	Cadmium	0.63			P
7440-70-2	Calcium	1480			P
7440-47-3	Chromium	5.8			P
7440-48-4	Cobalt	2.3			P
7440-50-8	Copper	3.5			P
7439-89-6	Iron	3750			P
7439-92-1	Lead	14.7			P
7439-95-4	Magnesium	550			P
7439-96-5	Manganese	138			P
7439-97-6	Mercury	0.11			CV
7440-02-0	Nickel	4.4			P
7440-09-7	Potassium	286			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U	*	P
7440-23-5	Sodium	106	U	UJK	P
7440-28-0	Thallium	0.53	U		P
7440-62-2	Vanadium	6.6			P
7440-66-6	Zinc	25.6			P

Color Before: _____ Clarity Before: _____ Texture: G_____

Color After: Y_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID: SB19-0102

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START - DALLAS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

9-0708

Lab Name: ECOLOGY_AND_ENVIRONMENT__ Contract: _____

Lab Code: EANDE_ Case No.:9801.230 SAS No.: _____ SDG No.: 9-0102

Matrix (soil/water): SOIL_ Lab Sample ID: 8237

Level (low/med): LOW__ Date Received: 06/05/98

% Solids: _88.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4110			P
7440-36-0	Antimony	1.1	U	N*	P
7440-38-2	Arsenic	0.83			P
7440-39-3	Barium	33.6			P
7440-41-7	Beryllium	0.57	U		P
7440-43-9	Cadmium	0.57	U		P
7440-70-2	Calcium	754			P
7440-47-3	Chromium	8.6			P
7440-48-4	Cobalt	2.3	U		P
7440-50-8	Copper	3.5			P
7439-89-6	Iron	2930			P
7439-92-1	Lead	1.9			P
7439-95-4	Magnesium	785			P
7439-96-5	Manganese	34.5			P
7439-97-6	Mercury	0.05			CV
7440-02-0	Nickel	2.8			P
7440-09-7	Potassium	500			P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	1.1	U	*	P
7440-23-5	Sodium	174		JK	P
7440-28-0	Thallium	0.57	U		P
7440-62-2	Vanadium	3.8			P
7440-66-6	Zinc	3.1			P

Color Before: _____ Clarity Before: _____ Texture: CY____

Color After: CL_____ Clarity After: C_____ Artifacts: _____

Comments:

CLIENT_SAMPLE_ID: SB19-0708

FORM I - IN

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PH DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in SW846 method 9045C.

2. Holding Times:

The samples were analyzed within the holding time of 24 hours of receipt.

3. Initial Calibration:

The initial calibration included at least two points and recovery results were within control limits of ± 0.05pH units of the buffer solution value.

4. Continuing Calibration:

A buffer solution at midrange was analyzed and results were within control limits of its true value..

5. Blanks:

No blank was analyzed with this sample delivery group..

6. Laboratory Control Sample (LCS):

No LCS was analyzed with this sample delivery group.

7. Duplicate Sample Analysis:

Samples SB18-0708 and SB19-0708 underwent duplicate analysis. The Relative Percent Difference (RPD) values for the duplicate sample analysis were within QC criteria.

8. Spiked Sample Analysis:

No spiked sample analysis was performed for this method.

9. Sample Quantitation:

No quantitation was necessary for this method.

10.Laboratory Contact:

No laboratory contact was necessary.

11. Overall Assessment:

The data is acceptable and no qualifications have been placed on it.

TEST CODE :SPH 1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : PH UNITS : S.U.
PARAMETER : pH

SAMPLE ID	RESULTS	Q	QNT. LIMIT
EE-98-08034 SB14 0102	9.5		0.10
EE-98-08035 SB14 0506	9.4		0.10
EE-98-08036 SB15 0001	8.1		0.10
EE-98-08037 SB16 -	6.6		0.10
EE-98-08038 SB17 0102	7.4		0.10
EE-98-08039 SB17D 0102	7.3		0.10
EE-98-08040 SB17 5565	5.6		0.10
EE-98-08041 SB18 0102	7.7		0.10
EE-98-08042 SB18 0708	6.1		0.10

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE
NA = NOT APPLICABLE

663

003060

TEST CODE :SPH 1 JOB NUMBER :9801.230
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : PH UNITS : S.U.
PARAMETER : pH

SAMPLE ID	RESULTS	Q	QNT. LIMIT
EE-98-08236			
SB19-0102	7.4		0.10
EE-98-08237			
SB19-0708	6.3		0.10

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE
NA = NOT APPLICABLE

TOTAL SOLIDS DATA EVALUATION

1. Analytical Method:

Samples were prepared and analyzed using the procedures specified in CLP methodology.

