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**Second Five-Year Review Report**  
**for**  
**Coakley Landfill Superfund Site**  
**North Hampton and Greenland**  
**Rockingham County, New Hampshire**

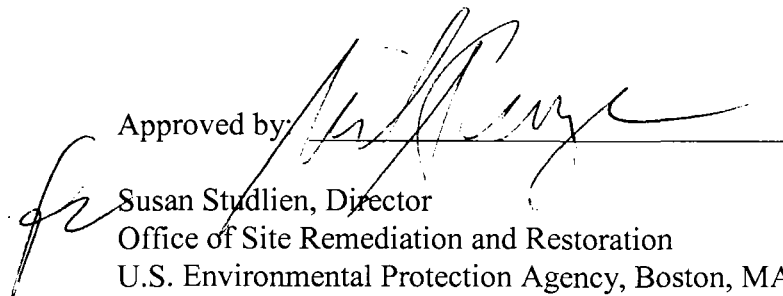
**September 21, 2006**

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**with assistance from**

 **New Hampshire Department of Environmental Services**

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Date: 9-21-06

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## ABBREVIATIONS AND ACRONYMS

ARARs	Applicable or Relevant and Appropriate Requirements
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLG	Coakley Landfill Group
COC	Contaminants of Concern
ESD	Explanation of Significant Difference
GMP	Groundwater Management Permit
GMZ	Groundwater Management Zone
IC	Institutional Controls
ICL	Interim Cleanup Levels
ICP	Institutional Control Plan
LFG	Landfill Gas
MCL	Maximum Contaminant Level
NCP	National Contingency Plan
NHDES	New Hampshire Department of Environmental Services
NPL	National Priorities List
O&M	Operation and Maintenance
OMP	Operation and Maintenance Plan
OU	Operable Unit
PAH	Polycyclic Aromatic Hydrocarbons
RA	Remedial Action
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
ug/l	micrograms per liter (i.e., parts per billion)
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds

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## Executive Summary

*The United States Environmental Protection Agency, Region 1 (USEPA) has conducted a Five-Year Review Report of the Remedial Actions (RAs) implemented at the Coakley Landfill Superfund Site in North Hampton and Greenland, New Hampshire in compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. Section 9601, et seq. USEPA conducted this review between February 2006 and September 2006 with technical assistance from the New Hampshire Department of Environmental Services (NHDES).*

*This is the second Five-Year Review Report for the site. The triggering action for this review was the date of the first Five-Year Review, signed September 25, 2001. Subsequent reviews are conducted at least every five years. The purpose of the Five-Year Review is to evaluate whether response actions and original performance standards remain protective of human health and the environment.*

*The response actions for the site are documented in two Records of Decision (RODs) and three Explanation of Significant Differences (ESDs). The site is divided into two separate operable units (OUs). The first OU (source control) provided for the remediation of the source of contamination at the Coakley site, including the contaminated groundwater beneath and in the vicinity of the landfill. Source control included consolidation of wastes and sediments identified beyond the landfill and covering the landfill with an impermeable cap. The remedy for the second OU (management of migration) addresses groundwater contamination which has migrated from the landfill. The response action includes using institutional controls to prevent use of contaminated groundwater; utilizing natural attenuation to remediate the contaminated groundwater plume; and groundwater monitoring. Coakley Landfill achieved construction completion status with the signing of the Preliminary Close-Out Report on September 29, 1999.*

*A protectiveness determination for the Coakley Landfill Superfund Site cannot be made at this time until further information is obtained. Metals exceedences are present above ecological benchmarks in the surface water, leachate and sediment at the site and high levels of arsenic and manganese are present in wells at the edge of the proposed groundwater management zone. Additional data has been and/or will be collected and will be analyzed over the next 15 months, at which time a protectiveness determination will be made.*

### Five-Year Review Summary Form

<b><i>SITE IDENTIFICATION</i></b>		
<b>Site name:</b> Coakley Landfill		
<b>EPA ID:</b> NHD064424153		
<b>Region:</b> 1	<b>State:</b> NH	<b>City/County:</b> North Hampton and Greenland, Rockingham County
<b><i>SITE STATUS</i></b>		
<b>NPL status:</b> Final		
<b>Remediation status:</b> Complete		
<b>Multiple OUs?</b> Yes	<b>Construction completion date:</b> 09/29/1999	
<b>Has site been put into reuse?</b> No		
<b><i>REVIEW STATUS</i></b>		
<b>Lead agency:</b> PRP with EPA and State oversight		
<b>Author name:</b> Brenda Haslett		
<b>Author title:</b> Remedial Project Manager	<b>Author affiliation:</b> EPA Region 1	
<b>Review period:</b> 02/13/2006 to 09/25/2006		
<b>Date(s) of site inspection:</b> 07/25/2006		
<b>Type of review:</b> <div style="text-align: right; margin-top: 5px;"> <input checked="" type="checkbox"/> Post-SARA              <input type="checkbox"/> Pre-SARA              <input type="checkbox"/> NPL-Removal only  <input type="checkbox"/> Non-NPL Remedial Action Site              <input type="checkbox"/> NPL State/Tribe-lead  <input type="checkbox"/> Regional Discretion         </div>		
<b>Review number:</b> Second		
<b>Triggering action:</b> Completion of First Five-Year Review		
<b>Triggering action date:</b> 09/25/2001		
<b>Due date (five years after triggering action date):</b> 09/25/2006		

## Five-Year Review Summary Form, cont'd.

### Issues:

1. Arsenic MCL has been lowered to 10 ug/l from current site ICL of 50 ug/l and health advisory for manganese has changed from 180 ug/l to 300 ug/l.
2. Boundary of proposed Groundwater Management Zone (GMZ) needs to be affirmed.
3. Groundwater Management Permit (GMP) Application needs to be finalized by CLG and approved by NHDES.
4. Institutional controls must be in place.
5. Off-site methane gas levels must be brought into compliance with state regulations.
6. Leachate, surface water and sediment metal exceedances must be addressed.

### Recommendations and Follow-up Actions:

1. USEPA will produce an ESD by September 30, 2007 outlining the arsenic and manganese changes.
2. If GMZ boundary needs to be expanded, obtain ICs on additional properties where appropriate.
3. Finalize GMP application and obtain approval from NHDES.
4. Obtain easements for three properties which currently require ICs.
5. Install active measures to control methane gas exceedances in compliance with state regulations.
6. Follow up discussions with USEPA and NHDES on leachate, surface water and sediment sampling and determine whether any additional remedial measures are required to address Site risks.

### Protectiveness Statement(s):

A protectiveness determination of the source control remedy at OUI cannot be made at this time until further information is obtained. Metals exceedances are present above ecological benchmarks in the surface water, leachate and sediment at the site. Additional monitoring data has been collected and will be analyzed to determine if adverse ecological impacts are present in these media. It is expected that the data analysis will take approximately 15 months to complete, at which time a protectiveness determination will be made. In addition, sporadic violation of off-site methane gas levels must be brought into compliance with state regulations. 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.

*A protectiveness determination of the management of migration remedy at OU2 cannot be made at this time until further information is obtained. High levels of arsenic and manganese are present in wells at the edge of the proposed groundwater management zone. Additional data must be collected so that a determination can be made whether elevated levels are a result of landfill impacts or from a source other than the NPL site. Dependent on these findings, the scope of the groundwater remedy may need to be modified. A protectiveness determination will be made in 15 months when all data has been evaluated. The extent of the GMZ needs to be determined and institutional controls established for all properties within the GMZ. Monitoring of the site will continue until cleanup levels for the contaminants of concern are met. It is expected to take approximately 15 years to reach cleanup levels.*

*A site-wide protectiveness determination for the Coakley Superfund Site cannot be made at this time until further information is obtained. Metals exceedences are present above ecological benchmarks in the surface water, leachate and sediment at the site and high levels of arsenic and manganese are present in wells at the edge of the proposed groundwater management zone. Additional data has been and/or will be collected and analyzed and a protectiveness determination will be made in 15 months.*

## 1.0 INTRODUCTION

The purpose of a five-year review is to determine whether a remedy at a Superfund site is protective of human health and the environment. The methods, findings and conclusions of reviews are documented in Five-Year Review Reports. In addition, Five-Year Review Reports identify issues found during the review, if any, and identify recommendations to address them.

The Agency is preparing this Five-Year Review Report pursuant to CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300. CERCLA Section 121(c) as amended states:

*If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such review, and any actions taken as a result of such reviews.*

The Agency interpreted this requirement further in the NCP, 40 CFR Section 300.430(f)(4)(ii) states:

*If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after initiation of the remedial action.*

USEPA has conducted this five-year review of the selected remedy at the Coakley Landfill Superfund Site in Greenland and North Hampton, New Hampshire. The review was conducted from February through September 2006, with assistance from the New Hampshire Department of Environmental Services (NHDES). This report documents the results of the review.

This is the second five-year review for the site. This five-year review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure. The triggering action for this statutory review is the date of the first Five-Year Review Report signed on September 25, 2001.



## 2.0 SITE CHRONOLOGY

Table 1 lists the chronology of events for the Coakley Landfill Superfund site.

**Table 1: Chronology of Site Events**

Date	Event
1972	Landfill operations begin
1979	Initial discovery of the problem
1983	Water main extension completed near the site by the town of North Hampton and Rye Water Districts
July, 1985	Landfill operations cease
June 10, 1986	Final listing on NPL
March 2, 1990	Operable Unit 1 RI/FS complete
June 28, 1990	Operable Unit 1 ROD signature
March 22, 1991	Operable Unit 1 ESD addressing landfill cover design
May 23, 1994	Operable Unit 2 RI/FS complete
September 30, 1994	Operable Unit 2 ROD signature
May 17, 1996	Operable Unit 1 ESD addressing landfill gas system design
September 24, 1996	Operable Unit 1 construction start
September 29, 1999	Operable Unit 1 ESD addressing leachate collection and treatment
September 29, 1999	Construction completion
September 25, 2001	First five-year review report

## **3.0 BACKGROUND**

### **3.1 Physical Characteristics**

The Coakley Landfill Superfund Site (the '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 farmland, undeveloped woodlands and wetlands to the north and west and commercial and residential properties to the east and south.

### **3.2 Land and Resource Use**

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. In 1982, the city of Portsmouth began operating a refuse-to-energy plant on leased property at Pease Air Force Base. 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 this plant for incineration. The Coakley Landfill generally accepted incinerator residue from the new plant after July, 1982. In March 1983, the New Hampshire Bureau of Solid Waste Management ordered the landfill closed to all waste disposal except burnt residue from the incinerator. In July, 1985 the landfill was closed to all disposal activities.

### **3.3 History of Contamination**

In 1979, the New Hampshire Waste Management Division received a complaint concerning leachate breakouts in the area. A subsequent investigation by the Bureau of Solid Waste Management 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).

### **3.3 Initial Response**

A subsequent confirmatory sampling beyond these initial wells detected 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 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 listed in 1986.

### **3.4 Basis for Taking Action**

A cooperative agreement was signed with the state of New Hampshire on August 12, 1985 to conduct a Remedial Investigation/Feasibility Study (RI/FS). The RI/FS for OU1 (Source Control) was completed on March 2, 1990. The RI/FS for OU2 (Management of Migration) was conducted by the USEPA and completed on May 23, 1994. Both studies found contaminants in groundwater beneath the landfill as well as outside the landfill boundaries. Volatile organic compounds (VOCs) detected at the site included benzene, ethyl benzene, chloroethane, chlorobenzene and xylene. Semi-volatile organic compounds (SVOCs) detected at the site 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.

The objective of the OU1 ROD is to protect the drinking water aquifer by minimizing further migration of contaminants to the groundwater and surface water and eliminate threats posed by direct contact with or ingestion of contaminated soils and wastes at the site. The objective of the OU2 ROD is to manage the migration of contaminated groundwater outside the landfill boundaries. 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 contaminants of concern (COC):

**Table 2: Contaminants of Concern**

<b>Contaminant</b>	<b>ICL (ug/l)*</b>	<b>Revised ICL (ug/l)</b>
Benzene	5	
Chlorobenzene	100	
Tetrachloroethene	3.5	
1,2-Dichloropropane	5	
2-Butanone	200	
Diethyl phthalate	2,800	
Trans-1,2-dichloroethene	100	
Phenol	280	
Antimony	6	
Arsenic	50	10** (MCL)
Beryllium	4	
Chromium	50	
Lead	15	
Manganese	180 (health advisory)	300 ** (health advisory)
Nickel	100	
Vanadium	260	

\* ICLs from 1990 and 1994 RODs.

