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FOURTH FIVE-YEAR REVIEW REPORT FOR COAKLEY LANDFILL SUPERFUND SITE ROCKINGHAM COUNTY, NEW HAMPSHIRE

Prepared by

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Region 1
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Date

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LIST OF ABBREVIATIONS & ACRONYMS

AGQS	Ambient Groundwater Quality Standard
ARAR	Applicable or Relevant and Appropriate Requirement
BQs	Benchmark Quotients
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CD	Consent Decree
CFR	Code of Federal Regulations
CIC	Community Involvement Coordinator
CL	Cleanup Level
CLG	Coakley Landfill Group
COCs	Contaminants of Concern
ESD	Explanation of Significant Differences
EPA	United States Environmental Protection Agency
EPC	Exposure Point Concentration
FYR	Five-Year Review
GMP	Groundwater Management Permit
GMZ	Groundwater Management Zone
HI	Hazard Index
ICs	Institutional Controls
ICL	Interim Compliance Level
ICP	Institutional Control Plan
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NH DES	New Hampshire Department of Environmental Services
NH DHHS	New Hampshire Department of Health and Human Services
NOAA	National Oceanic and Atmospheric Administration
NPL	National Priorities List
OMP	Operations and Maintenance Plan
O&M	Operation and Maintenance
OU	Operable Unit
PAH	polynuclear aromatic hydrocarbons
PFCs	perfluorinated compounds
PFOA	perfluoro-octanoic acid
PFOS	perfluoro-octanoic sulfonate
POP	Project Operations Plan
PPB	Pleuropulmonary Blastoma
Ppb	parts per billion
ppt	parts per trillion
PRP	Potentially Responsible Party
QA/QC	Quality Assurance/Quality Control
RA	Remedial Action
RAO	Remedial Action Objectives
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
RMS	Rhabdomyosarcoma
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	Regional Screening Level
SAP	Sampling and Analysis Plan
SVOC	Semivolatile Organic Compounds
SQuiRT	Screening Quick Reference Tables

TBA	tertiary butyl alcohol.
TBC	To be considered
TCE	trichloroethene
TEC	Total Exposure Concentration
UCL	Upper Confidence Limit
µg/l	micrograms per liter (*i.e.*, parts per billion)
USEPA	United States Environmental Protection Agency
UU/UE	unlimited use and unrestricted exposure
VOC	Volatile Organic Compounds
VI	Vapor Intrusion
VISL	Vapor Intrusion Screening Level

I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this five-year review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP)(40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the fourth FYR for the Coakley Landfill Superfund Site. The triggering action for this statutory review is the completion date of the previous FYR. The FYR has been prepared due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of 2 Operable Units (OUs) and all OUs will be addressed in this FYR. OU-1 (Source Control) addresses the source of contamination at the Coakley Landfill Site, including the contaminated groundwater beneath and in the vicinity of the landfill. Source control response actions included consolidation onto the landfill of wastes and sediments identified beyond the edge of the landfill and covering the landfill with an impermeable cap. OU-2 (management of migration) addresses groundwater contamination which has migrated from the landfill. The response action includes utilizing natural attenuation to remediate the contaminated groundwater plume; groundwater monitoring; and using institutional controls (ICs) to prevent use of contaminated groundwater.

The Coakley Landfill Superfund Site Five-Year Review was led by Gerardo Millán-Ramos, Remedial Project Manager at EPA Region 1.

Participants included:

Andrew Hoffman, P.E.	NH DES Remedial Project Manager
Ruthann Sherman, Esq.	U.S.EPA Attorney
Jim Murphy	U.S. EPA Community Involvement Coordinator
Richard Sugatt, Ph.D.	U.S. EPA Risk Assessor
Courtney Carroll	U.S. EPA Risk Assessor
Bill Brandon	U.S. EPA Hydro-geologist

The review began on 1/21/2016.

Site Background

The Coakley Landfill Superfund Site (Site) includes approximately 92 acres located within the towns of Greenland and North Hampton, Rockingham County, New Hampshire. The actual landfill covers approximately 27 acres. The Site is located about 400 to 800 feet west of Lafayette Road (U.S. Route 1), directly south of Breakfast Hill Road, and about 2.5 miles northeast of the center of the town of North Hampton. The landfill borders undeveloped woodlands and wetlands to the north and west and commercial and residential properties to the east and south.

Landfill operations began in 1972, with waste disposal from the municipalities of Portsmouth, North Hampton, Newington, New Castle, and Pease Air Force Base. Concurrent with landfill operations, rock quarrying was conducted from approximately 1973 through 1977. Much of the refuse disposed of at the Site was placed in open (some liquid-filled) trenches created by rock quarrying and sand/gravel mining. Also from 1982 through 1985, Pease Air Force Base, and the above mentioned municipalities among others, transported their refuse to an incineration plant operated by the City of Portsmouth, which in turn transported the incinerator residues to the Site until 1985 when the landfill was closed to all disposal activities.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Coakley Landfill		
EPA ID: NHD064424153		
Region: 1	**State:** NH	**City/County:** North Hampton, Greenland, and Rye/Rockingham County
SITE STATUS		
NPL Status: Final		
Multiple OUs? Yes	**Has the site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: EPA		
Author name (Federal or State Project Manager): Gerardo Millán-Ramos		
Author affiliation: EPA Region 1		
Review period: 1/21/2016 - 9/21/2016		
Date of site inspection: 5/25/2016		
Type of review: Statutory		
Review number: 4		
Triggering action date: 9/22/2011		
Due date *(five years after triggering action date)*: 9/22/2016		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

EPA signed a cooperative agreement with the state of New Hampshire on August 12, 1985 to conduct a Remedial Investigation/Feasibility Study (RI/FS). The RI/FS for OU-1 (Source Control) was completed on March 2, 1990. The RI/FS for OU-2 (Management of Migration) was conducted by the EPA and completed on May 23, 1994. Both studies found contaminants in groundwater beneath the landfill as well as outside the landfill boundaries. VOCs detected at the Site included benzene, ethyl benzene, chloroethane, chlorobenzene and xylene. Semi-volatile organic compounds (SVOCs) detected included predominantly polycyclic aromatic hydrocarbons (PAHs) and dichlorinated benzenes. Inorganic compounds were detected in all groundwater and sediment samples and included arsenic, barium, iron, lead, manganese, nickel, beryllium, selenium and vanadium.

In summary, the objectives of the OU-1 Record of Decision (ROD) were to eliminate threats posed by direct contact with or ingestion of contaminated soils and wastes at the Site, and to protect the drinking water aquifer by minimizing further migration of contaminants to the groundwater and surface water. For a complete list of the remedial action objectives please see the Response Actions for OU-1 in page 7.

In summary, the objective of the OU-2 ROD was to manage the migration of contaminated groundwater outside the landfill boundaries. For a complete list of the remedial action objectives please see the Response Actions for OU-2 in page 8. Groundwater in this area is classified a drinking water aquifer. However, since October 2008 the NH DES has issued and renewed a Groundwater Management Permit (GMP) that allows the Coakley Landfill Group (CLG) to monitor the effects of past discharges of contaminants of concern (COCs) as defined in the OU-2 ROD. Investigations at the Site have identified ingestion of groundwater as the primary threat to human health at this Site. Interim cleanup levels (ICL) for groundwater were established for 16 COCs[1] ICLs were selected based on Maximum Contaminant Levels (MCLs) and non-zero Maximum Contaminant Level Goals (MCLGs) established under the federal Safe Drinking Water Act, or more stringent New Hampshire Ambient Groundwater Quality Standards (NH AGQSs):

Table 1: Contaminants of Concern

Contaminant	ICL (µg/l)*	Revised ICL (µg/l)
Benzene	5	
Chlorobenzene	100	
Tetrachloroethene	3.5	
1,2-Dichloropropane	5	
2-Bµtanone	200	
Diethyl phthalate	2,800	
Trans-1,2-dichloroethene	100	
Phenol	280	
Antimony	6	

[1] The *Final Fifth ESD for OU-1 and Third ESD for OU-2*, published in August 2015, eliminated the use of the term "Interim" and replaced the term with "Cleanup Level". This change in terminology did not affect the numeric value of the levels that must be attained.

Arsenic	50	10** (MCL)
Beryllium	4	
Chromium	50	
Lead	15	
Manganese	180 (health advisory)	300 ** (health advisory)
Nickel	100	
Vanadium	260	
Tetrahydrofuran	154 (NH AGQS)***	
1,4-dioxane	3 (NH AGQS)****	

* ICLs from 1990 and 1994 RODs.

****** Revised MCL (effective January 23, 2006) and health advisory (as of 2004) was addressed in the September 20, 2007, ESD.

*** Incorporated as a new COC via the September 20, 2007, ESD

**** Incorporated as a new COC via the August 4, 2015, ESD

__Response Actions__

Pre-ROD activities

Investigations by the NH DES Bureau of Solid Waste Management revealed VOC contamination to the south, southeast, and northeast of the Coakley Landfill. As a result, the town of North Hampton extended public water to Lafayette Terrace in 1983 and to Birch and North Roads in 1986. Prior to this time, commercial and residential water supply in these areas was obtained from private wells.

Also in 1983, the Rye Water District completed a water main extension along Washington Road to the corner of Lafayette Road (U.S. Route 1) and along Dow Lane. This extension brought the public water supply into the area due east and southeast of the intersection of Breakfast Hill Road and U.S. Route 1. See Figure 1 (Site Location Plan) in Appendix B. In December 1983 the Coakley Landfill was proposed for listing on the NPL, and was listed in 1986. On June 28, 1990, EPA issued a ROD for OU-1 of the Site and the ROD for OU-2 was issued on September 30, 1994.

OU-1

Remedial action objectives (RAOs) as stated in the ROD:

- Prevent ingestion of groundwater containing contamination in excess of federal and state drinking water standards or criteria, or that poses a threat to public health and the environment.
- Prevent the public from direct contact with contaminated soils, sediments, solid waste and surface water which may present a health risk.
- Eliminate or minimize the migration of contaminants from the soil into groundwater.
- Prevent the off-site migration of contaminants above levels protective of public health and the environment.
- Restore ground and surface water, soils and sediments to levels which are protective of public health and the environment.

Remedy (Source Control) Components as stated in the ROD:

- Consolidation of the solid waste
- Consolidation of sediment in wetlands
- Capping of the landfill
- Collection and treatment of landfill gases
- Groundwater extraction and treatment
- Long-term environmental monitoring
- Institutional controls (ICs) where possible

Remedy Components Modified by the five ESDs:

- Capping of the landfill.
  - On March 22, 1991, EPA issued an Explanation of Significant Differences (ESD) that required the cap to include both a synthetic liner and an underlying clay layer.
- Collection and treatment of landfill gases.
  - The March 22, 1991, EPA ESD also modified the ROD to require the implementation of carbon adsorption or thermal destruction of VOCs regardless of emission levels.
  - A second ESD was issued on May 17, 1996, which changed active landfill gas collection and treatment to a passive collection system.
- Groundwater extraction and treatment.
  - A third ESD was issued on September 29, 1999, which documented the decision to eliminate groundwater collection and treatment.
- Long-term environmental monitoring.
  - On September 20, 2007, a fourth ESD was issued, revising the MCL for Arsenic from 50 µg/L to 10 µg/L, updating the EPA health advisory for manganese from 180 µg/L to 300 µg/L, and adding tetrahydrofuran to the list of COCs.
  - On July 1, 2009 a fifth ESD clarified that the Maximum Contaminant Level (MCL) for arsenic was revised to 0.010 mg/L and re-issuing the 2007 ESD, to reflect the correct MCL.
- Institutional Controls (ICs).
  - On August 4th 2015, a sixth ESD for OU-1 and third for OU-2 was issued, incorporating 1,4-dioxane as a COC with 3 µg/L as the CL; documenting changes that had been made to the Groundwater Management Zone (GMZ), ICs, and the Site's monitoring network; requiring additional ICs; changing the terminology regarding groundwater cleanup levels; and clarifying the approach that will be utilized to determine that the groundwater restoration remedy is protective and complete.

OU-2

RAOs as stated in the ROD:

- To prevent ingestion of groundwater contamination in excess of drinking water standards (MCLs/MCLGs) or in their absence, an excess cancer risk level of 10^{-6}, for each carcinogenic compound. Also to prevent ingestion of contaminated groundwater in excess of a total cancer risk level for all carcinogenic compounds outside the risk range of 10^{-4} to 10^{-6}.
- To prevent ingestion of groundwater contaminated in excess of drinking water standards for each non-carcinogenic compound and a total hazard index greater than one for each non-carcinogenic compound.

- To facilitate the restoration of the groundwater aquifer to drinking water standards or in their absence, the more stringent of an excess cancer risk of 10^{-6}, for each carcinogenic compound or a hazard quotient of one for each non-carcinogenic compound. Also, restore the aquifer water quality to the more stringent of 1) a total excess cancer risk within the risk range of 10^{-4} to 10^{-6} and 2) a hazard index of 1-10.
- Ensure that the remedy does not negatively impact the wetlands and facilitates the restoration of the wetland environment.

Remedy Components as stated in the ROD:

- Natural attenuation for the contaminated groundwater plume
- Groundwater monitoring
- Institutional controls (such as deed restrictions) to prevent use of contaminated groundwater

Remedy Components Modified by ESDs:

- Groundwater monitoring
  - On September 20, 2007, a first ESD was issued, revising the MCL for arsenic from 0.5mg/L to 0.10 mg/L, updating the EPA health advisory for manganese from 180 µg/L to 300 µg/L, and adding tetrahydrofuran to the list of COCs.
  - On July 1, 2009 a second ESD was issued clarifying that the MCL for arsenic was revised to 0.010 mg/L and re-issuing the 2007 ESD, to reflect the correct MCL.
- Institutional controls to prevent use of contaminated groundwater
  - On August 4, 2015, a third ESD was issued, incorporating 1,4-dioxane as a COC; documenting changes that had been made to the GMZ, ICs, and the Site's monitoring network; requiring additional ICs; changing the terminology regarding groundwater cleanup levels from "Interim Cleanup Levels" to "Cleanup Levels"; and clarifying the approach that will be utilized to determine that the groundwater restoration remedy is protective and complete.

Cleanup Levels as stated in the OU-1 and OU-2 RODs:

See Table 1 above for a list of COCs and their respective cleanup levels.

<u>Status of Implementation</u>

A Consent Decree (CD) for the remedial design (RD), construction, operation and maintenance (O&M) of the source control remedy became effective on May 5, 1992. The Coakley Landfill Group (CLG), representing parties potentially responsible for the contamination, completed the design of the OU-1 remedy, and EPA approved the design on January 25, 1996. Construction began September 24, 1996, with the relocation of trash from along the perimeter of the landfill to the top of the landfill. Wetland sediments were removed and placed on the landfill during 1997. The landfill cap was completed in the fall of 1998 and a pre-final inspection was conducted by EPA and NH DES on September 15, 1998, which concluded that no significant construction items remained. Similarly, a pre-final inspection was conducted on October 6, 1998, which determined that wetland construction/restoration activities were complete.

Monitoring of groundwater quality and water levels continued throughout the RD, construction and post-construction phases. EPA evaluated that data and determined that the landfill cap was effective in reducing leachate generation such that the collection and treatment of contaminated groundwater at the edge of the landfill was no longer necessary. EPA's decision was documented in the ESD issued on September 29, 1999.

A CD for the implementation of the management of migration remedy became effective on January 11, 1999. The CLG submitted an environmental monitoring plan for the OU-2 remedy which EPA approved on March 10, 1999. The monitoring plan objective was to 1) assess OU-1 Remedial Action (RA) impacts on site sediment, surface water, groundwater, and 2) monitor natural attenuation of Cleanup Level constituents in the OU-2 area, sediments, surface water and groundwater. To attain this objective, the monitoring plan originally required sediment, surface water and groundwater sampling and analysis in April, August and November of each year. The monitoring plan also required analysis for VOCs, SVOCs, metals, natural attenuation indicators and water quality indicators. Annual monitoring of groundwater and surface water continues today, and an annual data assessment report is provided to the EPA and NH DES. However, sediment sampling was subsequently modified to be collected every five years, and ambient air and landfill gas monitoring to occur quarterly with reports provided to both agencies.

An updated version of the Project Operations Plan (POP) for the management of migration remedy was conditionally approved on May 10, 2010; it contained an Environmental Monitoring Plan, a Quality Assurance Project Plan, a Health and Safety Plan, and a Methane Monitoring Plan. The Environmental Monitoring Plan's purpose was to monitor the extent of migration of the contaminated groundwater and other potentially affected media (surface water and sediments), and to track the natural attenuation of the groundwater contamination. The plan outlined the methods and procedures to demonstrate conformance and compliance with ICLs.[2]

Under the POP, wells at OU-1 and OU-2 were monitored annually for field parameters (i.e. static water level, turbidity, specific conductance, temperature, pH, and dissolved oxygen), dissolved metals, total metals, and volatile organic compounds. Surface water and leachate samples were collected and analyzed annually for field parameters, inorganic parameters, total metals and volatile organic compounds. Sediment samples were collected and analyzed every 5 years for total metals.

In August 2014, after a number of field audits performed jointly by NH DES and EPA, the POP was superseded by a Sampling and Analysis Plan (SAP). This SAP incorporates the requirements contained in the New Hampshire Department of Environmental Services (NH DES) and United States Environmental Protection Agency (USEPA) approved NH DES Hazardous Waste Remediation Bureau's Master Quality Assurance Project Plan (HWRB Master QAPP) Revision 2, dated February 2015 (http://des.nh.gov/organization/divisions/waste/hwrb/documents/hwrb_master_qapp.pdf) and it is updated every year. The latest version of the SAP at the time of this review is the Sampling and Analysis Plan Coakley Landfill Superfund Site North Hampton and Greenland, New Hampshire, CES Inc., October, 4, 2015 (http://semspub.epa.gov/src/document/01/590814).

[2] *Ibid.*

Table 2: Summary of Planned and/or implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Groundwater and Soils	Yes	Yes	See Appendix C for a copy of the Renewal of the GMP which includes a list of parcels with ICs.	To prohibit any activity, including, but not limited to any construction, or use of the property which would damage the landfill cap, or interfere with the performance, operation or maintenance of remedial actions for OU-1 and OU-2.	Implemented. NH DES Groundwater Management Permit #GWP-198712001-N002 (Original permit implemented on 06/16/2008. Permit renewed on 01/07/14)
Groundwater	Yes	Yes	Lots #10, 11, 11A, 11B, and 12 as identified in the Town of Greenland Tax Map R-1	To prohibit or restrict the installation of new wells and the increased use of existing wells, except those needed for response actions and approved by EPA.	Planned. This additional IC is laid out in the August 2015 ESD.
Groundwater and Soils	Yes	Yes	Undetermi ned.	Possible land use restrictions or other ICs to restrict any use or extraction of groundwater and /or provision of an alternate water supply, if needed.	Planned. This additional IC is laid out in the August 2015 ESD.

Systems Operations/Operation & Maintenance

Required system operations in the OU-1 Operation and Maintenance Plan (OMP) include: annual mowing and inspection of the landfill cap and surface water drainage systems, and quarterly ambient air and landfill gas monitoring. Annual sampling and monitoring of groundwater and surface water is required for both OUs. Sediment sampling is performed every five years. Since some ICs are in place, annual monitoring of the effectiveness of ICs is also required.

No problems in the implementation of system operations/O&M have been identified.

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the **last** five-year review as well as the recommendations from the **last** five-year review and the current status of those recommendations.

Table 3: Protectiveness Determinations/Statements from the 2011 FYR

OU #	Protectiveness Determination	Protectiveness Statement
1	Protective	The remedy at Operable Unit 1 currently protects human health and the environment, both in the short and long term. All human health threats at the Site have been addressed through stabilization and capping of the landfill and the landfill cap is functioning as intended. Installation of fencing and warning signs and deed restrictions are preventing human exposures at the capped landfill. Toxicity tests that were applied to a "worst case scenario " in the sediment samples, revealed no significant ecological impact, and EPA concluded that it is likely there are no significant ecological impacts in surface water and sediment at the Site. In order to ensure that the currently nontoxic concentrations are not increasing significantly, a reduced surface water and sediment monitoring effort will remain in place. Also, the landfill gas monitoring program will remain in place.
2	Short-term Protective	The remedy at OU-2 currently protects human health and the environment in the short-term because on-site residents are not exposed to the groundwater, as water utility service has been provided, and there is no evidence of such exposure for off-site residents. Also, a GMZ has been established via a NH DES GMP, and ICs have been established for all properties within the GMZ. Groundwater monitoring to determine compliance with the groundwater monitoring standards for the landfill, will continue to be conducted as a component of OU-2. Long-term protectiveness will be achieved when interim groundwater cleanup levels for all contaminants of concern are met.
Sitewide	Short-term Protective	Overall, the remedy at the Coakley Landfill Superfund Site currently protects human health and the environment in the short-term. Long-term protectiveness has been achieved already in OU-l based on the maintenance of the landfill cap, long-term monitoring, and use restrictions. Long-term protectiveness will be achieved in OU-2 when interim groundwater cleanup levels for all contaminants of concern are met and restrictions on the use of groundwater within OU-2 can be removed. Monitoring of the Site will continue until

		cleanup levels for the contaminants of concern are met.

Table 4: Status of Recommendations from the 2011 FYR

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
1, 2	GMP needs to be renewed.	Renew GMP for GMZ and potentially expand boundary if additional tests show site contaminants migrating beyond the current GMZ boundary.	Completed	The GMP was renewed by NH DES and it includes an expansion to the GMZ.	1/7/2014
1	Fence was damaged, gates were unlocked and some wells were unlocked. Also, some areas had excessive vegetation and construction equipment/materials were leaning against the fence.	Perform the necessary repairs to the fence, and lock / properly label all monitoring wells that were lacking these features at the time of the inspection. Also remove excessive vegetation and relocate the construction equipment and materials to a safe distance from the fence. Coordinate and document this activity with the regulatory agencies and the CLG.	Completed	The CLG completed the necessary repair and maintenance items. The materials and equipment were relocated. All of these activities were documented with Site photographs provided by the CLG and verified in the field during subsequent Site visits.	11/4/2011
1, 2	1,4 Dioxane and other contaminants may be moving outside the GMZ. Additional tests are needed to determine if GMZ needs to be expanded.	Prepare an Explanation of Significant Differences (ESD) to add 1,4-Dioxane as a COC with an ICL.	Completed	Additional evaluations were performed by EPA and NH DES. EPA prepared an ESD that added 1,4-Dioxane as a COC, documented changes to the GMZ, ICs and the Site's Monitoring network, among other elements.	08/04/2015

1,2	There is a possible need for groundwater extraction restrictions for properties on the eastern side of the landfill. Groundwater extraction in this area has the potential to alter the flow of groundwater and increase the extent of the plume, thus adding complexities and time to the ongoing remedy.	Evaluate the need for further ICs in the area east of the landfill to prevent altering of groundwater flow as a means of containing the contaminated groundwater plume.	Completed	The GMZ/IC evaluation was submitted by the CLG. The agencies reviewed it and determined that no further ICs were necessary east of the landfill.	02/15/2013
1,2	1,4 Dioxane and other contaminants may be moving outside the GMZ. Additional tests are needed to determine if GMZ needs to be expanded.	Perform additional analysis to determine whether the site contaminants are moving beyond the edge of the GMZ and whether the current GMZ needs to be expanded and Institutional Controls (ICs) need to be established on additional properties and evaluate the need for further response action.	Completed	The CLG performed additional tests that included the sampling of residential drinking water wells north/north east of the landfill for the COCs being monitored within the GMZ. Based on an analysis of all the data available at the time, the agencies determined that an expansion to the GMZ was warranted, that additional monitoring points were necessary, that arsenic and manganese were moving beyond the extent of the GMZ boundary, and that additional sampling of residential units was necessary.	04/26/2013
1,2	1,4 Dioxane and other contaminants may be moving outside the GMZ. Additional tests are needed to determine if GMZ needs to be expanded.	Sample monitoring wells at the outermost edge of the GMZ and the two residential wells for 1,4 - Dioxane for the next two rounds.	Completed	The CLG sampled these wells during 2012 and 2013.	08/16/2013

1,2	Changes to the Institutional Control Plan were made at the time the GMZ was being discussed and implemented. However, these changes have not been incorporated into the Final Institutional Control Plan that was approved by EPA.	Update the Final Institutional Control Plan to incorporate changes that were made to the follow-up requirements for ICs.	Completed	PRPs submitted updated ICP.	02/15/2013

IV. FIVE-YEAR REVIEW PROCESS

<u>Community Notification, Involvement & Site Interviews</u>

A public notice was made available by a news release titled *EPA Begins Reviews of Nine New England Site Cleanups this Year* on 2/25/2016, stating that there was a five-year review and inviting the public to submit any comments to the U.S. EPA. The results of the review and the report will be made available at the Site information repository located at EPA Site Profile web page: http://www.epa.gov/region1/superfund/sites/coakley and the following locations:

- The North Hampton Public Library, 237-A Atlantic Avenue, North Hampton, New Hampshire. For the library hours please call 603-964-6326.
- The U.S. Environmental Protection Agency Records Center located at 5 Post Office Square, Suite 100, Boston, Massachusetts. For the Records Center hours and to book an appointment to view the records at the EPA's office please call at 617-918-1440.
- On-line at the NH DES website.

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy that has been implemented to date**.** The results of these interviews are summarized below.

On May 25, 2016 the EPA Community Involvement Coordinator (CIC) and the Remedial Project Manager (RPM) interviewed 3 local residents in the vicinity of the Coakley Landfill:

<u>Resident 1 (Mrs. Aimee Miller)</u>

Mrs. Miller is a local homeowner and her private well had been tested in 2013, yet results were never received. While initially concerned about not receiving the analysis (as she had two young children), she eventually forgot in the course of everyday matters of raising a family. The recent news of the local cancer cluster had again brought the question of the family's drinking water quality to the forefront and she again was quite nervous due to the sudden focus on the landfill.

Mrs. Miller is very interested in knowing the current condition of her well water and the planned sampling frequency going forward including the expected timeframe for receiving test results following a sampling event. She attended a recent public information meeting and felt the information provided by EPA & NH DES was very useful in understanding the general site history and present groundwater conditions including flow direction and recent and historic sampling results, etc.

Mrs. Miller asked who would cover the cost of installing a filtration system in her home and expressed her frustration and disappointment that a public water supply line is not being actively considered and planned for her neighborhood. Her feeling is that the contamination emanating from the landfill is coming in their direction and that the neighbors should not have to wait for the levels in their wells to reach problematic levels.

Resident 2 (Ms. Cheryl Vermette)

Ms. Vermette is also a local homeowner who is very concerned about her health and the health of her family. Both she and her husband are health professionals and she has not been able to practice for four years due to personal health issues. She is very concerned about the well water staining of home fixture/appliances and has had contractors in to evaluate and attempt to address the problem with her water quality. She was also concerned about her home's proximity to Berry's Brook that flows along her property as she understands that groundwater from the Coakley Landfill is flowing in that direction and could impact surface water and her well.

Ms. Vermette is interested in knowing more about what assumptions are utilized in establishing the level of risk for the contaminants in the groundwater and that there may be health impacts even below the regulatory standards. She feels that both the town and the PRP group consider the neighborhood's situation a low priority; she would like to be connected to public water immediately and not wait until the situation worsens. She is concerned that her well is sampled only annually and feels that the sampling frequency should be increased due to the conditions at the landfill.

Ms. Vermette felt very informed about the site due to the recent public information meeting and subsequent email and phone communication with the RPM on multiple occasions.

Resident 3 (Ms. Jillian Lane)

Ms. Jillian Lane is a resident who has learned about the Coakley Landfill in the last few months, and has continued to educate herself by reading up on past five year reviews. She had not heard of the Coakley site prior to the State's release of the Pediatric Cancer Cluster study. She has small children and is on a private bedrock well. Her biggest concern is the migration of the plume off site. Ms. Lane worries about the relationship between the irrigation taking place at a local golf course and the movement of the plume coming from the landfill. She understands and appreciates both EPA and the State of New Hampshire's role in continuing to sample and monitor plume migration, but believes there is more that EPA could do in directing the Town on land uses around the site.

NH DES Project Manager (Mr. Andrew Hoffman, P.E.)

Mr. Andrew Hoffman is a Site Project Manager with the New Hampshire Department of Environmental Services. Overall he thinks the site has made a lot of headway with the implementation of the OU1 remedy. There has been a decreasing trend in VOC concentrations since then, and we continue to see those site-specific contaminants attenuate over time. NH DES' concern now primarily lies with two emerging contaminants (i.e., 1,4-dioxane and perflourochemicals) and their potential to move off site and impact area drinking water wells. To date, sampling of area residential wells has not revealed contaminant levels above any applicable drinking water quality criteria. The plume separates into two components west of the landfill; one moving to the north, along Berry's Brook, and one to the south, along Little River. The agencies continue to evaluate the monitoring program in these two directions and are working with the PRPs to gain access for the installation and sampling of compliance wells to the north and south of the landfill. NH DES has worked collaboratively with EPA to perform audits of the PRP-appointed sampling team and to evaluate associated deliverables and recommendations. The PRPs have historically monitored surface water quality west of the site and NH DES has requested analysis for the emerging contaminants in future sampling.

Town Administrator (Ms. Karen Anderson)

Ms. Karen Anderson is the Town Administrator for the Town of Greenland. Overall she believes that the work on site has been done well, but believes that as issues had come up, that there should have been more frequent testing. Her office has not done routine communication on the site, but puts out information in response to concerns raised by the community. She is concerned about the 1,4-dioxane and the PFOA/PFOS migrating from the site. She believes there should be a more proactive approach to managing the moving contaminants situation. While she understands the legal issues surrounding the review of superfund sites, the process of waiting for a contaminant to reach a level where it is determined to be a "hazard" and then reacting, to her, does not seem reasonable. She also raised the issue of the Golf Course's potential impact on the groundwater and migration of the plume.

CLG's project manager (Mr. Peter Britz)

What is your overall impression of the project: Is the remedy functioning as expected? What does the monitoring data show?

The remedy appears to be generally functioning. Considerations related to emerging contaminants have been the major surprises since the last Five Year Review, other than those new concerns the site is progressing as expected. Since the previous Five Year Review, we began sampling on a regular basis for 1,4 Dioxane and more recently have had to look more closely at PFCs, a more recent emerging contaminant which had not previously been sampled for during monitoring events.

Monitoring data trends over the years had shown that some contaminants have decreased, others are not showing up at all (below standards), a small number have increased. Generally, it is my understanding that the groundwater trends are consistent with the conceptual site model.

What is the O&M presence at the site and what are the site activities? Have there been changes in the maintenance schedules or sampling routines in the last five years?

The site is visited by staff on a monthly or bi-monthly basis. There is an annual review / inspection of institutional controls, and sampling activities occur on semi-annual or annual basis depending on the media being sampled (bedrock and overburden groundwater, landfill gas, sediment, surface water). Some sampling protocols have changed over the past five years and all specific activities / results are documented in the annual summary report for the Coakley Landfill. Oversight and O&M work is ongoing on a regular basis for activities such as mowing, fence repair, clearing drainage ditches, etc.

Have there been unexpected O&M difficulties or costs since startup or the last FYR?
The CLG is anticipating payment for the installation of a public water supply line in the near future as they have agreed to assist with the installation of a water line to an area near the landfill. In addition the Group is planning on installing two new well couplets to get a better understanding c contaminant migration to the Northeast.

Have there been opportunities to optimize O&M or sampling efforts?
Optimization efforts have been focused on changing monitoring techniques installing new wells refining sampling elevations in wells and looking closely at the data to determine the status of the remedy.

Other general comments, suggestions, or recommendations?
There is a good working relationship between NH DES, EPA, and CLG which contributes to a better overall understanding of the site and conditions. While emerging contaminants have been detected at this point it appears as if natural attenuation is still the appropriate remedy.

During this Five Year Review Period there was extensive and intensive community involvement primarily due to the public concern about a potential link between the Site and a recently discovered pediatric cancer cluster[3]. As a result, various public meetings organized by other parties were attended

[3] The New Hampshire Department of Human and Health Services (NH DHHS) investigated whether a higher than expected number of rhabdomyosarcoma (RMS) cases were present in the combined New Hampshire area of Rye and the surrounding four towns of New Castle, Portsmouth, Greenland and North Hampton (five-town area). The investigation did not identify a cause for the potential RMS cancer cluster and NH DHHS published the investigation study in February 2016. For more

by the EPA CIC and the RPM. Also, as a follow up to some of the public meetings, the RPM had to respond to a large number of challenging technical questions about the Site and possible impacts to drinking water supplies, from neighbors to the Site. Based on the questions asked by the neighbors at the public meetings, via e-mail after the meetings and during some of the interviews, a list of Frequently Asked Questions (FAQs) and responses was prepared and posted at the Site Profile webpage. The FAQs and responses are available at: https://semspub.epa.gov/work/01/593103.pdf

Data Review

Landfill Gas

During this Five Year Review period, the monitoring of landfill gas continued with quarterly monitoring of landfill gas probes M-4, M-5, M-6 and M-7 and bi-annual (twice a year) monitoring of probes M-l and M-2. See Appendix B for a map showing the landfill gas monitoring locations and the landfill gas monitoring trends of gas probes M-4, M-5, M-6, and M-7.

A review of the data collected from 09/28/2011 to 03/10/2016 shows that on probes M-4, M-6 and M-7 no methane was detected at levels exceeding the NH DES methane soil gas standard (2.5 %) with readings ranging from 0.1 to 0.4%. The single exceedance to the standard was observed in probe M-5 on 09/28/2011 with a reading of 5.6%; all other readings at this probe ranged from 0.5 to 0.1%. On probes M-1 and M-2, all readings were non-detect with the exception of two readings on probe M-2 (0.2% on 03/19/15 and 0.1% on 03/10/26).

Based on these results, and in response to a CLG request for reduced landfill gas monitoring, on January 22, 2016, NH DES allowed a reduction in the frequency of the landfill gas generation/migration monitoring from quarterly to annual with sampling occurring when snow/ice is present (*e.g.*, annual first quarter sampling). NH DES also allowed a reduction in the frequency of monitoring at gas probes M-1 and M-2 to once every five years, with sampling occurring the years the Five Year Reviews are due. Nonetheless, NH DES emphasized that monitoring for landfill gas generation/migration must continue until it is demonstrated that the facility no longer produces landfill gas and that monitoring for landfill gas generation, via sampling a representative number of vents, should be performed to demonstrate future achievement of the performance standards. See Appendix D for a copy of a letter report from Aries Engineering to Mr. Peter Britz. This letter includes the January 22, 2016, NH DES letter as an attachment.

Indoor Air

Six abutting properties continued being monitored for methane via continuously operating gas alarms inside the buildings. One of the alarms (Unit #6 at Mr. Sol Negm's building) had to be replaced with a new one by the CLG since apparently it was removed and it could not be found. On March 10, 2016, the CLG and its consultant (Aries Engineering Inc.) verified that all units were properly operating. During this review period, the CLG project manager, Mr. Peter Britz stated that he had not been notified of any methane detection alarm activation.

Based on these facts, the NH DES recommended the continued monitoring and maintenance of real-time gas alarms in occupied structures and their documentation in the annual report. In particular, they recommended adding the following items to the annual reports:

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information on the ongoing investigation and a copy of the study please visit:
http://www.dhhs.nh.gov/dphs/hsdm/cancer/rms-investigation.htm

- A description of the location of the alarms within each structure
- Standard operation procedures for these alarms
- Documentation of training for owners/occupants.

Ambient Air

The monitoring of ambient air was discontinued in December 2015 since methane gas in ambient air readings has not been detected at levels above 0.2 percent since the beginning of monitoring activities in March 1999.

Surface Water

During this review period surface water samples were collected from two surface water locations (SW-5 and SW-103). Surface water could not be collected from the third sampling location (SW-4) due to the extremely dry conditions and insufficient water. For the same reason, SW-103 was not sampled during 2014. The samples that were collected were tested for VOCs and metals.

Toluene was the only VOC detected (at a concentration of less than 1 µg/L) and the only exceedances to the NH DES Surface Water Standards were observed on September 2015 at location SW-5 with a concentration of copper at 0.004 mg/L, slightly over the NH DES Acute Surface Water Standard (0.0036 mg/L), and at location SW-103 with a concentration of iron at 4.40 mg/L, exceeding the NH DES Chronic Surface Water Standard of 1 mg/L. See Table 5 in Appendix D for a table with all the analytical results.

Sediment

During this review period sediment samples were collected from two locations (SED-4 and SED-5). These samples were tested for total metals and compared against the National Oceanic and Atmospheric Administration Screening Quick Reference Tables Threshold Effects Concentrations (NOAA SQuiRT TECs). The results were also compared with site-specific no-effect benchmarks using the technical approach recommended at the time of the Third Five Year Review.

Both sampling locations showed some exceedances of TECs, but no exceedances of site-specific no-effect benchmarks during October 2014 and September 2015. Although all of the results were qualified as J (estimated values) or R (rejected values) due to excess moisture, the results were considered to be usable for risk evaluation. See Table 6 in Appendix D for a table summarizing all the analytical results.

The ecological risk of the sediment metals was evaluated by the EPA Risk Assessor using the technical approach recommended at the time of the Third Five Year Review. This approach calculates the site-specific Benchmark Quotient (BQ) by dividing the average concentration of a chemical in sediment by the site-specific no-effect benchmark for that chemical. The BQs for the individual metals are then averaged to calculate an average BQ for all of the metals in that location. The average BQ is then compared to the evaluation criteria developed during the Third Five Year Review. The ecological risk evaluation indicates that the sediments are likely non-toxic; therefore, according to the protocol, only analysis of metals at one sediment location (SED5), combined with risk evaluation according to the protocol (without additional toxicity testing) should be conducted at least once during the next Five Year Review period. This metals analysis and risk evaluation should be conducted once every five years until CLs are achieved, or it has been shown that the sediments are likely to be non-toxic in the future. This can be demonstrated by a decreasing or stable trend in BQ values. A copy of the technical approach is included in Appendix F.

Leachate

During this review period leachate samples were collected from one location (L-1). The samples were tested for VOCs, 1,4-dioxane, metals, and general chemistry parameters (Chemical Oxygen Demand and Ammonia). The results were compared against the acute and chronic NH DES Surface Water Standards.

Only two parameters were observed at levels exceeding the standards, iron and ammonia. Iron was observed in all samples, at concentrations that ranged from 31,000 to 45,000 µg/L, above the chronic NH DES Surface Water Standard (1,000 µg/L). Ammonia was observed at concentrations that ranged from 19 to 24 mg/L, exceeding the chronic NH DES Surface Water Standard (5.91 mg/L). See all the analytical results on Table 7 in Appendix D.

Groundwater

Under the SAP groundwater continues to be tested for VOCs, metals, natural attenuation indicators and water quality indicators. During this review period, groundwater was generally sampled bi-annually from 32 monitoring wells (11 wells within OU-1 and 21 in OU-2). The exception were years 2014 and 2015 where one well (FPC-5A) could not be sampled due to well integrity issues and lack of access to the property in order to properly abandon the well and install a replacement. These wells were tested for VOCs and metals and the results were compared against the EPA CLs and the NH DES AGQSs. A subset of 9 wells in OU-1 and 13 wells in OU-2 were also tested annually for 1,4-dioxane. See Figure 1-2 in Appendix B for a Site plan showing all the monitoring locations.

Four off-site drinking water supply wells (R-3, 339BHR, 415BHR, and 346BHR) were tested annually for arsenic, manganese and 1,4-dioxane, and two of these wells (R-3 and 339BHR) were tested bi-annually for 1,4-dioxane only. As part of this Fourth Five Year Review, in addition to the four wells that are regularly sampled, ten additional drinking water supply wells were tested for 1,4-dioxane, arsenic, manganese, toluene, and methyl-tert-butyl ether during May 2016. The results were compared against the EPA CLs and the NH DES AGQSs and showed well 339BHR meeting the EPA CL and NHAGQS (both set at 0.01 mg/L) for arsenic at 0.011 mg/L and slightly exceeding the EPA CL for manganese (0.30 mg/L) at 0.31 mg/L. A slight exceedance to the arsenic EPA CL was also observed at well 16 SMW (0.011 mg/L). The results also showed exceedances to the manganese EPA CL at well 4 ROD[4] (0.34 mg/L), well 10 ROD (0.31 mg/L) and well 16 SMW (2.1 mg/L) which also exceeded the NHAGQS for manganese (0.84 mg/L). Nonetheless with the exception of well 339BHR all of these private drinking water wells showed concentrations below the regulatory standards in samples taken from water that had passed through their respective treatment units. See Table XXX in Appendix D for all the analytical results in the off-site drinking water supply wells sampled in May 2016. In addition, Table 10 in Appendix D shows a historical summary of all the groundwater analytical results for COCs in all monitoring wells and off-site drinking water supplies up to September 2015.

A review of the 2015 analytical data for wells in OU-2, and in particular wells AE-4A & 4B, FPC-4B & GZ-105 shows that GZ-105 (a bedrock well) had 1,4-dioxane detected at 62 ppb in September 2015. Bedrock well GZ-105 analytical data detected 1,4-dioxane at 98 ppb in August 2012, 69 ppb in September 2014 and 62 ppb in September 2015. This pattern of decreasing concentrations through time plus the bedrock groundwater contours shown in the 2015 Annual Report suggest that at least a portion of the plume is moving south, probably along the valley of the Little River. In addition, at the time this Five Year Review Report was being prepared, the most recent 1,4-dioxane concentration (62 ppb at well GZ-105 in September 2015), the OU-2 monitoring well closest to the headwaters of Little River, was much higher than the concentration obtained during the same time at well FPC-6B (19 ppb), the monitoring well

[4] The "ROD" in the nomenclature of these wells refers to their location at Red Oak Drive.

closest to the headwaters of Berry's Brook. All of these observations indicate that additional monitoring wells are needed to further determine the extent of the plume in the southern direction. Furthermore, in July 2016, NH DES notified the PRP and EPA that there is a residential private well located along the southern component of the groundwater flow (*i.e.* along the valley of Little River) that has not been possible to sample as the property owner has not responded to NH DES communications[5]. It is uncertain if there are any other residential wells along the Little River valley and if their users are being exposed to COCs exceeding NH AGQSs or EPA CLs.

Due to the recent discovery of a pediatric cancer cluster and concerns about a potential link between it and the Site contaminants, eight monitoring wells within OU-1 and twenty wells within OU-2 were tested for the emerging contaminants perfluoro-octanoic acid (PFOA) and perfluoro-octanoic sulfonate (PFOS) plus an additional four other perfluorinated compounds (PFCs). Sixteen off-site drinking water supply wells were also tested for all these PFCs. The PFOA and PFOS results were compared against the NH DES Emergency AGQS (70 ppt) which was based on the EPA lifetime drinking water health advisories for these two compounds. See all the preliminary PFC results in the tables included at Appendix D.

In OU-1 monitoring wells, PFOA and PFOS combined were observed at levels that ranged from 70.9 to 1108 parts per trillion (ppt), all of them above the NH DES AGQS of 70 ppt. Monitoring wells in OU-2 showed concentrations that ranged from non-detects to 1133 ppt, and most of these concentrations exceeded the advisory/NHAGQS. Lastly, at the off-site drinking water supply wells concentrations ranged from non-detects to 8.1 ppt of PFOS and 25 ppt of PFOA. All of these levels were below the NH DES AGQS of 70 ppt.

The OU-2 PFC data show a pattern of decreasing concentrations in the groundwater with distance from the Site and indicates that further sampling is needed to arrive at more meaningful conclusions. Similar to the observations for 1,4-dioxane, well GZ-105 exhibited a higher concentration of combined PFOA/PFOS (328 ppt) than the corresponding concentration observed at well FPC-6B (92.5 ppt). These results also highlight the need to install additional monitoring wells along the southern component of the plume (*i.e.* along the valley of Little River) and regularly test those for all COCs and the PFCs previously tested.

The following is a brief summary of the status of each COC in groundwater, based on the data presented in Table 10. The concentration in parenthesis is the EPA CL:

- Benzene (5 µg/L):
  The only exceedances were at wells MW-8 in OU-1 and GZ-105 in OU-2 both at 6 µg/L during August 2012. Results from the September 2015 event, showed only trace concentrations that range from 1 to 4 µg/L in monitoring wells at both OUs.

- Chlorobenzene (100 µg/L):
  No exceedances have been reported since 2002. During this review period only trace concentrations that range from 2 to 9 µg/L have been reported in both OUs.

- Tetrachloroethylene (3.5 µg/L):
  No detections have been reported since the start of the long-term monitoring plan in 1999.

- Tetrahydrofuran (154 µg/L):

[5] E-mail from Andrew Hoffman (NH DES) to Peter Britz (CLG) re: GW sampling and reporting dated July 6, 2016.

In the last five years, there have been no exceedances. The last reported exceedance of a CL or AGQS was in 2010 in well MW-8. In OU-1, concentrations have ranged from 10 to 90 µg/L in four wells. In OU-2 concentrations have ranged from 20 to 50 µg/L in two wells.

- 1,2-dichloropropane (5 µg/L):
  No detections have been reported since the start of the long-term monitoring plan in 1999.

- 2-butanone (200 µg/L):
  In 1998 and 1999, trace concentrations were reported at MW-11. No detections have been reported since 2000.

- Trans-1,2-dichloroethene (100 µg/L):
  No detections have been reported since the start of the long-term monitoring plan in 1999.

- 1,4-dioxane (3 µg/L):
  In OU-1, exceedances ranging from 10 to 240 µg/L have been observed in seven wells. In OU-2, exceedances ranging from 13 to 98 µg/L were observed in nine wells. The highest concentration was observed at well GZ-105 (98 µg/L). Trace concentrations (0.38 to 0.74 µg/L) below the AGQS (3 µg/L) have been reported at two water supply wells (R-3 and 339BHR) located downgradient of the landfill along Breakfast Hill Road. Concentrations over time in both of these wells appear to be stable.

- Tertiary butyl alcohol (TBA) (40 µg/L):
  Samples from selected monitoring wells have been analyzed for TBA since 2007. TBA has been reported above the reporting limits at two bedrock wells (MW-5D and MW-8). In 2015 both wells reported a concentration equal to the NH DES AGQS (40 µg/L).

- Antimony (0.006 mg/L):
  Antimony is rarely detected in the Site’s groundwater. The last exceedance was an isolated detection/exceedance reported at AE-4A in 2006.

- Arsenic/Manganese (0.01 mg/L/0.3 mg/L):
  Arsenic and manganese are reported above cleanup criteria (CL/AGQS) at many wells located in close proximity to or downgradient of the landfill. Arsenic and/or manganese exceedances have been reported at several monitoring wells (FPC-7, AE-1 and AE-4, and historically at GZ-123, GZ-125 and FPC-2) located hydraulically upgradient or cross-gradient of the impacted groundwater area.

  The manganese concentration (0.31 mg/L) at one of the off-site drinking water wells, well 339BHR during September 2015 slightly exceeded the CL (0.3 mg/L), however it is below the NHAGQS (0.84 mg/L).

  These observations are consistent with the understanding that reducing conditions in the groundwater downgradient of the landfill have resulted in the mobilization of naturally occurring arsenic and manganese present in overburden and bedrock. It is unclear how much comes directly from the landfill vs. mobilized by the reducing conditions created by the landfill vs. the reducing conditions already present in the area and possibly created by the presence of wetlands.

- Beryllium (4 mg/L):
  Beryllium is rarely detected in groundwater. The last exceedance was an isolated detection/exceedance reported in OU-2 at wells MW-6, AE-1A and FPC-11A in 2004.

- Chromium / Lead / Nickel (0.05 mg/L / 0.015 mg/L / 0.1 mg/L):
  Chromium, lead and/or nickel exceedances (total metals) were reported in OU-1 at one well (MW-4) in 2006, 2007 and 2008; however, only trace concentrations well below cleanup criteria have been reported at that well since 2009.

- Vanadium (0.26 mg/L):
  Trace concentrations have been reported at selected monitoring wells. No exceedances have been reported since 2005.

All the historical data up to the data collected in 2015 for the COCs that have shown exceedances to the standards (arsenic, benzene, manganese, TBA, and 1,4-dioxane) were subjected to a visual trend test and a Man-Kendall statistical test. See details in table 9 at Appendix D. The majority of the statistical trend tests (46 out of 76 or 61%) show no statistically significant trend, while 16 out of 76 (21%) show a decreasing trend and 14 out of 76 (18%) show an increasing trend.

Trends in arsenic and/or manganese concentrations at wells AE-1A, AE-2A, AE-2B, BP-4, and MW-8 indicate a general trend towards more oxidizing conditions indicative of an improvement in groundwater quality. Trends in arsenic and manganese concentrations at wells FPC-6A, OP-2, OP-5, and possibly AE-1B and FPC-9A indicate a general trend towards more reducing conditions. Trends indicative of a change in water quality were not identified at the remaining sampling points.

<u>Regularly monitored off-site drinking water wells</u>
At the four off-site drinking water wells the contaminants detected were arsenic, manganese and 1,4 dioxane, and all of the results were trace levels below the regulatory standards except those for manganese at well 339BHR which have been slightly above the CL since October 2014. The following is a summary of the status for these three contaminants:

- 1,4-dioxane has only been detected at wells R-3 and 339BHR with concentrations that range from 0.30 to 0.45 µg/L at well R-3 and from 0.38 to 0.74 µg/L at well 339BHR. All these concentrations are below the CL and NH DES AGQS (both set at 3 µg/L), and appear to be stable because no statistically significant trend could be identified.

- Arsenic has been detected only once at well 339BHR with a concentration of 0.002 µg/L, below the CL and NH DES AGQS (both set at 0.01 µg/L). Visual and statistical trend tests could not be performed on the data because a minimum of five data points is needed.

- Manganese has been detected at well 339BHR with concentrations that range from 0.25 to 0.32 mg/L, at well R-3, with concentrations that range from 0.10 to 0.19 mg/L, at well 346BHR with concentrations that range from 0.29 to 0.37 mg/L, and at well 415BHR with concentrations that range from 0.028 to 0.046 mg/L. Some of these results exceeded the CL (0.30 mg/L) but all of them are below the NHAGQS (0.84 mg/L). Visual and statistical trend tests could not be performed on the data because a minimum of five data points is needed.

Site Inspection

The Five Year Review inspection of the Site was conducted on 5/25/2016. In attendance were the U.S. EPA RPM, the NH DES project manager, and the CLG project manager. The purpose of the inspection was to assess the protectiveness of the remedy.

The Site inspection revealed no issues impacting current protectiveness. A number of minor O&M issues were observed and pointed out to the CLG representative on-site. Namely, overgrown vegetation immediately adjacent to, and on top of some sections of the fence, overgrown vegetation in some rip-rap channels, a rusty passive vent cap that was not moving, and a damaged gas vent pipe. Some of these deficiencies were corrected in August 2016. Please see Appendix E for photographs documenting the inspection findings and the repairs.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

Question A Summary:

Yes. A review of all available documents, applicable or relevant and appropriate requirements (ARARs), risk assumptions and the results of the Site inspection and visits indicates that the remedy is functioning as intended. Much of the area in the vicinity of the landfill is serviced by public water, and according to all the available data and site information at the time of this review no one is exposed to contaminated groundwater at levels exceeding CLs or NH AGQSs. However, as explained in the Data Review section above, it is uncertain if there are any other residential wells along the Little River valley and if their users are being exposed to COCs exceeding NH AGQSs or EPA CLs.

Also, there are about fourteen residential properties, located approximately 3,000 feet north of the landfill (vicinity of Stone Meadow Way, Red Oak Drive, and Berry Farm Lane), five residential properties along Breakfast Hill Road and a Golf Club, that use drinking water from private wells. The vast majority of these private water supply wells have been closely monitored revealing only trace levels of manganese, arsenic, and 1,4 dioxane, well under the regulatory standards. These water supply wells will continue to be sampled at an increased frequency as a precaution.

The ecological risk evaluation performed on the metals in sediment samples shows that sediments are unlikely to be toxic to aquatic organisms, thus posing no significant risk to the ecosystem. Analysis of sediment for metals and a risk evaluation will continue to be conducted at least once every five years until the remedy is completed or results show no need for further evaluation.

Only a single exceedance of the NH landfill gas standard for methane was detected in 2011 and no methane has been detected by the methane alarms installed at any of the residential and commercial buildings being monitored. Monitoring of landfill gas will continue as a precaution.

Institutional controls (ICs) are in place, however there are currently no ICs for a proposed 10 lot residential development (property located at 410 Breakfast Hill Road, Greenland). EPA is exploring options for further institutional controls in order to prevent an unacceptable risk from occurring in the future while balancing those controls with existing property rights. Please see Table 2 above for a description of ICs that are currently in place and the August 2015 ESD in Appendix C for further details on the additional ICs that are needed.

Access controls (fence around the landfill and warning signs) are in place and in good condition as evidenced by the inspection and visits to the Site. They continue to be effective in preventing exposures.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Question B Summary:

No. Since the 2011 five-year review, there have been several changes at the Site, including changes in exposure assumptions and potential land use. Additionally, groundwater monitoring has shown some emerging patterns in contaminant migration, with data suggesting that contaminants such as 1,4-dioxane and some metals, may be migrating toward residential wells. Currently, the remedy in OU-1 is protective, however in OU-2, as explained further below in ***Changes in Exposure Pathways***, there are data gaps that preclude the EPA from making a protectiveness determination at this time.

Changes in Standards and TBCs

The evaluated ARARs include the Safe Drinking Water Act (42 USC §300f et. seq.) Maximum Contaminant Levels (MCLs) (40 CFR 141, Subpart B and G) and the New Hampshire Department of Environmental Services (NH DES) Ambient Groundwater Quality Standards. There have been no changes in these ARARs affecting the protectiveness of the Remedy.

On May 16, 2016, EPA issued lifetime drinking water health advisories for PFOA and PFOS at 70 ppt for both individual and combined concentrations. These advisories are non-enforceable and non-regulatory; they provide technical information to states agencies and other public health officials on health effects, analytical methodologies, and treatment technologies associated with drinking water contamination. EPA's health advisory levels for PFOA and PFOS offer a margin of protection for all Americans throughout their life from adverse health effects resulting from exposure to PFOA and PFOS in drinking water. Please see the EPA PFOA / PFOS Drinking Water health advisory web page (https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos) for more information.

Based on these advisories, on May 31, 2016 NH DES established ambient groundwater quality standards (AGQS) for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS), via an emergency rule. NH DES set three groundwater standards: 70 parts per trillion (ppt) for PFOA, 70 ppt for PFOS and 70 ppt for combined PFOA and PFOS, where the chemicals are found together. These standards give NH DES the authority to direct site remediation activities related to these contaminants, and also require public water systems to comply with these standards if these contaminants are found in their sources of drinking water. The emergency rule was effective immediately for 180 days, during which time NH DES has been undertaking a regular rulemaking process to adopt rules on a long-term basis.

The NH DES AGQS for PFOA/PFOs do not currently affect the protectiveness of the remedy in the short-term because all but two of the 16 tested off-site private drinking water wells were non-detect as of May 2016. Only two out of 16 potable water wells tested showed concentrations of 25 ppt of PFOA and

8.1 ppt of PFOS and these concentrations are well below the NH AGQS of 70 ppt. However, for the reasons laid out in the August 2015 ESD, there is the potential for some of these drinking water receptors to be exposed to levels meeting or exceeding this new standard in the future.

Changes in Toxicity and Other Contaminant Characteristics

On September 28, 2011, EPA finalized the December 2009 revised toxicity values for trichloroethene (TCE). The new values indicate that TCE is more toxic from both cancer and non-cancer health effects, than previously known. These toxicity changes would result in increased non-cancer hazard and cancer risk from exposure to TCE. However, none of these changes in toxicity factors have changed in a way that could affect the protectiveness of the remedy because TCE is not a COC and has not been detected in any of the samples.

Changes in Risk Assessment Methods

- *2015 Vapor Intrusion Technical Guide*

  In June 2015, EPA finalized the Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air and updated the vapor intrusion screening levels (VISLs) electronic calculator to develop media-specific risk-based VISLs for groundwater, soil gas, and indoor air. These VISLs can be found at the EPA vapor intrusion web page (https://www.epa.gov/vaporintrusion).

  EPA Region 1 evaluated whether the vapor intrusion pathway is a concern for the Site by performing a screening level risk evaluation using the data presented in the 2015 Annual Summary Report and the VISLs. The EPA Risk Assessor performed a conservative risk evaluation of the maximum detected concentrations using the risk ratio approach. The total cancer risk was estimated and compared against EPA's acceptable risk range of 10^{-4} to 10^{-6} and a non-cancer hazard index (HI) was calculated and compared to the EPA's acceptable level of 1.

  The estimated total cancer risk result was 1.9×10^{-6}, indicating that potential VI exposure to these contaminants via groundwater at the Coakley Landfill site is within the EPA's acceptable risk range of 10^{-4} to 10^{-6}. In addition, the calculated non-cancer hazard index (HI) was 0.017, well below EPA's acceptable level of 1. Therefore the vapor intrusion pathway is not considered a concern for the Site. A copy of the Vapor Intrusion Screening Level Risk Evaluation is included in Appendix F.

  EPA will continue monitoring according to the most current guidance available for vapor intrusion. For a copy of this guidance please see: http://www.epa.gov/sites/production/files/2015-09/documents/oswer-vapor-intrusion-technical-guide-final.pdf.

- *2014 OSWER Directive Determining Groundwater Exposure Point Concentrations, Supplemental Guidance*

  In 2014, EPA finalized a Directive to determine groundwater exposure point concentrations (EPCs). This Directive provides recommendations for developing groundwater EPCs, including the recommendation to calculate the 95% Upper Confidence Limit (95% UCL) of the arithmetic mean concentration for each contaminant from wells within the core/center of the plume, using the statistical software ProUCL, rather than using the maximum concentration anywhere on site, as was routinely used previously as the EPC for risk assessment. Depending on the number of data points, the 95% UCL can be higher or lower than the maximum concentration. Risk assessment guidance continues to recommend that the EPC for risk assessment purposes is the lower of the 95% UCL or maximum concentration. This new procedure does not affect the protectiveness at the Site because compliance with the CLs is based on concentrations in individual wells, not EPCs in the center of the plume. This procedure does not affect how chemicals are selected as contaminants of potential concern (COPCs) because COPC selection continues to be based on maximum concentrations anywhere at a site. Future risk evaluation of chemicals in off-Site wells will use the concentrations measured in each well rather than the 95% UCL of all of the wells, (*USEPA. 2014. Determining Groundwater Exposure Point Concentrations. OSWER Directive 9283.1-42. February 2014*). For a copy of the directive please see: https://web.archive.org/web/20150912180339/http://www.epa.gov/oswer/riskassessment/pdf/superfund-hh-exposure/OSWER-Directive-9283-1-42-GWEPC-2014.pdf

- *2014 OSWER Directive on the Update of Standard Default Exposure Factors*

  In 2014, EPA finalized a Directive to update standard default exposure factors and frequently asked questions associated with these updates. These were updated in 2016 on the May, 2016 EPA Regional Screening Level (RSL) website: https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016 Many of these exposure factors differ from those used in the risk assessment(s) supporting the ROD. These changes in general would result in a slight decrease in the risk estimates for most chemicals. (*USEPA. 2014. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER Directive 9200.1-120. February 6, 2014.)* http://www.epa.gov/sites/production/files/2015-11/documents/oswer_directive_9200.1-120_exposurefactors_corrected2.pdf Although calculated risks from potential exposure pathways at the Site may differ from those previously estimated, slightly higher for some contaminants and slightly lower for others, the revised methodologies themselves are not expected to affect the protectiveness of the remedy because the remedy is based on prevention of exposure in OU-1 and groundwater concentration standards (MCLs, AGQS) in OU-2, rather than risk limits. A review of site information concludes that these updates do not call into question the protectiveness of the remedy.

- *RSL tables*

  These tables are updated twice a year and the most current ones are available at the EPA Regional Screening Levels web page (http://www.epa.gov/risk/regional-screening-table).

  EPA Region 1 performed a review of the Site's CLs comparing them to the most current federal MCLs, NH AGQSs, and EPA RSLs for residential tap water, to determine whether or not the CLs are still considered protective. The review revealed that all CLs are still considered protective except vanadium, for which the residential tap water RSL (86 µg/L) is lower than the risk based CL (260 µg/L).

  Another finding of the review is that the CL for chromium (50 µg/L) remains protective if the chromium is not in the hexavalent form in the Site's groundwater. Hexavalent chrome is much more toxic than the trivalent form, which is the most common form found in landfill groundwater. Hexavalent chromium is not normally expected in landfills but its presence at the Site is unknown, and further testing is needed to eliminate this uncertainty. See the Technical Memorandum from

EPA Risk Assessors, Courtney Caroll and Rick Sugatt to the RPM in Appendix F for further details on the risk evaluation.

Changes in Exposure Pathways

There have been no changes in exposure pathways at the Coakley Landfill site since the 2011 five-year review. However, there are reasonably anticipated future land use changes near the Site. Namely, a 10 unit residential development has been proposed at a lot adjacent to the northeastern boundary of the GMZ. The original re-development proposal included the installation of 10 bedrock wells, and both EPA and NH DES expressed oral and written reservations about the strong potential for these wells to cause groundwater contaminant migration from the Site to the proposed residential development. As a reaction to this expressed concern, the Town of Greenland conditionally approved the proposed development on the basis that the developer satisfactorily address, among other things, the Agencies' concerns about potential contamination migration and interference with the ongoing remedy. A private agreement to provide public water to the proposed development is about to be signed, and it addresses the Agencies' immediate concerns. EPA continues to monitor the situation to confirm that a water line is being established. Please see the August 2015 ESD in Appendix C for more details.

No human health or ecological routes of exposure or receptors have been newly identified or changed in a way that could affect the protectiveness of the remedy. However, there is uncertainty about the existence of human exposures within the southern area of the GMZ, along the valley of Little River. Also, the extent of the plume in that direction is unknown. See answer to question C below for more details.

Two new contaminants, PFOA and PFOS, have been identified but the potential pathway remains the same; namely the ingestion of drinking water. It has not been possible to test for the presence of PFOA and PFOS in sediments and surface water due to the extremely dry conditions that prevailed over the summer of 2016. The potential presence of PFOS and/or PFOA, and the other PFCs in sediment and surface water is a possible pathway that needs further evaluation.

Since 2009, 1,4-dioxane has been observed at both OUs, in both overburden and bedrock groundwater monitoring wells. These wells include a number of wells located inside and outside the Groundwater Management Zone (GMZ). EPA finalized an ESD in 2015, which formally added 1,4-dioxane as a Contaminant of Concern (COC), and incorporated the NH DES AGQS (3 µg/L) as a performance standard for monitoring the protectiveness of the remedy at OU-1 and as a CL at OU-2.

Expected Progress Towards Meeting RAOs

According to the available data and information, the remedy at the Coakley Landfill site is progressing as expected. However the recent detection of two emerging contaminants (PFOA and PFOS) in both OUs of the Site has the potential to impact the remedy protectiveness. Therefore further testing of monitoring wells, private drinking water wells, and surface water/sediment is recommended.

QUESTION C: Has any **other** information come to light that could call into question the protectiveness of the remedy?

Yes. As explained in the groundwater subsection of the data review section of this report, the fact that higher concentrations of 1,4-dioxane and PFCs have been detected in well GZ-105 (monitoring well closest to the headwaters of Little River), in comparison to the concentrations observed in well FPC-6B (monitoring well closest to the headwaters of Berry's Brook), the pattern of decreasing concentrations through time plus the bedrock groundwater contours, and the existence of at least one residential drinking water well within the southern area of the GMZ (i.e. along the valley of Little River), point to the need for the collection of additional groundwater data. This data is needed to determine the extent of the plume in that direction, and whether there are any human exposures to COCs above State standards or EPA CLs. This lack of data is the reason a protectiveness determination cannot be made at this time.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
OU-1

Issues and Recommendations Identified in the Five-Year Review:				
OU(s): 2	**Issue Category: Institutional Controls**			
	Issue: There are currently no ICs in place for the proposed residential development site. These are needed in order to prevent the potential for further migration of the impacted groundwater plume and to ensure that such groundwater is not used as drinking water or for any other purpose.			
	Recommendation: Implement land use restrictions, and/or other ICs (*e.g.* a municipal ordinance), prohibiting the installation of new wells and the increased use of existing wells, as laid out in the August 2015 ESD.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	Other	EPA/State	12/30/2017
OU(s): 2	**Issue Category: Monitoring**			
	Issue: Two new contaminants, PFOA and PFOS have been identified in the groundwater but it has not been possible to test for the presence of those contaminants in sediments and surface water due to the extremely dry conditions. The surface water/sediment pathway needs further evaluation.			
	Recommendation: Determine whether it is necessary to collect surface water and/or sediment samples plus leachate samples for the analysis of PFOA/PFOS and the other PFCs already measured.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**

No	Yes	EPA/State	EPA/State	12/30/2016
OU(s): 2	**Issue Category: Monitoring**			
	Issue: The recent detection of two emerging contaminants (PFOA and PFOS) in both OUs and in some private drinking water wells has the potential to impact the future remedy protectiveness.			
	Recommendation: Continue testing all previously sampled monitoring wells and private drinking water wells twice a year (spring and fall) for the next two years to determine whether there are trends indicating migration of the plume and impacts to nearby private drinking water wells.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	8/31/2018
OU(s): 2	**Issue Category: Monitoring**			
	Issue: The data for 1,4-dioxane and PFCs in OU-2 indicates that there is a need to sample or install additional monitoring wells along the southern component of the plume to further determine its extent in the southern direction.			
	Recommendation: Identify existing wells (overburden & bedrock) south of well GZ-105 that could be incorporated into the annual monitoring program to function as southern GMZ boundary compliance wells. If no existing wells are identified, propose location(s), install and sample a new well cluster (overburden and bedrock wells) for COCs and PFCs.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	12/30/2016
OU(s): 2	**Issue Category: Monitoring**			
	Issue: Well FPC-5A needs to be decommissioned and replaced with a new well. Also two additional monitoring well couplets are needed in the area of the GMZ extension shown in the GMP renewal.			
	Recommendation: Decommission well FPC-5A and replace it with another well as close as possible to it. Also install, develop and sample two additional monitoring well couplets within the GMZ extension, for all COCs, PFOA/PFOS, and the other PFCs already measured.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**

No	Yes	PRP	EPA/State	12/30/2016
OU(s): 2	**Issue Category: Monitoring**			
	Issue: The concentrations of arsenic and manganese imply that reducing conditions in the groundwater downgradient of the landfill have resulted in the mobilization of naturally occurring arsenic and manganese present in overburden and bedrock. It is unclear how much comes directly from the landfill vs. mobilized by the reducing conditions created by the landfill vs. the reducing background conditions already present in the area due to the presence of wetlands.			
	Recommendation: Design and implement a background study, including sampling and analysis, as necessary, to determine if the concentrations of arsenic and manganese are reflective of background conditions or rather the result of mobilization due to the reducing conditions created by the landfill.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	9/30/2017
OU(s): 2	**Issue Category: Monitoring**			
	Issue: At the time this FYR Report was being prepared the CLG had not submitted validated data results for the PFOA/PFOS sampling that the CLG performed in OU-1 and OU-2. This validated data is needed to assess the protectiveness of the remedy and to precisely determine what should be the next steps.			
	Recommendation: Obtain and review validated data results for the PFOA/PFOS sampling that the CLG performed in OU-1 and OU-2.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	10/31/2016
OU(s): 2	**Issue Category: Monitoring**			
	Issue: At the time this FYR Report was being prepared, NH DES and EPA had not received validated data results for the sampling that the NH DES performed in several off-site residential wells. This validated data is needed to assess the protectiveness of the remedy and to precisely determine what should be the next steps.			

	Recommendation: Obtain and review validated data results for the sampling that NH DES performed on residential wells at the time this Report was being prepared.

Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	EPA/State	EPA/State	10/31/2016

OU(s): 2	**Issue Category: Monitoring**
	Issue: The CL for total chromium (50 µg/L) is considered protective because it is lower than the current MCL and the NH AGQS (both set at 100 µg/L). However, this CL is based on the assumption that there is no significant amount of hexavalent chromium in the Site's groundwater. Only trace levels of total chromium (1 – 16 µg/L) have been detected in monitoring wells since 2009 and hexavalent chromium is not normally expected in landfills. Nonetheless, its presence at the Site is unknown and further testing is needed to confirm that this CL is adequate.
	Recommendation: Test for the presence of hexavalent chromium in all monitoring wells at OU-1 and OU-2 for the next two sampling rounds.

Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	PRP	EPA/State	8/31/2017

OTHER FINDINGS

None.

VII. PROTECTIVNESS STATEMENT

Protectiveness Statement(s)	
Operable Unit: 1	*Protectiveness Determination:* Protective
Protectiveness Statement: The remedy at OU-1 is protective of human health and the environment.	

The remedy at OU-1 currently protects human health and the environment, both in the short and long term. All human health threats at the Site have been addressed through stabilization and capping of the landfill and the landfill cap is functioning as intended. Installation of fencing and warning signs and deed restrictions are preventing human exposures at the capped landfill.

The evaluation performed on the sediment samples shows that sediments are unlikely to be toxic to the ecological receptors, thus posing no unacceptable risk to the environment. In order to ensure that the currently non-toxic concentrations are not increasing significantly, a reduced surface water and sediment monitoring effort will remain in place, and the ecological risk of the sediments will continue to be evaluated every five years until the remedy is completed or results show no need for further evaluation.

Also, as a precaution the landfill gas monitoring program will remain in place.

Protectiveness Statement(s)		
Operable Unit: 2	*Protectiveness Determination:* Protectiveness Deferred	*Planned Addendum Completion Date:* 9/30/2017

Protectiveness Statement:

A protectiveness determination of the remedy at OU-2 cannot be made at this time until further information is obtained. Further information will be obtained by taking the following actions:

1. Sampling existing or installing and sampling new monitoring wells in the southern area of the GMZ, for all COCs, PFOA/PFOS, and the other PFCs already measured.
2. Sampling any private drinking water wells that may exist within the southern area of the GMZ, for all COCs, PFOA/PFOS, and the other PFCs already measured.
3. Submitting validated data from the sampling effort aforementioned to EPA and NH DES.

It is expected that these actions will take approximately a year to complete, at which time a protectiveness determination will be made.

There is uncertainty about the existence of human exposures within the southern area of the GMZ, along the valley of Little River. The extent of the plume in that direction is also unknown. These uncertainties need to be addressed first in order to completely assess the protectiveness of the remedy. Therefore the OU-2 and Sitewide protectiveness needs to be deferred until additional data as laid out above can be obtained and evaluated.

The collection of additional data needed to make a protectiveness determination should occur as soon as possible during the fall of 2016. The validation of the data is expected to require approximately a month, thus EPA expects to receive the validated data by the end of December 2016, evaluate the data and subsequently prepare an Addendum to this Five Year Review.

With the exception of the issues related to the southern component of the groundwater flow, the remedy at OU-2 is protective in the short term because the data indicates no one is being exposed to COCs at levels exceeding either State Standards or EPA CLs. This is evidenced by the data obtained from the annual monitoring events, the regular sampling of off-Site private drinking water supplies, and the additional sampling for PFOA/PFOS and VOCs performed by NH DES at numerous private residential wells near the Site's GMZ.

The decision to defer a protectiveness determination is strictly based on the lack of groundwater data for the southern area of the GMZ and not in any of the other issues laid out in Section VI above. Those issues and their respective recommendations need to be addressed because they have the potential to affect the long-term protectiveness of OU-2.

Sitewide Protectiveness Statement	
Protectiveness Determination: Protectiveness Deferred	*Planned Addendum Completion Date:* 9/30/2017
Protectiveness Statement: A Sitewide protectiveness determination of the remedy cannot be made at this time until further information is obtained for OU-2. Further information will be obtained by taking the following actions: 1. Sampling existing or installing and sampling new monitoring wells in the southern area of the GMZ, for all COCs, PFOA/PFOS, and the other PFCs already measured. 2. Sampling any private drinking water wells that may exist within the southern area of the GMZ, for all COCs, PFOA/PFOS, and the other PFCs already measured. 3. Submitting validated data from the sampling effort aforementioned to EPA and NH DES. It is expected that these actions will take approximately a year to complete, at which time a protectiveness determination will be made.	

VIII. NEXT REVIEW

The next five-year review report for the Coakley Landfill Superfund Site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

2001 Annual Monitoring Report, Aries Engineering, Inc., July 2001

2002 Annual Monitoring Report, Aries Engineering, Inc., March, 2003

2003 Annual Monitoring Report, Aries Engineering, Inc., April, 2004

2004 Annual Monitoring Report, Coakley Landfill Group, May, 2005

2005 Annual Monitoring Report, Coakley Landfill Group, May, 2006

2006 Annual Monitoring Report, Coakley Landfill Group, June 2007

2007 Post Closure Annual Monitoring Report, Provan & Lorber Inc., July 7, 2008

2008 Post Closure Annual Monitoring Report, Provan & Lorber Inc., February 3, 2009

2009 Post Closure Annual Monitoring Report, Provan & Lorber Inc., December 8, 2009

2010 Post Closure Annual Monitoring Report, Provan & Lorber Inc., April 25, 2011

2011 Post Closure Annual Monitoring Report, Provan & Lorber Inc., March 28, 2012

2012 Post Closure Annual Monitoring Report, Provan & Lorber Inc., February 7, 2013

2013 Annual Summary Report, Summit Environmental Consultants Inc., January 17, 2014

2014 Annual Summary Report, Summit Environmental Consultants Inc., May 20, 2015

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Addendum to the Second Five Year Review Report, U.S. Environmental Protection Agency, July 29, 2009

Coakley Landfill Site Profile webpage, U.S. EPA Region 1, August 9, 2016
http://www.epa.gov/region1/superfund/sites/coakley

December 2006 Landfill Gas Monitoring Results, Aries Engineering, Inc., January 23, 2007

December 2007 Landfill Gas Monitoring Results, Aries Engineering, Inc., January 17, 2008

December 2008 Landfill Gas Monitoring Results, Aries Engineering, Inc., March 25, 2009

December 2009 Landfill Gas Monitoring Results, Aries Engineering, Inc., February 19, 2010

E-mail from Andrew Hoffman (NH DES) to Peter Britz (CLG) re: GW sampling and reporting dated July 6, 2016.