2. Holding Times:

No holding time was established for this method.

3. Initial Calibration:

No initial calibration was necessary for this method.

4. Continuing Calibration:

No continuing calibration was necessary for this method.

5. Blanks:

No blank was analyzed with this method.

6. Laboratory Control Sample (LCS):

No LCS was analyzed with this method.

7. Duplicate Sample Analysis:

Sample 8340 (Batch QC) underwent duplicate analysis. The Relative Percent Difference (RPD) value for the duplicate sample analysis was within QC criteria.

8. Spiked Sample Analysis:

No spiked sample analysis was performed for this method.

9. Sample Quantitation

Concentrations were correctly calculated.

10. Laboratory Contact:

No laboratory contact was necessary.

11. Overall Assessment:

The data is acceptable and no qualifications have been placed on it.

TEST CODE :STS 1 JOB NUMBER :9801.203
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : SOLIDS TOTAL UNITS : %
PARAMETER : Solids-Total

SAMPLE ID	RESULTS	Q
EE-98-08034		
SB14 0102	88	
EE-98-08035		
SB14 0506	83	
EE-98-08036		
SB15 0001	81	
EE-98-08037		
SB16 -	82	
EE-98-08038		
SB17 0102	90	
EE-98-08039		
SB17D 0102	90	
EE-98-08040		
SB17 5565	88	
EE-98-08041		
SB18 0102	87	
EE-98-08042		
SB18 0708	85	

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE

TEST CODE :STS 1 JOB NUMBER :9801.230
ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : START - DALLAS
TEST NAME : SOLIDS TOTAL UNITS : %
PARAMETER : Solids-Total

SAMPLE ID	RESULTS	Q
EE-98-08236		
SB19-0102	90	
EE-98-08237		
SB19-0708	88	

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE

Appendix K
POLREPs
(15 Pages)

Final POLREPs are to be provided by EPA

Appendix L
Copy of TDD # S06-98-03-0009 and Amendments A through E

EPA

Technical Direction Document (TDD)

06-98-03-0009

START CONTRACT #: 68-W6-0013

Activity Type: IV.B.4 Oil Spill Response **Task:** medium **Estimated Completion Date:** 06/12/98	**Created On:** 03/05/98 **DPO/PO:** Thompson **Task Monitor:** Smith D. (214/665-6489) **Task Codes:** RO; RV
Site/Project Name: Wilcox Refinery **County Name:** Creek **City, State, Zip:** Barstow, OK	**Estimated Cost:** $29,000.00 **Estimated Hrs:** (b) **Dedicated:** (b) (5) **Non-Dedicated:** 0
Funds Source: OPA Site Specific **DCN #(s):** LSR038 (AUZ) OPA Site Specific $29,000.00	**Deliverable:** Formal Report **Overtime:** Yes **Reference:** No
TDD Expenditure Limit: $29,000.00 **Hours:** (b) (5) **Dedicated Hours:** (b) (5) **Non-Dedicated Hours:** 0	**Staffing:** Dedicated Staff **Priority:** High **Start Date:** 03/05/98

Specific Element(s): Conduct Oil Spill Response, Coordinate with Federal, State, & Local Officials, Document Area & Extent of Spill Impact, Identify & Document Cause/Probable Cause, Maintain Site Log Book, Prepare Maps & Sketches, Prepare Waste Assessment (HAZCAT), Provide Print Photo Documentation, IAW Y3 AWP (medium)

Comments: 1. FPN 088079.
2. Conduct site assessment for potential removal action under the NPL for Oil Pollution Act of 1990.
3. Determine threat to waters.