\*\* Revised MCL (effective January 23, 2006) and health advisory (as of 2004) will be addressed in a 2007 planned ESD.

## 4.0 REMEDIAL ACTIONS

### 4.1 Remedy Selection

On June 28, 1990, USEPA issued a ROD for the source control operable unit of the site. On March 22, 1991, USEPA issued an ESD concerning modifications to the source control remedy related to landfill cap construction and emissions from air strippers proposed to be used to treat the leachate. A second ESD was issued on May 17, 1996, which changed active landfill gas collection and treatment to a passive collection system. A third ESD was issued on September 29, 1999 which documented the decision to eliminate leachate collection and treatment.

The remedial action objectives, as stated in the OU1 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 remedy as modified by the three ESDs are:

- Excavation with disposal onto the landfill, of 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

The ROD for the management of migration operable unit was issued on September 30, 1994. The ROD called for natural attenuation of the contaminated groundwater, which had migrated from beneath the landfill into off-site areas, together with long-term environmental monitoring and institutional controls.

## **4.2 Remedy Implementation**

### **4.2.1 Source Control and Management of Migration**

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 OU1 remedy, and USEPA 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 cover was completed in the fall of 1998 and a pre-final inspection was conducted by USEPA and NHDES 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. USEPA evaluated that data and determined that the landfill cover 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. USEPA'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 OU2 remedy which USEPA approved on March 10, 1999. The monitoring plan objective was to 1) assess OU1 Remedial Action (RA) impacts on site sediment, surface water, groundwater, and 2) monitor natural attenuation of cleanup standard constituents in the OU2 area, sediments, surface water and groundwater. To attain this objective, the monitoring plan required sediment, surface water and groundwater sampling and analysis in April, August and November of 1999. The monitoring plan also required analysis for VOCs, SVOCs, metals, natural attenuation indicators and water quality indicators. Annual monitoring of groundwater, surface water and sediments continues today and an annual data assessment report is provided to the USEPA and NHDES. Ambient air and landfill gas monitoring occurs quarterly after which reports are provided to the agencies.

### **4.2.2 Institutional Controls**

A plan for implementation of institutional controls (ICP) was submitted to USEPA by CLG in June 2000 and the final draft of the Groundwater Use Restriction documents for incorporation into the ICP in June 2001. Both documents were approved by USEPA in August 2001. The objectives of the ICP are to: 1) provide a plan and schedule to implement site institutional controls to restrict ingestion of water from the degraded groundwater plume migrating from the site in accordance with Section X of the OU2 ROD, and 2) evaluate the effectiveness of the selected and implemented institutional controls. The CD defines these institutional controls as deed restrictions

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or other declarations of covenants, easements or notices created to restrict the use of groundwater at the site, limit exposure to waste material, ensure non-interference with the remedy and ensure the integrity and effectiveness of the remedy. More specifically, the statement of work attached to the CD states that with respect to groundwater use, ICs for the Coakley site will include an IC plan that creates a groundwater management zone (GMZ) for the landfill and the contaminated groundwater plume. Groundwater easements to restrict and/or control the use of groundwater shall be obtained by the CLG from property owners located within the GMZ that do not have alternate water available. In addition, notifications will be recorded with the registry of deeds on all parcels contained within the GMZ that have alternate water available.

Restrictions on the landfill property 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 OU1 and OU2.

**4.3 System Operations/Operation and Maintenance (O&M)**

Required system operations included in the OU1 Operation and Maintenance Plan (OMP) include: annual mowing and inspection of the landfill cover and surface water drainage systems; and quarterly ambient air and landfill gas monitoring. Annual sampling and monitoring of groundwater, surface water and sediments is required for both OUs. Once ICs are in place, annual monitoring of the effectiveness of ICs will be required.

**Table 3: Annual Operating and Maintenance Expenses by Operable Unit**

<b>Year</b>	<b>Operable Unit 1</b>	<b>Operable Unit 2</b>
2005	\$ 55,348.37	\$ 49,725.41
2004	\$ 48,528.85	\$ 53,608.20
2003	\$ 26,609.05	\$ 37,494.70
2002	\$ 600,988.36	\$ 68,701.78
2001	\$1,506,084.60	\$ 82,393.01
<b>TOTAL</b>	\$2,237,559.23	\$291,923.10
Estimated annual cost (3 year average)	\$ 43,495.42	\$ 46,942.77

## **5.0 PROGRESS SINCE THE LAST FIVE-YEAR REVIEW**

### **5.1 Protectiveness Statement from the Previous Five-Year Review**

“The remedy at Operable Unit 1 is expected to be protective of human health and the environment upon implementation of actions to control off site migration of landfill gas.”

“The remedy at Operable Unit 2 is expected to be protective of human health and the environment upon implementation of institutional controls.”

### **5.2 Progress Since the Last Five-Year Review**

The last Five-Year Review occurred in September 2001. The overall findings of the 2001 review indicated that the site remained protective of human health and the environment in the short-term. The recommendations of the 2001 review stated:

- In accordance with the approved Institutional Control Plan, deed restrictions must be obtained by February 1, 2002. This will ensure no contact with contaminated groundwater.
- The arsenic cleanup level must be reviewed and a determination made as to whether the remedy (monitored natural attenuation) remains protective in light of any revised cleanup levels.
- A proposal to address off-site migration of landfill gas through the soil will be submitted by the end of October 2001 for review and approval by EPA and the NHDES.

### **5.3 Status of Recommendations Since the Last Five-Year Review**



**Table 4: Status of Recommendations since Last Five-Year Review**

Issues from Previous Review	Action Taken and Outcome
<p>Institutional Controls need to be put in place.</p>	<p>In accordance with the approved Institutional Control Plan, the CLG should have obtained all deed restrictions by February 1, 2002 prohibiting groundwater use on those properties without public water which overlie the contaminated groundwater plume at the site. To date, a declaration of groundwater use restriction has been recorded on seven parcels of land which overlie the groundwater plume, however, three properties still need deed restrictions/easements. Deed notices on approximately 23 parcels of land where public water has been made available are pending approval of the GMP application. USEPA and NHDES are working closely with the CLG to ensure progress continues in this effort.</p>
<p>Address off-site migration of landfill gas.</p>	<p>Off-site landfill gas levels must be brought into compliance with state regulations for methane concentrations. A draft Methane Soil Gas Survey Workplan was submitted to USEPA and NHDES in January 2006. Subsequent conversations among EPA, NHDES and the CLG have indicated that plans to proceed with active measures rather than first performing a study will be completed. The CLG will provide a cross-section from the Crotty property to the landfill to document gas migration pathways, landfill toe location, gas vent screen intervals, water table, and foundation depths. The CLG will also develop an engineered plan to actively vent landfill gas using a solar powered fan mounted on one of the landfill vents closest to M-7. The plan will be submitted to the NHDES as soon as it can be completed, but not later than December 1, 2006. Upon approval of this plan the CLG will install said fan unit to the appropriate vent. In addition, the CLG will request permission of the property owners at each of the six abutting properties to install a methane gas alarm which will alert the occupants of any unsafe gas conditions on the premises. Once the alarms are installed the CLG will cease its quarterly monitoring of landfill gas at these locations. Note: to date there has not been a reading of higher than 0.0% methane within any of these buildings.</p>
<p>Does remedy remain protective in light of any revised cleanup levels?</p>	<p>The arsenic cleanup level has changed from 50 ug/l to 10 ug/l, and the health advisory for manganese has increased from 180 ug/l to 300 ug/l since the last five-year review. Wells with elevated levels of arsenic and manganese still appear to be within the proposed GMZ, and no one is drinking the groundwater. The CLG will continue to perform annual monitoring until cleanup levels of all COCs are met.</p>

## **6.0 THE FIVE-YEAR REVIEW PROCESS**

### **6.1 Administrative Components**

The Coakley Landfill Superfund Site five-year review was conducted by Brenda Haslett, the USEPA Remedial Project Manager, with assistance from Michael Jasinski the USEPA Superfund Section Chief and Andrew Hoffman, NHDES Remedial Project Manager. The five-year review was conducted between February, 2006 and September, 2006.

### **6.2 Community Notification and Involvement**

Community notification was initiated by the release of a fact sheet announcing the start of the five-year review. Angela Bonarrigo, EPA Community Involvement Coordinator issued the fact sheet on June 15, 2006. The notification was published in the Portsmouth Herald.

Another fact sheet and notification to the newspaper will be issued announcing the completion of the report and the results of the review. A copy of the final report will be available for review at the North Hampton Public Library, 235 Atlantic Avenue, North Hampton, NH; at USEPA's office at 1 Congress Street, Boston, MA; and at <http://www.epa.gov/region1/superfund/sites/coakley>.

### **6.3 Document Review**

The project team reviewed several documents and site files to become knowledgeable with the history and status of cleanup in order to assess the protectiveness of the remedy at the site. Specific documents reviewed included:

1. Records of Decision: June 28, 1990 and September 30, 1994
2. Explanations of Significant Differences: March 22, 1991; May 17, 1996; September 29, 1999
3. Initial Data Analysis and Monitoring Report: September 1999
4. Final Institutional Control Plan: June 2000
5. Initial Five-Year Review Report: September 25, 2001
6. Annual Monitoring Reports: 2000-2005
7. Methane Soil Gas Survey Workplan: January 2006
8. Landfill Gas Monitoring Results: 2006

Angela Bonarrigo and Brenda Haslett visited the Coakley Landfill repository at the town of North Hampton public library and noted several years' worth of documents missing. USEPA will work with CLG to ensure all applicable documents are maintained at the repository.

## 6.4 Data Review

### 6.4.1 Groundwater Monitoring

For the site, 16 groundwater contaminants of concern were identified and interim cleanup levels (ICLs) were established in the OU2 ROD (refer to Table 2 in Section 3 herein). Thirty-five compliance wells were sampled in the latest groundwater sampling round for which data are available (August, 2005). Six chemicals of concern did not meet their specified cleanup levels. Seventeen wells exceeded the arsenic cleanup level (MCL of 10 ug/l) ranging from 11 ug/l to 300 ug/l; twenty-six wells exceeded the manganese cleanup level (health advisory of 300 ug/l) ranging from 370 ug/l to 13,000 ug/l; two wells exceeded the benzene cleanup level (MCL of 5 ug/l) ranging from 7 to 8 ug/l; three wells exceeded the nickel cleanup level (MCL of 100 ug/l) ranging from 150 to 410 ug/l; two wells exceeded the chromium cleanup level (50 ug/l) ranging from 140 ug/l to 600 ug/l; and one well exceeded the lead cleanup level (15 ug/l) at 100 ug/l.

Since the last five-year review, the MCL for arsenic has changed from 50 ug/l to 10 ug/l. Nine of the seventeen wells mentioned above were in the range of 10 ug/l and 50 ug/l. All wells exceeding their respective ICLs are located within the proposed GMZ (although one well, FPC-6B, is on the outer boundary of the proposed GMZ).

Since the last five-year review, the health advisory for manganese has increased from 180 ug/l to 300 ug/l. All wells exceeding their respective ICLs are located within the proposed GMZ (although one well, FPC-6B is on the outer boundary of the proposed GMZ).

VOCs were not detected in either of the off-site residential water supply wells at concentrations that exceeded the laboratory detection limits of 0.5 ug/l. The analytical results for samples collected from off-site residential water supply wells do not indicate any impacts from the landfill site.

COCs in some of the overburden and bedrock groundwater samples collected during the August, 2005 annual monitoring event are included in Appendix C.

Monitoring well FPC-6B shows high levels of manganese (6,200 ug/l) and arsenic (50 ug/l). This well is on the edge of the proposed GMZ. A determination needs to be made whether elevated levels are coming from or caused by the landfill or from a source other than the NPL site. CLG will need to collect and analyze more data to answer the question and present its findings to USEPA and NHDES, so that a decision can be made whether the scope of the groundwater remedy needs to be modified. Depending on the findings, it may be necessary to either 1) expand the proposed GMZ in order to locate a clean edge or 2) reduce the proposed GMZ if it is determined that the well is influenced by non-NPL site sources of contamination. Several other monitoring wells near the edge of the proposed GMZ will require a similar evaluation as noted for well FPC-6B.