Explanation of Significant Differences, U.S. Environmental Protection Agency, March 22, 1991

Explanation of Significant Differences, U.S. Environmental Protection Agency, May 17, 1996

Explanation of Significant Differences, U.S. Environmental Protection Agency, September 29, 1999

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Final Institutional Control (IC) Plan, Summit Environmental, April 1, 2013

Final Groundwater Management Zone (GMZ) Evaluation, Summit Environmental, April 1, 2013

Initial Data Analysis and Monitoring Report, Aries Engineering, Inc., September 1999

Initial Five-Year Review Report, U.S. Environmental Protection Agency, September, 2001

June 2006 Landfill Gas Monitoring Results, Aries Engineering, Inc., July 25, 2006

June 2007 Landfill Gas Monitoring Results, Aries Engineering, Inc., August 13, 2007

June 2008 Landfill Gas Monitoring Results, Aries Engineering, Inc., September 29, 2008

June 2010 Landfill Gas Monitoring Results, Aries Engineering, Inc., October 12, 2010

June 2011 Landfill Gas Monitoring Results, Aries Engineering, Inc., August 16, 2011

Landfill Gas Monitoring Results, Aries Engineering, Inc., February, 2006

March 2012 Landfill Gas Monitoring Results, Aries Engineering, Inc., April 30 2012

Methane Soil Gas Survey Work plan, Golder Associates Inc., January, 2006

March 2006 Landfill Gas Monitoring Results, Aries Engineering, Inc., April 12, 2006

March 2007 Landfill Gas Monitoring Results, Aries Engineering, Inc., May 7, 2007

March 2010 Landfill Gas Monitoring Results, Aries Engineering, Inc., June 21, 2010

March 2011 Landfill Gas Monitoring Results, Aries Engineering, Inc., May 19, 2011

NH DES Hazardous Waste Remediation Bureau's Master Quality Assurance Project Plan (HWRB Master QAPP) Revision 2, dated February 2015 (http://des.nh.gov/organization/divisions/waste/hwrb/documents/hwrb_master_qapp.pdf)

North Hampton – Coakley Landfill Superfund Site, Groundwater Management Permit, DES #198712001, Project #431, NH DES, January 7, 2014

PFOA/PFOS Drinking Water health advisory webpage, U.S EPA, July 26, 2016 https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos

Project Operations Plan Coakley Landfill Superfund Site North Hampton and Greenland, New Hampshire, Revision 1.0, Golder Associates Inc., April 2010

Record of Decision Operable Unit 1, U.S. Environmental Protection Agency, June 28, 1990

Record of Decision Operable Unit 2, U.S. Environmental Protection Agency, September 30, 1994

Sampling and Analysis Plan Coakley Landfill Superfund Site North Hampton and Greenland, New Hampshire, CES Inc., October, 4, 2015 https://sems.epa.gov/work/1471026111697/01-590814.pdf

Second Five Year Review Report, U.S. Environmental Protection Agency, September 21, 2006

September 2006 Landfill Gas Monitoring Results, Aries Engineering, Inc., October 20, 2006

September 2007 Landfill Gas Monitoring Results, Aries Engineering, Inc., November 5, 2007

September 2008 Landfill Gas Monitoring Results, Aries Engineering, Inc., October 17, 2008

September 2009 Landfill Gas Monitoring Results, Aries Engineering, Inc., December 8, 2009

September 2010 Landfill Gas Monitoring Results, Aries Engineering, Inc., October 26, 2010

September 2011 Landfill Gas Monitoring Results, Aries Engineering, Inc., January 20, 2012

U.S. EPA. Third Five Year Review Report, September 21, 2011

U.S. EPA. 2016 Vapor Intrusion web page, July 14, 2016 https://www.epa.gov/vaporintrusion

U.S. EPA. 2015 OSWER TECHNICAL GUIDE FOR ASSESSING AND MITIGATING THE VAPOR INTRUSION PATHWAY FROM SUBSURFACE VAPOR SOURCES TO INDOOR AIR, OSWER Publication 9200.2-154, June 2015

U.S. EPA. 2014. Determining Groundwater Exposure Point Concentrations. OSWER Directive 9283.1-42. February 2014 https://web.archive.org/web/20150912180339/http://www.epa.gov/oswer/riskassessment/pdf/superfund-hh-exposure/OSWER-Directive-9283-1-42-GWEPC-2014.pdf

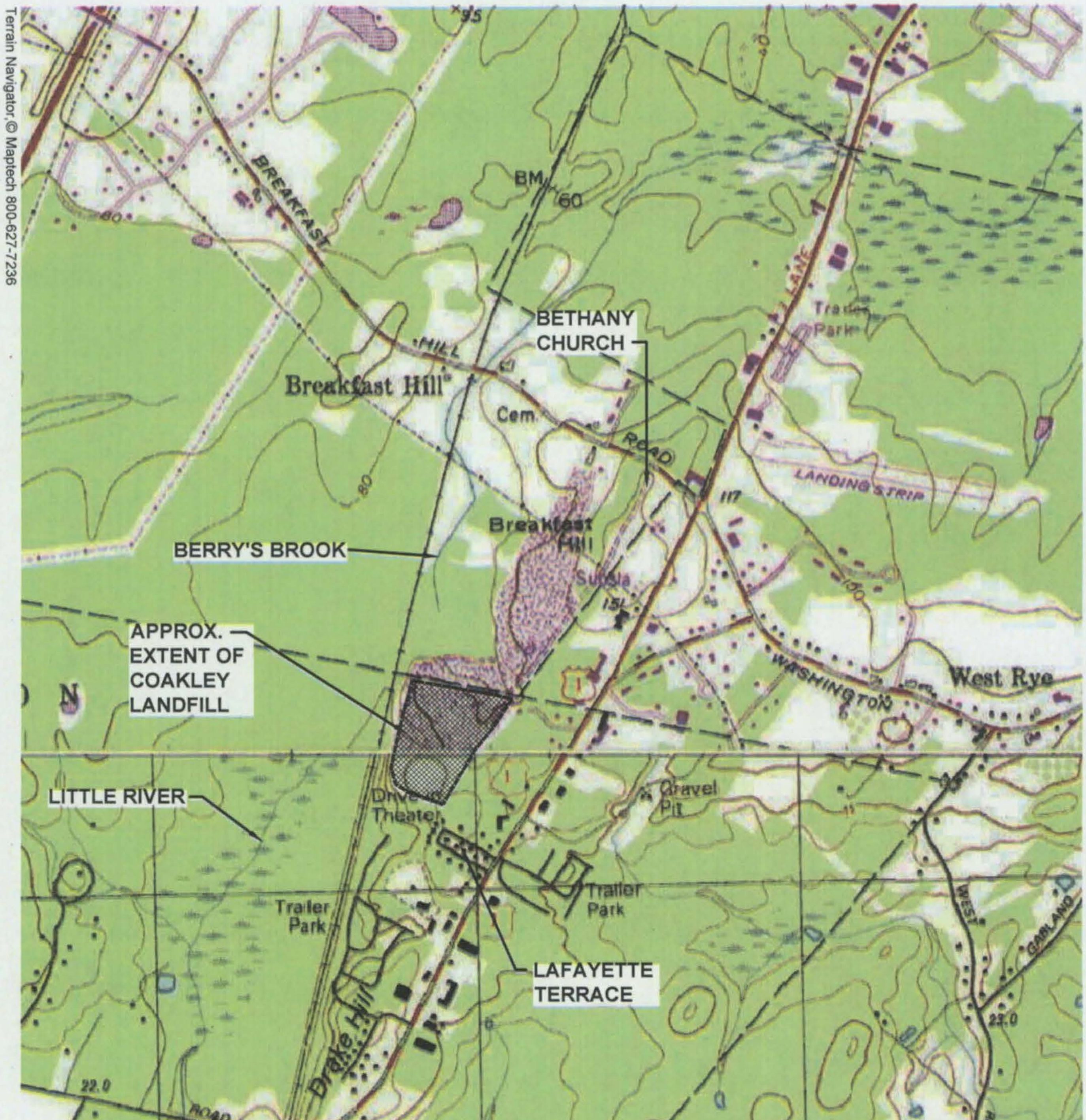
U.S. EPA. 2014. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER Directive 9200.1-120. February 6, 2014. http://www.epa.gov/sites/production/files/2015-11/documents/oswer_directive_9200.1-120_exposurefactors_corrected2.pdf

U.S. EPA. 2015. EPA Regional Screening Level (RSL) website. November 2015. http://www.epa.gov/sites/production/files/2015-11/documents/faqs_expf_directive_2015_sept.pdf

U.S. EPA. 2016. Regional Screening Levels. May 25, 2016. http://www.epa.gov/risk/regional-screening-table.

APPENDIX B – MAPS & FIGURES

Site Location Map
GMZ & Environmental Monitoring Network Map
Map showing landfill gas monitoring locations
Figures attached to the 09/07/2016 e-mail from Andrew Hoffman



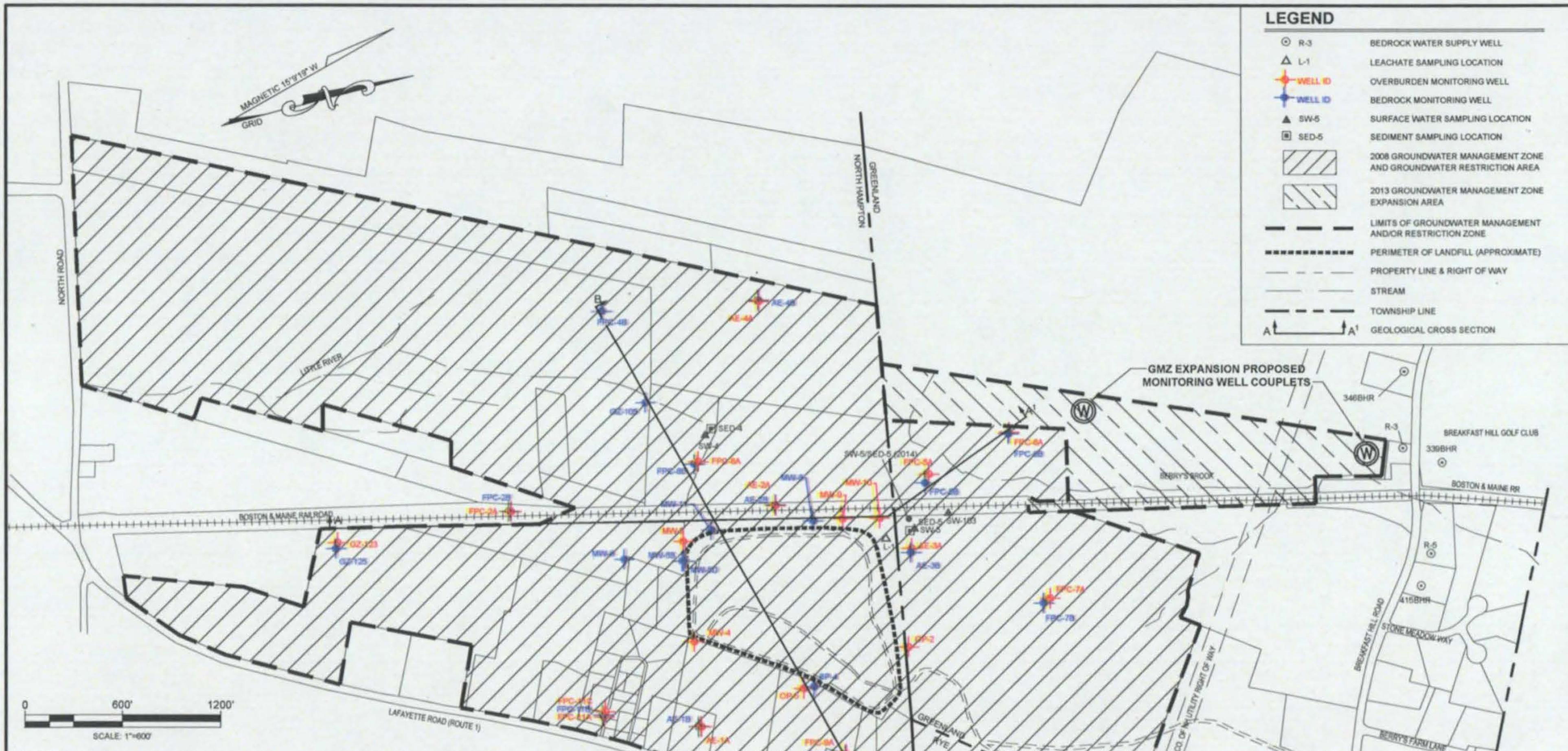
SOURCE:
U.S.G.S. TOPOGRAPHIC QUADRANGLE
PORTSMOUTH
SCALE: 1"=1500'

CES INC

COAKLEY LANDFILL
NORTH HAMPTON & GREENLAND, NH
LOCATION MAP

2015-02-11
10424.003

FIGURE 1



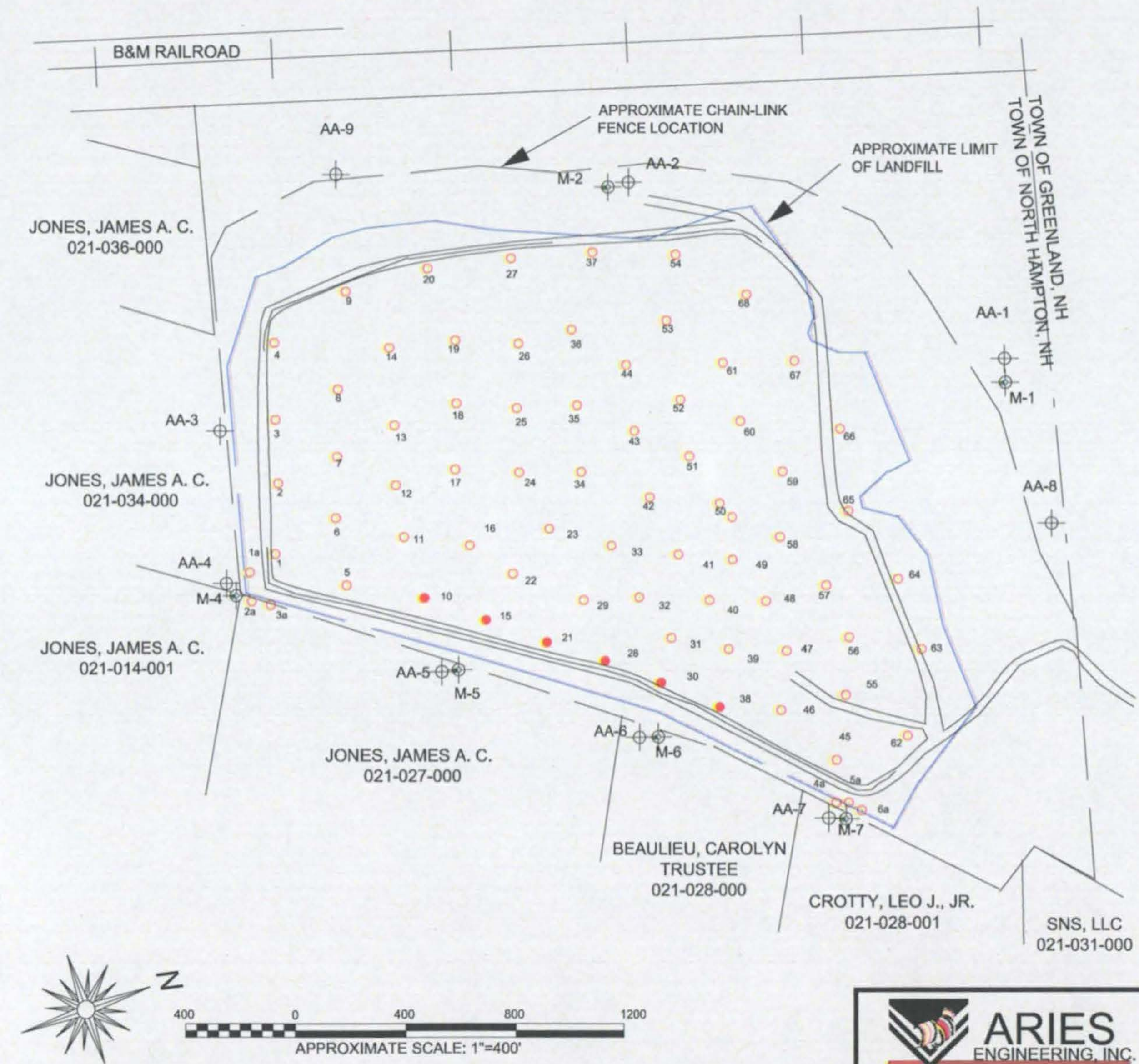
NOTES:

1. THIS PLAN IS BASED UPON A PLAN IN THE APRIL 2010 POP TITLED "ENVIRONMENTAL MONITORING NETWORK" DATED 08/16/07 (GOLDER ASSOCIATES, INC.), A PLAN IN THE 1999 SEDIMENT, SURFACE WATER AND GROUNDWATER MONITORING PLAN TITLED "SITE PLAN" (ARIES ENGINEERING, INC.), AND CITY OF PORTSMOUTH SUBMETER-GPS LOCATIONS FOR SITE MONITORING POINTS. STREAMS AND WATER SUPPLY WELL LOCATIONS BASED ON NH GRANIT AERIAL PHOTOGRAPHY AND THE ABOVE REFERENCE SITE PLANS. SITE FEATURE LOCATIONS AND SCALE ARE APPROXIMATE.

2. APPROXIMATE PROPERTY LINES BASED ON AFOREMENTIONED PLANS. PROPERTIES IN GREENLAND ON BREAKFAST HILL ROAD BASED UPON TOWN OF GREENLAND TAX MAP R-1 (DATED APRIL 1, 2013).

3. GMZ BOUNDARY IS BASED UPON "GMZ BOUNDARY PLAN" DATED MAY 9, 2008 INCLUDED IN THE 2008 GMP APPLICATION PREPARED BY HANCOCK ASSOCIATES, AND 2013 GMZ EXPANSION AREA ESTABLISHED BY THE 2013 GMP DATED JANUARY 7, 2014.

PROJECT TITLE: COAKLEY LANDFILL SUPERFUND SITE NORTH HAMPTON & GREENLAND, NEW HAMPSHIRE	DWG: FIGURE 1-2	BY: TND	REV:	DESCRIPTION:		CES INC Engineers • Environmental Scientists • Surveyors
		DATE: 2016-02-16	REV DATE:			
SHEET TITLE: GROUNDWATER MANAGEMENT ZONE & ENVIRONMENTAL MONITORING NETWORK	JN: 10424.003	APPROVED BY: SBM	ISSUE:	DESCRIPTION:		
	SCALE: 1"=600'	CHECKED BY: SBM	ISSUE DATE:			



NOTES:

1. Aries developed the Institutional Control Zone Area Plan from a plan titled "Study Area Base Map" contained in the May 1994 Management of Migration Remedial Investigation Feasibility Study prepared by Camp Dresser & McKee Inc. of Boston, MA.

2. Approximate property boundary locations are from Town of Greenland, NH Tax Map R-1, Town of Rye, NH Tax Map 10, Town of North Hampton Tax Map 17 and a Town of North Hampton map titled "Properties Within or Adjacent to the Coakley GMZ".

3. Methane volume percent measurements were collected with a Geotechnical Instrument, Ltd Model GEM-2000 Infrared Gas Analyzer.

4. Site feature locations are approximate.

LEGEND:

- M-1 — Landfill gas monitoring probe
- AA-1 — Ambient air monitoring station
- 15 — Sampled landfill gas vent
- 63 — Landfill gas vent
- 021-028-001 — Town of North Hampton map, block, and lot number
- Chain-link fence
- Approximate limit of landfill
- Approximate property boundary based on Town of Greenland, Rye and North Hampton Tax Maps
- Railroad tracks

JOB # 97070G

ARIES ENGINEERING, INC.
environmental engineers and hydrogeologists

TECHNICAL ASSISTANCE SERVICES
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE

LANDFILL GAS MONITORING LOCATIONS

MARCH 2016 FIGURE 1

® 2016 ARIES ENGINEERING, INC.

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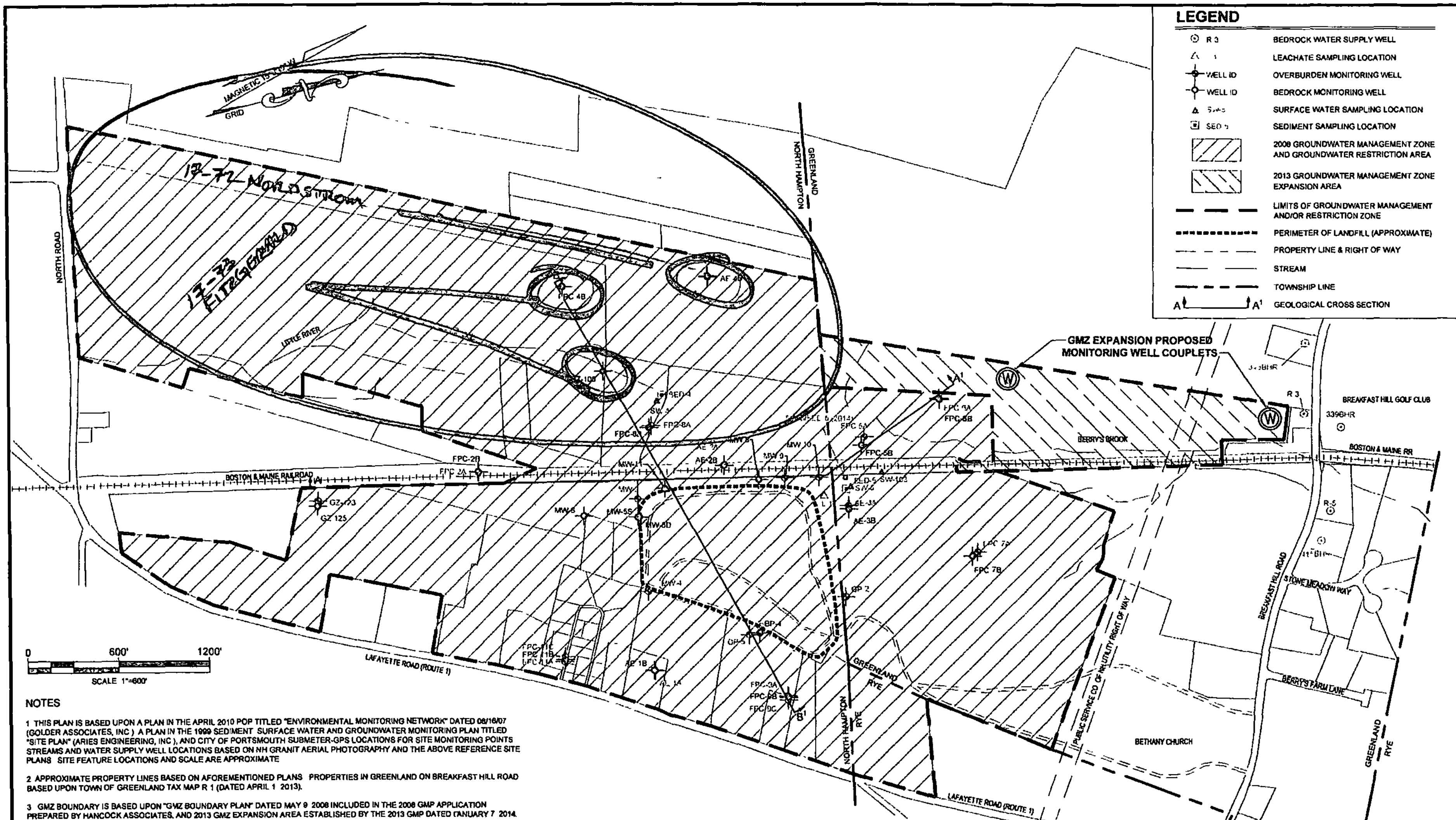


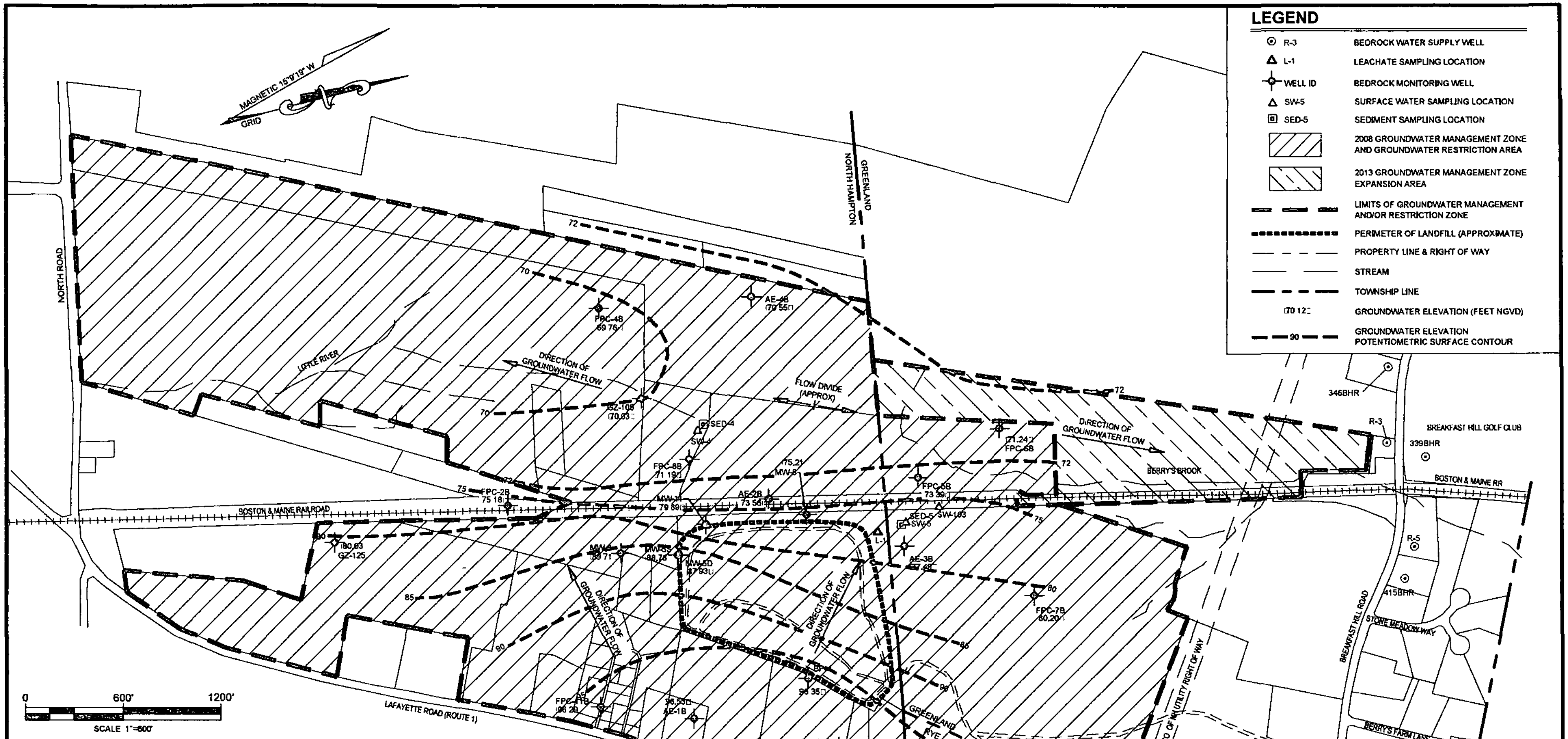
NOTES

1 THIS PLAN IS BASED UPON A PLAN IN THE APRIL 2010 POP TITLED "ENVIRONMENTAL MONITORING NETWORK" DATED 08/16/07 (GOLDER ASSOCIATES, INC) A PLAN IN THE 1999 SEDIMENT SURFACE WATER AND GROUNDWATER MONITORING PLAN TITLED "SITE PLAN" (ARIES ENGINEERING, INC), AND CITY OF PORTSMOUTH SUBMETER-GPS LOCATIONS FOR SITE MONITORING POINTS STREAMS AND WATER SUPPLY WELL LOCATIONS BASED ON NH GRANIT AERIAL PHOTOGRAPHY AND THE ABOVE REFERENCE SITE PLANS SITE FEATURE LOCATIONS AND SCALE ARE APPROXIMATE

2 APPROXIMATE PROPERTY LINES BASED ON AFOREMENTIONED PLANS PROPERTIES IN GREENLAND ON BREAKFAST HILL ROAD BASED UPON TOWN OF GREENLAND TAX MAP R 1 (DATED APRIL 1 2013).

3 GMZ BOUNDARY IS BASED UPON "GMZ BOUNDARY PLAN" DATED MAY 9 2008 INCLUDED IN THE 2008 GMP APPLICATION PREPARED BY HANCOCK ASSOCIATES, AND 2013 GMZ EXPANSION AREA ESTABLISHED BY THE 2013 GMP DATED JANUARY 7 2014.

PROJECT TITLE. COAKLEY LANDFILL SUPERFUND SITE NORTH HAMPTON & GREENLAND, NEW HAMPSHIRE	DWG: FIGURE 1-2	BY TND	REV:	DESCRIPTION:	CES INC Engineers • Environmental Scientists • Surveyors
		DATE. 2016-02-16	REV DATE:		
SHEET TITLE. GROUNDWATER MANAGEMENT ZONE & ENVIRONMENTAL MONITORING NETWORK	JN: 10424 003	APPROVED BY: SBM	ISSUE.	DESCRIPTION.	
	SCALE. 1"=600'	CHECKED BY: SBM	ISSUE DATE.		



NOTES

1. THIS PLAN IS BASED UPON A PLAN IN THE APRIL 2010 POP TITLED "ENVIRONMENTAL MONITORING NETWORK" DATED 08/16/07 (GOLDER ASSOCIATES, INC) A PLAN IN THE 1999 SEDIMENT, SURFACE WATER AND GROUNDWATER MONITORING PLAN TITLED "SITE PLAN" (ARIES ENGINEERING, INC) AND CITY OF PORTSMOUTH SUBMETER-GPS LOCATIONS FOR SITE MONITORING POINTS STREAMS AND WATER SUPPLY WELL LOCATIONS BASED ON NH GRANIT AERIAL PHOTOGRAPHY AND THE ABOVE REFERENCE SITE PLANS SITE FEATURE LOCATIONS AND SCALE ARE APPROXIMATE

2. APPROXIMATE PROPERTY LINES BASED ON AFOREMENTIONED PLANS PROPERTIES IN GREENLAND ON BREAKFAST HILL ROAD BASED UPON TOWN OF GREENLAND TAX MAP R-1 (DATED APRIL 1 2013).

3. GMZ BOUNDARY IS BASED UPON "GMZ BOUNDARY PLAN" DATED MAY 9 2008 INCLUDED IN THE 2008 GMP APPLICATION PREPARED BY HANCOCK ASSOCIATES AND 2013 GMZ EXPANSION AREA ESTABLISHED BY THE 2013 GMP DATED JANUARY 7 2014

PROJECT TITLE: COAKLEY LANDFILL SUPERFUND SITE NORTH HAMPTON & GREENLAND, NEW HAMPSHIRE	DWG: FIGURE 4	BY: TND	REV:	DESCRIPTION:	CES INC
		DATE: 2016-01-14	REV DATE:		
SHEET TITLE: SEPTEMBER 2015 BEDROCK GROUNDWATER POTENTIOMETRIC SURFACE	JN: 10424 005	APPROVED BY: SLY	ISSUE:	DESCRIPTION:	Engineers • Environmental Scientists • Surveyors
	SCALE: 1"=600'	CHECKED BY: SLY	ISSUE DATE:		

FILL MATERIAL

LANDFILL REFUSE

Outwash Dense brown, fine to coarse sand and gravel, trace silt, portions of sand and gravel vary widly with location

MARINE DEPOSITS Medium dense, gray clay and silt to soft gray silt and clay, locally stratified with fine sand

GLACIAL TILL Very dense, brown, fine to coarse sand, some fine to coarse gravel, little silt

CENTRAL SILICIC COMPLEX Generally consists of moderately hard to hard muscovite-biotite granite, quartz-feldspar granite, mylonite gneiss, and vein quartz complex likely correlates with the breakfast hill granite and the breakfast hill member of the rye gneiss

METAMORPHIC ROCKS Generally consist of soft to hard phyllite, meta-graywacke, quartzite, amphibolie, and schist These rocks likely correlate with the Rye Gneiss

CROSS SECTIONS BASED ON SECTION INCLUDED IN 2012 ANNUAL REPORT (PREPARED BY PROVAN & LORBER, INC)

GENERAL SOIL AND BEDROCK DESCRIPTIONS FROM PLANS PREPARED BY GZA/WESTON, REMEDIAL INVESTIGATION - OCT 1988

BOTTOM OF REFUSE BASED ON A PLAN PREPARED BY ARIES ENGINEERING INC NOV 1999 MONITORING PLAN REPORT, FIGURE 5 FEBRUARY 2000

BORING LOGS AND WELL CONSTRUCTION DETAILS FROM MULTIPLE SOURCES WERE USED

WELL DESIGNATION (OFFSET DISTANCE AND DIRECTION)

10

GENERALIZED GROUNDWATER POTENTIOMETRIC SURFACE

SCREENED / OPEN INTERVAL

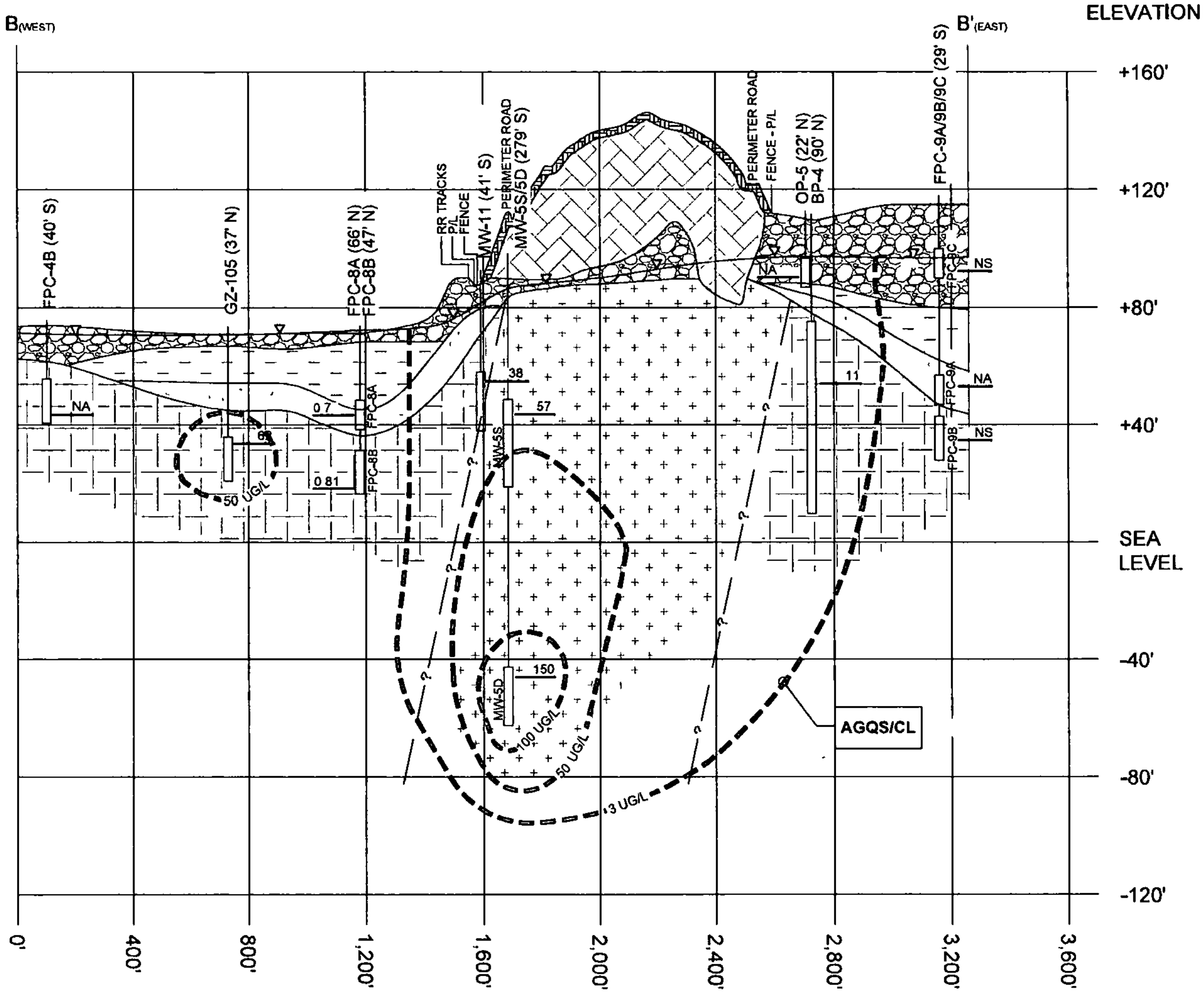
CONCENTRATION IN UG/L

LEGEND

100	ISOCONCENTRATION CONTOUR (UG/L)
N/A	SAMPLE COLLECTED BUT NOT ANALYZED FOR PARAMETER PLOTTED
N/S	NOT SAMPLED

0 400' 800'
HORIZONTAL SCALE 1"=400'

0 40' 80'
VERTICAL SCALE 1"=40'



GEOLOGICAL CROSS SECTION B-B'

PROJECT TITLE: COAKLEY LANDFILL SUPERFUND SITE NORTH HAMPTON & GREENLAND, NEW HAMPSHIRE	DWG: FIGURE 16	BY: TND	REV:	DESCRIPTION:	CES INC Engineers • Environmental Scientists • Surveyors
		DATE: 2016-01-14	REV DATE:		
SHEET TITLE: SEPTEMBER 2015 VERTICAL DISTRIBUTION OF 1,4 - DIOXANE IN GROUNDWATER B-B'	JN: 10424 005	APPROVED BY: SLY	ISSUE:	DESCRIPTION:	
	SCALE: 1"=600'	CHECKED BY: SLY	ISSUE DATE:		

TABLE 10

Contaminants of Concern Analytical Data (November 2000 – September 2015)

1,4-Dioxane (Low Level Method) in Groundwater

Coakley Landfill Superfund Site

North Hampton and Greenland, New Hampshire

Well ID / Appox. Date	Aug-09	Aug-10	Feb-11	Aug-11	Aug-12	Mar-13	Apr-13	Aug-13	Feb-14	Sep-14	Sep-15
Operating Unit 1 Wells											
BP-4	NA	NA	9	10	13	NS	NS	9.6	NS	12	11
MW-2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-4	NA	6	NS	6	2.5	NS	NS	4.8	NS	6.9	8.5
MW-5D	140	150	NS	140	140	NS	NS	INT	NS	130	150
MW-5S	70	90	NS	70	61	NS	NS	INT	NS	49	57
MW-6	< 1	NA	NS	< 1	< 0.25	NS	NS	< 0.25	NS	< 0 25	< 0.25
MW-8	310	230	NS	200	210	NS	NS	INT	NS	200	240
MW-9	NA	16	NS	14	30	NS	NS	6.1	NS	28	26
MW-10	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-11	100	45	NS	40	56	NS	NS	INT	NS	41	38
OP-2	NA	1	NS	1	1	NS	NS	1.2	NS	1 5	1 6
OP-5	NA	< 1	NS	< 1	NA	NS	NS	NA	NS	NA	NA
Operating Unit 2 Wells											
AE-1A	NA	NA	NS	< 1	NA	NS	NS	NA	NS	NA	NA
AE-1B	NA	NA	NS	< 1	NA	NS	NS	NA	NS	NA	NA
AE-2A	NA	12	NS	14	16	NS	NS	15	NS	16	13
AE-2B	NA	110	NS	80	82	NS	NS	88	NS	87	96
AE-3A	NA	23	NS	19	24	NS	NS	21	NS	25	24
AE-3B	NA	24	NS	19	27	NS	NS	INT	NS	26	25
AE-4A	NA	NA	NA	NA	< 0 25	NS	NS	NA	NS	NA	<0.25
AE-4B	NA	NA	NA	NA	< 0 25	NS	NS	NA	NS	NA	<0 25
FPC-2A	NA	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS
FPC-2B	NA	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS
FPC-4B	NA	NA	NA	NA	< 0 25	NA	NA	INT	NS	NA	NA
FPC-5A	NA	NA	NS	27	25	NS	NS	29	NS	NS	NS
FPC-5B	NA	NA	NS	50	53	NS	NS	INT	NS	64	67
FPC-6A	NA	NA	NS	NA	31	NS	NS	21	NS	26	30
FPC-6B	NA	NA	NS	NA	23	NS	NS	INT	NS	19	19
FPC-7A	NA	NA	NA	< 1	< 0 25	NA	NA	NA	NS	NA	NA
FPC-7B	NA	NA	NA	< 1	< 0 25	NA	NA	INT	NS	NA	NA
FPC-8A	NA	< 1	NS	< 1	0.51	NS	NS	0 6	NS	0 60	0 70
FPC-8B	NA	1	NS	< 1	0 93	NS	NS	INT	NS	0.62	0.81
FPC-9A	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
FPC-9B	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-9C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-11A	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
FPC-11B	NA	NA	NS	NA	NA	NS	NS	NA	NS	INT	1 4
FPC-11C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GZ-105	NA	NA	NS	80	98	NS	NS	INT	NS	69	82
GZ-123	NA	NA	NS	NA	NA	NS	NS	NS	NS	NS	NS
GZ-125	NA	NA	NS	NA	NA	NS	NS	NS	NS	NS	NS
Water Supply Wells											
R-3	NA	NA	NS	NA	0.4	0 45	NS	0 45	0 42	0.37	0 37
R-5	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS
346BHR	NS	NS	NS	NS	< 0 25	NS	NS	< 0.25	NS	< 0 25	< 0 25
339BHR	NS	NS	NS	NS	NS	NS	0 38	0.42	0.63	0.42	0.74
415BHR	NS	NS	NS	NS	NS	NS	< 0.25	< 0 25	NS	< 0 25	< 0 25

Table Notes.

1. All data in micrograms per liter (ug/L), parts per billion - Analysis by Method 8260B SIM (a low level detection limit methodology)
2. 1,4-dioxane not included on Method 8260B parameter list prior to August 2010. First analyses by 8260B SIM were completed in Aug. 2009.
3. Results for standard Method 8260B (detection limit of 50 ug/L) are not provided in this table
4. NHDES Ambient Groundwater Quality Standard (AGQS) for 1,4-dioxane is 3 ug/L Exceedances are identified with GRAY shading
5. An EPA Interim Cleanup Level (ICL) for 1,4-dioxane has not been established

Abbreviations:

NA = Not Analyzed, NS = Not Sampled, INT = Interval Sampled, < ## = reported concentration is less than the detection limit (##)

APPENDIX C – IC RELATED DOCUMENTS

Renewal of GMP Permit from NH DES dated January 7, 2014
EPA ESD August 2015

The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

Thomas S. Burack, Commissioner

January 7, 2014

Peter Britz
Environmental Planner
City of Portsmouth
1 Junkins Avenue
Portsmouth, NH 03801

Subject: **North Hampton** – Coakley Landfill Superfund Site, Groundwater Management Permit, DES #198712001, Project #431

Groundwater Management Permit Renewal Application, prepared by Summit Environmental Consultants, dated October 4, 2013

Dear Mr. Britz:

Please find enclosed Groundwater Management Permit Number **GWP-198712001-N-002**, approved by the Department of Environmental Services (Department). This permit is renewed and issued for a period of 5 years to monitor the effects of past discharges of contaminants of concern, as defined in Table 12 of the 1994 Site Record of Decision and subsequent decision documents.

All monitoring summaries and all required sampling results shall be submitted to the Groundwater Management Permits Coordinator at the address below. All correspondence must contain a cover letter that clearly shows the Department identification number for the site (DES #198712001). Please note that upon issuance of this permit, it is only necessary to submit monitoring results to the "Groundwater Management Permits Coordinator" and not to my attention.

The Groundwater Management Zone for this permit includes properties which are not owned by the permit holder and were not noticed or recorded with the original permit. Therefore, Condition #9 requires the permit holder to provide notice of the permit by certified mail, within 15 days of permit issuance, to those property owners of lots of record added to the Groundwater Management Zone since the original permit was issued. Documentation of the notification, in the form of a copy of the notice with return receipt(s), shall be submitted to the Department within 45 days of permit issuance.

Please note in future sampling & analysis plans and sampling activities the specific sampling methodologies for metals (e.g., total versus field filtered), as shown in the table under Standard Condition #7. In addition, sampling for metals (at minimum, arsenic and manganese) shall be conducted for all residential wells in the sampling program, as arsenic and manganese are above standards in certain GMZ compliance wells.

Also, please note that Condition #10 requires the permit holder to record "Notice" of the permit (not the permit), within 60 days of issuance, at the registry of deeds in the chain of title for each lot added to the Groundwater Management Zone since the original permit issuance. A separate Notice form for each newly added property within the Groundwater Management Zone shall be generated and recorded. The original notice on Lot 13 Map R1 should be amended to reflect the expanded GMZ within this lot.

An example Notice can be found on the Department's web page at the following link: http://des.nh.gov/organization/divisions/waste/hwrb/sss/grp/documents/example_notice_gmp.doc. A copy of each recorded Notice shall be submitted to the Department and, as appropriate, to the Towns of North Hampton, Greenland and Rye within 30 days of recordation.

Confirmation of the revised GMZ boundary for Map R1 Lot 13 is conditional upon analytical results from samples collected from four new compliance monitoring wells meeting established cleanup standards (see Special Condition 13), as discussed during a November 15, 2013 conference call.

Should you have any questions, please contact me at the Waste Management Division.

Sincerely,

Andrew Hoffman
Hazardous Waste Remediation Bureau
Tel: (603) 271-6778
Fax: (603) 271-2181
Email: Andrew.hoffman@des.nh.gov

Waste Management Division

Digitally signed by Waste Management Division
DN: cn=Waste Management Division, o=Environmental Services, ou=HWRB, email=elise.hubbard@des.nh.gov, c=US
Date: 2014.01.07 10:19:40 -05'00'

ec: Stephen B. Marcotte, Summit Environmental
Greenland Health Officer
North Hampton Health Officer
Rye Health Officer
Gerardo Millan-Ramos, EPA

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

The

NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES

hereby issues

GROUNDWATER MANAGEMENT PERMIT NO. GWP-198712001-N-002

to the permittee

COAKLEY LANDFILL GROUP

to monitor the past discharge of

Contaminants Of Concern
(as identified in Table 12 of the 1994 Record of Decision and subsequent decision documents)

at

COAKLEY LANDFILL
(480 Breakfast Hill Road)

in NORTH HAMPTON, N.H.

via the groundwater, surface water and sediment monitoring system comprised of

32 monitoring wells, 3 surface water, 2 sediment, and 1 leachate sampling locations and 5 residential drinking water supply wells

as depicted on the Site Plan and tables entitled

Environmental Monitoring Network (site plan);
OU-1 Groundwater Monitoring Wells and Water Supply Wells; and
OU-2 Groundwater Monitoring Wells

dated September 2013 (site plan) and July 2013 Revision 2.0 (tables), prepared by Summit Environmental Consultants

TO: COAKLEY LANDFILL GROUP
1 JUNKINS AVENUE
PORTSMOUTH, NEW HAMPSHIRE 03801

Date of Issuance: January 7, 2014
Date of Expiration: January 6, 2019

(continued)

Pursuant to authority in N.H. RSA 485-C:6-a, the New Hampshire Department of Environmental Services (Department), hereby grants this permit to monitor past discharges to the groundwater at the above described location for five years subject to the following conditions:

STANDARD MANAGEMENT PERMIT CONDITIONS

1. The permittee shall not violate Ambient Groundwater Quality Standards adopted by the Department (N.H. Admin. Rules Env-Or 600) in groundwater outside the boundaries of the Groundwater Management Zone, as shown on the referenced site plan and updated on the plot plan entitled *"Groundwater Monitoring Zone Plan"* prepared by Richard D. Bartlett & Associates, LLC., certified on December 11, 2013.

2. The permittee shall not cause groundwater degradation that results in a violation of surface water quality standards (N.H. Admin. Rules Env-Ws 1700) in any surface water body.

3. The permittee shall allow any authorized staff of the Department, or its agent, to enter the property covered by this permit for the purpose of collecting information, examining records, collecting samples, or undertaking other action associated with this permit.

4. The permittee shall apply for the renewal of this permit at least 90 days prior to its expiration date.

5. This permit is transferable only upon written request to, and approval of, the Department. Compliance with the existing Permit shall be established prior to permit transfer. Transfer requests shall include the name and address of the person to whom the permit transfer is requested, signature of the current and future permittee, and a summary of all monitoring results to date.

6. The Department reserves the right, under N.H. Admin. Rules Env-Or 600, to require additional hydrogeologic studies and/or remedial measures if the Department receives information indicating the need for such work.

7. The permittee shall maintain a water quality monitoring program and submit monitoring results to the Department's Waste Management Division no later than 45 days after sampling. Samples shall be taken from site monitoring wells, surface water and sediment sampling points as shown and labeled on the referenced site plan in accordance with the schedule outlined herein:

Monitoring Locations	Sampling Frequency	Parameters
FPC-4B, AE-4B	August each year	Bedrock well - field parameters, TAL metals (**total, unless highly turbid**), NHDES Waste Management Division full list of analytes for volatile organics (full list VOCs).
FPC-5A, MW-4, MW-9, OP-2	August each year	Overburden wells – field parameters, TAL metals (**dissolved**), 1,4-dioxane
FPC-6B, FPC-8B, GZ-105, AE-2B, AE-3B, MW-5S, MW-5D, MW-6, MW-8, MW-11	August each year	Bedrock wells – field parameters, TAL metals (**total, unless highly turbid**), full list VOCs, 1,4-dioxane.
FPC-7A, FPC-9A, FPC-11A, AE-1A, MW-10, OP-5	August each year	Overburden wells – field parameters, TAL metals (**dissolved**)

- 3 -**Monitoring Locations**	**Sampling Frequency**	**Parameters**
FPC-5B, BP-4	August each year	Bedrock well – field parameters, TAL metals (**total, unless highly turbid**), 1,4-dioxane
FPC-6A, FPC-8A, AE-2A, AE-3A	August each year	Overburden wells – field parameters, TAL metals (**dissolved**), full list VOCs, 1,4-dioxane
AE-4A	August each year	Overburden well – field parameters, TAL metals (**dissolved**), full list VOCs.
FPC-7B, FPC-11B, AE-1B	August each year	Bedrock wells – field parameters, TAL metals (**total, unless highly turbid**).
Residential, Surface Water, Sediment & Leachate		
368BHR (R-3), 339BHR	August & February each year	Bedrock drinking water well – Field parameters, arsenic & manganese (**total**), VOCs full list (EPA Method 524), 1,4-dioxane.
399BHR (R-5), 346BHR, 415BHR	August each year	Field parameters, arsenic & manganese (**total**), NHDES full list (EPA Method 524), 1,4-dioxane.
SW-4, SW-5, SW-103	August each year	Field parameters, ammonia, TAL metals (**dissolved**), full list VOCs.
SED-4, SED-5	August each year	Metals (total).
L-1	August each year	Field parameters, COD, ammonia, TAL metals (**dissolved**)

Sampling shall be performed in accordance with the documents listed in Env-Or 610.02 (e) and the approved Environmental Monitoring Plan. Samples shall be analyzed by a laboratory certified by the U.S. Environmental Protection Agency or the New Hampshire Department of Environmental Services pursuant to Env-C 300. All overburden groundwater samples collected for metal analyses shall be analyzed for dissolved metals; and thus must be field filtered (with a 0.45-micron filter) and acidified after filtration in the field. Surface water samples and samples collected from bedrock or water supply wells shall be analyzed for total metals, and shall not be filtered. As referred to herein, the term "TAL Metals" refers to aluminum, arsenic, barium, cadmium, calcium, chromium, copper, iron, lead, magnesium, mercury, nickel, potassium, selenium, silver, sodium, thallium, zinc, cobalt, beryllium, manganese, antimony, and vanadium.

Summaries of water quality shall be submitted annually to the Department's Waste Management Division, in the month of February, using a format acceptable to the Department. The Summary Report shall include the information listed in Env-Or 607.04 (a), as applicable.

The Annual Summary Report shall be prepared and stamped by a professional engineer or professional geologist licensed in the State of New Hampshire.

8. Issuance of this permit is based on the Groundwater Management Permit Application dated October 3, 2013 and the historical documents found in the Department file DES #198712001. The Department may require additional hydrogeologic studies and/or remedial measures if invalid or inaccurate data are submitted.

9. Within 15 days of the date of Department approval of this Groundwater Management Permit, the permittee shall provide notice of the permit by certified mail, return receipt requested, to all owners of **newly added lots** of record (i.e., not noticed under original permit) within the Groundwater Management Zone (see shaded lots in Special Condition #12). The permittee shall submit documentation of this notification to the Department within 45 days of permit issuance.

(continued)

10. Within 60 days of the date of Department approval of this Groundwater Management Permit, the permit holder shall record notice of the permit in the registry of deeds in the chain of title for each **newly added lot** within the Groundwater Management Zone (see shaded lots in Special Condition #12). The original notice on Lot 13 Map R1 shall be amended to reflect the expanded GMZ within this lot. **Recordation requires that the registry be provided with the name of current property owner and associated book and page numbers for the deed of each lot encumbered by this permit. Portions of State/Town/City roadways and associated right-of-way properties within the Groundwater Management Zone do not require recordation.** A copy of each recorded notice shall be submitted to the Department and to the governing body of each municipality in which the site or any lot within the GMZ is located within 30 days of recordation

11. Within 30 days of discovery of a violation of an ambient groundwater quality standard at or beyond the Groundwater Management Zone boundary, the permittee shall notify the Department in writing. Within 60 days of discovery, the permittee shall submit recommendations to correct the violation. The Department shall approve the recommendations if the Department determines that they will correct the violation.

SPECIAL CONDITIONS FOR THIS PERMIT

12. Recorded property within the Groundwater Management Zone shall include the lots, or portions thereof, as listed and described in the following table:

Tax Map / Lot No.	Property Address	Owner	Deed Ref. (Book / Page)
6/37	365 Lafayette Road, Rye	SNS LLC	5238/2463
10/11	355 Lafayette Road, Rye	Malcolm E. Smith III	5079/0262
17/72	67 North Road, North Hampton	Joan M Nordstrom	2416/583
17/73	65 North Road, North Hampton	Joseph F and Yolanda Fitzgerald	3007/2807
17/82	160 Lafayette Road, North Hampton	Luck Enterprises, Inc.	2473/1659
17/86	180 Lafayette Road, North Hampton	Christopher C and Louis J Fucci	3319/952
17/87	186 Lafayette Road, North Hampton	Lori A Lessard Trustee	2760/2099
21/8	188 Lafayette Road, North Hampton	Joseph J and Helen M McKittrick	2641/2656
21/10	8A Lafayette Terrace, North Hampton	John J Sr and Dorleena Wylie	4030/2567
21/11	12A Lafayette Terrace, North Hampton	Seth McAlister	5044/102
21/12	16A Lafayette Terrace, North Hampton	William and Christine Adinolfo	2963/1721
21/14	20 Lafayette Terrace, North Hampton	Joseph Hanley	4682/1265
21/14-1	40-42 Lafayette Terrace, North Hampton	James A C Jones	4451/1104
21/15	44 Lafayette Terrace, North Hampton	Joseph B and Bridget S Conner	4183/1638
21/16	46 Lafayette Terrace, North Hampton	Rodney K Booker Trustee	5196/2724

(continued)

Tax Map / Lot No.	Property Address	Owner	Deed Ref. (Book / Page)
21/17	1 Lafayette Terrace, North Hampton	Judith I and Bernard P Tracey	2450/687
21/18	3 Lafayette Terrace, North Hampton	Erin and Joshua Miller	5029/1768
21/19	5 Lafayette Terrace, North Hampton	Richard P and Kimberly M Bartlett	3824/2799
21/20	9 Lafayette Terrace, North Hampton	Alexis J Perron III	3088/1774
21/21	11 Lafayette Terrace, North Hampton	Kenneth and Tracey Margeson	3121/1606
21/22	15 Lafayette Terrace, North Hampton	Edward and Anita Gabree	3013/2221
21/23	Part of 11 Lafayette Terrace	Kenneth and Tracey Margeson	3121/1606
21/24	43 Lafayette Terrace, North Hampton	William Warman	4374/1365
21/25	45 Lafayette Terrace, North Hampton	ZCCMMXIIVOOOOOIIIII5INH LTD Partnership	2530/1863
21/26	198 Lafayette Road, North Hampton	Gozinta LLC	4275/904
21/27	206 Lafayette Road, North Hampton	206 Lafayette Road LLC	4785/379
21/27-1	200 Lafayette Road, North Hampton	Derek R Burt Trustee	5147/325
21/28	216 Lafayette Road, North Hampton	Stella A Ciborowski Trust	2414/729
21/28-1	216 Lafayette Road, North Hampton	Leo J Crotty Jr	2475/1278
21/29	212 Lafayette Road, North Hampton	S&L Realty Trust	3666/1199
21/31	224 Lafayette Road, North Hampton	SNS LLC	5238/2463
21/32	Coakley Landfill, North Hampton	Coakley Landfill LLC	3117/2934
21/33	Coakley Landfill, North Hampton	Coakley Landfill LLC	3117/2934
21/34	Lafayette Road Rear, North Hampton	James A C Jones	4451/1102
21/35	Lafayette Terrace Rear, North Hampton	James A C Jones	4451/1102
21/36	Lafayette Terrace Rear, North Hampton	James A C Jones	4451/1102
21/37	Lafayette Terrace Rear, North Hampton	Town of North Hampton	3415/1661
21/39	North Road Rear, North Hampton	Joan, Breen and Denise Grenier- Winther, Susan Sherr, and Caryn Blake	5142/2979
21/41	North Road Rear, North Hampton	Elmer M Sewall	1340/524
21/46	10 Lafayette Terrace / Part of 8A, North Hampton	John J Sr and Dorleena L Wylie	3219/2588

(continued)

Tax Map / Lot No.	Property Address	Owner	Deed Ref. (Book / Page)
*R1/13	340 Breakfast Hill Road (Portion Only)	Elmer M Sewall Rev Trust 96	3159/928
R1/9B	560 Breakfast Hill Road	Town of Greenland	3454/1131

Shaded rows indicate newly added lots that require notice per Standard Permit Conditions #9 and #10. The original notice on Lot 13 Map R1 should be amended and recorded to reflect the expanded GMZ within this lot.

*An expanded portion of the Sewall parcel (Tax Map R1 Lot #13) is included within the GMZ, as shown on the updated plot plan entitled *"Groundwater Monitoring Zone Plan"* prepared by Richard D. Bartlett & Associates, LLC., certified on December 11, 2013, and described as follows:

Commencing at a point on the easterly line of land now or formerly of the Boston and Maine Corporation, said point being a distance of 600.93 feet as measured along a curve to the left, having a central angle of 01°54'46" and a radius of 18,000.00 feet, from a steel pin set on the southerly sideline of Breakfast Hill Road marking the northeasterly most corner of said Boston and Maine land identified on tax map R1 as lot 11, thence by a curve to the left, having a central angle of 00°33'15" and a radius of 18,000.00 feet, a distance of 174.06 feet to a point, thence by a curve to the left, having a central angle of 00°24'32" and a radius of 11,425.51 feet, a distance of 81.56 feet to a point; thence S13°08'30"W a distance of 1,419.54 feet to a point; thence, N76°51'30"W a distance of 99.00 feet to a point at land now or formerly of Elmer M. Sewall Revocable Trust 96, thence, along said Sewall land, N35°09'35"E a distance of 88.02 feet to a point; thence, continuing by said Sewall land, N13°08'30"E a distance of 163.21 feet to a point; thence N76°51'30"W a distance of 434.00 feet, through said Sewall land to a point; thence S17°29'30"W a distance of 1,097.80 feet to a point on the Greenland-North Hampton town line, said point being N79°55'00"W a distance of 18.99 feet from a concrete bound, on said town line, engraved "G" and "N-H", thence, along said town line, N79°55'00"W a distance of 345.00 feet to a point; thence N23°21'55"E a distance of 2,504.63 feet to a point; thence N25°28'15"E a distance of 551.47 feet to a point; thence S72°51'15"E a distance of 221.87 feet to a point; thence S15°37'10"W a distance of 441.43 feet to a point; thence S75°34'35"E a distance of 166.70 feet continuing through said Sewall land and said Boston and Maine land to the point of beginning.

Containing 1,306,532 square feet or 29.99 acres, of which 27.42 acres is the land of the Elmer M. Sewall Revocable Trust 96 and 2.57 acres is the land of the Boston and Maine Corporation.

13. INSTALLATION OF NEW GMZ COMPLIANCE WELLS

Two well couplets (overburden and bedrock) shall be installed near the revised GMZ boundary. Locations to be confirmed with EPA & DES prior to construction. Wells shall be installed and sampled as part of the regular scheduled 2014 sampling program.

14. UNDEVELOPED LOTS WITHIN THE GROUNDWATER MANAGEMENT ZONE: Consistent with Env-Or 607.06(d), for each undeveloped lot, or portion thereof, which is within the Groundwater Management Zone and lacks access to a public water supply, the permittee shall contact the property owner annually to determine if a water supply well has been installed. The permittee shall include a report on this inquiry in the Annual Summary Report required in Standard Permit Condition #7. The results of these inquiries shall be documented in each Annual Summary Report.

Upon discovery of a new drinking water supply well within the Groundwater Management Zone, the permittee shall provide written notification to the Department and, to ensure compliance with Env-Or 607.06(a), submit a contingency plan to provide potable drinking water in the event the well is or becomes contaminated above the ambient groundwater quality standards. The potable water supply shall meet applicable federal and state water quality criteria. This plan shall be submitted to the Department for approval within 15 days of the date of discovery.

The permittee shall sample the new supply well within 30 days of discovery. The well shall be sampled for all the analytical parameters included in Standard Condition # 7, unless otherwise specified in writing by the Department. The permittee shall forward all analytical results to the Department's Waste Management Division, the Department's Environmental Health Program, and the owner of the drinking water supply well within 7 days of receipt of the results.

If the results for the new well meet the ambient groundwater quality standards, the permittee shall continue to sample the new wells annually as part of the permit. If the results for the new well indicate a violation of the ambient groundwater quality standards, the permittee shall notify the owner immediately and conduct confirmatory sampling within 14 days of receiving the original results.

Upon confirmation of a violation of the ambient groundwater quality standards in a new drinking water well, the permittee shall immediately implement the contingency plan to provide a potable drinking water supply that meets applicable federal and state water quality criteria.

15. All monitoring wells at the site shall be properly maintained and secured from unauthorized access or surface water infiltration.

16. The permittee shall update ownership information required by Env-Or 607.03(a)(20) for all properties within the Groundwater Management Zone prior to renewal of the permit or upon a recommendation for site closure.

Carl W. Baxter, P.E., Administrator
Hazardous Waste Remediation Bureau
Waste Management Division

Under RSA 21-0:14 and 21-0:9-V, any person aggrieved by any terms or conditions of this permit may appeal to the Waste Management Council in accordance with RSA 541-A and N.H. Admin. Rules, Env-WMC 200. Such appeal must be made to the Council within 30 days and must be addressed to the Chairman of the Waste Management Council, c/o Appeals Clerk, Department of Environmental Services Legal Unit, 29 Hazen Drive, P O. Box 95, Concord, NH 03302-0095.

Superfund Rec... Center
SITE Coakley Landfill
BREAK 5.4
OTHER 581119

FINAL
FIFTH EXPLANATION OF SIGNIFICANT DIFFERENCES (ESD) FOR OPERABLE UNIT – 1 AND THIRD ESD FOR OPERABLE UNIT – 2

COAKLEY LANDFILL SUPERFUND SITE
EPA ID: NHD064424153

NORTH HAMPTON AND GREENLAND, NH

August 2015

Fifth Explanation of Significant Differences (ESD) for Operable Unit – 1 (OU-1)
And Third ESD for Operable Unit – 2 (OU-2)
Coakley Landfill Superfund Site

August 2015

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COAKLEY LANDFILL SUPERFUND SITE

I. INTRODUCTION

A Site Name and Location

Coakley Landfill Superfund Site (Site) is located at 480 Breakfast Hill Road, Greenland, New Hampshire, and includes a large area in the Town of North Hampton, New Hampshire

B Lead and Support Agencies

Lead Agency United States Environmental Protection Agency (EPA)
Contact Gerardo Millan-Ramos, Remedial Project Manager (617) 918-1377

Support Agency New Hampshire Department of Environmental Services (NHDES)
Contact Andrew Hoffman, P E , Project Manager (603) 271-6778

C Legal Authority

Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U S C Section 9617(c), requires that, if the remedial action being undertaken at a site differs significantly from the Record of Decision (ROD) for that site, EPA shall publish an ESD and the reasons such changes were made The National Contingency Plan (NCP), 40 C F R § 300 435(c)(2)(i), and Office of Solid Waste and Emergency Response (OSWER) Directive 9200 1-23P, indicate that an ESD, rather than a ROD Amendment, is appropriate where the adjustments being made to the ROD are significant, but do not fundamentally alter the remedy with respect to scope, performance, or cost This ESD documents changes to certain components of the remedy set forth in the June 1990 ROD for OU-1 and the September 1994 ROD for OU-2 and subsequent ESDs to those RODs[1] EPA has determined that the adjustments to the 1990 and 1994 RODs provided in this ESD are significant, but do not fundamentally alter the overall remedy for OU-1 and OU-2 with respect to scope, performance or cost Therefore, this ESD is properly issued

[1] ESDs for the June 1990 ROD for OU-1 were issued on March 22, 1991, May 17, 1996, September 29, 1999, and September 28, 2007 with a reissue on July 1, 2009 An ESD for the September 1994 ROD for OU-2 was issued on September 28, 2007 with a reissue on July 1, 2009 These ESDs and the RODs for the Coakley Landfill Superfund Site may be found at the EPA-maintained website
http //yosemite epa gov/r1/npl_pad nsf/701b6886f189ceae85256bd20014e93d/406c3d9b0f2c81c58525690d0044968 4!OpenDocument

In accordance with Section 300 825(b) of the NCP, EPA voluntarily chose to hold a public comment period on this draft document from April 1, 2015 to April 30, 2015 to ensure that all interested parties had an opportunity to provide input to EPA before its final decision on this modification to the remedy

D Summary of the Circumstances Necessitating this ESD

In January 2008, New Hampshire began requiring groundwater sampling for 1,4-dioxane at all hazardous waste sites Since 2009, the contaminant 1,4-dioxane has been observed at both Operable Units of the Coakley Landfill Superfund Site, in both overburden and bedrock groundwater monitoring wells These wells include a number of wells located inside and outside the Groundwater Management Zone (GMZ) Some concentrations observed inside the GMZ have exceeded the New Hampshire Department of Environmental Services (NHDES) 1,4-dioxane Ambient Groundwater Quality Standard (AGQS) of 3 µg/L, including 1,4-dioxane concentrations at the northwestern boundary of the GMZ An expansion of the GMZ in this area was determined to be warranted and the NHDES issued a renewed Groundwater Management Permit on January 7, 2014, which expanded the GMZ and required the installation of two additional overburden/bedrock monitoring well couplets in the expansion area (see Attachment 3)

At the present time, the concentrations observed outside the expanded GMZ have not exceeded the AGQS, but based on all the available hydrogeological information, interpretation and evaluation of that information by the PRPs' consultant, and the review of such evaluation by NHDES and the EPA, the contaminant plume appears to be migrating westerly away from the landfill area toward the Berry's Brook Valley, and then turning to the north/northeast The detection pattern for 1,4-dioxane at the Site has been consistent with this interpretation of groundwater flow

Aware of potential residential development plans that include bedrock drinking water wells on property located at 410 Breakfast Hill Road, directly north of the Coakley Landfill, both EPA and NHDES expressed oral and written reservations about placement of additional bedrock wells in this area given the strong potential for these wells to cause groundwater contaminant migration, including 1,4-dioxane, from the Site towards the proposed residential development Other existing residential drinking water wells may also be impacted by such development Both EPA and NHDES have notified the Town of Greenland, the Town of North Hampton, the Town of Rye, and the potential developer of the existence of 1,4-dioxane exceedances in the groundwater plume at the northwestern-most corner of the GMZ boundary and the north/northeast direction of the groundwater flow and potential migration of the contaminant plume

Subsequent to these notices from the Agencies, on September 24, 2013, the Town of Greenland issued a conditional approval for the construction of a ten-lot residential subdivision development and associated bedrock drinking water wells on a property located at 410 Breakfast Hill Road (Tax Map R-1, Lot #10) As set forth in the Notice of Decision, the Town's approval was conditioned on the developer satisfactorily addressing, among other things, the Agencies' concerns about potential contamination migration and interfering with the ongoing remedy at the Site EPA understands that the Town of Rye Water District recently agreed to provide potable water that the City of Portsmouth can use to supply the potential ten-lot subdivision and a nearby church, and that such agreement has been recently ratified by the parties' governing bodies

EPA has determined that 1,4-dioxane is a contaminant in the groundwater that should be added to the list of Contaminants of Concern (COC) for the Site, and that a cleanup level (CL) for 1,4-dioxane in groundwater should be established

Therefore, for the reasons described above, this ESD includes the following

1 Formal incorporation of 1,4-dioxane as a Site COC in groundwater with the NHDES AGQS (3 µg/L) as a performance standard for monitoring the protectiveness of the remedy at OU-1 and as a CL at OU-2

2 Documentation of changes that have been made to the GMZ, Institutional Controls (ICs), and the Site's monitoring network

3 Institutional controls shall be established in accordance with the following

   a Land use restrictions, and/or other institutional controls (for example, a municipal ordinance regarding well drilling), prohibiting or restricting the installation of new wells and the increased use of existing wells, except those needed for response actions at the Site and approved by EPA, shall be implemented as approved by EPA for the properties located in the Town of Greenland identified on Tax Map R-1 as Lots #10, 11, 11A, 11B, and 12 The land use restriction(s), and/or other institutional controls, on these properties shall remain in place until—or shall not be required in the first instance if—further study is done, under EPA supervision and approval, concluding that such new wells or any increased use of existing wells will not cause groundwater contaminant migration from the Site, and that they will not interfere with the remedy at the Site

   b The groundwater monitoring program shall continue, in accordance with the RODs, ESDs, and associated EPA-approved Statements of Work and Work Plans (*e g* Sampling and Analysis Plan) If any existing or future wells in the monitoring program for OU-2 indicate exceedances of Cleanup Levels for Contaminants of Concern, further response actions shall be taken, which may include measures such as land use restriction(s), or other institutional controls, to restrict any use or extraction of groundwater, and/or provision of an alternate water source, such as connection to a public water supply line If any existing or future wells in the monitoring program for OU-2 indicate the potential for groundwater migration or interference with the remedy, further studies and/or response actions shall be taken

   c Any wells installed after the date of this ESD, as recorded in the inventory maintained by the New Hampshire State Water Well Board, within one mile to the north and northwest of the Landfill property, shall be reported by the PRPs annually to EPA Any proposals for new well installations, as submitted to the Town of Greenland, shall also be reported by the PRPs every six months to EPA

4 A change to terminology regarding groundwater cleanup levels in order to better reflect the changed process described below Specifically, Interim Cleanup Levels identified in the RODs and any subsequent ESDs are now considered Cleanup Levels While the term "Interim" is being eliminated, there is no change in the numeric groundwater cleanup levels identified in the RODs and subsequent ESDs that must be attained

5 Clarification on the approach that will be utilized to determine that groundwater Cleanup Levels have been attained, the groundwater restoration remedy is protective, and support for a determination that groundwater restoration is complete

E Availability of Documents

EPA considered and responded to all formal comments received during the comment period before issuing a final ESD EPA's response to these comments is attached as a Responsiveness Summary to this final ESD (Attachment 7) The ESD, supporting documentation for the ESD, and the Administrative Record are available to the public at the following locations and may be reviewed at the times listed below

U S Environmental Protection Agency
Office of Site Remediation and Restoration Records Center
5 Post Office Square, Suite 100
Boston, MA 02109-3912
Tel (617) 918-1440
Hours Monday - Friday 9 00 a m to 5 00 p m
Website http //www epa gov/region1/cleanup/resource/records/

North Hampton Public Library
237-A Atlantic Avenue North Hampton, NH 03862
Tel (603) 692-4587
Hours Monday/Wednesday 10 00 a m - 8 00 p m Tuesday/Thursday/Friday 10 00 a m - 5 00 p m Saturday 10 00 a m -2 00 p m
Website http //nhplib org

Greenland (Weeks) Public Library
36 Post Road, Greenland NH 03840
Tel (603) 436-8538
Hours Mon - Thu 10 00 am - 8 00 pm, Fri 10 00 am - 5 00 pm, Sat 9 00 am - 1 00 pm
Website http //www weekslibrary org

This ESD and the Administrative Record are available for public viewing at the locations and times listed above as well as on the internet at
http //www epa gov/region1/superfund/sites/coakley/

Adobe Reader is required to review the documents

II. SUMMARY OF SITE HISTORY, CONTAMINATION PROBLEMS AND SELECTED REMEDY

A Site History and Contamination Problems

The Coakley Landfill Superfund Site includes approximately 92 acres located within the towns of Greenland and North Hampton, Rockingham County, New Hampshire The actual landfill covers approximately 27 acres The Site is located about 400 to 800 feet west of Lafayette Road (U S Route I), directly south of Breakfast Hill Road, and about 2 5 miles northeast of the center of the town of North Hampton The landfill borders farmland, undeveloped woodlands and wetlands to the north and west and commercial and residential properties to the east and south

Landfill operations began in 1972, with the southern portion of the Site used for waste disposal from the New Hampshire municipalities of Portsmouth, North Hampton, Newington, and New Castle, along with Pease Air Force Base Concurrent with landfill operations, rock quarrying was conducted at the Site from approximately 1973 through 1977 Much of the refuse disposed of at Coakley Landfill was placed in open (some liquid-filled) trenches created by rock quarrying and sand and gravel mining

From July 1982 through July 1985, Pease Air Force Base and the municipalities of Rye, North Hampton, Portsmouth, New Castle, Newington and Derry, among others, began transporting their refuse to a new incineration plant within the Pease Air Force Base The Coakley Landfill generally accepted residue from the incineration plant beginning in July 1982 In March 1983, the New Hampshire Office of Waste Management (formerly the New Hampshire Bureau of Waste Solid Management) ordered the landfill closed to all waste disposal except burnt residue from the incinerator and in July 1985, the landfill was closed to all disposal activities

In 1979, the New Hampshire Office of Waste Management received a complaint concerning leachate breakouts in the area A subsequent investigation resulted in the discovery of allegedly empty drums with markings indicative of cyanide waste A second complaint was received in early 1983 by the New Hampshire Water Supply and Pollution Control Commission regarding the water quality from a domestic drinking water well Testing revealed the presence of five different volatile organic compounds (VOCs) Subsequent confirmatory sampling beyond these initial wells detected VOCs to the south, southeast, and northeast of the Coakley Landfill As a result, the town of North Hampton extended public water to Lafayette Terrace in 1983 and to Birch and North Roads in 1986 Prior to this time, commercial and residential water supply came from private wells

Also in 1983, the Rye Water District completed a water main extension along Washington Road to the corner of Lafayette Road (U S Route 1) and along Dow Lane This extension brought the public water supply into the area due east and southeast of the intersection of Breakfast Hill Road and U S Route 1 In December 1983, the Coakley Landfill was proposed for listing on the National Priorities List (NPL) and was eventually listed in 1986

In June 1990, EPA issued a ROD for the source control operable unit of the Site (OU-1) and in March 1991, EPA issued an OU-1 ESD concerning modifications related to landfill cap construction and emissions from air strippers that would treat the leachate The ROD for the management of groundwater migration operable unit (OU-2) was issued in September 1994 A second OU-1 ESD was issued in May 1996, which changed active landfill gas collection and treatment to a passive collection system A third OU-1 ESD was issued in September 1999, which documented the decision to eliminate leachate collection and treatment A fourth OU-1 ESD and the first OU-2 ESD were issued on September 2007 to document revisions to the MCL for arsenic, the EPA Health Advisory for Manganese, State standards, and to add tetrahydrofuran as a Site Contaminant of Concern The 2007 OU-2 ESD was re-issued on July 2009 in order to clarify a revision to the arsenic MCL A similar ESD was re-issued on July 2009 for OU-1

On-site groundwater is contaminated with arsenic, phenol, 1,4-dioxane, and methyl ethyl ketones, while off-site groundwater is contaminated with heavy metals, including arsenic, chromium, and lead, and VOCs, including benzene, 1,4-dioxane, tetrahydrofuran, and methyl ethyl ketones On-site soils and sediments are contaminated with arsenic and lead, stream sediment contaminants include arsenic and VOCs, among others, leachate contaminants include VOCs, tetrahydrofuran, and ketones, and nearby wetlands have shown detections of metals and VOCs Potential use of the groundwater as a drinking water supply remains the main threat to human health

In January 2008, following the establishment of the AGQS for 1,4-dioxane, NHDES required that the groundwater at all sites with hazardous waste be tested for 1,4-dioxane Subsequently, in August 2009, 1,4-dioxane was added to the list of groundwater parameters being tested for at the Site See Part III (Discussion of Significant Differences and the Basis for These Differences) for a further discussion of contamination problems at the Site associated with 1,4-dioxane

B <u>Summary of the Selected Remedy</u>

The remedy for the Site is divided into two operable units OU-1 (source control) and OU-2 (management of migration)

1 <u>OU-1</u>

The remedial objectives, as stated in the OU-1 ROD, are to

- Prevent ingestion of groundwater containing contamination in excess of federal and state drinking water standards or criteria, or that poses a threat to public health and the environment
- Prevent the public from direct contact with contaminated soils, sediments, solid waste and surface water which may present a health risk
- Eliminate or minimize the migration of contaminants from the soil into groundwater
- Prevent the off-site migration of contaminants above levels protective of public health and the environment
- Restore ground and surface water, soils and sediments to levels which are protective of public health and the environment

The major components of the source control portion of the remedy as modified by prior ESDs are

- Excavation with disposal onto the landfill, of contaminated sediment in the wetlands
- Consolidate solid waste
- Cap the landfill
- Fence the landfill
- Collect and vent landfill gases
- Long-term environmental monitoring
- Institutional controls – to prevent contact with site contaminants and to protect components of the remedy

ii OU-2

The ROD for the management of migration operable unit (OU-2) at the Site was issued in September 1994 The ROD, as modified by all prior ESDs, calls for the following

- Natural attenuation of the contaminated groundwater, which had migrated from beneath the landfill into off-site areas
- Long-term environmental monitoring and institutional controls

The 1990 OU-1 ROD and the 1994 OU-2 ROD identified Safe Drinking Water Act (42 U S C §300f et seq) Maximum Contaminant Levels (MCLs) (40 C F R 141, Subpart B and G) as chemical-specific Applicable or Relevant and Appropriate (ARARs) for the purposes of establishing groundwater cleanup standards for groundwater at OU-1 and OU-2 [2] The RODs also identified State standards, such as the New Hampshire Ambient Groundwater Quality Standards (AGQS), as ARARs The 1994 ROD explained that the AGQS have been established for Site groundwater contaminants for which no MCLs are established and are derived to be protective for drinking water uses

[2] The OU-1 ROD was later modified in the 2007 ESD to revise the MCLs to be action-specific standards to be used to monitor the protectiveness of the source control remedy rather than to establish cleanup standards for groundwater within the OU-1 compliance boundary MCLs continue to be chemical-specific cleanup levels for groundwater in the OU-2 ROD

The 1994 ROD set forth a process to evaluate attainment of remedial action objectives and overall protectiveness of groundwater restoration This process required that Interim Cleanup Levels be achieved and not be exceeded for a period of three (3) consecutive years, after which time a risk assessment on the residual groundwater contamination would be completed to confirm the protectiveness related to ingestion of water The potential risk associated with the inhalation of volatile organic compounds during showering would be comparable to those risks predicted for the ingestion route of exposure The 1994 ROD further stated that if the results of this risk assessment conclude that the remedy was not protective, remedial actions would continue until 1) protective levels were achieved and were not exceeded for three (3) consecutive years or 2) until the remedy was otherwise deemed protective It should be noted that the groundwater remediation at this Site addresses only those contaminants related to the Site

III. DESCRIPTION OF SIGNIFICANT DIFFERENCES AND THE BASIS FOR THESE DIFFERENCES

A Adding 1,4-dioxane as a Site Contaminant of Concern

1,4-dioxane is a clear liquid with a faint pleasant odor that mixes easily with water Once dissolved into water, it does not easily leave the water and enter into the air It is used primarily as a solvent in the manufacture of other chemicals and as a laboratory reagent 1,4-dioxane may also be present in trace amounts in cosmetics, detergents and shampoos Government agencies believe that 1,4-dioxane is likely to be carcinogenic to humans [3]

Currently, there is not a federal enforceable drinking water standard for 1,4-dioxane However, under New Hampshire Statutes (RSA 485-C 6), the NHDES Commissioner is directed to establish and adopt an Ambient Groundwater Quality Standard (AGQS) for contaminants which adversely affect human health or the environment Under the statute, where health advisories have been established for a contaminant and where such standards are based on a cancer risk, the AGQS for a contaminant shall be equivalent to a lifetime exposure risk of one cancer in one million (1 in 1,000,000 or 10^{-6}) exposed population [4] According to NHDES regulations, ambient groundwater quality standards are also considered drinking water standards if a Maximum Contaminant Level (MCL) standard has not been developed for a particular compound [5]

In 2005, NHDES adopted an AGQS for 1,4-dioxane of 3 micrograms per Liter (μg/L) based on information provided at the time by EPA's Integrated Risk Information System (IRIS) toxicological review

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[3] *See* Public Health Statement, 1,4-Dioxane, CAS#123-91-1 (April 2012, ATSDR, *available at* http //www atsdr cdc gov/phs/phs asp?id=953&tid=199

[4] Letter from Frederick J McGarry (NHDES Assistant Director, Waste Management Division) to all environmental professionals, Re "Change in Reporting Limit for 1,4-Dioxane " October 19, 2011

[5] NHDES Environmental Fact Sheet (WD-DWGB-3-24), 2011

In 2010, EPA developed a cancer risk screening level, which was updated in May 2014, for 1,4-dioxane in tap water of 0.78 µg/L using risk assessment guidance from the EPA Superfund program. This federal screening level guideline of 0.78 µg/L is equivalent to 1 in one million (1 in 1,000,000 or 10^{-6}) cancer risk which is at the most conservative end of EPA's acceptable risk range of between 10^{-6} (1 in 1,000,000) to 10^{-4} (1 in 10,000) cancer risk. The federal screening level for 10^{-4} (or 1 in 10,000) cancer risk is 78 µg/L. These screening values are considered by EPA to be protective of humans (including sensitive groups) over a lifetime. The New Hampshire's AGQS concentration of 3 µg/L for 1,4-dioxane is well within EPA's acceptable risk range for Superfund Sites.[6]

In January 2008, following the establishment of the AGQS for 1,4-dioxane, NHDES required that the groundwater at all sites with hazardous waste be tested for 1,4-dioxane. Subsequently, in August 2009, 1,4-dioxane was added to the list of parameters being tested for in the Site's groundwater. During that year, a subset of five bedrock wells, four within OU-1 (MW-5S, MW-5D, MW-8, and MW-11) and one within OU-2 (MW-6), were tested for 1,4-dioxane. The contaminant was not detected at the well in OU-2. However, it was detected at all four wells within OU-1 at concentrations ranging from 70 to 310 µg/L.