Standard Language: Coordinate with Task Monitor

A. TDD Created By: - Signed by William Jernigan/R6/USEPA/US on 03/05/98 08:58:18 AM, according to /

Signed On:

B. Reviewed and Approved By: - Signed by William Jernigan/R6/USEPA/US on 03/05/98 08:58:18 AM, acc

Project Officer: William Jernigan

William Jernigan

03/05/98
Signed On:

Beer
052601SFXX
00531

EPA

Technical Direction Document (TDD)

06-98-03-0009

START CONTRACT #: 68-W6-0013

Activity Type: IV.B.4 Oil Spill Response **Task:** medium **Estimated Completion Date:** 06/12/98	**Created On:** 03/05/98 **DPO/PO:** Thompson **Task Monitor:** Smith D. (214/665-6489) **Task Codes:** RO; RV
Site/Project Name: Wilcox Refinery **County Name:** Creek **City, State, Zip:** Barstow, OK	**Estimated Cost:** $29,000.00 **Estimated Hrs:** (b) (5) **Dedicated:** (b) (5) **Non-Dedicated:**0
Funds Source: OPA Site Specific **DCN #(s):** LSR038 (AUZ) OPA Site Specific $29,000.00	**Deliverable:**Formal Report **Overtime:** Yes **Reference:** No
TDD Expenditure Limit: $29,000.00 **Hours:** (b) (5) **Dedicated Hours:** (b) (5) **Non-Dedicated Hours:** 0	**Staffing:** Dedicated Staff **Priority:** High **Start Date:** 03/05/98

Specific Element(s): Conduct Oil Spill Response, Coordinate with Federal, State, & Local Officials, Document Area & Extent of Spill Impact, Identify & Document Cause/Probable Cause, Maintain Site Log Book, Prepare Maps & Sketches, Prepare Waste Assessment (HAZCAT), Provide Print Photo Documentation, IAW Y3 AWP (medium)

Comments: 1. FPN 088079.
2. Conduct site assessment for potential removal action under the NPL for Oil Pollution Act of 1990.
3. Determine threat to waters.

Standard Language: Coordinate with Task Monitor

A. TDD Created By: - Signed by William Jernigan/R6/USEPA/US on 03/05/98 08:58:18 AM, according to /

Signed On:

B. Reviewed and Approved By: - Signed by William Jernigan/R6/USEPA/US on 03/05/98 08:58:18 AM, acc

Project Officer: William Jernigan

03/05/98
Signed On:

Beer
052601SFXX
00531

File Copy

EPA

Technical Direction Document Amendment

06-98-03-0009-A

START CONTRACT #: 68-W6-0013

Activity Type: IV.B.4 Oil Spill Response **Task:** medium **Completion Date:** 08/12/98	**Created On:** 05/01/98 **DPO/PO:** Thompson **Task Monitor:** Smith D. (214/665-6489) **Task Codes:** RO; RV
Site/Project Name: Wilcox Refinery **County Name:** Creek **City, State, Zip:** Bristow , OK	**Estimated Cost :** $45,841.00 **Estimated Hrs:** (b) (5) **Dedicated** (b) (5) **Non-Dedicated:** 0
Funds Source: OPA Site Specific **DCN #(s):** LSR038 (AUZ) OPA Site Specific $45,841.00	**Deliverable:** Formal Report **Overtime:** Yes **Reference:** No
TDD Expenditure Limit: $74,841.00 **Hours:** (b) (5) **Dedicated Hours:** (b) (5) **Non-Dedicated Hours:** 0	**Staffing:** Dedicated Staff **Priority:** High **Start Date:** 03/05/98

Specific Element(s): Collect Multimedia Sampling, Conduct Oil Spill Response, Coordinate with Federal, State, & Local Officials, Document Area & Extent of Spill Impact, Identify & Document Cause/Probable Cause, Maintain Site Log Book, Prepare Maps & Sketches, Prepare Quality Assurance Sampling Plan, Prepare Waste Assessment (HAZCAT), Procure Laboratory Services, Provide Print Photo Documentation, Review Validation of Analytical Laboratory Results, Refer to Statement of Work--08/02/94, IAW Y3 AWP (medium)

Comments: This amendment (a) adds LOE and cost to provide for continued on-site activity; (b) extends the completion date to accommodate such activity, (c) funds analytical laboratory services (estimated cost $14,700); and (d) provides funding for program support activities such as monthly reporting, equipment, and on-call emergency response support. This amendment was originally issued by D. Ponder on 4/28/98.