#### 6.4.2 Landfill Gas Monitoring

Landfill gas monitoring has shown sporadic violations of the state standard for methane (2.5%). No indication of methane in the six nearby occupied buildings being monitored has been found to date. "Turbine vents" have been installed on several landfill gas vents in order to prevent the off-site migration of landfill gas. Additional actions to fully address off-site soil gas violations are currently under development and will include the following: 1) the CLG will provide a cross-section from the Crotty property to the landfill to document gas migration pathways, landfill toe location, gas vent screen intervals, water table, and foundation depths and 2) the CLG will develop an engineered plan to actively vent landfill gas using a solar powered fan mounted on one of the landfill vents closest to M-7. The plan will be submitted to the NHDES as soon as it can be completed but not later than December 1, 2006. Upon approval of this plan the CLG will install said fan unit to the appropriate vent. In addition, the CLG will also request permission of the property owners at each of the six abutting properties along the eastern edge of the landfill to install a methane gas alarm which will alert the occupants of any unsafe gas conditions on the premises. After the alarms are installed, the CLG will cease its quarterly monitoring of landfill gas at these locations.

#### 6.4.3 Surface Water/Sediment Monitoring

Comparison of the last five years of monitoring results with ecological benchmarks for freshwater organisms revealed exceedances by some metals (Appendix C) in landfill leachate, surface water and sediment. CLG performed a round of sampling in August, 2006 and will share results with USEPA and NHDES as soon as practicable. Next steps will be discussed at that time to evaluate the ecological significance of these exceedances. CLG has requested that Aries Engineering provide a scope of services for additional investigations regarding these exceedances. CLG will work with USEPA and NHDES in proceeding with any investigation.

#### 6.4.4 Institutional Controls

Restrictions on the landfill property 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 OU1 and OU2.

USEPA endorses the State Comprehensive Ground Water Protection Program embodied in RSA 485C. New Hampshire law holds that all groundwater must meet drinking water quality standards. The exception is for areas contained within a GMZ where a GMP has been issued. A GMP establishes an area within which it is acknowledged that groundwater is contaminated above drinking water quality standards. Further, the GMP includes mechanisms to restrict the use of groundwater while remedial actions, including natural attenuation, are occurring and includes monitoring criteria that will ensure the long-term protection of public health and the environment. The goal in establishing a GMZ is to bring groundwater back to drinking water quality standards.

There are two categories of ICs under the NHDES GMP regulations: 1) deed notices and 2) easements. Deed notices are required for properties within the GMZ with access to public water supplies; permission of the landowner is not required to record a deed notice. Easements are required on properties within the GMZ where no alternative water supply exists and are designed to restrict and/or control the use of groundwater. Easements are obtained by the permittee from property owners within the GMZ.

At Coakley, there are 23 properties requiring a deed notice and 11 properties requiring easements. Owner permission has been obtained for all but three properties requiring easements. A B&M railroad right-of-way, a property originally identified as needing an easement, has been removed. Under NH regulation, rights-of-way do not require restrictions. Depending on the updated analysis of the extent of the plume, the size of the GMZ may be revised and additional properties may require ICs.

## **6.5 Site Inspection**

The five-year review site inspection to assess the protectiveness of the remedy was conducted on July 25, 2006. The inspection was conducted by Brenda Haslett, USEPA Remedial Project Manager, Andrew Hoffman, NHDES Project Manager, Peter Britz, CLG representative, and Angela Bonarrigo, USEPA Community Involvement Coordinator. During the inspection, the integrity of the landfill cover and surface drainage systems was evaluated. The condition of the landfill gas extraction and monitoring system, groundwater monitoring wells and the perimeter fence were observed. Warning signs were posted and gates and (observed) wells were locked. On August 28, 2006, USEPA Region 1 personnel also visited the site during the scheduled annual monitoring event. Primary purpose of this site visit was to observe the sampling of surface water and sediment locations around the landfill.

See Appendix E for photos documenting site conditions and Appendix F for the inspection checklist.

## **6.6 Interviews**

Brenda Haslett and Angela Bonarrigo interviewed the town administrator for the town of Greenland, and local land and business owners. A report of those interviews can be found in Appendix D.

## 7.0 TECHNICAL ASSESSMENT

### 7.1 Question A: Is the remedy functioning as intended by the decision documents?

Yes. A review of all available documents, applicable or relevant and appropriate requirements (ARARs), risk assumptions and the results of the site inspections indicates that the remedy is functioning as intended, except additional information and analysis is required to determine whether leachate, surface water, and sediments are posing a current ecological risk that will need to be addressed through additional remedial action. Although a number of wells show elevated levels of arsenic and manganese, these wells are within the proposed GMZ as drawn in the ICP, and public water supply has been provided to all potential drinking water users in the immediate area of the landfill. While natural attenuation processes are occurring at the site, additional analysis is required to determine whether the current proposed GMZ adequately includes the entire area where risk from the NPL site contaminated groundwater exists. The size of the proposed GMZ may need to be revised, implementation of ICs by the CLG must be obtained, and landfill gas must be addressed in order to achieve future protectiveness.

### 7.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy selection still valid?

Yes. There have been no changes in land use at the site which would change the exposure assumptions contained in the RODs or affect the protectiveness of the remedy. No new contaminants, sources or exposure pathways were identified during this five-year review. USEPA has revised the Maximum Concentration Level (MCL) for arsenic from 50 parts per billion to 10 parts per billion effective January 23, 2006. A health advisory in 2004 increased the health advisory for manganese from 180 ug/l to 300 ug/l. These changes will not affect the risk calculated at the site; however, they do revise the cleanup levels for groundwater and may require a revision to the size of the proposed GMZ. An ESD will be prepared in calendar year 2007 documenting the revised cleanup levels for arsenic and revised health advisory for manganese for the site.

An operation and maintenance plan (OMP) is currently in place which requires annual groundwater, leachate, surface water and sediment monitoring. In addition, a landfill gas (LFG) monitoring plan is also in place which requires quarterly monitoring at several locations. These monitoring events continue to provide the necessary data to ensure that the cleanup levels and RAOs are still valid at the site.

The following ARARs and To Be Considered guidances were reviewed for changes that could affect protectiveness:

- Federal Safe Drinking Water Act regulations (40 CFR Part 141)
- Federal Resource Conservation and Recovery Act regulations (40 CFR 264)
- Federal Clean Water Act regulations (40 CFR 122)

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EPA 2004 Drinking Water Health Advisory for Manganese, EPA-822-R-04-003; January, 2004

New Hampshire Groundwater Management Rules, Env-Wm 1403 (formerly Env-Ws 410) (Sections 1403.12 – 1403.17)

Data provided and analyzed indicate no change in site conditions which would warrant a re-evaluation of risk, except for additional data analysis that is required to determine whether the current proposed GMZ adequately includes the entire area of groundwater contamination attributable to the NPL site, and whether the existing leachate, surface water and sediment sampling is adequate for the site.

No other ARARs have changed which would affect the protectiveness of the remedy.

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

Yes. Although no newly identified human health risks have been identified to date, an analysis of historic data indicates that metals exceed surface water standards or other freshwater ecological benchmarks in landfill leachate, surface water, and sediment. Additional assessment will be conducted to determine the ecological significance of these exceedances and whether changes to the surface water and sediment sampling program are needed in the future.

Additional assessment will also be conducted to determine whether the area of the proposed GMZ needs to be revised.

No other information has come to light which could affect the protectiveness of the remedy.

### **7.4 Technical Assessment Summary**

According to the data reviewed, the site inspections and the interviews, the remedy is functioning as intended by the existing RODs and ESDs, except additional information and analysis is required to determine whether leachate, surface water, and sediments are posing a current ecological risk that will need to be addressed through additional remedial action. Institutional controls have still not been fully implemented to restrict use of the landfill-impacted groundwater surrounding the site. In addition, supplemental data collection is required to ensure that the boundaries of the GMZ are adequate and that potential surface water-sediment exposures are not resulting in unacceptable risks in the future.

## 8.0 ISSUES

The following issues were identified as a result of the Five-Year Review:

**Table 5: Issues**

ISSUES	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Arsenic MCL has been lowered to 10 ug/l from current site ICL of 50 ug/l and health advisory for manganese has changed from 180 ug/l to 300 ug/l.	N	Y
Boundary of proposed GMZ needs to be affirmed.	Defer *	Defer *
GMP must be obtained	N	Y
Institutional Controls must be in place.	N	Y
Off-site methane gas levels must be brought into compliance with state regulations.	N	Y
Leachate, surface water and sediment metal exceedances must be addressed.	Defer *	Defer *

\* High levels of arsenic and manganese are present in wells at the edge of the proposed groundwater management zone. In addition, metal exceedances are present above ecological benchmarks in the surface water, leachate and sediment. Therefore a protectiveness statement will be deferred until additional information is obtained and analyzed.



## 9.0 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

The following recommendations have been made based on the data review for the site.

**Table 6: Recommendations and Follow-up Actions**

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Arsenic and Manganese ICLs have changed	Prepare an ESD	USEPA	---	September 2007	N	Y
Affirm Boundary of GMZ	If GMZ needs to be expanded, additional properties may need ICs	CLG	USEPA and NHDES	September 2007	Defer *	Defer *
Groundwater Management Permit	Obtain GMP approval from NHDES	CLG	USEPA and NHDES	September 2007	N	Y
Institutional Controls	Obtain easements for three properties which currently require ICs, and others, if GMZ is expanded	CLG	USEPA and NHDES	September 2007	N	Y
Methane Gas	Install active measures to control methane gas exceedances in compliance with state regulations	CLG	USEPA and NHDES	September 2007	N	Y
Sediment, Surface Water and Leachate Sampling	Follow up sampling and discussion with USEPA and NHDES to determine whether the sediment, surface water and leachate pose an ecological risk and, if so, how it should be addressed	CLG	USEPA and NHDES	December 2007	Defer *	Defer *

\* High levels of arsenic and manganese are present in wells at the edge of the proposed groundwater management zone. In addition, metal exceedances are present above ecological benchmarks in the surface water, leachate and sediment. Therefore a protectiveness statement will be deferred until additional information is obtained and analyzed.

## 10.0 PROTECTIVENESS STATEMENTS

A protectiveness determination of the source control remedy at OU1 cannot be made at this time until further information is obtained. Metals exceedences are present above ecological benchmarks in the surface water, leachate and sediment at the site. Additional monitoring data has been collected and will be analyzed to determine if adverse ecological impacts are present in these media. It is expected that the data analysis will take approximately 15 months to complete, at which time a protectiveness determination will be made. In addition, sporadic violation of off-site methane gas levels must be brought into compliance with state regulations. 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.

A protectiveness determination of the management of migration remedy at OU2 cannot be made at this time until further information is obtained. High levels of arsenic and manganese are present in wells at the edge of the proposed groundwater management zone. Additional data must be collected so that a determination can be made whether elevated levels are a result of landfill impacts or from a source other than the NPL site. Dependent on these findings, the scope of the groundwater remedy may need to be modified. A protectiveness determination will be made in 15 months when all data has been evaluated. The extent of the GMZ needs to be determined and institutional controls established for all properties within the GMZ. Monitoring of the site will continue until cleanup levels for the contaminants of concern are met. It is expected to take approximately 15 years to reach cleanup levels.

A site-wide protectiveness determination for the Coakley Superfund Site cannot be made at this time until further information is obtained. Metals exceedences are present above ecological benchmarks in the surface water, leachate and sediment at the site and high levels of arsenic and manganese are present in wells at the edge of the proposed groundwater management zone. Additional data has been and/or will be collected and analyzed and a protectiveness determination will be made in 15 months.

## **11.0 NEXT REVIEW**

The next statutory five-year review for the Coakley Landfill Superfund Site will be issued either on or prior to September 21, 2011, five years from the date of signature of this review.

A five-year review addendum will be issued December, 2007 at which time a protectiveness determination for the site will be made.