From 2009 to the present, the number of wells tested for 1,4-dioxane has increased. In general, results of long-term monitoring events in 2009, 2010, 2011, 2012, and 2013 have documented the presence of 1,4-dioxane at several wells, with the highest concentrations at wells in close proximity to the landfill. Historically, the highest observed level was 310 µg/L, at bedrock well MW-8 in 2009. See Attachments 3 and 5 for the location of these monitoring wells and currently known extent of 1-4-dioxane contamination.

Based on these and the subsequent sampling results discussed below, 1,4-dioxane is now incorporated as a contaminant of concern in groundwater for both OU-1 and OU-2 at the Coakley Landfill Superfund Site. A Cleanup Level of 3 µg/L is established through this ESD and all future monitoring activities and long-term monitoring plans, including monitoring performed as part of the Groundwater Management Plan, shall include sampling for 1,4-dioxane. New Hampshire's AGQS for 1,4-dioxane is identified as an applicable requirement and the State's fact sheet (WD-DWGB-3-24), 2011, stating that AGQS are considered drinking water standards if an MCL standard has not been developed for a particular compound, is identified as a guidance to be considered for the remedy. All other ARARs identified in the OU-1 and OU-2 RODs and subsequent ESDs remain the same (see Attachment 6).

The costs associated with this change, which includes costs related to sampling for one additional contaminant, 1,4-dioxane, are expected to be insignificant.

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[6] *See* Memorandum from Meghan Cassidy, Chief, Technical and Enforcement Support Section, EPA Office of Site Remediation & Restoration, to Gerardo Millan-Ramos, EPA Remedial Project Manager, "1,4-Dioxane, Coakley Landfill, North Hampton, NH," dated February 4, 2015.

B Expansion of the Existing Groundwater Management Zone

In 2008, NHDES approved a Groundwater Management Permit (GMP) application submitted by the Coakley Landfill Group (CLG) By this approval, a Groundwater Management Zone (GMZ) was established, which delineated the area around the landfill in which contaminated groundwater would be monitored Deed notices were also recorded to restrict the use of groundwater on parcels within the GMZ Beginning in 2009, after New Hampshire began requiring testing for 1,4-dioxane in groundwater, 1,4-dioxane has been observed at both Operable Units of the Coakley Landfill Superfund Site, in both overburden and bedrock groundwater monitoring wells These wells include a number of wells located inside and outside the former boundaries of the established GMZ for the Site

In 2009, five wells within OU-1 were sampled for 1,4-dioxane for the first time 1,4-dioxane was detected at concentrations ranging from 70 μg/L to 310 μg/L, well exceeding the AGQS, in four of the five monitoring wells tested Based on these results, it was recommended that additional monitoring wells be tested in both the overburden and the bedrock

Sampling results from 2010 showed that 1,4-dioxane was detected in samples collected from thirteen of fifteen monitoring wells at concentrations as high as 230 μg/L Eleven of the thirteen wells detected levels that exceeded the New Hampshire AGQS of 3 μg/L Concentrations of 1,4-dioxane were generally greater in bedrock wells compared to adjacent overburden wells

In 2011, sampling again was extended to additional wells 1,4-dioxane was detected at eight of ten monitoring wells sampled in OU-1 and in seven of 22 monitoring wells in OU-2 Thirteen of the fifteen detections exceeded the NH AGQS Detections of 1,4-dioxane in OU-2 were generally in wells close to OU-1 and these were again generally greater in bedrock wells compared to adjacent overburden wells

In the August 2012 sampling event, 1,4-dioxane was detected at eight of nine monitoring wells collected from OU-1, six at levels exceeding the AGQS, and in eleven of 22 monitoring wells in OU-2, eight at levels exceeding the AGQS The sampling results indicated that 1,4-dioxane concentrations at the perimeter of the then existing Site GMZ ranged from < 0 25 μg/L (below detection limit or BDL) at the farthermost monitoring wells (both bedrock and overburden) west of the landfill (FPC-4B, AE-4A, and AE-4B), to 23 μg/L and 31 μg/L (above the AGQS) at the northernmost bedrock and overburden monitoring wells (FPC-6A and FPC-6B) [7] The August 2012 sampling event is also noteworthy because it showed detections of 1,4-dioxane for the first time (albeit below the AGQS) at a residential well (R-3) outside the GMZ, to the north of the landfill

During the August 2013 sampling event, groundwater samples from a subset of thirty bedrock and overburden monitoring wells in both OUs were submitted for analysis of 1,4-dioxane These included eleven wells in OU-1 (MW-4, MW-5S, MW-5D, MW-6, MW-8,

[7] See Attachment 3 for the locations of the monitoring wells at the Site Attachment 2 shows the extent of the Coakley Landfill, which comprises Operable Unit 1 The management of groundwater migration operable unit (Operable Unit 2) comprises the rest of the Site

MW-9, MW-10, MW-11, OP-2, OP-5, and BP-4) and nineteen wells in OU-2 (FPC-4B, FPC-5A, FPC-5B, FPC-6A, FPC-6B, FPC-7A, FPC-7B, FPC-8A, FPC-8B, FPC-9A, AE-1A, AE-1B, AE-2A, AE-2B, AE-3A, AE-3B, AE-4A, AE-4B, and GZ-105)

1,4-dioxane was reported at concentrations exceeding the AGQS at 16 (53%) of all wells sampled The sixteen wells showing exceedances include seven wells at OU-1 (MW-4, MW-5S, MW-5D, MW-8, MW-9, MW-11, and BP-4) and nine wells at OU-2 (FPC-5A, FPC-5B, FPC-6A, FPC-6B, AE-2A, AE-2B, AE-3A, AE-3B, and GZ-105) These concentrations ranged from 4 6 to 250 µg/L at OU-1 and from 5 3 to 88 µg/L at OU-2, and they showed that the highest concentration observed (250 µg/L at MW-8) was approximately 19% higher than the highest value reported in the previous (August 2012) sampling event (210 µg/L at MW-8)

As part of the 2013 groundwater monitoring effort, isoconcentration maps showing the lateral and vertical distributions of total arsenic, total manganese and 1,4-dioxane concentrations in groundwater were prepared and interpreted by the PRPs' consultant From both the lateral and vertical distributions of these contaminants, and for 1,4-dioxane in particular, the following general conclusions were drawn[8]

- *In general, 1,4-dioxane concentrations in bedrock and overburden groundwater decrease with distance from the landfill area*

- *The horizontal and vertical distributions of 1,4-dioxane concentrations in bedrock and overburden groundwater are generally consistent with groundwater flow directions established using groundwater potentiometric surface elevations at wells and well couplets*

- *The pattern of the 1,4-dioxane-impacted groundwater area in bedrock and overburden groundwater is consistent with the predominant direction of groundwater flow being westerly away from the landfill area toward the Berry's Brook valley, where the direction of groundwater flow then turns to the north-northeast*

- *The extent of the 1,4-dioxane-impacted groundwater area extends beyond the area where elevated redox metal (arsenic, iron and manganese) concentrations are observed This result is consistent with previous interpretations (Summit, 2013a) indicating that 1,4-dioxane defines the leading edge of the impacted groundwater area*

See Attachment 5 for isoconcentration maps depicting the estimated contours of 1,4-dioxane concentrations in overburden and bedrock groundwater on the Site from 2010 to 2013 The maps illustrate the change in the areal extant of the 1,4-dioxane plume based on the highest concentrations detected across the years, indicating migration of the contaminant plume from the landfill to the north/northeast towards the Berry's Brook Valley

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[8] 2013 Annual Summary Report Summit Environmental Consultants January 17, 2014

Wells at the northwestern boundary of the former GMZ[9] (FPC-6A and FPC-6B) could not demonstrate a clean edge of the plume, as they showed exceedances of the 1,4-dioxane AGQS, the Arsenic Cleanup Level (CL) of 10 µg/L, and the Manganese CL of 300 µg/L As a result, an approximately 30-acre expansion of the GMZ in this area, along the northwestern boundary, was determined to be warranted This expansion was accomplished through the process and procedures contained in the New Hampshire regulations for Contaminated Site Management (NH Admin Code Env-Or 600, 607, 608, 610, 611) which were identified as applicable regulations in the OU-2 ROD and subsequent ESDs

The expansion of the GMZ has been documented in the Renewal of the Groundwater Management Permit (GMP) issued by NHDES to the CLG on January 7, 2014 It is an expanded portion of the Sewall parcel (Tax Map R1 Lot #13), as shown on the updated plot plan entitled "*Groundwater Monitoring Zone Plan*," prepared by Richard D Bartlett & Associates, LLC , certified on December 11, 2013, and described as follows

> *Commencing at a point on the easterly line of land now or formerly of the Boston and Maine Corporation, said point being a distance of 600 93 feet as measured along a curve to the left, having a central angle of 01°54'46" and a radius of 18,000 00 feet, from a steel pin set on the southerly sideline of Breakfast Hill Road marking the northeasterly most corner of said Boston and Maine land identified on tax map R1 as lot 11, thence by a curve to the left, having a central angle of 00°33'15" and a radius of 18,000 00 feet, a distance of 174 06 feet to a point, thence by a curve to the left, having a central angle of 00°24'32" and a radius of 11,425 51 feet, a distance of 81 56 feet to a point, thence S13°08'30"W a distance of 1,419 54 feet to a point, thence, N76°51'30"W a distance of 99 00 feet to a point at land now or formerly of Elmer M Sewall Revocable Trust 96, thence, along said Sewall land, N35°09'35"E a distance of 88 02 feet to a point, thence, continuing by said Sewall land, N13°08'30"E a distance of 163 21 feet to a point, thence N76°51'30"W a distance of 434 00 feet, through said Sewall land to a point, thence S17°29'30"W a distance of 1,097 80 feet to a point on the Greenland-North Hampton town line, said point being N79°55'00"W a distance of 18 99 feet from a concrete bound, on said town line, engraved G" and "N-H", thence, along said town line, N79°55'00"W a distance of 345 00 feet to a point, thence N23°21 55"E a distance of 2,504 63 feet to a point, thence N25°28'15"E a distance of 551 47 feet to a point, thence S72°51'15"E a distance of 221 87 feet to a point, thence S15°37'10"W a distance of 441 43 feet to a point, thence S75°34'35"E a distance of 166 70 feet continuing through said Sewall land and said Boston and Maine land to the point of beginning Containing 1,306,532 square feet or 29 99 acres, of which 27 42 acres is the land of the Elmer M Sewall Revocable Trust 96 and 2 57 acres is the land of the Boston and Maine Corporation*

The 2014 Notice of Groundwater Management Permit can be located at Book 5515, Page 1046 at the Rockingham County Registry of Deeds The map in Attachment 3 shows the expanded GMZ

The new GMP also requires the installation of four new GMZ compliance wells (two overburden/bedrock monitoring well couplets) near the expanded GMZ boundary Those

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[9] See Attachment 3 for a site plan of the former and extended boundaries of the GMZ and the locations of groundwater monitoring wells

wells should be installed and sampled as part of the 2015 annual sampling event Their exact location will be confirmed with NHDES and EPA prior to construction

The costs associated with this change, which includes costs related to the installation of wells, sampling and long-term monitoring, are expected to be minimal

C <u>Land Use Restrictions or other Institutional Controls</u>

Notably, 1,4-dioxane has been consistently detected at drinking water wells north of the boundary of the GMZ expansion area (R-3 and 339BHR) for the past three years The August 2013 sampling event detected levels of 1,4-dioxane at 0 45 µg/L at R-3 and 0 42 µg/L at 339BHR The February 2014 semi-annual long-term sampling event, which is required by NHDES as part of the GMZ permit, indicated similar levels, 0 41 µg/L at R-3 and 0 63 µg/L at 339BHR The detection of 1,4-dioxane at these locations is consistent with the pattern of 1,4-dioxane impacted groundwater and with the direction of groundwater flow being westerly away from the Coakley Landfill area toward the Berry's Brook Valley, where the direction of the flow turns to the north/northeast

Through discussions with NHDES, EPA has become aware of a potential residential subdivision, including the installation of bedrock drinking water wells, in an area directly north of the Coakley Landfill, in the Town of Greenland (Tax Map R-1, Lot 10) Both EPA and NHDES have notified the Town of Greenland, the Town of North Hampton, the Town of Rye, and the potential developer of the existence of 1,4-dioxane exceedances in the groundwater plume at the northwestern-most corner of the former GMZ boundary and the north/northeast direction of the groundwater flow within Berry's Brook Valley Both EPA and NHDES expressed oral and written reservations about development in this area given the strong potential for associated new wells to cause groundwater contaminant migration, including 1,4-dioxane, from the Coakley Landfill Site Other existing residential drinking water wells, located further north from the Coakley Landfill and the area of the proposed development, could also be impacted by such development

Subsequent to these notices, EPA and NHDES became aware that on September 24, 2013, the Town of Greenland issued a conditional approval related to the construction of a proposed ten-lot residential subdivision development and associated bedrock drinking water wells at 410 Breakfast Hill Road (Tax Map R-1, Lot #10), located at the southwest corner of the intersection of Breakfast Hill Road and the Boston & Maine Railroad, nearly abutting a portion of the expanded GMZ to the west As set forth in the Notice of Decision, the Town's approval was conditioned on the developer satisfactorily addressing, among other things, the Agencies' concerns about potential contamination migration and interfering with the ongoing remedy at the Site

Based on the sampling results from bedrock and overburden wells from 2009 to the present time that are discussed above and other Site information and data, EPA and NHDES believe the installation of drinking water wells in the proposed ten-lot residential subdivision development at 410 Breakfast Hill Road (Tax Map R-1, Lot #10) would have the strong potential to pull the contaminated groundwater plume, including 1,4-dioxane, from the Site into residential drinking water wells on the proposed development property, as well as existing residential properties to the north of the proposed development In addition, new wells or the increased use of existing wells in the area near the proposed residential subdivision have the strong potential to influence the groundwater plume

In order to prevent the potential for further migration of the groundwater contamination plume from the Site, including 1,4-dioxane, and to ensure contaminated groundwater migrating from Coakley Landfill is not used as drinking water and for other uses, institutional controls shall be implemented in accordance with the following

a Land use restrictions, and/or other institutional controls (for example, a municipal ordinance regarding well drilling), prohibiting or restricting the installation of new wells and the increased use of existing wells, except those needed for response actions at the Site and approved by EPA, shall be implemented as approved by EPA for the properties located in the Town of Greenland identified on Tax Map R-1 as Lots #10, 11, 11A, 11B, and 12 The land use restriction(s), and/or other institutional controls, on these properties shall remain in place until—or shall not be required in the first instance if—further study is done, under EPA supervision and approval, concluding that such new wells or any increased use of existing wells will not cause groundwater contaminant migration from the Site, and that they will not interfere with the remedy at the Site

b The groundwater monitoring program shall continue, in accordance with the RODs, ESDs, and associated EPA-approved Statements of Work and Work Plans (*e g* Sampling and Analysis Plan) If any existing or future wells in the monitoring program for OU-2 indicate exceedances of Cleanup Levels for Contaminants of Concern, further response actions shall be taken, which may include measures such as land use restriction(s), or other institutional controls, to restrict any use or extraction of groundwater, and/or provision of an alternate water source, such as connection to a public water supply line If any existing or future wells in the monitoring program for OU-2 indicate the potential for groundwater migration or interference with the remedy, further studies and/or response actions shall be taken

c Any wells installed after the date of this ESD, as recorded in the inventory maintained by the New Hampshire State Water Well Board, within one mile to the north and northwest of the Landfill property, shall be reported by the PRPs annually to EPA Any proposals for new well installations, as submitted to the Town of Greenland, shall also be reported by the PRPs every six months to EPA

See Attachment 4 for a depiction of the approximate location of the land use restriction(s) or other institutional controls described in subparagraph (a) above See Attachment 3 for a map showing the currently existing monitoring wells in the monitoring program If necessary, a survey of the exact location of the area subject to the land use restriction(s), or other institutional controls, will be conducted by the PRPs

As for the potential ten-lot subdivision to the north of the landfill, EPA understands that the Town of Rye Water District recently agreed to provide potable water that the City of Portsmouth can use to supply the subdivision and a nearby church
An agreement for the supply of such water has been executed by the Water District and the City, the agreement has been ratified by the parties' governing bodies Given the known potential for groundwater contamination to migrate due to the installation of new wells in this area, EPA will continue to coordinate with the Town and the State on other future development projects in this area

The costs associated with this change in regards to the implemented remedy, which may include costs related to the development and/or installation of wells, sampling and monitoring, are expected to be minimal There may be some additional costs associated with securing land use restrictions

D Change in Terminology for Groundwater Cleanup Levels

The 1994 ROD and subsequent ESDs established Interim Groundwater Cleanup Levels for site-related Contaminants of Concern (COCs) in groundwater The Interim Cleanup Levels were selected based on Maximum Containment Levels (MCLs) and non-zero Maximum Containment Level Goals (MCLGs) established under the federal Safe Drinking Water Act, or more stringent New Hampshire AGQS For contaminants without federal/state drinking water standards (ARARs), site-specific, risk-based Interim Cleanup Levels were calculated If a groundwater cleanup value identified by any of the methods described above was not capable of being detected with good precision and accuracy, or was below what was deemed to be the background value, then the practical quantification limit or background value was selected as the Interim Cleanup Level This ESD, while not changing any of the numeric groundwater cleanup values, adds a groundwater cleanup level for 1,4-dioxane and changes the terminology such that the Interim Cleanup Levels are now referred to as the Cleanup Levels for groundwater

The costs associated with this change are expected to be insignificant

E Evaluation of Cleanup Level Attainment

The 1994 ROD and subsequent ESDs described a process for evaluating when groundwater Cleanup Levels have been achieved Through this ESD, the evaluation of attainment of groundwater Cleanup Levels is being clarified and updated, as follows

The determination that groundwater Cleanup Levels have been met will now be based on site-specific considerations In particular, EPA will consider historical and current monitoring data, contaminant distribution, trend analysis, and the appropriateness of the compliance monitoring program (i e , locations, frequency of monitoring, sampling parameters, etc) At the time this determination is made, EPA will provide a complete description of this technical evaluation documenting attainment of groundwater Cleanup Levels

After all groundwater Cleanup Levels have been met, as determined by EPA consistent with Agency guidance at the available time, EPA will perform a risk evaluation which considers additive risk from remaining COCs considering all potential routes of exposure to document the residual risk based on exposure to groundwater at the Site The residual risk evaluation will document the potential risk associated with the concentrations of COCs remaining in groundwater at the Site (if detected)

This updated approach to evaluating attainment of groundwater Cleanup Levels, protectiveness of the groundwater remedy, and completion of groundwater restoration efforts reflects 1) acknowledgement that MCLs established under the Safe Drinking Water Act are deemed protective by EPA, 2) consideration of all potential routes of exposure for groundwater, 3) improved methods for assessing data variability and other dynamic aquifer conditions that impact monitoring data, and 4) reliance on up-to-date technical guidance and tools This updated approach will support determinations when groundwater at the Site has been restored for its permissible, beneficial use, and that the groundwater no longer presents an unacceptable risk to human health due to the presence of site-related contaminants

The costs associated with this change are expected to be minimal

IV. SUPPORT AGENCY COMMENTS

The NHDES reviewed the draft ESD and supports the changes to the 1990 ROD for OU-1 and the 1994 ROD for OU-2 The NHDES evaluated public comments on the draft ESD and concurs with this final ESD

V. STATUTORY DETERMINATIONS

In accordance with Section 121 of CERCLA, EPA, in consultation with NHDES, has determined that the modified remedy remains protective of human health and the environment, complies with all Federal and State requirements that are applicable or relevant and appropriate to the remedy as modified herein and is cost-effective Because the modifications are limited to addition of a COC and institutional controls, the revised remedy does not utilize permanent solutions and alternative treatment technologies to the maximum extent practicable for this Site

VI. PUBLIC PARTICIPATION

In accordance with Section 300 825(b) of the National Contingency Plan, EPA voluntarily chose to allow a 30-day public comment period prior to the finalization and signing of this ESD Such comment period was designed to allow consideration of any possible concerns from the public, local municipalities and/or the PRPs A draft of this ESD was issued publicly on April 1, 2015 A formal public comment period regarding the draft ESD was held from April 1, 2015 to April 30, 2015 EPA accepted written and e-mailed comments on this ESD which have been included in the administrative record, and provided a response to those comments in a Responsiveness Summary attached to this ESD (see Attachment 7)

VII. DECLARATION

For the foregoing reasons, by my signature below, I approve the issuance of this Fifth Explanation of Significant Differences for Operable Unit 1 and Second Explanation of Significant Differences for Operable Unit 2 of the Coakley Landfill Superfund Site in North Hampton and Greenland, New Hampshire, and the changes and conclusions stated therein

08/04/15
Date

Nancy Barmakian, Acting Director
Office of Site Remediation and Restoration
U S Environmental Protection Agency
Region 1 - New England

ATTACHMENT 1

Site Location Map of the Coakley Landfill Superfund Site

FIGURE 1
SITE LOCATION MAP

COAKLEY LANDFILL – NORTH HAMPTON, NH

PREPARED FOR

THE COAKLEY LANDFILL GROUP

DATE: JAN. 2014	DRAWN BY: SBM	CHECKED BY: MAD
JOB: 12-3173	1" = 1,500 FEET	FILE: 12-3173FIG1

Summit
Environmental Consultants
A CES, Inc. Company
640 MAIN ST.
LEWISTON, MAINE 04240
Tel.: (207) 795-6009
Fax: (207) 795-6128

ATTACHMENT 2

Map Showing OU-1 (area within landfill boundaries) and OU-2 (area within GMZ boundaries) prior to the GMZ extension approved by NHDES on January 7, 2014


NOTES
GROUNDWATER MANAGEMENT ZONE
RECORDED GROUNDWATER RESTRICTION
APPROXIMATE LANDFILL BOUNDARY
GREENLAND TAX MAP R-002
NORTH ROAD
US ROUTE 1
GROUNDWATER MANAGEMENT ZONE
NORTH HAMPTON
GREENLAND
COAKLEY LANDFILL
BREAKFAST HILL RD
R-7
MAP 17
MAP 21
MAP 16
MAP 20
RYE LANDFILL
NORTH HAMPTON
RYE
Summit
Environmental Consultants, Inc.
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE
COAKLEY LANDFILL GROUP
GROUNDWATER MANAGEMENT ZONE TAX MAP OVERLAY
FIGURE 3

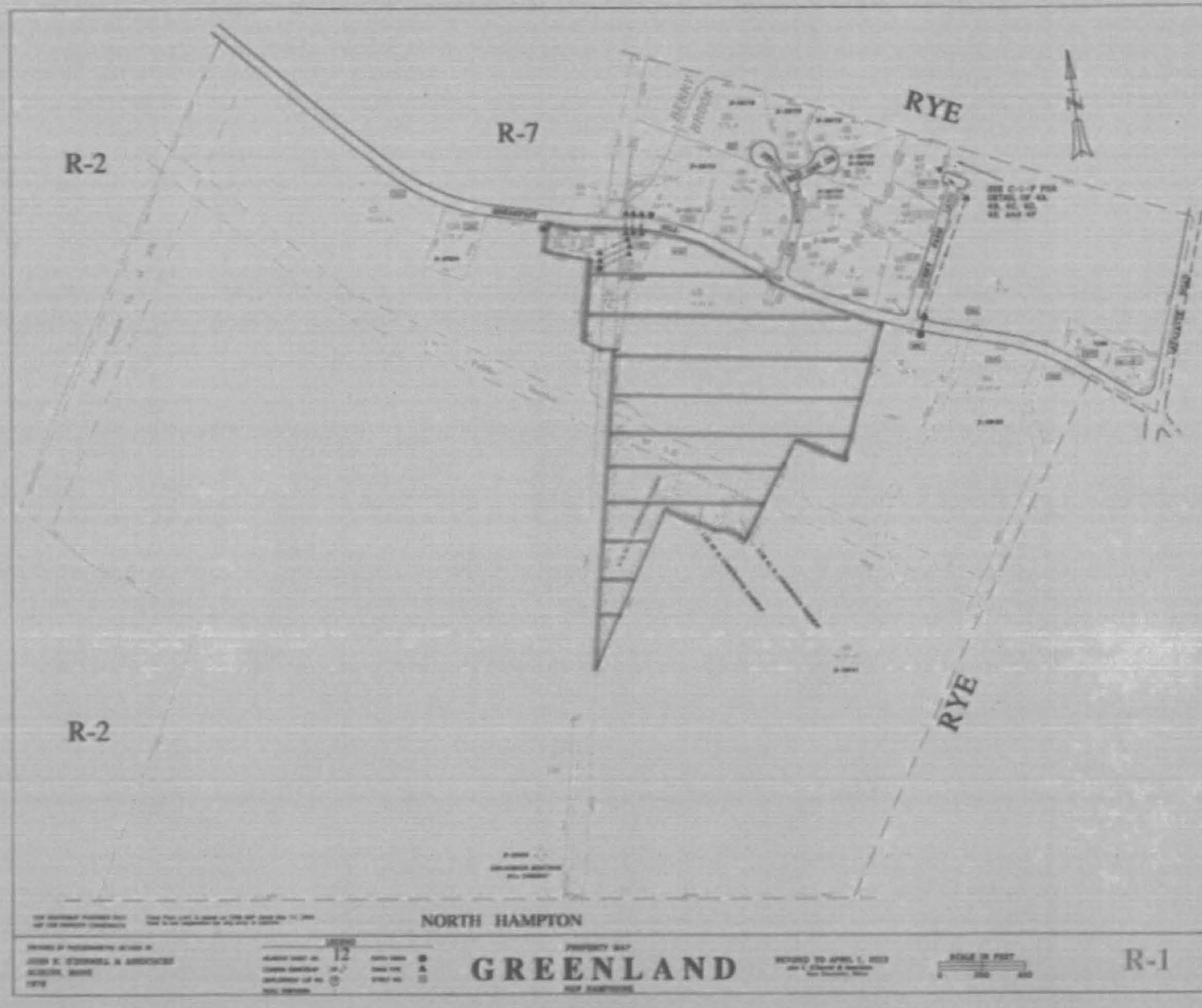
ATTACHMENT 3

Site Plan showing GMZ expansion and monitoring wells


LEGEND
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON & GREENLAND, NEW HAMPSHIRE
GROUNDWATER MANAGEMENT ZONE &
ENVIRONMENTAL MONITORING NETWORK
FIGURE 1-2
CES INC

ATTACHMENT 4

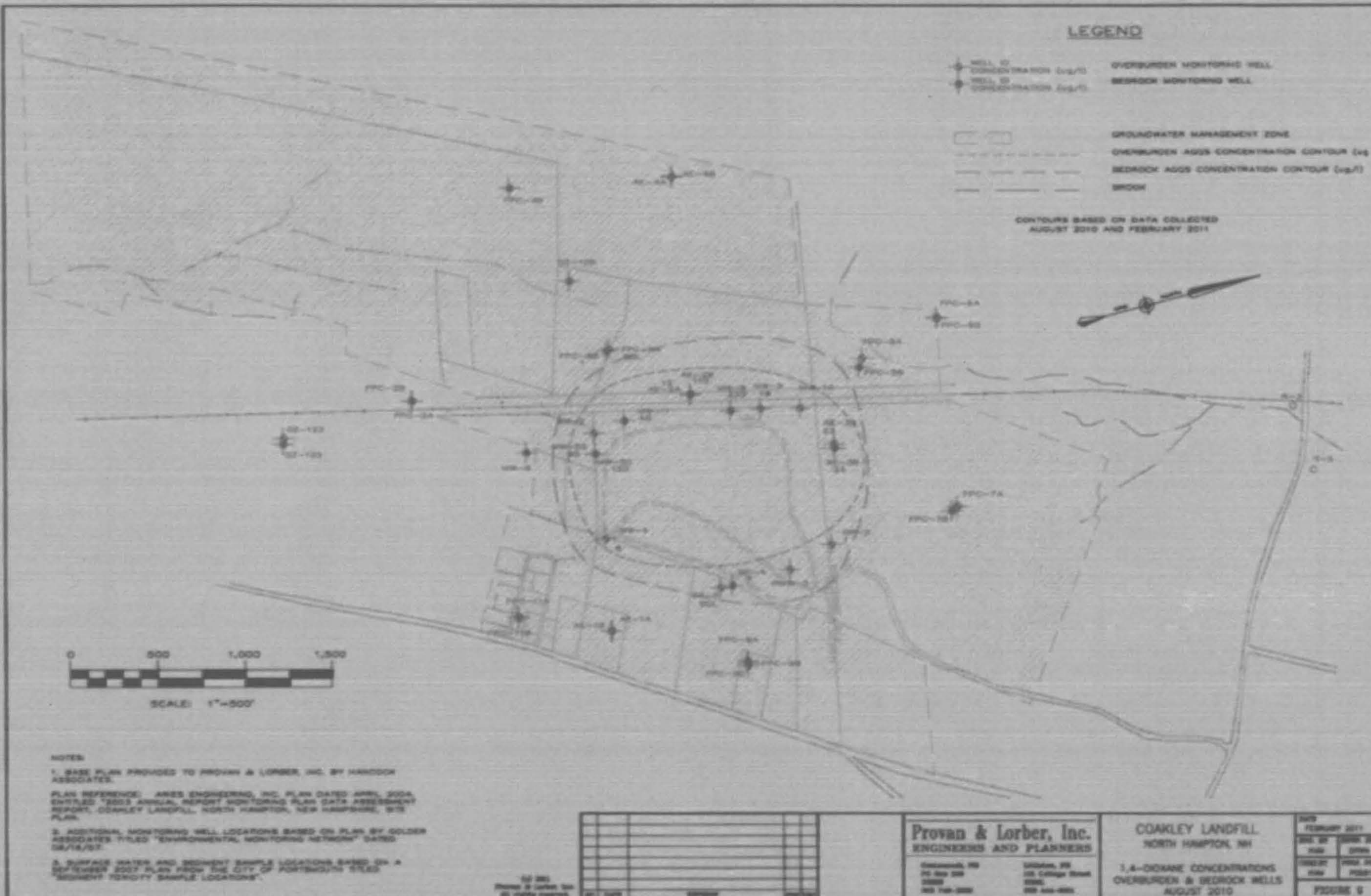
Tax map showing the approximate location of land use restrictions to be implemented



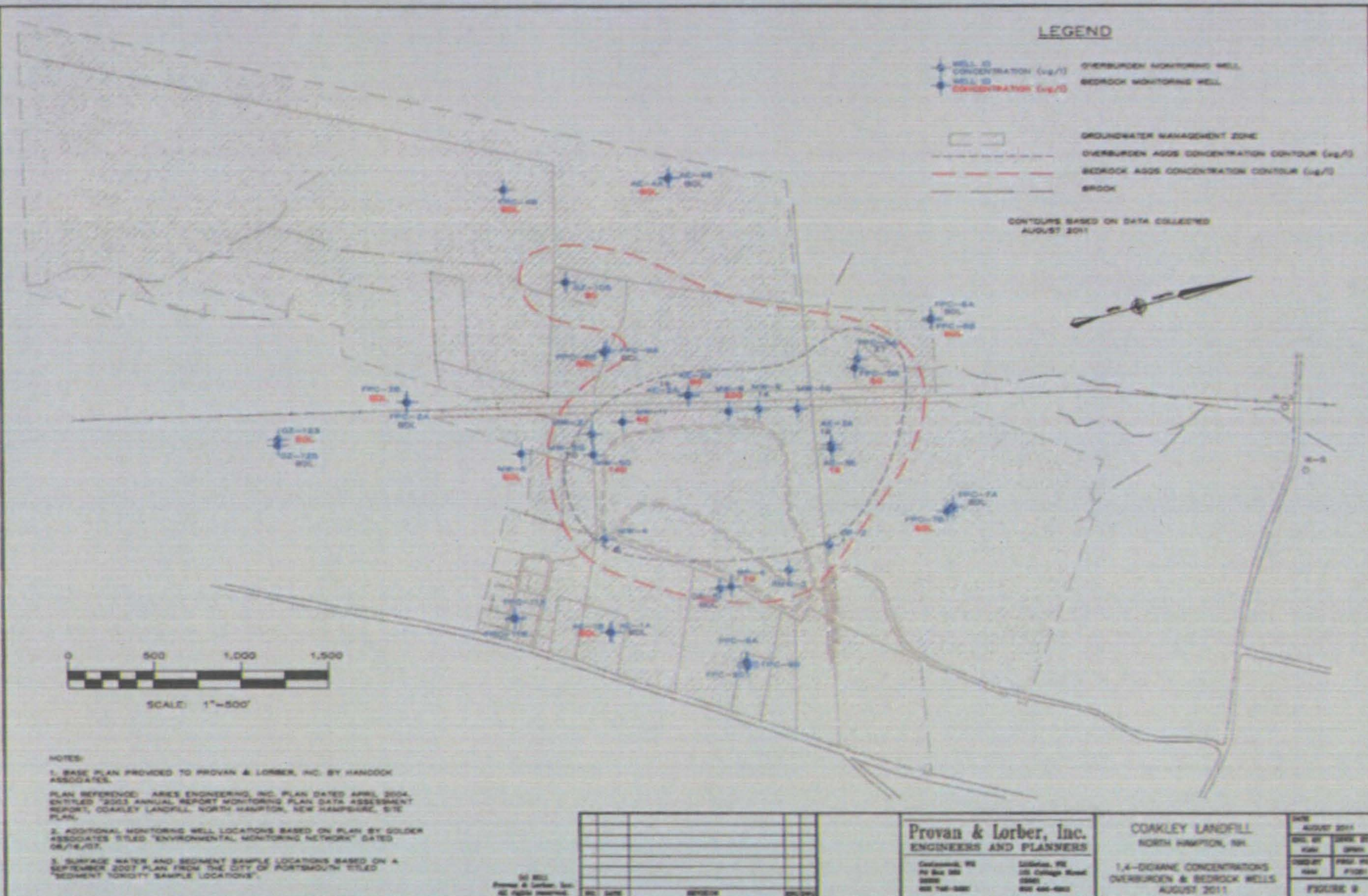
R-2
R-7
RYE
R-2
RYE
NORTH HAMPTON
12
GREENLAND
R-1

ATTACHMENT 5

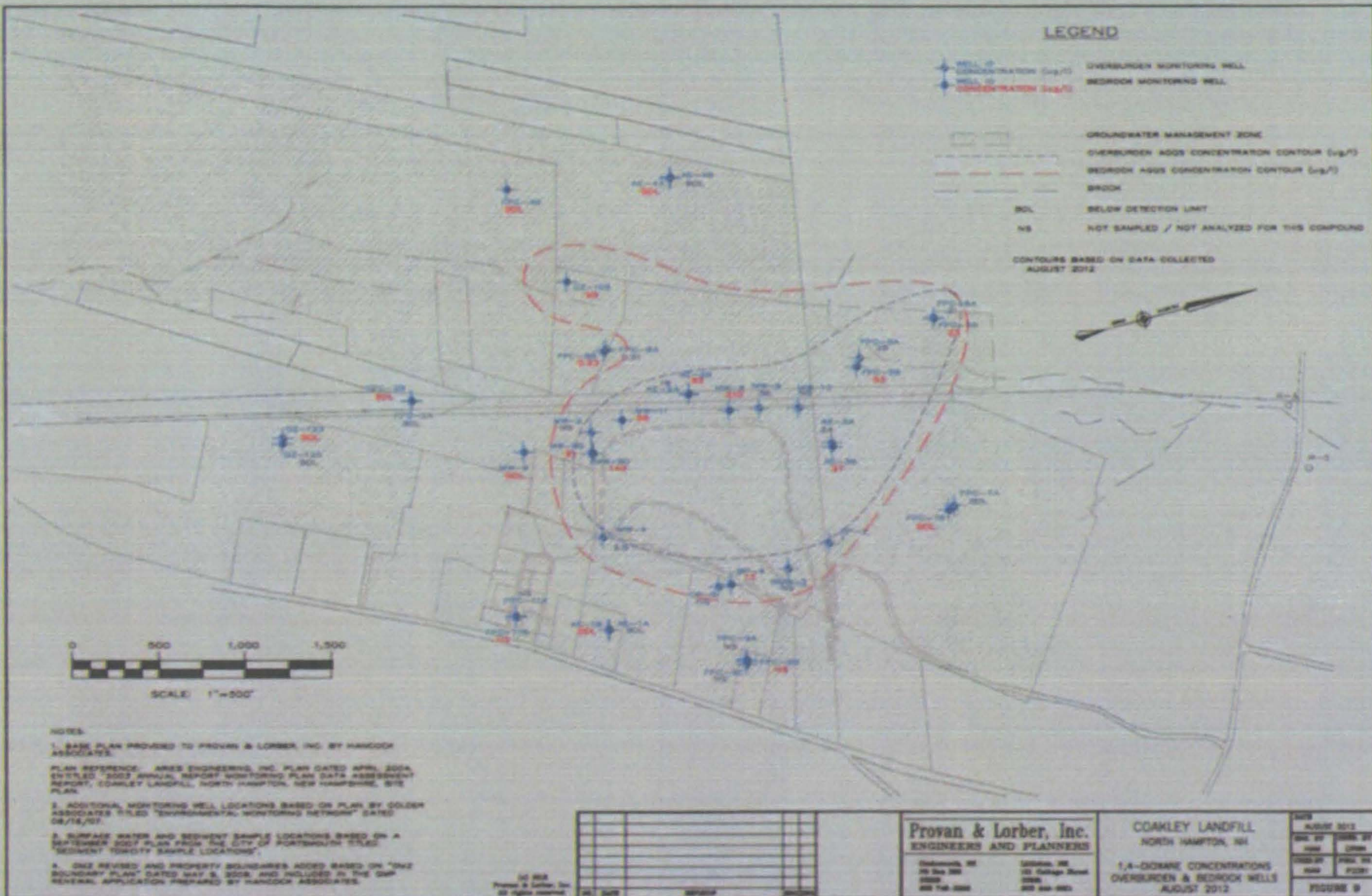
Isoconcentration Maps showing contours of 1,4-Dioxane contamination from 2010 to 2013



LEGEND
OVERBURDEN MONITORING WELL
BEDROCK MONITORING WELL
GROUNDWATER MANAGEMENT ZONE
BEDROCK AGQS CONCENTRATION CONTOUR (ug/l)
BROOK
CONTOURS BASED ON DATA COLLECTED AUGUST 2010 AND FEBRUARY 2011
0
500
1,000
1,500
SCALE: 1"=500'
Provan & Lorber, Inc.
ENGINEERS AND PLANNERS
COAKLEY LANDFILL
NORTH HAMPTON, NH
1,4-DIOXANE CONCENTRATIONS
OVERBURDEN & BEDROCK WELLS
AUGUST 2010



LEGEND
OVERBURDEN MONITORING WELL
BEDROCK MONITORING WELL
GROUNDWATER MANAGEMENT ZONE
BROOK
CONTOURS BASED ON DATA COLLECTED AUGUST 2011
0
500
1,000
1,500
SCALE: 1"=500'
NOTES:
1. BASE PLAN PROVIDED TO PROVAN & LORBER, INC. BY HANCOCK ASSOCIATES.
PLAN REFERENCE: ARIES ENGINEERING, INC. PLAN DATED APRIL 2004, ENTITLED "2003 ANNUAL REPORT MONITORING PLAN DATA ASSESSMENT REPORT, COAKLEY LANDFILL, NORTH HAMPTON, NEW HAMPSHIRE, SITE PLAN.
2. ADDITIONAL MONITORING WELL LOCATIONS BASED ON PLAN BY GOLDER ASSOCIATES TITLED "ENVIRONMENTAL MONITORING NETWORK" DATED 08/14/07.
3. SURFACE WATER AND SEDIMENT SAMPLE LOCATIONS BASED ON A SEPTEMBER 2007 PLAN FROM THE CITY OF PORTSMOUTH TITLED "SEDIMENT TOXICITY SAMPLE LOCATIONS".
Provan & Lorber, Inc.
ENGINEERS AND PLANNERS
COAKLEY LANDFILL
NORTH HAMPTON, NH
1,4-DIOXANE CONCENTRATIONS
OVERBURDEN & BEDROCK WELLS
AUGUST 2011
AUGUST 2011
FIGURE 9


LEGEND
OVERBURDEN MONITORING WELL
BEDROCK MONITORING WELL
GROUNDWATER MANAGEMENT ZONE
BROOK
BDL
BELOW DETECTION LIMIT
CONTOURS BASED ON DATA COLLECTED AUGUST 2012
0
500
1,000
1,500
SCALE: 1"=500'
NOTES:
Provan & Lorber, Inc.
ENGINEERS AND PLANNERS
COAKLEY LANDFILL
NORTH HAMPTON, NH
1,4-DIOXANE CONCENTRATIONS
OVERBURDEN & BEDROCK WELLS
AUGUST 2012
AUGUST 2012
FIGURE 9

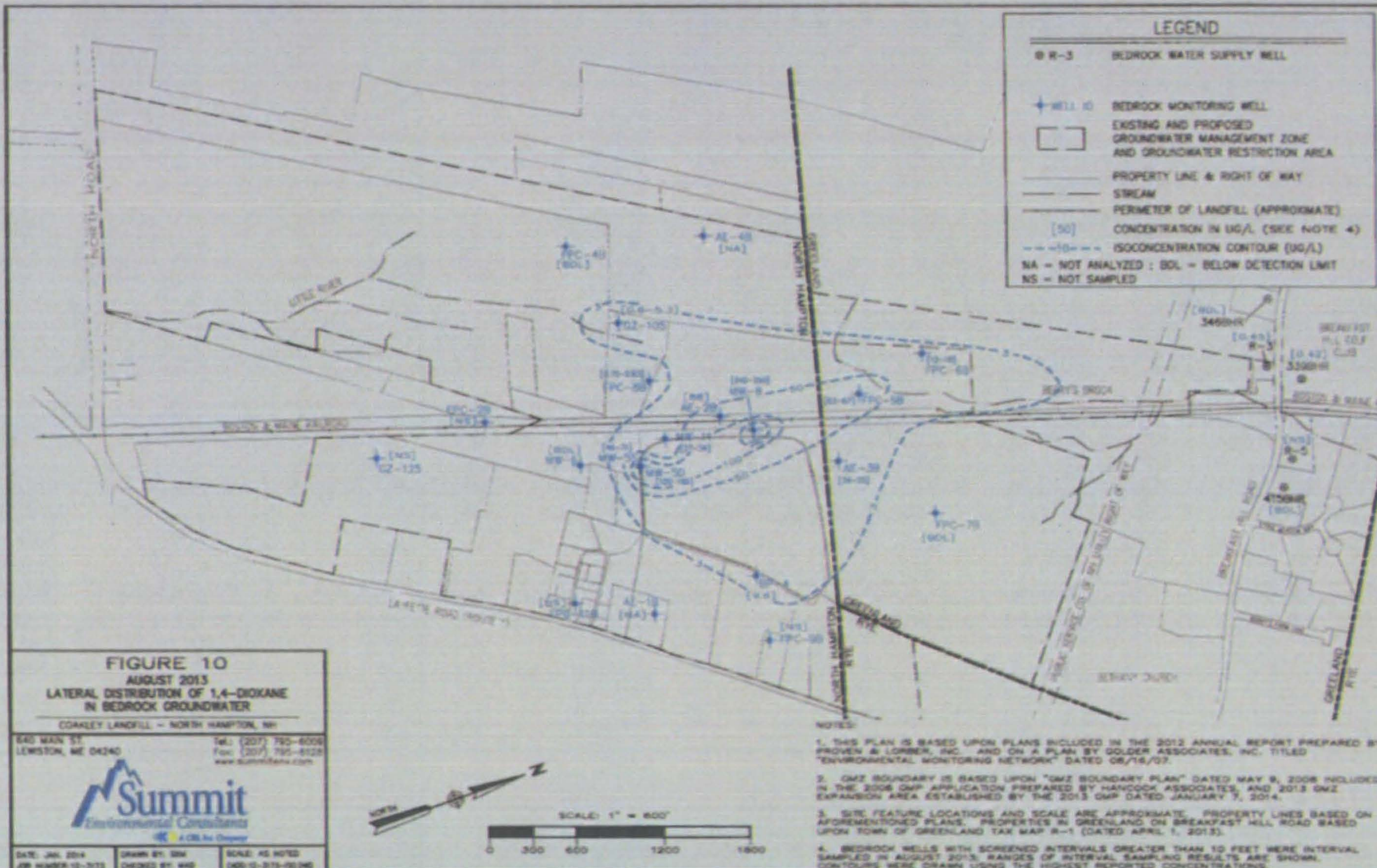

LEGEND
R-3 BEDROCK WATER SUPPLY WELL
WELL ID BEDROCK MONITORING WELL
EXISTING AND PROPOSED GROUNDWATER MANAGEMENT ZONE AND GROUNDWATER RESTRICTION AREA
PROPERTY LINE & RIGHT OF WAY
STREAM
PERIMETER OF LANDFILL (APPROXIMATE)
[50] CONCENTRATION IN UG/L (SEE NOTE 4)
ISOCONCENTRATION CONTOUR (UG/L)
NA = NOT ANALYZED ; BDL = BELOW DETECTION LIMIT
NS = NOT SAMPLED
NORTH ROAD
NORTH HAMPTON
GREENLAND
GREENLAND AVE
FIGURE 10
AUGUST 2013
LATERAL DISTRIBUTION OF 1,4-DIOXANE
IN BEDROCK GROUNDWATER
COAKLEY LANDFILL - NORTH HAMPTON, NH
640 MAIN ST.
LEWISTON, ME 04240
Tel.: (207) 795-6009
Fax: (207) 795-6128
Summit Environmental Consultants
DATE: JAN. 2014
JOB NUMBER 12-3173
DRAWN BY: SBM
CHECKED BY: MAG
SCALE: AS NOTED
SCALE: 1" = 600'
0 300 600 1200 1800
NOTES:
1. THIS PLAN IS BASED UPON PLANS INCLUDED IN THE 2012 ANNUAL REPORT PREPARED BY PROVEN & LORBER, INC. AND ON A PLAN BY GOLDER ASSOCIATES, INC. TITLED "ENVIRONMENTAL MONITORING NETWORK" DATED 06/16/07.
2. GMZ BOUNDARY IS BASED UPON "GMZ BOUNDARY PLAN" DATED MAY 9, 2008 INCLUDED IN THE 2008 GMP APPLICATION PREPARED BY HANCOCK ASSOCIATES, AND 2013 GMZ EXPANSION AREA ESTABLISHED BY THE 2013 GMP DATED JANUARY 7, 2014.
3. SITE FEATURE LOCATIONS AND SCALE ARE APPROXIMATE. PROPERTY LINES BASED ON AFOREMENTIONED PLANS. PROPERTIES IN GREENLAND ON BREAKFAST HILL ROAD BASED UPON TOWN OF GREENLAND TAX MAP R-1 (DATED APRIL 1, 2013).
4. BEDROCK WELLS WITH SCREENED INTERVALS GREATER THAN 10 FEET WERE INTERVAL SAMPLED IN AUGUST 2013; RANGES OF INTERVAL SAMPLING RESULTS ARE SHOWN. CONTOURS WERE DRAWN USING THE HIGHEST REPORTED CONCENTRATIONS.

FIGURE 7
AUGUST 2013
LATERAL DISTRIBUTION OF 1,4-DIOXANE IN OVERBURDEN GROUNDWATER

ATTACHMENT 6

Table of Applicable or Relevant and Appropriate Standards (ARARs)

Table 1. Coakley Landfill – OU-1
Action-Specific ARARs

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR
Federal Requirements			
ATSDR Public Health Statement, 1,4-Dioxane CAS#123-91-1 (April 2012)	To Be Considered	Public Health Statement from the Department of Health and Human Services provides information about 1,4-dioxane and effects of exposure to it	EPA considered this Statement when modifying the remedy.
State Requirements			
New Hampshire Ambient Groundwater Quality Standard (NH AGQS) for 1,4-Dioxane (Env-Or 603.03, Table 600-1)	Applicable	The NH AGQS for 1,4-dioxane is 3.0 µg/L. NH AGQS have been established for site groundwater contaminants for which no MCLs are established, and are derived to be protective for drinking water uses. The NH AGQS will be used for site contaminants where MCLs are not currently established	1,4-dioxane has been added as a contaminant of concern in groundwater for the Site. The NH AGQS of 3.0 µg/L for 1,4-dioxane is added as a performance standard for monitoring Site groundwater as part of the remedy
NHDES Environmental Fact Sheet, 1,4-Dioxane and Drinking Water (WD-DWGB-3-24) 2011	To Be Considered	This fact sheet describes New Hampshire's drinking water health standards as related to 1,4-Dioxane.	NH Fact Sheet states that by regulation, ambient groundwater quality standards are also considered drinking water standards if a Maximum Contaminant Level standard has not been developed for a particular compound.

Table 2. Coakley Landfill – OU-2
Chemical-Specific ARARs

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR
Federal Requirements			
USEPA Risk Reference Dose (RfDs)	To Be Considered	Reference Doses (RfDs) are estimates of the daily exposure levels that are unlikely to cause significant adverse non-carcinogenic effects over time	RfDs are used to characterize human health risks due to non-carcinogens in site media.
USEPA Cancer Slope Factors (CSFs)	To Be Considered	Cancer slope factors (CSFs) represent the upper-bound probability of an individual developing cancer as a result of a lifetime of exposure to a particular concentration of a potential carcinogen.	CSFs are used to compute the individual incremental cancer risk resulting from exposure to carcinogens in site media
Guidelines for Carcinogen Risk Assessment EPA/630/P-03/001F (March 2005)	To Be Considered	These guidelines provide guidance on conducting risk assessments involving carcinogens	Guidelines are used to evaluate all risk assessments on carcinogenicity
Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens EPA/630/R-03/003F (March 2005)	To Be Considered	These guidelines provide guidance on conducting risk assessments involving carcinogens.	Guidelines are used to evaluate all risk assessments on carcinogenicity in children
ATSDR Public Health Statement, 1,4-Dioxane CAS#123-91-1 (April 2012)	To Be Considered	Public Health Statement from the Department of Health and Human Services provides information about 1,4-dioxane and effects of exposure to it	EPA considered this Statement when modifying the remedy

Table 2. Coakley Landfill – OU-2
Chemical-Specific ARARs

State Requirements			
New Hampshire Ambient Groundwater Quality Standard (NH AGQS) for 1,4-Dioxane (Env-Or 603.03, Table 600-1)	Applicable	The NH AGQS for 1,4-dioxane is 3.0 µ/L. NH AGQS have been established for site groundwater contaminants for which no MCLs are established, and are derived to be protective for drinking water uses The NH AGQS will be used for site contaminants where MCLs are not currently established	1,4-dioxane has been added as a contaminant of concern in groundwater for the Site The NH AGQS of 3 0 µg/L for 1,4-dioxane is added as a cleanup level for Site groundwater as part of the remedy Long-term monitoring will include 1,4-dioxane and will be performed to evaluate whether the natural attenuation remedy is effective
NHDES Environmental Fact Sheet, 1,4-Dioxane and Drinking Water (WD-DWGB-3-24) 2011	To Be Considered	This fact sheet describes New Hampshire's drinking water health standards as related to 1,4-Dioxane	NH Fact Sheet states that by regulation, ambient groundwater quality standards are also considered drinking water standards if a Maximum Contaminant Level standard has not been developed for a particular compound.

ATTACHMENT 7

Responsiveness Summary

ATTACHMENT 7
RESPONSIVENESS SUMMARY

A. PREFACE

The purpose of this Responsiveness Summary is to document EPA's responses to the written questions, comments, and concerns raised during the public comment period on the draft fifth Explanation of Significant Differences (ESD) for OU-1 and third ESD for OU-2, prepared by the EPA for the Coakley Landfill Superfund Site (the "Site"). A Responsiveness Summary, although not required, is allowed under CERCLA §117 and the NCP §§300.430(f)(3)(i)(F) and 300.430(f)(5)(iii)(B).

The EPA held a 30-day comment period from April 1st to April 30th, 2015 on the draft ESD. Written comments were received by e-mail from two entities, a law firm representing the Sewall family (owners of land abutting the Site and the Site's Groundwater Management Zone (GMZ)), and Mr. Robert P. Sullivan, representing the Coakley Landfill Group (CLG). The CLG are the Settling Defendants in the Consent Decree for the Site. The letters and comments submitted to EPA are included in the Administrative Record. No other parties submitted comments to the EPA.

EPA considered all of the comments provided during the comment period, which are summarized in this document, before finalizing for signature this ESD for the Site. The comments received by EPA express opposition to or concerns about the Institutional Controls to be established in areas adjacent to the GMZ; however, none of the comments were in opposition to the other changes brought forth by the ESD. The State of New Hampshire concurs with and is supportive of this ESD for the Site.

B. COMMENTS RECEIVED AND EPA RESPONSES

The comments provided by the two entities are summarized below and the EPA response follows.

I. Peter V. Doyle from Shaines and McEachern, PA, a law firm representing the Sewall family, submitted a 10 page letter with four exhibits as attachments on April 29, 2015. The letter contains 10 specific questions (reproduced below).

The specific questions contained in the letter and EPA responses are as follows:

1. Questions about Institutional Controls and Public Water Supply

"Q. 1, a: What are the full array of steps being considered by the EPA, which fall under the general category of "institutional controls"?"

EPA Response:
The institutional controls that EPA will consider include, without limitation, restrictive easements, deed notices, advisories, the monitoring of well installations, and municipal by-laws or regulations. The goal of these controls is to prevent the exposure to Site contaminants by prohibiting the use of groundwater in the area highlighted in Attachment 4 of the ESD as drinking water. The controls also aim to prevent alterations to the groundwater flow that may hamper the effectiveness of the ongoing remedy, by causing plume migration and complexities adding to the cost and timeline of the cleanup.

"Q. 1, b: Has the EPA considered the impact on neighborhood homeowners and businesses if the proposed one mile prohibition against digging new wells is adopted? If so, in what way?"

EPA Response:
To clarify, the prohibition against digging new wells will be limited to the area highlighted in Attachment 4 of the ESD. The prohibition will not be applied to properties within a mile radius from the Site other than those already implemented by the CLG on various properties surrounding the Coakley Landfill. For properties within one mile to the north and northwest of the Landfill property (that is, the fenced area), the CLG, among other requirements, will be required to report annually to EPA any wells installed after the date of the ESD, as recorded in the inventory maintained by the New Hampshire State Water Well Board. Also, every six months the CLG will have to report to EPA any proposals for new well installations that have been submitted to the Town of Greenland.

"Q. 1, c: The Sewall family has five wells in or near the proximity to the Site. What happens if an existing well fails or, unacceptable contamination levels are found in the well?"

EPA Response:
Although it is unclear what specific wells are being referenced in the question, if any existing or future wells in the monitoring program for OU-2 of the Site, including drinking water wells, indicate exceedances of Cleanup Levels for Contaminants of Concern, further response actions shall be taken to protect human health and the environment. Such actions may include measures such as additional monitoring, land use restriction(s) (or other institutional controls) to restrict any use or extraction of groundwater, and/or provision of an alternate water source, such as connection to a public water supply line.

More specifically, should an existing Coakley Landfill monitoring well exceed applicable standards, EPA, in consultation with NHDES, will review the historical concentrations in that well and other proximal wells to determine the existence of any trends indicating attenuation, lack thereof, and/or migration. If such trends are detected, depending on the location of the well, additional response actions will be considered, including an increase or decrease in the frequency of monitoring, the installation of additional monitoring wells, and the provision of alternative water supplies. A recent example is what occurred with the Coakley Landfill monitoring well FPC-6A, which showed concentrations of arsenic and manganese above the NHDES standards in 2013. Because that well was considered a well demonstrating a clean edge of the GMZ, EPA and NHDES required the extension of the GMZ further north/north-east from the Landfill, and required the CLG to install two additional monitoring well couplets (overburden and bedrock well) within the extended GMZ. (Note that well FPC-6A is not a drinking water well.)

If a new drinking water supply well is installed on any undeveloped lot, or portion thereof, which is within the Groundwater Management Zone and becomes impacted above applicable standards, consistent with the GMP, the NHDES will require the CLG to provide an alternative source of drinking. The goal of the GMP, and the associated residential and Site groundwater monitoring program, is to delineate and monitor for contaminated groundwater impacts.

"Q. 1, d· In the event of a failure of a well for reasons other than contamination, will the purpose of the well make a difference (irrigation v. drinking water) as to whether it can be replaced?"

EPA Response:
EPA assumes that this comment refers to wells that belong to the Sewall family or other parties that are not part of the Site's monitoring program. However, it is difficult to respond to this question in the abstract, without knowing details about the particular well, such as location, pumping rate, depth of the well, and contaminant levels in and near the well. Nevertheless, as a general matter, if the well in question presented a risk to human health or the environment, EPA probably would give a higher priority to the replacement of a drinking water well rather than an irrigation well.

2. Questions about a subtle shift between the EPA September 25, 2013 letter and the draft proposal.

"Q 2,a: In the draft proposal the language that wells were proposed for development might possibly draw contaminants toward them has become "strong" probability in the draft for public comment. What is the new evidence to support this change in language?"

EPA Response:
Between September 25, 2013 and April 1, 2015, the regulatory agencies (EPA and NHDES) obtained additional information (that is, increased concentrations of contaminants at some existing and new monitoring wells) that reinforced and augmented EPA's concern about plume migration to the north/north-east of the GMZ boundary. Specifically the February 2014 Data Transmittal dated April 25, 2014 revealed the presence of manganese in residential wells for the first time and the continued presence

of 1,4-dioxane in those wells (R-3 and 339BHR). Also, the 2013 Annual Summary Report dated July 28, 2014 showed an increasing concentration trend of manganese and arsenic at well FPC-6A and an exceedance of the NHDES AGQS for 1,4 dioxane in this same well plus well couplet FPC-5A/B, among others. When compared to previous data, an increasing contaminant trend appears to be developing in the area north/north-east of the GMZ boundary. This observation, together with the available information about the general groundwater flow direction in the area, supports EPA's increased concern about contaminant migration.

"Q. 2,b: While proposing to impose institutional controls (prohibiting use of ground water, deed restrictions, drilling prohibitions etc.) the draft proposal also states that provision of a potable public water supply might also be required (page 14, paragraph b) Is the EPA prepared to stand behind and fight for this necessary provision?"

EPA Response:
EPA is strongly in favor of the construction of an extension to the existing public water supply to serve residential homes in the proposed subdivision located along the southern side of Breakfast Hill Road. EPA has had several conversations with the CLG about this water line extension. EPA understands that an Agreement between interested stakeholders for the supply of water for the proposed subdivision has very recently been executed and ratified by the City of Portsmouth and the Town of Rye. In addition, EPA realizes the additional agreements that must be achieved among all stakeholders in order for the public water extension to proceed. Also, see EPA's response to Q. 1, c. above.

"Q 2,c. The language in the Millán-Ramos letter of September 25, 2013, assigning blame to nearby residents for using ground water and threatening them with PRP status is absent from the draft proposal. Does this absence reflect a repudiation of the initial EPA approach of blaming the neighborhood property owners for the ground water attenuation plume?"

EPA Response:
EPA's letter did not blame the residents for using groundwater nor did it threaten them with responsible party status. The September 25, 2013 letter simply informed Mr. Stuart Gerome, Chairman of the Town of Greenland Planning Board, and Mr. Christian Smith, Engineer at Beals and Associates Inc., about EPA's concern that the proposed residential wells and other existing wells could pull contaminated groundwater from the Site and the nearby Rye Landfill. The letter also described the potential liabilities that could arise from using the groundwater and thus causing the plume to migrate beyond its current known limits. These potential liabilities are a legal reality under CERCLA. Nothing in the draft ESD language changes EPA's position as expressed in the aforementioned letter.

3. <u>Questions about EPA and the Responsible Parties v. the Neighborhood.</u>

"Q. 3, a: How is EPA or its scientists able to know when and where the 1,4 dioxane first migrated offsite?"

<u>EPA Response</u>:
The current state of the science does not allow EPA to pinpoint the exact time a release of 1,4 dioxane first migrated from the Landfill. However, EPA is able to identify the general location and direction of the plume migration by evaluating all the existing information about the geology and hydrology of the Site and the area around the Site, and by testing for the presence of 1,4 dioxane and other contaminants throughout the network of monitoring wells near the landfill and within the GMZ.

In the commenter's letter, the preceding paragraph to the question above, states that "*The first 1,4 dioxane samples were taken in 2009, about fifteen years after capping the landfill.*"

EPA would like to clarify that 1,4-dioxane is an emergent contaminant that was not known to exist at the time the Site's Remedy was selected. The first sampling took place in 2009 as a result of an NHDES initiative mandating testing for 1,4 dioxane for all CERCLA sites within New Hampshire.

"Q. 3,b: How does it know that the 1,4 dioxane was not present offsite [sic] *a decade earlier?"*

<u>EPA Response</u>:
It is not possible to ascertain whether 1,4 dioxane was present prior to 2009 because sampling for 1,4 dioxane began in 2009. Please see response to Q. 3,a above.

"Q. 3,c: In the absence of such knowledge how does the EPA conclude that using ground water from offsite [sic] *wells will draw the contaminant plume in that direction?"*

<u>EPA Response</u>:
The current knowledge of the Site's geology, hydrology, groundwater flow, contaminant concentration trends within the network of monitoring wells, and evaluations performed by the PRP's consultant, all indicate that a component of the groundwater flow is moving from the landfill generally along the valley of Berry's Brook to areas north and north-east from the landfill. Any extraction of groundwater in those areas, especially those closest to the Berry's Brook valley, has the potential to draw Site's contaminants further in that direction (north/north-east of the Site). This is a likely and reasonable expectation given the known Site-specific conditions at this time.

In addition to the specific questions above, there are a couple of comments in Mr. Doyle's letter to which EPA gives a response:

Comment:
On page 4, the letter argues that the ESD establishes a one-mile prohibition on the installation of drinking water wells, making existing groundwater sources not useable, which leads to property losses. It also states that, accordingly, the Responsible Parties should be required to deliver a source of potable water to all impacted properties, including all of Breakfast Hill Road.

EPA Response:
EPA is not establishing a one-mile prohibition on the installation of drinking water wells. Please see the response to question Q. 1,b above.

EPA believes that the CLG should address potable water for the proposed subdivision and any other property with exceedances of applicable contaminant standards due to contaminated groundwater migrating from the Site. Note that the Groundwater Management Permit granted by NHDES also requires that the CLG provide potable water in certain circumstances.

Comment:
On page 8, the Section titled "Anticipated Costs", states that although EPA claims that there will be minimal costs, there will be substantial costs to innocent landowners if institutional controls are imposed without a requirement that the Responsible Parties provide potable water. The Section also states that the only just compensation for the loss of free access to property ground water and the stigma created by the institutional controls, is the mandatory provision of potable water to Breakfast Hill Road.

EPA Response:
EPA understands the concerns about substantial costs to landowners if the restriction on the drilling of new wells and the increased use of existing wells is imposed without a provision of an alternate source of potable water. To that effect, EPA plans to coordinate the timing of the institutional controls with the extension of the existing waterline to service the proposed residential subdivision.

II. Robert P. Sullivan, Chair of the CLG submitted a three page letter on April 30, 2015. The letter basically asks EPA to delete the requirement to implement institutional controls (ICs) as described in Section III.C.a. of the draft ESD, or to make those ICs more regulatory than prohibitive. They argue that other elements of the ESD (*e.g.* the expansion of the groundwater management zone for the Site under the State program, the monitoring program, and the required notification to EPA of new wells installed in the area) are more than adequate to provide EPA and the Group notice of any uses of uncontaminated land in the vicinity of the Site that might warrant concern about groundwater plume migration, and the flexibility to craft appropriate measures to address such uses. They also argue that the land use restrictions would be neither necessary nor appropriate in light of the fact that they would be more onerous than existing ICs on properties where contamination has been detected, and the fact that one portion of the proposed IC area, where a development has been proposed, can be provided with public water.

The following is a list of the significant assertions included in Mr. Sullivan's letter and a specific response from EPA:

1. On the first page, second paragraph: "*The CES Report concluded that private groundwater withdrawals at the proposed subdivision could be accomplished without adversely impacting the migration of the existing groundwater plume.*"

   EPA Response:
   EPA disagrees with the conclusion above from the May 2, 2014 CES Report (the Report). The Report does not provide enough data and hydrogeological analysis to support such a conclusion. A more robust study (for example, a prolonged pumping test to evaluate the possibility of fracture interconnections) is necessary in order to determine with better certainty if a pumping rate exists that can be deemed safe (that is, not capable of adversely impacting the migration of the existing plume). The statements of a previous report (Groundwater Management Zone Evaluation, February 2013) by the same consultants (known as Summit Environmental Consultants at the time) appear to be at odds with the conclusion in the Report noted above. Specifically the February 2013 Evaluation indicates that a component of the groundwater flow moves to the west of the landfill and then north, basically following the valley of Berry's Brook. This assertion was also expressed in the 2013 Annual Summary Report prepared by Summit Environmental Consultants in January 17, 2014. See third bullet on page 11 of the ESD. Absent a more rigorous study about the effect of pumping rates upon the Site's plume, EPA cannot accept CES's conclusion and must implement a restriction on the drilling of new wells and the increased use of existing wells to prevent potential exposures to the Site's contaminated groundwater.

   Another concern and reason to implement ICs is that the Report appears to be based on an EPM ("equivalent porous medium") assumption for bedrock. In other words, they are analyzing the bedrock groundwater data as if it behaves just like overburden (above the bedrock). This assumption is simplistic, unlikely to be accurate, and does not capture the nature of the bedrock which needs further expert examination of the data as a whole. For example, it is very likely that North East-striking fractures extend from the Coakley landfill in the direction of the proposed subdivision. If this is true, fracture pathways may allow for a preferential pathway for contaminant migration in this direction either through pumping or just by ambient gradients.

2. On the first and second page, second and third paragraph: "*...The idea that it is necessary to impose land use restrictions...appears overly conservative, is well beyond typical*

measures imposed for other sites...given that other elements of the draft ESD appropriately provide...EPA and the Group notice of any activities or conditions that might warrant greater attention. All of these provisions will provide a more than sufficient early warning system..."

EPA Response:
The other IC elements (that is, the expansion of the GMZ under the State Program, the monitoring program described in Section III.C.b. of the ESD, and the required notification to EPA of new wells installed in the area, as provided in Section III.C.c. of the ESD) are not sufficient by themselves. Although they form part of an early warning system, by themselves these measures do not prevent the possibility of plume migration, human exposures to the contaminated groundwater, and the ongoing remedy being compromised. EPA guidance encourages the "layering" of ICs to provide more protectiveness. See Page 9, December, 2012, *Institutional Controls: A Guide to Planning, Implementing, Maintaining, and Enforcing Institutional Controls at Contaminated Sites* ("Often ICs are more effective if they are layered or implemented in series"). Also it should be noted that not all ICs will apply to the same areas around the Site.

3. On the second page, the last sentence of the first partial paragraph,: "*It would be unnecessarily overbroad for EPA to impose blanket land use restrictions...when other ICs in the draft ESD are available to facilitate a more focused and flexible approach to address in a timely manner any problematic situations only if and when they arise.*"

   EPA Response:
   EPA disagrees with this assertion. These groundwater use restrictions are to be applied to a limited area adjacent to the Site's Groundwater Management Zone as depicted in Attachment 4 to the ESD. The restrictions could be removed if an appropriate study confirms the existence of a pumping rate that is reasonable for that area. Also, as expressed above, the other ICs are not sufficient protection tools by themselves but are additional protective measures. Relying on such other ICs alone to deal with the problems caused by new wells or the increased use of existing wells, after the fact would not be a proactive and protective approach.

4. On the second page, last sentence of the first complete paragraph: "*Given the availability of this public water supply, it would be inappropriate to implement such onerous ICs on uncontaminated properties.*"

   EPA Response:
   ICs, including the restriction on groundwater wells, are needed even if a water line is available. The provision of public water to the area is highly encouraged by EPA as it takes care of the immediate most pressing problem: human exposures to contaminants due to ingestion of the groundwater. However, the water line does not preclude the increased use of existing wells or the installation of new wells that are extremely likely to

exert hydraulic pressures or demands capable of further expanding the groundwater plume of contaminants towards them. Such extraction of groundwater also has the potential to alter the groundwater flow and direction, and chemistry in ways that could increase the areal extent of the contamination at the Site, thus increasing the overall timeframe for achieving the remedy's cleanup levels and increasing the overall cost of the remedy's implementation.

5. On the second page, first sentence of the second full paragraph: "*The imposition of ICs seems particularly inappropriate given that they go farther than the ICs that are required over much of the GMZ and the Site itself, where contamination has been detected.*"

<u>EPA Response:</u>
EPA believes that the CLG has misinterpreted the IC provisions stated in the ESD. EPA is not necessarily requiring deeded land use restrictions as the only IC to be implemented over the highlighted area on Appendix 4 of the draft ESD. An ordinance or a deed notice also could be sufficient for this area. Accordingly EPA would not be necessarily imposing ICs over the highlighted area that are more restrictive than at other areas of the Site.