Original Comments: 1. FPN 088079. 2. Conduct site assessment for potential removal action under the NPL for Oil Pollution Act of 1990. 3. Determine threat to waters.

Standard Language: Coordinate with Task Monitor

A. TDD Created By: - Signed by William Jernigan/R6/USEPA/US on 04/27/98 08:49:21 AM, according to /

William Jernigan — **Signed On:** 04/27/98

B. Reviewed and Approved By: - Signed by Tobin Osterberg/R6/USEPA/US on 05/01/98 11:28:05 AM, acco

Amendment #06-98-03-0009-A Printed On 05/01/98 at 01:54:04 PM

Beer

Tobin Osterberg

Contract Officer: Tobin Osterberg

05/01/98
Signed On:

EPA

Technical Direction Document Amendment

06-98-03-0009-B

START CONTRACT #: 68-W6-0013

Activity Type: IV.B.4 Oil Spill Response **Task:** medium **Completion Date:** 10/15/98	**Created On:** 07/20/98 **DPO/PO:**Thompson **Task Monitor:** Smith D. (214/665-6489) **Task Codes:** RO; RV
Site/Project Name: Wilcox Refinery **County Name:** Creek **City, State, Zip:** Bristow , OK	**Estimated Cost :**$29,640.00 **Estimated Hrs** (b) (5) (b) (5) **Dedicated** **Non-Dedicated:**0
Funds Source: OPA Site Specific **DCN #(s):** LSR038 (AUZ) OPA Site Specific $29,640.00	**Deliverable:** Formal Report **Overtime:** Yes **Reference:** No
TDD Expenditure Limit: $104,481.00 **Hours** (b) (5) **Dedicated Hours:** (b) (5) **Non-Dedicated Hours:** 0	**Staffing:** Dedicated Staff **Priority:** High **Start Date:** 03/05/98

Specific Element(s): Collect Multimedia Sampling, Conduct Oil Spill Response, Coordinate with Federal, State, & Local Officials, Document Area & Extent of Spill Impact, Identify & Document Cause/Probable Cause, Maintain Site Log Book, Prepare Maps & Sketches, Prepare Quality Assurance Sampling Plan, Prepare Waste Assessment (HAZCAT), Procure Laboratory Services, Provide Print Photo Documentation, Review Validation of Analytical Laboratory Results, Refer to Statement of Work--08/02/94, IAW Y3 AWP (medium)

Comments: This amendment (a) adds LOE and cost to provide for continued on-site activity, with current emphasis on plume modeling of samples; (b) extends the completion date to accommodate such activity, (c) and provides funding for program support activities such as monthly reporting, equipment, and on-call emergency response support.

Original Comments: 1. FPN 088079. 2. Conduct site assessment for potential removal action under the NPL for Oil Pollution Act of 1990. 3. Determine threat to waters.

Standard Language: Coordinate with Task Monitor

A. TDD Created By: - Signed by William Jernigan/R6/USEPA/US on 07/17/98 01:56:29 PM, according to /

William Jernigan — Signed On: 07/17/98

B. Reviewed and Approved By: - Signed by Tobin Osterberg/R6/USEPA/US on 07/20/98 09:21:53 AM, acco

Tobin Osterberg

Contract Officer: Tobin Osterberg

07/20/98
Signed On:

Beer

EPA

Technical Direction Document Amendment

06-98-03-0009-C

START CONTRACT #: 68-W6-0013

Activity Type: IV.B.4 Oil Spill Response **Task:** medium **Completion Date:** 10/15/98	**Created On:** 07/21/98 **DPO/PO:**Thompson **Task Monitor:** Smith D. (214/665-6489) **Task Codes:** RO; RV
Site/Project Name: Wilcox Refinery **County Name:** Creek **City, State, Zip:** Bristow , OK	**Estimated Cost :**$2,447.00 **Estimated Hrs:** (b) (5) **Dedicated** (b) (5) **Non-Dedicated:**0
Funds Source: OPA Site Specific **DCN #(s):** LSR038 (AUZ) OPA Site Specific $2,447.00	**Deliverable:** Formal Report **Overtime:** Yes **Reference:** No
TDD Expenditure Limit: $106,928.00 **Hours:** (b) (5) **Dedicated Hours:** (b) (5) **Non-Dedicated Hours:** 0	**Staffing:** Dedicated Staff **Priority:** High **Start Date:** 03/05/98

Specific Element(s): Collect Multimedia Sampling, Conduct Oil Spill Response, Coordinate with Federal, State, & Local Officials, Document Area & Extent of Spill Impact, Identify & Document Cause/Probable Cause, Maintain Site Log Book, Prepare Maps & Sketches, Prepare Quality Assurance Sampling Plan, Prepare Waste Assessment (HAZCAT), Procure Laboratory Services, Provide Print Photo Documentation, Review Validation of Analytical Laboratory Results, Refer to Statement of Work--08/02/94, IAW Y3 AWP (medium)

Comments: This is an administrative amendment adding 9 percent of the original TDD hours to provide funding for program support activities such as monthly reporting, equipment, and on-call emergency response support, per procedures established on 03/03/98 with the START contractor.

Original Comments: 1. FPN 088079. 2. Conduct site assessment for potential removal action under the NPL for Oil Pollution Act of 1990. 3. Determine threat to waters.

Standard Language: Coordinate with Task Monitor

A. TDD Created By: - Signed by William Jernigan/R6/USEPA/US on 07/21/98 08:54:51 AM, according to /

William Jernigan — Signed On: 07/21/98

B. Reviewed and Approved By: - Signed by Tobin Osterberg/R6/USEPA/US on 07/21/98 09:28:33 AM, acco

Tobin Osterberg

Contract Officer: Tobin Osterberg

07/21/98
Signed On:

Beer

EPA

Technical Direction Document Amendment

06-98-03-0009-D

START CONTRACT #: 68-W6-0013

Activity Type: IV.B.4 Oil Spill Response **Task:** large **Completion Date:** 10/15/98	**Created On:** 08/03/98 **DPO/PO:**Thompson **Task Monitor:** Smith D. (214/665-6489) **Task Codes:** RO; RV
Site/Project Name: Wilcox Refinery **County Name:** Creek **City, State, Zip:** Bristow , OK	**Estimated Cost :**$58,314.00 **Estimated Hrs:** (b) (5) **Dedicated:** (b) (5) **Non-Dedicated:**0
Funds Source: OPA Site Specific **DCN #(s):** LSR038 (AUZ) OPA Site Specific $58,314.00	**Deliverable:** Formal Report **Overtime:** Yes **Reference:** No
TDD Expenditure Limit: $165,242.00 **Hours:** (b) (5) **Dedicated Hours:** (b) (5) **Non-Dedicated Hours:** 0	**Staffing:** Dedicated Staff **Priority:** High **Start Date:** 03/05/98

Specific Element(s): Collect Multimedia Samples, Conduct Oil Spill Response, Coordinate with Federal, State, & Local Officials, Document Area & Extent of Spill Impact, Identify & Document Cause/Probable Cause, Maintain Site Log Book, Prepare Maps & Sketches, Prepare Quality Assurance Sampling Plan, Prepare Waste Assessment (HAZCAT), Procure Laboratory Services, Provide Print Photo Documentation, Review Validation of Analytical Laboratory Results, Refer to Statement of Work--08/02/94, IAW Y3 AWP (large)

Comments: This amendment (a) adds LOE and funding for continued site activity involving investigation of diameter of contaminant plume and (b) provides for laboratory analysis service of samples of petroleum-based contaminants within the plume (estimated cost $16,900). Funding provides for program support activities such as monthly reporting, equipment, and on-call emergency response support.