## **APPENDIX A**

### **REFERENCES**

- “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
- “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
- “Initial Data Analysis and Monitoring Report,” Aries Engineering, Inc., September 1999
- “Final Institutional Control Plan,” Aries Engineering, Inc., June 2000
- “Initial Five-Year Review Report,” U.S. Environmental Protection Agency, September, 2001
- “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
- “Methane Soil Gas Survey Workplan,” Golder Associates Inc., January, 2006
- “Landfill Gas Monitoring Results,” Aries Engineering, Inc., February, 2006

**APPENDIX B – SITE MAP**

Coakley Landfill  
 Second Five-Year Review



PREPARED FROM: USGS HAMPTON AND  
 PORTSMOUTH, NEW HAMPSHIRE QUADRANGLE, 1986



NOTES: Aries developed the Locus Map from the New Hampshire Geographically Referenced Analysis and Information Transfer System (NH GRANIT) maintained by the University of New Hampshire and the NH Office of State Planning.

Aries Project # 970700  
 File # 970700(1)3.04.mxd



2003 GROUNDWATER MONITORING  
 COAKLEY LANDFILL  
 NORTH HAMPTON, NEW HAMPSHIRE

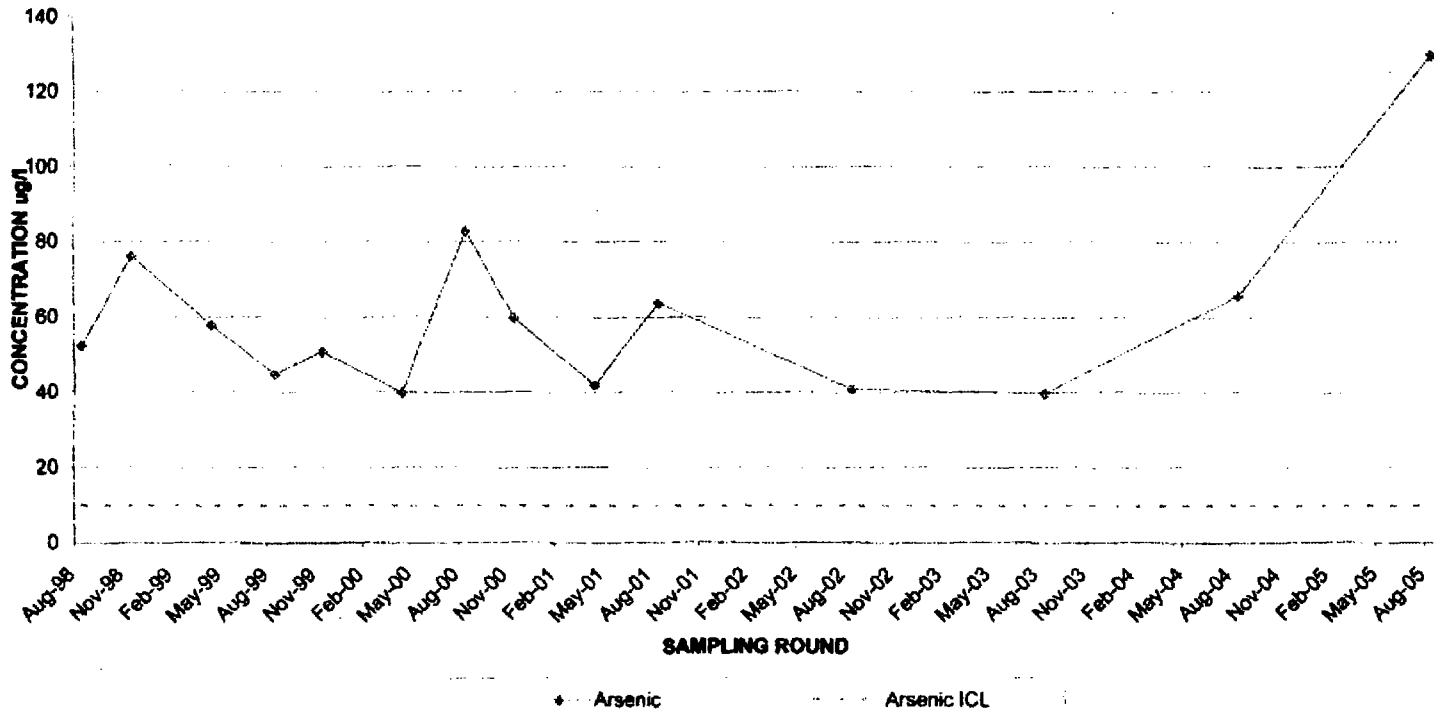
LOCUS PLAN  
 APRIL 2004  
 FIGURE 1

**APPENDIX C – ANNUAL MONITORING RESULTS**

5/19/2006

CHART A-1  
POST-CAP CONSTRUCTION TRENDS IN OVERBURDEN  
GROUNDWATER CONTAMINANTS OF CONCERN ARSENIC MW-4

COAKLEY LANDFILL  
NORTH HAMPTON, NEW HAMPSHIRE

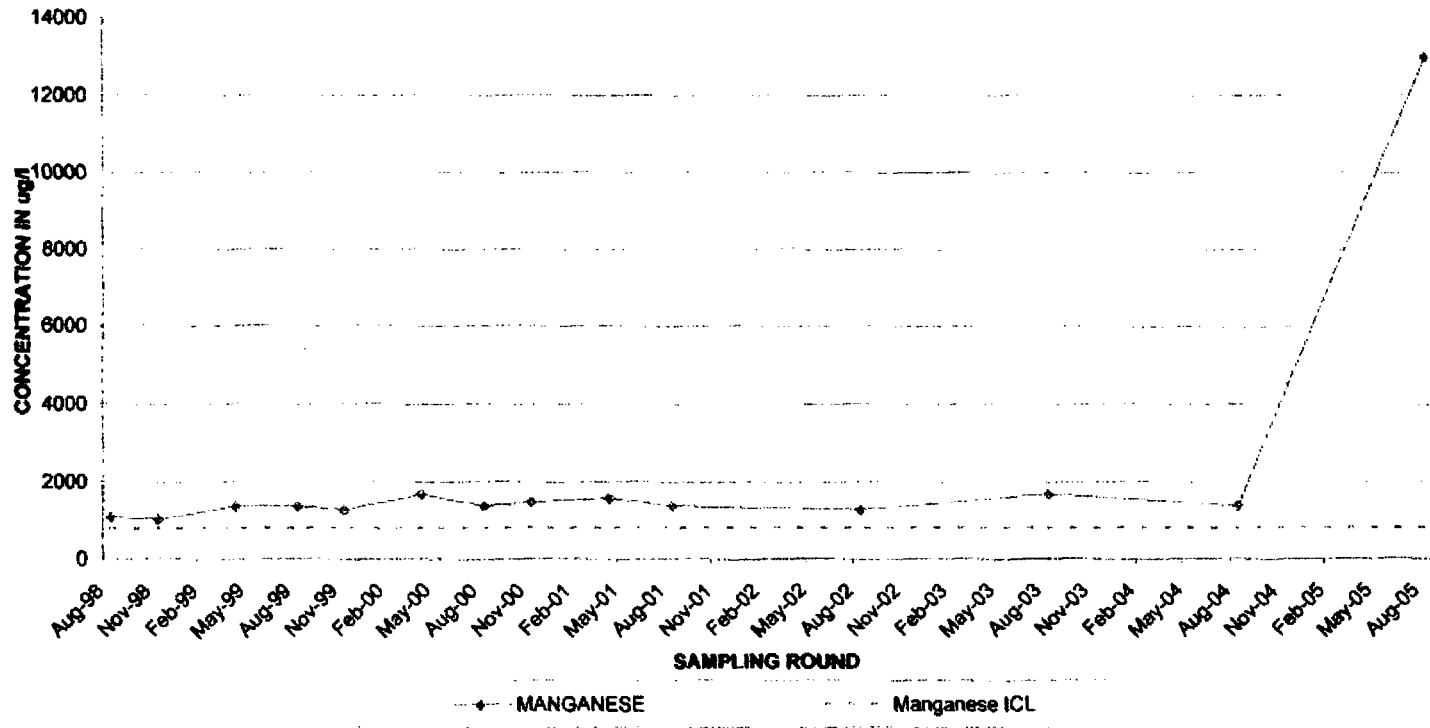


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5/19/2006

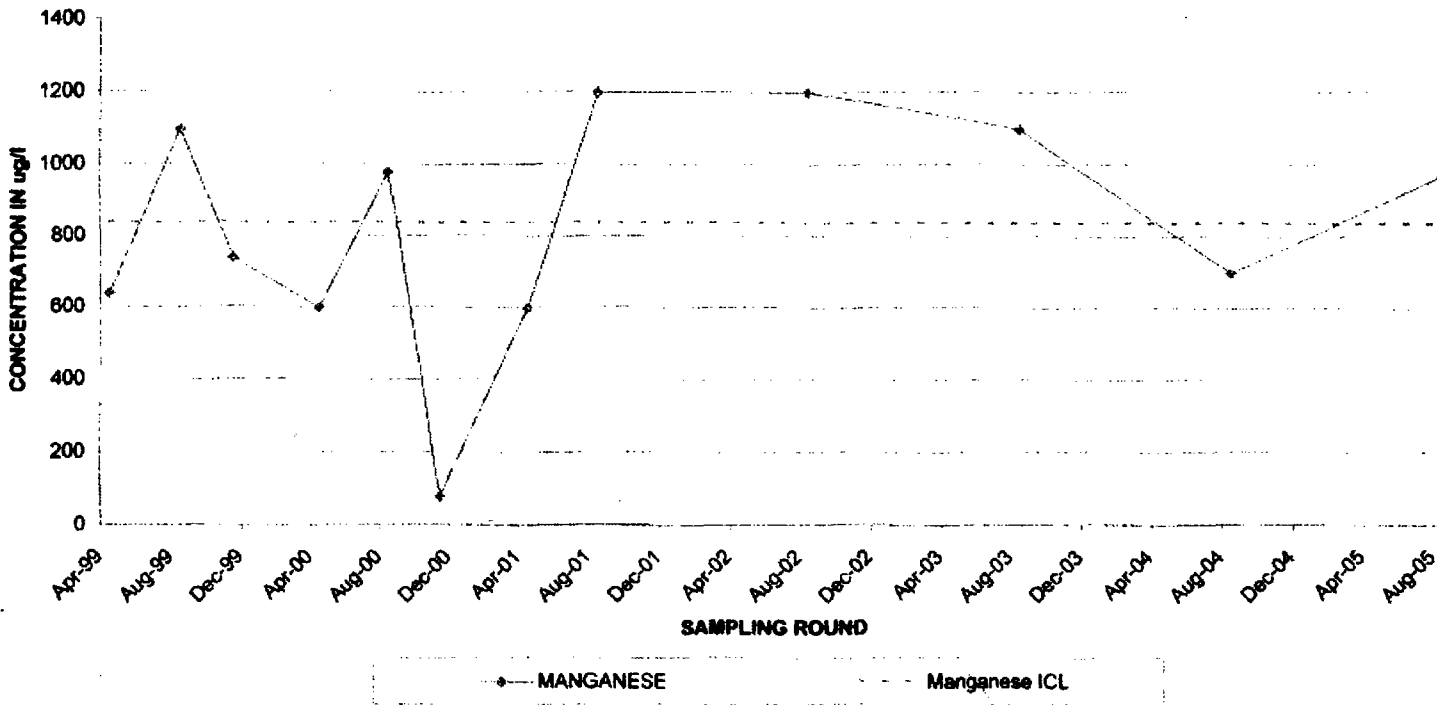
**CHART A-2**  
**POST-CAP CONSTRUCTION TRENDS IN OVERBURDEN**  
**GROUNDWATER CONTAMINANTS OF CONCERN MANGANESE MW-4**  
**COAKLEY LANDFILL**  
**NORTH HAMPTON, NEW HAMPSHIRE**