In the particular case of this Site, one component of the groundwater flow is moving through the area where ICs are proposed and observed concentrations of contaminants within the monitoring well network suggest plume migration in that direction. Furthermore, recent detections of 1,4-dioxane offer additional concern of such migration as it is known to be a contaminant that travels very quickly, often ahead of other contaminants within a groundwater plume. Therefore, EPA believes that in some particular areas of the Site, given their high susceptibility to be impacted by the plume's migration, the existence of current and future human exposure pathways, and the pattern of contaminant concentrations that are being observed, it is justified to implement restrictive ICs.

6. On the third page, last sentence of the second paragraph: "*The Group therefore asks EPA to revise the draft ESD to eliminate the requirement to implement ICs as described in Section III.C.a. of the draft ESD, or at the very least to make those ICs more regulatory than prohibitive in approach.*"

<u>EPA Response:</u>
EPA understands the concerns of the CLG but declines their proposal to eliminate ICs or make them regulatory in approach. As expressed in response to Comment #2 above, ICs in the proposed area shown on Attachment 4 to the draft ESD are necessary to prevent potential human exposures to contaminants from the Site, which appear to be migrating towards this area, and to assure the effectiveness of the ongoing remedy. Without more detailed hydro-geologic studies, anything short of those restrictions preventing the

consumption of the water would not offer the needed protection to human health and the environment. The restrictions could be removed if an appropriate study confirms the existence of a pumping rate that is reasonable for that area.

APPENDIX D – MONITORING RELATED DOCUMENTS

Letter report from Aries Engineering to Mr. Peter Britz.

Table summarizing OU-1 and OU-2 GW Analytical Results

Table summarizing Analytical Results for Off-Site Water Supply Wells – 2015 Annual Report

Table summarizing Preliminary Analytical Results for Off-Site Water Supply Wells – Wells sampled in May 2016

Table summarizing Surface Water Analytical Data

Table summarizing Sediment Analytical Data

Table summarizing Leachate Analytical Results

Table showing Statistical and Visual Trend Analysis Results

Table showing Contaminant of Concern Analytical Data (November 2000 – September 2015)

Figure showing preliminary PFC concentrations in OU-1 and OU-2

Table showing preliminary GW PFC results in OU-1

Table showing preliminary GW PFC results in OU-2

EPA Region 1 Analytical Results for PFCs at off-site drinking water wells

E-mail from Andrew Hoffman (NH DES) to Peter Britz (CLG) re: GW sampling and reporting dated July 6, 2016.

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March 17, 2016
File No. 97070G

Mr. Peter Britz
City of Portsmouth
Planning Department
City Hall
1 Junkins Ave
Portsmouth, NH 03801

Re: 2016 Landfill Gas Monitoring Results
Coakley Landfill Superfund Site
North Hampton, New Hampshire

Dear Mr. Britz:

Aries Engineering, Inc. (Aries) conducted the 2016 landfill gas (LFG) monitoring round for the Coakley Landfill on March 10, 2016. LFG monitoring was conducted consistent with the requirements specified in the New Hampshire Department of Environmental Service's (Department's) January 22, 2016 correspondence. LFG samples were collected with a GEM-2000 lab-calibrated infrared landfill gas analyzer with a methane detection range of approximately 0-100% on a volumetric basis. LFG monitoring locations are depicted on Figure 1.

Attached are the tabulated monitoring data and charts for landfill gas monitoring trends in samples collected from LFG monitoring probes M-1, M-2, M-4, M-5, M-6 and M-7. Also attached are the tabulated monitoring data for landfill vents numbered 10, 15, 21, 28, 30, and 38. Following is a summary of LFG monitoring round results.

LFG Monitoring Probes

During the 2016 LFG monitoring event, Aries sampled LFG monitoring probes M-1, M-2, M-4, M-5, M-6 and M-7. Methane gas was not detected in LFG monitoring probes M-1, M-4, M-6, or M-7. Methane gas was detected at a concentration of 0.1% in LFG monitoring probes M-2 and M-5 (Table 1). The Department's methane soil gas standard is 2.5%.

Ambient Air Monitoring

Ambient air monitoring has been discontinued at the Coakley Landfill as methane gas has not been detected above 0.2 percent in ambient air readings since ambient air monitoring began in 1999. Historical ambient air readings are depicted in Table 3.

Landfill Vent Monitoring

During the 2016 LFG monitoring event, Aries sampled six landfill gas vents located along the eastern edge of the landfill numbered 10, 15, 21, 28, 30, and 38. These vents are not part of the required annual sampling, but will be sampled periodically to provide an overall update on the level of degradation of the landfill waste. Methane gas was detected in these landfill gas vents at concentrations ranging from 8.8% in landfill vent 10 to 29.9% in landfill vent 30 (Table 2).

ARIES ENGINEERING INC. | 46 South Main Street | Concord, NH 03301 Phone: 603-228-0008 | Fax: 603-226-0374 | www.aries-eng.com

Buildings

During the March 2007 landfill gas sampling event, new methane gas alarms were installed by Aries and Mr. Peter Britz in the North Hill Nursery main sales building on the Jones property (Lot 021-027-000, formerly the Ferland property) and in the main workshop area of the Crotty Property (Northeast Creations, Lot 021-028-001). Aries understands that on March 20, 2008, Mr. Peter Britz installed a new methane gas alarm in Unit #6 of the SNS, LLC property building (Lot 021-031-000, Tudor Office Building, formerly the McGonagle property) owned by Mr. Sol Negm. In November of 2014, Peter Britz installed a new alarm in Unit #6 of Mr. Sol Negm's building as the old alarm had been removed and the current tenant did not know what happened to the alarm. Aries and Mr. Britz checked the methane gas alarms at each property on March 10, 2016 and all alarms were functioning properly. Mr. Britz stated that he has not been notified of any methane detection alarm activations in the buildings where the methane alarms were installed. Therefore, since the abutting property buildings are being continuously monitored, building air monitoring readings are no longer being conducted as a part of the required LFG monitoring.

Barometric Pressure Readings

In accordance with the Department's June 30, 2009 correspondence, barometric pressure readings have been discontinued.

Aries understands that you will review the 2016 landfill gas data and provide Aries with comments prior to Aries distributing this report to the Coakley Committee members, the Department, the U.S. Environmental Protection Agency (EPA), and Golder Associates.

Sincerely,
Aries Engineering, Inc.

Cheryl A. Bentley, E.I.T.
Project Engineer

Michael P. Donahue, P.E.
Principal Engineer

CAB:kd

Attachments: Table 1 - Landfill Gas Probe Monitoring Results Summary
Table 2 – Landfill Vent Monitoring Results Summary
Table 3 - Ambient Air Monitoring Results Summary
Figure 1 - Landfill Gas Monitoring Locations
Landfill Gas Monitoring Trends
January 22, 2016 NHDES Correspondence re: Landfill Gas Monitoring

cc: Mr. Seth Jaffe, Foley Hoag, LLP
Mr. Robert Sullivan, City of Portsmouth
Mr. Daniel MacRitchie
Ms. Bea Hebert, Eversource
Mr. Curtis Shipley, Ellis & Winters LLP
Mr. Joe Montello, Republic Services, Inc.
Mr. Andrew Hoffman, NH Department of Environmental Services (E-Copy)
Mr. Gerardo Millan-Ramos, U.S. Environmental Protection Agency (E-Copy)

TABLE 1

LANDFILL GAS PROBE MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Gas Monitoring Probe Number	Gas Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
M-1	3/24/1999	20.9%	0.0%	0 0%
	6/10/1999	1.5%	29 7%	**55.9%**
	7/29/1999	0 3%	38 4%	**58.4%**
	8/23/1999	0 9%	37 1%	**55.1%**
	9/24/1999	0 2%	40.1%	**64.8%**
	10/19/1999	0 4%	36 8%	**76.2%**
	11/24/1999	0 0%	27 7%	**83.6%**
	12/21/1999	5 5%	22.9%	**71.7%**
	3/7/2000	8.9%	16.5%	**46.0%**
	6/28/2000	5.1%	13.5%	**19.5%**
	9/29/2000	19 3%	1.5%	0 7%
	12/13/2000	3 6%	15 8%	**45.0%**
	3/29/2001	19 2%	1 0%	**4.5%**
	6/15/2001	1 4%	17 6%	**55.0%**
	9/14/2001	2.0%	21 3%	**55.0%**
	12/19/2001	0.3%	15 3%	**47.1%**
	3/21/2002	19 4%	0 5%	0 9%
	6/6/2002	19 8%	1 7%	0 0%
	12/30/2002	Vandalized	Vandalized	Vandalized
	3/27/2003	Vandalized	Vandalized	Vandalized
	6/27/2003	Vandalized	Vandalized	Vandalized
	9/9/2003	Vandalized	Vandalized	Vandalized
	12/22/2003	Vandalized	Vandalized	Vandalized
	3/30/2004	Vandalized	Vandalized	Vandalized
	6/23/2004	Vandalized	Vandalized	Vandalized
	9/13/2004	Vandalized	Vandalized	Vandalized
	12/17/2004	Vandalized	Vandalized	Vandalized
	4/1/2005	20.9%	0 0%	1.0%
	6/28/2005	20 4%	0 3%	1 0%
	9/13/2005	20 0%	0 8%	0.1%
	12/15/2005	20 2%	0 6%	0 1%
	3/31/2006	21 1%	0 0%	0.1%
	6/16/2006	21 0%	0 0%	0 0%
	9/21/2006	18 3%	2 1%	0 0%
	12/19/2006	20 8%	0 1%	0 0%
	3/30/2007	19.8%	1 1%	0 0%
	6/27/2007	19 6%	0 2%	0 0%

TABLE 1

LANDFILL GAS PROBE MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Gas Monitoring Probe Number	Gas Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
M-1 (continued)	9/24/2007	13 5%	4 2%	**2.6%**
	12/21/2007	19 8%	0 2%	0 0%
	3/28/2008	20 9%	0 0%	0 0%
	6/25/2008	20 5%	0 0%	0 0%
	9/30/2008	21 0%	0 0%	0 0%
	12/22/2008	20 7%	0 0%	0 0%
	3/31/2009	20 7%	0.0%	0 0%
	6/29/2009	20 1%	0 0%	0 0%
	9/18/2009	20 9%	0.1%	0 0%
	12/22/2009	NS	NS	NS
	3/19/2010	20 6%	0 0%	0 0%
	6/30/2010	NS	NS	NS
	9/30/2010	20.3%	0 0%	0 0%
	12/17/2010	NS	NS	NS
	3/30/2011	20 4%	0 0%	0 0%
	6/29/2011	NS	NS	NS
	9/28/2011	21 0%	0.0%	0 0%
	12/30/2011	NS	NS	NS
	3/23/2012	20 8%	0.0%	0 0%
	6/15/2012	NS	NS	NS
	9/28/2012	20 9%	0 0%	0 0%
	12/20/2012	NS	NS	NS
	3/29/2013	20 7%	0.0%	0 0%
	6/28/2013	NS	NS	NS
	9/17/2013	20 9%	0 1%	0 0%
	12/5/2013	NS	NS	NS
	3/31/2014	21.0%	0 0%	0 0%
	6/12/2014	NS	NS	NS
	9/18/2014	20.5%	0.0%	0 0%
	12/4/2014	NS	NS	NS
	3/19/2015	20 8%	0 2%	0 2%
	6/30/2015	NS	NS	NS
	9/17/2015	19 8%	0 1%	0 0%
	12/3/2015	NS	NS	NS
	3/10/2016	20 4%	0 1%	0 0%

TABLE 1

LANDFILL GAS PROBE MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Gas Monitoring Probe Number	Gas Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
M-2	3/24/1999	14 3%	6 4%	0 0%
	6/10/1999	18 5%	2.3%	0.0%
	7/29/1999	11 7%	10 5%	0 0%
	8/23/1999	12 8%	10.5%	0 0%
	9/24/1999	13 9%	7 0%	0 0%
	10/19/1999	11 7%	12 1%	0 0%
	11/24/1999	14 7%	6 3%	0 0%
	12/21/1999	12 3%	6.9%	0 1%
	3/7/2000	19 3%	5 6%	0.0%
	6/28/2000	13 1%	6 2%	0 0%
	9/29/2000	18 7%	1 9%	0 0%
	12/13/2000	16 5%	4 2%	0 0%
	3/29/2001	18 4%	1.5%	0.0%
	6/15/2001	15 5%	4 3%	0 0%
	9/14/2001	15 3%	6 8%	0 0%
	12/19/2001	17 0%	3 5%	0 0%
	3/21/2002	18.9%	1.8%	0 0%
	6/6/2002	16 8%	3.4%	0 0%
	12/30/2002	17 0%	1 6%	0 0%
	3/27/2003	20.2%	0 0%	0 0%
	6/27/2003	15 5%	4 3%	0 0%
	9/9/2003	13.7%	7 9%	0 0%
	12/22/2003	17 1%	2 4%	0 0%
	3/30/2004	13.0%	4 0%	0.1%
	6/23/2004	13 0%	4 8%	0 0%
	9/13/2004	12 8%	6 0%	0 0%
	12/17/2004	18 5%	1 0%	0 0%
	3/31/2005	17.8%	1 4%	0 0%
	6/28/2005	20.2%	1 0%	0 9%
	9/13/2005	18 0%	2 0%	0 0%
	12/15/2005	18 2%	2 0%	0 0%
	3/31/2006	18 0%	1 4%	0.1%
	6/16/2006	19.7%	1 1%	0.0%
	9/21/2006	13 7%	5 5%	0 0%
	12/19/2006	20 7%	0.1%	0.0%
	3/30/2007	14.8%	2.3%	0.0%
	6/27/2007	20.4%	0.0%	0 0%

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LANDFILL GAS PROBE MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Gas Monitoring Probe Number	Gas Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
M-2 (continued)	9/24/2007	14 1%	6 8%	0 0%
	12/21/2007	17 5%	5 3%	0 0%
	3/28/2008	19 3%	1 2%	0 0%
	6/25/2008	16 4%	3 8%	0.0%
	9/30/2008	14 0%	5 7%	0 0%
	12/22/2008	18 1%	2 3%	0.0%
	3/31/2009	19 3%	1 2%	0 0%
	6/29/2009	18 7%	1 7%	0 0%
	9/18/2009	13 8%	7 0%	0 0%
	12/17/2010	NS	NS	NS
	3/19/2010	18 7%	1 4%	0 0%
	6/30/2010	NS	NS	NS
	9/30/2010	19 5%	0 8%	0 0%
	12/17/2010	NS	NS	NS
	3/30/2011	19 7%	0 5%	0 0%
	6/29/2011	NS	NS	NS
	9/28/2011	15.0%	5 9%	0 0%
	12/30/2011	NS	NS	NS
	3/23/2012	20 8%	0 0%	0 0%
	6/15/2012	NS	NS	NS
	9/28/2012	20 5%	0 2%	0 0%
	12/20/2012	NS	NS	NS
	3/29/2013	16.8%	1 4%	0 0%
	6/28/2013	NS	NS	NS
	9/17/2013	14 7%	5 7%	0 0%
	12/5/2013	NS	NS	NS
	3/31/2014	18.2%	1 8%	0 0%
	6/12/2014	NS	NS	NS
	9/18/2014	15.3%	4 2%	0 0%
	12/4/2014	NS	NS	NS
	3/19/2015	20 1%	0 4%	0 2%
	6/30/2015	NS	NS	NS
	9/17/2015	19 7%	0 0%	0 0%
	12/3/2015	NS	NS	NS
	3/10/2016	18 6%	1 5%	0 1%

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LANDFILL GAS PROBE MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Gas Monitoring Probe Number	Gas Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
M-4	3/24/1999	19 2%	1 7%	0 0%
	6/10/1999	21 3%	0.0%	0 0%
	7/29/1999	19 4%	0 7%	0.1%
	8/23/1999	20 9%	0 0%	0 0%
	9/24/1999	20 0%	0.0%	0 1%
	10/19/1999	20.5%	4.7%	0 0%
	11/24/1999	16 6%	5 6%	0.0%
	12/21/1999	13 1%	6 6%	0 0%
	3/7/2000	22 2%	29 0%	0 0%
	6/28/2000	20.7%	0.0%	0 1%
	9/29/2000	17 2%	3 8%	0 0%
	12/13/2000	12 0%	8 1%	0.0%
	3/29/2001	17 5%	2 3%	0 0%
	6/15/2001	20 0%	0 4%	0 0%
	9/14/2001	20 7%	0 3%	0 0%
	12/19/2001	14 8%	5 3%	0 0%
	3/21/2002	16 4%	3.8%	0.0%
	6/6/2002	20.7%	0.2%	0.0%
	12/30/2002	13 0%	7 0%	0 0%
	3/27/2003	18 6%	1 6%	0 0%
	6/27/2003	20 3%	0.3%	0 0%
	9/9/2003	20 8%	0.0%	0 0%
	12/22/2003	17 2%	2.4%	0 0%
	3/30/2004	19.6%	2 1%	0 0%
	6/23/2004	19 7%	0 6%	0 0%
	9/13/2004	19 9%	1 1%	0 0%
	12/17/2004	17 8%	3 2%	0 0%
	3/31/2005	20 2%	1.3%	0 0%
	6/28/2005	20.4%	0 8%	0 0%
	9/13/2005	20 6%	0.4%	0.0%
	12/15/2005	18 0%	3.4%	0 0%
	3/31/2006	18.7%	2.4%	0 1%
	6/16/2006	20 6%	0 5%	0 0%
	9/21/2006	20 1%	0 9%	0 0%
	12/19/2006	20 8%	0 0%	0 0%
	3/30/2007	20 1%	1 7%	0 0%
	6/27/2007	20 2%	0.1%	0 0%

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LANDFILL GAS PROBE MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Gas Monitoring Probe Number	Gas Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
M-4	9/24/2007	19.9%	0 7%	0.0%
(continued)	12/21/2007	19.7%	2 1%	0 0%
	3/28/2008	18 6%	2 2%	0 0%
	6/25/2008	20.0%	0 5%	0.0%
	9/30/2008	19.6%	1 2%	0 0%
	12/22/2008	17 4%	3 1%	0 0%
	3/31/2009	19 8%	1 2%	0 0%
	6/29/2009	20 4%	0 0%	0 0%
	9/18/2009	20 2%	0.9%	0 0%
	12/22/2009	20 3%	0 0%	0 0%
	3/19/2010	20 6%	0 0%	0 0%
	6/30/2010	19 5%	0 2%	0 1%
	9/30/2010	20 3%	0 0%	0 0%
	12/17/2010	16 8%	3 4%	0 1%
	3/30/2011	20.5%	0 0%	0.0%
	6/29/2011	20 2%	0 6%	0 0%
	9/28/2011	20 5%	0 07%	0 0%
	12/30/2011	19 7%	0.8%	0 0%
	3/23/2012	20 5%	1 1%	0 0%
	6/15/2012	20 3%	0 1%	0 0%
	9/28/2012	20 8%	0 1%	0 0%
	12/20/2012	18 8%	1 4%	0 0%
	3/29/2013	20 4%	1 2%	0 0%
	6/28/2013	19 7%	0 6%	0 0%
	9/17/2013	18 6%	1 3%	0 0%
	12/5/2013	18 3%	2 3%	0 0%
	3/31/2014	19 9%	1 6%	0 0%
	6/12/2014	21 0%	0 5%	0 0%
	9/18/2014	19.9%	0 5%	0.0%
	12/4/2014	20 0%	1 3%	0 0%
	3/19/2015	19 7%	2 4%	0 2%
	6/30/2015	20 3%	0.2%	0.0%
	9/17/2015	20 5%	0 0%	0 0%
	12/3/2015	21 9%	6 1%	0 0%
	3/10/2016	20 3%	0 8%	0 0%

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LANDFILL GAS PROBE MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Gas Monitoring Probe Number	Gas Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
M-5	**3/24/1999**	11 3%	14 1%	**19.3%**
	6/10/1999	10 4%	12 8%	**9.2%**
	7/29/1999	0.4%	32 3%	**22.1%**
	8/23/1999	3.3%	27 4%	**18.8%**
	9/24/1999	14 6%	5.7%	**5.2%**
	10/19/1999	20 6%	0.3%	0 0%
	11/24/1999	0 0%	33.0%	**36.2%**
	12/21/1999	15 8%	2 3%	**3.1%**
	3/7/2000	19.8%	5.1%	**5.7%**
	6/28/2000	11.6%	12 0%	**9.0%**
	9/29/2000	0 3%	21 4%	**9.6%**
	12/13/2000	20.7%	0.1%	0 0%
	3/29/2001	20 4%	0 4%	0.0%
	6/15/2001	2.8%	21 5%	**16.0%**
	9/14/2001	21.0%	0 0%	0.0%
	12/19/2001	21.0%	0 0%	0 0%
	3/21/2002	19.3%	1.2%	1 3%
	6/6/2002	6 1%	15 1%	**6.2%**
	12/30/2002	19.8%	0 5%	0 0%
	3/27/2003	18 8%	2.3%	0 0%
	6/27/2003	11 7%	8.0%	0 1%
	9/9/2003	19 3%	2 0%	0 0%
	12/22/2003	18 7%	1.7%	0 0%
	3/30/2004	19.8%	1 6%	0 1%
	6/23/2004	17 6%	3 4%	0 0%
	9/13/2004	17 1%	4 3%	0 0%
	12/17/2004	19.8%	2.1%	0 0%
	3/31/2005	14 9%	6 6%	0 0%
	6/28/2005	18.4%	3 3%	0 0%
	9/13/2005	19 2%	1 9%	0 0%
	12/15/2005	17 2%	5 9%	0 0%
	3/31/2006	16.4%	5 8%	0 0%
	6/16/2006	13 9%	12 6%	0 0%
	9/21/2006	19.8%	0 6%	0 2%
	12/19/2006	20 8%	0 0%	0 0%
	3/30/2007	17.4%	3 5%	0 1%
	6/27/2007	18 6%	2 6%	0 0%

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LANDFILL GAS PROBE MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Gas Monitoring Probe Number	Gas Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
M-5 (continued)	**9/24/2007**	20 1%	0 6%	0 0%
	12/21/2007	20.3%	0 2%	0 0%
	3/28/2008	12.6%	10 4%	0 4%
	6/25/2008	11.1%	12 1%	0 0%
	9/30/2008	12 8%	12 6%	0 0%
	12/22/2008	15 6%	8 5%	0.0%
	3/31/2009	16 2%	7 0%	0 0%
	6/29/2009	17 3%	3 2%	0 0%
	9/18/2009	11 2%	6 0%	0 0%
	12/22/2009	15 4%	5 8%	0 0%
	3/19/2010	17.5%	3 5%	0 0%
	6/30/2010	12.1%	17 1%	0 0%
	9/30/2010	14 6%	6 1%	0 0%
	12/17/2010	19 4%	1 9%	0 1%
	3/30/2011	18.2%	2 1%	0 0%
	6/29/2011	18 8%	1 1%	0 0%
	9/28/2011	1.3%	22 0%	**5.6%**
	12/30/2011	20 1%	2 2%	0 3%
	3/23/2012	19 9%	0.6%	0 1%
	6/15/2012	17 6%	3 1%	0 0%
	9/28/2012	15 4%	5 3%	0 5%
	12/20/2012	19 6%	2 8%	0 0%
	3/29/2013	17.9%	4 1%	0.0%
	6/28/2013	19 8%	0 9%	0 0%
	9/17/2013	13 2%	5 9%	0 2%
	12/5/2013	16 7%	3 6%	0.0%
	3/31/2014	14 9%	1 0%	0 0%
	6/12/2014	4 9%	16.5%	0 0%
	9/18/2014	9 2%	10 8%	0 0%
	12/4/2014	21 4%	1.0%	0 0%
	3/19/2015	21 4%	0 2%	0 2%
	6/30/2015	11 2%	10 5%	0 0%
	9/17/2015	15.4%	3 7%	0 0%
	12/3/2015	21 8%	4 1%	0.1%
	3/10/2016	15 1%	4.3%	0 1%

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LANDFILL GAS PROBE MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Gas Monitoring Probe Number	Gas Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
M-6	3/24/1999	3 7%	27.5%	**34.7%**
	6/10/1999	0 5%	30 8%	**28.8%**
	7/29/1999	0 0%	36 5%	**37.1%**
	8/23/1999	0 5%	37 0%	**36.9%**
	9/24/1999	1 4%	37 6%	**49.0%**
	10/19/1999	0 0%	37 4%	**46.3%**
	11/24/1999	0.0%	36 7%	**47.5%**
	12/21/1999	12 2%	33.2%	**48.2%**
	3/7/2000	13 8%	27 4%	**27.2%**
	6/28/2000	0 2%	26 3%	**26.1%**
	9/29/2000	7 0%	19 2%	**21.6%**
	12/13/2000	19.7%	1 0%	0 5%
	3/29/2001	0 4%	13 0%	**3.0%**
	6/15/2001	0.2%	23 2%	**20.6%**
	9/14/2001	8 9%	16 2%	**17.0%**
	12/19/2001	18.5%	1 8%	1 0%
	3/21/2002	8 9%	17 2%	**25.1%**
	6/6/2002	2 0%	22 5%	**22.7%**
	12/30/2002	20.1%	0 0%	0 0%
	3/27/2003	12 0%	8 0%	**11.9%**
	6/27/2003	0 3%	21 0%	**20.1%**
	9/9/2003	16 5%	5 8%	**4.3%**
	12/22/2003	19.2%	1.7%	0 3%
	3/30/2004	13 2%	7 7%	**7.6%**
	6/23/2004	9.7%	10 6%	**11.8%**
	9/13/2004	18 4%	2 1%	0 0%
	12/17/2004	19 4%	1.8%	**2.6%**
	3/31/2005	20 9%	0 4%	0 0%
	6/28/2005	20 4%	0 0%	0 0%
	9/13/2005	5 3%	17.9%	**20.0%**
	12/15/2005	19 2%	0 7%	0.6%
	3/31/2006	19 1%	1 4%	0 7%
	6/16/2006	6 6%	8 0%	0 0%
	9/21/2006	20.3%	0 7%	0 4%
	12/19/2006	20.9%	0 0%	0 0%
	3/30/2007	18.6%	2 1%	0 0%
	6/27/2007	19 9%	1 6%	0.0%

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LANDFILL GAS PROBE MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Gas Monitoring Probe Number	Gas Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
M-6	9/24/2007	18 9%	1 9%	0 0%
(continued)	12/21/2007	20 4%	0 2%	0 0%
	3/28/2008	17 2%	1 8%	0 0%
	6/25/2008	16 0%	4 1%	0 8%
	9/30/2008	9 0%	14 3%	**8.1%**
	12/22/2008	19 9%	0 0%	0 0%
	3/31/2009	20 1%	0 3%	0 1%
	6/29/2009	15 9%	4 3%	0 0%
	9/18/2009	14.5%	8.6%	**4.5%**
	12/22/2009	16 4%	4 8%	0.2%
	3/19/2010	18 2%	4.1%	0 1%
	6/30/2010	17 7%	2 1%	**8.0%**
	9/30/2010	15 3%	4 0%	2 3%
	12/17/2010	20 4%	0 2%	0 2%
	3/30/2011	16 7%	3 9%	**3.4%**
	6/29/2011	17 9%	2 6%	0 0%
	9/28/2011	12 2%	8 7%	0 3%
	12/30/2011	17 7%	3 5%	0 1%
	3/23/2012	19 7%	1 2%	0 0%
	6/15/2012	18 0%	2 1%	0.6%
	9/28/2012	19 2%	0 7%	0.3%
	12/20/2012	16.4%	4 8%	0 0%
	3/29/2013	14 4%	1 3%	0 3%
	6/28/2013	17.3%	3 6%	0 0%
	9/17/2013	19 3%	0.7%	0 4%
	12/5/2013	15.6%	3 1%	0 0%
	3/31/2014	21 2%	0 1%	0 0%
	6/12/2014	15 5%	5 0%	0 0%
	9/18/2014	18 2%	2 0%	0 0%
	12/4/2014	20 8%	0 7%	0 0%
	3/19/2015	21 4%	0 1%	0 1%
	6/30/2015	20 1%	0 3%	0.0%
	9/17/2015	18 3%	1 6%	0 0%
	12/3/2015	21 5%	4.2%	0.1%
	3/10/2016	14 2%	4.6%	0 0%

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LANDFILL GAS PROBE MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Gas Monitoring Probe Number	Gas Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
M-7	3/24/1999	13 7%	3.5%	0 0%
	6/10/1999	6 7%	10 6%	1 0%
	7/29/1999	11 0%	10 0%	0.2%
	8/23/1999	7 8%	14 6%	0 0%
	9/24/1999	18 2%	1 1%	0 0%
	10/19/1999	2 6%	16 2%	0 8%
	11/24/1999	10.2%	8 4%	0 0%
	12/21/1999	16 4%	1.6%	0 0%
	3/7/2000	25 0%	18 0%	0 0%
	6/28/2000	14.5%	5 9%	0 3%
	9/29/2000	13 2%	8.5%	0 0%
	12/13/2000	20 6%	0 3%	0 0%
	3/29/2001	5 9%	12.8%	0 0%
	6/15/2001	20 6%	0 3%	0.0%
	9/14/2001	8 0%	12 9%	2 0%
	12/19/2001	13 0%	8 7%	0 0%
	3/21/2002	20 0%	0.0%	0 0%
	6/6/2002	5.3%	10.9%	0 2%
	12/30/2002	20 1%	0 0%	0.0%
	3/27/2003	4 3%	12 3%	**7.4%**
	6/27/2003	9 2%	10.5%	0 1%
	9/9/2003	21 1%	0 1%	0 0%
	12/22/2003	18 4%	1 2%	0 0%
	3/30/2004	15 1%	5 6%	0 0%
	6/23/2004	14.1%	4 4%	0 5%
	9/13/2004	13 0%	8 2%	1.3%
	12/17/2004	20 5%	0 3%	0 0%
	3/31/2005	2 2%	15 2%	**5.8%**
	6/28/2005	15 3%	1 1%	**4.8%**
	9/13/2005	10 8%	9 4%	**4.6%**
	12/15/2005	17 2%	3 6%	1 1%
	3/31/2006	10 0%	5.2%	0 3%
	6/16/2006	17.3%	2.4%	0 4%
	9/21/2006	21.1%	0 0%	0 1%
	12/19/2006	20 9%	0 0%	0 0%
	3/30/2007	20.3%	0.4%	0 0%
	6/27/2007	17 6%	2 8%	0 2%

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LANDFILL GAS PROBE MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Gas Monitoring Probe Number	Gas Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
M-7	**9/24/2007**	16 8%	4 2%	0 0%
(continued)	**12/21/2007**	17.8%	3.2%	0 0%
	3/28/2008	19 8%	1 6%	0 0%
	6/25/2008	12 5%	8 0%	0 0%
	9/30/2008	0 2%	20.6%	**4.2%**
	12/22/2008	19 7%	1 0%	0 0%
	3/31/2009	18 2%	2 6%	0 2%
	6/29/2009	16 4%	4 3%	1 2%
	9/18/2009	14 9%	7.3%	0 0%
	12/22/2009	18 7%	3 1%	0 0%
	3/19/2010	16 0%	4 9%	0 0%
	6/30/2010	20 1%	0 0%	0.1%
	9/30/2010	20 4%	0 0%	0 0%
	12/17/2010	17 0%	4 0%	0 0%
	3/30/2011	17 0%	4.0%	0 0%
	6/29/2011	17 8%	3 2%	0 0%
	9/28/2011	11 4%	11 1%	0 0%
	12/30/2011	19 3%	1 1%	0 0%
	3/23/2012	20 3%	0 6%	0 0%
	6/15/2012	18 2%	2 3%	0 2%
	9/28/2012	16.4%	3 9%	0 0%
	12/20/2012	19 7%	1 4%	0 0%
	3/29/2013	18 2%	1 8%	0 0%
	6/28/2013	15.6%	5 1%	0 1%
	9/17/2013	16 4%	4.3%	0 0%
	12/5/2013	16.8%	4 0%	0 0%
	3/31/2014	15.9%	3 9%	0 0%
	6/12/2014	15 1%	6.9%	0 0%
	9/18/2014	15 7%	4 8%	0.2%
	12/4/2014	20 0%	1 7%	0 0%
	3/19/2015	21 0%	0.1%	0 1%
	6/30/2015	20 2%	0 1%	0 0%
	9/17/2015	17 8%	1 8%	0 0%
	12/3/2015	20 9%	3 8%	0 0%
	3/10/2016	11 7%	8 6%	0 0%

NOTES:

1 All readings are percent by volume

2 All readings prior to March 2004 were made using an infrared GA-90 gas analyzer, while readings from March 2004 onward were made with a model GEM-5000, GEM-2000 or GEM-500 infrared gas analyzer.

3. When mixed with air, LEL for methane is 5% on a volume basis & the UEL for methane is 15% The DES ambient air methane standard is 0 5% and the soil gas standard is 2 5%

4 Aries conducted the landfill gas monitoring rounds in accordance with the April 2010 Coakley Project Operations Plan, Attachment IV and the January 22, 2016 NHDES correspondence regarding Landfill Gas Monitoring Reduction Support (attached)

5 The GEM-500 infrared gas analyzer methane detection limit is approximately 0 1%

6 Monitoring probes M-1 and M-2 were sampled in March and September until 2016 M-1 and M-2 were sampled in March 2016 and subsequently every five years in accordance with DES recommendations

7. Bold values indicate exceedances of the DES methane soil gas standard of 2 5%

8 NS = not sampled in accordance with the June 30, 2009 NHDES correspondence

9 On March 19, 2015 Aries experienced slight instrumental drift due to significant wind gusts

TABLE 2

LANDFILL VENT MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Landfill Vent Number	Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
10	6/10/1999	NR	NR	0 0%
	10/19/1999	NR	NR	10 0%
	9/29/2000	NR	NR	8 7%
	12/13/2000	NR	NR	0 0%
	3/29/2001	NR	NR	9 6%
	6/15/2001	NR	NR	29 1%
	9/14/2001	NR	NR	10 0%
	12/19/2001	NR	NR	0 0%
	3/21/2002	NR	NR	1 4%
	6/6/2002	NR	NR	0 0%
	12/30/2002	NR	NR	2 6%
	3/27/2003	NR	NR	0 0%
	6/27/2003	NR	NR	8 2%
	9/9/2003	NR	NR	5 9%
	12/22/2003	NR	NR	14 9%
	3/30/2004	NR	NR	29 3%
	6/23/2004	NR	NR	1 1%
	9/13/2004	NR	NR	0 2%
	12/17/2004	NR	NR	0 1%
	3/31/2005	NR	NR	5 7%
	6/28/2005	NR	NR	4 8%
	9/13/2005	NR	NR	5 2%
	12/15/2005	NR	NR	7 0%
	3/31/2006	NR	NR	27 5%
	6/16/2006	NR	NR	0 0%
	3/10/2016	16 6%	6 2%	8 8%
15	6/10/1999	NR	NR	0 0%
	10/19/1999	NR	NR	8 0%
	9/29/2000	NR	NR	38 5%
	12/13/2000	NR	NR	0 0%
	3/29/2001	NR	NR	21 0%
	6/15/2001	NR	NR	53.9%
	9/14/2001	NR	NR	21 1%
	12/19/2001	NR	NR	0 0%
	3/21/2002	NR	NR	32 3%
	6/6/2002	NR	NR	0 1%
	12/30/2002	NR	NR	4 7%
	3/27/2003	NR	NR	0 0%
	6/27/2003	NR	NR	27 1%
	9/9/2003	NR	NR	19 9%
	12/22/2003	NR	NR	37 4%
	3/30/2004	NR	NR	51 3%
	6/23/2004	NR	NR	6 2%
	9/13/2004	NR	NR	10 4%
	12/17/2004	NR	NR	0 0%
	3/31/2005	NR	NR	8 9%
	6/28/2005	NR	NR	6 8%
	9/13/2005	NR	NR	12 7%
	12/15/2005	NR	NR	39 6%
	3/31/2006	NR	NR	56 8%
	6/16/2006	NR	NR	0 1%
	3/10/2016	0 0%	25 1%	24 0%

TABLE 2

LANDFILL VENT MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Landfill Vent Number	Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
21	6/10/1999	NR	NR	0 0%
	10/19/1999	NR	NR	3 3%
	9/29/2000	NR	NR	11 3%
	12/13/2000	NR	NR	0 0%
	3/29/2001	NR	NR	11 0%
	6/15/2001	NR	NR	34 0%
	9/14/2001	NR	NR	17 1%
	12/19/2001	NR	NR	0 0%
	3/21/2002	NR	NR	2 2%
	6/6/2002	NR	NR	0 0%
	12/30/2002	NR	NR	0 6%
	3/27/2003	NR	NR	0 0%
	6/27/2003	NR	NR	17 3%
	9/9/2003	NR	NR	5 7%
	12/22/2003	NR	NR	13 9%
	3/30/2004	NR	NR	37 7%
	6/23/2004	NR	NR	0 0%
	9/13/2004	NR	NR	0 4%
	12/17/2004	NR	NR	0 0%
	3/31/2005	NR	NR	2 9%
	6/28/2005	NR	NR	2 7%
	9/13/2005	NR	NR	6 3%
	12/15/2005	NR	NR	10 3%
	3/31/2006	NR	NR	44 6%
	6/16/2006	NR	NR	0 4%
	3/10/2016	8 2%	14 0%	18 6%
28	6/10/1999	NR	NR	1 8%
	10/19/1999	NR	NR	15 8%
	9/29/2000	NR	NR	29 0%
	12/13/2000	NR	NR	0 0%
	3/29/2001	NR	NR	10 3%
	6/15/2001	NR	NR	41 0%
	9/14/2001	NR	NR	25 1%
	12/19/2001	NR	NR	0 0%
	3/21/2002	NR	NR	8 4%
	6/6/2002	NR	NR	0 0%
	12/30/2002	NR	NR	0 0%
	3/27/2003	NR	NR	0 0%
	6/27/2003	NR	NR	31 2%
	9/9/2003	NR	NR	13 0%
	12/22/2003	NR	NR	23 6%
	3/30/2004	NR	NR	39 3%
	6/23/2004	NR	NR	1 3%
	9/13/2004	NR	NR	1 6%
	12/17/2004	NR	NR	0 2%
	3/31/2005	NR	NR	5 4%
	6/28/2005	NR	NR	4 5%
	9/13/2005	NR	NR	9 3%
	12/15/2005	NR	NR	12 1%
	3/31/2006	NR	NR	41 7%
	6/16/2006	NR	NR	0 0%
	3/10/2016	6 0%	18 9%	22 1%

TABLE 2

LANDFILL VENT MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Landfill Vent Number	Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
30	6/10/1999	NR	NR	36 8%
	10/19/1999	NR	NR	17 7%
	9/29/2000	NR	NR	42 6%
	12/13/2000	NR	NR	0 0%
	3/29/2001	NR	NR	8 8%
	6/15/2001	NR	NR	32 0%
	9/14/2001	NR	NR	29 1%
	12/19/2001	NR	NR	0 0%
	3/21/2002	NR	NR	4 0%
	6/6/2002	NR	NR	0 0%
	12/30/2002	NR	NR	0 0%
	3/27/2003	NR	NR	0 0%
	6/27/2003	NR	NR	19 2%
	9/9/2003	NR	NR	33 0%
	12/22/2003	NR	NR	31 8%
	3/30/2004	NR	NR	26 5%
	6/23/2004	NR	NR	2 7%
	9/13/2004	NR	NR	7 0%
	12/17/2004	NR	NR	3 1%
	3/31/2005	NR	NR	3 6%
	6/28/2005	NR	NR	3 3%
	9/13/2005	NR	NR	4 2%
	12/15/2005	NR	NR	15 8%
	3/31/2006	NR	NR	38 0%
	6/16/2006	NR	NR	0 3%
	3/10/2016	0 0%	26 5%	29 9%
38	6/10/1999	NR	NR	41 5%
	10/19/1999	NR	NR	18 7%
	9/29/2000	NR	NR	34 0%
	12/13/2000	NR	NR	0 0%
	3/29/2001	NR	NR	9 4%
	6/15/2001	NR	NR	37 6%
	9/14/2001	NR	NR	41 9%
	12/19/2001	NR	NR	0 0%
	3/21/2002	NR	NR	19 2%
	6/6/2002	NR	NR	0 0%
	12/30/2002	NR	NR	0 3%
	3/27/2003	NR	NR	0 0%
	6/27/2003	NR	NR	18 2%
	9/9/2003	NR	NR	27 6%
	12/22/2003	NR	NR	43 6%
	3/30/2004	NR	NR	34 7%
	6/23/2004	NR	NR	9 2%
	9/13/2004	NR	NR	14 0%
	12/17/2004	NR	NR	6 4%
	3/31/2005	NR	NR	5 6%
	6/28/2005	NR	NR	4 9%
	9/13/2005	NR	NR	8 7%
	12/15/2005	NR	NR	14 0%
	3/31/2006	NR	NR	50 2%
	6/16/2006	NR	NR	0 5%
	3/10/2016	3 6%	22 1%	23 9%

NOTES:

1 All readings are percent by volume

2 All readings were made with a model GEM-2000 infrared gas analyzer

3 NR indicates not recorded

4 Aries conducted the landfill gas monitoring rounds in accordance with the April 2010 Coakley Project Operations Plan, Attachment IV and the January 22, 2016 NHDES correspondence regarding Landfill Gas Monitoring Reduction Support (attached)

TABLE 3

AMBIENT AIR MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Ambient Air Monitoring Station	Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
AA-1	3/24/1999	20 8%	0 0%	0 0%
	6/10/1999	21 5%	0 0%	0 0%
	7/29/1999	20.8%	0 0%	0 0%
	8/23/1999	21 3%	0.0%	0 0%
	9/24/1999	20.2%	0 0%	0 0%
	10/19/1999	21 6%	0 0%	0.0%
	11/24/1999	19 9%	0 0%	0 0%
	12/21/1999	17 4%	0 0%	0 0%
	3/7/2000	22 0%	0 0%	0 0%
	6/28/2000	20 8%	0 0%	0 0%
	9/29/2000	21 2%	0 0%	0 0%
	12/13/2000	20 7%	0 0%	0 0%
	3/29/2001	20 6%	0 0%	0 0%
	6/15/2001	20 7%	0 0%	0 0%
	9/14/2001	20 1%	0 0%	0 0%
	12/19/2001	21.0%	0 0%	0 0%
	3/21/2002	20.7%	0 0%	0 0%
	6/6/2002	20 8%	0 0%	0 0%
	12/30/2002	20 1%	0 0%	0 0%
	3/27/2003	20.2%	0 0%	0 0%
	6/27/2003	20 7%	0 0%	0 0%
	9/9/2003	20.8%	0 0%	0 0%
	12/22/2003	20 5%	0 0%	0 0%
	3/30/2004	21 0%	0 0%	0 0%
	6/23/2004	20 7%	0 0%	0 0%
	9/13/2004	20 9%	0 0%	0 0%
	12/17/2004	21 3%	0 0%	0 0%
	3/31/2005	21 3%	0 1%	0 0%
	6/28/2005	20 4%	0 0%	0 0%
	9/13/2005	20 9%	0 0%	0 0%
	12/15/2005	20 8%	0.0%	0 0%
	3/31/2006	21.1%	0.0%	0 0%
	6/16/2006	21.2%	0 0%	0 0%
	9/21/2006	20 8%	0 0%	0 0%
	12/19/2006	20 9%	0 0%	0 0%

TABLE 3

AMBIENT AIR MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Ambient Air Monitoring Station	Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
AA-1	**3/30/2007**	21 3%	0.0%	0 0%
(continued)	**6/27/2007**	20 5%	0 0%	0 0%
	9/24/2007	20 7%	0 0%	0 0%
	12/21/2007	20.6%	0 0%	0 0%
	3/28/2008	20.9%	0 0%	0 0%
	6/25/2008	20 7%	0 0%	0.0%
	9/30/2008	21 0%	0 0%	0 0%
	12/22/2008	20 8%	0 0%	0 0%
	3/31/2009	20 8%	0.0%	0 0%
	6/29/2009	20 5%	0 0%	0 1%
	9/18/2009	20 9%	0 1%	0 0%
	12/22/2009	20.3%	0 0%	0 0%
	3/19/2010	20.6%	0 0%	0 0%
	6/30/2010	20 1%	0 0%	0 1%
	9/30/2010	20 4%	0 0%	0 0%
	12/17/2010	20 0%	0 2%	0 0%
	3/30/2011	20 5%	0 0%	0 0%
	6/29/2011	20 7%	0 0%	0 0%
	9/28/2011	21 1%	0.0%	0 0%
	12/30/2011	20 8%	0 0%	0 0%
	3/23/2012	20 7%	0 0%	0 0%
	6/15/2012	20 8%	0 0%	0 0%
	9/28/2012	20 9%	0 0%	0 0%
	12/20/2012	20 6%	0 00%	0 0%
	3/29/2013	20 7%	0.0%	0 0%
	6/28/2013	20 5%	0 0%	0 0%
	9/17/2013	21 0%	0 0%	0 0%
	12/5/2013	20 9%	0 0%	0 0%
	3/31/2014	21 0%	0 0%	0 0%
	6/12/2014	21 5%	0 0%	0 0%
	9/18/2014	20 6%	0 0%	0 0%
	12/4/2014	21.6%	0 0%	0 0%
	3/19/2015	20 3%	0 2%	0 1%
	6/30/2015	20 4%	0.0%	0 0%
	9/17/2015	20 0%	0 0%	0 0%
	12/3/2015	22 1%	3 4%	0 0%

TABLE 3

AMBIENT AIR MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Ambient Air Monitoring Station	Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
AA-2	3/24/1999	20 5%	0 0%	0 0%
	6/10/1999	21 5%	0 0%	0 0%
	7/29/1999	20 6%	0 0%	0 1%
	8/23/1999	21 3%	0 0%	0 0%
	9/24/1999	20 2%	0 0%	0 0%
	10/19/1999	22 3%	0 0%	0 0%
	11/24/1999	20 0%	0 0%	0 0%
	12/21/1999	17 4%	0 0%	0.0%
	3/7/2000	24 3%	0 0%	0 0%
	6/28/2000	20 7%	0 0%	0 0%
	9/29/2000	21 0%	0 0%	0 0%
	12/13/2000	20 7%	0 0%	0 0%
	3/29/2001	20 7%	0 0%	0 0%
	6/15/2001	20 6%	0 0%	0 0%
	9/14/2001	20 1%	0 0%	0 0%
	12/19/2001	21 0%	0 0%	0 0%
	3/21/2002	20 7%	0 0%	0 0%
	6/6/2002	20 8%	0 0%	0 0%
	12/30/2002	20 0%	0 0%	0 0%
	3/27/2003	20.2%	0 0%	0 0%
	6/27/2003	20.5%	0 0%	0 0%
	9/9/2003	20 6%	0 0%	0 0%
	12/22/2003	20 3%	0 0%	0 0%
	3/30/2004	21 2%	0 0%	0 0%
	6/23/2004	20 7%	0 0%	0 0%
	9/13/2004	20 8%	0.1%	0 0%
	12/17/2004	21 3%	0 0%	0 0%
	3/31/2005	21 3%	0 1%	0 0%
	6/28/2005	20 4%	0 0%	0 0%
	9/13/2005	20 8%	0 1%	0 0%
	12/15/2005	20 7%	0 0%	0 0%
	3/31/2006	21 1%	0 0%	0 0%
	6/16/2006	21 1%	0 0%	0 0%
	9/21/2006	20 8%	0 0%	0 0%
	12/19/2006	20 8%	0 0%	0 0%

TABLE 3

AMBIENT AIR MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Ambient Air Monitoring Station	Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
AA-2	3/30/2007	21 3%	0 0%	0 0%
(continued)	6/27/2007	20 4%	0 0%	0 0%
	9/24/2007	20 3%	0 0%	0 0%
	12/21/2007	20 4%	0.1%	0 0%
	3/28/2008	20 9%	0.0%	0.0%
	6/25/2008	20 5%	0.0%	0 0%
	9/30/2008	20.7%	0.0%	0.0%
	12/22/2008	20 4%	0.0%	0 0%
	3/31/2009	20.7%	0 0%	0 0%
	6/29/2009	20 6%	1 7%	0 0%
	9/18/2009	21.0%	0 1%	0 0%
	12/22/2009	20.3%	0.0%	0 0%
	3/19/2010	20 6%	0.0%	0.0%
	6/30/2010	19 4%	0 0%	0 0%
	9/30/2010	20 3%	0.0%	0 0%
	12/17/2010	19 9%	0.2%	0.0%
	3/30/2011	20 4%	0 0%	0 0%
	6/29/2011	20 6%	0.0%	0.0%
	9/28/2011	20 7%	0 0%	0 0%
	12/30/2011	20.7%	0 0%	0 0%
	3/23/2012	20 8%	0 0%	0.0%
	6/15/2012	20 8%	0 0%	0 0%
	9/28/2012	20 9%	0 00%	0 0%
	12/20/2012	20 6%	0 0%	0 0%
	3/29/2013	20 7%	0 0%	0 0%
	6/28/2013	20.6%	0 0%	0 0%
	9/17/2013	21 0%	0 0%	0 0%
	12/5/2013	20.9%	0.0%	0.0%
	3/31/2014	21.0%	0 0%	0 0%
	6/12/2014	21 5%	0.0%	0.0%
	9/18/2014	20 6%	0 0%	0 0%
	12/4/2014	21 8%	0.0%	0 0%
	3/19/2015	21 1%	0.2%	0 1%
	6/30/2015	20 2%	0 0%	0.0%
	9/17/2015	19 9%	0 0%	0 0%
	12/3/2015	22 1%	3.2%	0 0%

TABLE 3

AMBIENT AIR MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Ambient Air Monitoring Station	Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
AA-3	3/24/1999	20 6%	0 0%	0 0%
	6/10/1999	21 4%	0 0%	0 0%
	7/29/1999	20 5%	0 0%	0 1%
	8/23/1999	21.2%	0 0%	0 0%
	9/24/1999	20 0%	0 0%	0 0%
	10/19/1999	24 2%	0 0%	0 0%
	11/24/1999	19 8%	0 0%	0 0%
	12/21/1999	17 9%	0 0%	0 0%
	3/7/2000	24 4%	0 0%	0 0%
	6/28/2000	20 7%	0 0%	0 0%
	9/29/2000	21 2%	0.0%	0 0%
	12/13/2000	20 7%	0.0%	0 0%
	3/29/2001	20 7%	0 0%	0 0%
	6/15/2001	20 7%	0 0%	0 0%
	9/14/2001	20 4%	0 0%	0 0%
	12/19/2001	21 0%	0 0%	0 0%
	3/21/2002	20 7%	0 0%	0 0%
	6/6/2002	20 8%	0 0%	0 0%
	12/30/2002	20 0%	0 0%	0 0%
	3/27/2003	20 2%	0 0%	0 0%
	6/27/2003	20 5%	0 0%	0 0%
	9/9/2003	20 6%	0 0%	0 0%
	12/22/2003	20 4%	0 0%	0 0%
	3/30/2004	21 2%	0 0%	0 0%
	6/23/2004	20 7%	0 0%	0 0%
	9/13/2004	20 9%	0 0%	0 0%
	12/17/2004	21 4%	0 0%	0 0%
	3/31/2005	21.3%	0 0%	0 0%
	6/28/2005	20 3%	0 0%	0.0%
	9/13/2005	20 9%	0 0%	0 0%
	12/15/2005	20 7%	0 0%	0 0%
	3/31/2006	21 1%	0 0%	0 0%
	6/16/2006	21 2%	0 0%	0 0%
	9/21/2006	20 9%	0 0%	0 0%
	12/19/2006	20 8%	0 0%	0 0%

TABLE 3

AMBIENT AIR MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Ambient Air Monitoring Station	Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
AA-3 (continued)	3/30/2007	21 2%	0 0%	0.0%
	6/27/2007	20 5%	0 0%	0 0%
	9/24/2007	20.3%	0.0%	0 0%
	12/21/2007	20 4%	0 1%	0.0%
	3/28/2008	20 8%	0 0%	0 0%
	6/25/2008	20 5%	0 0%	0 0%
	9/30/2008	21 0%	0 0%	0.0%
	12/22/2008	20.0%	0 0%	0 0%
	3/31/2009	20 6%	0 0%	0 0%
	6/29/2009	20 5%	0.0%	0 0%
	9/18/2009	20 9%	0 1%	0 0%
	12/22/2009	20 2%	0 0%	0 0%
	3/19/2010	20.5%	0 0%	0 0%
	6/30/2010	19 5%	0 0%	0 1%
	9/30/2010	20 4%	0 0%	0 0%
	12/17/2010	20.2%	0 1%	0.0%
	3/30/2011	20 3%	0.0%	0 0%
	6/29/2011	20.6%	0 0%	0 0%
	9/28/2011	20 9%	0 0%	0 0%
	12/30/2011	20 7%	0 0%	0 0%
	3/23/2012	20 8%	0 0%	0 0%
	6/15/2012	20 8%	0 0%	0 0%
	9/28/2012	20 9%	0 00%	0 0%
	12/20/2012	20.7%	0 0%	0 0%
	3/29/2013	20.6%	0 0%	0 0%
	6/28/2013	20 5%	0 0%	0 0%
	9/17/2013	21 0%	0 0%	0 0%
	12/5/2013	20.9%	0 0%	0 0%
	3/31/2014	21 4%	0 0%	0 0%
	6/12/2014	21 4%	0 1%	0 0%
	9/18/2014	20 8%	0 0%	0 0%
	12/4/2014	21 9%	0 0%	0 0%
	3/19/2015	21 4%	0 2%	0 2%
	6/30/2015	20 5%	0 0%	0 0%
	9/17/2015	20 5%	0 0%	0 0%
	12/3/2015	22 0%	4 1%	0 0%

TABLE 3

AMBIENT AIR MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Ambient Air Monitoring Station	Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
AA-4	3/24/1999	20 6%	0 0%	0 0%
	6/10/1999	21 1%	0 0%	0 0%
	7/29/1999	20.5%	0 0%	0 1%
	8/23/1999	21 1%	0 0%	0 0%
	9/24/1999	20.0%	0 0%	0 0%
	10/19/1999	24 0%	0 0%	0.0%
	11/24/1999	19 7%	0.0%	0 0%
	12/21/1999	18.2%	0 0%	0 0%
	3/7/2000	24.6%	0 0%	0 0%
	6/28/2000	20 7%	0 0%	0 0%
	9/29/2000	21.2%	0 0%	0 0%
	12/13/2000	20 6%	0 0%	0 0%
	3/29/2001	20 8%	0 0%	0.0%
	6/15/2001	20.8%	0 0%	0 0%
	9/14/2001	20.1%	0 0%	0 0%
	12/19/2001	21 0%	0.0%	0 0%
	3/21/2002	20 7%	0 0%	0 0%
	6/6/2002	20 8%	0 0%	0 0%
	12/30/2002	20 1%	0 0%	0 0%
	3/27/2003	20 2%	0 0%	0 0%
	6/27/2003	20 7%	0 0%	0 0%
	9/9/2003	20 7%	0 0%	0 0%
	12/22/2003	20 0%	0 0%	0.0%
	3/30/2004	21 2%	0 0%	0 0%
	6/23/2004	20 7%	0 0%	0 0%
	9/13/2004	20 9%	0 0%	0.0%
	12/17/2004	21 3%	0 0%	0 0%
	3/31/2005	21 3%	0 0%	0 0%
	6/28/2005	20.4%	0 0%	0 0%
	9/13/2005	20 9%	0 0%	0 0%
	12/15/2005	20.7%	0 0%	0 0%
	3/31/2006	21.0%	0 0%	0 0%
	6/16/2006	21.2%	0 0%	0 0%
	9/21/2006	20 9%	0 0%	0 0%
	12/19/2006	20 9%	0 0%	0 0%

TABLE 3

AMBIENT AIR MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Ambient Air Monitoring Station	Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
AA-4 (continued)	3/30/2007	21 2%	0 0%	0 0%
	6/27/2007	20 5%	0 0%	0 0%
	9/24/2007	20 5%	0 0%	0 0%
	12/21/2007	20 6%	0.1%	0 0%
	3/28/2008	20 6%	0 0%	0 0%
	6/25/2008	20 6%	0.0%	0 0%
	9/30/2008	21.0%	0 0%	0 0%
	12/22/2008	20 3%	0.0%	0 0%
	3/31/2009	20 6%	0 0%	0 0%
	6/29/2009	20.4%	0 0%	0 0%
	9/18/2009	21 0%	0 0%	0 0%
	12/22/2009	20.3%	0 0%	0 0%
	3/19/2010	20 6%	0 0%	0 0%
	6/30/2010	17 7%	0 0%	0 1%
	9/30/2010	20 4%	0.0%	0 0%
	12/17/2010	20.3%	0 1%	0.0%
	3/30/2011	20 4%	0 1%	0 0%
	6/29/2011	20 5%	0.0%	0 0%
	9/28/2011	21.1%	0 0%	0.0%
	12/30/2011	20.9%	0 0%	0 0%
	3/23/2012	20.8%	0 0%	0.0%
	6/15/2012	20 7%	0 0%	0 0%
	9/28/2012	20 9%	0 00%	0 0%
	12/20/2012	20 6%	0.0%	0 0%
	3/29/2013	20.7%	0 0%	0 0%
	6/28/2013	20 5%	0.0%	0.0%
	9/17/2013	21.0%	0 0%	0 0%
	12/5/2013	20 9%	0 0%	0 0%
	3/31/2014	21.5%	0 0%	0 0%
	6/12/2014	21 4%	0 0%	0 0%
	9/18/2014	20 7%	0 0%	0 0%
	12/4/2014	21 8%	0.0%	0.0%
	3/19/2015	21 4%	0 2%	0 1%
	6/30/2015	20 5%	0 0%	0 0%
	9/17/2015	20 5%	0 0%	0 0%
	12/3/2015	22 0%	3 4%	0 0%

TABLE 3

AMBIENT AIR MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Ambient Air Monitoring Station	Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
AA-5	3/24/1999	20 6%	0 0%	0 0%
	6/10/1999	21.5%	0 0%	0 0%
	7/29/1999	20.5%	0 0%	0 1%
	8/23/1999	21 2%	0 0%	0 0%
	9/24/1999	20 2%	0 0%	0 0%
	10/19/1999	21 1%	0 0%	0 0%
	11/24/1999	19 7%	0 0%	0 0%
	12/21/1999	17 6%	0 0%	0 0%
	3/7/2000	24 4%	0 0%	0 0%
	6/28/2000	21 1%	0 0%	0 0%
	9/29/2000	20 8%	0 0%	0 0%
	12/13/2000	20 7%	0 0%	0 0%
	3/29/2001	20 6%	0 0%	0 0%
	6/15/2001	20 9%	0 0%	0 0%
	9/14/2001	20.4%	0 0%	0 0%
	12/19/2001	21 0%	0 0%	0 0%
	3/21/2002	20 7%	0 0%	0 0%
	6/6/2002	20 9%	0 0%	0 0%
	12/30/2002	20 0%	0 0%	0 0%
	3/27/2003	20 0%	0 0%	0 0%
	6/27/2003	20 7%	0 0%	0 0%
	9/9/2003	20 6%	0 0%	0 0%
	12/22/2003	20 3%	0 0%	0 0%
	3/30/2004	21 2%	0.0%	0 0%
	6/23/2004	20 7%	0 0%	0 0%
	9/13/2004	20 9%	0 0%	0 0%
	12/17/2004	21 3%	0 0%	0 0%
	3/31/2005	21.3%	0.0%	0 0%
	6/28/2005	20 4%	0 0%	0 0%
	9/13/2005	20 9%	0 0%	0 0%
	12/15/2005	20 7%	0.0%	0 0%
	3/31/2006	21 1%	0 0%	0 0%
	6/16/2006	21 2%	0 0%	0 0%
	9/21/2006	20 8%	0 0%	0 0%
	12/19/2006	20 8%	0 0%	0 0%

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AMBIENT AIR MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Ambient Air Monitoring Station	Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
AA-5	3/30/2007	21 3%	0 0%	0 0%
(continued)	6/27/2007	20 5%	0 0%	0 0%
	9/24/2007	20.8%	0.0%	0.0%
	12/21/2007	20 3%	0.1%	0 0%
	3/28/2008	20 8%	0 0%	0 0%
	6/25/2008	20 5%	0 0%	0 0%
	9/30/2008	20.8%	0.0%	0 0%
	12/22/2008	20 0%	0 0%	0.0%
	3/31/2009	20 4%	0.0%	0 0%
	6/29/2009	20 4%	0 0%	0 0%
	9/18/2009	21 0%	0.0%	0 0%
	12/22/2009	20 3%	0 0%	0 0%
	3/19/2010	20 6%	0 0%	0 0%
	6/30/2010	20 0%	0 0%	0 1%
	9/30/2010	20 4%	0.0%	0 0%
	12/17/2010	20 4%	0 1%	0.0%
	3/30/2011	20 5%	0 0%	0 0%
	6/29/2011	20 6%	0 0%	0 0%
	9/28/2011	21 2%	0 0%	0.0%
	12/30/2011	20 8%	0 0%	0.0%
	3/23/2012	20 9%	0 0%	0 0%
	6/15/2012	20 8%	0.0%	0 0%
	9/28/2012	20 9%	0.00%	0.0%
	12/20/2012	20 6%	0 0%	0 0%
	3/29/2013	20 7%	0 0%	0 0%
	6/28/2013	20 6%	0 0%	0 0%
	9/17/2013	20 9%	0 0%	0 0%
	12/5/2013	21 0%	0 0%	0 0%
	3/31/2014	21 5%	0 0%	0.0%
	6/12/2014	21 3%	0 1%	0 0%
	9/18/2014	20 8%	0 0%	0 0%
	12/4/2014	22 1%	0 0%	0 0%
	3/19/2015	21 5%	0 2%	0 2%
	6/30/2015	20 4%	0.0%	0 0%
	9/17/2015	20 3%	0 0%	0 0%
	12/3/2015	21 9%	3 3%	0 0%

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AMBIENT AIR MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Ambient Air Monitoring Station	Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
AA-6	3/24/1999	20.9%	0 0%	0 0%
	6/10/1999	20 9%	0 0%	0 0%
	7/29/1999	20 4%	0 0%	0 1%
	8/23/1999	21.3%	0 0%	0.0%
	9/24/1999	19 9%	0 0%	0 1%
	10/19/1999	21 0%	0 0%	0 0%
	11/24/1999	20 0%	0 0%	0 0%
	12/21/1999	17 4%	0 0%	0 0%
	3/7/2000	26 9%	0 0%	0 0%
	6/28/2000	21 0%	0 0%	0 0%
	9/29/2000	20 8%	0 0%	0 0%
	12/13/2000	20.7%	0 0%	0 0%
	3/29/2001	20 7%	0 0%	0 0%
	6/15/2001	20 8%	0.0%	0 0%
	9/14/2001	20 2%	0 0%	0.0%
	12/19/2001	21 0%	0 0%	0 0%
	3/21/2002	20 7%	0 0%	0 0%
	6/6/2002	20 9%	0 0%	0 0%
	12/30/2002	20 1%	0 0%	0 0%
	3/27/2003	20 0%	0 0%	0 0%
	6/27/2003	20 7%	0 0%	0 0%
	9/9/2003	20 7%	0 0%	0 0%
	12/22/2003	20 5%	0 0%	0 0%
	3/30/2004	21 2%	0 0%	0 0%
	6/23/2004	20 7%	0 0%	0 0%
	9/13/2004	20 9%	0 0%	0 0%
	12/17/2004	21 3%	0 0%	0 0%
	3/31/2005	21 3%	0 0%	0 0%
	6/28/2005	20 4%	0 0%	0 0%
	9/13/2005	20 9%	0 0%	0 0%
	12/15/2005	20 8%	0.0%	0 0%
	3/31/2006	21 1%	0 0%	0 0%
	6/16/2006	21 1%	0 0%	0 0%
	9/21/2006	20.8%	0 0%	0 0%
	12/19/2006	20 8%	0.0%	0.0%

TABLE 3

AMBIENT AIR MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Ambient Air Monitoring Station	Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
AA-6 (continued)	**3/30/2007**	21 2%	0 0%	0.0%
	6/27/2007	20.4%	0 0%	0 0%
	9/24/2007	20 9%	0 0%	0.0%
	12/21/2007	20.5%	0.0%	0 0%
	3/28/2008	20 8%	0 0%	0 0%
	6/25/2008	20.4%	0 0%	0.0%
	9/30/2008	20.5%	0 0%	0 0%
	12/22/2008	19 2%	0 0%	0 0%
	3/31/2009	20.5%	0 0%	0 0%
	6/29/2009	20 4%	0 0%	0 0%
	9/18/2009	21 2%	0 1%	0 0%
	12/22/2009	20.3%	0 0%	0 0%
	3/19/2010	20 6%	0 0%	0 0%
	6/30/2010	20 1%	0 0%	0 1%
	9/30/2010	20 5%	0 0%	0 0%
	12/17/2010	20 4%	0 1%	0 0%
	3/30/2011	20.3%	0 0%	0 0%
	6/29/2011	20.6%	0 0%	0 0%
	9/28/2011	21 4%	0.0%	0.0%
	12/30/2011	20 7%	0.0%	0.0%
	3/23/2012	20.9%	0 0%	0 0%
	6/15/2012	20.8%	0.0%	0.0%
	9/28/2012	20 9%	0 00%	0 0%
	12/20/2012	20 7%	0 0%	0 0%
	3/29/2013	20 7%	0 0%	0 0%
	6/28/2013	20 6%	0 0%	0 0%
	9/17/2013	21 0%	0 1%	0 0%
	12/5/2013	21 0%	0 1%	0 0%
	3/31/2014	21 3%	0 0%	0 0%
	6/12/2014	21 2%	0 1%	0 0%
	9/18/2014	20 6%	0 0%	0 0%
	12/4/2014	21 9%	0 0%	0 0%
	3/19/2015	21.4%	0 1%	0.2%
	6/30/2015	20 5%	0 0%	0 0%
	9/17/2015	20 4%	0.0%	0 0%
	12/3/2015	21 6%	3.5%	0 0%

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AMBIENT AIR MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Ambient Air Monitoring Station	Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
AA-7	3/24/1999	20 8%	0.0%	0 0%
	6/10/1999	21 5%	0 0%	0 0%
	7/29/1999	20.4%	0.0%	0 0%
	8/23/1999	21 2%	0 0%	0 0%
	9/24/1999	20 2%	0 0%	0 0%
	10/19/1999	21 0%	0 0%	0 0%
	11/24/1999	19 8%	0 0%	0 0%
	12/21/1999	17 6%	0 0%	0 0%
	3/7/2000	27 7%	0 0%	0 0%
	6/28/2000	21 0%	0 0%	0 0%
	9/29/2000	20 5%	0 0%	0 0%
	12/13/2000	20 8%	0 0%	0 0%
	3/29/2001	20 7%	0 0%	0 0%
	6/15/2001	20 8%	0 0%	0 0%
	9/14/2001	20 4%	0 0%	0 0%
	12/19/2001	21 0%	0 0%	0 0%
	3/21/2002	20 7%	0 0%	0 0%
	6/6/2002	20 8%	0 0%	0 0%
	12/30/2002	20 1%	0 0%	0 0%
	3/27/2003	20 0%	0.0%	0 0%
	6/27/2003	20 7%	0 0%	0 0%
	9/9/2003	20 8%	0 0%	0 0%
	12/22/2003	20 3%	0 0%	0 0%
	3/30/2004	21 2%	0 0%	0 0%
	6/23/2004	20 7%	0 0%	0 0%
	9/13/2004	20 9%	0 0%	0 0%
	12/17/2004	21.2%	0 0%	0 0%
	3/31/2005	21 3%	0 0%	0 0%
	6/28/2005	20 4%	0 0%	0 0%
	9/13/2005	20 8%	0 0%	0 0%
	12/15/2005	20.7%	0 0%	0 0%
	3/31/2006	21.0%	0 0%	0.0%
	6/16/2006	21 2%	0 0%	0.0%
	9/21/2006	20 8%	0 0%	0 0%
	12/19/2006	20 8%	0 0%	0.0%

TABLE 3

AMBIENT AIR MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Ambient Air Monitoring Station	Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
AA-7 (continued)	3/30/2007	21 2%	0 0%	0 0%
	6/27/2007	20 5%	0.0%	0 0%
	9/24/2007	21 0%	0 0%	0 0%
	12/21/2007	20 5%	0.0%	0 0%
	3/28/2008	20 7%	0 0%	0.0%
	6/25/2008	20.5%	0 0%	0 0%
	9/30/2008	20.8%	0 0%	0 0%
	12/22/2008	20.0%	0 0%	0 0%
	3/31/2009	20 7%	0 0%	0.0%
	6/29/2009	20.5%	0 0%	0 0%
	9/18/2009	21 0%	0 1%	0.0%
	12/22/2009	20.4%	0 0%	0 0%
	3/19/2010	20 5%	0 0%	0.0%
	6/30/2010	19 4%	0.0%	0.0%
	9/30/2010	20 4%	0 0%	0 0%
	12/17/2010	20.6%	0 1%	0 0%
	3/30/2011	20 5%	0 0%	0 0%
	6/29/2011	20 5%	0.0%	0 0%
	9/28/2011	21 4%	0.0%	0 0%
	12/30/2011	20.8%	0 0%	0 0%
	3/23/2012	20 7%	0 0%	0 0%
	6/15/2012	20 8%	0 0%	0 0%
	9/28/2012	20 9%	0 00%	0 0%
	12/20/2012	20.6%	0 0%	0 0%
	3/29/2013	20 7%	0 0%	0 0%
	6/28/2013	20 6%	0 0%	0 0%
	9/17/2013	21 0%	0 0%	0 0%
	12/5/2013	20 9%	0 0%	0 0%
	3/31/2014	21 0%	0 0%	0 0%
	6/12/2014	21 0%	0 1%	0 0%
	9/18/2014	20 4%	0 0%	0 0%
	12/4/2014	21 7%	0 0%	0 0%
	3/19/2015	21.4%	0.1%	0 1%
	6/30/2015	20 3%	0 0%	0 0%
	9/17/2015	20 3%	0 0%	0 0%
	12/3/2015	21.3%	3.6%	0 0%

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AMBIENT AIR MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Ambient Air Monitoring Station	Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
AA-8	3/24/1999	20 9%	0.0%	0.0%
	6/10/1999	21 4%	0 0%	0 0%
	7/29/1999	20 9%	0 0%	0 0%
	8/23/1999	21 3%	0 0%	0 0%
	9/24/1999	20 2%	0 0%	0 0%
	10/19/1999	21.6%	0 0%	0 0%
	11/24/1999	20 0%	0 0%	0 0%
	12/21/1999	18 1%	0 0%	0 0%
	3/7/2000	22 0%	0 0%	0 0%
	6/28/2000	20 8%	0 0%	0 0%
	9/29/2000	21 2%	0 0%	0 0%
	12/13/2000	20 7%	0 0%	0 0%
	3/29/2001	20 7%	0 0%	0 0%
	6/15/2001	20 7%	0 0%	0 0%
	9/14/2001	20 4%	0 0%	0 0%
	12/19/2001	21.0%	0.0%	0 0%
	3/21/2002	20 7%	0 0%	0.0%
	6/6/2002	20 9%	0 0%	0 0%
	12/30/2002	20 0%	0 0%	0 0%
	3/27/2003	20 2%	0 0%	0 0%
	6/27/2003	20 5%	0 0%	0 0%
	9/9/2003	20 7%	0 0%	0 0%
	12/22/2003	20 4%	0 0%	0.0%
	3/30/2004	21 2%	0 0%	0 0%
	6/23/2004	20 7%	0 0%	0 0%
	9/13/2004	20 9%	0 0%	0 0%
	12/17/2004	21 3%	0 0%	0 0%
	3/31/2005	21 3%	0 0%	0 0%
	6/28/2005	20 4%	0.0%	0 0%
	9/13/2005	20 9%	0 0%	0.0%
	12/15/2005	20 7%	0 0%	0 0%
	3/31/2006	21 1%	0 0%	0 0%
	6/16/2006	21 2%	0 0%	0.0%
	9/21/2006	20.8%	0 0%	0 0%
	12/19/2006	20 9%	0 0%	0 0%

TABLE 3

AMBIENT AIR MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Ambient Air Monitoring Station	Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
AA-8	3/30/2007	21.2%	0 0%	0 0%
(continued)	6/27/2007	205 0%	0 0%	0 0%
	9/24/2007	20 6%	0.0%	0 0%
	12/21/2007	20 5%	0 1%	0 0%
	3/28/2008	20 8%	0 0%	0 0%
	6/25/2008	20 2%	0 0%	0 0%
	9/30/2008	21 0%	0 0%	0 0%
	12/22/2008	20 8%	0.0%	0 0%
	3/31/2009	20 7%	0 0%	0 0%
	6/29/2009	20.5%	0 0%	0.0%
	9/18/2009	20 9%	0 1%	0 0%
	12/22/2009	20 3%	0.0%	0 0%
	3/19/2010	20 6%	0 0%	0 0%
	6/30/2010	19 3%	0 0%	0 0%
	9/30/2010	20 3%	0 0%	0 0%
	12/17/2010	20 0%	0 2%	0 0%
	3/30/2011	20.4%	0.0%	0 0%
	6/29/2011	20 6%	0.0%	0 0%
	9/28/2011	21 2%	0.0%	0 0%
	12/30/2011	20.9%	0 0%	0.0%
	3/23/2012	20.8%	0 0%	0 0%
	6/15/2012	20 8%	0 0%	0 0%
	9/28/2012	20 9%	0.00%	0 0%
	12/20/2012	20 7%	0 0%	0 0%
	3/29/2013	20 7%	0 0%	0 0%
	6/28/2013	20 6%	0 0%	0 0%
	9/17/2013	20 3%	0 0%	0 0%
	12/5/2013	20 9%	0.0%	0 0%
	3/31/2014	21.0%	0 0%	0 0%
	6/12/2014	21 4%	0.0%	0 0%
	9/18/2014	20.6%	0.0%	0 0%
	12/4/2014	21.5%	0 0%	0 0%
	3/19/2015	20 1%	0 2%	0 1%
	6/30/2015	20 4%	0 0%	0 0%
	9/17/2015	20 2%	0.0%	0 0%
	12/3/2015	22 1%	3.3%	0 0%

TABLE 3

AMBIENT AIR MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Ambient Air Monitoring Station	Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
AA-9	3/24/1999	20 8%	0 0%	0 0%
	6/10/1999	21 5%	0 0%	0 0%
	7/29/1999	20.6%	0 0%	0 0%
	8/23/1999	21 2%	0 0%	0 0%
	9/24/1999	20 1%	0 0%	0 0%
	10/19/1999	22 0%	0 0%	0.0%
	11/24/1999	20 0%	0 0%	0 0%
	12/21/1999	17 4%	0 0%	0.0%
	3/7/2000	24 3%	0 0%	0 0%
	6/28/2000	20 7%	0 0%	0 0%
	9/29/2000	21 0%	0 0%	0 0%
	12/13/2000	20 8%	0 0%	0 0%
	3/29/2001	20.7%	0 0%	0 0%
	6/15/2001	20 8%	0 0%	0 0%
	9/14/2001	20 2%	0.0%	0 0%
	12/19/2001	21 0%	0 0%	0 0%
	3/21/2002	20 7%	0 0%	0 0%
	6/6/2002	20.8%	0 0%	0 0%
	12/30/2002	20.0%	0 0%	0 0%
	3/27/2003	20 2%	0 0%	0 0%
	6/27/2003	20 7%	0 0%	0 0%
	9/9/2003	20 8%	0 0%	0 0%
	12/22/2003	20 4%	0 0%	0 0%
	3/30/2004	21 2%	0 0%	0 0%
	6/23/2004	20 8%	0 0%	0 0%
	9/13/2004	20 9%	0 0%	0 0%
	12/17/2004	21 4%	0.0%	0 0%
	3/31/2005	21 3%	0 0%	0 0%
	6/28/2005	20.4%	0 0%	0 0%
	9/13/2005	20 9%	0 0%	0 0%
	12/15/2005	20.7%	0 0%	0 0%
	3/31/2006	21 1%	0 0%	0 0%
	6/16/2006	21 2%	0 0%	0 0%
	9/21/2006	20 8%	0.0%	0 0%
	12/19/2006	20 8%	0 0%	0 0%

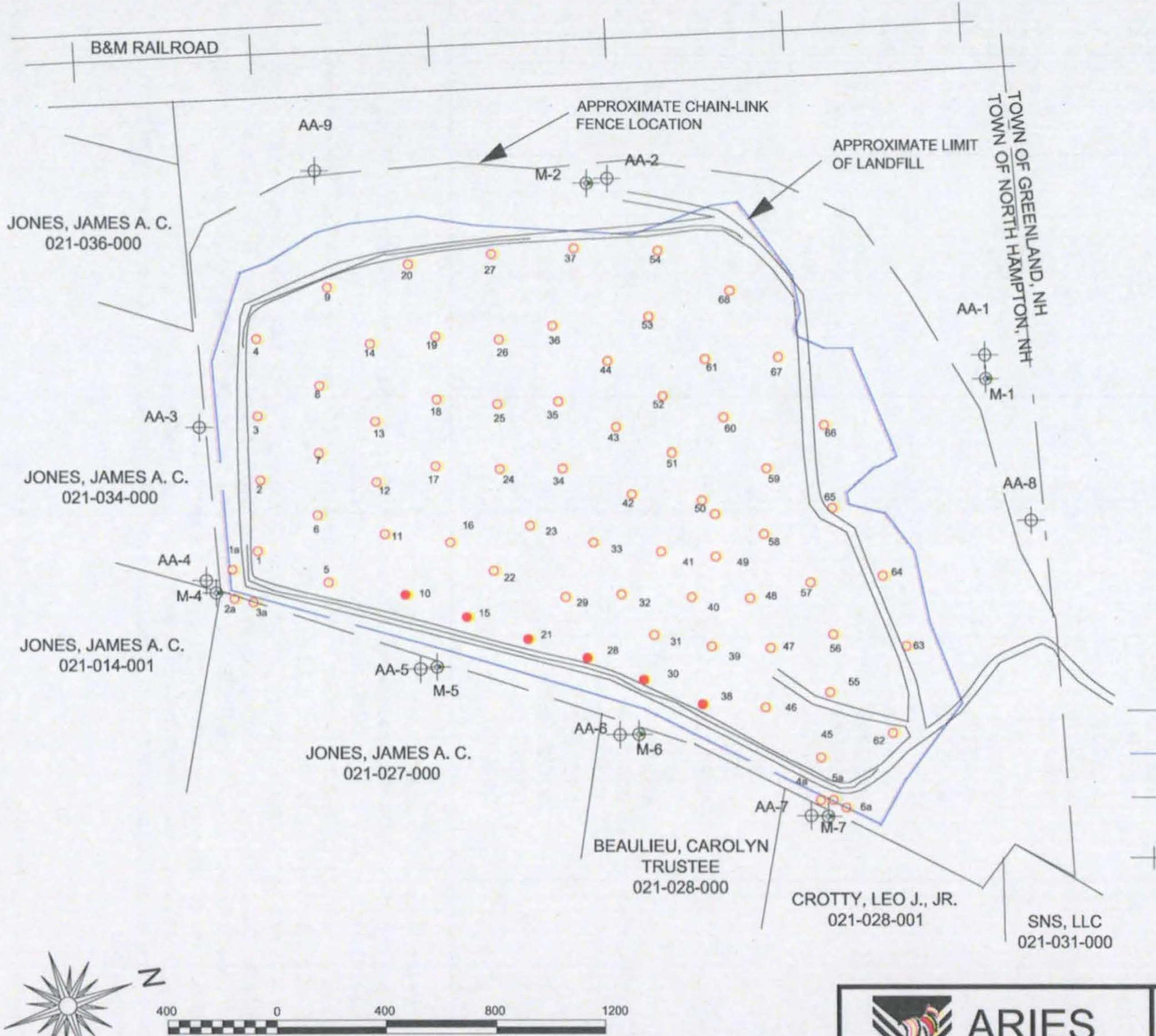
TABLE 3

AMBIENT AIR MONITORING RESULTS SUMMARY
2016 LANDFILL GAS MONITORING RESULTS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Ambient Air Monitoring Station	Monitoring Date	OXYGEN	CARBON DIOXIDE	METHANE
AA-9	**3/30/2007**	21 3%	0 0%	0.0%
(continued)	**6/27/2007**	20 4%	0 0%	0 0%
	9/24/2007	20 1%	0 0%	0 0%
	12/21/2007	20.4%	0 1%	0 0%
	3/28/2008	20.8%	0 0%	0.0%
	6/25/2008	20.2%	0 0%	0 0%
	9/30/2008	20 9%	0.0%	0 0%
	12/22/2008	20 0%	0 0%	0 0%
	3/31/2009	20 5%	0.0%	0 0%
	6/29/2009	20.5%	0 0%	0 0%
	9/18/2009	20 9%	0.1%	0 0%
	12/22/2009	20.3%	0.1%	0 0%
	3/19/2010	20 6%	0.0%	0 0%
	6/30/2010	19.6%	0 0%	0 1%
	9/30/2010	20.4%	0 0%	0.0%
	12/17/2010	20 3%	0.2%	0 0%
	3/30/2011	20 5%	0.0%	0 0%
	6/29/2011	20 6%	0.0%	0 0%
	9/28/2011	20 8%	0 0%	0 0%
	12/30/2011	20.7%	0 0%	0 0%
	3/23/2012	20 9%	0 0%	0 0%
	6/15/2012	20 8%	0 0%	0 0%
	9/28/2012	20 9%	0.00%	0 0%
	12/20/2012	20 7%	0 0%	0 0%
	3/29/2013	20.6%	0 0%	0 0%
	6/28/2013	20.6%	0 0%	0 0%
	9/17/2013	21 1%	0 0%	0 0%
	12/5/2013	21 0%	0 0%	0.0%
	3/31/2014	21.4%	0 0%	0 0%
	6/12/2014	21 5%	0 0%	0 0%
	9/18/2014	20.7%	0 0%	0 0%
	12/4/2014	21 7%	0.0%	0 0%
	3/19/2015	21 4%	0 2%	0 1%
	6/30/2015	20 2%	0 0%	0 0%
	9/17/2015	20.5%	0 0%	0 0%
	12/3/2015	22 0%	3.4%	0 0%

NOTES:

1. All readings are percent by volume
2. All readings prior to March 2004 were made using an infrared GA-90 gas analyzer, while readings from March 2004 onward were made with a model GEM-2000 or GEM-500 infrared gas analyzer
3 When mixed with air, LEL for methane is 5% on a volume basis & the UEL for methane is 15% The DES ambient air methane standard is 0 5% and the soil gas standard is 2 5%
4 Aries field calibrated the infrared gas analyzer for the March 2001 monitoring round and all subsequent monitoring rounds.
5. Aries conducted the landfill gas monitoring rounds in accordance with the April 2010 Coakley Project Operations Plan, Attachment IV and the January 22, 2016 NHDES correspondence regarding Landfill Gas Monitoring Reduction Support (attached)
6. The GEM-500 infrared gas analyzer methane detection limit is approximately 0 1%
7 On March 19, 2015 Aries experienced slight instrumental drift due to significant wind gusts.
8 Ambient air sampling was discontinued following the December 2015 monitoring round in accordance with DES recommendations



NOTES:

1. Aries developed the Institutional Control Zone Area Plan from a plan titled "Study Area Base Map" contained in the May 1994 Management of Migration Remedial Investigation Feasibility Study prepared by Camp Dresser & McKee Inc. of Boston, MA.