Original Comments: 1. FPN 088079. 2. Conduct site assessment for potential removal action under the NPL for Oil Pollution Act of 1990. 3. Determine threat to waters.

Standard Language: Coordinate with Task Monitor

A. TDD Created By: - Signed by William Jernigan/R6/USEPA/US on 07/31/98 03:30:36 PM, according to /

William Jernigan — Signed On: 07/31/98

B. Reviewed and Approved By: - Signed by Tobin Osterberg/R6/USEPA/US on 08/03/98 12:51:23 PM, accor

Tobin Osterberg

Contract Officer: Tobin Osterberg

08/03/98
Signed On:

Beer

Amendment #06-98-03-0009-D Printed On 08/03/98 at 02:09:39 PM

EPA

Technical Direction Document Amendment

06-98-03-0009-E

START CONTRACT #: 68-W6-0013

Activity Type: IV.B.4 Oil Spill Response **Task:** large **Completion Date:** 05/15/99	**Created On:** 10/20/98 **DPO/PO:** Thompson **Task Monitor:** Smith D. (214/665-6489) **Task Codes:** RO; RV
Site/Project Name: Wilcox Refinery **County Name:** Creek **City, State, Zip:** Bristow , OK	**Estimated Cost :** $28,039.00 **Estimated Hr** (b) (5) (b) (5) **Dedicated:** **Non-Dedicated:** 0
Funds Source: OPA Site Specific **DCN #(s):** LSR038 (AUZ) OPA Site Specific $28,039.00	**Deliverable:** Formal Report **Overtime:** Yes **Reference:** No
TDD Expenditure Limit: $193,281.00 **Hours:** (b) (5) **Dedicated Hours:** (b) (5) **Non-Dedicated Hours:** 0	**Staffing:** Dedicated Staff **Priority:** High **Start Date:** 03/05/98

Specific Element(s): Collect Multimedia Samples, Conduct Oil Spill Response, Coordinate with Federal, State, & Local Officials, Document Area & Extent of Spill Impact, Identify & Document Cause/Probable Cause, Maintain Site Log Book, Prepare Maps & Sketches, Prepare Quality Assurance Sampling Plan, Prepare Waste Assessment (HAZCAT), Procure Laboratory Services, Provide Print Photo Documentation, Review Validation of Analytical Laboratory Results, Refer to Statement of Work--08/02/94

Comments: This amendment (a) adds LOE and funding for continued site activity involving investigation of site size (specifically concerned with diameter of contaminant plume) and (b) extends the completion date for on-going coordination with State of Oklahoma regarding removal/remediation technique and analysis. Funding provides for program support activities such as monthly reporting, equipment, and on-call emergency response support.

Original Comments: 1. FPN 088079. 2. Conduct site assessment for potential removal action under the NPL for Oil Pollution Act of 1990. 3. Determine threat to waters.

Standard Language: Coordinate with Task Monitor

A. TDD Created By: - Signed by William Jernigan/R6/USEPA/US on 10/15/98 14:40:10, according to /R6/U

William Jernigan — Signed On: 10/15/98

B. Reviewed and Approved By: - Signed by Tobin Osterberg/R6/USEPA/US on 10/20/98 11:45:54, according

Amendment #06-98-03-0009-E Printed On 10/21/98 at 16:15:10

Tobin Osterberg

Contract Officer: Tobin Osterberg

10/20/98
Signed On:

Beer

Amendment #06-98-03-0009-E Printed On 10/21/98 at 16:15:10

TECHNICAL DIRECTION DOCUMENT

S06-98-03-0009

TDD

06/052601SFXX

PAN

Wilcox Refinery/ OPA

Site Name / Non Site Activity

Bristow, Creek County, OK

Site Location

EPA

Contract 68-W6-0013 with

ecology and environment, inc.