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5/19/2008

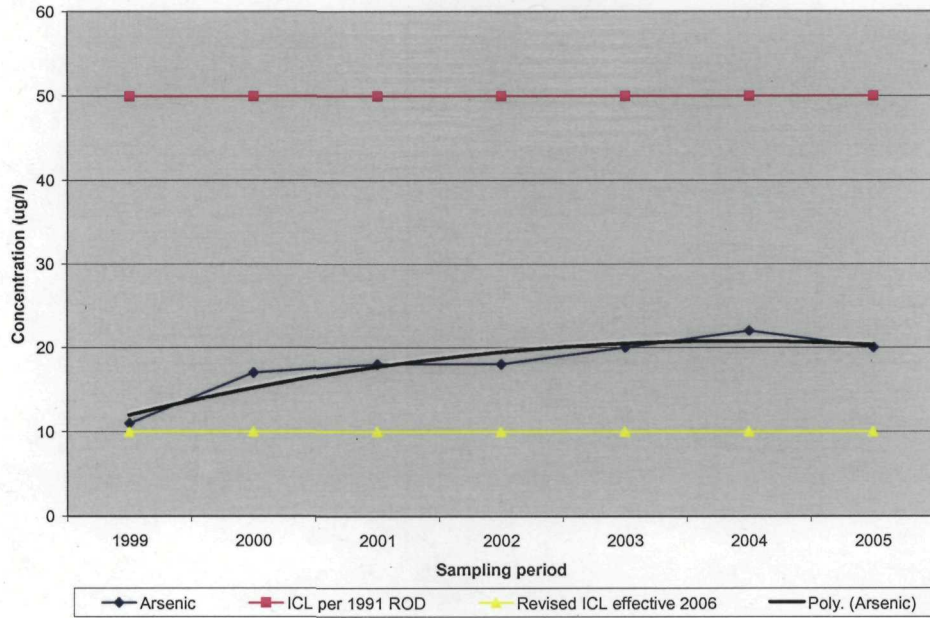
CHART C-2  
POST-CAP CONSTRUCTION TRENDS IN BEDROCK  
GROUNDWATER METALS CONTAMINANTS OF CONCERN MANGANESE MW-6  
COAKLEY LANDFILL  
NORTH HAMPTON, NEW HAMPSHIRE



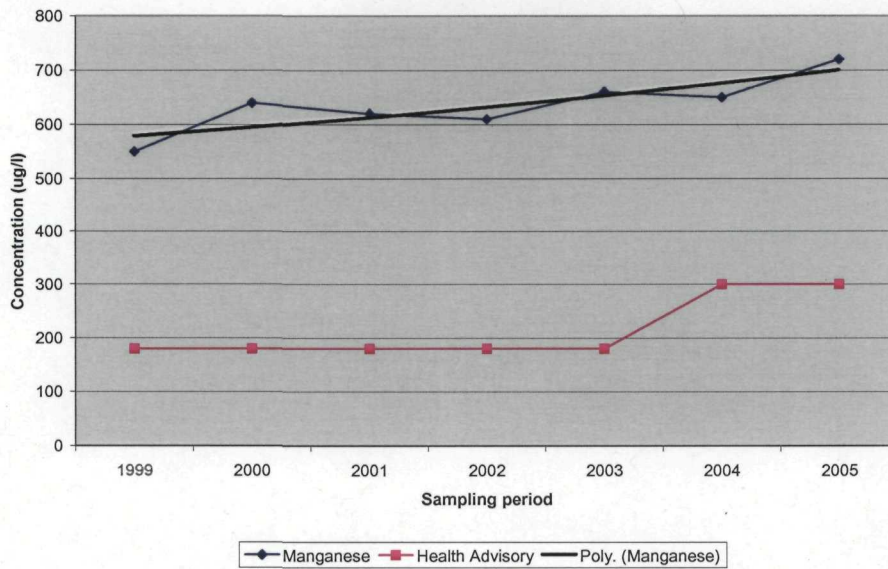
38

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Summary of Historical Groundwater Analytical Results  
AE1A Overburden (Arsenic)

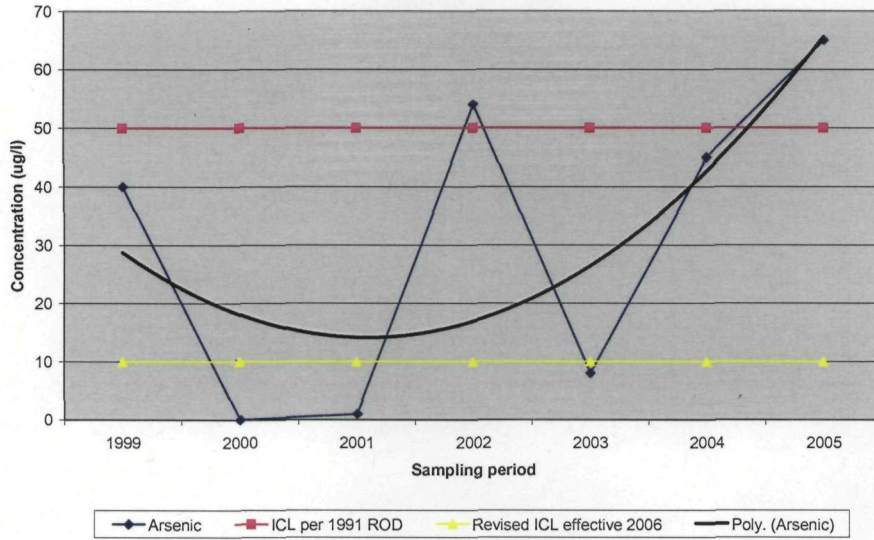


Summary of Historical Groundwater Analytical Results  
AE 1B Bedrock (Manganese)

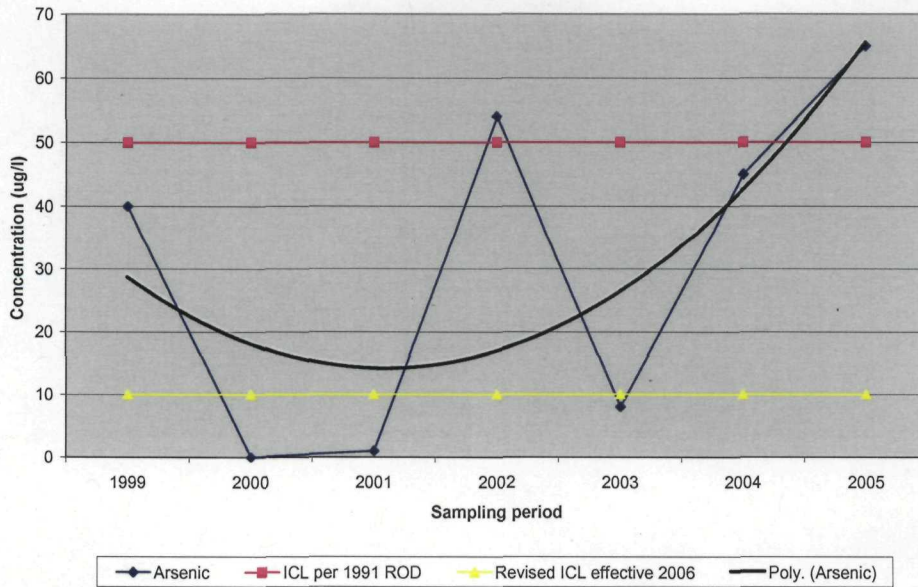


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Summary of Historical Groundwater Analytical Results  
 FPC 5A Overburden (Arsenic)

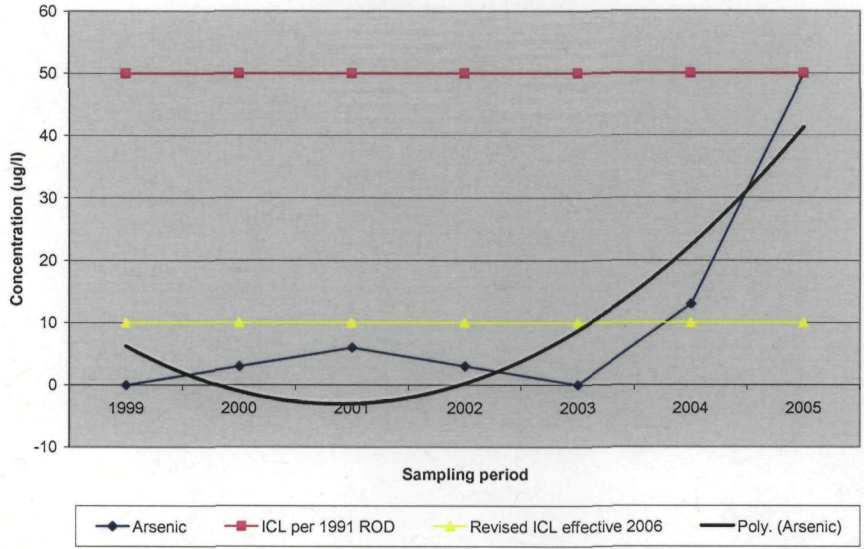


Summary of Historical Groundwater Analytical Results  
 FPC 5A Overburden (Arsenic)

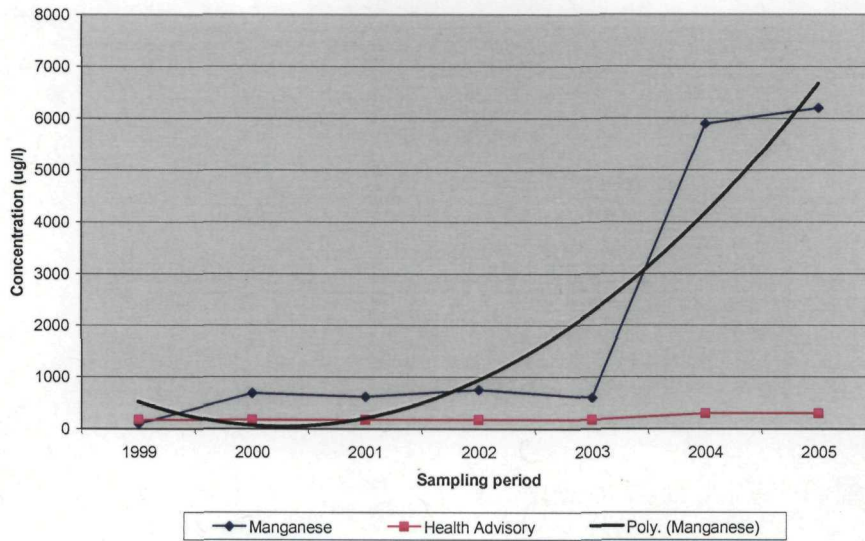


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Summary of Historical Groundwater Analytical Results  
 FPC 6B Bedrock (Arsenic)



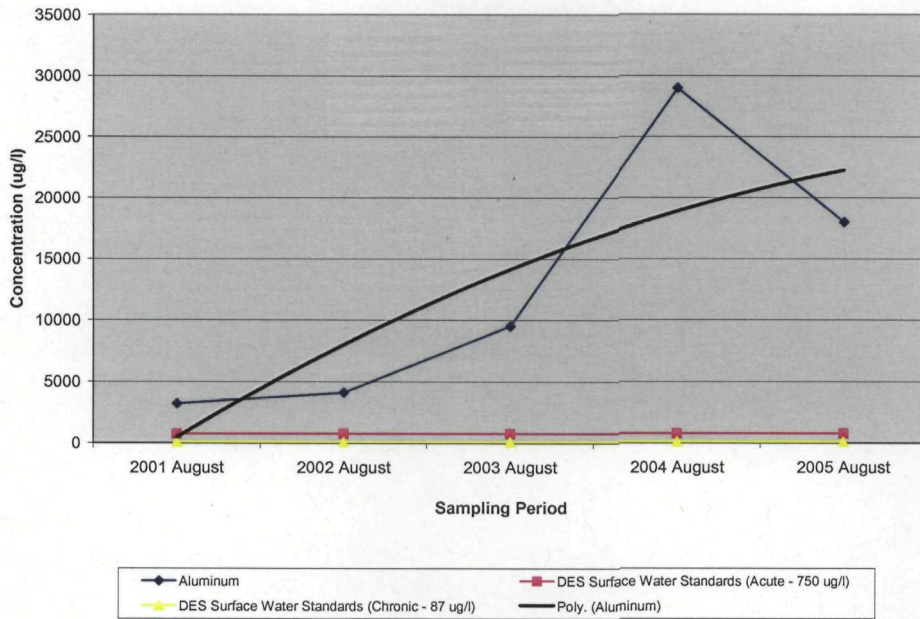
Summary of Historical Groundwater Analytical Results  
 FPC 6B Bedrock (Manganese)