2. Approximate property boundary locations are from Town of Greenland, NH Tax Map R-1, Town of Rye, NH Tax Map 10, Town of North Hampton Tax Map 17 and a Town of North Hampton map titled "Properties Within or Adjacent to the Coakley GMZ".

3. Methane volume percent measurements were collected with a Geotechnical Instrument, Ltd Model GEM-2000 Infrared Gas Analyzer.

4. Site feature locations are approximate.

LEGEND:

M-1	Landfill gas monitoring probe
AA-1	Ambient air monitoring station
15	Sampled landfill gas vent
63	Landfill gas vent
021-028-001	Town of North Hampton map, block, and lot number
	Chain-link fence
	Approximate limit of landfill
	Approximate property boundary based on Town of Greenland, Rye and North Hampton Tax Maps
	Railroad tracks

JOB # 97070G

ARIES ENGINEERING, INC.
environmental engineers and hydrogeologists

TECHNICAL ASSISTANCE SERVICES
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE

LANDFILL GAS MONITORING LOCATIONS

MARCH 2016

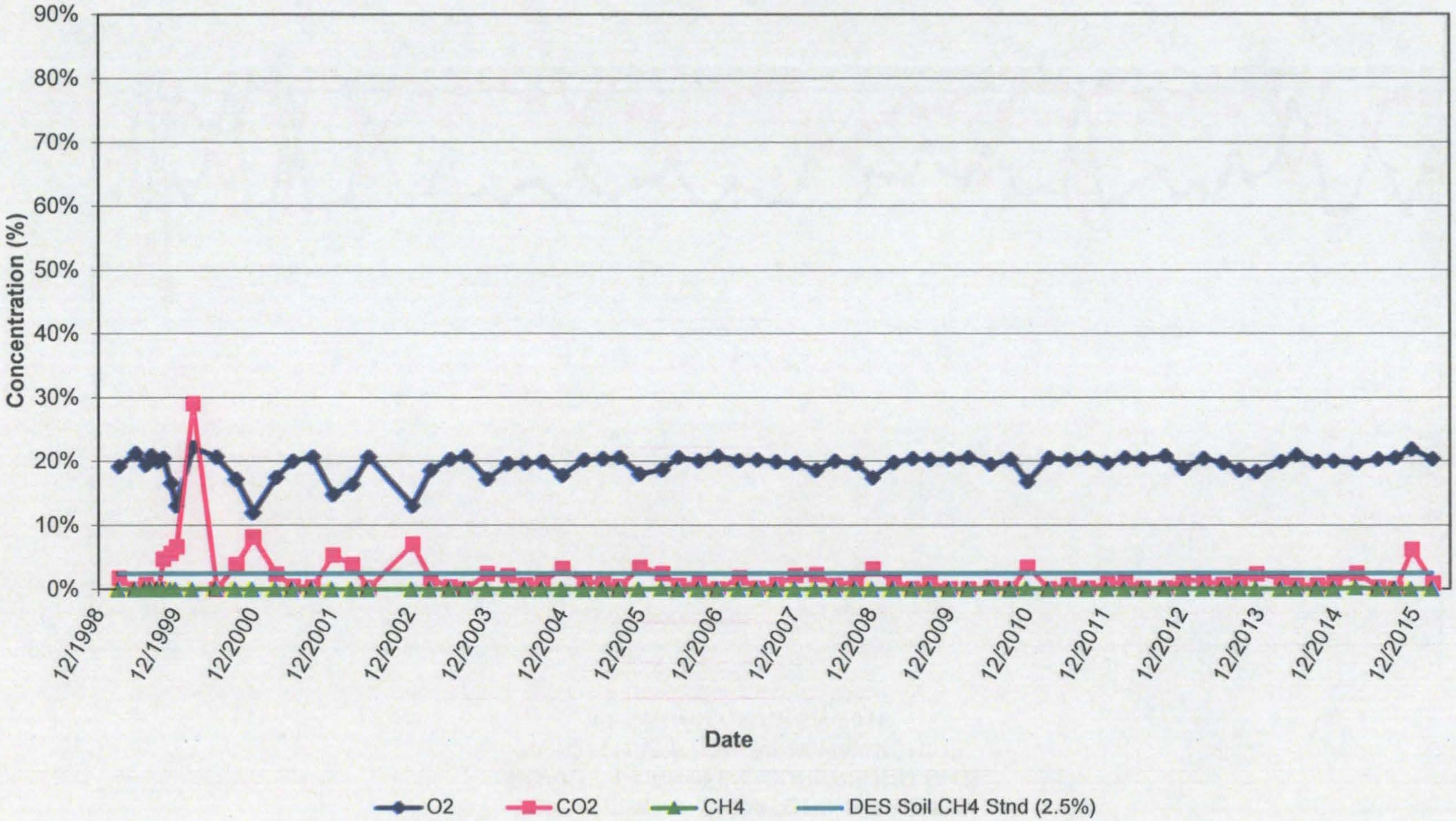
FIGURE 1

® 2016 ARIES ENGINEERING, INC.

97070G(1)03.16.DWG

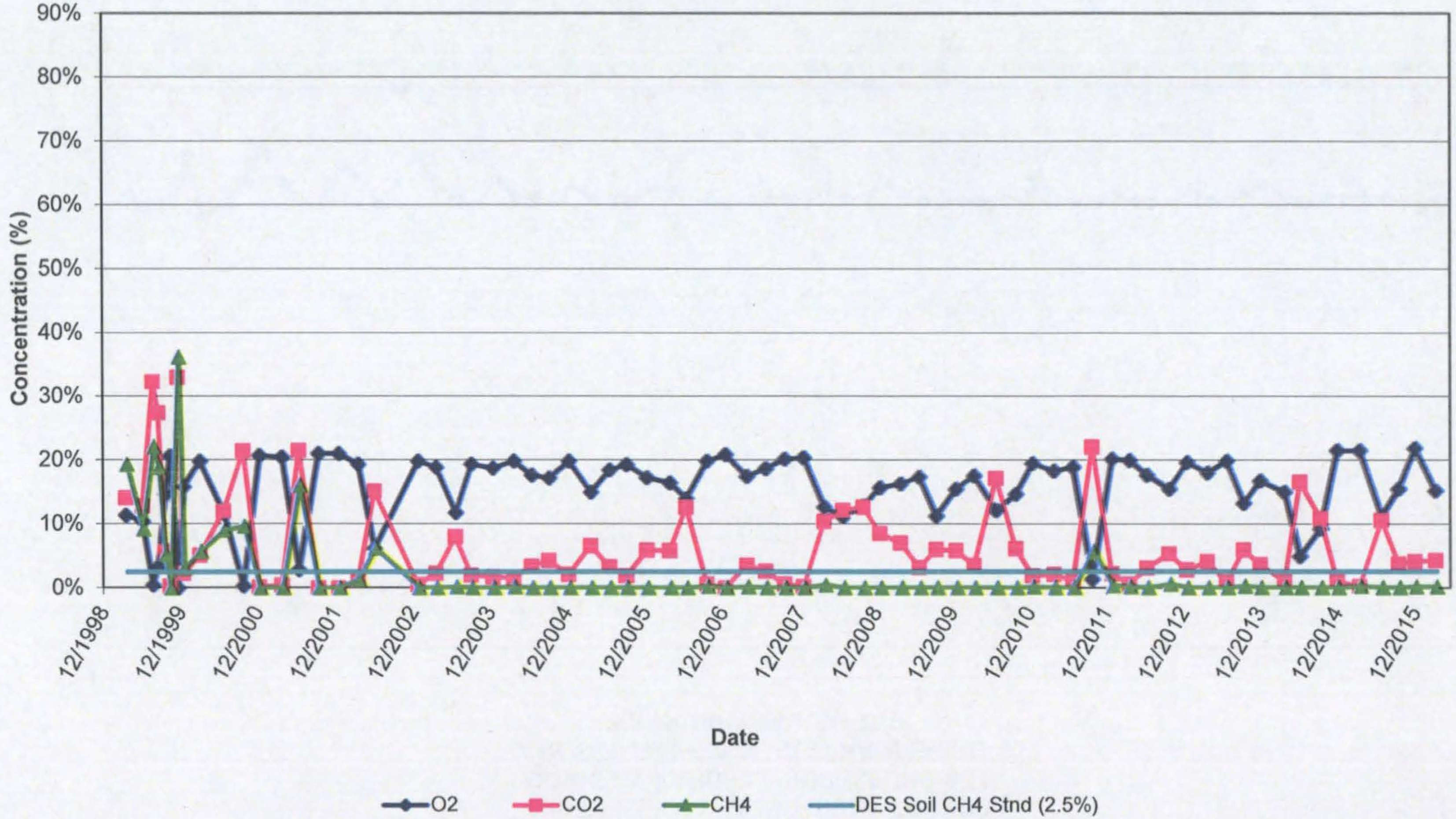
PROBE M-4

LANDFILL GAS MONITORING TRENDS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE
FEBRUARY/MARCH 2016



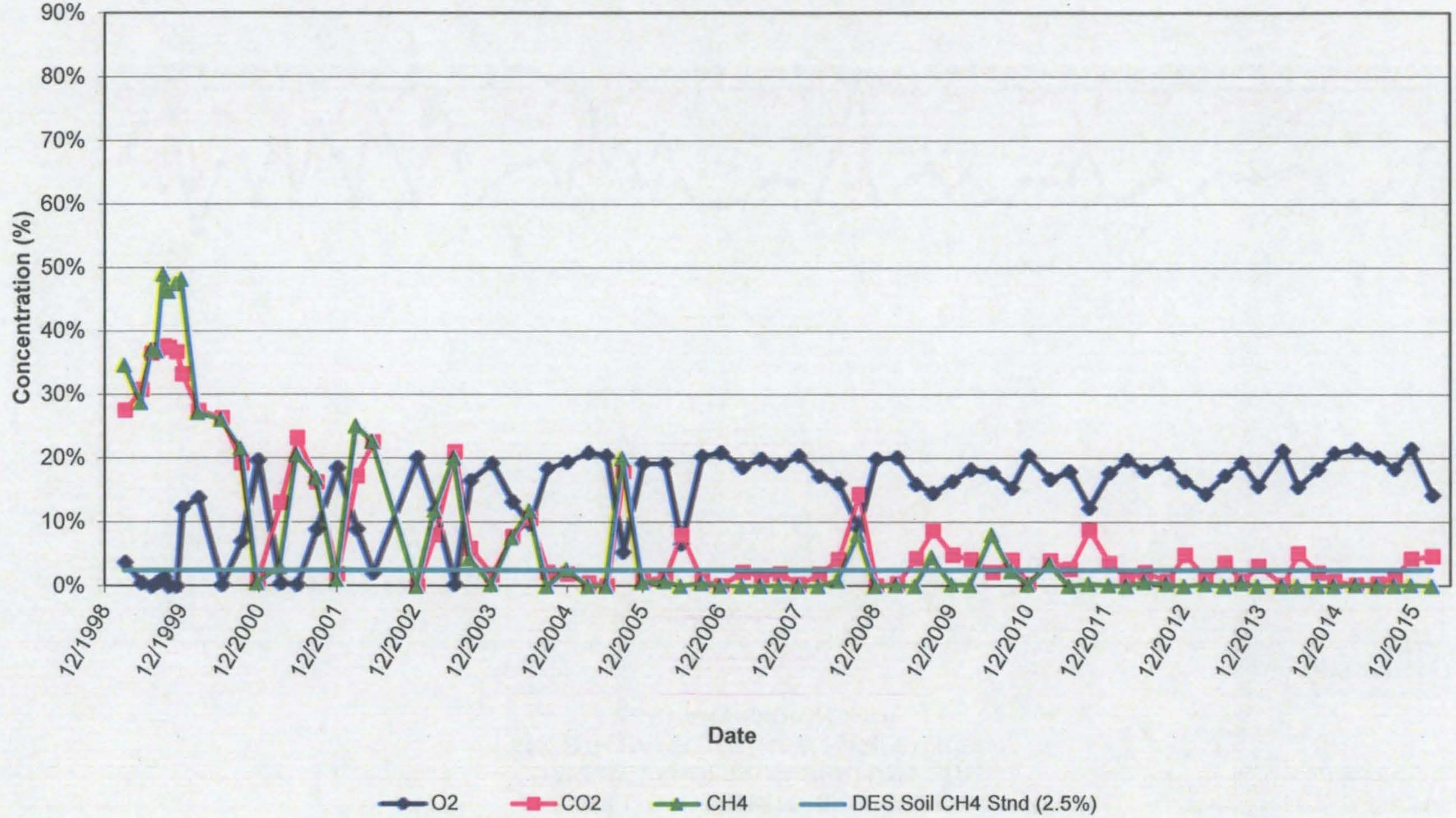
PROBE M-5

LANDFILL GAS MONITORING TRENDS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE
FEBRUARY/MARCH 2016



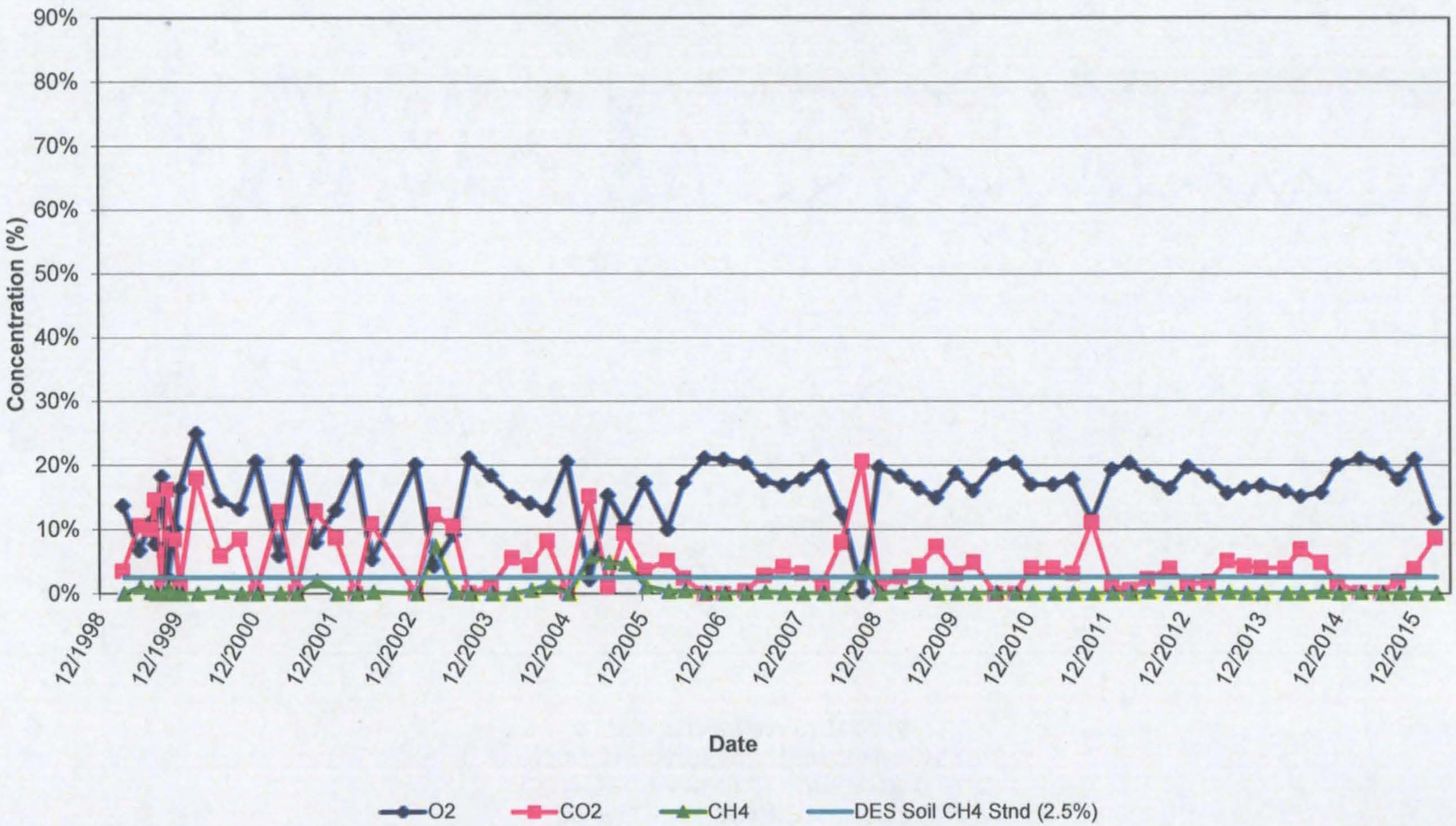
PROBE M-6

LANDFILL GAS MONITORING TRENDS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE
FEBRUARY/MARCH 2016



PROBE M-7

LANDFILL GAS MONITORING TRENDS
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE
FEBRUARY/MARCH 2016



EMAIL ONLY

January 22, 2016

Peter L. Britz
Environmental Planner/Sustainability Coordinator
City of Portsmouth – Planning Department
1 Junkins Avenue
Portsmouth, NH 03801

Subject: **North Hampton – Coakley Superfund Site**, Breakfast Hill Road
DES Site **#198712001**, Project #431

Landfill Gas Monitoring Reduction Support

Dear Mr. Britz:

I have reviewed the following to support further consideration of your request to discontinue landfill gas monitoring at the Coakley Landfill Superfund Site as proposed in your December 2, 2015 letter and Golder Associate's November 23, 2015 letter:

1. Intra-Department Communication from the Department's Solid Waste Management Bureau, dated January 4, 2016 (enclosed);
2. DES letter responding to March 2009 Landfill Gas Monitoring Results, dated June 30, 2009 (enclosed);
3. December 2015 Landfill Gas Monitoring Results, dated December 11, 2015 (by reference); and
4. E-mail from Peter Britz regarding landfill gas alarms in nearby occupied structures, dated January 14, 2016 (enclosed).

The content and findings of each of the above references is summarized below:

Item 1 – The Department's Solid Waste Management Bureau (SWMB) found the subject submittal contained insufficient data to evaluate the request. In addition, the SWMB cites the landfill performance standards, Env-Sw 807.04 (enclosed), which specifically states: "*the permittee shall implement an approved closure plan requiring that: (b) the facility and site effectively cease generating decomposition gases*". Env-Sw 807.05(a) goes on to say "*the post-closure period of a landfill shall be the period of time required to demonstrate the facility has achieved the performance standards specified in Env-Sw 807.04*."

Finding: Monitoring for landfill gas generation/migration is required by Statute to continue until it is demonstrated that the facility no longer produces landfill gas.

Item 2 – The June 2009 letter recommended, among other things, collecting gas data from landfill vents to illustrate trends in landfill gas generation in comparison with data collected from the perimeter gas probes.

Finding: Monitoring of landfill vents has not occurred, making it impossible to assess the landfill's continued generation of landfill gas.

Item 3 – The December 2015 Landfill Gas Monitoring Results summarize current and historical gas monitoring data. The gas probes of greatest interest, due to their proximity to nearby buildings located east of the landfill; include M-4, M-5, M-6 and M-7. In summary, over the last ten years, Probe M-4 has not exceeded the state standard for methane (2.5 percent); Probe M-5 has exceeded the standard once; Probe M-6 has exceeded the standard four times; and Probe M-7 has exceeded the standard once. Since 2000, there have been seven exceedances of the standard in March, nine in June, six in September and one exceedance in December; therefore, based on the data, June is the most common time of year for gas exceedances to occur at the eastern property boundary. Gas probes M-1 and M-2 are less of a concern given their relative remote location away from occupied structures; however, neither has exceeded the state standard in the last ten years. Ambient air monitoring has been performed since 1999; methane has not been detected above 0.2 percent.

Finding: Based on historic sampling results, the month of June is the most common time of year that exceedances occur at the eastern property boundary; March is the second most common month for exceedances. Ambient air monitoring has not detected methane above 0.2 percent.

Item 4 – The December 2015 Landfill Gas Monitoring Report provides a text summary of the status of methane alarms that were installed in 2007 in three nearby structures east of the landfill (see Coakley Landfill Gas Alarm Location Map enclosed). This summary notes that Peter Britz checks the alarms annually and that he has not been notified of any methane alarm activations. Mr. Britz provided the enclosed email and associated figure as follow-up to a DES inquiry as to the alarm locations and operation and maintenance procedures.

Finding: Three real-time methane alarms are installed and maintained in key occupied structures located east of the landfill. To the Department's knowledge, there has never been a positive alarm for methane at any of these locations. It is not known if the building owners/occupants are trained on standard operation procedures in the event of an alarm. What is the source of the butane test?

Conclusions

1. Monitoring for landfill gas generation/migration must continue until it is demonstrated that the facility no longer produces landfill gas.
2. Monitoring for landfill gas generation, via sampling a representative number of vents, should be performed to demonstrate future achievement of the performance standards as noted in Item 1 above.
3. Monitoring of landfill gas generation/migration can be reduced from quarterly to annual. Sampling shall occur when snow/ice is present (e.g., annual first quarter sampling). For purposes of streamlining and simplifying reporting, landfill gas sampling results may be incorporated into the annual report currently performed for groundwater monitoring, institutional control documentation and general landfill inspection reporting.
4. Monitoring of gas probes M-1 and M-2 can be reduced to once every five years; the year before the five year review. Note that the Fourth Five-Year Review is due in September 2016; therefore, probes M-1 and M-2 should be sampled this year.

5. Monitoring and maintenance of real-time gas alarms in occupied structures shall continue and should be documented in the annual report. Include on a figure in the report the location of the alarms. Include a summary of the location of the alarms within each structure (e.g., alarm is located four feet off the floor on the break room wall in the lower level/basement at this location. Etc.). Standard operation procedures for these alarms and documentation of training for owners/occupants should also be included in the report.

If you have any questions, please feel free to contact me at the number or E-mail address provided below.

Sincerely,

Andrew J. Hoffman, P.E.
Hazardous Waste Remediation Bureau
Tel: (603) 271-6778
E-mail: Andrew.hoffman@des.nh.gov

Attms: NHDES Intra-Department Communication
June 30, 2009 letter to Peter Britz
January 14, 2016 Email from Peter Britz
Env-Sw 807.04 and 807.05

ec: Gerardo Millán-Ramos, EPA
Robin Mongeon, NHDES
Paul Gildersleeve, NHDES
Melanie Doiron, NHDES

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

STATE OF NEW HAMPSHIRE

Intra-Department Communication

DATE: January 4, 2016 **AT (OFFICE):** DES/WMD

FROM: Paul Gildersleeve, P.G., NHDES, WMD, Solid Waste Management Bureau

TO: Andrew Hoffman, P.E. NHDES, WMD, Hazardous Waste Remediation Bureau

SUBJECT: Coakley Landfill, 480 Breakfast Hill Road, North Hampton
Gas monitoring reduction
NH Permit: None

This memo responds to your request for comments on whether the subject proposal to eliminate gas monitoring at the Coakley Landfill is consistent with gas monitoring requirements applicable to unlined landfills that are regulated under the NH Solid Waste Rules. Coakley Landfill does not have a solid waste permit, but it is regulated under CERCLA.

DES received a letter addressed to Andrew Hoffman, P.E. on December 2, 2015 from Peter L. Britz, Coakley Landfill Group Coordinator, requesting authorization to discontinue sampling for landfill gas.

Following a review of the request by the Solid Waste Management Bureau (SWMB), we have the following comments:

- There is insufficient data submitted to grant the request or to weigh in on an alternative to this request.
- The landfill is still generating gas, according to the quarterly sampling results mentioned in the cover letter. The gas standards specified in the cover letter, and outlined in Env-Sw 807.04 and in the Solid Waste Rules below are action limits for gas concentrations. Gas generated below these thresholds does not justify discontinuing gas monitoring; however, an alternative monitoring schedule may be justified.

Env-Sw 806.07 Decomposition Gas Control Requirements.
(a) Decomposition gases shall be controlled to prevent hazards to health, safety or property.
(b) Facility operations shall not cause the concentration of methane and other explosive gases to:
(1) Exceed 25 percent of the lower explosive limit for gases in structures on or off-site, excluding leachate collection and gas control and recovery components; and

(2) Exceed 50 percent of the lower explosive limit for the gases at and beyond the property boundary within the soil.

(c) To assure that the requirements in (a) above are met, a monitoring program shall be implemented by the permittee in accordance with provisions in the facility's approved operating plan and closure plan.

(d) The type and frequency of monitoring shall be based on the following factors:

(1) Soil conditions;

(2) The hydrogeological and hydraulic conditions surrounding the disposal area; and

(3) The location of any man-made structures and property boundaries.

(e) If methane or other explosive gases are detected above the limits specified in (b) above, the permittee shall notify the department immediately and implement contingency procedures to ensure the protection of public health and safety.

- The SWMB does not recommend discontinuing monitoring at this time. The property owner should continue to monitor as scheduled, until an alternative plan is approved by DES.

The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

Thomas S. Burack, Commissioner

June 30, 2009

Peter Britz
City of Portsmouth
City Hall
1 Junkins Avenue
Portsmouth, NH 03801

SUBJECT: **NORTH HAMPTON** - Coakley Landfill Superfund Site, Breakfast Hill Road
DES# **198712001**, Project RSN # 431

March 2009 Landfill Gas Monitoring Results, submitted by Aries Engineering, Inc. and dated June 15, 2009

Dear Mr. Britz:

The New Hampshire Department of Environmental Services (Department) has completed a review of the landfill gas monitoring data report dated June 15, 2009. You requested that landfill gas sampling at the Coakley Landfill be reduced from quarterly to bi-annually. However, the October 17, 2008 report on the September 2008 Landfill Gas Monitoring Results showed a jump in methane concentrations in wells M-6 (8.1%) and M-7 (4.2%) which were above the NHDES methane soil gas standard. Therefore, a reduction in sampling frequency at all locations would not be appropriate at this time. Please continue quarterly monitoring of landfill gas probes M-4, M-5, M-6 & M-7 and monitoring and maintenance of the indoor air sampling devises located in nearby structures for 2009. Landfill gas monitoring at M-1 and M-2 could be scaled back to twice a year based on historical data and lack of any nearby structures.

We will not require further collection of barometric pressure data as there doesn't appear to be any correlation.

The Department's Solid Waste Management Bureau suggests that the following information would be beneficial as support for future requests to reduce the frequency of landfill gas monitoring:

- Gas data from the landfill vents showing the same declining methane trends as indicated by the probes;
- Soil types beyond the limits of the landfill that might indicate the ease or difficulty in transmitting methane;
- Depth of the water table around/beneath the landfill;
- Information on nearby structures and whether they have basements;
- Depth of probes and historic nature of landfill (e.g. was it originally a gravel pit);
- What's the age and make up of the landfilled waste;

Should you have any questions, please contact me at the Department's Waste Management Division at the letterhead address, by E-mail or by phone.

Sincerely,

Joseph Donovan

Joseph Donovan, P.G.
Hazardous Waste Remediation Bureau
Tel: (603) 271-6811
Fax: (603) 271-2181
E-mail: joseph.donovan@des.nh.gov

cc: Doug Kemp, NHDES
Richard Pease, NHDES
Mike Jasinski, USEPA
Brenda M. Haslett, USEPA
Anne M. Piekarski, Aries Engineering, Inc.

Durgin, Kimberly

From: Peter L. Britz <plbritz@cityofportsmouth.com>
Sent: Thursday, January 14, 2016 9:53 AM
To: Hoffman, Andrew
Subject: RE: Coakley LF gas
Attachments: Landfill Gas Alams.pdf

Hi Drew:
I have attached a map showing the locations of the landfill gas alarms. Each of these sites is checked annually in conjunction with our annual sampling. The site check consists of visiting the location where the gas alarms are installed and testing the unit as described by the manufacturer. This is using a butane lighter and allowing the gas to enter the sensor and check that the alarm sounds. If the alarm sounds the unit is working properly. Each unit has been determined to be working properly at each test. However, a gas alarm was replaced was in November of 2014 as the alarm had been removed.
If you have any questions or need more information please do not hesitate to contact me.
Regards,
Peter

From: Hoffman, Andrew [mailto:Andrew.Hoffman@des.nh.gov]
Sent: Wednesday, January 13, 2016 1:41 PM
To: Peter L. Britz <plbritz@cityofportsmouth.com>
Subject: RE: Coakley LF gas

Peter,

Would you be able to provide me a map (use the attached if you like) that identifies the approximate locations of the building where the real-time methane gas monitors/alarms are located, a summary of the O&M of these units and when they were last checked and/or property owners contacted and questioned as to their function/alarm status?

This would be helpful.
Thanks,
Drew

From: Peter L. Britz [mailto:plbritz@cityofportsmouth.com]
Sent: Wednesday, January 13, 2016 9:56 AM
To: Hoffman, Andrew
Subject: Re: Coakley LF gas

Hi Drew;
Thank you for your consideration and for taking the time to talk with me yesterday. Let me know if you have any questions.
Best,
Peter

Sent from my iPhone

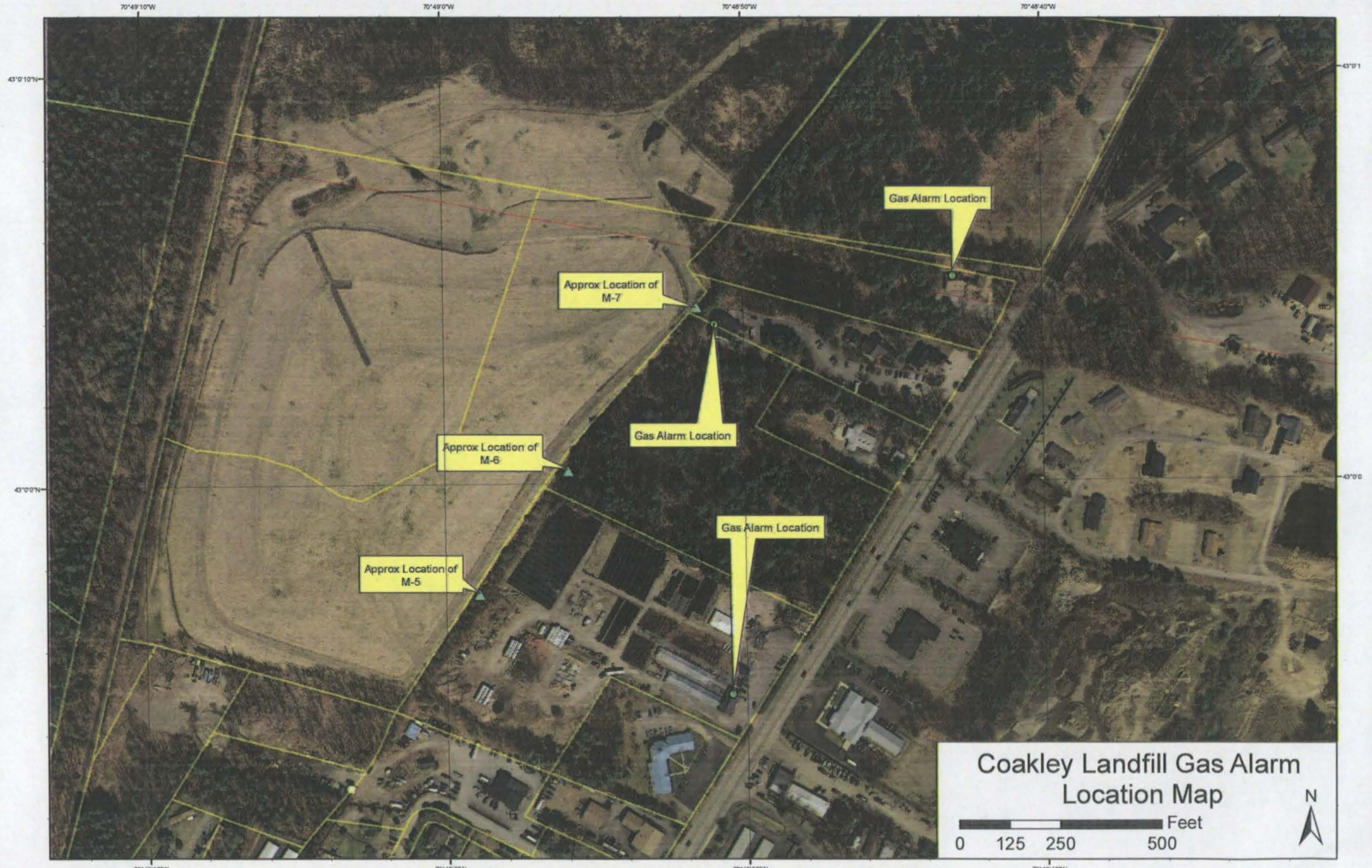
On Jan 13, 2016, at 9:17 AM, "Hoffman, Andrew" <Andrew.Hoffman@des.nh.gov> wrote:

Hi Peter,

I am holding on to the letter we spoke about yesterday until I have an opportunity to discuss further with others internally. I'll let you know where things are shortly.

Thank you for your patience.
Drew

Andrew Hoffman, P.E.
New Hampshire Department of Environmental Services
Waste Management Division
Hazardous Waste Remediation Bureau
29 Hazen Drive, P.O. Box 95
Concord, NH 03302
(603) 271-6778
Andrew.Hoffman@des.nh.gov



70°49'10"W
70°49'0"W
70°48'50"W
70°48'40"W
43°0'10"N
43°0'0"N
Gas Alarm Location
Approx Location of M-7
Gas Alarm Location
Approx Location of M-6
Gas Alarm Location
Approx Location of M-5
Coakley Landfill Gas Alarm Location Map
N
Feet
0 125 250 500

Source. #5172, eff 7-1-91; amd by #5297, eff 12-24-91; ss by #6535, INTERIM, eff 7-1-97, EXPIRES: 10-29-97; ss by #6619-B, eff 10-29-97; (See Revision Note at chapter heading for Env-Sw 800); ss by #8459, eff 10-28-05 (formerly Env-Wm 2507.03); ss by #10597, eff 7-1-14

Env-Sw 807.04 Performance Standards. The permittee shall implement an approved closure plan requiring that:

(a) The facility and site effectively cease generating leachate;

(b) The facility and site effectively cease generating decomposition gases;

(c) The facility and site achieve maximum settlement, with the capping system intact and no reasonable expectation that integrity of the capping system will be at risk without regular maintenance;

(d) The facility and site have no adverse impact to air, groundwater or surface water; and

(e) The facility and site not otherwise pose a risk to human health or the environment.

Source. #5172, eff 7-1-91; amd by #5297, eff 12-24-91; ss by #6535, INTERIM, eff 7-1-97, EXPIRES: 10-29-97; ss by #6619-B, eff 10-29-97; (See Revision Note at chapter heading for Env-Sw 800); ss by #8459, eff 10-28-05 (formerly Env-Wm 2507.04); ss by #10597, eff 7-1-14

Env-Sw 807.05 Post-Closure Inspections, Monitoring, Maintenance and Reporting Requirements.

(a) The post-closure period of a landfill shall be the period of time required to demonstrate the facility has achieved the performance standards specified in Env-Sw 807.04.

(b) During the post-closure period, the permittee shall have specific obligations to regularly inspect, monitor and maintain the facility in conformance with the solid waste rules based on the provisions of a post-closure inspection, monitoring and maintenance plan approved by the department in the permit pursuant to (e) below.

(c) Subject to (d) below, for the purposes of determining financial assurance requirements, the post-closure period for landfills shall be 30 years from the date the complete capping system is installed or the date of the last most recent estimate obtained by the permittee as required by Env-Sw 1405.02, whichever is later.

(d) The post-closure period shall be subject to periodic adjustment by implementing the permit modification procedures in Env-Sw 306 and Env-Sw 315 as follows:

(1) In the event that post-closure monitoring data or other available information provides an indication that the required performance standards are unlikely to be achieved during the approved post-closure monitoring period:

a. The permittee shall identify the cause in a report to the department; and

b. Depending on the cause, the department shall adjust the post-closure monitoring period or require the permittee to implement remedial closure or post-closure work, pursuant to the permit modification procedures in Env-Sw 306; or

(2) In the event the permittee believes that post-closure monitoring data and other available information provides sufficient evidence that the required performance standards are achieved at

CESINC

TABLE 3

SUMMARY OF OU-1 AND OU-2 GROUNWATER ANALYTICAL RESULTS

TABLE 3

Summary of September 2015 Groundwater Analytical Data

Coakley Landfill Superfund Site - North Hampton and Greenland, New Hampshire

OPERABLE UNIT 1 (OU-1)															# of Exceedances	
Sampling Point ID			MW-4	MW-4-DUP	MW-5D	MW-5S	MW-6	MW-8	MW-9	MW-10	MW-11	OP-2	OP-5	BP-4		
Monitored Zone / Unit	EPA	NHDES	Till	Till	DBR	SBR	OBH BR	SBR	Outwash	Outwash	SBR	Outwash	Outwash	OBH-BR	EPA	NHDES
Date of Sample Collection	CL	AGQS	9/16/15	9/16/15	9/16/15	9/16/15	9/16/15	9/17/15	9/16/15	9/16/15	9/17/15	9/15/15	9/15/15	9/15/15	CL	AGQS
VOLATILE ORGANIC COMPOUNDS BY 8260B - (ug/L)																
1,2,4-Trimethylbenzene	---	330	N/A	N/A	1 U	1 U	1 U	1 U	N/A	N/A	1 U	N/A	N/A	N/A	---	0
1,2-Dichloropropane	5	5	N/A	N/A	2 U	2 U	2 U	2 U	N/A	N/A	2 U	N/A	N/A	N/A	0	0
1,4-Dichlorobenzene	---	75	N/A	N/A	1 U	1	1 U	1 U	N/A	N/A	1 U	N/A	N/A	N/A	---	0
2-Butanone(MEK)	200	4000	N/A	N/A	10 U	10 U	10 U	10 U	N/A	N/A	10 U	N/A	N/A	N/A	0	0
Benzene	5	5	N/A	N/A	2	2	1 U	3	N/A	N/A	2	N/A	N/A	N/A	0	0
Chlorobenzene	100	100	N/A	N/A	2 U	2 U	2 U	3	N/A	N/A	2 U	N/A	N/A	N/A	0	0
Chloroethane	---	---	N/A	N/A	34	5 U	5 U	13	N/A	N/A	5 U	N/A	N/A	N/A	---	---
Diethyl Ether	---	1400	N/A	N/A	98	22	5 U	76	N/A	N/A	13	N/A	N/A	N/A	- -	0
IsoPropylbenzene	---	800	N/A	N/A	1 U	1U	1 U	1 U	N/A	N/A	1 U	N/A	N/A	N/A	---	0
Methyl-t-butyl ether(MTBE)	---	13	N/A	N/A	5 U	5 U	5 U	5 U	N/A	N/A	5 U	N/A	N/A	N/A	---	0
m&p-Xylene	---	10000^	N/A	N/A	1 U	1 U	1 U	1 U	N/A	N/A	1	N/A	N/A	N/A	---	0
o-Xylene	--	10000^	N/A	N/A	1 U	1 U	1 U	1 U	N/A	N/A	1 U	N/A	N/A	N/A	--	0
tert-Butyl Alcohol (TBA)	---	40	N/A	N/A	40	30 U	30 U	40	N/A	N/A	30 U	N/A	N/A	N/A	---	0
Tetrachloroethene	3 5	5	N/A	N/A	2 U	2 U	2 U	2 U	N/A	N/A	2 U	N/A	N/A	N/A	0	0
Tetrahydrofuran(THF)	154	600	N/A	N/A	50	20	10 U	140	N/A	N/A	10	N/A	N/A	N/A	0	0
trans-1,2-Dichloroethene	100	100	N/A	N/A	2 U	2 U	2 U	2 U	N/A	N/A	2 U	N/A	N/A	N/A	0	0
1,4-DIOXANE BY 8260B SIM - (ug/L)																
1,4-Dioxane	3	3	8 5	8 6	150	57	0 25 U	240	26	N/A	38	1 6	N/A	11	8	8
DISSOLVED METALS BY 200 8 - (mg/L)																
Dissolved Antimony	0 006	0 006	0 001 U	0 001 U	N/A	N/A	N/A	N/A	0 001 U	0 001 U	N/A	0 001 U	0 001 U	N/A	0	0
Dissolved Arsenic	0 01	0 01	**0 05J**	**0 072J**	N/A	N/A	N/A	N/A	**0 14**	**0 014**	N/A	**0 22**	**0 044**	N/A	4	4
Dissolved Barium	---	2	0 066	0 058	N/A	N/A	N/A	N/A	0 095	0 055	N/A	0 024	0 02	N/A	---	0
Dissolved Beryllium	0 004	0 004	0 001 U	0 001 U	N/A	N/A	N/A	N/A	0 001 U	0 001 U	N/A	0 001 U	0 001 U	N/A	0	0
Dissolved Calcium	---	---	70	78	N/A	N/A	N/A	N/A	77	44	N/A	26	13	N/A	---	---
Dissolved Chromium	0 05	0 1	0 001 U	0 001 U	N/A	N/A	N/A	N/A	0 001	0 001 U	N/A	0 001 U	0 001 U	N/A	0	0
Dissolved Iron	---	---	20	19	N/A	N/A	N/A	N/A	45	24	N/A	36	18	N/A	---	--
Dissolved Lead	0 015	0 015	0 001 U	0 001 U	N/A	N/A	N/A	N/A	0 001 U	0 001 U	N/A	0 001 U	0 001 U	N/A	0	0
Dissolved Magnesium	---	---	18	17	N/A	N/A	N/A	N/A	26	14	N/A	8 8	3 9	N/A	---	---
Dissolved Manganese	0 3	0 84	**0 9**	**1**	N/A	N/A	N/A	N/A	**1 2**	**1 9**	N/A	**1**	**3**	N/A	6	6
Dissolved Nickel	0 1	0 1	0 009J	0 006J	N/A	N/A	N/A	N/A	0 007	0 004	N/A	0 01	0 014	N/A	0	0
Dissolved Potassium	---	---	27	24	N/A	N/A	N/A	N/A	17	12	N/A	18	2 5	N/A	---	---
Dissolved Sodium	---	---	26	22	N/A	N/A	N/A	N/A	70	59	N/A	17	9	N/A	---	--
Dissolved Vanadium	0 26	---	0 005 U	0 005 U	N/A	N/A	N/A	N/A	0 005 U	0 005 U	N/A	0 005 U	0 005 U	N/A	0	---
TOTAL METALS BY 200.8																
Total Antimony	0 006	0 006	N/A	N/A	0 001 U	0 001 U	0 001 U	0 001 U	N/A	N/A	0 001 U	N/A	N/A	0 001 U	0	0
Total Arsenic	0 01	0 01	N/A	N/A	0 01	**0 017**	0 001 U	**0 011**	N/A	N/A	**0 014**	N/A	N/A	**0 017**	4	4
Total Barium	---	2	N/A	N/A	0 099	0 12	0 006	0 17	N/A	N/A	0 067	N/A	N/A	0 03	---	0
Total Beryllium	0 004	0 004	N/A	N/A	0 001 U	0 001 U	0 001 U	0 001 U	N/A	N/A	0 001 U	N/A	N/A	0 001 U	0	0
Total Calcium	---	---	N/A	N/A	28	26	16	26	N/A	N/A	18	N/A	N/A	34	---	---
Total Chromium	0 05	0 1	N/A	N/A	0 001 U	0 001 U	0 001 U	0 001 U	N/A	N/A	0 001 U	N/A	N/A	0 001 U	0	0
Total Iron	---	---	N/A	N/A	13	11	2 2	4	N/A	N/A	13	N/A	N/A	16	---	---
Total Lead	0 015	0 015	N/A	N/A	0 001 U	0 001 U	0 001 U	0 001 U	N/A	N/A	0 001 U	N/A	N/A	0 001 U	0	0
Total Magnesium	---	---	N/A	N/A	26	14	7	29	N/A	N/A	15	N/A	N/A	17	---	---
Total Manganese	0 3	0 84	N/A	N/A	**0 7**	**2.4**	**2 2**	**1 1**	N/A	N/A	**0 45**	N/A	N/A	**0 49**	6	3
Total Nickel	0 1	0 1	N/A	N/A	0 006	0 008	0 003	0 016	N/A	N/A	0 006	N/A	N/A	0 005	0	0
Total Potassium	---	---	N/A	N/A	17	14	1 9	11	N/A	N/A	8 4	N/A	N/A	15	---	---
Total Sodium	---	---	N/A	N/A	140	76	15	180	N/A	N/A	74	N/A	N/A	66	---	---
Total Vanadium	0 26	---	N/A	N/A	0 005 U	0 005 U	0 005 U	0 005 U	N/A	N/A	0 005 U	N/A	N/A	0 005 U	0	---
FIELD PARAMETERS																
Dissolved Oxygen (mg/l)	---	---	N/A	N/A	1 3	1 4	1 1	1	1 7	1 3	0 9	0 9	2 1	1 7	---	---
Oxidation Reduction Potential (mV)	---	--	N/A	N/A	-170	-129	78	-187	-54	-86	-144	-77	-28	-173	---	---
pH (standard units)	---	--	N/A	N/A	7 2	7	6 1	7 6	6 4	6 5	7	6 2	5 9	7	---	---
Specific Conductance (us/cm)	---	---	N/A	N/A	1394	851	293	1274	1249	722	593	690	256	823	---	---
Temperature (degrees Celcius)	---	---	N/A	N/A	16	16	15	17	16	16	16	16	14	17	---	---
Turbidity (NTU)	---	---	N/A	N/A	11	6	<5	7	12	7	9	<5	< 5	<5	---	---

TABLE 3

Summary of September 2015 Groundwater Analytical Data

Coakley Landfill Superfund Site - North Hampton and Greenland, New Hampshire

OPERABLE UNIT 2 (OU-2)																										
Sampling Point ID			AE-1A	AE-1B	AE-2A	AE-2B	AE-3A	AE-3A-DUP	AE-3B	AE-4A	AE-4B	FPC-4B	FPC-5B	FPC-6A	FPC-6B	FPC-7A	FPC-7B	FPC-8A	FPC-8B	FPC-9A	FPC-11A	FPC-11B	GZ-105	GZ-105-DUP	# of Exceedances	
Monitored Unit	EPA	NHDES	Till	SBR	Till	SBR	Till	Till	SBR	Till	SBR	SBR	SBR	Till	SBR	Till	SBR	Till	SBR	Till	Till	Till	SBR	SBR	EPA	NHDES
Date of Sample Collection	CL	AGQS	9/15/15	9/14/15	9/16/15	9/16/15	9/15/15	9/15/15	9/15/15	9/17/15	9/17/15	9/17/15	9/16/15	9/17/15	9/17/15	9/15/15	9/15/15	9/16/15	9/16/15	9/15/15	9/17/15	9/17/15	9/16/15	9/16/15	CL	AGQS
VOLATILE ORGANIC COMPOUNDS BY 8260B - (ug/L)																										
1,2,4-Trimethylbenzene	---	330	N/A	N/A	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	N/A	1 U	1 U	N/A	N/A	1 U	1 U	N/A	N/A	N/A	1 U	1 U	---	0
1,2-Dichloropropane	5	5	N/A	N/A	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	N/A	2 U	2 U	N/A	N/A	2 U	2 U	N/A	N/A	N/A	2 U	2 U	0	0
1,4-Dichlorobenzene	---	75	N/A	N/A	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	N/A	1	1 U	N/A	N/A	1 U	1 U	N/A	N/A	N/A	2	2	---	0
2-Butanone(MEK)	200	4000	N/A	N/A	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	N/A	10 U	10 U	N/A	N/A	10 U	10 U	N/A	N/A	N/A	10 U	10 U	0	0
Benzene	5	5	N/A	N/A	1 U	1	2	2	1 U	1 U	1 U	1 U	N/A	1	1 U	N/A	N/A	1 U	1 U	N/A	N/A	N/A	3	3	0	0
Chlorobenzene	100	100	N/A	N/A	2U	2 U	7	7	3	2 U	2 U	2 U	N/A	4	2	N/A	N/A	2 U	2 U	N/A	N/A	N/A	5	5	0	0
Chloroethane	---	---	N/A	N/A	5 U	5U	7	7	5 U	5 U	5 U	5 U	N/A	5 U	5 U	N/A	N/A	5 U	5 U	N/A	N/A	N/A	5U	5U	---	---
Diethyl Ether	---	1400	N/A	N/A	5	23	13	13	9	5 U	5 U	5 U	N/A	13	10	N/A	N/A	5 U	5 U	N/A	N/A	N/A	28	25	---	0
IsoPropylbenzene	---	800	N/A	N/A	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	N/A	1 U	1 U	N/A	N/A	1 U	1 U	N/A	N/A	N/A	2U	2U	---	0
Methyl-t-butyl ether(MTBE)	---	13	N/A	N/A	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	N/A	5 U	5 U	N/A	N/A	5 U	5 U	N/A	N/A	N/A	5 U	5 U	---	0
m&p-Xylene	---	10000^	N/A	N/A	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	N/A	1 U	1 U	N/A	N/A	1 U	1 U	N/A	N/A	N/A	1 U	1 U	---	0
o-Xylene	---	10000^	N/A	N/A	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	N/A	1 U	1 U	N/A	N/A	1 U	1 U	N/A	N/A	N/A	1 U	1 U	---	0
tert-Butyl Alcohol (TBA)	---	40	N/A	N/A	30 U	30 U	30 U	30 U	30 U	30 U	30 U	30 U	N/A	30 U	30 U	N/A	N/A	30 U	30 U	N/A	N/A	N/A	30 U	30 U	---	0
Tetrachloroethene	3.5	5	N/A	N/A	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	N/A	2 U	2 U	N/A	N/A	2 U	2 U	N/A	N/A	N/A	2 U	2 U	0	0
Tetrahydrofuran(THF)	154	600	N/A	N/A	10 U	30	10 U	10 U	10 U	10 U	10 U	10 U	N/A	10 U	10 U	N/A	N/A	10 U	10 U	N/A	N/A	N/A	20	20	0	0
trans-1,2-Dichloroethene	100	100	N/A	N/A	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	N/A	2 U	2 U	N/A	N/A	2 U	2 U	N/A	N/A	N/A	2 U	2 U	0	0
1,4-DIOXANE BY 8260B SIM - (ug/L)																										
1,4-Dioxane	#	3	N/A	N/A	13	96	24	20	25	0.25 U	0.25 U	N/A	67	30	19	N/A	N/A	0.7	0.81	N/A	N/A	1.4	62	60	10	10
DISSOLVED METALS BY 200.8 - (mg/L)																										
Dissolved Antimony	0.006	0.006	0.001 U	N/A	0.001 U	N/A	0.001 U	0.001 U	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	0.001 U	0.001 U	N/A	N/A	N/A	0	0
Dissolved Arsenic	0.01	0.01	0.016	N/A	0.19	N/A	0.13	0.13	N/A	0.001 U	N/A	N/A	N/A	0.032	N/A	0.001 U	N/A	0.001	N/A	0.048	0.003	N/A	N/A	N/A	6	6
Dissolved Barium	---	2	0.019	N/A	0.028	N/A	0.067	0.067	N/A	0.008	N/A	N/A	N/A	0.037	N/A	0.003	N/A	0.007	N/A	0.1	0.02	N/A	N/A	N/A	---	0
Dissolved Beryllium	0.004	0.004	0.001 U	N/A	0.001 U	N/A	0.001 U	0.001 U	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	0.001 U	0.001 U	N/A	N/A	N/A	0	0
Dissolved Calcium	---	---	31	N/A	22	N/A	36 J+	34 J+	N/A	6.8	N/A	N/A	N/A	32	N/A	11	N/A	33	N/A	60	63	N/A	N/A	N/A	---	---
Dissolved Chromium	0.05	0.1	0.001 U	N/A	0.001 U	N/A	0.001 U	0.001 U	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	0.001 U	0.001 U	N/A	N/A	N/A	0	0
Dissolved Iron	---	---	0.37	N/A	16	N/A	20	20	N/A	0.09	N/A	N/A	N/A	2.3	N/A	0.05 U	N/A	0.17	N/A	6.7	0.59	N/A	N/A	N/A	---	---
Dissolved Lead	0.015	0.015	0.001 U	N/A	0.001 U	N/A	0.001 U	0.001 U	N/A	0.001 U	N/A	N/A	N/A	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	0.001 U	0.001 U	N/A	N/A	N/A	0	0
Dissolved Magnesium	---	---	11	N/A	9	N/A	18	18	N/A	5.9	N/A	N/A	N/A	14	N/A	3.7	N/A	5.4	N/A	26	16	N/A	N/A	N/A	---	---
Dissolved Manganese	0.3	0.84	0.44	N/A	0.77	N/A	0.94	0.94	N/A	0.13	N/A	N/A	N/A	3.1	N/A	0.005 U	N/A	0.15	N/A	0.23	0.41	N/A	N/A	N/A	6	3
Dissolved Nickel	0.1	0.1	0.001 U	N/A	0.007	N/A	0.006	0.006	N/A	0.001 U	N/A	N/A	N/A	0.006	N/A	0.003	N/A	0.001U	N/A	0.003	0.001 U	N/A	N/A	N/A	0	0
Dissolved Potassium	---	---	3.6	N/A	14	N/A	17	16	N/A	2.7	N/A	N/A	N/A	8.3	N/A	1.9	N/A	2.6	N/A	9.6	5.6	N/A	N/A	N/A	-	---
Dissolved Sodium	---	---	20	N/A	33	N/A	73	73	N/A	9	N/A	N/A	N/A	110	N/A	8	N/A	16	N/A	93	160	N/A	N/A	N/A	---	---
Dissolved Vanadium	0.26	---	0.005 U	N/A	0.005 U	N/A	0.005 U	0.005 U	N/A	0.005 U	N/A	N/A	N/A	0.005 U	N/A	0.005 U	N/A	0.005 U	N/A	0.005 U	0.005 U	N/A	N/A	N/A	0	---
TOTAL METALS BY 200.8																										
Total Antimony	0.006	0.006	N/A	0.001 U	N/A	0.001 U	N/A	N/A	0.001 U	N/A	0.001 U	0.001 U	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	N/A	0.001 U	0.001 U	0.001 U	0	0
Total Arsenic	0.01	0.01	N/A	0.008	N/A	0.012	N/A	N/A	0.061	N/A	0.001 U	0.001 U	0.002	N/A	0.003	N/A	0.001 U	N/A	0.007	N/A	N/A	0.004	0.008	0.009	2	2
Total Barium	---	2	N/A	0.063	N/A	0.098	N/A	N/A	0.13	N/A	0.008	0.005	0.035	N/A	0.072	N/A	0.002	N/A	0.006	N/A	N/A	0.19	0.032	0.035	---	0
Total Beryllium	0.004	0.004	N/A	0.001 U	N/A	0.001 U	N/A	N/A	0.001 U	N/A	0.001 U	0.001 U	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	N/A	0.001 U	0.001 U	0.001 U	0	0
Total Calcium	---	---	N/A	25	N/A	31	N/A	N/A	33	N/A	7	4.9	5.3	N/A	16	N/A	11	N/A	16 J-	N/A	N/A	91	32	34	---	---
Total Chromium	0.05	0.1	N/A	0.001 U	N/A	0.001 U	N/A	N/A	0.001 U	N/A	0.001 U	0.001 U	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	N/A	0.001 U	0.001 U	0.001 U	0	0
Total Iron	---	---	N/A	3.2	N/A	7.6	N/A	N/A	9.2	N/A	0.05 U	0.05 U	0.18	N/A	7.3	N/A	0.05 U	N/A	0.08	N/A	N/A	9.2	1.9	2	---	---
Total Lead	0.015	0.015	N/A	0.002	N/A	0.001 U	N/A	N/A	0.001 U	N/A	0.001 U	0.001 U	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	0.001 U	N/A	N/A	0.001 U	0.001 U	0.001 U	0	0
Total Magnesium	---	---	N/A	12	N/A	24	N/A	N/A	18	N/A	5.5	3.1	3.1	N/A	9.6	N/A	3.6	N/A	4.1 J-	N/A	N/A	23	12	12	---	---
Total Manganese	0.3	0.84	N/A	0.45	N/A	0.86	N/A	N/A	0.74	N/A	0.005 U	0.005 U	0.047	N/A	0.44	N/A	0.005 U	N/A	0.024	N/A	N/A	1.9	0.23	0.25	5	2
Total Nickel	0.1	0.1	N/A	0.001	N/A	0.006	N/A	N/A	0.006	N/A	0.001 U	0.001 U	0.005	N/A	0.003	N/A	0.001 U	N/A	0.001 U	N/A	N/A	0.005	0.004	0.004	0	0
Total Potassium	---	---	N/A	4.9	N/A	9.6	N/A	N/A	15	N/A	3.6	2	5.4	N/A	6.6	N/A	1.6	N/A	2.4	N/A	N/A	17	4.6	4.9	---	---
Total Sodium	---	---	N/A	20	N/A	180	N/A	N/A	82	N/A	17	7	270	N/A	82	N/A	8	N/A	14 J-	N/A	N/A	920	130	140	---	---
Total Vanadium	0.26	---	N/A	0.005 U	N/A	0.005 U	N/A	N/A	0.005 U	N/A	0.005 U	0.005 U	0.005 U	N/A	0.005 U	N/A	0.005 U	N/A	0.005 U	N/A	N/A	0.007J+	0.005 U	0.005 U	0	---
FIELD PARAMETERS																										
Dissolved Oxygen (mg/l)	---	---	N/A	N/A	0.9	1	0.7	N/A	2.8	2.1	1.4	1	0.8	<0.5	<0.5	4.5	3.9	1	0.7	1	1.7	1.3	<0.5	N/A	---	---
Oxidation Reduction Potential (mV)	---	---	N/A	N/A	-91	-136	-80	N/A	-47	75	317	97	-172	-60	-102	147	145	24	-187	-124	-149	-134	-151	N/A	---	---
pH (standard units)	---	---	N/A	N/A	6.6	7	6.8	N/A	5.2	6.3	6.4	6.1	7.8	6.6	6.6	6.5	6.6	6.8	8	7.2	7.4	7.2	7.2	N/A	---	--
Specific Conductance (us/cm)	---	---	N/A	N/A	530	1167	944	N/A	847	124	167	89	1099	777	482	145	159	334	225	1045	1196	4654	762	N/A	---	---
Temperature (degrees Celcius)	---	---	N/A	N/A	14	15	16	N/A	17	16	15	13	17	17	15	15	16.6	15	15	14	17	17	13	N/A	---	---
Turbidity (NTU)	---	---	N/A	N/A	<5	<5	<5	N/A	<5	33.9	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	11	13	<5	N/A	---	---

Notes on Last Page of Table

TABLE 3

Summary of September 2015 Groundwater Analytical Data

Coakley Landfill Superfund Site - North Hampton and Greenland, New Hampshire

NOTES

1. Monitored Zone / Unit identifies the hydrogeological unit within the screened/open interval. The hydrogeology of the site is comprised of four principle geological units include including bedrock, glacial till, marine sediments consisting of predominately of silt and clay, and sandy outwash. Bedrock well screened intervals vary as follows: "OBH-BR" wells are standard 6-inch diameter wells with steel casing set in bedrock and open boreholes (typical water supply well construction). "SBR" indicates the screen interval is the upper most section of bedrock. "DBR" is used to differentiate a screened interval that is below the uppermost section of bedrock (i.e.; MW-5S versus MW-5D).
2. **Bolded values** denote concentration exceeding the EPA Interim Cleanup Level (ICL)
3. Shaded values denote concentration exceeding the NHDES Ambient Groundwater Quality Standard
4. The list of volatile organic compounds (VOCs) provided includes analytes detected in OU-1 or OU-2 since 2006, and all VOCs that have ICLs. ICLs were established for 1,2-dichloropropane and tetrachloroethylene (PCE), however, no detections have been reported at groundwater sampling points included in the long-term monitoring events since 1998. An ICL was established for trans-1,2-dichloroethene however no detections have been reported at groundwater sampling points included in the long-term monitoring events since 1999.
5. An ICL was established for the semi-volatile organic compounds (SVOCs) diethyl phthalate and phenol. However, in May 1998 and April 1999, groundwater samples were submitted for analysis of SVOCs and no exceedances were reported; therefore, SVOCs were removed from the long-term monitoring plan.
6. Result for groundwater primary/duplicate samples are provided in this table: MW-4/MW-4-DUP, AE-3A/AE-3A-DUP, and GZ-105/GZ-105-DUP.

ABBREVIATIONS

N/A	Sample was not analyzed/measured for indicated parameter
#.## U	Not Detected at the reporting detection limit indicated
NHDES AGQS	NH Department of Environmental Services Ambient Groundwater Quality Standard (Env-Or-600, Table 600-1)
EPA CL	US Environmental Protection Agency Cleanup Level established in 2015 Fifth Explanation of Significant Difference. Cleanup Levels were historically called Interium Cleanup Levels.
uS/cm	microsiemens per centimeter
ug/L	micrograms per liter, parts per billion
mg/L	milligram per liter, parts per million
NTU	nephelometric turbidity unit
mV	millivolt
*	Field parameter result qualified due to failed QA/QC or suspected issues with measurements, as noted on field forms and
^	The AGQS for xylenes is for total xylene or the sum of all isomers, including: m&p-Xylene and o-Xylene.