003080

TECHNICAL DIRECTION DOCUMENT TRACKING AND FILE INVENTORY

REPORT DUE DATE: ___/___ ___
MONTH DAY YEAR

TDD#: S06-98-03-0009 AMENDMENTS: A-E
CERCLIS#/CASE#: OK001010917 PAN#: 06/052601SFXX
SITE NAME/LOCATION: Wilcox Refinery Bristow, Creek Co., OK
START PROJECT MANAGER(S): (1) Tom Beer (2)

RESPONSE ACTIVITY	CERCLA ASSESSMENT	PREVENTION & PREPAREDNESS	TECHNICAL SUPPORT
[ ] Emergency Response (CERCLA)	[ ] Preliminary Assessments	[ ] Chemical Emergency (CEPP)	[ ] General
[ ] Removal Support (Funded)	[ ] Site Inspections	[ ] Contingency Planning	[ ] _____
[X] Oil Spill Response *	[ ] Site Insp. Prioritization	[ ] Chemical Safety Audits	
[ ] Eng. Eva.-Cost Anal.(EE/CA)	[ ] Exp. Site Insp./Remedial Inv.	[ ] SPCC Inspections *	
[ ] Reg. Response Center Support	[ ] HRS/NPL Package	[ ] Oil Program Initiatives *	
[ ] Site Documentation	[X] Removal Assessment		
[ ] Removal Support PRP	[ ] Combined Assessment		

FILE CHECKLIST

PM	PR	QAO	
✓	MF		COPY OF ORIGINAL TDD (SIGNED BY STL)
✓	MF		COPY OF TDD AMENDMENTS (A, B, C, D, E, ~~F, G, H, I~~)
			~~AOC~~
✓	MF		SITE SAFETY PLAN ~~(ORIGINAL AND~~ COPY)
			SITE SAFETY PLAN WAIVER (ORIGINAL AND COPY)
			OVERALL SITE SAFETY PLAY (HASP)
✓			TDD TARGET COVER SHEET
✓	MF		WRITTEN REPORT (DISTRIBUTION LISTED BELOW)
			HRS PACKAGE
			PA REPORT
			SI REPORT
			LOCATION MAP
			SITE SKETCH
			ENVIRONMENTAL JUSTICE REPORT
✓	MF		PHOTOGRAPHS/SLIDES/VIDEO (ORIGINALS IN EPA FILE REPORT)
✓	MF		UNUSED PHOTOGRAPHS (ORIGINALS IN START Dc Hos)
✓	MF		NEGATIVES (ORIGINALS IN START Dc Hos)
✓	MF		RECORDS OF COMMUNICATION
✓	MF		POLREPS
✓	MF		COPY OF LOGBOOK (ORIGINAL IN DALLAS)
			DRAFT ON-SCENE COORDINATORS REPORT
			DISK COPY OF DRAFT ON-SCENE COORDINATORS REPORT
			FILENAME _____ SOFTWARE _____
			PRESCORE w REFERENCE _____

PM	PR	QAO	
			TRAINING AGENDA/TRAINING MANUAL
			COVER MEMO
			BID ANALYSIS
			PURCHASE REQUISITION (SIGNED BY ZPM)
			WRITTEN BIDS
			CONFIRMATION LETTER TO LAB
			PURCHASE ORDER
			COPY OF INVOICE (SIGNED BY PM)
✓	MF		ANALYTICAL RESULTS/SUMMARY
✓	MF		DATA VALIDATION SUMMARY
			FIT REPORTS (TDD # _____)
			PRP/STATE REPORTS (_____)
			OIL AND HAZMAT SPILL INVESTIGATION FORM
			HAZARDOUS AIR RELEASE INVESTIGATION FORM
✓	MF		QUALITY ASSURANCE SAMPLING PLAN (QASP)
			HAZARD CATEGORIZATION FIELD SHEETS
			FEDERAL RECORDS CENTER TRANSMITTAL AND RECEIPT
			DISK COPY OF FEDERAL RECORDS CENTER FORMS
			(FILENAME _____ SOFTWARE _____)
			PASCORE w REFERENCES _____
			DISK COPY OF PA/PRE SCORE _____

PEER REVIEWERS INITIALS	DATE	FILE AUDITED BY (NAME)	DATE
MF	4/2/99		

REMARKS: _____

LISTED DELIVERABLES WERE PROVIDED TO:
[ ] BR-START [X] EPA FILES [X] OTHER ODEQ
[ ] HOU-START [ ] EPA-TM
[X] DAL-START [ ] USCG VIA EPA