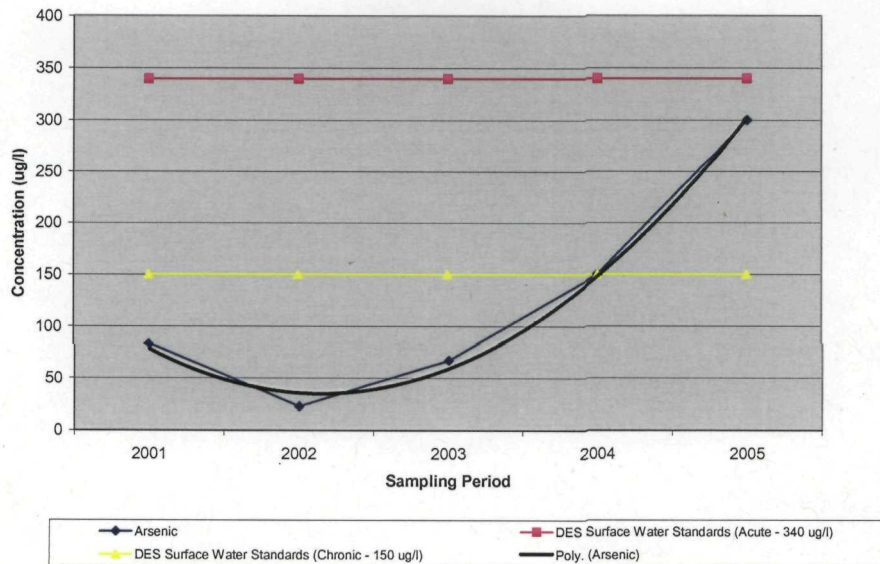


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Historical Leachate Analytical Results 2001-2005  
 L-1 (Aluminum)

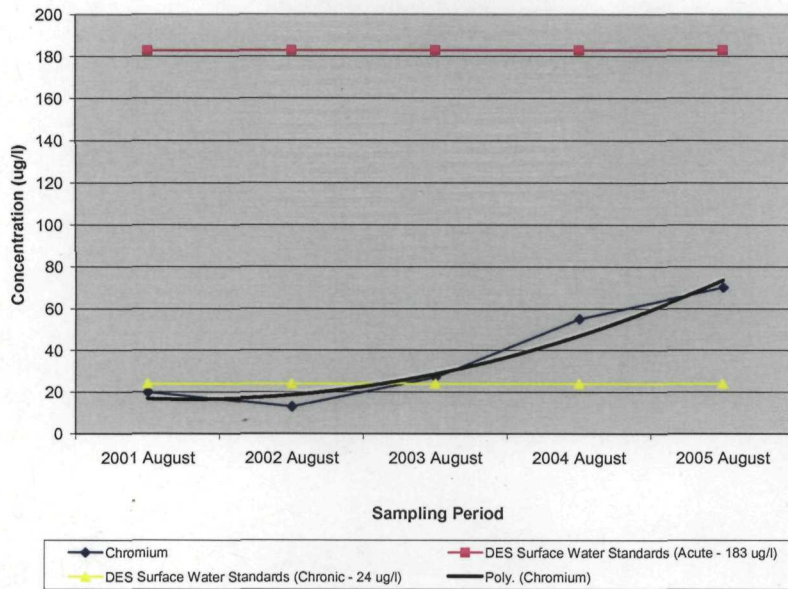


Historical Leachate Analytical Results 2001-2005  
 L-1 (Arsenic)

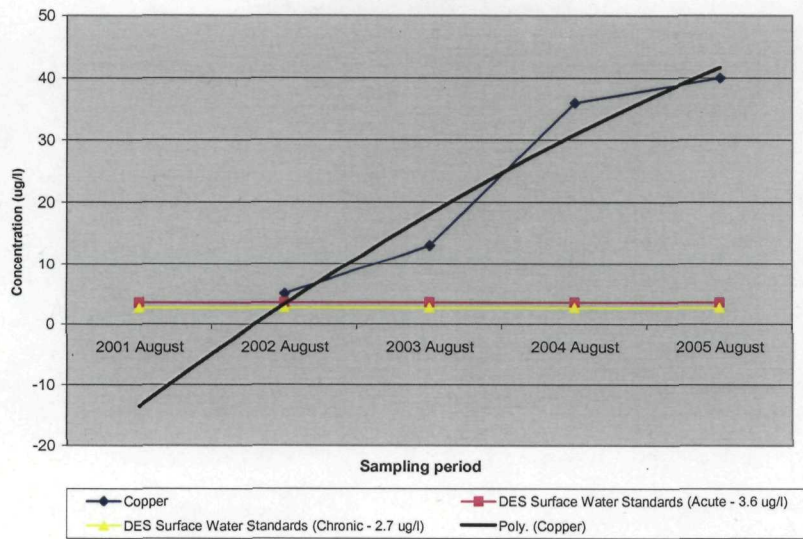


Coakley Landfill  
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Historical Leachate Analytical Results 2001-2005  
L-1 (Chromium)

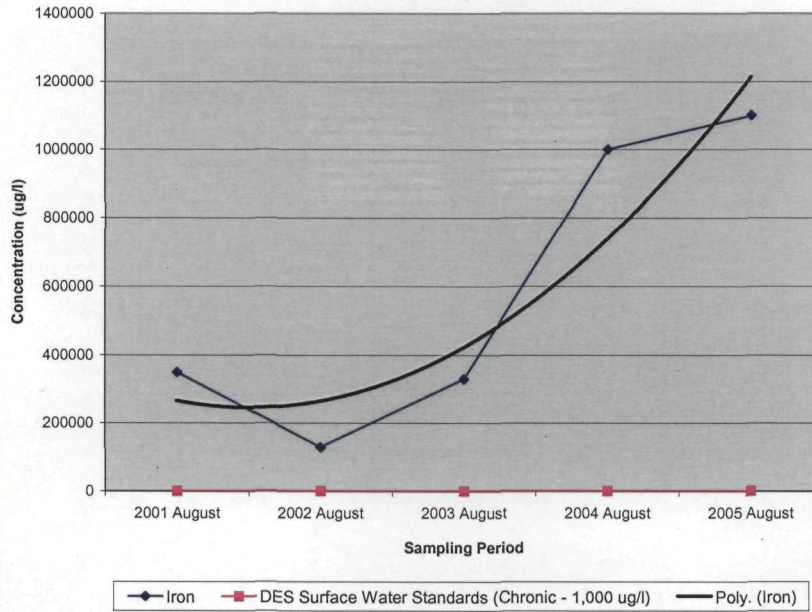


Historical Leachate Analytical Results 2001-2005  
L-1 (Copper)

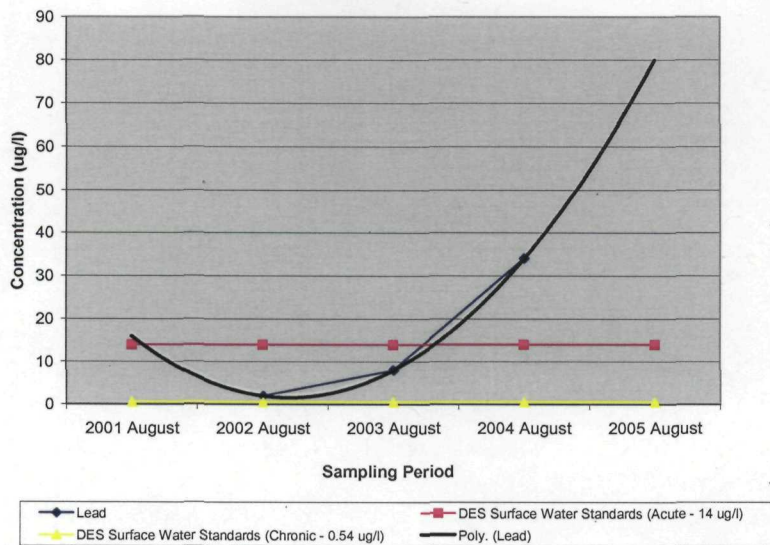


Coakley Landfill  
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Historical Leachate Analytical Results  
 L-1 Iron



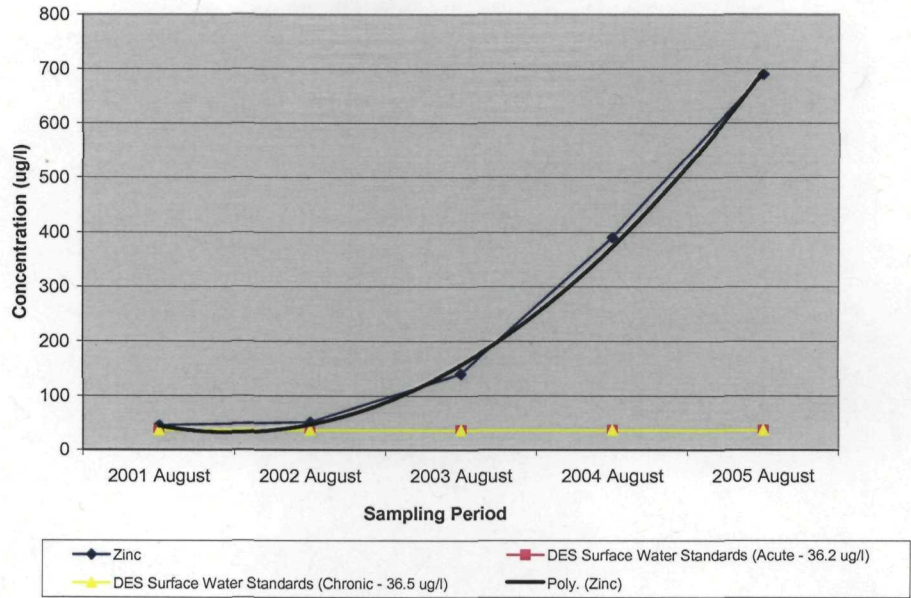
Historical Leachate Analytical Results 2001-2005  
 L-1 (Lead)





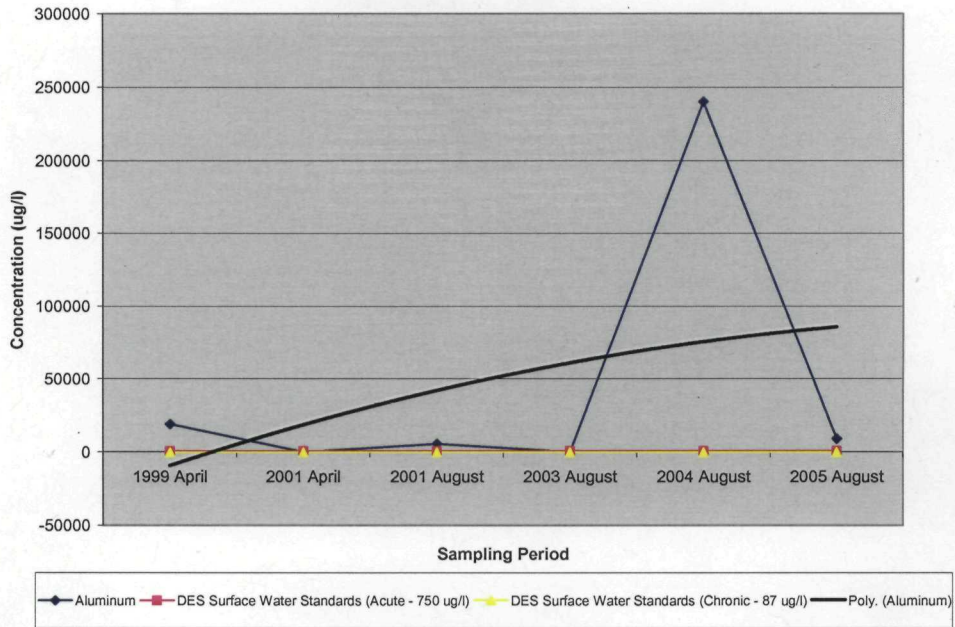
Coakley Landfill  
Second Five-Year Review

Historical Leachate Analytical Results 2001-2005  
Coakley Landfill ou1 and ou2  
L-1 (Zinc)