TABLE 4

SUMMARY OF OFF-SITE WATER SUPPLY WELL MONITORING RESULTS

TABLE 4

Summary of Analytical Results for Off-Site Water Supply Wells
2015 Annual Report
Coakley Landfill - North Hampton, New Hampshire

SAMPLE IDENTIFICATION	EPA	NHDES	EPA	R-3	R-3	R-3	R-3	R-3	R-3	R-3	R-3-DUP	R-3	R-3-DUP	R-3	R-3-DUP	R-3	R-3-DUP	R-3	R-3-DUP	R-3	R-3-DUP
DATE SAMPLED	CL	AGQS	MCL	24-Jan-08	13-Aug-08	19-Aug-09	17-Aug-10	18-Aug-11	30-Aug-12	26-Mar-13	26-Mar-13	16-Aug-13	16-Aug-13	27-Feb-14	27-Feb-14	3-Oct-14	3-Oct-14	25-Feb-15	25-Feb-15	15-Sep-15	15-Sep-15
VOLATILE ORGANIC COMPOUNDS																					
Methyl tert-butyl ether (ug/L)	-	13	-	1 6	<0 5	<0 5	<0 5	<0 5	<0 5	NA	NA	<0 5	<0 5	<0 5	<0 5	<0 5	<0 5	<0 5	<0 5	<0 5	<0 5
Toluene (ug/L)	-	1000	1000	<0 5	<0 5	<0 5	<0 5	<0 5	<0 5	NA	NA	<0 5	<0 5	<0 5	<0 5	<0 5	<0 5	<0 5	<0 5	<0 5	<0 5
1,4-dioxane (ug/L)	3	3	-	NA	NA	NA	NA	NA	0 40	0 45	0 26	0 45	0 41	0 41	0 42	0 37	0 36	0 46	0 43	0 37	0 35
METALS																					
Arsenic, total (mg/L)	0 01	0 01	0 01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001
Manganese, total (mg/L)	0 3	0 84	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0 13	0 14	0 10	0 098	0 14	0 14	0 16	0 16
FIELD PARAMETERS																					
Temperature (degrees Celcius)	-	-	-	13 51	12 51	11 38	12 58	12 62	12 73	NM	NM	13	NA	8	NA	12	NA	10 1	NA	13	NA
pH (standard units)	-	-	-	5 63	5 85	7 92	7 14	8 08	8 54	NM	NM	7	NA	7 9	NA	8 4	NA	8 3	NA	8 1	NA
Conductivity (uS/cm)	-	-	-	316	423	452	443	238	466	NM	NM	414	NA	NR	NA	417	NA	422	NA	448	NA
Dissolved Oxygen (mg/L)	-	-	-	4.16	3 72	4 64	2 19	4 65	4 98	NM	NM	<0 5	NA	<0 5	NA	< 0 5	NA	<0 5	NA	0 8	NA
Turbidity (NTU)	-	-	-	2 0	15 4	2 2	0 5	1 04	0 70	NM	NM	6 00	NA	<5	NA	< 5	NA	<5	NA	< 5	NA
Oxidation/Reduction Potential (mV)	-	-	-	157	95	-122	-35	-164 5	22 5	NM	NM	-224	NA	-143	NA	-219	NA	-186	NA	-194	NA

SAMPLE IDENTIFICATION	EPA	NHDES	EPA	R-5	R-5	R-5	R-5
DATE SAMPLED	CL	AGQS	MCL	24-Jan-08	13-Aug-08	19-Aug-09	19-Aug-10
VOLATILE ORGANIC COMPOUNDS							
Methyl tert-butyl ether (ug/L)	-	13	-	<0 5	<0 5	<0 5	<0 5
Toluene (ug/L)	-	1000	1000	<0 5	<0 5	<0 5	<0 5
1,4-dioxane (ug/L)	3	3	-	NA	NA	NA	NA
METALS							
Arsenic, total (mg/L)	0 01	0 01	0 01	NA	NA	NA	NA
Manganese, total (mg/L)	0 3	0 84	-	NA	NA	NA	NA
FIELD PARAMETERS							
Temperature (degrees Celcius)	-	-	-	14	14	17	19
pH (standard units)	-	-	-	5 8	5 9	6 7	6 0
Conductivity (uS/cm)	-	-	-	243	281	456	222
Dissolved Oxygen (mg/L)	-	-	-	6 4	8 0	6 8	5 5
Turbidity (NTU)	-	-	-	1 4	12.0	2 0	0 2
Oxidation/Reduction Potential (mV)	-	-	-	162	87	194	146

SAMPLE IDENTIFICATION	EPA	NHDES	EPA	339BHR	339BHR	339BHR	339BHR	339BHR	339BHR
DATE SAMPLED	CL	AGQS	MCL	29-Apr-13	16-Aug-13	27-Feb-14	3-Oct-14	25-Feb-15	18-Sep-15
VOLATILE ORGANIC COMPOUNDS									
Methyl tert-butyl ether (ug/L)	-	13	-	NA	<0 5	<0 5	< 0 5	< 0 5	< 0 5
Toluene (ug/L)	-	1000	1000	NA	<0 5	<0 5	1 8	<0 5	<0 5
Chloroform (ug/L)	-	80	-	NA	< 0 5	< 0 5	< 0 5	< 0 5	0 7
1,4-dioxane (ug/L)	3	3	-	0 38	0 42	0 63	0 42	0 85	0 74
METALS									
Arsenic, total (mg/L)	0 01	0 01	0 01	NA	NA	< 0 001	< 0 001	<0 001	0 002
Manganese, total (mg/L)	0 3	0 84	-	NA	NA	0 25	0 32	0 36	0 31
FIELD PARAMETERS									
Temperature (degrees Celcius)	-	-	-	NM	NM	11	12	10	14
pH (standard units)	-	-	-	NM	NM	7 1	7 1	7 1	6 1
Conductivity (uS/cm)	-	-	-	NM	NM	NR	394	399	383
Dissolved Oxygen (mg/L)	-	-	-	NM	NM	0 7	0 7	0 7	<0 5
Turbidity (NTU)	-	-	-	NM	NM	35	5	22	<5
Oxidation/Reduction Potential (mV)		-	-	NM	NM	-22	-63	20	-55

Notes on last page of table

TABLE 4

Summary of Analytical Results for Off-Site Water Supply Wells
2015 Annual Report
Coakley Landfill - North Hampton, New Hampshire

SAMPLE IDENTIFICATION	EPA	NHDES	EPA	346BHR	346BHR	346BHR	346BHR
DATE SAMPLED	CL	AGQS	MCL	30-Aug-12	16-Aug-13	3-Oct-14	18-Sep-15
VOLATILE ORGANIC COMPOUNDS							
Methyl tert-butyl ether (ug/L)	-	13	-	<0 5	<0 5	<0.5	<0 5
Toluene (ug/L)	-	1000	1000	<0.5	<0 5	<0 5	<0 5
1,4-dioxane (ug/L)	3	3	-	<0 25	<0 25	<0 25	<0 25
METALS							
Arsenic, total (mg/L)	0 01	0 01	0 01	NA	NA	< 0.001	< 0 001
Manganese, total (mg/L)	0 3	0 84	-	NA	NA	0 29	0 37
FIELD PARAMETERS							
Temperature (degrees Celcius)	-	-	-	13	NM	12	12
pH (standard units)	-	-	-	7 3	NM	6 9	6 8
Conductivity (uS/cm)	-	-	-	606	NM	608	600
Dissolved Oxygen (mg/L)	-	-	-	6 4	NM	0 9	<0 5
Turbidity (NTU)	-	-	-	18	NM	21	<5
Oxidation/Reduction Potential (mV)	-	-	-	76	NM	-6	-21

SAMPLE IDENTIFICATION	EPA	NHDES	EPA	415BHR	415BHR	415BHR	415BHR
DATE SAMPLED	CL	AGQS	MCL	16-Apr-13	16-Aug-13	3-Oct-14	15-Sep-15
VOLATILE ORGANIC COMPOUNDS							
Methyl tert-butyl ether (ug/L)	0.01	0 01	0 01	NA	<0 5	<0 5	<0 5
Toluene (ug/L)	-	1000	1000	NA	<0 5	<0 5	<0 5
1,4-dioxane (ug/L)	3	3	-	<0 25	<0 25	<0 25	<0 25
METALS							
Arsenic, total (mg/L)	0 01	0.01	0 01	NA	NA	< 0 001	< 0 001
Manganese, total (mg/L)	0 3	0 84	-	NA	NA	0 028	0.03
FIELD PARAMETERS							
Temperature (degrees Celcius)	-	-	-	NM	13 00	13	14
pH (standard units)	-	-	-	NM	8 10	8 6	8 5
Conductivity (uS/cm)	-	-	-	NM	351 00	386	389
Dissolved Oxygen (mg/L)	-	-	-	NM	0.57	0 6	<0 5
Turbidity (NTU)	-	-	-	NM	< 5	< 5	< 5
Oxidation/Reduction Potential (mV)	-	-	-	NM	-188	-178	-223

TABLE NOTES:

1 R-5 not sampled since Aug 19, 2010 due to the water system being out of service

2 Field parameter measurements prior to Aug 2013 were not collected with a flow cell directly connected to the sampling tap, therefore, dissolved oxygen and oxidation reduction potential measurements may be biased high due to exposure to the atmosphere

3 Only analytes detected in one or more groundwater samples at water supply wells are listed in this table Analytical methods include, VOCs by 524 2, 1,4-dioxane by 8260B SIM, and metals by 200 8

4 Chloroform is synonamous with trihalomethane, therefore, the NHDES AGQS for trihalomethane will be used for chloroform

TABLE ABBREVIATIONS:

NA = Not Analyzed
NM = Not Measured
NR = Not Recorded - field parameter measurement did not meet QA/QC criteria and were rejected
uS/cm = microsiemens per centimeter
ug/L = micrograms per liter (parts per billion)
mg/L = milligrams per liter (parts per million)
NTU - Nephelometric Turbidity Units
mV = millivolts
< = parameter concentration below detection limit indicated
R-3-DUP = duplicate sample collected at R-3
NHDES AGQS = NHDES Ambient Groundwater Quality Standard
EPA MCL = EPA Primary Drinking Water Standard
EPA CL = EPA Groundwater Quality Standard

TABLE XXX
Summary of Analytical Results for Off-Site Water Supply Wells
2016 Annual Report
Coakley Landfill - North Hampton, New Hampshire

SAMPLE IDENTIFICATION	EPA	NHDES	EPA	339BHR	346BHR	415BHR	R-3	R-3 Dup	67RCD	4SMW	4SMW Post	9SMW	9SMW Post	10 SMW	10 SMW Post
DATE SAMPLED	**CL**	**AGQS**	**MCL**	26-May-16	26-May-16	25-May-16	1-Jun-16	1-Jun-16	26-May-16	26-May-16	26-May-16	26-May-16	26-May-16	25-May-16	25-May-16
VOLATILE ORGANIC COMPOUNDS															
Methyl tert-butyl ether (ug/L)	-	13	-	<0 05	<0.05	<0.05	<0.05	<0.05	NA	NA	NA	NA	NA	NA	NA
Toluene (ug/L)	-	1000	1000	<0.05	<0.05	<0.05	<0.05	<0.05	NA	NA	NA	NA	NA	NA	NA
1,4-dioxane (ug/L)	3	3	-	0 51	<0.25	<0.25	0.3	0.34	<0.25	<0.25	NA	<0.25	NA	<0 25	NA
METALS															
Arsenic, total (mg/L)	0 01	0.01	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0 001
Manganese, total (mg/L)	0 3	0 84	-	**0.31**	0.28	0.046	0.19	0.19	0.17	0.14	<0.005	0.14	<0 005	0 14	<0.005
FIELD PARAMETERS															
Temperature (degrees Celcius)	-	-	-	12	11	11	11	NA	11	12	NA	11	NA	11	NA
pH (standard units)	-	-	-	7 2	6.9	8.6	7.9	NA	7.7	6.8	NA	7.9	NA	6.8	NA
Conductivity (uS/cm)	-	-	-	424	893	401	402	NA	286	663	NA	435	NA	411	NA
Dissolved Oxygen (mg/L)	-	-	-	2 2	1.4	0.6	< 0.5	NA	< 0.5	1.0	NA	4.5	NA	3 3	NA
Turbidity (NTU)	-	-	-	7	8	< 5	< 5	NA	< 5	< 5	NA	5	NA	< 5	NA
Oxidation/Reduction Potential (mV)	-	-	-	-94	-2	-237	-180	NA	-140	93	NA	-194	NA	53	NA

SAMPLE IDENTIFICATION	EPA	NHDES	EPA	16SMW	16SMW Post	19 SMW	19 SMW Post	21 SMW	21 SMW Post	4 ROD	4 ROD Post	10 ROD	10 ROD Post	25 FW	25 FW Post
DATE SAMPLED	**CL**	**AGQS**	**MCL**	27-May-16	27-May-16	27-May-16	27-May-16	25-May-16	25-May-16	26-May-16	26-May-16	25-May-16	25-May-16	27-May-16	27-May-16
VOLATILE ORGANIC COMPOUNDS															
Methyl tert-butyl ether (ug/L)	-	13	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene (ug/L)	-	1000	1000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-dioxane (ug/L)	3	3	-	<0 25	NA	<0.25	NA	<0.25	NA	<0.25	NA	<0.25	NA	<0 25	NA
METALS															
Arsenic, total (mg/L)	0.01	0 01	0 01	**0.011**	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0 001	<0 001	<0 001
Manganese, total (mg/L)	0.3	0.84	-	**2.1**	0.016	0.15	0.009	0.06	<0.005	**0.34**	<0.005	**0.31**	<0.005	0.034	0 029
FIELD PARAMETERS															
Temperature (degrees Celcius)	-	-	-	10	NA	10	NA	11	NA	11	NA	10	NA	10	NA
pH (standard units)	-	-	-	7.5	NA	8.0	NA	8.5	NA	7.0	NA	7.7	NA	7 8	NA
Conductivity (uS/cm)	-	-	-	549	NA	852	NA	681	NA	609	NA	494	NA	363	NA
Dissolved Oxygen (mg/L)	-	-	-	1	NA	0.5	NA	0.6	NA	1.1	NA	1.1	NA	< 0.5	NA
Turbidity (NTU)	-	-	-	< 5	NA	< 5	NA	< 5	NA	< 5	NA	< 5	NA	< 5	NA
Oxidation/Reduction Potential (mV)	-	-	-	75	NA	-167	NA	-188	NA	-37	NA	8	NA	-146	NA

TABLE NOTES:

TABLE ABBREVIATIONS:

NA = Not Analyzed
NM = Not Measured
NR = Not Recorded - field parameter measurement did not meet QA/QC criteria and were rejected
uS/cm = microsiemens per centimeter
ug/L = micrograms per liter (parts per billion)
mg/L = milligrams per liter (parts per million)
NTU - Nephelometric Turbidity Units
mV = millivolts
< = parameter concentration below detection limit indicated
R-3-DUP = duplicate sample collected at R-3

NHDES AGQS = NHDES Ambient Groundwater Quality Standard
EPA MCL = EPA Primary Drinking Water Standard
EPA CL = EPA Groundwater Quality Standard
BHR = Breakfast Hill Road
RCD = Ridgecreast Drive
SMW = Stone Meadow Way
ROD = Red Oak Drive
FW = Fells Way
Post = Post treatment sample collected for arsenic and manganese

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TABLE 5

SUMMARY OF SURFACT WATER ANALYTICAL RESULTS

TABLE 5
Summary of Surface Water Analytical Data for SW-5 & SW-103
Coakley Landfill Superfund Site - North Hampton Greenland, New Hampshire

SAMPLE IDENTIFICATION	NHDES Surface Water Standard		SW-5	SW-5	SW-5		SW-5		SW-5	SW-5	SW-5	SW-5	SW-5 (DUP)	SW-5	SW-5 (DUP)
DATE SAMPLED	Acute	Chronic	26-Aug-04	29-Aug-05	30-Aug-06		15-Nov-07		14-Aug-08	19-Aug-09	19-Aug-11	3-Oct-14	3-Oct-14	16-Sep-15	16-Sep-15
VOLATILE ORGANIC COMPOUNDS BY 8260B (ug/L)															
Toluene	---	---	< 2	< 2	< 2		< 1		< 1	7 2	< 1	< 1	< 1	< 1	< 1
METALS BY 200.8 (mg/L)															
TOTAL OR DISSOLVED (METALS ONLY)			Total	Total	Total	Dissolved	Total	Dissolved	Total	Total	Total	Dissolved	Dissolved	Dissolved	Dissolved
Aluminum	0 75	0 087	**240**	**9.1 J**	**3**	**0.08**	**0.15**	< 0 05	< 0 05	< 0 5	< 0 05	< 0 05	< 0 05	< 0 05	< 0 05
Antimony	9	1 6	< 0 004	< 0 05	< 0 004	< 0 002	< 0 001	< 0 001	< 0 001	< 0 001	< 0.001	< 0 001	< 0 001	< 0 001	< 0 001
Arsenic*	0 34	0 15	**0.72**	**1.2**	0 017	0 019	0 006	0 008	0 002	0 045	0.007	< 0 001	< 0 001	0 002	0 002
Barium	---	---	6 1	0 36	0 07	0 056	0 029	0 033	0 053	0 063	0 023	0 013	0 014	0 016	0 015
Beryllium	0 13	0 0053	0 011	< 0 01	< 0 002	< 0 002	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001	< 0.001	< 0 001
Cadmium*	0 00095	0 0008	0 01	< 0 01	< 0 002	< 0 002	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001	< 0.001	< 0 001	< 0 001
Calcium	---	---	310	54 J	67	66	28	33	43	66	29	29	30	19 J-	19 J-
Chromium (Cr+3 + Cr+6)*	0 183 (Cr+3) 0 016 (Cr+6)	0 024 (Cr+3) 0 011 (Cr+6)	**0.38**	**0.03**	0 005	< 0 002	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001
Cobalt	---	---	0 2	0 01	0 003	< 0 004	0 003	0 003	0 002	0 002	0 003	< 0 001	< 0 001	< 0 001	< 0 001
Copper*	0 0036	0 0027	**0.14**	< 0 01 J	< 0 005	< 0 004	**0 003**	0 002	< 0 001	0 001	**0 003**	0 001	0 001	**0.004**	0.003
Iron	---	1	1,200	250	25	14	5	6	2	30	4.6	0 6	0 6	0 41	0 42
Lead*	0 014	0 00054	**0.44**	0 01	< 0 002	< 0 002	**0 001**	< 0 001	< 0 001	**0 001**	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001
Magnesium	---	---	90	18	19	17	8	10	10	15	7 3	8 3	8 2	5 4	5 1
Manganese	---	---	200	6	3	2 6	1	2	1	2	2 1	0 35	0 36	0.26	0 24
Mercury*	0 0014	0 00077	0 002	< 0 001	< 0 0002	< 0 0002	< 0 0001	< 0 0001	< 0 0001	< 0 0001	< 0 0001	< 0 0001	< 0 0001	< 0 0001	< 0 0001
Nickel*	0 1449	0 016	**0.27**	0 02	0 008	0 005	0 005	0 006	0 005	0 005	0 004	0.002	0 002	0 003	0 003
Potassium	---	---	50	20	20	23	21	24	7	20	14	5 4	5 5	5 0	4 7
Selenium	---	0 0005	0 009	< 0 01 J	< 0 002	< 0 002	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001	0 001	0 001	<0 001	0 001
Silver*	0.00032	---	< 0 004	< 0 01	< 0 002	< 0 002	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001
Sodium	---	---	22	21	43	52	35	42	36	46	20	28	27	25 J-	23 J-
Thallium	1 4	0 04	< 0.004	< 0 01	< 0 002	< 0 002	< 0.001	< 0 001	< 0 001	< 0 001	< 0 001	< 0.001	< 0 001	< 0 001	< 0 001
Vanadium	---	---	0 36	0 019	< 0 004	< 0 002	< 0 001	< 0 001	< 0 001	0 001	< 0 001	< 0 005	< 0 005	< 0 005	< 0 005
Zinc*	0 0362	0 0365	**0.53**	**0.05**	**0 019**	0 019	0 01	**0.9**	< 0 005	**0 089**	0.016	< 0 005	< 0 005	0 013	0 011
GENERAL CHEMISTRY															
Ammonia** (mg/L)	pH Dependent		9 85	11 3	5 8		2 9		< 0 05	8 7	1 9	0 08	0 08	0 08	0 06
FIELD PARAMETERS															
Temperature (degrees C)	---	---	NA	NA	NA		7 46		18 1	19 69	18 48	11 5	NA	18	NA
pH (Standard Units)	---	---	NA	NA	NA		6 99		6 45	6 31	6 51	6 8	NA	6 2	NA
Specific Conductance (us/cm)	---	---	NA	NA	NA		675		451	965	178	397	NA	347	NA
Dissolved Oxygen (mg/L)	---	---	NA	NA	NA		0 5		3 29	0 84	2 25	3 2	NA	1 8	NA
Turbidity (NTU)	---	---	NA	NA	NA		12 6		8 4	33	5 48	7	NA	<5	NA
Oxidation Reduction Potential (mV)	---	---	NA	NA	NA		-70		73	-111	-50	41	NA	63	NA

NOTES:

1 VOCs list is limited to analytes detected in samples
2 --- no standard has been established for the indicated parameter
3 NHDES Surface Water Standards are listed in Env Wq 1700, Table 1703 1
4 There are no ROD ICLs established for surface water
5 Highlighting Bold values denote NHDES Acute Surface Water Criteria Exceedances; Gray shaded values denote NHDES Chronic Criteria Exceedances
6 The reporting detection limit (RDL) for zinc, silver and lead are consistent with RDLs specified in the SAP, however, they exceed the "default" (see footnote *) acute and/or chronic standards
* Acute and chronic standards based on "default" values listed in Env Wq 1700, Table 1703 1 Actual standards may vary based on the water effect ratio (WER) value used and/or total hardness
** The freshwater and saltwater aquatic life criteria for ammonia are pH dependent Refer to Env-Wq 1703 25 through Env-Wq 1703 31
(DUP) Duplicate sample results

TABLE 5

Summary of Surface Water Analytical Data for SW-5 & SW-103

Coakley Landfill Superfund Site - North Hampton Greenland, New Hampshire

SAMPLE IDENTIFICATION	NHDES Surface Water Standard		SW-103	SW-103		SW-103	SW-103	SW-103	SW-103
DATE SAMPLED	Acute	Chronic	28-Aug-06	13-Sep-07		14-Aug-08	19-Aug-09	19-Aug-11	16-Sep-15
VOLATILE ORGANIC COMPOUNDS BY 8260B (ug/L)									
Toluene	---	---	< 2	< 1		< 1	7 2	< 1	< 1
METALS BY 200.8 (mg/L)									
TOTAL OR DISSOLVED (METALS ONLY)			Total	Total	Dissolved	Total	Total	Total	Dissolved
Aluminum	0 75	0 087	0.2	<0 05	< 0 05	< 0 05	< 0 5	< 0 05	< 0 05
Antimony	9	1 6	< 0 05	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001
Arsenic*	0 34	0 15	0 004	0 005	0 006	0 002	0 011	0 002	0 002
Barium	---	---	0 038	0 04	0 045	0 029	0 078	0 019	0 017
Beryllium	0 13	0 0053	< 0 01	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001
Cadmium*	0 00095	0 0008	< 0 01	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001
Calcium	---	---	48	33	37	46	55	26	22
Chromium (Cr+3 + Cr+6)*	0 183 (Cr+3) 0 016 (Cr+6)	0 024 (Cr+3) 0 011 (Cr+6)	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001
Cobalt	---	---	< 0 01	0 007	0 009	< 0 001	0 002	< 0 001	< 0 001
Copper*	0 0036	0 0027	< 0 01	0.003	0 002	0 002	0.003	0 002	<0 001
Iron	---	1	14	11	13	2 8	25	0 96	4 40
Lead*	0 014	0 00054	< 0 01	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001
Magnesium	---	---	12	8 9	9 9	10	14	7 5	5 4
Manganese	---	---	1 6	1 4	1 6	0 59	3 3	0 4	0 60
Mercury*	0 0014	0 00077	< 0 01	< 0 0001	< 0 0001	< 0 0001	< 0 0001	< 0 0001	< 0 0001
Nickel*	0 1449	0 016	<0 01	0 007	0 007	0 006	0 005	0 003	0 003
Potassium	---	---	7 1	18 0	18 0	9 4	8 2	11 0	6 0
Selenium	---	0 0005	< 0 01	< 0 001	< 0 001	< 0 001	< 0.001	< 0 001	<0 001
Silver*	0 00032	---	< 0 01	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001
Sodium	---	---	23	38	41	16	39	24	20
Thallium	1 4	0 04	< 0 01	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001	< 0 001
Vanadium	---	---	<0 01	< 0 001	< 0 001	< 0 001	0 002	< 0 001	< 0 005
Zinc*	0 0362	0 0365	0 006	0 01	**0.74**	< 0 005	**0.69**	0 013	0 011
GENERAL CHEMISTRY									
Ammonia** (mg/L)	pH Dependent		0 2	0 44		0 81	0 48	0 24	0 08
FIELD PARAMETERS									
Temperature (degrees C)	---	---	NA	7 71		17 84	21 04	18 62	16
pH (Standard Units)	---	---	NA	6 69		6 35	6 77	7 87	6 3
Specific Conductance (us/cm)	---	---	NA	603		388	610	189	272
Dissolved Oxygen (mg/L)	---	---	NA	1 3		2 85	1 09	0 76	3 1
Turbidity (NTU)	---	---	NA	2 44		7 4	43 5	2 68	12 7
Oxidation Reduction Potential (mV)	---	---	NA	-9		114	-137	20 4	-55

NOTES

1. VOCs list is limited to analytes detected in samples
2 --- no standard has been established for the indicated parameter
3 NHDES Surface Water Standards are listed in Env Wq 1700, Table 1703 1
4 There are no ROD ICLs established for surface water
5 Highlighting Bold values denote NHDES Acute Surface Water Criteria Exceedances, Gray shaded values denote NHDES Chronic Criteria Exceedances
6 The reporting detection limit (RDL) for zinc, silver and lead are consistent with RDLs specified in the SAP, however, they exceed the "default" (see footnote
* Acute and chronic standards based on "default" values listed in Env Wq 1700, Table 1703 1 Actual standards may vary based on the water effect ratio (WER
** The freshwater and saltwater aquatic life criteria for ammonia are pH dependent Refer to Env Wq 1703 25 through Env-Wq 1703 31

TABLE 6

SUMMARY OF SEDIMENT ANALYTICAL RESULTS

TABLE 6
Summary of Sediment Analytical Data for SED-4 & SED-5
Coakley Landfill Superfund Site - North Hampton and Greenland, New Hampshire

Sampling Point ID	SQuiRT TEC	SED-4	SED-4	SED-4	SED-4	SED-4	SED-4	SED-4		SED-4	SED-4
Date of Sample Collection	(Dry Weight)	4/26/2001	8/26/2004	8/29/2005	8/29/2006	11/15/2007	8/14/2008	8/19/2009		10/03/2014	9/16/2015
TOTAL METALS BY 6020 - (mg/kg)											
Total Aluminum	---	8100	4400	7900	6700	3800	12000	3100	Sediment Sampling Not Required for 2010-2013	3900 J	4600 J
Total Antimony	---	5.3	< 12	< 4	< 24	1	< 0.5	0.7		< 1 UJ	0.8 J
Total Arsenic	9.79	40	< 6	< 4	< 6	4.2	2.1	3.1		4 J	3.6 J
Total Barium	---	220	28	60	49	68	71	52		95 J	57 J
Total Beryllium	---	1.8	< 12	< 4	< 6	< 0.5	0.6	< 0.5		< 1 UJ	<0.5 UJ
Total Cadmium	0.99	0.8	< 6	< 4	< 6	0.8	< 0.5	0.5		1 J	0.8 J
Total Calcium	---	31000	9200	13000	12000	15000	2000	17000		20000 J	16000 J
Total Chromium	43.4	69	6	12	< 6	4	14	3.4		5 J	4.8 J
Total Cobalt	---	14	< 3	< 4	< 6	17	1.2	2		5 J	1.6 J
Total Copper	31.6	67	< 6	17	20	2.3	2.5	16		15 J	14 J
Total Iron	---	2500	1200	3900	2400	3100	2100	2800		9100 J	3300 J
Total Lead	35.8	250	15	130	110	68	10	32		91 J	89 J
Total Magnesium	---	4400	1500	3500	2400	2000	900	2000		2100 J	2000 J
Total Manganese	---	500	400	190	160	910	63	980		2100 J	470 J
Total Mercury	0.18	0.3	< 0.6	0.4	< 0.6	0.5	< 0.1	0.3		0.5 J	0.4 J
Total Nickel	22.7	53	< 6	14	< 9	7.4	6.3	6.9		9 J	7.1 J
Total Potassium	---	800	370	500	340	300	1700	200		800 J	800 J
Total Selenium	---	2.9	< 6	< 4	< 6	< 0.5	< 0.5	2.2		3 J	1.8 J
Total Silver	---	< 1	< 6	< 4	< 6	< 0.5	< 0.5	< 0.5		< 1 UJ	<0.5 UJ
Total Sodium	---	100	230	190	1100	300	200	400		300 J	200 J
Total Thallium	---	< 1	< 15	< 4	< 6	< 0.5	< 0.5	< 0.5		< 1 UJ	<0.5 UJ
Total Vanadium	---	71	7	38	29	14	14	10		27 J	28 J
Total Zinc	121	220	57	91	74	110	8.3	93		170 J	74 J
TOTAL SOLIDS BY 2540G-91 - (Percent - %)											
Solids Total	---	60.5	22.0	20.9	14.5	12.7	54.8	11.4		12.2	17.3

NOTES:

mg/kg = milligram per kilogram, parts per million
--- = no standard has been established for the indicated parameter
< = concentration is below reporting detection limit indicated
J, UJ = data qualifiers applied based on EPA's Tier I Plus data validation guidelines J = estimated, UJ = estimated detection limit

1. Beginning in 2014, sediment data was qualified in accordance with EPA's Tier I Plus data validation guidelines
2. The EPA has not established a cleanup standard for sediment.
3. Sediment laboratory analytical data are compared to the NHDES Draft Evaluation of Sediment Quality Guidance Document, dated April 2005, that includes the "National Oceanic and Atmospheric Administration Screening Quick Reference Tables (NOAA SQuiRT Tables for Inorganics in Sediment - Freshwater). Current SQuiRT Tables are located on the NOAA website http://archive.orr.noaa.gov/book_shelf/122_NEW-SQuiRTs.pdf . TEC is Threshold Effect Concentration, which is consensus-based and incorporates the Ontario Ministry of the Environment lowest-observed effect levels (LELs)
4. Shaded values denote concentrations exceeding the NOAA SQuiRT TEC standard

TABLE 6

Summary of Sediment Analytical Data for SED-4 & SED-5

Coakley Landfill Superfund Site - North Hampton and Greenland, New Hampshire

Sampling Point ID	SQuiRT TEC	SED-5	SED-5	SED-5	SED-5	SED-5/SED-3T	SED-5	SED-5		SED-5	SED-5-DUP	SED-5	SED-5-DUP
Date of Sample Collection	(Dry Weight)	8/27/2003	8/26/2004	8/29/2005	8/30/2006	11/15/2007	8/14/2008	8/19/2009		10/03/2014	10/3/2014	9/16/2015	9/16/2015
TOTAL METALS BY 6020 - (mg/kg)													
Total Aluminum	---	18000	17000	6600	34000	9900	11000	17000	Sediment Sampling Not Required for 2010-2013	16000 J	24000 J	14000 J	16000 J
Total Antimony	---	< 2	< 12	< 4	< 8	1	< 0.5	< 0.5		0.8 J	0.7 J	1.8 J	1.9 J
Total Arsenic	9.79	19	36	310	17	15	16	15		10 J	12 J	14 J	16 J
Total Barium	---	88	130	270	150	110	49	110		140 J	210 J	120 J	140 J
Total Beryllium	---	< 4	< 12	< 4	< 2	< 0.5	< 0.5	1		0.9 J	1.3 J	0.7 J	0.8 J
Total Cadmium	0.99	< 1	< 6	< 4	< 2	2.7	< 0.5	< 0.5		< 0.5 UJ	0.5 J	0.6 J	0.6 J
Total Calcium	---	4700	11000	8900	3600	8700	1700	1700		5600 J	11000 J	9800 J	11000 J
Total Chromium	43.4	46	56	13	69	39	23	49		28 J	45 J	26 J	29 J
Total Cobalt	---	12	13	6	14	55	5.1	11		5.9 J	8 J	7 J	7 J
Total Copper	31.6	37	20	6	45	9.7	16	28		21 J	34 J	36 J	38 J
Total Iron	---	31000	37000	210000	40000	54000	13000	29000		18000 J	30000 J	20000 J	23000 J
Total Lead	35.8	25	40	20	23	4000	10	18		15 J	22 J	55 J	58 J
Total Magnesium	---	6500	6000	3200	10000	4500	3800	7700		3900 J	6800 J	3700 J	4400 J
Total Manganese	---	840	1400	2500	500	600	240	300		350 J	570 J	470 J	520 J
Total Mercury	0.18	< 0.2	< 0.6	0.5	< 0.2	0.9	0.2	< 0.1		< 0.1 UJ	0.1 J	0.4 J	0.4 J
Total Nickel	22.7	38	38	9	53	32	14	38		21 J	33 J	24 J	26 J
Total Potassium	---	4400	2000	1300	8200	1600	1300	5400		5200 J	8200 J	3800 J	4200 J
Total Selenium	---	< 2	< 6	< 4	< 2	< 0.5	< 0.5	< 0.5		0.7 J	0.7 J	1.9 J	1.3 J
Total Silver	---	< 2	< 6	< 4	< 2	1.4	< 0.5	< 0.5		< 0.5 UJ	< 0.5 UJ	< 0.5 UJ	< 0.5 UJ
Total Sodium	---	480	270	240	800	400	200	300		400 J	700 J	300 J	400 J
Total Thallium	---	< 1	< 6	< 4	< 2	< 0.5	< 0.5	< 0.5		< 0.5 UJ	< 0.5 UJ	< 0.5 UJ	< 0.5 UJ
Total Vanadium	---	35	38	17	55	24	25	41		34 J	53 J	46 J	49 J
Total Zinc	121	170	120	38	130	700	28	80		94 J	130 J	110 J	120 J
TOTAL SOLIDS BY 2540G-91 - (Percent - %)													
Solids Total	---	39.9	22.0	23.4	45.5	32	82.1	60.1		20.9	19.2	22.8	22.2

NOTES:

mg/kg = milligram per kilogram, parts per million

--- = no standard has been established for the indicated parameter.

< = concentration is below reporting detection limit indicated

J, UJ = data qualifiers applied based on EPA's Tier I Plus data validation guidelines. J = estimated, UJ = estimated detection limit

1. Beginning in 2014, sediment data was qualified in accordance with EPA's Tier I Plus data validation guidelines.
2. The EPA has not established a cleanup standard for sediment.
3. Sediment laboratory analytical data are compared to the NHDES Draft Evaluation of Sediment Quality Guidance Document, dated April 2005, that includes the "National Oceanic and Atmospheric Administration Screening Quick Reference Tables (NOAA SQuiRT Tables for Inorganics in Sediment - Freshwater). Current SQuiRT Tables are located on the NOAA website: http://archive.orr.noaa.gov/book_shelf/122_NEW-SQuiRTs.pdf . TEC is Threshold Effect Concentration, which is consensus-based and incorporates the Ontario Ministry of the Environment lowest-observed effect levels (LELs).
4. Shaded values denote concentrations exceeding the NOAA SQuiRT TEC standard.

CES INC

TABLE 7

SUMMARY OF LEACHATE ANALYTICAL RESULTS

TABLE 7

Summary of Leachate Analytical Results
2015 Annual Report
Coakley Landfill - North Hampton, New Hampshire

SAMPLE IDENTIFICATION	NHDES SURFACE WATER STANDARDS		L-1	L-1	L-1	L-1	L-1	L-1	L-1		L-1	L-1	L-1	L-1	L-1	L-1	L-1-DUP	L-1	L-1-DUP
DATE SAMPLED	ACUTE	CHRONIC	16-Aug-01	7-Aug-02	27-Aug-03	25-Aug-04	25-Aug-05	30-Nov-06	13-Nov-07		12-Aug-08	19-Aug-09	17-Aug-10	19-Aug-11	30-Aug-12	14-Aug-13	14-Aug-13	17-Sep-15	17-Sep-15
COMMENTS								ID 104240											
PARAMETER ANALYZED																			
VOLATILE ORGANIC COMPOUNDS (ug/L)																			
Benzene	5300	NSE	3	2	2	<2	2	2	3		<1	1.9	2	2.0	2	2	2	2	2
Chlorobenzene	250	50	27	15	18	12	20	18	22		<2	20	24	18	15	13	14	16	14
Chloroethane	NSE	NSE	8	6	6	3	6	<10	6		<5	4.4	<5	4.1	<5	<5	<5	<5	<5
1,4 Dichlorobenzene (See Note 5)	1120	763	<2	3	2	<2	3	2	3		<1	2.5	3	2.3	2	2	2	2	2
1,2 Dichlorobenzene (See Note 5)			<2	<2	<2	<2	<2	<2	1		<1	1.1	2	1.2	1	<1	<1	<1	<1
Isopropylbenzene	NSE	NSE	<2	<2	<2	<2	<2	2	2		<1	1.5	2	1.6	1	1	1	1	<1
Diethyl Ether	NSE	NSE	31	<10	<10	<10	<10	<10	23		<5	13	15	12	10	10	10	11	10
Naphthalene	2300	620	<10	<10	<10	<10	<10	<10	<5		<5	0.6	<5	<5	<5	<5	<5	<5	<5
Tetrahydrofuran	NSE	NSE	32	<30	<30	<30	<30	<30	20		<10	12	10	13	<10	<10	<10	10	10
Toluene	NSE	NSE	<2	<2	<2	<2	<2	<2	<1		<1	<1	1	<1	<1	<1	<1	<1	2J
LOW LEVEL 1,4-DIOXANE (ug/L)																			
1,4-Dioxane	NSE	NSE	NA	NA	NA	NA	NA	NA	NA		NA	26	20	25	28	22	24	NA	NA
METALS (ug/L)			Total	Total	Total	Total	Total		Total	Dissolved	Total	Total	Total	Total	Total	Total	Total	Total	Total
Aluminum	750	87	3200	4100	9,500	29,000	18,000	NA	<50	<50	170	<50	<50	<50	<50	<50	80	<50	<50
Antimony	9,000	1,600	6	<2	<2	<4	<6	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Arsenic	340	150	83	23	67	150	300	NA	7	6	4	4	7	6	4	5	7	6	6
Barium	NSE	NSE	1300	280	610	2200	4600	NA	97	99	11	100	100	97	87	92	110	100	96
Beryllium	130	5.3	3	<4	<4	3	<2	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	0.95	0.80	<2	<2	<2	<4	<6	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Calcium	NSE	NSE	120,000	97,000	100,000	140,000	150,000	NA	50,000	62,000	20,000	64,000	71,000	63,000	79,000	56,000	57,000	67,000	67,000
Chromium	183	24	20	13	27	55	70	NA	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1
Cobalt	NSE	NSE	<2	3	6	11	10	NA	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Copper	3.6	2.7	<2	6	13	36	40	NA	<1	1	8	<1	<1	1	<1	<1	<1	<1	<1
Iron	NSE	1,000	350,000	130,000	330,000	1,000,000	1,100,000	NA	30,000	27,000	1,200	35,000	34,000	31,000	31,000	35,000	45,000	35,000	33,000
Lead	14	0.54	<2	2	8	34	<6	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Magnesium	NSE	NSE	49,000	43,000	36,000	34,000	43,000	NA	20,000	25,000	2,500	25,000	21,000	21,000	20,000	16,000	16,000	17,000	17,000
Manganese	NSE	NSE	7,600	5,700	5,900	10,000	9,800	NA	2,700	3,200	98	3,200	2,900	2,700	3,300	2,500	2,500	2400 J+	2,200 J+
Mercury	1.4	0.77	<0.2	<0.2	<0.2	<0.2	<0.2	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	144.9	16.1	22	18	28	32	40	NA	7	8	3	7	6	4	6	5	5	5	5
Potassium	NSE	NSE	66	55	46,000	38,000	50,000	NA	34,000	40	7,800	37,000	33,000	30,000	31,000	25,000	27,000	26,000	27,000
Selenium	NSE	5	7	6	4	3	<2	NA	<1	<1	<1	<1	2	2	5	5	5	5	5
Silver	0.32	NSE	<2	<2	2	<4	<6	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Sodium	NSE	NSE	220,000	200,000	160,000	140,000	150,000	NA	130,000	150,000	<10	100,000	110,000	91,000	100,000	78,000	76,000	90,000	90,000
Thallium	1,400	40	<2	<2	<2	<4	<6	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Vanadium	NSE	NSE	46	13	36	89	220	NA	1	1	2	2	1	<5	<5	<5	<5	<5	<5
Zinc	36.2	36.5	45	51	140	390	690	NA	<5	650	56	12	6	<5	<5	<5	10	<5	<5
GENERAL CHEMISTRY																			
Chemical Oxygen Demand (mg/l)	NSE	NSE	190	178	560	282	377	NA	70		50	50	54	40	44	52	68	32	43
Ammonia-N (mg/l)	36.1	5.91	44	41	44.8	66.8	79	NA	33		0.62	21	22	25	24	21	19	23	23

FIELD PARAMETERS	13-Nov-07	12-Aug-08	19-Aug-09	17-Aug-10	19-Aug-11	30-Aug-12	14-Aug-13	14-Aug-13 (DUP)	17-Sep-15	17-Sep-15 (DUP)
Temperature (degrees Celcius)	12	18	14	16	15	16	15	NA	15	NA
Ph (standard units)	6.2	6.6	6.4	6.6	5.1	6.6	6.3	NA	6.4	NA
Conductivity (us/cm)	1,600	176	1,459	1,500	821	1,399	1,220	NA	1,283	NA
Dissolved Oxygen (mg/l)	2.2	4.9	1.3	0.6	3.4	2.3	2.3	NA	2.6	NA
Turbidity (NTU)	18	90	10	9	2	17	144	NA	6	NA
Oxidation/Reduction Potential (mV)	138	42	-38	-99	-73.1	-76.0	-102.0	NA	-111.0	NA

NOTES:

1. <1 = Below Detection Limit; NA = Not Analyzed
2. NSE indicates no standard has been established for the indicated parameter.
3. NHDES Surface Water Standard are listed in Env Wq 1700
4. Acute and chronic standards based on total dichlorobenzenes
5. Ammonia-N standard is based on pH of 7.0 at 14 C, salinoids not present.
6. A bold entry indicates the parameter exceeded the acute surface water standard.
7. Shaded values indicate the parameter exceeded the chronic surface water standard.
8. Bold and shaded values indicate exceedances of both NHDES acute and chronic criteria.
9. Volatile organic compounds and metals results are in micrograms per liter (µg/l).
10. Only volatile organic compounds detected in one or more leachate sample during the period shown are listed.
11. Only volatile organic compounds detected in one or more leachate sample during the period shown are listed.
12. Refer to Table 2 and 3 for Field Parameter unit abbreviations
13. The laboratory detection limits (for 2013) were above the either the Acute or Chronic standard for the following parameters (detection limit in parantheses): Cadmium (1 ug/L), Lead (1 ug/L) and Silver (1 ug/L).

LABORATORY ANALYTICAL METHODS*(Not Confirmed for Analyses Performed Prior to 2010)*

1. Volatile Organic Compounds (VOC) analyzed by EPA Method 8260B.
2. 1,4-dioxane (low level) analyzed by EPA Method 8260B SIM
3. Metals analyzed by EPA Method 200.8
4. Chemical Oxygen Demand analyzed by 4500-NH3
5. Ammonia-N analyzed by H8000

TABLE 9

STATISTICAL AND VISUAL ANALYSIS RESULTS

TABLE 9
Statistical and Visual Trend Analysis Results
2015 Annual Report - Coakley Landfill, North Hampton, New Hampshire

	1,4-dioxane		Benzene		Tertiary-butyl Alcohol (TBA)		Arsenic		Manganese	
Well	Statistical Trend	Visual Trend	Statistical Trend	Visual Trend	Statistical Trend	Visual Trend	Statistical Trend	Visual Trend	Statistical Trend	Visual Trend
Operating Unit 1 Wells										
BP-4	No Trend	Stable	NA	NA	NA	NA	No Trend	Decreasing	No Trend	Decreasing
MW-4	No Trend	Increasing	NA	NA	NA	NA	No Trend	Stable	Decreasing	Stable
MW-5D	No Trend	Stable	No Trend	Stable	No Trend	Stable	No Trend	Stable	No Trend	Decreasing
MW-5S	No Trend	Decreasing	No Trend	Decreasing	ND	ND	No Trend	Stable	Decreasing	Decreasing
MW-6	ND	ND	ND	ND	ND	ND	NP	NP	Increasing	Not Stable
MW-8	No Trend	Stable	No Trend	Stable	Decreasing	Decreasing	Increasing	Not Stable	No Trend	Decreasing
MW-9	No Trend	Not Stable	NA	NA	NA	NA	No Trend	Not Stable	No Trend	Stable
MW-10	NA	NA	NA	NA	NA	NA	No Trend	Not Stable	Decreasing	Not Stable
MW-11	No Trend	Not Stable	Decreasing	Decreasing	ND	ND	No Trend	Increasing	No Trend	Stable
OP-2	NP	NP	NA	NA	NA	NA	Increasing	Stable	Increasing	Increasing
OP-5	NA	NA	NA	NA	NA	NA	No Trend	Increasing	No Trend	Increasing
Operating Unit 2 Wells										
AE-1A	NA	NA	NA	NA	NA	NA	No Trend	Decreasing	No Trend	Decreasing
AE-1B	NA	NA	NA	NA	NA	NA	Increasing	Increasing	No Trend	Decreasing
AE-2A	No Trend	Stable	Decreasing	Stable	ND	ND	Decreasing	Decreasing	No Trend	Stable
AE-2B	No Trend	Stable	Decreasing	Stable	ND	ND	No Trend	Not Stable	Decreasing	Decreasing
AE-3A	No Trend	Stable	No Trend	Stable	ND	ND	No Trend	Not Stable	Increasing	Stable
AE-3B	No Trend	Stable	Decreasing	Stable	ND	ND	No Trend	Stable	No Trend	Decreasing
AE-4A	NA	NA	ND	ND	ND	ND	NP	NP	No Trend	Decreasing
AE-4B	NA	NA	ND	ND	ND	ND	NP	NP	Decreasing	Stable
FPC-4B	NA	NA	ND	ND	ND	ND	NP	NP	NP	NP
FPC-5B	NP*	NP*	NA	NA	NA	NA	NP	NP	No Trend	Decreasing
FPC-6A	NP*	NP*	Decreasing	Stable	ND	ND	Increasing	Increasing	Increasing	Not Stable
FPC-6B	NP*	NP*	Decreasing	Stable	ND	ND	No Trend	Stable	Decreasing	Stable
FPC-7A	NA	NA	NA	NA	NA	NA	NP	NP	NP	NP
FPC-7B	NA	NA	NA	NA	NA	NA	NP	NP	NP	NP
FPC-8A	No Trend	Stable	ND	ND	ND	ND	NP	NP	NP	NP
FPC-8B	No Trend	Stable	ND	ND	ND	ND	NP	NP	NP	NP
FPC-9A	NA	NA	NA	NA	NA	NA	Increasing	Increasing	No Trend	Decreasing
FPC-11A	NA	NA	NA	NA	NA	NA	NP	NP	No Trend	Stable
FPC-11B	NA	NA	NA	NA	NA	NA	NP	NP	No Trend	Increasing
GZ-105	NP*	NP*	Decreasing	Decreasing	ND	ND	No Trend	Decreasing	NP	NP
Water Supply Wells										
R-3	No Trend	Stable	ND	ND	ND	ND	NP*	NP*	NP*	NP*
339BHR	No Trend	Stable	ND	ND	ND	ND	NP*	NP*	NP*	NP*
346BHR	ND	ND	ND	ND	ND	ND	NP*	NP*	NP*	NP*
415BHR	ND	ND	ND	ND	ND	ND	NP*	NP*	NP*	NP*
Trend Tests Completed	16		11		2		23		24	
Trends Identified	0		7		1		9		13	
Increasing Trends	0		1		0		7		6	
Decreasing Trends	0		6		1		2		7	
No Trend	16		4		1		14		11	

NOTES:

NA Parameter Not Analyzed
ND Parameter Not Detected
NP Not Performed, trend analysis not performed because parameter has not recently exceeded USEPA ICL or NHDES AGQS.
NP* Not Performed, data from at least 5 sampling events are required for Mann Kendall statistical analysis or visual trend analysis.

1. Wells with screened interval longer than 10 feet were interval sampled in August 2013 (MW-5D, MW-5S, MW-8, MW-11, AE-3B, FPC-4B, FPC-5B, FPC-6B, FPC-7B, FPC-8B, GZ-105), or September/October 2014 (FPC-11B). Samples collected using the interval sampling method are not considered to be directly comparable to data from low flow purging sampling methods; therefore, the interval sampling data was excluded from the trends analyses - although it is noted that average concentrations for the interval data were used when plotting time series plots.
2. Mann Kendall trend analysis completed using 95% confidence interval. Possible outcomes include: No Trend, Increasing, or Decreasing.
3. Visual trend analysis focused on data from last 5 years, in the context of complete data set. Possible outcomes include: Stable, Not Stable, Increasing, or Decreasing.
4. FPC-5A: Not sampled in 2015; therefore no trend analysis was completed.
5. FPC-11B - trend analysis was not performed because the well was interval sampled in Fall 2014.

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TABLE 10

CONTAMINANTS OF CONCERN ANALYTICAL DATA
(NOVEMBER 2000 – SEPTEMBER 2015)

TABLE 10

Contaminants of Concern Analytical Data (November 2000 – September 2015)

Antimony in Groundwater

Coakley Landfill Superfund Site

North Hampton and Greenland, New Hampshire

Well ID / Appox Date	Nov-00	Apr-01	Aug-01	Aug-02	Aug-03	Aug-04	Aug-05	Aug-06	Nov-07	Jan-08	Aug-08	Aug-09	Aug-10	Feb-11	Aug-11	Aug-12	Mar-13	Apr-13	Aug-13	Feb-14	Sep-14	Sep-15
Operating Unit 1 Wells																						
BP-4	< 0 005	< 0 001	NA	< 0 002	< 0 002	< 0 004	< 0 04	< 0 002	< 0 001	NS	< 0 001	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
MW-2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-4	< 0 02	< 0 005	NA	< 0 004	< 0 004	< 0 004	< 0 012	< 0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
MW-5D	< 0 001	< 0 01	NA	< 0 002	< 0 002	< 0 004	< 0 006	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
MW-5S	< 0 02	< 0 001	NA	< 0 002	< 0 004	< 0 004	< 0 006	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
MW-6	< 0 02	< 0 005	NA	< 0 005	< 0 002	< 0 005	< 0 012	< 0 002	< 0 001	NS	< 0 001	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
MW-8	< 0 02	< 0 005	NA	< 0 002	< 0 004	< 0 004	< 0 006	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
MW-9	< 0 02	< 0 005	NA	0 002	<0 004	**0.007**	< 0 006	< 0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
MW-10	< 0 02	< 0 005	NA	< 0 002	< 0 002	< 0 004	< 0 006	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
MW-11	< 0 02	< 0 005	NA	< 0 002	< 0 002	< 0 004	< 0 006	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
OP-2	< 0 02	< 0 001	NA	< 0 002	< 0 002	< 0 005	< 0 006	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
OP-5	< 0 005	< 0 001	NA	< 0 002	< 0 002	< 0 004	< 0 016	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
Operating Unit 2 Wells																						
AE-1A	< 0 005	< 0 001	NA	< 0 002	0 002	< 0 004	**0.012**	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
AE-1B	< 0 02	< 0 005	NA	< 0 002	< 0 002	< 0 004	< 0 006	< 0 002	NS	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
AE-2A	< 0 005	< 0 001	NA	< 0 002	< 0 002	< 0 005	< 0 006	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
AE-2B	< 0 025	< 0 005	NA	< 0 002	< 0 002	< 0 004	< 0 04	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
AE-3A	< 0 025	< 0 005	NA	< 0 002	< 0 002	< 0 004	< 0 04	< 0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
AE-3B	< 0 025	< 0 01	NA	< 0 002	< 0 002	< 0 004	< 0 016	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
AE-4A	NS	NS	NS	NS	0 005	< 0 005	< 0 008	**0.008**	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
AE-4B	NS	NS	NS	NS	< 0 008	< 0 005	< 0 008	< 0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
FPC-2A	NA	< 0 001	NA	NA	< 0 002	< 0 004	< 0 006	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	NS	NS	NS	NS
FPC-2B	NS	NS	NS	NS	< 0 002	**0.007**	< 0 006	< 0 002	< 0 001	NS	< 0 001	0 002	< 0 001	NS	< 0 001	< 0 001	NS	NS	NS	NS	NS	NS
FPC-4B	NS	NS	NS	NS	< 0 004	< 0 004	< 0 004	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
FPC-5A	< 0 025	< 0 001	NA	< 0 002	< 0 002	< 0 004	< 0 004	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	NS	NS
FPC-5B	0 006	< 0 005	NA	< 0 002	< 0 004	< 0 004	< 0 006	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
FPC-6A	< 0 005	< 0 001	NS	NS	< 0 008	< 0 004	< 0 006	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
FPC-6B	< 0 025	< 0 001	NA	< 0 002	< 0 004	< 0 004	< 0 02	< 0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
FPC-7A	NS	NS	NS	NS	< 0 004	NA	< 0 006	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
FPC-7B	NS	NS	NS	NS	< 0 004	NA	< 0 006	< 0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
FPC-8A	< 0 025	0 005	NA	0 002	< 0 004	< 0 004	< 0 008	< 0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
FPC-8B	< 0 005	< 0 001	NA	< 0 004	< 0 002	< 0 004	< 0 008	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
FPC-9A	< 0 001	< 0 005	NA	< 0 002	< 0 002	< 0 004	< 0 006	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
FPC-9B	< 0 02	NS	NS	< 0 005	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-9C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-11A	NS	NS	NS	NS	< 0 002	< 0 004	< 0 016	< 0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	NS	NS	< 0 001	< 0 001
FPC-11B	NS	NS	NS	NS	0 003	< 0 004	< 0 016	< 0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	NS	NS	INT	<0 001
FPC-11C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GZ-105	< 0 001	< 0 005	NA	< 0 002	< 0 004	< 0 004	< 0 04	0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
GZ-123	NS	NS	NS	NS	NS	NS	NS	NS	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	NS	NS	NS	NS
GZ-125	NS	NS	NS	NS	NS	NS	NS	NS	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	NS	NS	NS	NS
Water Supply Wells																						
R-3	NS	NA	NS	NS	NA	NA	NA	NS	NA	NA	NA	NA	NA	NS	NA	NA	NA	NS	NA	NA	NA	NA
R-5	NS	NA	NS	NS	NA	NA	NA	NS	NA	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NA	NA
346BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NA	NS	NA	NS	NA	NA
339BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NA	NA	NA	NA	NA
415BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NA	NS	NA	NA

Table Notes

1 All data in milligrams per liter (mg/L), parts per million - Analyzed by Method 200 8
2 NHDES Ambient Groundwater Quality Standard (AGQS) for Antimony is 0 006 mg/L Exceedances are identified with GRAY shading
3 EPA Interim Cleanup Level (ICL) for Antimony is 0 006 mg/L Exceedances are identified with BOLD text
4 All data for Total metals, with the exception of the following overburden wells for Sept. 2014 (MW-4, MW-9, MW-10, OP-2, OP-5, AE-1A, AE-2A, AE-3A, AE-4A, FPC-6A, FPC-7A, FPC-8A, FPC-9A and FPC-11A)

Abbreviations:

NA = Not Analyzed, NS = Not Sampled, INT = Interval Sampled, < ## = reported concentration is less than the detection limit (##)

TABLE 10

Contaminants of Concern Analytical Data (November 2000 – September 2015)

Arsenic in Groundwater

Coakley Landfill Superfund Site

North Hampton and Greenland, New Hampshire

Well ID / Appox Date	Nov-00	Apr-01	Aug-01	Aug-02	Aug-03	Aug-04	Aug-05	Aug-06	Nov-07	Jan-08	Aug-08	Aug-09	Aug-10	Feb-11	Aug-11	Aug-12	Mar-13	Apr-13	Aug-13	Feb-14	Sep-14	Sep-15
Operating Unit 1 Wells																						
BP-4	0.035	0.02	0.031	0.036	0.032	0.022	0.011	0.028	0.03	NS	0.023	0.022	NS	0.034	0.033	0.034	NS	NS	0.032	NS	0.025	0.017
MW-2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-4	0.06	0.042	0.064	0.041	0.04	0.066	0.13	0.043	0.058	NS	0.069	0.07	0.064	NS	0.081	0.08	NS	NS	0.053	NS	0.063	0.05J
MW-5D	0.009	0.007	0.008	0.006	0.007	0.005	0.006	0.005	0.011	NS	0.005	0.006	0.01	NS	0.01	0.011	NS	NS	INT	NS	0.009	0.01
MW-5S	0.018	0.021	0.023	0.026	0.01	0.015	0.014	0.01	0.026	NS	0.026	0.018	0.016	NS	0.018	0.017	NS	NS	INT	NS	0.022	0.017
MW-6	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001 J	< 0.002	< 0.004	< 0.002	< 0.001	NS	< 0.001	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	NS	0.002	NS	< 0.001	< 0.001
MW-8	0.01	0.011	0.043	0.009	0.008	0.006	0.01	0.007	0.01	NS	0.008	0.008	0.013	NS	0.016	0.018	NS	NS	INT	NS	0.009	0.011
MW-9	0.069	0.063	0.15	0.14	0.12	0.08	0.28	0.081	0.056	NS	0.057	0.078	0.12	NS	0.13	0.14	NS	NS	0.046	NS	0.12	0.14
MW-10	0.01	0.003	0.032	0.028	0.011 J	0.033	0.024	0.011	0.012	NS	0.009	0.017	0.019	NS	0.012	0.019	NS	NS	0.015	NS	0.022	0.014
MW-11	0.01	0.014	0.02	0.017	0.016	0.011	0.012	0.01	0.015	NS	0.013	0.011	0.011	NS	0.008	0.009	NS	NS	INT	NS	0.013	0.014
OP-2	0.2	0.17	0.29	0.26	0.27	0.19	0.025	0.2	0.19	NS	0.17	0.2	0.22	NS	0.21	0.22	NS	NS	0.2	NS	0.23	0.22
OP-5	0.05	0.027	0.043	0.048	0.046	0.033	0.025	0.027	0.033	NS	0.017	0.013	0.019	NS	0.027	0.03	NS	NS	0.03	NS	0.048	0.044
Operating Unit 2 Wells																						
AE-1A	0.017	0.018	0.017	0.018	0.02	0.022	0.02	0.015	0.039	NS	0.041	0.029	0.02	NS	0.022	0.018	NS	NS	0.018	NS	0.014	0.016
AE-1B	0.004	0.005	0.005	0.005	0.004 J	0.004	0.003	< 0.002	NS	NS	0.003	0.004	0.006	NS	0.006	0.007	NS	NS	0.008	NS	0.008	0.008
AE-2A	0.29	0.3	0.34	0.29	0.33	0.29	0.3	0.24	0.28	NS	0.23	0.24	0.24	NS	0.25	0.24	NS	NS	0.19	NS	0.012	0.19
AE-2B	0.026	0.013	0.016	0.011	0.018	0.016	0.025	0.024	0.02	NS	0.019	0.026	0.016	NS	0.028	0.02	NS	NS	0.02	NS	0.014	0.012
AE-3A	0.1	0.09	0.13	0.11	0.11	0.11	0.12	0.1	0.13	NS	0.15	0.12	0.12	NS	0.11	0.11	NS	NS	0.14	NS	0.13	0.13
AE-3B	0.093	0.083	0.11	0.073	0.084 J	0.092	0.078	0.091	0.082	NS	0.095	0.091	0.079	NS	0.083	0.088	NS	NS	INT	NS	0.087	0.061
AE-4A	NS	NS	NS	NS	< 0.002 JM	< 0.002	< 0.002	< 0.002	0.003	NS	0.01	0.003	0.002	NS	0.001	0.001	NS	NS	< 0.001	NS	< 0.001	< 0.001
AE-4B	NS	NS	NS	NS	0.003	< 0.002	< 0.002	< 0.002	0.001	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	< 0.001	NS	< 0.001	< 0.001
FPC-2A	< 0.005	0.001	< 0.001	NA	0.001	< 0.002	0.005	< 0.002	0.008	NS	0.003	0.002	0.002	NS	0.002	0.002	NS	NS	NS	NS	NS	NS
FPC-2B	NS	NS	NS	NS	0.004	< 0.002	0.004	< 0.002	0.002	NS	0.003	0.003	0.003	NS	0.003	0.002	NS	NS	NS	NS	NS	NS
FPC-4B	NS	NS	NS	NS	< 0.001	< 0.002	< 0.002	< 0.002	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	INT	NS	< 0.001	< 0.001
FPC-5A	< 0.001	0.001	0.046	0.054	0.008	0.045	0.065	0.042	0.053	NS	0.054	0.053	0.055	NS	0.051	0.053	NS	NS	0.052	NS	NS	NS
FPC-5B	0.031	0.034	0.002	0.001	0.038 J	< 0.002	0.004	< 0.002	0.004	NS	0.001	0.001	0.003	NS	0.002	0.002	NS	NS	0.002	NS	0.002	0.002
FPC-6A	< 0.005	< 0.001	NS	NS	0.009	< 0.002	0.003	< 0.002	0.003	NS	0.002	0.013	0.03	NS	0.009	0.037	NS	NS	0.018	NS	0.038	0.032
FPC-6B	0.003	0.006	0.006	0.003	< 0.002 J	0.013	0.05	0.005	0.009	NS	0.014	0.002	0.003	NS	0.005	0.004	NS	NS	INT	NS	0.003	0.003
FPC-7A	NS	NS	NS	NS	< 0.001 J	< 0.004	< 0.002	< 0.002	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	< 0.001	NS	< 0.001	< 0.001
FPC-7B	NS	NS	NS	NS	< 0.001 J	0.007	0.002	< 0.002	< 0.001	NS	0.002	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	INT	NS	< 0.001	< 0.001
FPC-8A	0.003	0.004	0.007	0.008	0.004	< 0.002	0.008	<0.002	0.004	NS	0.002	0.006	0.007	NS	0.008	0.006	NS	NS	0.002	NS	0.001	0.001
FPC-8B	0.007	0.008	0.008	0.008	0.009	0.004	0.005	0.005	0.007	NS	0.007	0.007	0.007	NS	0.008	0.007	NS	NS	INT	NS	0.008	0.007
FPC-9A	0.07	0.53	0.085	0.079	0.064	< 0.002	< 0.002	0.044	0.037	NS	0.026	0.034	0.036	NS	0.042	0.041	NS	NS	0.045	NS	0.058	0.048
FPC-9B	< 0.002	NS	NS	< 0.001	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-9C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-11A	NS	NS	NS	NS	0.002 J	< 0.002	< 0.004	< 0.002	0.001	NS	0.001	< 0.001	0.009	NS	0.008	0.007	NS	NS	NS	NS	0.004	0.003
FPC-11B	NS	NS	NS	NS	0.03 J	0.008	0.011	0.006	0.009	NS	0.008	0.01	0.01	NS	0.004	0.003	NS	NS	NS	NS	INT	0.004
FPC-11C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GZ-105	0.018	0.008	0.012	0.013	0.009	0.01	0.009	0.006	0.011	NS	0.01	0.013	0.015	NS	0.016	0.015	NS	NS	INT	NS	0.012	0.008
GZ-123	NS	NS	NS	NS	NS	NS	NS	NS	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	NS	NS	NS	NS
GZ-125	NS	NS	NS	NS	NS	NS	NS	NS	< 0.001	NS	< 0.001	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	NS	NS	NS	NS	NS
Water Supply Wells																						
R-3	NS	NA	NS	NS	NA	NA	NA	NS	NA	NA	NA	NA	NA	NS	NA	NA	NA	NS	NA	< 0.001	< 0.001	< 0.001
R-5	NS	NA	NS	NS	NA	NA	NA	NS	NA	NA	NA	NA	NA	NS	NS	NS	NA	NS	NS	NS	NA	NA
346BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NA	NS	NA	NS	< 0.001	< 0.001
339BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NA	NA	< 0.001	< 0.001	0.002
415BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NA	NS	< 0.001	< 0.001

Table Notes:

1. All data in milligrams per liter (mg/L), parts per million - Analyzed by Method 200.8
2. NHDES Ambient Groundwater Quality Standard (AGQS) for Arsenic is 0.01 mg/L. Exceedances are identified with GRAY shading
3. EPA Interim Cleanup Level (ICL) for Arsenic is 0.01 mg/L. Exceedances are identified with BOLD text
4. All data for Total metals, with the exception of the following overburden wells for Sept 2014 (MW-4, MW-9, MW-10, OP-2, OP-5, AE-1A, AE-2A, AE-3A, AE-4A, FPC-6A, FPC-7A, FPC-8A, FPC-9A and FPC-11A)

Abbreviations

NA = Not Analyzed, NS = Not Sampled, INT = Interval Sampled, < ## = reported concentration is less than the detection limit (##)

TABLE 10

Contaminants of Concern Analytical Data (November 2000 – September 2015)

Beryllium in Groundwater

Coakley Landfill Superfund Site

North Hampton and Greenland, New Hampshire

Well ID / Appox Date	Nov-00	Apr-01	Aug-01	Aug-02	Aug-03	Aug-04	Aug-05	Aug-06	Nov-07	Jan-08	Aug-08	Aug-09	Aug-10	Feb-11	Aug-11	Aug-12	Mar-13	Apr-13	Aug-13	Feb-14	Sep-14	Sep-15
Operating Unit 1 Wells																						
BP-4	< 0 005	< 0 002	NA	< 0 004	< 0 004	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
MW-2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-4	< 0 001	< 0 002	NA	< 0 004	< 0 004	< 0 002	< 0 002	< 0 002	0 003	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
MW-5D	< 0 01	0 002	NA	< 0 02	< 0 004	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
MW-5S	< 0 01	< 0 02	NA	< 0 02	< 0 02	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
MW-6	< 0 005	< 0 002	NA	< 0 004	< 0 004 J	< 0 002	**0.006**	< 0 002	< 0 001	NS	< 0 001	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
MW-8	< 0 005	< 0 002	NA	< 0 02	< 0 004	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
MW-9	< 0 001	< 0 002	NA	< 0 004	< 0 004	< 0 002	< 0 002 M	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
MW-10	< 0 005	< 0 002	NA	< 0 004	< 0 004 J	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
MW-11	< 0 005	< 0 002	NA	< 0 02	< 0 004	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
OP-2	< 0 001	< 0 002	NA	< 0 004	< 0 004	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
OP-5	< 0 005	< 0 002	NA	< 0 004	< 0 004	< 0 002	< 0 004	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
Operating Unit 2 Wells																						
AE-1A	< 0 005	< 0 002	NA	< 0 004	< 0 004 J	< 0 002	**0.006**	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
AE-1B	< 0 005	< 0 002	NA	< 0 004	< 0 004	< 0 002	< 0 002	< 0 002	NS	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
AE-2A	< 0 005	< 0 002	NA	< 0 008	< 0 004	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
AE-2B	< 0 01	< 0 002	NA	< 0 004	< 0 004	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
AE-3A	< 0 001	< 0 004	NA	< 0 004	< 0 004 J	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
AE-3B	< 0 001	< 0 004	NA	< 0 004	< 0 004 J	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
AE-4A	NS	NS	NS	NS	< 0 008 M	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
AE-4B	NS	NS	NS	NS	< 0 004	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
FPC-2A	NA	< 0 002	NA	NA	< 0 004	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	NS	NS	NS	NS
FPC-2B	NS	NS	NS	NS	< 0 004	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	NS	NS	NS	NS
FPC-4B	NS	NS	NS	NS	< 0 004	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
FPC-5A	< 0 001	< 0 002	NA	< 0 004	< 0 004	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	NS	NS
FPC-5B	< 0 001	< 0 002	NA	< 0 004	< 0 004 J	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
FPC-6A	< 0 005	< 0 002	NS	NS	< 0 004	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
FPC-6B	< 0 001	< 0 002	NA	< 0 004	< 0 004	< 0 002	< 0 1	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
FPC-7A	NS	NS	NS	NS	< 0 004 J	NA	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
FPC-7B	NS	NS	NS	NS	< 0 004 J	NA	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
FPC-8A	< 0 001	< 0 002	NA	< 0 004	< 0 004 J	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
FPC-8B	< 0 005	< 0 002	NA	< 0 008	< 0 004	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
FPC-9A	< 0 005	< 0 002	NA	< 0 004	< 0 004	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
FPC-9B	< 0 005	NS	NS	< 0 004	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-9C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-11A	NS	NS	NS	NS	< 0 004 J	< 0 002	**0.006**	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	NS	NS	< 0 001	< 0 001
FPC-11B	NS	NS	NS	NS	< 0 004 J	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	NS	NS	INT	<0 001
FPC-11C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GZ-105	< 0 005	< 0 002	NA	< 0 008	< 0 004	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
GZ-123	NS	NS	NS	NS	NS	NS	NS	NS	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	NS	NS	NS	NS
GZ-125	NS	NS	NS	NS	NS	NS	NS	NS	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	NS	NS	NS	NS
Water Supply Wells																						
R-3	NS	NA	NS	NS	NA	NA	NA	NS	NA	NA	NA	NA	NA	NS	NA	NA	NA	NS	NA	NA	NA	NA
R-5	NS	NA	NS	NS	NA	NA	NA	NS	NA	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NA	NA
346BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NA	NS	NA	NS	NA	NA
339BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NA	NA	NA	NA	NA
415BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NA	NS	NA	NA

Table Notes·

1 All data in milligrams per liter (mg/L), parts per million - Analyzed by Method 200 8
2 NHDES Ambient Groundwater Quality Standard (AGQS) for Beryllium is 0 004 mg/L Exceedances are identified with GRAY shading
3 EPA Interim Cleanup Level (ICL) for Beryllium is 0 004 mg/L Exceedances are identified with BOLD text.
4 All data for Total metals, with the exception of the following overburden wells for Sept 2014 (MW-4, MW-9, MW-10, OP-2, OP-5, AE-1A, AE-2A, AE-3A, AE-4A, FPC-6A, FPC-7A, FPC-8A, FPC-9A and FPC-11A)

Abbreviations

NA = Not Analyzed, NS = Not Sampled, INT = Interval Sampled, < ## = reported concentration is less than the detection limit (##)

TABLE 10

Contaminants of Concern Analytical Data (November 2000 – September 2015)
Chromium in Groundwater
Coakley Landfill Superfund Site
North Hampton and Greenland, New Hampshire

Well ID / Appox Date	Nov-00	Apr-01	Aug-01	Aug-02	Aug-03	Aug-04	Aug-05	Aug-06	Nov-07	Jan-08	Aug-08	Aug-09	Aug-10	Feb-11	Aug-11	Aug-12	Mar-13	Apr-13	Aug-13	Feb-14	Sep-14	Sep-15
Operating Unit 1 Wells																						
BP-4	< 0.005	0.002	NA	0.001	0.002	< 0.002	0.015	< 0.002	< 0.001	NS	< 0.001	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	NS	< 0.001	NS	< 0.001	< 0.001
MW-2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-4	0.042	< 0.002	NA	0.006	0.032	< 0.002	**0.6**	**0.15**	**0.14**	NS	**0.19**	0.002	< 0.001	NS	0.001	< 0.001	NS	NS	0.003	NS	< 0.001	< 0.001
MW-5D	< 0.005	< 0.02	NA	0.001	0.002	< 0.002	< 0.002	< 0.002	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	INT	NS	< 0.001	< 0.001
MW-5S	< 0.015	0.002	NA	0.002	0.004	< 0.002	< 0.002	< 0.002	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	INT	NS	< 0.001	< 0.001
MW-6	< 0.015	< 0.02	NA	< 0.002	< 0.002	< 0.002	< 0.004	< 0.002	< 0.001	NS	< 0.001	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	NS	< 0.001	NS	< 0.001	< 0.001
MW-8	< 0.015	< 0.02	NA	0.001	0.004	< 0.002	0.002	< 0.002	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	INT	NS	< 0.001	< 0.001
MW-9	< 0.015	< 0.02	NA	0.014	0.007	0.005	0.003	< 0.004	< 0.001	NS	< 0.001	< 0.001	0.001	NS	< 0.001	0.001	NS	NS	< 0.001	NS	< 0.001	< 0.001
MW-10	< 0.015	< 0.02	NA	0.001	0.005	< 0.002	< 0.002	< 0.002	< 0.001	NS	< 0.001	0.002	< 0.001	NS	< 0.001	< 0.001	NS	NS	< 0.001	NS	< 0.001	< 0.001
MW-11	< 0.015	< 0.02	NA	0.002	0.002	< 0.002	< 0.002	< 0.002	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	INT	NS	< 0.001	< 0.001
OP-2	< 0.015	0.003	NA	0.002	0.003	< 0.002	< 0.002	< 0.002	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	< 0.001	NS	< 0.001	< 0.001
OP-5	< 0.005	< 0.001	NA	< 0.001	< 0.001	< 0.002	0.007	< 0.002	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	< 0.001	NS	< 0.001	< 0.001
Operating Unit 2 Wells																						
AE-1A	< 0.005	0.001	NA	< 0.001	0.016	< 0.002	0.005	< 0.002	0.005	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	0.008	NS	< 0.001	< 0.001
AE-1B	< 0.015	< 0.02	NA	0.003	0.002	< 0.002	< 0.002	< 0.002	NS	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	< 0.001	NS	< 0.001	< 0.001
AE-2A	< 0.005	0.002	NA	< 0.002	0.001	< 0.002	< 0.002	< 0.002	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	< 0.001	NS	< 0.001	< 0.001
AE-2B	**0.13**	0.03	NA	0.013	0.003	0.002	< 0.01	< 0.002	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	< 0.001	NS	< 0.001	< 0.001
AE-3A	< 0.02	< 0.02	NA	0.017	0.006	< 0.002	< 0.002	< 0.004	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	0.003	NS	< 0.001	< 0.001
AE-3B	< 0.02	< 0.02	NA	0.005	0.009	< 0.002	< 0.004	< 0.002	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	INT	NS	< 0.001	< 0.001
AE-4A	NS	NS	NS	NS	0.0042	< 0.002	0.005	< 0.002	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	< 0.001	NS	< 0.001	< 0.001
AE-4B	NS	NS	NS	NS	**0.34**	< 0.002	0.004	< 0.004	0.003	NS	0.002	< 0.001	0.001	NS	< 0.001	< 0.001	NS	NS	< 0.001	NS	< 0.001	< 0.001
FPC-2A	NA	< 0.001	NA	NA	< 0.001	< 0.002	< 0.002	< 0.002	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	NS	NS	NS	NS
FPC-2B	NS	NS	NS	NS	< 0.001	0.002	< 0.002	< 0.002	< 0.001	NS	< 0.001	0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	NS	NS	NS	NS
FPC-4B	NS	NS	NS	NS	0.003	< 0.002	< 0.002	< 0.002	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	INT	NS	< 0.001	< 0.001
FPC-5A	< 0.02	0.001	NA	0.002	< 0.001	< 0.002	< 0.002	< 0.002	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	< 0.001	NS	NS	NS
FPC-5B	< 0.02	< 0.02	NA	< 0.001	0.005	< 0.002	< 0.002	< 0.002	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	INT	NS	< 0.001	< 0.001
FPC-6A	< 0.005	0.001	NS	NS	0.013	< 0.002	< 0.002	< 0.002	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	< 0.001	NS	< 0.001	< 0.001
FPC-6B	< 0.02	0.001	NA	< 0.001	0.001	0.008	0.008	< 0.004	0.003	NS	0.002	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	INT	NS	< 0.001	< 0.001
FPC-7A	NS	NS	NS	NS	0.003	< 0.004	< 0.002	< 0.002	0.002	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	< 0.001	NS	< 0.001	< 0.001
FPC-7B	NS	NS	NS	NS	0.002	**0.067**	< 0.002	< 0.004	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	INT	NS	< 0.001	< 0.001
FPC-8A	0.013	< 0.02	NA	0.023	0.008	< 0.002	0.01	<0.004	< 0.001	NS	< 0.001	0.006	0.006	NS	0.003	0.003	NS	NS	< 0.001	NS	< 0.001	< 0.001
FPC-8B	< 0.005	< 0.001	NA	< 0.002	< 0.001	< 0.002	0.002	< 0.002	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	INT	NS	< 0.001	< 0.001
FPC-9A	< 0.005	< 0.02	NA	< 0.001	0.001	< 0.002	< 0.002	< 0.002	0.002	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	< 0.001	NS	< 0.001	< 0.001
FPC-9B	< 0.015	NS	NS	0.002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-9C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-11A	NS	NS	NS	NS	0.006	< 0.002	0.024	< 0.004	0.002	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	NS	NS	< 0.001	< 0.001
FPC-11B	NS	NS	NS	NS	0.046	< 0.002	**0.14**	0.016	< 0.001	NS	0.002	< 0.001	< 0.001	NS	0.016	< 0.001	NS	NS	NS	NS	INT	<0.001
FPC-11C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GZ-105	< 0.005	< 0.02	NA	0.002	0.004	< 0.002	< 0.002	< 0.004	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	INT	NS	< 0.001	< 0.001
GZ-123	NS	NS	NS	NS	NS	NS	NS	NS	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	NS	NS	NS	NS
GZ-125	NS	NS	NS	NS	NS	NS	NS	NS	< 0.001	NS	< 0.001	< 0.001	< 0.001	NS	< 0.001	< 0.001	NS	NS	NS	NS	NS	NS
Water Supply Wells																						
R-3	NS	NA	NS	NS	NA	NA	NA	NS	NA	NA	NA	NA	NA	NS	NA	NA	NA	NS	NA	NA	NA	NA
R-5	NS	NA	NS	NS	NA	NA	NA	NS	NA	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NA	NA
346BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NA	NS	NA	NS	NA	NA
339BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NA	NA	NA	NA	NA
415BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NA	NS	NA	NA

Table Notes

1 All data in milligrams per liter (mg/L), parts per million - Analyzed by Method 200 8
2 NHDES Ambient Groundwater Quality Standard (AGQS) for Chromium is 0 1 mg/L Exceedances are identified with GRAY shading
3 EPA Interim Cleanup Level (ICL) for Chromium is 0 05 mg/L Exceedances are identified with BOLD text
4 All data for Total metals, with the exception of the following overburden wells for Sept 2014 (MW-4, MW-9, MW-10, OP-2, OP-5, AE-1A, AE-2A, AE-3A, AE-4A, FPC-6A, FPC-7A, FPC-8A, FPC-9A and FPC-11A)

Abbreviations

NA = Not Analyzed, NS = Not Sampled, INT = Interval Sampled, < ## = reported concentration is less than the detection limit (##)

TABLE 10

Contaminants of Concern Analytical Data (November 2000 – September 2015)

Lead in Groundwater

Coakley Landfill Superfund Site

North Hampton and Greenland, New Hampshire

Well ID / Appox Date	Nov-00	Apr-01	Aug-01	Aug-02	Aug-03	Aug-04	Aug-05	Aug-06	Nov-07	Jan-08	Aug-08	Aug-09	Aug-10	Feb-11	Aug-11	Aug-12	Mar-13	Apr-13	Aug-13	Feb-14	Sep-14	Sep-15
Operating Unit 1 Wells																						
BP-4	< 0 005	< 0 001	NA	< 0 001	< 0 001	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	NS	0 004	0 01	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
MW-2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-4	0 002	< 0 005	NA	< 0 001	< 0 002	< 0 002	**0.1**	**0.023**	**0.037**	NS	**0.043**	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	0 002	NS	< 0 001	< 0 001
MW-5D	< 0 005	< 0 002	NA	< 0 001	< 0 001	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
MW-5S	< 0 002	< 0 001	NA	< 0 01	< 0 001	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
MW-6	< 0 002	< 0 005	NA	< 0 002	< 0 001	< 0 002	< 0 004	< 0 002	< 0 001	NS	< 0 001	< 0 001	NS	0 003	0 001	0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
MW-8	< 0 002	< 0 01	NA	< 0 001	< 0 001	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
MW-9	< 0 002	< 0 01	NA	0 002	< 0 001	< 0 002	< 0 002	< 0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	0 001	NS	< 0 001	< 0 001
MW-10	< 0 002	< 0 01	NA	< 0 001	< 0 001	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
MW-11	< 0 002	< 0 01	NA	< 0 001	< 0 001	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
OP-2	< 0 002	< 0 001	NA	< 0 001	< 0 001	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	0 006	NS	NS	< 0 001	NS	< 0 001	< 0 001
OP-5	< 0 005	< 0 001	NA	< 0 001	< 0 001	< 0 002	0 003	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
Operating Unit 2 Wells																						
AE-1A	< 0 005	< 0 001	NA	< 0 001	0 001	< 0 002	< 0 004	< 0 002	0 015	NS	0 003	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	0 004	NS	< 0 001	< 0 001
AE-1B	< 0 002	< 0 005	NA	< 0 001	< 0 001	< 0 002	< 0 002	< 0 002	NS	NS	< 0 001	< 0 001	< 0 001	NS	0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	0 002
AE-2A	< 0 005	< 0 001	NA	< 0 001	< 0 001	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
AE-2B	**0.017**	< 0 005	NA	< 0 02	< 0 001	< 0 002	< 0 01	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
AE-3A	< 0 001	< 0 002	NA	0 007	< 0 001	< 0 002	< 0 002	< 0 004	< 0 001	NS	0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
AE-3B	< 0 001	< 0 002	NA	< 0 001	< 0 001	< 0 002	< 0 004	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
AE-4A	NS	NS	NS	NS	0 007	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
AE-4B	NS	NS	NS	NS	**0.05**	< 0 002	< 0 002	< 0 004	0 002	NS	0 002	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
FPC-2A	NA	< 0 001	NA	NA	< 0 001	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	NS	NS	NS	NS
FPC-2B	NS	NS	NS	NS	< 0 001	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	0 003	< 0 001	NS	< 0 001	< 0 001	NS	NS	NS	NS	NS	NS
FPC-4B	NS	NS	NS	NS	< 0 001	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
FPC-5A	< 0 001	< 0 001	NA	< 0 005	< 0 001	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	NS	NS	NS	NS
FPC-5B	< 0 001	< 0 01	NA	< 0 001	< 0 001	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
FPC-6A	< 0 005	< 0 001	NA	NS	< 0 002	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
FPC-6B	< 0 001	< 0 001	NA	< 0 001	< 0 001	< 0 002	< 0 01 J	< 0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
FPC-7A	NS	NS	NS	NS	< 0 001	< 0 004	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
FPC-7B	NS	NS	NS	NS	< 0 001	**0.018**	< 0 002	< 0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
FPC-8A	0 001	< 0 01	NA	0 003	< 0 001	< 0 002	< 0 002	< 0 004	< 0 001	NS	< 0 001	0 001	0 002	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
FPC-8B	< 0 005	< 0 001	NA	< 0 002	< 0 001	< 0 002	< 0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
FPC-9A	< 0 005	< 0 005	NA	< 0 001	< 0 001	< 0 002	< 0 002	< 0 002	0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
FPC-9B	< 0 002	NS	NS	< 0 002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-9C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-11A	NS	NS	NS	NS	< 0 001	< 0 002	< 0 004	< 0 004	0 002	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	NS	NS	< 0 001	< 0 001
FPC-11B	NS	NS	NS	NS	0 007	< 0 002	< 0 004	0 006	0 001	NS	< 0 001	< 0 001	< 0 001	NS	0 006	< 0 001	NS	NS	NS	NS	INT	<0 001
FPC-11C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GZ-105	< 0 005	< 0 01	NA	< 0 002	< 0 001	< 0 002	< 0 002	< 0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
GZ-123	NS	NS	NS	NS	NS	NS	NS	NS	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	NS	NS	NS	NS
GZ-125	NS	NS	NS	NS	NS	NS	NS	NS	< 0 001	NS	< 0 001	< 0 001	NS	0 002	0 004	< 0 001	NS	NS	NS	NS	NS	NS
Water Supply Wells																						
R-3	NS	NA	NS	NS	NA	NA	NA	NS	NA	NA	NA	NA	NA	NS	NA	NA	NA	NS	NA	NA	NA	NA
R-5	NS	NA	NS	NS	NA	NA	NA	NS	NA	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NA	NA
346BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NA	NS	NA	NS	NA	NA
339BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NA	NA	NA	NA	NA
415BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NA	NS	NA	NA