OTHER ITEMS SUBMITTED TO EPA BUT NOT RETAINED IN START FILES:
_____ SITE FILES
_____ _____

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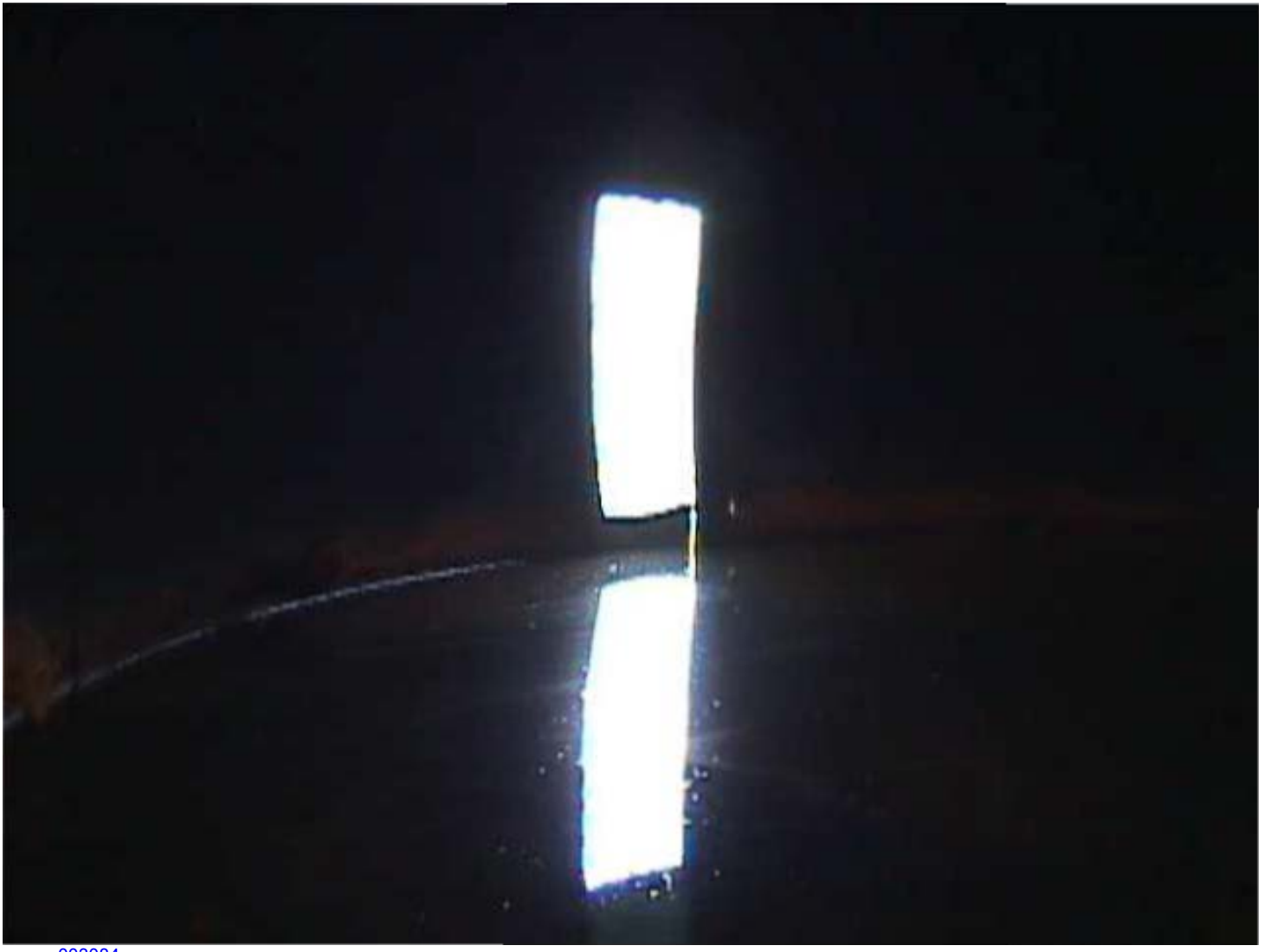

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