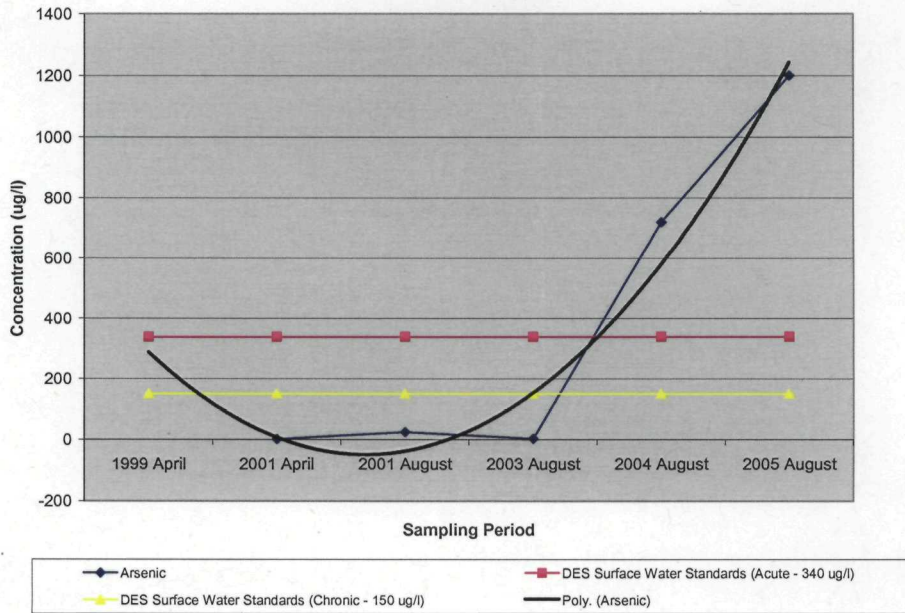


Coakley Landfill  
Second Five-Year Review

Summary of Historical Surface Water Analytical Results 1999-2005  
SW-5 (Aluminum)

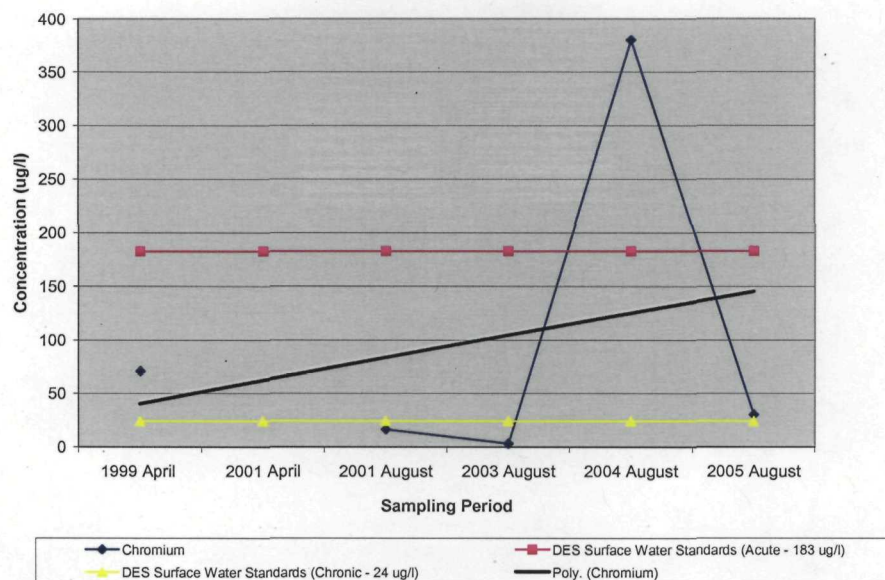


Summary of Historical Surface Water Analytical Results 1999-2005  
SW-5 (Arsenic)

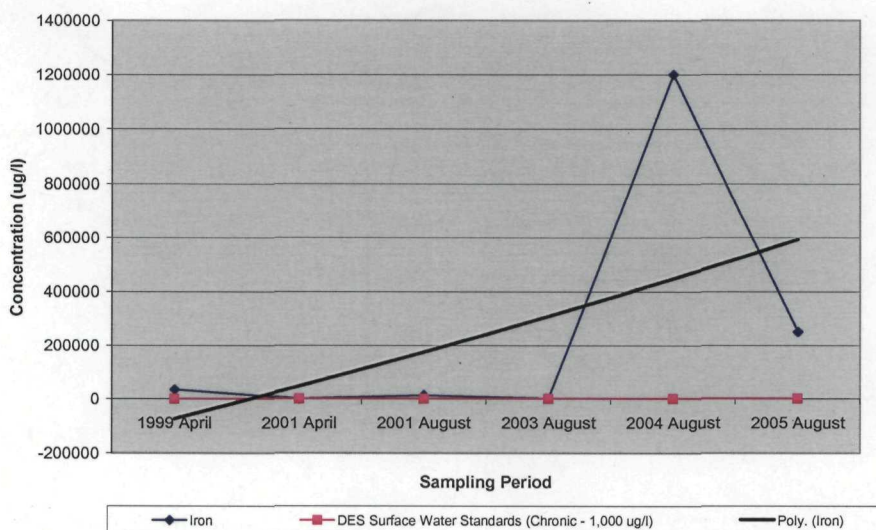


Coakley Landfill  
Second Five-Year Review

Summary of Historical Surface Water Analytical Results 1999-2005  
SW-5 (Chromium)



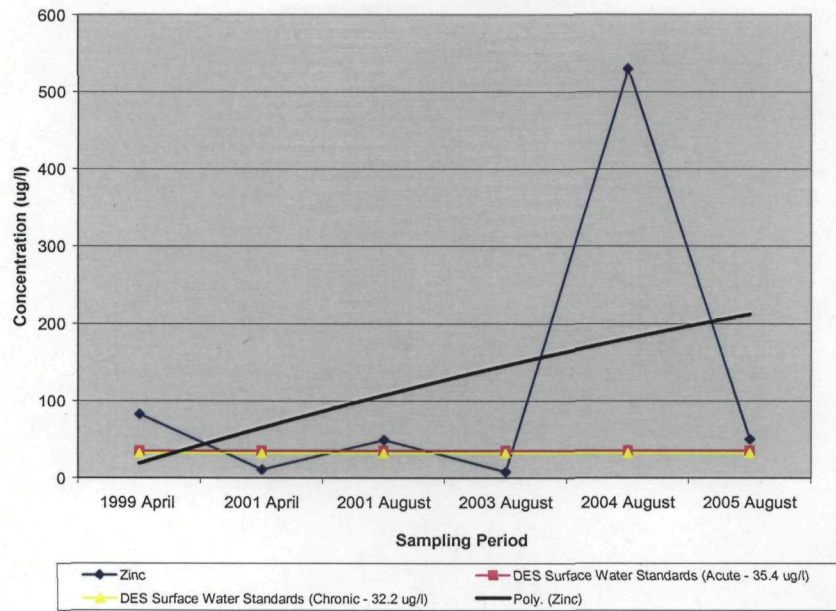
Summary of Historical Surface Water Analytical Results 1999-2005  
SW-5 (Iron)





Coakley Landfill  
Second Five-Year Review

Summary of Historical Surface Water Analytical Results 1999-2005  
SW-5 (Zinc)



**Metals in Sediment – Coakley Landfill**

<sup>1</sup>EPA Region III benchmarks for freshwater sediment

<sup>2</sup> mean values in Table 15 in 1999 Annual Monitoring Plan Data Assessment Report

Benchmark <sup>1</sup> (mg/kg)	April, 1999 <sup>2</sup> (mg/kg)	SED-3	SED-101	SED-4				SED-05			
		7-Aug-02 (mg/kg)	7-Aug-02 (mg/kg)	26-Apr-01 (mg/kg)	5-Aug-02 (mg/kg)	26-Aug-04 (mg/kg)	29-Aug-05 (mg/kg)	26-Apr-01	27-Aug-03	26-Aug-04	29-Aug-05
		(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
NA		29000	12000	8100	11000	4400	7900	27000	18000	17000	6600
9.8	12	29	17	40	BDL	BDL	BDL	25	19	36	310
NA		170	70	220	61	28	60	150	88	130	270
0.99		BDL	B	0.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NA		25000	3900	31000	4600	9200	13000	4300	4700	11000	8900
43.4	25	67	30	69	13	6	12	70	46	56	13
31.6		44	28	67	12	BDL	17	40	37	20	6
20000		51000	19000	2500	2400	1200	3900	36000	31000	37000	210000
35.8	44	26	27	250	24	15	130	24	25	40	20
NA		9400	4100	4400	1100	1500	3500	8400	6500	6000	3200
0.18		BDL	B	0.3	BDL	BDL	0.4	BDL	BDL	BDL	0.5
22.7	17	50	25	53	8	BDL	14	53	38	38	9
NA		7000	3200	800	1500	370	500	25000	4400	2000	1300
2		BDL	B	2.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1		BDL	B	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NA		1300	600	100	500	230	190	350	480	270	240
NA		BDL	B	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
121		130	83	220	29	57	91	110	170	120	38
50		16	9	14	BDL	BDL	BDL	14	12	13	6
NA		BDL	B	1.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL
460		2400	400	500	33	400	190	680	840	1400	2500
2		BDL	B	5.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NA		50	30	71	30	7	38	53	35	38	17

**APPENDIX D – INTERVIEW REPORT**

<b>INTERVIEW DOCUMENTATION FORM</b>			
The following is a list of individuals interviewed for this five-year review. See the attached contact record(s) for a detailed summary of the interviews.			
Karen Anderson	Town Administrator	Greenland, NH	July 25, 2006
Jody and Walter Nordstrom	Landowners w/in GMZ	North Hampton, NH	July 25, 2006
Don Mitchell	Owner	North Hill Nursery, Greenland, NH	July 25, 2006



<b>INTERVIEW RECORD</b>		
<b>Site Name:</b> Coakley Landfill		<b>EPA ID No.:</b>
<b>Subject:</b> Five Year Review		<b>Time:</b> 1:00 <b>Date:</b> 7/25/06
<b>Type:</b> <input type="checkbox"/> Telephone <input checked="" type="checkbox"/> Visit <input type="checkbox"/> Other <b>Location of Visit:</b> Town Hall, town of Greenland		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing
<b>Contact Made By:</b>		
<b>Name:</b> Brenda Haslett	<b>Title:</b> Remedial Project Manager	<b>Organization:</b> U.S. EPA
<b>Individual Contacted:</b>		
<b>Name:</b> Karen Anderson	<b>Title:</b> Town Administrator	<b>Organization:</b> Greenland, NH
<b>Telephone No:</b> (603) 431-7111	<b>Street Address:</b> 575 Portsmouth Avenue	
<b>Fax No:</b>	<b>City, State, Zip:</b> Greenland, NH 03840	
<b>E-Mail Address:</b>		
<b>Summary Of Conversation</b>		
<p>Angela Bonarrigo, U.S. EPA Community Involvement Coordinator and Brenda Haslett, U.S. EPA Remedial Project Manager interviewed Ms. Anderson in her office. We discussed institutional controls and potential reuse opportunities at the site. Ms. Anderson had a report in hand which highlighted passive recreation reuse opportunities. We asked for a copy of the report for our records.</p>		

<b>INTERVIEW RECORD</b>		
<b>Site Name:</b> Coakley Landfill		<b>EPA ID No.:</b>
<b>Subject:</b> Five Year Review		<b>Time:</b> 2:00
<b>Date:</b> 7/25/06		
<b>Type:</b> <input type="checkbox"/> Telephone <input checked="" type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing
<b>Location of Visit:</b> North Hampton, NH		
<b>Contact Made By:</b>		
<b>Name:</b> Brenda Haslett	<b>Title:</b> Remedial Project Manager	<b>Organization:</b> U.S. EPA
<b>Individual Contacted:</b>		
<b>Name:</b> Jody and Walter Nordstrom	<b>Title:</b> homeowners	<b>Organization:</b> North Hampton, NH
<b>Telephone No:</b> (603) 964-5206	<b>Street Address:</b> 67 North Road	
<b>Fax No:</b>	<b>City, State, Zip:</b> North Hampton, NH	
<b>E-Mail Address:</b>		
<b>Summary Of Conversation</b>		
<p>Angela Bonarrigo, U.S. EPA Community Involvement Coordinator and Brenda Haslett, U.S. EPA Remedial Project Manager met with the Nordstrom's in their home. Mrs. Nordstrom has been living in the home for 40 years; Mr. Nordstrom 22 years. They recalled for us the history of the site and effects on the surrounding community. They mentioned they do not have any big concerns over the site, just aware of its existence.</p> <p>Mr. Nordstrom mows the landfill for the CLG once per year for a fee. There are monitoring wells on their property and they should be receiving results of yearly monitoring per contract with CLG when wells were put in place. Their records revealed they had not received results since the 2003 sampling round. We told them we would talk to Peter Britz, CLG representative regarding sampling results.</p>		