Table Notes

1 All data in milligrams per liter (mg/L), parts per million - Analyzed by Method 200 8

2 NHDES Ambient Groundwater Quality Standard (AGQS) for Lead is 0 015 mg/L Exceedances are identified with GRAY shading

3 EPA Interim Cleanup Level (ICL) for Lead is 0 015 mg/L Exceedances are identified with BOLD text

4 All data for Total metals, with the exception of the following overburden wells for Sept 2014 (MW-4, MW-9, MW-10, OP-2, OP-5, AE-1A, AE-2A, AE-3A, AE-4A, FPC-6A, FPC-7A, FPC-8A, FPC-9A and FPC-11A)

Abbreviations

NA = Not Analyzed, NS = Not Sampled, INT = Interval Sampled, < ## = reported concentration is less than the detection limit (##)

TABLE 10
Contaminants of Concern Analytical Data (November 2000 – September 2015)
Manganese in Groundwater
Coakley Landfill Superfund Site
North Hampton and Greenland, New Hampshire

Well ID / Appox Date	Nov-00	Apr-01	Aug-01	Aug-02	Aug-03	Aug-04	Aug-05	Aug-06	Nov-07	Jan-08	Aug-08	Aug-09	Aug-10	Feb-11	Aug-11	Aug-12	Mar-13	Apr-13	Aug-13	Feb-14	Sep-14	Sep-15
Operating Unit 1 Wells																						
BP-4	**1.4**	**1.7**	**1.5**	**1.3**	**1.4**	**1.3**	**1.7**	**1.3**	**1.2**	NS	**1.1**	0 094	NS	**1 2**	**1 1**	**1.2**	NS	NS	**0.98**	NS	0.69	0.49
MW-2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-4	**1.5**	**1.6**	**1.4**	**1.3**	**1.7**	**1.4**	**13**	**4.5**	**6.9**	NS	**6.8**	**1.2**	**1.1**	NS	**1.3**	**1.2**	NS	NS	**0.97**	NS	**1.2**	**0.9**
MW-5D	**0.92**	**1.2**	**0.92**	**0.86**	**0.88**	**0.87**	**0.89**	**0.89**	**0.86**	NS	0 78	0.77	0 73	NS	0.78	**0.98**	NS	NS	INT	NS	0.79	0.7
MW-5S	**3.4**	**3.1**	**3.2**	**3.6**	**4.1**	**3.8**	**3.6**	**3.7**	**4.4**	NS	**3.9**	**3.4**	**2.9**	NS	**2.9**	**3.8**	NS	NS	INT	NS	**3.3**	**2.4**
MW-6	0 08	0.6	**1.2**	**1.2**	**1.1**	0 7	**0.97**	0.54	0 74	NS	0 52	0.49	NS	**1.9**	**1.8**	**2.5**	NS	NS	**0.99**	NS	**2.7**	**2.2**
MW-8	**3.6**	**3.2**	**9.8**	**2.8**	**2.9**	**2.4**	**2.6**	**2.6**	**1.6**	NS	**1.9**	**2**	**2.1**	NS	**1.7**	**2.2**	NS	NS	INT	NS	**1.3**	**1.1**
MW-9	**1.1**	**0.88**	**1**	**1.1**	**1.3**	**1.1**	0.71	**2.4**	**1.2**	NS	**3.5**	**2.1**	**1.4**	NS	**0.88**	**1.4**	NS	NS	**1.3**	NS	**1.4**	**1.2**
MW-10	**1.9**	**0.91**	**3.9**	**4.4**	**8.1**	**3.9**	**3.5**	**3.2**	**2.8**	NS	0.76	**2.2**	**2.7**	NS	**1.6**	**3**	NS	NS	**1 7**	NS	**2.3**	**1.9**
MW-11	**0.95**	0 78	0.71	0 6	0 6	0.59	0 53	0 45	0 41	NS	0 44	0.39	0 34	NS	0.35	0.41	NS	NS	INT	NS	0.43	0 45
OP-2	0.45	0.5	0 29	0.33	0.36	0 38	0 39	0.47	0 62	NS	0.58	0 63	0 76	NS	**1**	**1**	NS	NS	**0.98**	NS	**1.2**	**1**
OP-5	**6.7**	**4.9**	**5.6**	**5.2**	**3.9**	**3.5**	**3.8**	**2.5**	**3.8**	NS	**2.3**	**1.8**	**2.2**	NS	**2.7**	**3.7**	NS	NS	**3.1**	NS	**4.3**	**3**
Operating Unit 2 Wells																						
AE-1A	0 16	0 21	0 31	0 35	0 38	0 28	0 25	0 44	0 13	NS	0 014	0 25	0 38	NS	0.39	0 5	NS	NS	0 47	NS	0.46	0 44
AE-1B	0 64	0 62	0.61	0 61	0.66	0.65	0.72	0.64	NS	NS	0 3	0.73	0 53	NS	0.56	0 59	NS	NS	0 49	NS	0.53	0 45
AE-2A	0 65	0 83	0 74	**0.95**	0 83	0.76	0.72	0 51	0 77	NS	0.61	0 65	0 7	NS	0.74	0 82	NS	NS	0.81	NS	0.81	0 77
AE-2B	**6.4**	**5.1**	**4.4**	**4.4**	**3.7**	**3**	**3.1**	**2.4**	**2.1**	NS	**1.7**	**1.7**	**1.3**	NS	**1.2**	**1.5**	NS	NS	**1.2**	NS	**1.1**	**0.86**
AE-3A	**1.2**	**0.89**	**0.9**	**0.95**	**1.3**	0 74	0.69	0.69	0 84	NS	**0.85**	**1.3**	0 76	NS	**0.9**	**1.2**	NS	NS	0.84	NS	**1**	**0.94**
AE-3B	**2.1**	**2**	**1.4**	**1.4**	**1.5**	**1.1**	**1.1**	**1**	0 57	NS	0.48	**1.4**	**0.95**	NS	**1.4**	**1.5**	NS	NS	INT	NS	**1.1**	0 74
AE-4A	NS	NS	NS	NS	**0.93**	0.35	0 38	0 31	0 29	NS	0 4	0 32	0 29	NS	0 47	0 42	NS	NS	0 38	NS	0 21	0 13
AE-4B	NS	NS	NS	NS	**2.2**	0.46	0 7	0 22	**1.1**	NS	0.6	0 26	0 19	NS	0 22	0 013	NS	NS	0 008	NS	0 018	<0 005
FPC-2A	0 74	**0.92**	0.68	0 67	0.6	0.59	0.57	0 67	0 8	NS	0.62	0 73	0 5	NS	0 55	0 63	NS	NS	NS	NS	NS	NS
FPC-2B	NS	NS	NS	NS	0 035	0 027	0 012	0 018	< 0 001	NS	0 023	0 084	0 021	NS	0 019	0 015	NS	NS	NS	NS	NS	NS
FPC-4B	NS	NS	NS	NS	0 046	0 003	0 079	< 0 003	0 031	NS	0 066	< 0 005	< 0 005	NS	< 0 005	< 0 005	NS	NS	INT	NS	0 006	<0 005
FPC-5A	0 05	0 055	0 17	0 16	0 074	0 18	0 15	0 14	0 11	NS	0 11	0 11	0 1	NS	0 11	0 14	NS	NS	0 11	NS	NS	NS
FPC-5B	0 2	0 19	0 055	0 07	0 17	0 073	0 076	0 088	0 095	NS	0 074	0 087	0 07	NS	0 056	0 059	NS	NS	INT	NS	0 057	0 047
FPC-6A	0 2	0 15	NS	NS	**7.2**	0.53	0.61	0 41	0 5	NS	0 36	**2.4**	**3.6**	NS	**2 1**	**3.9**	NS	NS	**2.3**	NS	**3.1**	**3.1**
FPC-6B	0 69	0 62	0.83	0 75	0.6	**5.9**	**6.2**	**2.1**	**3.1**	NS	**3**	0.34	0 4	NS	0.38	0 47	NS	NS	INT	NS	0 39	0 44
FPC-7A	NS	NS	NS	NS	0 014	NA	0 006	< 0 003	0 11	NS	0 034	< 0 005	< 0 005	NS	< 0 005	< 0 005	NS	NS	< 0 005	NS	< 0 005	< 0 005
FPC-7B	NS	NS	NS	NS	0 34	NA	0.37	0 2	0 076	NS	**1 8**	0 11	0 014	NS	0 015	0 009	NS	NS	INT	NS	< 0 005	< 0 005
FPC-8A	0 46	0 35	0 44	0 41	0 3	0 31	0 26	0 15	0 15	NS	0 062	0 19	0 21	NS	0 26	0 27	NS	NS	0 21	NS	0 17	0 15
FPC-8B	0 023	0 033	0 025	0 033	0 035	0 022	0 03	0 021	0 029	NS	0 028	0 025	0 032	NS	0 032	0 029	NS	NS	INT	NS	0 03	0 024
FPC-9A	0 32	0 35	0 3	0.34	0 42	0 04	0 03	0 27	0 41	NS	0 52	0 27	0 22	NS	0 26	0 31	NS	NS	0 24	NS	0 18	0 23
FPC-9B	0 08	NS	NS	0 053	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-9C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-11A	NS	NS	NS	NS	**1**	0.31	0 5	0 022	0 5	NS	0 036	0 01	0 4	NS	0 35	0.44	NS	NS	NS	NS	0 43	0.41
FPC-11B	NS	NS	NS	NS	**3**	**2.2**	**2.5**	**0.88**	**1.3**	NS	**1.4**	0.71	0 52	NS	0 21	0 58	NS	NS	NS	NS	INT	**1.9**
FPC-11C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GZ-105	0.67	0 67	0.64	0 7	0.68	0 57	0 63	0.48	0 39	NS	0.4	0 5	0 46	NS	0 47	0 52	NS	NS	INT	NS	0.34	0 23
GZ-123	NS	NS	NS	NS	NS	NS	NS	NS	**3.3**	NS	**2.3**	**3**	**2.2**	NS	**2.4**	**1.7**	NS	NS	NS	NS	NS	NS
GZ-125	NS	NS	NS	NS	NS	NS	NS	NS	0 16	NS	0 062	0 081	NS	0 29	0 23	0.31	NS	NS	NS	NS	NS	NS
Water Supply Wells																						
R-3	NS	NA	NS	NS	NA	NA	NA	NS	NA	NA	NA	NA	NA	NS	NA	NA	NA	NS	NA	0 14	0 1	0 16
R-5	NS	NA	NS	NS	NA	NA	NA	NS	NA	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS
346BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NA	NS	NA	NS	0 29	0.37
339BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NA	NA	0 25	0 32	0 31
415BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NA	NS	0 028	0 03

Table Notes
1 All data in milligrams per liter (mg/L), parts per million - Analyzed by Method 200 8
2 NHDES Ambient Groundwater Quality Standard (AGQS) for Manganese is 0 84 mg/L Exceedances are identified with GRAY shading
3 EPA Interim Cleanup Level (ICL) for Manganese is 0 3 mg/L Exceedances are identified with BOLD text
4 All data for Total metals, with the exception of the following overburden wells for Sept 2014 (MW-4, MW-9, MW-10, OP-2, OP-5, AE-1A, AE-2A, AE-3A, AE-4A, FPC-6A, FPC-7A, FPC-8A, FPC-9A and FPC-11A)

Abbreviations
NA = Not Analyzed, NS = Not Sampled, INT = Interval Sampled, < ## = reported concentration is less than the detection limit (##)

TABLE 10

Contaminants of Concern Analytical Data (November 2000 – September 2015)

Nickel in Groundwater

Coakley Landfill Superfund Site

North Hampton and Greenland, New Hampshire

Well ID / Appox. Date	Nov-00	Apr-01	Aug-01	Aug-02	Aug-03	Aug-04	Aug-05	Aug-06	Nov-07	Jan-08	Aug-08	Aug-09	Aug-10	Feb-11	Aug-11	Aug-12	Mar-13	Apr-13	Aug-13	Feb-14	Sep-14	Sep-15
Operating Unit 1 Wells																						
BP-4	0 014	0 011	NA	0 009	0 013	0 019	**0.15**	0 009	0 01	NS	0 013	0 008	NS	0 015	0 009	0 008	NS	NS	0 011	NS	0 008	0 005
MW-2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-4	0 039	0 021	NA	0 014	0 032	0 01	**0.41**	0 099	**0.13**	NS	**0.15**	0 009	0 008	NS	0 012	0 006	NS	NS	0 008	NS	0 007	0 009J
MW-5D	0 021	0 021 J	NA	0 017	0 019	0 016	0 017	< 0 002	0 011	NS	0 012	0 01	0 009	NS	0 009	0 009	NS	NS	INT	NS	0 009	0 006
MW-5S	0 027	0 021	NA	0 024	0 023	0 02	0 022	< 0 002	0 022	NS	0 019	0 014	0 011	NS	0 01	0 01	NS	NS	INT	NS	0 013	0 008
MW-6	< 0 002	0 003	NA	< 0 005	0 003	< 0 002	< 0 004	< 0 002	0 003	NS	0 001	0 002	NS	0 002	0 002	0 004	NS	NS	0 002	NS	0 003	0 003
MW-8	0 018	0 018	NA	0 014	0 018	0 019	0 02	0 018	0 019	NS	0 026	0 022	0 017	NS	0 019	0 02	NS	NS	INT	NS	0 021	0 016
MW-9	0 012	0 013	NA	0 028	0 018	0 01	0 014	0 005	0 016	NS	0 007	0 004	0 005	NS	0 005	0 014	NS	NS	0 008	NS	0 009	0 007
MW-10	0 01	0 003	NA	0 012	0 029	0 012	0 014	< 0 002	0 008	NS	0 003	0 005	0 006	NS	0 004	0 005	NS	NS	0 002	NS	0 003	0 004
MW-11	0 019	0 022	NA	0 015	0 014	0 01	0 018	0 008	0 012	NS	0 018	0 008	0 006	NS	0 005	0 005	NS	NS	INT	NS	0 007	0 006
OP-2	0 015	0 012	NA	0 01	0 01	0 008	0 011	0 007	0 007	NS	0 006	0 007	0 009	NS	0 007	0 034	NS	NS	0 006	NS	0 01	0 01
OP-5	0 039	0 022	NA	0 031	0 027	0 028	0 031	< 0 002	0 033	NS	0 03	0 025	0 027	NS	0 024	0 026	NS	NS	0 017	NS	0 015	0 014
Operating Unit 2 Wells																						
AE-1A	< 0 005	< 0 001	NA	< 0 001	0 011	< 0 002	0 005	< 0 002	0 005	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	0 013	NS	< 0 001	< 0 001
AE-1B	0 003	0 001	NA	0 002	0 001	< 0 002	0 002	< 0 002	NS	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	0 001
AE-2A	0 025	0 026	NA	0 03	0 024	0 019	0 018	0 012	0 012	NS	0 012	0 01	0 009	NS	0 008	0 008	NS	NS	0 017	NS	0 007	0 007
AE-2B	0 08	0 028	NA	0 02	0 014	0 016	0 03	0 01	0 013	NS	0 01	0 01	0 009	NS	0 007	0 008	NS	NS	0 008	NS	0 007	0 006
AE-3A	0 016	0 015	NA	0 025	0 015	0 011	0 013	0 008	0 008	NS	0 009	0 008	0 007	NS	0 006	0 007	NS	NS	0 006	NS	0 007	0 006
AE-3B	0 02	0 018	NA	0 014	0 016	0 011	0 014	0 008	0 008	NS	0 009	0 007	0 006	NS	0 005	0 006	NS	NS	INT	NS	0 008	0 006
AE-4A	NS	NS	NS	NS	0 04	< 0 002	0 003	< 0 002	0 007	NS	0 002	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
AE-4B	NS	NS	NS	NS	0 084	0 004	0 003	< 0 004	0 003	NS	0 002	0 001	0 001	NS	< 0 001	< 0 001	NS	NS	< 0 001	NS	< 0 001	< 0 001
FPC-2A	< 0 005	< 0 001	NA	NA	< 0 001	< 0 002	0 002	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	NS	NS	NS	NS
FPC-2B	NS	NS	NS	NS	< 0 001	< 0 002	0 002	< 0 002	< 0 001	NS	< 0 001	0 002	< 0 001	NS	< 0 001	< 0 001	NS	NS	NS	NS	NS	NS
FPC-4B	NS	NS	NS	NS	0 002	< 0 002	0 002	< 0 002	0 001	NS	0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
FPC-5A	0 01	0 004	NA	0 013	0 006	0 011	0 011	0 008	0 004	NS	0 01	0 007	0 007	NS	0 006	0 006	NS	NS	0 006	NS	NS	NS
FPC-5B	0 02	0 017	NA	0 005	0 014	0 005	0 008	0 005	0 008	NS	0 006	0 007	0 006	NS	0 005	0 005	NS	NS	INT	NS	0 006	0 005
FPC-6A	0 008	0 005	NA	NS	0 027	0 004	0 005	< 0 002	0 005	NS	0 002	0 005	0 006	NS	0 005	0 006	NS	NS	0 005	NS	0 006	0 006
FPC-6B	< 0 01	0 004	NA	0 007	0 006	0 017	0 019	< 0 004	0 013	NS	0 008	0 003	0 004	NS	0 004	0 004	NS	NS	INT	NS	0 003	0 003
FPC-7A	NS	NS	NS	NS	0 006	NA	0 006	0 003	0 013	NS	0 007	0 004	0 004	NS	0 003	0 004	NS	NS	0 003	NS	0 003	0 003
FPC-7B	NS	NS	NS	NS	0 003	NA	0 013	< 0 004	0 002	NS	0 018	0 002	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
FPC-8A	< 0 01	0 004	NA	0 012	0 005	< 0 002	0 007	< 0 004	0 002	NS	< 0 001	0 004	0 005	NS	0 003	0 003	NS	NS	0 001	NS	0 002	<0 001
FPC-8B	< 0 005	< 0 001	NA	< 0 002	< 0 001	< 0 002	0 003	< 0 002	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 001	NS	NS	INT	NS	< 0 001	< 0 001
FPC-9A	0 01	0 012	NA	0 009	0 008	< 0 002	0 002	0 004	0 003	NS	0 004	0 003	0 003	NS	0 003	0 003	NS	NS	0 004	NS	0 006	0 003
FPC-9B	< 0 002	NS	NS	< 0 005	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-9C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-11A	NS	NS	NS	NS	0 016	0 01	0 028	0 003	0 009	NS	0 004	0 003	< 0 001	NS	0 001	< 0 001	NS	NS	NS	NS	0 003	<0 001
FPC-11B	NS	NS	NS	NS	0 05	0 02	**0.15**	< 0 002	0 013	NS	0 012	0 003	< 0 001	NS	0 03	0 002	NS	NS	NS	NS	INT	0 005
FPC-11C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GZ-105	0 009	0 014	NA	0 01	0 013	0 01	0 015	0 007	0 008	NS	0 009	0 009	0 009	NS	0 008	0 008	NS	NS	INT	NS	0 006	0 004
GZ-123	NS	NS	NS	NS	NS	NS	NS	NS	0 005	NS	0 004	0 005	0 004	NS	0 003	0 002	NS	NS	NS	NS	NS	NS
GZ-125	NS	NS	NS	NS	NS	NS	NS	NS	< 0 001	NS	< 0 001	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	NS	NS	NS	NS	NS
Water Supply Wells																						
R-3	NS	NA	NS	NS	NA	NA	NA	NS	NA	NA	NA	NA	NA	NS	NA	NA	NA	NS	NA	NA	NA	NA
R-5	NS	NA	NS	NS	NA	NA	NA	NS	NA	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NA	NA
346BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NA	NS	NA	NS	NA	NA
339BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NA	NA	NA	NA	NA
415BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NA	NS	NA	NA

Table Notes

1 All data in milligrams per liter (mg/L), parts per million - Analyzed by Method 200 8
2 NHDES Ambient Groundwater Quality Standard (AGQS) for Nickel is 0 1 mg/L Exceedances are identified with GRAY shading
3 EPA Interim Cleanup Level (ICL) for Nickel is 0 1 mg/L Exceedances are identified with BOLD text
4 All data for Total metals, with the exception of the following overburden wells for Sept 2014 (MW-4, MW-9, MW-10, OP-2, OP-5, AE-1A, AE-2A, AE-3A, AE-4A, FPC-6A, FPC-7A, FPC-8A, FPC-9A and FPC-11A)

Abbreviations.

NA = Not Analyzed, NS = Not Sampled, INT = Interval Sampled, < ## = reported concentration is less than the detection limit (##)

TABLE 10
Contaminants of Concern Analytical Data (November 2000 – September 2015)
Vanadium in Groundwater
Coakley Landfill Superfund Site
North Hampton and Greenland, New Hampshire

Well ID / Appox Date	Nov-00	Apr-01	Aug-01	Aug-02	Aug-03	Aug-04	Aug-05	Aug-06	Nov-07	Jan-08	Aug-08	Aug-09	Aug-10	Feb-11	Aug-11	Aug-12	Mar-13	Apr-13	Aug-13	Feb-14	Sep-14	Sep-15
Operating Unit 1 Wells																						
BP-4	0 013	0 004	NA	< 0 002	0 006	< 0 002	< 0 002	< 0 004	< 0 001	NS	< 0 001	< 0 001	NS	< 0 001	< 0 001	< 0 005	NS	NS	< 0 005	NS	< 0 005	< 0 005
MW-2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-4	0 007	0 004	NA	0 003	0 008	< 0 002	**0.35**	0 063	0 082	NS	0 091	0 002	< 0 001	NS	< 0 001	< 0 005	NS	NS	< 0 005	NS	< 0 005	< 0 005
MW-5D	0 004	0 002	NA	< 0 002	0 004	< 0 002	0 003	< 0 004	0 001	NS	0 001	0 001	< 0 001	NS	< 0 001	< 0 005	NS	NS	INT	NS	< 0 005	< 0 005
MW-5S	0 001	0 004	NA	< 0 04	< 0 002	0 003	0 004	< 0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 005	NS	NS	INT	NS	< 0 005	< 0 005
MW-6	< 0 001	< 0 001	NA	< 0 001	< 0 002	< 0 002	< 0 002	< 0 004	< 0 001	NS	< 0 001	< 0 001	NS	< 0 001	< 0 001	< 0 005	NS	NS	< 0 005	NS	< 0 005	< 0 005
MW-8	0 001	0 001	NA	< 0 002	< 0 002	< 0 002	0 003	< 0 004	0 001	NS	0 002	0 002	0 001	NS	0 002	< 0 005	NS	NS	INT	NS	< 0 005	< 0 005
MW-9	0 004	0 003	NA	0 009	0 004	0 003	0 007	< 0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 005	NS	NS	< 0 005	NS	< 0 005	< 0 005
MW-10	< 0 001	0 001	NA	0 002	< 0 002	0 003	0 004	< 0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 005	NS	NS	< 0 005	NS	< 0 005	< 0 005
MW-11	0 002	0 002	NA	0 002	0 006	0 003	0 003	< 0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 005	NS	NS	INT	NS	< 0 005	< 0 005
OP-2	0 003	0 005	NA	0 003	0 008	< 0 002	0 004	< 0 004	< 0 001	NS	0 001	0 001	< 0 001	NS	< 0 001	< 0 005	NS	NS	< 0 005	NS	< 0 005	< 0 005
OP-5	0 009	0 002	NA	< 0 002	0 003	< 0 002	0 002	< 0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 005	NS	NS	< 0 005	NS	< 0 005	< 0 005
Operating Unit 2 Wells																						
AE-1A	< 0 002	< 0 001	NA	< 0 002	0 005	< 0 002	< 0 002	< 0 004	0 003	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 005	NS	NS	0 01	NS	< 0 005	< 0 005
AE-1B	< 0 001	< 0 001	NA	< 0 002	< 0 002	< 0 002	< 0 002	< 0 004	NS	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 005	NS	NS	< 0 005	NS	< 0 005	< 0 005
AE-2A	0 009	0 004	NA	< 0 004	0 006	0 002	0 004	< 0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 005	NS	NS	< 0 005	NS	< 0 005	< 0 005
AE-2B	0 076	0 007	NA	0 006	0 009	0 005	< 0 01	< 0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 005	NS	NS	< 0 005	NS	< 0 005	< 0 005
AE-3A	< 0 002	0 002	NA	< 0 002	0 005	< 0 002	< 0 002	< 0 004	< 0 001	NS	0 001	0 001	< 0 001	NS	< 0 001	< 0 005	NS	NS	< 0 005	NS	< 0 005	< 0 005
AE-3B	< 0 002	0 002	NA	< 0 002	0 005	0 004	< 0 002	< 0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 005	NS	NS	INT	NS	< 0 005	< 0 005
AE-4A	NS	NS	NS	NS	0 039	< 0 002	< 0 002	< 0 002	< 0 001	NS	0 002	< 0 001	< 0 001	NS	< 0 001	< 0 005	NS	NS	< 0 005	NS	< 0 005	< 0 005
AE-4B	NS	NS	NS	NS	0 12	< 0 002	< 0 002	< 0 004	0 003	NS	0 002	< 0 001	< 0 001	NS	< 0 001	< 0 005	NS	NS	< 0 005	NS	< 0 005	< 0 005
FPC-2A	NA	0 001	NA	NA	< 0 001	< 0 002	< 0 002	< 0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 005	NS	NS	NS	NS	NS	NS
FPC-2B	NS	NS	NS	NS	< 0 002	< 0 002	< 0 002	< 0 004	< 0 001	NS	< 0 001	0 001	< 0 001	NS	< 0 001	< 0 005	NS	NS	NS	NS	NS	NS
FPC-4B	NS	NS	NS	NS	< 0 002	< 0 002	< 0 002	< 0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 005	NS	NS	INT	NS	< 0 005	< 0 005
FPC-5A	< 0 002	0 003	NA	< 0 01	0 002	0 004	< 0 002	< 0 004	< 0 001	NS	0 001	< 0 001	< 0 001	NS	< 0 001	< 0 005	NS	NS	< 0 005	NS	NS	NS
FPC-5B	< 0 002	0 003	NA	< 0 002	< 0 002	< 0 002	0 003	< 0 004	0 001	NS	0 001	0 001	< 0 001	NS	< 0 001	< 0 005	NS	NS	INT	NS	< 0 005	< 0 005
FPC-6A	< 0 002	0 001	NA	NS	0 006	< 0 002	0 003	< 0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 005	NS	NS	< 0 005	NS	< 0 005	< 0 005
FPC-6B	< 0 001	0 003	NA	< 0 002	0 004	< 0 002	< 0 004	< 0 004	0 003	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 005	NS	NS	INT	NS	< 0 005	< 0 005
FPC-7A	NS	NS	NS	NS	< 0 002	NA	< 0 002	< 0 004	0 002	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 005	NS	NS	< 0 005	NS	< 0 005	< 0 005
FPC-7B	NS	NS	NS	NS	< 0 002	NA	0 002	< 0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 005	NS	NS	INT	NS	< 0 005	< 0 005
FPC-8A	0 009	0 006	NA	0 016	0 005	< 0 002	0 008	< 0 004	0 001	NS	< 0 001	0 007	0 006	NS	0 002	< 0 005	NS	NS	< 0 005	NS	< 0 005	< 0 005
FPC-8B	< 0 002	< 0 001	NA	< 0 004	< 0 002	< 0 002	< 0 002	< 0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 005	NS	NS	INT	NS	< 0 005	< 0 005
FPC-9A	0 006	0 001	NA	< 0 002	0 004	< 0 002	< 0 002	< 0 004	< 0 001	NS	< 0 001	< 0 001	< 0 001	NS	< 0 001	< 0 005	NS	NS	< 0 005	NS	< 0 005	< 0 005
FPC-9B	< 0 001	NS	NS	< 0 001	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-9C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-11A	NS	NS	NS	NS	0 004	< 0 002	0 008	< 0 004	0 003	NS	0 001	< 0 001	< 0 001	NS	0 002	< 0 005	NS	NS	NS	NS	< 0 005	< 0 005
FPC-11B	NS	NS	NS	NS	0 019	< 0 002	0 048	< 0 004	0 001	NS	< 0 001	< 0 001	< 0 001	NS	0 012	< 0 005	NS	NS	NS	NS	INT	0 007 J+
FPC-11C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GZ-105	0 005	0 002	NA	< 0 004	< 0 002	< 0 002	< 0 002	< 0 004	< 0 001	NS	0 001	< 0 001	< 0 001	NS	< 0 001	< 0 005	NS	NS	INT	NS	< 0 005	< 0 005
GZ-123	NS	NS	NS	NS	NS	NS	NS	NS	< 0 001	NS	0 001	0 001	0 001	NS	< 0 001	< 0 005	NS	NS	NS	NS	NS	NS
GZ-125	NS	NS	NS	NS	NS	NS	NS	NS	< 0 001	NS	0 001	0 001	NS	< 0 001	< 0 001	< 0 005	NS	NS	NS	NS	NS	NS
Water Supply Wells																						
R-3	NS	NA	NS	NS	NA	NA	NA	NS	NS	NA	NA	NA	NA	NS	NA	NA	NA	NS	NA	NA	NA	NA
R-5	NS	NA	NS	NS	NA	NA	NA	NS	NS	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NA	NA
346BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NA	NS	NA	NS	NA	NA
339BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NA	NA	NA	NA	NA
415BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NA	NS	NA	NA

Table Notes

1 All data in milligrams per liter (mg/L), parts per million - Analyzed by Method 200 8
2 An NHDES Ambient Groundwater Quality Standard (AGQS) for Vanadium has not been established
3 EPA Interim Cleanup Level (ICL) for Vanadium is 0 26 mg/L Exceedances are identified with BOLD text
4 All data for Total metals, with the exception of the following overburden wells for Sept 2014 (MW-4, MW-9, MW-10, OP-2, OP-5, AE-1A, AE-2A, AE-3A, AE-4A, FPC-6A, FPC-7A, FPC-8A, FPC-9A and FPC-11A)

Abbreviations

NA = Not Analyzed, NS = Not Sampled, INT = Interval Sampled, < ## = reported concentration is less than the detection limit (##)

TABLE 10

Contaminants of Concern Analytical Data (November 2000 – September 2015)

Benzene in Groundwater

Coakley Landfill Superfund Site

North Hampton and Greenland, New Hampshire

Well ID / Appox Date	Nov-00	Apr-01	Aug-01	Aug-02	Aug-03	Aug-04	Aug-05	Aug-06	Nov-07	Jan-08	Aug-08	Aug-09	Aug-10	Feb-11	Aug-11	Aug-12	Mar-13	Apr-13	Aug-13	Feb-14	Sep-14	Sep-15
Operating Unit 1 Wells																						
BP-4	2	3	2	2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-4	< 2	< 2	1	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-5D	**6**	< 2	3	2	< 2	2	< 2	2	3	NS	2	2	2	NS	2	2	NS	NS	INT	NS	1	2
MW-5S	**8**	**7**	**6**	**6**	2	< 2	< 2	< 2	5	NS	4	3	4	NS	4	3	NS	NS	INT	NS	2	2
MW-6	< 2	< 2	1	< 2	< 2	< 2	< 2	< 2	< 1	NS	< 1	< 1	NA	< 1	< 1	< 1	NS	NS	< 1	NS	< 1	<1
MW-8	**8**	5	5	3	4	< 2	3	5	3	NS	4	4	**6**	NS	**6**	**6**	NS	NS	INT	NS	3	3
MW-9	5	3	**7**	**10**	5	< 2	5	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-10	< 2	< 2	2	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-11	**19**	**22**	**26**	**22**	**14**	**7**	**8**	5	**8**	NS	5	4	3	NS	2	2	NS	NS	INT	NS	2	2
OP-2	5	3	1	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
OP-5	< 2	< 2	1	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
Operating Unit 2 Wells																						
AE-1A	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
AE-1B	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NS	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
AE-2A	3	3	2	3	< 2	< 2	< 2	< 2	2	NS	< 1	< 1	1	NS	1	< 1	NS	NS	< 1	NS	< 1	< 1
AE-2B	**10**	4	**6**	**8**	5	3	4	3	5	NS	5	2	2	NS	1	2	NS	NS	2	NS	2	1
AE-3A	4	2	3	3	2	< 2	< 2	< 2	2	NS	2	2	2	NS	1	1	NS	NS	1	NS	2	2
AE-3B	4	4	3	3	2	< 2	< 2	< 2	< 1	NS	< 1	1	1	NS	2	1	NS	NS	INT	NS	< 1	< 1
AE-4A	NS	NS	NS	NS	< 2	< 2	< 2	< 2	< 1	NS	< 1	< 1	< 1	NS	< 1	< 1	NS	NS	< 1	NS	< 1	< 1
AE-4B	NS	NS	NS	NS	< 2	< 2	< 2	< 2	< 1	NS	< 1	< 1	< 1	NS	< 1	< 1	NS	NS	< 1	NS	< 1	< 1
FPC-2A	NA	NA	NA	NA	< 2	< 2	< 2	< 2	< 1	NS	< 1	< 1	< 1	NS	< 1	< 1	NS	NS	NS	NS	NS	NS
FPC-2B	NS	NS	NS	NS	< 2	< 2	< 2	< 2	< 1	NS	< 1	< 1	< 1	NS	< 1	< 1	NS	NS	NS	NS	NS	NS
FPC-4B	NS	NS	NS	NS	< 2	< 2	NA	< 2	< 1	NS	< 1	< 1	< 1	NS	< 1	< 1	NS	NS	INT	NS	< 1	NA
FPC-5A	< 2	< 2	5	5	< 2	3	2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NS	NS
FPC-5B	**6**	5	< 2	< 2	4	< 2	5	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	INT	NS	NA	NA
FPC-6A	< 2	< 2	NS	NS	3	< 2	< 2	< 2	2	NS	< 1	< 1	2	NS	1	1	NS	NS	< 1	NS	1	1
FPC-6B	4	2	4	4	3	3	3	< 2	2	NS	1	< 1	2	NS	1	2	NS	NS	INT	NS	< 1	< 1
FPC-7A	NS	NS	NS	NS	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
FPC-7B	NS	NS	NS	NS	< 2	< 2	< 2	NA	< 1	NS	NA	NA	NA	NS	NA	NA	NS	NS	INT	NS	NA	NA
FPC-8A	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 1	NS	< 1	< 1	< 1	NS	< 1	< 1	NS	NS	< 1	NS	< 1	< 1
FPC-8B	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NS	< 1	< 1	< 1	NS	< 1	< 1	NS	NS	INT	NS	< 1	< 1
FPC-9A	4	4	3	3	3	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
FPC-9B	< 2	NS	NS	< 2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-9C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-11A	NS	NS	NS	NS	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NS	NS	NA	NA
FPC-11B	NS	NS	NS	NS	< 2	< 2	< 2	< 2	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NS	NS	INT	NA
FPC-11C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GZ-105	**10**	**10**	**10**	**11**	**9**	**7**	**7**	**6**	**6**	NS	**6**	**6**	**7**	NS	**6**	**6**	NS	NS	INT	NS	4	3
GZ-123	NS	NS	NS	NS	NS	NS	NS	NS	< 1	NS	< 1	< 1	< 1	NS	< 1	< 1	NS	NS	NS	NS	NS	NS
GZ-125	NS	NS	NS	NS	NS	NS	NS	NS	< 1	NS	< 1	< 1	NS	< 1	< 1	< 1	NS	NS	NS	NS	NS	NS
Water Supply Wells																						
R-3	NS	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	NS	< 0 5	< 0 5	< 0 5	< 0 5	NS	< 0 5	< 0 5	< 0 5	NS	< 0 5	< 0 5	< 0 5	< 0 5
R-5	NS	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	NS	< 0 5	< 0 5	< 0 5	< 0 5	NS	NS	NS	NS	NS	NS	NS	NS	NS
346BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	< 0 5	< 0 5	NS	< 0 5	NS	< 0 5	< 0 5
339BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5
415BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	< 0 5	< 0 5	NS	< 0 5	< 0 5

Table Notes

1 All data in micrograms per liter (ug/L), parts per billion - Analyzed by Method 8260B (monitoring well) or Method 524 (water supply wells)
2 NHDES Ambient Groundwater Quality Standard (AGQS) for Benzene is 5 ug/L Exceedances are identified with GRAY shading
3 EPA Interim Cleanup Level (ICL) for Benzene is 5 ug/L Exceedances are identified with BOLD text

Abbreviations.

NA = Not Analyzed, NS = Not Sampled, INT = Interval Sampled, < ## = reported concentration is less than the detection limit (##)

TABLE 10

Contaminants of Concern Analytical Data (November 2000 – September 2015)

Chlorobenzene in Groundwater

Coakley Landfill Superfund Site

North Hampton and Greenland, New Hampshire

Well ID / Appox Date	Nov-00	Apr-01	Aug-01	Aug-02	Aug-03	Aug-04	Aug-05	Aug-06	Nov-07	Jan-08	Aug-08	Aug-09	Aug-10	Feb-11	Aug-11	Aug-12	Mar-13	Apr-13	Aug-13	Feb-14	Sep-14	Sep-15
Operating Unit 1 Wells																						
BP-4	< 2	6	5	5	3	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-4	5	11	7	5	7	5	4	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-5D	8	3	4	4	4	4	3	4	5	NS	4	3	4	NS	3	3	NS	NS	INT	NS	< 2	< 2
MW-5S	7	7	6	5	3	< 2	< 2	< 2	3	NS	2	2	3	NS	2	< 2	NS	NS	INT	NS	< 2	< 2
MW-6	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	NA	< 2	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
MW-8	3	3	3	< 2	2	2	2	4	3	NS	4	3	7	NS	23	9	NS	NS	INT	NS	2	3
MW-9	62	66	**122**	**160**	80	25	79	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-10	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-11	6	5	4	4	4	3	3	2	3	NS	2	2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	< 2
OP-2	9	6	4	4	3	2	2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
OP-5	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
Operating Unit 2 Wells																						
AE-1A	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
AE-1B	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NS	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
AE-2A	6	8	5	8	4	3	3	< 2	5	NS	2	2	3	NS	3	< 2	NS	NS	< 2	NS	2	<2
AE-2B	8	4	6	8	5	3	3	3	5	NS	5	3	3	NS	2	< 2	NS	NS	< 2	NS	< 2	< 2
AE-3A	12	7	11	9	8	6	5	6	9	NS	8	7	6	NS	6	6	NS	NS	5	NS	6	7
AE-3B	10	11	9	8	6	4	2	< 2	< 2	NS	< 2	5	5	NS	7	5	NS	NS	INT	NS	3	3
AE-4A	NS	NS	NS	NS	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
AE-4B	NS	NS	NS	NS	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
FPC-2A	NA	NA	NA	NA	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	NS	NS	NS	NS
FPC-2B	NS	NS	NS	NS	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	NS	NS	NS	NS
FPC-4B	NS	NS	NS	NS	< 2	< 2	NA	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	NA
FPC-5A	< 2	< 2	16	13	< 2	9	6	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NS	NS
FPC-5B	20	17	< 2	< 2	11	< 2	76	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	INT	NS	NA	NA
FPC-6A	< 2	< 2	< 2	NS	9	4	3	3	5	NS	< 2	3	5	NS	3	4	NS	NS	3	NS	3	4
FPC-6B	7	4	9	8	6	7	7	3	7	NS	4	3	5	NS	4	4	NS	NS	INT	NS	2	2
FPC-7A	NS	NS	NS	NS	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
FPC-7B	NS	NS	NS	NS	< 2	< 2	< 2	NA	< 2	NS	NA	NA	NA	NS	NA	NA	NS	NS	INT	NS	NA	NA
FPC-8A	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
FPC-8B	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	< 2
FPC-9A	11	10	8	9	8	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
FPC-9B	< 2	NS	NS	< 2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-9C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-11A	NS	NS	NS	NS	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NS	NS	NA	NA
FPC-11B	NS	NS	NS	NS	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NS	NS	INT	NA
FPC-11C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GZ-105	9	9	10	13	12	9	10	9	10	NS	10	11	11	NS	11	9	NS	NS	INT	NS	6	5
GZ-123	NS	NS	NS	NS	NS	NS	NS	NS	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	NS	NS	NS	NS
GZ-125	NS	NS	NS	NS	NS	NS	NS	NS	< 2	NS	< 2	< 2	NS	< 2	< 2	< 2	NS	NS	NS	NS	NS	NS
Water Supply Wells																						
R-3	NS	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	NS	< 0 5	< 0 5	< 0 5	< 0 5	NS	< 0 5	< 0 5	< 0 5	NS	< 0 5	< 0 5	< 0 5	< 0 5
R-5	NS	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	NS	< 0 5	< 0 5	< 0 5	< 0 5	NS	NS	NS	NS	NS	NS	NS	NS	NS
346BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	< 0 5	< 0 5	NS	< 0 5	NS	NS	<0 5
339BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5
415BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	< 0 5	< 0 5	NS	NS	<0 5

Table Notes

1 All data in micrograms per liter (ug/L), parts per billion - Analyzed by Method 8260B (monitoring well) or Method 524 (water supply wells)

2 NHDES Ambient Groundwater Quality Standard (AGQS) for Chlorobenzene is 100 ug/L Exceedances are identified with GRAY shading

3 EPA Interim Cleanup Level (ICL) for Chlorobenzene is 100 ug/L Exceedances are identified with BOLD text

Abbreviations

NA = Not Analyzed, NS = Not Sampled, INT = Interval Sampled, < ## = reported concentration is less than the detection limit (##)

TABLE 10

Contaminants of Concern Analytical Data (November 2000 – September 2015)
Trans-1,2-Dichloroethene in Groundwater
Coakley Landfill Superfund Site
North Hampton and Greenland, New Hampshire

Well ID / Appox Date	Nov-00	Apr-01	Aug-01	Aug-02	Aug-03	Aug-04	Aug-05	Aug-06	Nov-07	Jan-08	Aug-08	Aug-09	Aug-10	Feb-11	Aug-11	Aug-12	Mar-13	Apr-13	Aug-13	Feb-14	Sep-14	Sep-15
Operating Unit 1 Wells																						
BP-4	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-4	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-5D	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	< 2
MW-5S	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	< 2
MW-6	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	NA	< 2	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
MW-8	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	< 2
MW-9	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-10	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-11	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	< 2
OP-2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
OP-5	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
Operating Unit 2 Wells																						
AE-1A	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
AE-1B	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NS	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
AE-2A	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
AE-2B	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
AE-3A	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
AE-3B	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	< 2
AE-4A	NS	NS	NS	NS	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
AE-4B	NS	NS	NS	NS	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
FPC-2A	NA	NA	NA	NA	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	NS	NS	NS	NS
FPC-2B	NS	NS	NS	NS	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	NS	NS	NS	NS
FPC-4B	NS	NS	NS	NS	< 2	< 2	NA	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	NA
FPC-5A	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NS	NS
FPC-5B	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	INT	NS	NA	NA
FPC-6A	< 2	< 2	< 2	NS	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
FPC-6B	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	< 2
FPC-7A	NS	NS	NS	NS	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
FPC-7B	NS	NS	NS	NS	< 2	< 2	< 2	NA	< 2	NS	NA	NA	NA	NS	NA	NA	NS	NS	INT	NS	NA	NA
FPC-8A	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
FPC-8B	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	< 2
FPC-9A	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
FPC-9B	< 2	NS	NS	< 2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-9C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-11A	NS	NS	NS	NS	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NS	NS	NA	NA
FPC-11B	NS	NS	NS	NS	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NS	NS	INT	NA
FPC-11C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GZ-105	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	< 2
GZ-123	NS	NS	NS	NS	NS	NS	NS	NS	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	NS	NS	NS	NS
GZ-125	NS	NS	NS	NS	NS	NS	NS	NS	< 2	NS	< 2	< 2	NS	< 2	< 2	< 2	NS	NS	NS	NS	NS	NS
Water Supply Wells																						
R-3	NS	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	NS	< 0 5	< 0 5	< 0 5	< 0 5	NS	< 0 5	< 0 5	< 0 5	NS	< 0 5	< 0 5	< 0 5	< 0 5
R-5	NS	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	NS	< 0 5	< 0 5	< 0 5	< 0 5	NS	NS	NS	NS	NS	NS	NS	NS	NS
346BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	< 0 5	< 0 5	NS	< 0 5	NS	< 0 5	< 0 5
339BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5
415BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	< 0 5	< 0 5	NS	< 0 5	< 0 5

Table Notes

1 All data in micrograms per liter (ug/L), parts per billion - Analyzed by Method 8260B (monitoring well) or Method 524 (water supply wells)
2 NHDES Ambient Groundwater Quality Standard (AGQS) for Trans-1,2-dichloroethene (Trans-DCE) is 100 ug/L Exceedances are identified with GRAY shading
3 EPA Interim Cleanup Level (ICL) for Trans-1,2-dichloroethene (Trans-DCE) is 100 ug/L Exceedances are identified with BOLD text

Abbreviations

NA = Not Analyzed, NS = Not Sampled, INT = Interval Sampled, < ## = reported concentration is less than the detection limit (##)

TABLE 10
Contaminants of Concern Analytical Data (November 2000 – September 2015)
1,2-Dichloropropane in Groundwater
Coakley Landfill Superfund Site
North Hampton and Greenland, New Hampshire

Well ID / Appox Date	Nov-00	Apr-01	Aug-01	Aug-02	Aug-03	Aug-04	Aug-05	Aug-06	Nov-07	Jan-08	Aug-08	Aug-09	Aug-10	Feb-11	Aug-11	Aug-12	Mar-13	Apr-13	Aug-13	Feb-14	Sep-14	Sep-15
Operating Unit 1 Wells																						
BP-4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-5D	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	< 2
MW-5S	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	< 2
MW-6	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 2	NS	< 2	< 2	NA	< 2	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
MW-8	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	< 2
MW-9	< 4	< 4	< 4	< 4	< 4	< 4	< 4	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-10	< 4	< 4	< 4	< 4	< 4	< 4	< 4	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-11	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	< 2
OP-2	< 4	< 4	< 4	< 4	< 4	< 4	< 4	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
OP-5	< 4	< 4	< 4	< 4	< 4	< 4	< 4	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
Operating Unit 2 Wells																						
AE-1A	< 4	< 4	< 4	< 4	< 4	< 4	< 4	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
AE-1B	< 4	< 4	< 4	< 4	< 4	< 4	< 4	NA	NS	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
AE-2A	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
AE-2B	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
AE-3A	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
AE-3B	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	< 2
AE-4A	NS	NS	NS	NS	< 4	< 4	< 4	< 4	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
AE-4B	NS	NS	NS	NS	< 4	< 4	< 4	< 4	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
FPC-2A	NA	NA	NA	NA	< 4	< 4	< 4	< 4	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	NS	NS	NS	NS
FPC-2B	NS	NS	NS	NS	< 4	< 4	< 4	< 4	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	NS	NS	NS	NS
FPC-4B	NS	NS	NS	NS	< 4	< 4	NA	< 4	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	NA
FPC-5A	< 4	< 4	< 4	< 4	< 4	< 4	< 4	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NS	NS
FPC-5B	< 4	< 4	< 4	< 4	< 4	< 4	< 4	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	INT	NS	NA	NA
FPC-6A	< 4	< 4	< 4	NS	< 4	< 4	< 4	< 4	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
FPC-6B	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	< 2
FPC-7A	NS	NS	NS	NS	< 4	< 4	< 4	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
FPC-7B	NS	NS	NS	NS	< 4	< 4	< 4	NA	< 2	NS	NA	NA	NA	NS	NA	NA	NS	NS	INT	NS	NA	NA
FPC-8A	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
FPC-8B	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	NA	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	< 2
FPC-9A	< 4	< 4	< 4	< 4	< 4	< 4	< 4	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
FPC-9B	< 4	NS	NS	< 4	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-9C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-11A	NS	NS	NS	NS	< 4	< 4	< 4	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NS	NS	NA	NA
FPC-11B	NS	NS	NS	NS	< 4	< 4	< 4	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NS	NS	INT	NA
FPC-11C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GZ-105	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	< 2
GZ-123	NS	NS	NS	NS	NS	NS	NS	NS	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	NS	NS	NS	NS
GZ-125	NS	NS	NS	NS	NS	NS	NS	NS	< 2	NS	< 2	< 2	NS	< 2	< 2	< 2	NS	NS	NS	NS	NS	NS
Water Supply Wells																						
R-3	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	NS	< 0 5	< 0 5	< 0 5	< 0 5	NS	< 0 5	< 0 5	< 0 5	NS	< 0 5	< 0 5	< 0 5	< 0 5
R-5	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	NS	< 0 5	< 0 5	< 0 5	< 0 5	NS	NS	NS	NS	NS	NS	NS	NS	NS
346BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	< 0 5	< 0 5	NS	< 0 5	NS	< 0 5	< 0 5
339BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5
415BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	< 0 5	< 0 5	NS	< 0 5	< 0 5

Table Notes

1 All data in micrograms per liter (ug/L), parts per billion - Analyzed by Method 8260B (monitoring well) or Method 524 (water supply wells)
2 NHDES Ambient Groundwater Quality Standard (AGQS) for 1,2-dichloropropane is 5 ug/L Exceedances are identified with GRAY shading
3 EPA Interim Cleanup Level (ICL) for 1,2-dichloropropane is 5 ug/L Exceedances are identified with BOLD text

Abbreviations

NA = Not Analyzed, NS = Not Sampled, INT = Interval Sampled, < ## = reported concentration is less than the detection limit (##)

TABLE 10

Contaminants of Concern Analytical Data (November 2000 – September 2015)

Tetrachloroethene (PCE) in Groundwater

Coakley Landfill Superfund Site

North Hampton and Greenland, New Hampshire

Well ID / Appox Date	Nov-00	Apr-01	Aug-01	Aug-02	Aug-03	Aug-04	Aug-05	Aug-06	Nov-07	Jan-08	Aug-08	Aug-09	Aug-10	Feb-11	Aug-11	Aug-12	Mar-13	Apr-13	Aug-13	Feb-14	Sep-14	Sep-15
Operating Unit 1 Wells																						
BP-4	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-4	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-5D	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	< 2
MW-5S	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	< 2
MW-6	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	NA	< 2	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
MW-8	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	< 2
MW-9	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-10	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-11	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	< 2
OP-2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
OP-5	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
Operating Unit 2 Wells																						
AE-1A	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
AE-1B	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NS	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
AE-2A	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
AE-2B	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
AE-3A	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
AE-3B	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	< 2
AE-4A	NS	NS	NS	NS	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
AE-4B	NS	NS	NS	NS	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
FPC-2A	NA	NA	NA	NA	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	NS	NS	NS	NS
FPC-2B	NS	NS	NS	NS	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	NS	NS	NS	NS
FPC-4B	NS	NS	NS	NS	< 2	< 2	NA	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	NA
FPC-5A	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NS	NS
FPC-5B	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	INT	NS	NA	NA
FPC-6A	< 2	< 2	< 2	NS	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
FPC-6B	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	< 2
FPC-7A	NS	NS	NS	NS	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
FPC-7B	NS	NS	NS	NS	< 2	< 2	< 2	NA	< 2	NS	NA	NA	NA	NS	NA	NA	NS	NS	INT	NS	NA	NA
FPC-8A	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	< 2	NS	< 2	< 2
FPC-8B	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	< 2
FPC-9A	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
FPC-9B	< 2	NS	NS	< 2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-9C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-11A	NS	NS	NS	NS	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NS	NS	NA	NA
FPC-11B	NS	NS	NS	NS	< 2	< 2	< 2	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NS	NS	INT	NA
FPC-11C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GZ-105	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	INT	NS	< 2	< 2
GZ-123	NS	NS	NS	NS	NS	NS	NS	NS	< 2	NS	< 2	< 2	< 2	NS	< 2	< 2	NS	NS	NS	NS	NS	NS
GZ-125	NS	NS	NS	NS	NS	NS	NS	NS	< 2	NS	< 2	< 2	NS	< 2	< 2	< 2	NS	NS	NS	NS	NS	NS
Water Supply Wells																						
R-3	NS	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	NS	< 0 5	< 0 5	< 0 5	< 0 5	NS	< 0 5	< 0 5	< 0 5	NS	< 0 5	< 0 5	< 0 5	< 0 5
R-5	NS	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	NS	< 0 5	< 0 5	< 0 5	< 0 5	NS	NS	NS	NS	NS	NS	NS	NS	NS
346BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	< 0 5	< 0 5	NS	< 0 5	NS	< 0 5	< 0 5
339BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5	< 0 5
415BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	< 0 5	< 0 5	NS	< 0 5	< 0 5

Table Notes

1 All data in micrograms per liter (ug/L), parts per billion - Analyzed by Method 8260B (monitoring well) or Method 524 (water supply wells)

2 NHDES Ambient Groundwater Quality Standard (AGQS) for tetrachloroethene (PCE) is 5 ug/L Exceedances are identified with GRAY shading

3 EPA Interim Cleanup Level (ICL) for tetrachloroethene (PCE) is 3 5 ug/L Exceedances are identified with BOLD text

Abbreviations

NA = Not Analyzed, NS = Not Sampled, INT = Interval Sampled, < ## = reported concentration is less than the detection limit (##)

TABLE 10

Contaminants of Concern Analytical Data (November 2000 – September 2015)

Methyl Ethyl Ketone (MEK) in Groundwater

Coakley Landfill Superfund Site

North Hampton and Greenland, New Hampshire

Well ID / Appox Date	Nov-00	Apr-01	Aug-01	Aug-02	Aug-03	Aug-04	Aug-05	Aug-06	Nov-07	Jan-08	Aug-08	Aug-09	Aug-10	Feb-11	Aug-11	Aug-12	Mar-13	Apr-13	Aug-13	Feb-14	Sep-14	Sep-15
Operating Unit 1 Wells																						
BP-4	< 50	< 50	< 50	< 50	< 50	< 50	< 50	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-4	< 50	< 50	< 50	< 50	< 50	< 50	< 50	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-5D	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	INT	NS	< 10	< 10
MW-5S	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	INT	NS	< 10	< 10
MW-6	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 10	NS	< 10	< 10	NA	< 10	< 10	< 10	NS	NS	< 10	NS	< 10	< 10
MW-8	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	INT	NS	< 10	< 10
MW-9	< 50	< 50	< 50	< 50	< 50	< 50	< 50	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-10	< 50	< 50	< 50	< 50	< 50	< 50	< 50	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-11	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	INT	NS	< 10	< 10
OP-2	< 50	< 50	< 50	< 50	< 50	< 50	< 50	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
OP-5	< 50	< 50	< 50	< 50	< 50	< 50	< 50	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
Operating Unit 2 Wells																						
AE-1A	< 50	< 50	< 50	< 50	< 50	< 50	< 50	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
AE-1B	< 50	< 50	< 50	< 50	< 50	< 50	< 50	NA	NS	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
AE-2A	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	< 10	NS	< 10	< 10
AE-2B	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	< 10	NS	< 10	< 10
AE-3A	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	< 10	NS	< 10	< 10
AE-3B	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	INT	NS	< 10	< 10
AE-4A	NS	NS	NS	NS	< 50	< 50	< 50	< 50	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	< 10	NS	< 10	< 10
AE-4B	NS	NS	NS	NS	< 50	< 50	< 50	< 50	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	< 10	NS	< 10	< 10
FPC-2A	NA	NA	NA	NA	< 50	< 50	< 50	< 50	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	NS	NS	NS	NS
FPC-2B	NS	NS	NS	NS	< 50	< 50	< 50	< 50	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	NS	NS	NS	NS
FPC-4B	NS	NS	NS	NS	< 50	< 50	NA	< 50	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	INT	NS	< 10	NA
FPC-5A	< 50	< 50	< 50	< 50	< 50	< 50	< 50	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NS	NS
FPC-5B	< 50	< 50	< 50	< 50	< 50	< 50	< 50	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	INT	NS	NA	NA
FPC-6A	< 50	< 50	< 50	NS	< 50	< 50	< 50	< 50	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	< 10	NS	< 10	< 10
FPC-6B	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	INT	NS	< 10	< 10
FPC-7A	NS	NS	NS	NS	< 50	< 50	< 50	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
FPC-7B	NS	NS	NS	NS	< 50	< 50	< 50	NA	< 10	NS	NA	NA	NA	NS	NA	NA	NS	NS	INT	NS	NA	NA
FPC-8A	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	< 10	NS	< 10	< 10
FPC-8B	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	NA	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	INT	NS	< 10	< 10
FPC-9A	< 50	< 50	< 50	< 50	< 50	< 50	< 50	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
FPC-9B	< 50	NS	NS	< 50	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-9C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-11A	NS	NS	NS	NS	< 50	< 50	< 50	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NS	NS	NA	NA
FPC-11B	NS	NS	NS	NS	< 50	< 50	< 50	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NS	NS	INT	NA
FPC-11C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GZ-105	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	INT	NS	< 10	< 10
GZ-123	NS	NS	NS	NS	NS	NS	NS	NS	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	NS	NS	NS	NS
GZ-125	NS	NS	NS	NS	NS	NS	NS	NS	< 10	NS	< 10	< 10	NS	< 10	< 10	< 10	NS	NS	NS	NS	NS	NS
Water Supply Wells																						
R-3	NS	< 12 5	< 12 5	< 12 5	< 12 5	< 12 5	< 12 5	< 12 5	NS	< 5	< 5	< 5	< 5	NS	< 5	< 5	< 5	NS	< 5	< 5	< 5	< 5
R-5	NS	< 12 5	< 12 5	< 12 5	< 12 5	< 12 5	< 12 5	< 12 5	NS	< 5	< 5	< 5	< 5	NS	NS	NS	NS	NS	NS	NS	NS	NS
346BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	< 5	< 5	NS	< 5	NS	< 5	< 5
339BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	< 5	< 5	< 5	< 5	< 5	< 5
415BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	< 5	< 5	NS	< 5	< 5

Table Notes

1 All data in micrograms per liter (ug/L), parts per billion - Analyzed by Method 8260B (monitoring well) or Method 524 (water supply wells)

2 NHDES Ambient Groundwater Quality Standard (AGQS) for methyl ethyl ketone (MEK, 2-butanone) is 4000 ug/L Exceedances are identified with GRAY shading

3 EPA Interim Cleanup Level (ICL) for methyl ethyl ketone (MEK, 2-butanone) is 200 ug/L Exceedances are identified with BOLD text

Abbreviations

NA = Not Analyzed, NS = Not Sampled, INT = Interval Sampled, < ## = reported concentration is less than the detection limit (##)

TABLE 10

Contaminants of Concern Analytical Data (November 2000 – September 2015)

Tetrahydrofuran (THF) in Groundwater

Coakley Landfill Superfund Site

North Hampton and Greenland, New Hampshire

Well ID / Appox Date	Nov-00	Apr-01	Aug-01	Aug-02	Aug-03	Aug-04	Aug-05	Aug-06	Nov-07	Jan-08	Aug-08	Aug-09	Aug-10	Feb-11	Aug-11	Aug-12	Mar-13	Apr-13	Aug-13	Feb-14	Sep-14	Sep-15
Operating Unit 1 Wells																						
BP-4	< 30	< 30	< 30	< 30	< 30	< 30	< 30	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-4	< 30	< 30	< 30	< 30	< 30	< 30	< 30	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-5D	**162**	60	< 30	101	85	142	88	110	110	NS	110	90	90	NS	110	90	NS	NS	INT	NS	50	50
MW-5S	44	35	< 30	46	< 30	34	< 30	< 30	60	NS	40	40	40	NS	40	30	NS	NS	INT	NS	20	20
MW-6	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 10	NS	< 10	< 10	NA	< 10	< 10	< 10	NS	NS	< 10	NS	< 10	< 10
MW-8	**248**	**157**	< 30	**175**	**184**	**282**	**273**	**239**	**180**	NS	**180**	**180**	**160**	NS	140	100	NS	NS	INT	NS	150	140
MW-9	< 30	< 30	< 30	137	< 30	< 30	84	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-10	< 30	< 30	< 30	< 30	< 30	< 30	< 30	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-11	**246**	**228**	< 30	**225**	130	114	< 30	50	60	NS	30	30	20	NS	20	10	NS	NS	INT	NS	10	10
OP-2	< 30	< 30	< 30	< 30	< 30	< 30	87	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
OP-5	< 30	< 30	< 30	< 30	< 30	< 30	< 30	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
Operating Unit 2 Wells																						
AE-1A	< 30	< 30	< 30	< 30	< 30	< 30	< 30	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
AE-1B	< 30	< 30	< 30	< 30	< 30	< 30	< 30	NA	NS	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
AE-2A	30	33	< 30	45	< 30	< 30	< 30	< 30	20	NS	< 10	10	< 10	NS	< 10	< 10	NS	NS	< 10	NS	< 10	< 10
AE-2B	**157**	86	< 30	127	104	92	81	69	60	NS	70	50	30	NS	30	30	NS	NS	30	NS	30	30
AE-3A	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	< 10	NS	< 10	< 10
AE-3B	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	INT	NS	< 10	< 10
AE-4A	NS	NS	NS	NS	< 30	< 30	< 30	< 30	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	< 10	NS	< 10	< 10
AE-4B	NS	NS	NS	NS	< 30	< 30	< 30	< 30	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	< 10	NS	< 10	< 10
FPC-2A	NA	NA	NA	NA	< 30	< 30	< 30	< 30	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	NS	NS	NS	NS
FPC-2B	NS	NS	NS	NS	< 30	< 30	< 30	< 30	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	NS	NS	NS	NS
FPC-4B	NS	NS	NS	NS	< 30	< 30	NA	< 30	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	INT	NS	< 10	NA
FPC-5A	< 30	< 30	< 30	< 30	< 30	< 30	< 30	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NS	NS
FPC-5B	< 30	< 30	< 30	< 30	< 30	< 30	79	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	INT	NS	NA	NA
FPC-6A	< 30	< 30	< 30	NS	< 30	< 30	< 30	< 30	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	< 10	NS	< 10	< 10
FPC-6B	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	INT	NS	< 10	< 10
FPC-7A	NS	NS	NS	NS	< 30	< 30	< 30	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
FPC-7B	NS	NS	NS	NS	< 30	< 30	< 30	NA	< 10	NS	NA	NA	NA	NS	NA	NA	NS	NS	INT	NS	NA	NA
FPC-8A	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	< 10	NS	< 10	< 10
FPC-8B	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	NA	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	INT	NS	< 10	< 10
FPC-9A	32	< 30	< 30	30	< 30	< 30	< 30	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
FPC-9B	< 30	NS	NS	< 30	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-9C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-11A	NS	NS	NS	NS	< 30	< 30	< 30	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NS	NS	NA	NA
FPC-11B	NS	NS	NS	NS	< 30	< 30	< 30	NA	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NS	NS	INT	NA
FPC-11C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GZ-105	**169**	120	< 30	112	113	131	151	83	80	NS	70	80	70	NS	70	50	NS	NS	INT	NS	20	20
GZ-123	NS	NS	NS	NS	NS	NS	NS	NS	< 10	NS	< 10	< 10	< 10	NS	< 10	< 10	NS	NS	NS	NS	NS	NS
GZ-125	NS	NS	NS	NS	NS	NS	NS	NS	< 10	NS	< 10	< 10	NS	< 10	< 10	< 10	NS	NS	NS	NS	NS	NS
Water Supply Wells																						
R-3	NS	< 7 5	< 7 5	< 7 5	< 7 5	< 7 5	< 7 5	< 7 5	NS	< 5	< 5	< 5	< 5	NS	< 5	< 5	< 5	NS	< 5	< 5	< 5	< 5
R-5	NS	< 7 5	< 7 5	< 7 5	< 7 5	< 7 5	< 7 5	< 7 5	NS	< 5	< 5	< 5	< 5	NS	NS	NS	NS	NS	NS	NS	NS	NS
346BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	< 5	< 5	NS	< 5	NS	< 5	< 5
339BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	< 5	< 5	< 5	< 5	< 5	< 5
415BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	< 5	< 5	NS	< 5	< 5

Table Notes

1 All data in micrograms per liter (ug/L), parts per billion - Analyzed by Method 8260B (monitoring well) or Method 524 (water supply wells)

2 NHDES Ambient Groundwater Quality Standard (AGQS) for tetrahydrofuran (THF) is 154 ug/L Exceedances are identified with GRAY shading

3 EPA Interim Cleanup Level (ICL) for tetrahydrofuran (THF) is 154 ug/L Exceedances are identified with BOLD text

Abbreviations

NA = Not Analyzed, NS = Not Sampled, INT = Interval Sampled, < ## = reported concentration is less than the detection limit (##)

TABLE 10

Contaminants of Concern Analytical Data (November 2000 – September 2015)

Tertiary Butyl Alchohol (TBA) in Groundwater

Coakley Landfill Superfund Site

North Hampton and Greenland, New Hampshire

Well ID / Appox. Date	Nov-07	Jan-08	Aug-08	Aug-09	Aug-10	Feb-11	Aug-11	Aug-12	Mar-13	Apr-13	Aug-13	Feb-14	Sep-14	Sep-15
Operating Unit 1 Wells														
BP-4	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-4	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-5D	60	NS	50	40	40	NS	50	40	NS	NS	INT	NS	60	40
MW-5S	< 30	NS	< 30	< 30	< 30	NS	< 30	< 30	NS	NS	INT	NS	< 30	< 30
MW-6	< 30	NS	< 30	< 30	NA	< 30	< 30	< 30	NS	NS	< 30	NS	< 30	< 30
MW-8	70	NS	70	60	50	NS	50	40	NS	NS	INT	NS	50	40
MW-9	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-10	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-11	< 30	NS	< 30	< 30	< 30	NS	< 30	< 30	NS	NS	INT	NS	< 30	< 30
OP-2	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
OP-5	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
Operating Unit 2 Wells														
AE-1A	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
AE-1B	NS	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
AE-2A	< 30	NS	< 30	< 30	< 30	NS	< 30	< 30	NS	NS	< 30	NS	< 30	< 30
AE-2B	< 30	NS	< 30	< 30	< 30	NS	< 30	< 30	NS	NS	< 30	NS	< 30	< 30
AE-3A	< 30	NS	< 30	< 30	< 30	NS	< 30	< 30	NS	NS	< 30	NS	< 30	< 30
AE-3B	< 30	NS	< 30	< 30	< 30	NS	< 30	< 30	NS	NS	INT	NS	< 30	< 30
AE-4A	< 30	NS	< 30	< 30	< 30	NS	< 30	< 30	NS	NS	< 30	NS	< 30	< 30
AE-4B	< 30	NS	< 30	< 30	< 30	NS	< 30	< 30	NS	NS	< 30	NS	< 30	< 30
FPC-2A	< 30	NS	< 30	< 30	< 30	NS	< 30	< 30	NS	NS	NS	NS	NS	NS
FPC-2B	< 30	NS	< 30	< 30	< 30	NS	< 30	< 30	NS	NS	NS	NS	NS	NS
FPC-4B	< 30	NS	< 30	< 30	< 30	NS	< 30	< 30	NS	NS	INT	NS	< 30	NA
FPC-5A	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NS	NS
FPC-5B	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	INT	NS	NA	NA
FPC-6A	< 30	NS	< 30	< 30	< 30	NS	< 30	< 30	NS	NS	< 30	NS	< 30	< 30
FPC-6B	< 30	NS	< 30	< 30	< 30	NS	< 30	< 30	NS	NS	INT	NS	< 30	< 30
FPC-7A	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
FPC-7B	< 30	NS	NA	NA	NA	NS	NA	NA	NS	NS	INT	NS	NA	NA
FPC-8A	< 30	NS	< 30	< 30	< 30	NS	< 30	< 30	NS	NS	< 30	NS	< 30	< 30
FPC-8B	NA	NS	< 30	< 30	< 30	NS	< 30	< 30	NS	NS	INT	NS	< 30	< 30
FPC-9A	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
FPC-9B	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-9C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-11A	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NS	NS	NA	NA
FPC-11B	NA	NS	NA	NA	NA	NS	NA	NA	NS	NS	NS	NS	INT	NA
FPC-11C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GZ-105	< 30	NS	< 30	< 30	< 30	NS	< 30	< 30	NS	NS	INT	NS	< 30	< 30
GZ-123	< 30	NS	< 30	< 30	< 30	NS	< 30	< 30	NS	NS	NS	NS	NS	NS
GZ-125	< 30	NS	< 30	< 30	NS	< 30	< 30	< 30	NS	NS	NS	NS	NS	NS
Water Supply Wells														
R-3	NS	< 30	< 30	< 30	< 30	NS	< 30	< 30	< 30	NS	< 30	< 30	< 30	< 30
R-5	NS	< 30	< 30	< 30	< 30	NS	NS	NS	NS	NS	NS	NS	NS	NS
346BHR	NS	NS	NS	NS	NS	NS	NS	< 30	< 30	NS	< 30	NS	< 30	< 30
339BHR	NS	NS	NS	NS	NS	NS	NS	NS	< 30	< 30	< 30	< 30	< 30	< 30
415BHR	NS	NS	NS	NS	NS	NS	NS	NS	NS	< 30	< 30	NS	< 30	< 30

Table Notes.

1 All data in micrograms per liter (ug/L), parts per billion - Analyzed by Method 8260B (monitoring well) or Method 524 (water supply wells

2 NHDES Ambient Groundwater Quality Standard (AGQS) for tertiary butyl alchohol (TBA) is 40 ug/L Exceedances are identified with GRAY shading

3 An EPA Interim Cleanup Level (ICL) for Chlorobenzene has not been established

4 Tertiary butyl alcohol (TBA) not included on Method 8260B parameter list prior to November 2007

Abbreviations:

NA = Not Analyzed, NS = Not Sampled, INT = Interval Sampled, < ## = reported concentration is less than the detection limit (##)

TABLE 10

Contaminants of Concern Analytical Data (November 2000 – September 2015)

1,4-Dioxane (Low Level Method) in Groundwater

Coakley Landfill Superfund Site

North Hampton and Greenland, New Hampshire

Well ID / Appox Date	Aug-09	Aug-10	Feb-11	Aug-11	Aug-12	Mar-13	Apr-13	Aug-13	Feb-14	Sep-14	Sep-15
Operating Unit 1 Wells											
BP-4	NA	NA	9	10	13	NS	NS	9.6	NS	12	11
MW-2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-4	NA	6	NS	6	2 5	NS	NS	4.8	NS	6.9	8.5
MW-5D	140	150	NS	140	140	NS	NS	INT	NS	130	150
MW-5S	70	90	NS	70	61	NS	NS	INT	NS	49	57
MW-6	< 1	NA	NS	< 1	< 0 25	NS	NS	< 0 25	NS	< 0 25	< 0 25
MW-8	310	230	NS	200	210	NS	NS	INT	NS	200	240
MW-9	NA	16	NS	14	30	NS	NS	6.1	NS	28	26
MW-10	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
MW-11	100	45	NS	40	56	NS	NS	INT	NS	41	38
OP-2	NA	1	NS	1	1	NS	NS	1 2	NS	1 5	1 6
OP-5	NA	< 1	NS	< 1	NA	NS	NS	NA	NS	NA	NA
Operating Unit 2 Wells											
AE-1A	NA	NA	NS	< 1	NA	NS	NS	NA	NS	NA	NA
AE-1B	NA	NA	NS	< 1	NA	NS	NS	NA	NS	NA	NA
AE-2A	NA	12	NS	14	16	NS	NS	15	NS	16	13
AE-2B	NA	110	NS	80	82	NS	NS	88	NS	87	96
AE-3A	NA	23	NS	19	24	NS	NS	21	NS	25	24
AE-3B	NA	24	NS	19	27	NS	NS	INT	NS	26	25
AE-4A	NA	NA	NA	NA	< 0 25	NS	NS	NA	NS	NA	<0 25
AE-4B	NA	NA	NA	NA	< 0 25	NS	NS	NA	NS	NA	<0 25
FPC-2A	NA	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS
FPC-2B	NA	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS
FPC-4B	NA	NA	NA	NA	< 0 25	NA	NA	INT	NS	NA	NA
FPC-5A	NA	NA	NS	27	25	NS	NS	29	NS	NS	NS
FPC-5B	NA	NA	NS	50	53	NS	NS	INT	NS	64	67
FPC-6A	NA	NA	NS	NA	31	NS	NS	21	NS	26	30
FPC-6B	NA	NA	NS	NA	23	NS	NS	INT	NS	19	19
FPC-7A	NA	NA	NA	< 1	< 0 25	NA	NA	NA	NS	NA	NA
FPC-7B	NA	NA	NA	< 1	< 0 25	NA	NA	INT	NS	NA	NA
FPC-8A	NA	< 1	NS	< 1	0 51	NS	NS	0 6	NS	0 60	0 70
FPC-8B	NA	1	NS	< 1	0 93	NS	NS	INT	NS	0 62	0 81
FPC-9A	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
FPC-9B	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-9C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FPC-11A	NA	NA	NS	NA	NA	NS	NS	NA	NS	NA	NA
FPC-11B	NA	NA	NS	NA	NA	NS	NS	NA	NS	INT	1 4
FPC-11C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GZ-105	NA	NA	NS	80	98	NS	NS	INT	NS	69	62
GZ-123	NA	NA	NS	NA	NA	NS	NS	NS	NS	NS	NS
GZ-125	NA	NA	NS	NA	NA	NS	NS	NS	NS	NS	NS
Water Supply Wells											
R-3	NA	NA	NS	NA	0 4	0 45	NS	0 45	0 42	0 37	0 37
R-5	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS
346BHR	NS	NS	NS	NS	< 0 25	NS	NS	< 0 25	NS	< 0 25	< 0 25
339BHR	NS	NS	NS	NS	NS	NS	0 38	0 42	0 63	0 42	0 74
415BHR	NS	NS	NS	NS	NS	NS	< 0 25	< 0 25	NS	< 0 25	< 0 25

Table Notes:

1 All data in micrograms per liter (ug/L), parts per billion - Analysis by Method 8260B SIM (a low level detection limit methodology)

2 1,4-dioxane not included on Method 8260B parameter list prior to August 2010 First analyses by 8260B SIM were completed in Aug 2009

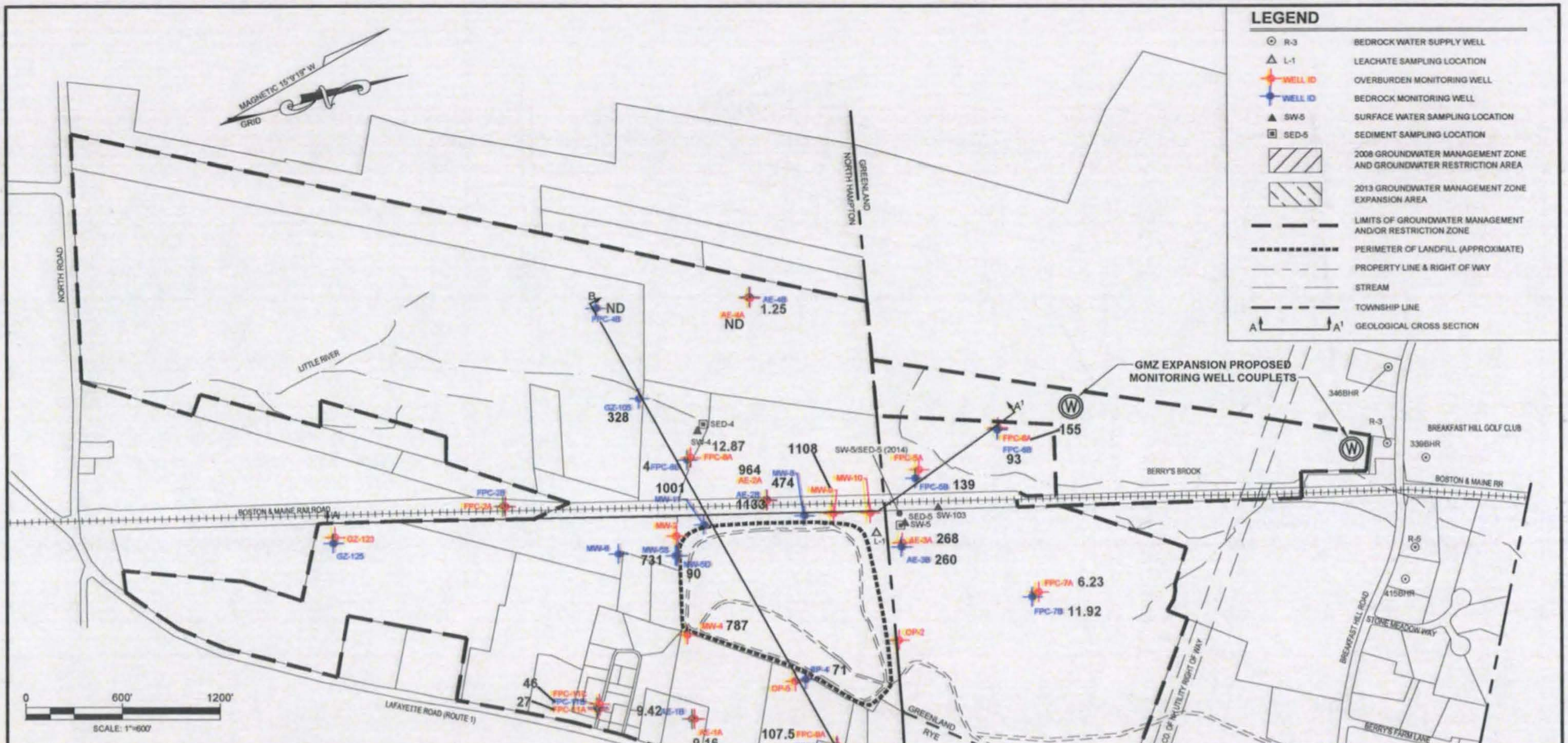
3 Results for standard Method 8260B (detection limit of 50 ug/L) are not provided in this table

4 NHDES Ambient Groundwater Quality Standard (AGQS) for 1,4-dioxane is 3 ug/L Exceedances are identified with GRAY shading

5 An EPA Interim Cleanup Level (ICL) for 1,4-dioxane has not been established

Abbreviations.

NA = Not Analyzed, NS = Not Sampled, INT = Interval Sampled, < ## = reported concentration is less than the detection limit (##)



NOTES:

1. THIS PLAN IS BASED UPON A PLAN IN THE APRIL 2010 POP TITLED "ENVIRONMENTAL MONITORING NETWORK" DATED 08/16/07 (GOLDER ASSOCIATES, INC.), A PLAN IN THE 1999 SEDIMENT, SURFACE WATER AND GROUNDWATER MONITORING PLAN TITLED "SITE PLAN" (ARIES ENGINEERING, INC.), AND CITY OF PORTSMOUTH SUBMETER-GPS LOCATIONS FOR SITE MONITORING POINTS. STREAMS AND WATER SUPPLY WELL LOCATIONS BASED ON NH GRANIT AERIAL PHOTOGRAPHY AND THE ABOVE REFERENCE SITE PLANS. SITE FEATURE LOCATIONS AND SCALE ARE APPROXIMATE.

2. APPROXIMATE PROPERTY LINES BASED ON AFOREMENTIONED PLANS. PROPERTIES IN GREENLAND ON BREAKFAST HILL ROAD BASED UPON TOWN OF GREENLAND TAX MAP R-1 (DATED APRIL 1, 2013).

3. GMZ BOUNDARY IS BASED UPON "GMZ BOUNDARY PLAN" DATED MAY 9, 2008 INCLUDED IN THE 2008 GMP APPLICATION PREPARED BY HANCOCK ASSOCIATES, AND 2013 GMZ EXPANSION AREA ESTABLISHED BY THE 2013 GMP DATED JANUARY 7, 2014.

PROJECT TITLE: COAKLEY LANDFILL SUPERFUND SITE NORTH HAMPTON & GREENLAND, NEW HAMPSHIRE	DWG: FIGURE 1-2	BY: TND	REV:
		DATE: 2016-02-16	REV DATE:
SHEET TITLE: PRELIMINARY PFC CONCENTRATIONS (PPT) MAY AND JULY, 2016	JN: 10424.003	APPROVED BY: SBM	ISSUE:
	SCALE: 1"=600'	CHECKED BY: SBM	ISSUE DATE:

DESCRIPTION:

DESCRIPTION:

CES INC
Engineers • Environmental Scientists • Surveyors

TABLE 3

Summary of May 2016 Groundwater Analytical Data

Coakley Landfill Superfund Site - North Hampton and Greenland, New Hampshire

OPERABLE UNIT 1 (OU-1)													
Sampling Point ID			**MW-4**	**MW-4-DUP**	**MW-5D**	**MW-5S**	**MW-8**	**MW-9**	**MW-11**	**BP-4**	**GW-EB-Waterlevel**	**FB-DI-Water**	**GW-EB-Bailer**
Monitored Zone / Unit	**EPA**	**NHDES**	Till	Till	DBR	SBR	SBR	Outwash	SBR	OBH-BR	Blank	Blank	Blank
Date of Sample Collection	**HA**	**AGQS**	5/24/16	5/24/16	5/25/16	5/24/16	5/24/16	5/24/16	5/25/16	5/24/16	5/24/16	5/24/16	5/24/16
PERFLUORINATED CHEMICALS BY MODIFIED 537 - (ng/L)													
Perfluorobutanesulfonic acid (PFBS)	---	---	5 06J	4 96J	27.5	10.1	30.8	3.53J	10.8	2 72J	<7 71U	<7.86U	<7.89U
Perfluoroheptanoic acid (PFHpA)	---	---	440	441	44.8	468	179	345	423	26.2	<7 71U	<7.86U	<7.89U
Perfluorohexanesulfonic acid (PFHxS)	---	---	40 4	32.8	42.9	58 6	93.6	17 9	60 2	12 1	<7 71U	<7.86U	<7.89U
Perfluorooctanoic acid (PFOA)	70	70	**756**	**728**	61.2	**647**	**262**	**656**	**693**	57.6	<7 71U	<7 86U	<7.89U
Perfluorononanoic acid (PFNA)	---	---	19.3	19.4	<8 05U	62 6	5.36J	169	84.9	1.55J	<7.71U	<7.86U	<7.89U
Perfluorooctanesulfonic (PFOS)	70	70	30 8	31	29.3	**84**	**212**	**452**	**308**	13 3	<7.71U	<7.86U	<7.89U
Combination of PFOA and PFOS	---	70	**786.8**	**759**	**90.5**	**731**	**474**	**1108**	**1001**	**70.9**	ND	ND	ND
FIELD PARAMETERS													
Dissolved Oxygen (mg/l)	---	---	N/A	N/A	1.2	1.4	1	1 8	0.9	0 9	N/A	N/A	N/A
Oxidation Reduction Potential (mV)	---	---	N/A	N/A	-148	-109	-141	23	-131	-171	N/A	N/A	N/A
pH (standard units)	---	---	N/A	N/A	7 2	7	7.6	6.4	7.1	7.5	N/A	N/A	N/A
Specific Conductance (us/cm)	---	---	N/A	N/A	1392	854	1198	283	615	736	N/A	N/A	N/A
Temperature (degrees Celcius)	---	---	N/A	N/A	12	11	10	9	11	10	N/A	N/A	N/A
Turbidity (NTU)	---	---	N/A	N/A	<5	<5	6	18	<5	<5	N/A	N/A	N/A

Notes:

1 Monitored Zone / Unit identifies the hydrogeological unit within the screened/open interval. The hydrogeology of the site is comprised of four principle geological units including bedrock, glacial till, marine sediments consisting predominately of silt and clay, and sandy outwash. Bedrock well screened intervals vary as follows: "OBH-BR" wells are standard 6-inch diameter wells with steel casing set in bedrock and open boreholes (typical water supply well construction). "SBR" indicates the screen interval is the upper most section of bedrock. "DBR" is used to differentiate a screened interval that is below the uppermost section of bedrock (i e ; MW-5S versus MW-5D).

2. **Bolded** and shaded values denote concentration exceeding the EPA Lifetime Health Advisory (HA).

3. Results for groundwater primary/duplicate samples are provided in this table: MW-4/MW-4-DUP

4 GW-EB-Waterlevel. Equipment blank for water level meter completed on a decomtaminated depth to water level meter after MW-8 was sampled.

5. FB-DI-Water. Field blank is laboratory-provided PFC free water that was used for decontamination purposes, poured directly from the lab supplied container into sampling containers

6. GW-EB-Bailer Equipment blank for bailer used for sampling MW-4 PFC free water supplied by the lab was poured directly onto a new bailer and collected in the sampling containers.

ABBREVIATIONS

N/A	Sample was not analyzed/measured for indicated parameter
ND	Not detected
PFC	Perfluorinated Chemicals
#.## U	Not Detected at the reporting detection limit indicated
EPA	US Environmental Protection Agency
NHDES AGQS	New Hampshire Department of Environmental Services Ambient Groundwater Quality Standard
HA	Health Advisory
uS/cm	microsiemens per centimeter
ng/L	nanograms per liter, parts per trillion
mg/L	milligram per liter, parts per million
NTU	nephelometric turbidity unit
mV	millivolt
---	Health Advisory standard not established
J	Concentration is detected below the Lower Calibration Limit of the instrument.

TABLE 2

Summary of JULY 2016 Groundwater Analytical Data

Coakley Landfill Superfund Site - North Hampton and Greenland, New Hampshire

OPERABLE UNIT 2 (OU-2)

Sampling Point ID			AE-1A	AE-1B	AE-2A	AE-2B	AE-3A	AE-3A-DUP	AE-3B	AE-4A	AE-4B
Monitored Unit	EPA	NHDES	Till	SBR	Till	SBR	Till	Till	SBR	Till	SBR
Date of Sample Collection	CL	AGQS	7/12/16	7/13/16	7/14/16	7/14/16	7/12/16	7/12/16	7/12/16	7/13/16	7/13/16
Perfluorobutanesulfonic acid (PFBS)	---	---	<7 89	<8 01	3 72	16 3	5 65	5 76	6 62	<8.26	<8 19
Perfluoroheptanoic acid (PFHpA)	---	---	1 21	1 71	342	350	83 4	86 3	82 2	<8 26	<8 19
Perfluorohexanesulfonic acid (PFHxS)	---	---	2 96	3 03	27 1	85 9	18 6	19 3	20 4	<8 26	<8 19
Perfluorooctanoic acid (PFOA)	70	70	6 1	5 71	**640**	**670**	**196**	**223**	**195**	<8 26	1 25
Perfluorononanoic acid (PFNA)	---	---	<7 89	<8 01	126	72 5	28 5	30 2	26 4	<8 26	<8 19
Perfluorooctanesulfonic (PFOS)	70	70	3 06	3 71	**324**	**463**	**72.1**	**73.5**	**62.8**	<8 26	<8 19
Combination of PFOA and PFOS	---	70	9 16	9 42	**964**	**1133**	**268.1**	**296.6**	**257.8**	ND	1 25
FIELD PARAMETERS											
Dissolved Oxygen (mg/l)	---	---	N/A	N/A	1 6	1.8	1 3	N/A	1.3	1 3	3 1
Oxidation Reduction Potential (mV)	---	---	N/A	N/A	-87	-128	-106	N/A	-115	137	164
pH (standard units)	---	---	N/A	N/A	6 7	7 3	6 9	N/A	7	6 6	6 7
Specific Conductance (us/cm)	---	---	N/A	N/A	486	1202	1028	N/A	1044	137	186
Temperature (degrees Celcius)	---	---	N/A	N/A	16	17	16	N/A	16	16	16
Turbidity (NTU)	---	---	N/A	N/A	<5	<5	<5	N/A	<5	<5	<5

Sampling Point ID	FPC-4B	FPC-5B	FPC-6A	FPC-6B	FPC-7A	FPC-7B	FPC-8A	FPC-8B	FPC-9A	FPC-11A	FPC-11B	GZ-105	GZ-105-DUP
Monitored Unit	SBR	SBR	Till	SBR	Till	SBR	Till	SBR	Till	Till	Till	SBR	SBR
Date of Sample Collection	7/13/16	7/13/16	7/13/16	7/13/16	7/14/16	7/14/16	7/12/16	7/12/16	7/12/16	7/13/16	7/13/16	7/12/16	7/12/16
Perfluorobutanesulfonic acid (PFBS)	<8 33	14 9	5 37	3 23	3 52	2 95	2.36	2 1	6 51	1 95	2 86	11	10 3
Perfluoroheptanoic acid (PFHpA)	<8 33	25 9	45 2	26 7	1 45	3 45	4 18	1 8	28	5 25	8 47	94.1	82 8
Perfluorohexanesulfonic acid (PFHxS)	<8 33	37 6	15 7	8.93	1 49	1 85	3 68	3.57	16 9	5 53	7 87	42 4	42 5
Perfluorooctanoic acid (PFOA)	<8 33	**108**	**126**	**74.9**	4 45	8 65	8 98	2 98	**81**	19 5	29 6	**198**	**159**
Perfluorononanoic acid (PFNA)	<8 33	1 29	7 41	4 7	<8 06	1 28	<8 36	<8 31	<8 24	<7 96	2 29	17 9	15 1
Perfluorooctanesulfonic (PFOS)	<8 33	31	28 4	17 6	1 78	3 27	3 89	1 46	26 5	5 21	16 5	**130**	**117**
Combination of PFOA and PFOS	ND	**139**	**154.4**	**92.5**	6 23	11 92	12 87	4 44	**107.5**	24 71	46 1	**328**	**276**
FIELD PARAMETERS													
Dissolved Oxygen (mg/l)	1 6	1 7	1 7	1 3	4 7	4 2	1 8	1 4	1 3	1 8	1 9	0 9	N/A
Oxidation Reduction Potential (mV)	169	84	-25	-80	133	179	108	-169	-123	-105	-132	-144	N/A
pH (standard units)	6 3	8 1	6 9	6 9	6 5	6.5	6 6	8 2	7 2	7 6	7 4	7 6	N/A
Specific Conductance (us/cm)	96	1206	742	477	151	175	282	230	1149	1294	3068	772	N/A
Temperature (degrees Celcius)	14	17	18	17	13	16	17	16	15	19	16	13	N/A
Turbidity (NTU)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	N/A

Notes

Region 1, New England

United States Environmental Protection Agency
Office of Environmental Measurement & Evaluation
11 Technology Drive
North Chelmsford, MA 01863-2431

Laboratory Report

July 21, 2016

Mike Jasinski - Mail Code OSRR07-1
US EPA New England Regional Laboratory

Project Number: 16070026
Project: Coakley Landfill - Greenland, NH
Analysis: Perfluorinated Alkyl Acids in Water
EPA Chemist: Peter Philbrook

Date Samples Received by the Laboratory: 07/14/2016

Analytical Procedure:

All samples were received and logged in by the laboratory according to the USEPA New England Laboratory SOP for Sample Log-in.

Sample preparation and analysis was done following the EPA Region I SOP, EIASOP-LCMS537-0.

Water samples were extracted and analyzed following US EPA Method 537, DETERMINATION OF SELECTED PERFLUORINATED ALKYL ACIDS IN DRINKING WATER BY SOLID PHASE EXTRACTION AND LIQUID CHROMATOGRAPHY / TANDEM MASS SPECTROMETRY (LC/MS/MS), Version 1.1, September 2009

Data were reviewed in accordance with the internal verification procedures described in the EPA New England Quality Manual for NERL.

Results relate only to the items tested or to the samples as received by the Laboratory. This analytical report shall not be reproduced except in full, without written approval of the laboratory.

If you have any questions please call me at 617-918-8340 .

Sincerely,

Digitally signed by Dan Boudreau
DN: cn=Dan Boudreau, o=EPA, ou=EIA,
email=boudreau.dan@epa.gov, c=US
Date: 2016.07.21 10:10:59 -04'00'

Qualifiers:

RL = Reporting limit
ND = Not Detected above Reporting limit
NA = Not Applicable due to high sample dilutions or sample interferences
NC = Not calculated since analyte concentration is ND.
J = Estimated value
J1 = Estimated value due to MS recovery outside accceptance criteria
J2 = Estimated value due to LFB result outside acceptance criteria
J3 = Estimated value due to RPD result outside acceptance criteria
J4 = Estimated value due to LCS result outside acceptance criteria
E = Estimated value exceeds the calibration range
L = Estimated value is below the calibration range
B = Analyte is associated with the lab blank or trip blank contamination. Values are qualified when the observed concentration of the contamination in the sample extract is less than 10 times the concentration in the blank.
R = No recovery was calculated since the analyte concentration is greater than four times the spike level.
P = The confirmation value exceeded 35% difference and is less than 100%. The lower value is reported.
C = The identification has been confirmed by GC/MS.
A = Suspected Aldol condensation product.
N = Tentatively identified compound.

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Coakley Landfill - Greenland, NH

Perfluorinated Alkyl Acids in Water

Client Sample ID:	MTBE-11141	Lab Sample ID:	AB62658
Date of Collection:	7/11/2016	Matrix:	Aqueous
Date of Preparation:	7/18/2016	Amount Prepared:	250 mL
Date of Analysis:	7/19/2016	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	RL ng/L	Qualifier
375-73-5	Perfluorobutanesulfonic acid - PFBS	ND	16	
375-85-9	Perfluoroheptanoic acid - PFHpA	77	16	B
355-46-4	Perfluorohexanesulfonic acid - PFHxS	ND	8.0	
335-67-1	Perfluorooctanoic acid - PFOA	ND	8.0	
1763-23-1	Perfluorooctanesulfonic acid - PFOS	ND	8.0	
375-95-1	Perfluorononanoic acid - PFNA	ND	16	

Surrogate Compounds	Recoveries (%)	QC Ranges
PFDA 13C2	130	70 - 130
PFHxA 13C2	114	70 - 130

Comments: B = Result is associated with lab blank contamination. PFHpA is a component of PTFE (Teflon) tubing which is ubiquitous in a laboratory environment. The PFHpA concentration in the lab blank was higher than the result found in the sample.

US ENVIRONMENTAL PROTECTION AGENCY
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Coakley Landfill - Greenland, NH

Perfluorinated Alkyl Acids in Water

Client Sample ID:	MTBE-11142	Lab Sample ID:	AB62659
Date of Collection:	7/11/2016	Matrix:	Aqueous
Date of Preparation:	7/18/2016	Amount Prepared:	250 mL
Date of Analysis:	7/19/2016	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	RL ng/L	Qualifier
375-73-5	Perfluorobutanesulfonic acid - PFBS	ND	16	
375-85-9	Perfluoroheptanoic acid - PFHpA	**22**	16	B
355-46-4	Perfluorohexanesulfonic acid - PFHxS	ND	8.0	
335-67-1	Perfluorooctanoic acid - PFOA	ND	8.0	
1763-23-1	Perfluorooctanesulfonic acid - PFOS	ND	8.0	
375-95-1	Perfluorononanoic acid - PFNA	ND	16	

Surrogate Compounds	Recoveries (%)	QC Ranges
PFDA 13C2	96	70 - 130
PFHxA 13C2	98	70 - 130

Comments: B = Result is associated with lab blank contamination. PFHpA is a component of PTFE (Teflon) tubing which is ubiquitous in a laboratory environment. The PFHpA concentration in the lab blank was higher than the result found in the sample.

US ENVIRONMENTAL PROTECTION AGENCY
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Coakley Landfill - Greenland, NH

Perfluorinated Alkyl Acids in Water

Client Sample ID:	MTBE-11144	Lab Sample ID:	AB62660
Date of Collection:	7/11/2016	Matrix:	Aqueous
Date of Preparation:	7/18/2016	Amount Prepared:	250 mL
Date of Analysis:	7/19/2016	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	RL ng/L	Qualifier
375-73-5	Perfluorobutanesulfonic acid - PFBS	ND	16	
375-85-9	Perfluoroheptanoic acid - PFHpA	ND	16	
355-46-4	Perfluorohexanesulfonic acid - PFHxS	ND	8.0	
335-67-1	Perfluorooctanoic acid - PFOA	ND	8.0	
1763-23-1	Perfluorooctanesulfonic acid - PFOS	ND	8.0	
375-95-1	Perfluorononanoic acid - PFNA	ND	16	

Surrogate Compounds	Recoveries (%)	QC Ranges
PFDA 13C2	125	70 - 130
PFHxA 13C2	115	70 - 130

US ENVIRONMENTAL PROTECTION AGENCY
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Coakley Landfill - Greenland, NH

Perfluorinated Alkyl Acids in Water

Client Sample ID:	MTBE-11143	Lab Sample ID:	AB62661
Date of Collection:	7/11/2016	Matrix:	Aqueous
Date of Preparation:	7/18/2016	Amount Prepared:	250 mL
Date of Analysis:	7/19/2016	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	RL ng/L	Qualifier
375-73-5	Perfluorobutanesulfonic acid - PFBS	ND	16	
375-85-9	Perfluoroheptanoic acid - PFHpA	ND	16	
355-46-4	Perfluorohexanesulfonic acid - PFHxS	ND	8.0	
335-67-1	Perfluorooctanoic acid - PFOA	ND	8.0	
1763-23-1	Perfluorooctanesulfonic acid - PFOS	ND	8.0	
375-95-1	Perfluorononanoic acid - PFNA	ND	16	

Surrogate Compounds	Recoveries (%)	QC Ranges
PFDA 13C2	105	70 - 130
PFHxA 13C2	107	70 - 130

US ENVIRONMENTAL PROTECTION AGENCY
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Coakley Landfill - Greenland, NH

Perfluorinated Alkyl Acids in Water

Client Sample ID:	MTBE-11145		Lab Sample ID:	AB62662
Date of Collection:	7/11/2016		Matrix:	Aqueous
Date of Preparation:	7/18/2016		Amount Prepared:	250 mL
Date of Analysis:	7/19/2016		Percent Solids:	N/A
Dry Weight Prepared:	N/A		Extract Dilution:	1
Wet Weight Prepared:	N/A		pH:	N/A

CAS Number	Compound	Concentration ng/L	RL ng/L	Qualifier
375-73-5	Perfluorobutanesulfonic acid - PFBS	ND	16	
375-85-9	Perfluoroheptanoic acid - PFHpA	ND	16	
355-46-4	Perfluorohexanesulfonic acid - PFHxS	**11**	8.0	
335-67-1	Perfluorooctanoic acid - PFOA	ND	8.0	
1763-23-1	Perfluorooctanesulfonic acid - PFOS	**8.1**	8.0	
375-95-1	Perfluorononanoic acid - PFNA	ND	16	

Surrogate Compounds	Recoveries (%)	QC Ranges
PFDA 13C2	95	70 - 130
PFHxA 13C2	102	70 - 130

US ENVIRONMENTAL PROTECTION AGENCY
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Coakley Landfill - Greenland, NH

Perfluorinated Alkyl Acids in Water

Client Sample ID:	MTBE-11152	Lab Sample ID:	AB62663
Date of Collection:	7/11/2016	Matrix:	Aqueous
Date of Preparation:	7/18/2016	Amount Prepared:	250 mL
Date of Analysis:	7/19/2016	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	RL ng/L	Qualifier
375-73-5	Perfluorobutanesulfonic acid - PFBS	ND	16	
375-85-9	Perfluoroheptanoic acid - PFHpA	ND	16	
355-46-4	Perfluorohexanesulfonic acid - PFHxS	ND	8.0	
335-67-1	Perfluorooctanoic acid - PFOA	ND	8.0	
1763-23-1	Perfluorooctanesulfonic acid - PFOS	ND	8.0	
375-95-1	Perfluorononanoic acid - PFNA	ND	16	

Surrogate Compounds	Recoveries (%)	QC Ranges
PFDA 13C2	106	70 - 130
PFHxA 13C2	107	70 - 130

Coakley Landfill - Greenland, NH

Perfluorinated Alkyl Acids in Water

Client Sample ID:	MTBE-11146	Lab Sample ID:	AB62664
Date of Collection:	7/11/2016	Matrix:	Aqueous
Date of Preparation:	7/18/2016	Amount Prepared:	250 mL
Date of Analysis:	7/19/2016	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	RL ng/L	Qualifier
375-73-5	Perfluorobutanesulfonic acid - PFBS	ND	16	
375-85-9	Perfluoroheptanoic acid - PFHpA	ND	16	
355-46-4	Perfluorohexanesulfonic acid - PFHxS	ND	8.0	
335-67-1	Perfluorooctanoic acid - PFOA	ND	8.0	
1763-23-1	Perfluorooctanesulfonic acid - PFOS	ND	8.0	
375-95-1	Perfluorononanoic acid - PFNA	ND	16	

Surrogate Compounds	Recoveries (%)	QC Ranges
PFDA 13C2	106	70 - 130
PFHxA 13C2	100	70 - 130

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Coakley Landfill - Greenland, NH

Perfluorinated Alkyl Acids in Water

Client Sample ID:	MTBE-11153	Lab Sample ID:	AB62665
Date of Collection:	7/11/2016	Matrix:	Aqueous
Date of Preparation:	7/18/2016	Amount Prepared:	250 mL
Date of Analysis:	7/19/2016	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	RL ng/L	Qualifier
375-73-5	Perfluorobutanesulfonic acid - PFBS	ND	16	
375-85-9	Perfluoroheptanoic acid - PFHpA	**91**	16	B
355-46-4	Perfluorohexanesulfonic acid - PFHxS	ND	8.0	
335-67-1	Perfluorooctanoic acid - PFOA	ND	8.0	
1763-23-1	Perfluorooctanesulfonic acid - PFOS	ND	8.0	
375-95-1	Perfluorononanoic acid - PFNA	ND	16	

Surrogate Compounds	Recoveries (%)	QC Ranges
PFDA 13C2	96	70 - 130
PFHxA 13C2	101	70 - 130

Comments: B = Result is associated with lab blank contamination. PFHpA is a component of PTFE (Teflon) tubing which is ubiquitous in a laboratory environment. The PFHpA concentration in the lab blank was higher than the result found in the sample.

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Perfluorinated Alkyl Acids in Water

Client Sample ID:	MTBE-11147	Lab Sample ID:	AB62666
Date of Collection:	7/11/2016	Matrix:	Aqueous
Date of Preparation:	7/18/2016	Amount Prepared:	250 mL
Date of Analysis:	7/19/2016	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	RL ng/L	Qualifier
375-73-5	Perfluorobutanesulfonic acid - PFBS	ND	16	
375-85-9	Perfluoroheptanoic acid - PFHpA	ND	16	
355-46-4	Perfluorohexanesulfonic acid - PFHxS	ND	8.0	
335-67-1	Perfluorooctanoic acid - PFOA	ND	8.0	
1763-23-1	Perfluorooctanesulfonic acid - PFOS	ND	8.0	
375-95-1	Perfluorononanoic acid - PFNA	ND	16	

Surrogate Compounds	Recoveries (%)	QC Ranges
PFDA 13C2	72	70 - 130
PFHxA 13C2	96	70 - 130

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Perfluorinated Alkyl Acids in Water

Client Sample ID:	MTBE-11148	Lab Sample ID:	AB62667
Date of Collection:	7/11/2016	Matrix:	Aqueous
Date of Preparation:	7/18/2016	Amount Prepared:	250 mL
Date of Analysis:	7/19/2016	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	RL ng/L	Qualifier
375-73-5	Perfluorobutanesulfonic acid - PFBS	ND	16	
375-85-9	Perfluoroheptanoic acid - PFHpA	ND	16	
355-46-4	Perfluorohexanesulfonic acid - PFHxS	ND	8.0	
335-67-1	Perfluorooctanoic acid - PFOA	ND	8.0	
1763-23-1	Perfluorooctanesulfonic acid - PFOS	ND	8.0	
375-95-1	Perfluorononanoic acid - PFNA	ND	16	

Surrogate Compounds	Recoveries (%)	QC Ranges
PFDA 13C2	74	70 - 130
PFHxA 13C2	101	70 - 130

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Coakley Landfill - Greenland, NH

Perfluorinated Alkyl Acids in Water

Client Sample ID:	Field Blank-1	Lab Sample ID:	AB62668
Date of Collection:	7/11/2016	Matrix:	Aqueous
Date of Preparation:	7/18/2016	Amount Prepared:	250 mL
Date of Analysis:	7/19/2016	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	RL ng/L	Qualifier
375-73-5	Perfluorobutanesulfonic acid - PFBS	ND	16	
375-85-9	Perfluoroheptanoic acid - PFHpA	ND	16	
355-46-4	Perfluorohexanesulfonic acid - PFHxS	ND	8.0	
335-67-1	Perfluorooctanoic acid - PFOA	ND	8.0	
1763-23-1	Perfluorooctanesulfonic acid - PFOS	ND	8.0	
375-95-1	Perfluorononanoic acid - PFNA	ND	16	

Surrogate Compounds	Recoveries (%)	QC Ranges
PFDA 13C2	78	70 - 130
PFHxA 13C2	106	70 - 130

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Coakley Landfill - Greenland, NH

Perfluorinated Alkyl Acids in Water

Client Sample ID:	0987050001	Lab Sample ID:	AB62669
Date of Collection:	7/11/2016	Matrix:	Aqueous
Date of Preparation:	7/18/2016	Amount Prepared:	250 mL
Date of Analysis:	7/19/2016	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	RL ng/L	Qualifier
375-73-5	Perfluorobutanesulfonic acid - PFBS	ND	16	
375-85-9	Perfluoroheptanoic acid - PFHpA	ND	16	
355-46-4	Perfluorohexanesulfonic acid - PFHxS	ND	8.0	
335-67-1	Perfluorooctanoic acid - PFOA	**25**	8.0	
1763-23-1	Perfluorooctanesulfonic acid - PFOS	ND	8.0	
375-95-1	Perfluorononanoic acid - PFNA	ND	16	

Surrogate Compounds	Recoveries (%)	QC Ranges
PFDA 13C2	82	70 - 130
PFHxA 13C2	94	70 - 130

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Coakley Landfill - Greenland, NH

Perfluorinated Alkyl Acids in Water

Client Sample ID:	MTBE-11150	Lab Sample ID:	AB62670
Date of Collection:	7/11/2016	Matrix:	Aqueous
Date of Preparation:	7/18/2016	Amount Prepared:	250 mL
Date of Analysis:	7/19/2016	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	RL ng/L	Qualifier
375-73-5	Perfluorobutanesulfonic acid - PFBS	ND	16	
375-85-9	Perfluoroheptanoic acid - PFHpA	ND	16	
355-46-4	Perfluorohexanesulfonic acid - PFHxS	ND	8.0	
335-67-1	Perfluorooctanoic acid - PFOA	ND	8.0	
1763-23-1	Perfluorooctanesulfonic acid - PFOS	ND	8.0	
375-95-1	Perfluorononanoic acid - PFNA	ND	16	

Surrogate Compounds	Recoveries (%)	QC Ranges
PFDA 13C2	76	70 - 130
PFHxA 13C2	88	70 - 130

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Coakley Landfill - Greenland, NH

Perfluorinated Alkyl Acids in Water

Client Sample ID:	MTBE-11149	Lab Sample ID:	AB62671
Date of Collection:	7/11/2016	Matrix:	Aqueous
Date of Preparation:	7/18/2016	Amount Prepared:	250 mL
Date of Analysis:	7/19/2016	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	RL ng/L	Qualifier
375-73-5	Perfluorobutanesulfonic acid - PFBS	ND	16	
375-85-9	Perfluoroheptanoic acid - PFHpA	ND	16	
355-46-4	Perfluorohexanesulfonic acid - PFHxS	ND	8.0	
335-67-1	Perfluorooctanoic acid - PFOA	ND	8.0	
1763-23-1	Perfluorooctanesulfonic acid - PFOS	ND	8.0	
375-95-1	Perfluorononanoic acid - PFNA	ND	16	

Surrogate Compounds	Recoveries (%)	QC Ranges
PFDA 13C2	74	70 - 130
PFHxA 13C2	107	70 - 130

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Coakley Landfill - Greenland, NH

Perfluorinated Alkyl Acids in Water

Client Sample ID:	MTBE-11160	Lab Sample ID:	AB62672
Date of Collection:	7/11/2016	Matrix:	Aqueous
Date of Preparation:	7/18/2016	Amount Prepared:	250 mL
Date of Analysis:	7/19/2016	Percent Solids·	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	RL ng/L	Qualifier
375-73-5	Perfluorobutanesulfonic acid - PFBS	ND	16	
375-85-9	Perfluoroheptanoic acid - PFHpA	ND	16	
355-46-4	Perfluorohexanesulfonic acid - PFHxS	ND	8.0	
335-67-1	Perfluorooctanoic acid - PFOA	ND	8.0	
1763-23-1	Perfluorooctanesulfonic acid - PFOS	ND	8.0	
375-95-1	Perfluorononanoic acid - PFNA	ND	16	

Surrogate Compounds	Recoveries (%)	QC Ranges
PFDA 13C2	69	70 - 130
PFHxA 13C2	104	70 - 130

Comments: Surrogate recovery for PFDA 13C2 was below QC criteria at 69%. The PFHxA 13C2 surrogate recovery was acceptable at 104%, and the associated internal standard recovery of PFDA 13C2 was 97%. No action taken - suspect matrix.

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Perfluorinated Alkyl Acids in Water

Client Sample ID:	MTBE-11162	Lab Sample ID:	AB62673
Date of Collection:	7/13/2016	Matrix:	Aqueous
Date of Preparation:	7/18/2016	Amount Prepared:	250 mL
Date of Analysis:	7/19/2016	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	RL ng/L	Qualifier
375-73-5	Perfluorobutanesulfonic acid - PFBS	ND	16	
375-85-9	Perfluoroheptanoic acid - PFHpA	ND	16	
355-46-4	Perfluorohexanesulfonic acid - PFHxS	ND	8.0	
335-67-1	Perfluorooctanoic acid - PFOA	ND	8.0	
1763-23-1	Perfluorooctanesulfonic acid - PFOS	ND	8.0	
375-95-1	Perfluorononanoic acid - PFNA	ND	16	

Surrogate Compounds	Recoveries (%)	QC Ranges
PFDA 13C2	78	70 - 130
PFHxA 13C2	106	70 - 130

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Coakley Landfill - Greenland, NH

Perfluorinated Alkyl Acids in Water

Client Sample ID:	Field Blank-2	Lab Sample ID:	AB62674
Date of Collection:	7/13/2016	Matrix:	Aqueous
Date of Preparation:	7/18/2016	Amount Prepared:	250 mL
Date of Analysis:	7/19/2016	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	RL ng/L	Qualifier
375-73-5	Perfluorobutanesulfonic acid - PFBS	ND	16	
375-85-9	Perfluoroheptanoic acid - PFHpA	ND	16	
355-46-4	Perfluorohexanesulfonic acid - PFHxS	ND	8.0	
335-67-1	Perfluorooctanoic acid - PFOA	ND	8.0	
1763-23-1	Perfluorooctanesulfonic acid - PFOS	ND	8.0	
375-95-1	Perfluorononanoic acid - PFNA	ND	16	

Surrogate Compounds	Recoveries (%)	QC Ranges
PFDA 13C2	75	70 - 130
PFHxA 13C2	100	70 - 130

US ENVIRONMENTAL PROTECTION AGENCY
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Coakley Landfill - Greenland, NH

Perfluorinated Alkyl Acids in Water

Client Sample ID:	MTBE-11164	Lab Sample ID:	AB62675
Date of Collection:	7/13/2016	Matrix:	Aqueous
Date of Preparation:	7/18/2016	Amount Prepared:	250 mL
Date of Analysis:	7/19/2016	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	RL ng/L	Qualifier
375-73-5	Perfluorobutanesulfonic acid - PFBS	ND	16	
375-85-9	Perfluoroheptanoic acid - PFHpA	ND	16	
355-46-4	Perfluorohexanesulfonic acid - PFHxS	ND	8.0	
335-67-1	Perfluorooctanoic acid - PFOA	ND	8.0	
1763-23-1	Perfluorooctanesulfonic acid - PFOS	ND	8.0	
375-95-1	Perfluorononanoic acid - PFNA	ND	16	

Surrogate Compounds	Recoveries (%)	QC Ranges
PFDA 13C2	72	70 - 130
PFHxA 13C2	88	70 - 130

US ENVIRONMENTAL PROTECTION AGENCY
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Coakley Landfill - Greenland, NH

Laboratory Blank

Client Sample ID:	N/A	Lab Sample ID:	N/A
Date of Collection:	N/A	Matrix:	Aqueous
Date of Preparation:	7/18/2016	Amount Prepared:	250 mL
Date of Analysis:	7/19/2016	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	RL ng/L	Qualifier
375-73-5	Perfluorobutanesulfonic acid - PFBS	ND	16	
375-85-9	Perfluoroheptanoic acid - PFHpA	**100**	16	
355-46-4	Perfluorohexanesulfonic acid - PFHxS	ND	8.0	
335-67-1	Perfluorooctanoic acid - PFOA	ND	8.0	
1763-23-1	Perfluorooctanesulfonic acid - PFOS	ND	8.0	
375-95-1	Perfluorononanoic acid - PFNA	ND	16	

Surrogate Compounds	Recoveries (%)	QC Ranges
PFDA 13C2	98	70 - 130
PFHxA 13C2	115	70 - 130

Comments: PFHpA is a component of PTFE (Teflon) tubing which is ubiquitous in a laboratory environment. The PFHpA concentration in the lab blank was higher than any of the results found in the samples. The PFHpA results for all samples in this batch are suspect due to lab blank contamination.

Coakley Landfill - Greenland, NH

MATRIX SPIKE (MS) RECOVERY

Sample ID: AB62665

PARAMETER	SPIKE ADDED ng/L	SAMPLE CONCENTRATION ng/L	MS CONCENTRATION ng/L	MS % REC	QC LIMITS (% REC)
Perfluorobutanesulfonic acid - PFBS	120	ND	106	88	70 - 130
Perfluoroheptanoic acid - PFHpA	120	91.0	122	26	70 - 130
Perfluorohexanesulfonic acid - PFHxS	120	ND	107	89	70 - 130
Perfluorononanoic acid - PFNA	120	ND	122	102	70 - 130
Perfluorooctanesulfonic acid - PFOS	120	ND	116	97	70 - 130
Perfluorooctanoic acid - PFOA	120	ND	116	97	70 - 130

Comment: PFHpA recovery was below QC limits due to lab contamination present in the un-spiked sample. The value found in the un-spiked sample is subtracted from the amount found in the matrix spike.

Coakley Landfill - Greenland, NH

Laboratory Duplicate Results

Sample ID: AB62659

PARAMETER	SAMPLE RESULT ng/L	SAMPLE DUPLICATE RESULT ng/L	PRECISION RPD %	QC LIMITS
Perfluorobutanesulfonic acid - PFBS	ND	ND	NC	30
Perfluoroheptanoic acid - PFHpA	22.0	12	59	30
Perfluorohexanesulfonic acid - PFHxS	ND	ND	NC	30
Perfluorononanoic acid - PFNA	ND	ND	NC	30
Perfluorooctanesulfonic acid - PFOS	ND	ND	NC	30
Perfluorooctanoic acid - PFOA	ND	ND	NC	30

Comment: An accurate RPD could not be determined for PFHpA as it is associated with lab blank contamination.

Coakley Landfill - Greenland, NH

Laboratory Fortified Blank (LFB) Results

PARAMETER	LFB AMOUNT SPIKED ng/L	LFB RESULT ng/L	LFB RECOVERY %	QC LIMITS %
High Level				
Perfluorobutanesulfonic acid - PFBS	80	85	106	70 - 130
Perfluoroheptanoic acid - PFHpA	80	139	174	70 - 130
Perfluorohexanesulfonic acid - PFHxS	80	83	104	70 - 130
Perfluorononanoic acid - PFNA	80	100	125	70 - 130
Perfluorooctanesulfonic acid - PFOS	80	84	105	70 - 130
Perfluorooctanoic acid - PFOA	80	97	121	70 - 130

Comments:

Samples in Batch: AB62658, AB62659, AB62660, AB62661, AB62662, AB62663, AB62664, AB62665, AB62666, AB62667, AB62668, AB62669, AB62670, AB62671, AB62672, AB62673, AB62674, AB62675

PN: 16070026

①

EPA LAB (CHELMSFORD) / NHDES MTBERB- WATER ANALYSIS LAB LOGIN AND CUSTODY SHEET

(Laboratory Policy: Samples not meeting method requirements will be analyzed at the discretion EPA Lab)
Samples must be delivered in a cooler with ice or ice packs.

ACCOUNT (Billing): 5293(PFC) **One Stop Project:** PFOA **NHDES Site Number:** Coakley Landfill

Description : MtBERB **Town:** Greenland / N. Hampton **Temp. ^{0}C.** ______

Collected by: M. Chase **Contact & Phone #** 271-8520

Sample Location/Station ID	Date Time Sampled	# of Containers	Matrix	PFC 537						Sampler Comments	Lab Login #
MTBE-11141	7/11 0910	1	AQ	X						10 Stone Meadow Way	
MTBE-11142 Duplicate	7/11 0934	~~3~~ 2	AQ	X						4 Stone Meadow Way	
MTBE-11144	7/11 0955	1	AQ	X						9 Stone Meadow Way	
MTBE-11143	7/11 1012	1	AQ	X						368 Breakfast Hill Rd	
MTBE-11145	7/11 1035	1	AQ	X						463 Breakfast Hill Rd	
MTBE-11152	7/11 1104	1	AQ	X						15 Berry Farm Rd	

Relinquished By [signature] Date and Time 7/11 1652 Received By Cold Storage 7.8 °C

Relinquished By [signature] Date and Time 7/14 926 Received By Cooler 3.9 °C

Relinquished By [signature] Date and Time 7/14 15:06 Received By [signature] ESAT 2.0 °C

Section No.: 22.0
Revision No.: 9
Date 02-28-2015
Page 1 of 1

Matrix: A= Air S= Soil AQ= Aqueous (Ground Water, Surface Water, Drinking Water, Waste Water) Other: ______

Page ______ **of** ______ Data Reviewed By ______ Date ______

7/11/16 7:31 AM

PN: 16070026

(2)

EPA LAB (CHELMSFORD) / NHDES MTBERB- WATER ANALYSIS LAB LOGIN AND CUSTODY SHEET

(Laboratory Policy: Samples not meeting method requirements will be analyzed at the discretion EPA Lab)
Samples must be delivered in a cooler with ice or ice packs.

ACCOUNT (Billing): 5293(PFC) **One Stop Project:** PFOA **NHDES Site Number:** Coakley Landfill

Description : MtBERB **Town:** Greenland/N. Hampton **Temp. ⁰C.**

Collected by: M. Chase **Contact & Phone #** 271-8520

Sample Location/Station ID	Date Time Sampled	# of Containers	Matrix	PFC 537						Sampler Comments	Lab Login #
MTBE-11146	7/11 1128	1	AQ	X						25 Falls Way	
MTBE-11153 Matrix Spike	7/11 1153	2	AQ	X						19 Stone Meadow Way	
MtBE-11147	7/11 1253	1	AQ	X						67 North Road	
MTBE-11148	7/11 1314	1	AQ	X						415 Breakfast Hill Rd	
Field Blank-1	7/11 1329	1	AQ	X						Field Blank	
0987050001	7/11 1353	1	AQ	X						339 Breakfast Hill Rd	

Relinquished By [signature] Date and Time 7/11 1652 Received By Cold Storage 7.8 °C

Relinquished By [signature] Date and Time 7/14 926 Received By Cooler 3.9 °C

Relinquished By [signature] Date and Time 7/14 1506 Received By [signature] ESAT 2.0 °C

Section No.: 22.0
Revision No.: 9
Date 02-28-2015
Page 1 of 1

Matrix: A= Air S= Soil AQ= Aqueous (Ground Water, Surface Water, Drinking Water, Waste Water) Other: ______

Page ______ **of** ______ Data Reviewed By______ Date______

7/11/16 7:31 AM

(8)

16070026 $537

EPA LAB (CHELMSFORD) / NHDES MTBERB- WATER ANALYSIS LAB LOGIN AND CUSTODY SHEET

(Laboratory Policy: Samples not meeting method requirements will be analyzed at the discretion EPA Lab)
Samples must be delivered in a cooler with ice or ice packs.

ACCOUNT (Billing): 5293(PFC) **One Stop Project:** PFOA **NHDES Site Number:** Coakley Landfill

Description : MtBERB **Town:** Greenland/ N. Hampton **Temp. ⁰ C.** ______

Collected by: M. Chase **Contact & Phone #** 271-8520 (603)

Sample Location/Station ID	Date Time Sampled	# of Containers	Matrix	PFC 537						Sampler Comments	Lab Login #
MTBE-11150	7/11 1414	1	AQ	X						346 Breakfast Hill Rd	
MTBE-11149	7/11 1434	1	AQ	X						340 Breakfast Hill Rd	
MTBE-11160	7/11 1504	1	AQ	X						10 Red Oak Drive	

Relinquished By [signature] Date and Time 7/11 1652 Received By Cold Storage 7.8 °C

Relinquished By [signature] Date and Time 7/14 926 Received By Cooler 3.9 °C

Relinquished By [signature] Date and Time 7/14 1506 Received By [signature] 2.0 °C

Section No.: 22.0
Revision No.: 9
Date 02-28-2015
Page 1 of 1

Matrix: A= Air S= Soil AQ= Aqueous (Ground Water, Surface Water, Drinking Water, Waste Water) Other: ______

Page ______ **of** ______ Data Reviewed By ______ Date ______

7/11/16 7:31 AM

FN:1607002б (4)

EPA LAB (CHELMSFORD) / NHDES MTBERB- WATER ANALYSIS LAB LOGIN AND CUSTODY SHEET

(Laboratory Policy: Samples not meeting method requirements will be analyzed at the discretion EPA Lab)
Samples must be delivered in a cooler with ice or ice packs.

ACCOUNT (Billing): 5293(PFC) **One Stop Project:** PFOA **NHDES Site Number:** Oakley

Description : MtBERB **Town:** Greenland **Temp. °C.** ______

Collected by: D. Barrett **Contact & Phone #** 271-8520

Sample Location/Station ID	Date Time Sampled	# of Containers	Matrix	PFC 537						Sampler Comments	Lab Login #
MTBE-11162 Duplicate	7/13 1657	2	AQ	X						21 Stone Meadow	
Field Blank-2	7/13 1733	1	AQ	X						Field Blank	
MTBE-11164 Matrix Spike	7/13 1750	2	AQ	X						5 Berry Farm	

Relinquished By [signature] Date and Time 7/13 2010 Received By Cold Storage 2.1 °C

Relinquished By [signature] Date and Time 7/14 926 Received By Cooler 3.9 °C

Relinquished By [signature] Date and Time 7/14 1506 Received By [signature] 20 °C

Section No.: 22.0
Revision No.: 9
Date 02-28-2015
Page 1 of 1

Matrix: A= Air S= Soil AQ= Aqueous (Ground Water, Surface Water, Drinking Water, Waste Water) Other: ______

Page ______ **of** ______ Data Reviewed By______________ Date__________

7/13/16 7:08 PM

Millan-Ramos, Gerardo

From:	Hoffman, Andrew <Andrew.Hoffman@des.nh.gov>
Sent:	Wednesday, July 06, 2016 3:17 PM
To:	Britz Peter (plbritz@ch.cityofportsmouth.com)
Cc:	Millan-Ramos, Gerardo; Jasinski, Michael; Mongeon, Robin
Subject:	Coakley gw sampling and reporting
Attachments:	2993_001.pdf; Coakley 2015 GW Contours.pdf; Coakley Dioxane Vertical Distribution.pdf; Coakley Dioxane Tabled Results pdf
Follow Up Flag:	Follow up
Flag Status:	Flagged

Peter,

I had a conversation with Henry Fuller (resident at 86 North Road and member of North Hampton Water Commission) today and discussed the following:

He asked if the North Road properties supplied by private well water that I sampled in May (Fuller and Nordstrom wells) would be sampled for PFCs. I responded that based on the previous sampling confirming our understanding of the plume status (e.g., flowing predominantly to the north and clean GMZ boundary wells to the south) that we would assess the need to extend sampling for PFCs to the south based on results from OU2 well sampling and northern residential well sampling. He was okay with this approach. HOWEVER, READ ON...

Mr. Fuller then requested to receive analytical results from monitoring wells located on Nordstrom (map 17 lot 72; AE-4A & 4B) (see attached figure) and Fitzgerald (map 17 lot 73; FPC-4B & GZ-105)) properties, both within the GMZ. He mentioned that both Nordstrom and Fitzgerald had reported to him that they previously requested (from those gaining access to sample the wells, I believe) a copy of the analytical data for these wells and did not ever receive the data. Mr. Fuller told me that Fitzgerald, out of frustration, even went as far as to remove (with an excavator) the monitoring wells on his property. Are you aware of any of this?

Furthermore, upon reviewing the 2015 analytical data for the aforementioned wells, I see that GZ-105 (a bedrock well) had 1,4-dioxane detected at 60 ppb last September; 69 in September 2014; and 98 in August 2012. The bedrock groundwater contours suggest that this portion of the plume is moving south, toward the Fitzgerald residence, which sits back on the lot from North Road. I don't understand why CES did not call this out in the annual report conclusions or recommendations. Monitoring wells AE-4A, AE-4B, FPC-4B and GZ-105 should all be sampled for PFCs AND 1,4-dioxane as part of the OU-2 sampling effort that you are currently planning. I will ask the DES sampling team to attempt to sample the Fitzgerald well (he refused to allow me to sample earlier in the spring) for PFCs and 1,4-dioxane.

Please give me call to discuss.
Drew

From: wdhwrbscan@des.nh.gov [mailto:wdhwrbscan@des.nh.gov]
Sent: Wednesday, July 06, 2016 1:47 PM
To: Hoffman, Andrew
Subject: Attached Image

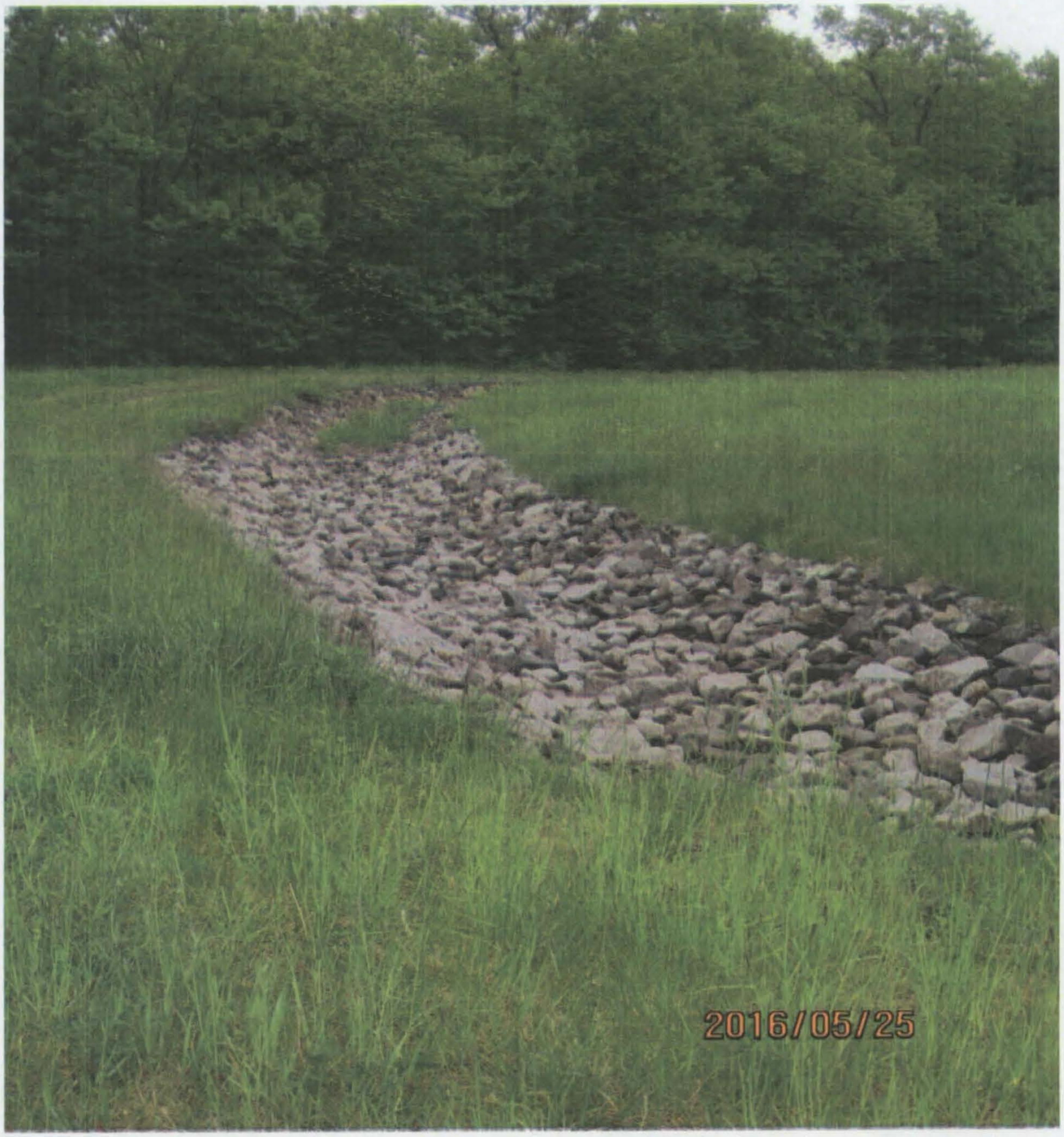
APPENDIX E – PHOTOGRAPHS

Photos from the Five Year Review Site Inspection

Photos sent by the CLG documenting repairs

PHOTOGRAPHS FROM SITE INSPECTION

View of the Crotty Property from the dirt road on top of the landfill, looking south.



View of rip-rap on top of drainage channel, looking south/south west from the dirt road.

View of damaged gas vent (second vent left of the dirt road going east to west).

View of the damaged gas vent on previous figure looking south. Note that it is at an angle; also note overgrown vegetation within the rip-rap.

View of overgrown vegetation in one of the drainage channels, looking to the southwest.

Example of mature vegetation that has grown on top of the drainage channels.

PFC sampling ongoing at one of the monitoring wells (MW-8) within OU-1.

View of the southwestern corner of the landfill and abutting landscaping/construction equipment & debris operations.

View of construction debris/landscaping operations abutting the southern section of the fence. Note the overgrown vegetation on top of the fence.

View of the gate at the southeastern corner of the fence, looking to the southwest.

Example of vegetation growing right next to the eastern section of the fence.

View of one of the gas vents with the whirly-wind cap not turning. Note the corrosion on the cap.

An example of vegetation that has grown too close and into the fence.

PHOTOGRAPHS SENT BY THE CLG DOCUMENTING REPAIRS

Photograph sent by the PRP in August 2016 documenting the repair (new whirly-wind cap) to a gas vent.

Photograph sent by the PRP in August 2016 documenting the repairs (new PVC couplings) to a broken gas vent.

APPENDIX F – RISK EVALUATIONS

Memorandum from Courtney Carroll to Gerardo Millán-Ramos re: Vapor Intrusion Screening Level Evaluation for Coakley Landfill 5YR, dated August 25, 2016

Technical Memo from Richard Sugatt to Gerardo Millán-Ramos re: Approach for evaluating sediment at Coakley Landfill during five year review periods, dated June 29, 2011

E-mail from Rick Sugatt to Gerardo Millán-Ramos re: Coakley Evaluation of Sediment Data dated August 30, 2016

Memorandum from Courtney Carroll and Rick Sugatt to Gerardo Millán-Ramos re: Review of the CLs for the 2016 Coakley Landfill Five-Year Review, dated August 22, 2016

MEMORANDUM

To: Gerardo Millan-Ramos
From: Courtney Carroll
Date: August 25, 2016
RE: Vapor Intrusion Screening Level Risk Evaluation for Coakley Landfill 5YR

Per request, please find in this memorandum a screening of groundwater data as well as a risk evaluation of these data for the vapor intrusion (VI) exposure pathway for the Coakley Landfill. This screening and risk evaluation is performed using data presented in the 2015 Annual Summary Report dated February 2016. Please note that this is a conservative risk evaluation of the maximum detected concentrations using the risk ratio approach instead of a conventional, full-scale risk assessment.

EPA's generic risk-based Vapor Intrusion Screening Levels (VISLs) are developed for chemicals with both cancer and non-cancer effects, following EPA Superfund guidance and using available toxicity values, standard risk methodology, and standard default exposure values. These generic VISLs can be found at https://www.epa.gov/vaporintrusion. The groundwater screening levels are developed specifically for the residential scenario for the VI exposure pathway.

These generic screening levels are based on the conservative target Cancer Risk (CR) level of 1E-06 or non-cancer Hazard Quotient (HQ) of 1 as the point of departure, with the lower value being used when there are both cancer and non-cancer screening levels. For this evaluation, the non-cancer VISLs are developed based on an HQ of 0.1 instead of 1 to account for a cumulative effect from multiple non-carcinogens. These levels are updated periodically to reflect updates on toxicity values and other factors contributing to their development. The current screening levels were last updated in May 2016.

Screening of groundwater data:

The maximum groundwater concentrations of the contaminants were compared against their respective risk-based groundwater VISLs for the residential scenario, and the results are shown in Table 1 below. Benzene and chlorobenzene were the only chemicals found to have maximum groundwater concentrations which exceeded their groundwater VISLs. Though above the VISLs, the maximum concentrations for benzene and chlorobenzene in the most recent round of sampling were much lower than the maximum historical concentrations.

Table 1 - Contaminants of Concern – VOCs Analyzed on an Annual Basis for Coakley Landfill

Contaminants	Max Historical Concentration (µg/L)	Max Sept 2015 Concentration (µg/L)	Residential Risk-based Groundwater VISLs (µg/L)
Benzene	26	3	1.6E+00
Chlorobenzene	160	7	4.1E+01
trans-1,2-Dichloroethene	< 2	< 2	NO VISL

1,2-Dichloropropane	< 4	< 2	2.4E+00
Tetrachloroethene (PCE)	< 2	< 2	5.8E+00
2-Butanone (MEK)	< 50	< 10	2.2E+05
Tetrahydrofuran (THF)	282	140	7.2E+04
tert-Butyl Alcohol (TBA)	70	40	NO VISL
1,4 dioxane	310	240	2.9E+03

< ## = reported concentration is less than the detection limit (##), VISL based on lower of CR = 1E-06 or HQ = 0 1

Table 2 – VOCs Analyzed for Sept 2015 Sampling Event

Contaminants	Max groundwater concentration (μg/L)	Residential Risk-based groundwater VISLs (μg/L)
1,2,4-Trimethylbenzene	< 1	2.9E+00
1,2-Dichloropropane	< 2	2.4E+00
1,4-Dichlorobenzene	2	2.6E+00
2-Butanone (MEK)	< 10	2.2E+05
Benzene	3	1.6E+00
Chlorobenzene	7	4.1E+01
Chloroethane	34	NO VISL
Diethyl Ether	98	NO VISL
IsoPropylbenzene	< 1	NO VISL
Methyl-t-butyl ether (MTBE)	< 5	4.5E+02
m&p-Xylene	1	3.6E+01

TECHNICAL MEMORANDUM

To: Gerardo Millan-Ramos

From: Richard Sugatt

Date: June 29, 2011

Subject: Approach for evaluating sediment at Coakley Landfill during five year review periods

Summary

The approach for evaluating potential toxicity of sediments at Coakley Landfill Superfund Site in the future is summarized here and detailed below. Every five years the worst-case sediment location at Coakley Landfill Superfund Site (SED-05) will be sampled and analyzed for inorganics. The Benchmark quotient (BQ) will be calculated by dividing the measured concentration of each metal by its site-specific benchmark, derived herein. The average BQ for all of the detected inorganics will be calculated and compared to the empirically demonstrated average BQ of 1 for the samples shown to be non-toxic by toxicity testing in 2007. Based on the average ratio of 4 between Threshold Effect Concentrations (TECs) and Probable Effect Concentrations (PECs) for metals from MacDonald et al (2000), additional toxicity testing will be required only if the average BQ exceeds 4 in future sediment samples. Otherwise, only analysis of inorganics in one sample from SED-05 would be conducted once during the next five year review period and evaluated by the describe BQ process.

Detailed Description of Approach

Sediment samples from several locations at Coakley Landfill have been analyzed on an annual basis since at least 2001. As part of the latest Five Year Review, it was determined that several inorganics in sediment exceeded generally accepted no-effect ecological benchmarks. The ecological benchmarks were the freshwater sediment benchmarks from EPA Region 3, which, for metals, are the same as the Threshold Effect Concentrations (TECs) from MacDonald et al (2000). Since exceedance of these benchmarks suggested that the site sediments might be toxic to aquatic organisms, it was decided to investigate prior to the subsequent five year review period whether there was any toxicity to aquatic organisms by sediment sampled at the site.

Since sediments with benchmark exceedances are often not toxic when tested in laboratory toxicity tests, it was not justified to conduct expensive toxicity testing at all historic sediment locations that had benchmark exceedances. Instead, it was decided to analyze another round of samples from these locations for inorganics concentrations and to conduct one toxicity test on the location that had the highest frequency and magnitude of benchmark exceedances. SED-05 was selected for toxicity testing because it had the highest benchmark quotients for the most chemicals. In 2007, a sediment sample was collected from this location and tested for toxicity on the freshwater amphipod *Hyallela azteca* in a standard 10-day test. There were no ecologically significant effects on the test organisms. As a result, it was concluded that the concentrations of inorganics measured in the sediment sample comprised site-specific no-effect concentrations that could be used as site-specific benchmarks for this site.

As shown in Table 1, the site-specific no-effect concentration was higher than the EPA Region 3 ecological benchmark for most of the chemicals that have benchmarks. Since the EPA Region 3 benchmarks represent non-toxic concentrations on a generic, non-site-specific basis, and the site-specific no-effect concentrations represent non-toxic concentrations in the particular type of sediments at the site, it is reasonable to assume that the site-specific no-effect benchmark should be the higher of the site-specific no-effect concentration or the EPA Region 3 benchmark.

The approach for evaluating potential toxicity of sediment collected in the future uses a benchmark quotient approach to evaluate the frequency and magnitude of benchmark exceedances using future data compared to site-specific no-effect benchmarks. This approach is exemplified in Table 1 in which the concentration of each inorganic in sample SED-05 taken in August 2009 is divided by its site-specific benchmark to derive a benchmark quotient. The benchmark quotient (BQ) approach is similar to the Hazard Quotient (HQ) approach in which the concentration at a site is divided by the no-effect concentration.

As shown in Table 1, the August 2009 concentration of chromium, nickel, and cobalt exceeded the site-specific benchmark concentration, with benchmark quotients of 1.1, 1.1, and 1.1, respectively. The toxicity of the August, 2009 sample was not measured, so the next step in developing an approach for future sampling is to estimate how much higher the concentrations would have to be compared to the non-toxic samples in November 2007 in order to be toxic. Of course, this can be done with total certainty only by conducting toxicity tests; however, the following approach can be used to estimate how high the BQ must go before toxicity is likely.

MacDonald et al (2000) derived TECs which are the concentrations, below which no toxicity is expected, but they also derived Probable Effect Concentrations (PECs) which are the concentrations, above which toxicity is likely, but not necessarily certain, to occur. For metals, the PEC was, on average, a factor of four higher than the TEC (Table 2). Therefore, it is reasonable to conclude that benchmark quotients would have to be about four times higher than no-effect benchmarks for toxicity to be likely.

Since the site-specific no-effect benchmarks for the inorganics in the 2007 non-toxic SED-05 sample are the same as the maximum measured concentrations of the same inorganics in the non-toxic sample, the average BQ in that non-toxic sample must be equal to 1, by definition. Therefore, the average benchmark quotient in a future sample would have to be 1 or less to be assured that the future sample is non-toxic. Conversely, the average BQ in a future sample would have to be no more than 4 to ensure that the future sample is unlikely to be toxic. Therefore, a future sample is likely to be non-toxic if the average BQ is less than or equal to 1, and likely to be toxic if the average BQ is equal to or greater than 4. It will be uncertain whether or not the sample is likely to be toxic if the average BQ is between 1 and 4. Therefore, the following criteria will be used to evaluate the potential for toxicity in future sediment samples:

- If average BQ is ≤ 1, conclude sample is likely to be non-toxic.
- If average BQ is > 1 but <4, conclude that it is uncertain whether sample is likely to be toxic.
- If average BQ is ≥ 4, conclude sample is likely to be toxic.

As an example of this type of approach, Table 1 shows that the average BQ for the sediment sample taken from SED-05 in August 2009 is 0.7. Based on the above criteria, it is concluded that this sample is likely to be non-toxic. If the average BQ had been between 1 and 4, then no conclusion could be made whether or not the sample was likely to be toxic. If the average BQ had been 4 or greater, then it would be concluded that the sample is likely to be toxic; however, only a toxicity test would be able to confirm that the sample was actually toxic. Therefore, it is proposed that a toxicity test be conducted only if future sampling shows that the average BQ is 4 or greater.

The concentrations of inorganics in the worst-case area of SED-05 are likely to increase only very slowly, if at all, based on the balance of leachate input via groundwater, overland erosive transport from the landfill surface and output via surface water export. Table 3 shows that there is no discernible trend in inorganics concentrations in SED-05 from 2001 to 2009. Therefore, it is reasonable to conclude that measuring inorganics and conducting the described BQ evaluation at an interval of five years will be sufficient to identify the development of conditions that might result in toxicity.

Therefore, the recommended criteria are summarized below along with the action(s) to be taken for each criterion:

- If average BQ is ≤ 1, conclude sample is likely to be non-toxic. Once during the next five year review period, collect and analyze one sample from SED-05 for inorganics and repeat BQ evaluation.
- If average BQ is > 1 but <4, conclude that it is uncertain whether sample is likely to be toxic. Once during the next five year review period, collect and analyze one sample from SED-05 and repeat the BQ evaluation.
- If average BQ is ≥ 4, conclude sample is likely to be toxic. Conduct 10-day amphipod toxicity test on a stored refrigerated aliquot of this sample or a freshly collected sample from SED-05 that is also analyzed for inorganics.
- If the tested sample is non-toxic, conclude that the area is not toxic and once during the next five year review period collect and analyze one sample from SED-05 for inorganics and repeat the BQ evaluation.
- If the tested sample is toxic, design appropriate remedial actions during the next five year review period.

Reference

MacDonald, D., C. Ingersoll, and T. Berger. 2000. Development and evaluation of consensus-based sediment quality guidelines for freshwater ecosystems. Archives of Environmental Contamination and Toxicology. 39: 20-31.

Sugatt, Richard

From: Sugatt, Richard
Sent: Tuesday, August 30, 2016 3:54 PM
To: Millan-Ramos, Gerardo
Subject: Coakley- evaluation of sediment data
Attachments: Sediment Benchmark Quotients 2014 -2016.xlsx

The most recent two years (2014-2016) of sediment metals data from location SED-5 are compiled in the attached table. Based on historical data, SED-5 is the location that had the highest concentration of most metals. A sediment sample from this location did not have any effects on amphipods in a 10-day toxicity test conducted in 2007; therefore, the maximum concentration of each metal in the sediment sample was considered to be the site-specific no-effect benchmark concentration, as described in a June 29, 2011 technical memorandum from Richard Sugatt to Gerardo Millan-Ramos and included in the most recent Five Year Review report. This memorandum described criteria and procedures for evaluating potential toxicity in the future using future sediment data from SED-5. The procedure involves calculation of a Benchmark Quotient (BQ) for each metal concentration by dividing the metal concentration by its site-specific no-effect benchmark concentration. The BQs for each metal are then averaged to calculate a mean BQ. Decision criteria in the memo include the following:

- If mean BQ is less than or equal to 1, conclude sample is likely to be non-toxic
- If mean BQ is greater than 1 but less than 4, conclude that it is uncertain whether sample is likely to be toxic
- If mean BQ is greater than or equal to 4, conclude that sample is likely to be toxic, and conduct toxicity test and metals analysis of additional samples

The data are shown on the attached table as reported (with qualifiers) and as used for the calculation of mean concentrations. J-qualified data were used as reported. U-qualified and UJ-qualified were adjusted to ½ the detection limit. R-qualified data were used as reported. The R designation indicates that the data were rejected, probably due to unacceptably high % moisture levels; however, the results are similar to those of the other acceptable samples so they were used in the calculation of mean concentrations. As shown in Table 1, the BQ for the mean concentration of each individual metal was lower than 1, and the mean BQ of all the individual metal BQ values was 0.49. Based on the evaluation criteria above, It is concluded that the samples from SED-5 are likely to be non-toxic, despite the fact that individual concentrations of some metals are higher than generic Threshold Effect Concentrations.

Richard H. Sugatt, Ph.D., USEPA Region 1, 5 Post Office Sq, STE 100, Mail Code OSRR07-2, Boston, MA 02109-3912, Telephone (617) 918-1415

MEMORANDUM

To:	Gerardo Millan-Ramos
From:	Courtney Carroll, Rick Sugatt
Date:	August 22, 2016
RE:	Review of CLs for the 2016 Coakley Landfill Five-Year Review

Per request, a review of the Cleanup Levels (CLs) was performed for the Coakley Landfill Five-Year Review, in August 2016. Table 1 below lists the CLs that were established for the Chemicals of Concern (COCs) identified at the Coakley Landfill Site and compares them to the most current federal MCLs, updated NH Ambient Groundwater Quality Standards (NHAGQS) and residential EPA Regional Screening Levels (RSLs) for residential tapwater. The table also indicates whether the CL was determined based on the Maximum Contaminant Level (MCL) or was a risk-based number.

Since the ROD CL for chemicals with MCLs or action limits (lead) was considered protective without regard to risk, the current MCLs (or action limit for lead) continue to be protective. These chemicals include benzene, chlorobenzene, 1,2-dichloropropane, trans-1,2-dichloroethene, antimony, arsenic, beryllium, and lead. The RSLs for diethyl phthalate and tetrahydrofuran were derived using the RSL calculator with standard defaults as inputs and current IRIS toxicity values. Since the CLs for diethyl phthalate and tetrahydrofuran were found to be lower than the newly calculated RSLs, they are still protective. In addition, the CLs for tetrachloroethene and chromium were determined to be protective because they are lower than their respective MCLs. However, this assumes that there is little or no hexavalent chromium in groundwater. The RSL for hexavalent chromium is 0.035 ug/L (based on 1E-06 cancer risk), which is much lower than the CL. In contrast, the RSL for trivalent chromium is 22,000 ug/L. The CL would need to be lower to be protective if hexavalent chromium is present in groundwater. Although the occurrence of hexavalent chromium is considered unlikely because it is rare in municipal landfills, an evaluation for the presence of hexavalent chromium in groundwater would be necessary to resolve this uncertainty. If hexavalent chromium is detected, then the CL may need to be lowered in order to be protective. The CLs for tetrachloroethene, manganese, 2-butanone (= methyl ethyl ketone), nickel and phenol were found to be protective because they are lower than their respective RSLs for tapwater. The CL for vanadium (i.e. "vanadium and compounds" in the RSL calculator) may not be protective because it is higher than the RSL for tapwater. An ESD may be required during the next five year review period to update the CL for vanadium.

Table 1. Protectiveness of Interim Cleanup Levels

Chemical of Concern	CL (ug/L)	MCL or risk based?	Tapwater RSL (ug/L) (TR=10^-6 or THQ=1)	Basis for RSL	Is CL still protective? **
Benzene	5	MCL = 5 ug/L	0.46	C	yes
Chlorobenzene	100	MCL = 100 ug/L	78	NC	yes
Tetrachloroethene	3.5	MCL=5 ug/L	11	C	yes
1,2-Dichloropropane	5	MCL = 5 ug/L	0.44	C	yes
2-Bμtanone	200	risk based	5,600	NC	yes
Diethyl phthalate	2800	risk based	14,800*	NC	yes
Trans-1,2-dichloroethene	100	MCL = 100 ug/L	360	NC	yes
Phenol	280	health advisory	5,800	NC	yes
Antimony	6	MCL = 6 ug/L	7.80	NC	yes
Arsenic	10	MCL = 10 ug/L	0.05	C	yes
Beryllium	4	MCL = 4 ug/L	25	NC	yes
Chromium	50	Previous MCL was 50 ug/L (current MCL = 100 ug/L for total Cr)	no RSL for total Cr; RSL for Cr(+3) = 22000 ug/L; RSL for Cr(+6) = 0.035 ug/L	NC for Cr+3; C for Cr+6	Yes, unless Cr+6 occurs
Lead	15	MCL = 15 ug/L	15	NC	Yes
Manganese	300 (health advisory)	risk based EPA health advisory	430	NC	Yes
Nickel	100	risk based	390	NC	Yes
Vanadium	260	risk based	86	**NC**	**No**
Tetrahydrofuran	154 (NH AGQS)***	Current NHAGQS = 600	3,380*	NC	Yes

*Calculated using the RSL calculator (standard defaults)

** CL is considered protective at the MCL.

*** NHAGQS = NH Ambient Groundwater Quality Standard

C = Cancer

NC = Non-cancer

Cr = Chromium