<b>INTERVIEW RECORD</b>		
<b>Site Name:</b> Coakley Landfill		<b>EPA ID No.:</b>
<b>Subject:</b> Five Year Review		<b>Time:</b> 3:00
<b>Date:</b> 7/25/06		<b>Date:</b> 7/25/06
<b>Type:</b> <input type="checkbox"/> Telephone <input checked="" type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing
<b>Location of Visit:</b> Town Hall, town of Greenland		
<b>Contact Made By:</b>		
<b>Name:</b> Brenda Haslett	<b>Title:</b> Remedial Project Manager	<b>Organization:</b> U.S. EPA
<b>Individual Contacted:</b>		
<b>Name:</b> Don Mitchell	<b>Title:</b> owner (leasing land from Ms. Evelyn Ferland)	<b>Organization:</b> North Hill Nursery, North Hampton, NH
<b>Telephone No:</b> (603) 964-7104		<b>Street Address:</b> 206 Lafayette Road
<b>Fax No:</b>		<b>City, State, Zip:</b> North Hampton, NH
<b>E-Mail Address:</b>		
<b>Summary Of Conversation</b>		
<p>Angela Bonarrigo, U.S. EPA Community Involvement Coordinator and Brenda Haslett, U.S. EPA Remedial Project Manager interviewed Mr. Mitchell at his nursery. Mr. Mitchell is leasing the land from Ms. Evelyn Ferland with an option to buy in a couple of years. He wants to be assured no contamination exists in the groundwater beneath the nursery. He talked with Peter Britz, CLG representative in the past regarding this issue. Mr. Britz advised him to get the property assessed which he did (phase 1 assessment) and may turn assessment over to agencies and CLG for interpretation. We told him groundwater at Coakley flows away from his property and reminded him as long as he did nothing to pull the plume his way, he should not expect groundwater contamination under that property.</p>		

**APPENDIX E – PHOTOS DOCUMENTING SITE CONDITIONS**



Coakley Landfill  
Second Five-Year Review



Western side of Coakley Landfill looking south along perimeter road.



Leachate (L-1) down chute from landfill



Coakley Landfill  
Second Five-Year Review



**Leachate (L-1) sample location**



**Surface water sample locations SW-103 (along RR track ditch)**



Coakley Landfill  
Second Five-Year Review



Location SW-103 showing town line marked between Greenland and North Hampton, NH



Surface water sample location SW-102 within wetlands north of Coakley Landfill



Coakley Landfill  
Second Five-Year Review



Surface water sample location SW-101 within wetlands north of Coakley Landfill



Whirly-gig (east side of landfill)



Coakley Landfill  
Second Five-Year Review



Landfill vents



Locked well



Coakley Landfill  
Second Five-Year Review



West of railroad tracks




Coakley Landfill  
Second Five-Year Review



Coakley Landfill - East side

**APPENDIX F – INSPECTION CHECKLIST**

I. SITE INFORMATION				
<b>Site name:</b> Coakley Landfill	<b>Date of inspection:</b> July 25, 2006			
<b>Location and Region:</b> North Hampton and Greenland, New Hampshire Region 1	<b>EPA ID:</b> NHD064424152			
<b>Agency, office, or company leading the five-year review:</b> U.S. EPA, Region 1	<b>Weather/temperature:</b> <div style="display: flex; align-items: center; gap: 10px;"> <div style="text-align: center;">9:55 AM</div> <div style="text-align: center;">                       Partly Cloudy 77°F                 </div> <div style="text-align: center;">79 °F</div> <div style="text-align: center;">66 °F</div> <div style="text-align: center;">69 %</div> <div style="text-align: center;">10.0 miles</div> <div style="text-align: center;">29.9 mph</div> <div style="text-align: center;">From SW 2mph</div> </div>			
<b>Remedy Includes:</b> (Check all that apply) <table style="width:100%; border: none;"> <tr> <td style="width:50%; vertical-align: top;"> <input checked="" type="checkbox"/> Landfill cover/containment  <input type="checkbox"/> Access controls  <input checked="" type="checkbox"/> Institutional controls  <input type="checkbox"/> Groundwater pump and treatment  <input type="checkbox"/> Surface water collection and treatment  <input type="checkbox"/> Other _____                 </td> <td style="width:50%; vertical-align: top;"> <input checked="" type="checkbox"/> Monitored natural attenuation  <input type="checkbox"/> Groundwater containment  <input type="checkbox"/> Vertical barrier walls                 </td> </tr> </table>		<input checked="" type="checkbox"/> Landfill cover/containment <input type="checkbox"/> Access controls <input checked="" type="checkbox"/> Institutional controls <input type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input type="checkbox"/> Other _____	<input checked="" type="checkbox"/> Monitored natural attenuation <input type="checkbox"/> Groundwater containment <input type="checkbox"/> Vertical barrier walls	
<input checked="" type="checkbox"/> Landfill cover/containment <input type="checkbox"/> Access controls <input checked="" type="checkbox"/> Institutional controls <input type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input type="checkbox"/> Other _____	<input checked="" type="checkbox"/> Monitored natural attenuation <input type="checkbox"/> Groundwater containment <input type="checkbox"/> Vertical barrier walls			
<b>Attachments:</b> <input checked="" type="checkbox"/> Inspection team roster attached <input checked="" type="checkbox"/> Site map attached				
II. INTERVIEWS (Check all that apply)				
<b>1. O&amp;M site manager</b> _____ <table style="width:100%; border: none;"> <tr> <td style="width:40%; text-align: center;">Name</td> <td style="width:30%; text-align: center;">Title</td> <td style="width:30%; text-align: center;">Date</td> </tr> </table> Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone   Phone no. _____ Problems, suggestions; <input type="checkbox"/> Report attached _____ _____		Name	Title	Date
Name	Title	Date		
<b>2. O&amp;M staff</b> _____ <table style="width:100%; border: none;"> <tr> <td style="width:40%; text-align: center;">Name</td> <td style="width:30%; text-align: center;">Title</td> <td style="width:30%; text-align: center;">Date</td> </tr> </table> Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone   Phone no. _____ Problems, suggestions; <input type="checkbox"/> Report attached _____ _____		Name	Title	Date
Name	Title	Date		
<b>3. Local regulatory authorities and response agencies</b> (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.  Agency <b>New Hampshire Department of Environmental Services</b> Contact <b>Andrew Hoffman State Remedial Project Manager 603-271-6778</b>  Problems; suggestions; <input type="checkbox"/> Report attached   CLG needs to address exceedance of methane gas. Agencies and CLG need to address GMZ boundary and surface water and sediment issues.				



<b>4. Other interviews: Report Attached</b>			
<b>III. ON-SITE DOCUMENTS &amp; RECORDS VERIFIED</b> (Check all that apply)			
1.	<b>O&amp;M Documents</b> <input type="checkbox"/> O&M manual <input type="checkbox"/> As-built drawings <input type="checkbox"/> Maintenance logs Remarks _____	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <b>X N/A</b> <b>X N/A</b> <b>X N/A</b>
2.	<b>Site-Specific Health and Safety Plan</b> <input type="checkbox"/> Contingency plan/emergency response plan Remarks _____	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <b>X N/A</b> <b>X N/A</b>
3.	<b>O&amp;M and OSHA Training Records</b> Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <b>X N/A</b>
4.	<b>Permits and Service Agreements</b> <input type="checkbox"/> Air discharge permit <input type="checkbox"/> Effluent discharge <input type="checkbox"/> Waste disposal, POTW <input type="checkbox"/> Other permits _____ Remarks _____	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <b>X N/A</b> <b>X N/A</b> <b>X N/A</b> <b>X N/A</b>
5.	<b>Gas Generation Records</b> Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <b>X N/A</b>
6.	<b>Settlement Monument Records</b> Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <b>X N/A</b>
7.	<b>Groundwater Monitoring Records</b> Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <b>X N/A</b>
8.	<b>Leachate Extraction Records</b> Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <b>X N/A</b>
9.	<b>Discharge Compliance Records</b> <input type="checkbox"/> Air <input type="checkbox"/> Water (effluent) Remarks _____	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <b>X N/A</b> <b>X N/A</b>

10.	<b>Daily Access/Security Logs</b>	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<b>X</b> N/A
Remarks _____ _____				
<b>IV. O&amp;M COSTS</b>				
1.	<b>O&amp;M Organization</b>	<input type="checkbox"/> State in-house	<input type="checkbox"/> Contractor for State	
		<input type="checkbox"/> PRP in-house	<b>X</b> Contractor for PRP	
		<input type="checkbox"/> Federal Facility in-house	<input type="checkbox"/> Contractor for Federal Facility	
	<input type="checkbox"/> Other _____			
2.	<b>O&amp;M Cost Records</b>	<b>X</b> Readily available	<b>X</b> Up to date	
		<input type="checkbox"/> Funding mechanism/agreement in place		
	Original O&M cost estimate _____	<input type="checkbox"/> Breakdown attached		
Total annual cost by year for review period if available <b>(Breakdown shown on Table 3)</b>				
	From _____ To _____	_____	<input type="checkbox"/> Breakdown attached	
	Date                  Date	Total cost		
	From _____ To _____	_____	<input type="checkbox"/> Breakdown attached	
	Date                  Date	Total cost		
	From _____ To _____	_____	<input type="checkbox"/> Breakdown attached	
	Date                  Date	Total cost		
	From _____ To _____	_____	<input type="checkbox"/> Breakdown attached	
	Date                  Date	Total cost		
3.	<b>Unanticipated or Unusually High O&amp;M Costs During Review Period</b>			
	Describe costs and reasons: <b>NONE</b>			
<b>V. ACCESS AND INSTITUTIONAL CONTROLS</b> <b>X</b> Applicable <input type="checkbox"/> N/A				
<b>A. Fencing</b>				
1.	<input type="checkbox"/> Fencing damaged	<input type="checkbox"/> Location shown on site map	<b>X</b> Gates secured	<input type="checkbox"/> N/A
Remarks: _____				
<b>B. Other Access Restrictions</b>				
1.	<b>X</b> Signs and other security measures	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A	
Remarks: <b>Warning signs posted at each gate (one upside down)</b>				

<b>C. Institutional Controls (ICs)</b>				
1.	<b>Implementation and enforcement</b>			
	Site conditions imply ICs not properly implemented	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Site conditions imply ICs not being fully enforced	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Type of monitoring (e.g., self-reporting, drive by) _____			
	Frequency _____			
	Responsible party/agency _____			
	Contact _____			
	Name	Title	Date	Phone no.
	Reporting is up-to-date	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Reports are verified by the lead agency	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Specific requirements in deed or decision documents have been met	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Violations have been reported	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Other problems or suggestions: <input type="checkbox"/> Report attached			
<p><b>ICs are not completely in place. Draft application for Groundwater Management Permit has been submitted by CLG to the NHDES. Once permit is issued, CLG must acquire easements and/or record notices for all affected properties. At this time, the CLG have not been able to secure easements on three properties. CLG will continue best efforts with oversight from USEPA and NHDES. Depending on the analysis of the area required for the GMZ, additional properties may require institutional controls.</b></p>				
2.	<b>Adequacy</b>	<input type="checkbox"/> ICs are adequate	<input checked="" type="checkbox"/> ICs are inadequate	<input type="checkbox"/> N/A
	Remarks: <b>ICs not yet completely in place; when in place, will be adequate as long as they are monitored and enforced.</b>			
<b>D. General</b>				
1.	<input type="checkbox"/> Vandalism/trespassing	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No <b>"on-site"</b> vandalism evident	
	Remarks: <b>No vandalism w/in fence around landfill. A couch and fire pit were observed outside of fence. Suspect access through railroad bed, not on site.</b>			
2.	Land use changes on site	None		
	Remarks _____			
3.	Land use changes off site	None		
	Remarks _____			
<b>VI. GENERAL SITE CONDITIONS</b>				
<b>A. Roads</b>	<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A		

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1.	<input type="checkbox"/> Roads damaged Remarks _____	<input checked="" type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Roads adequate	<input type="checkbox"/> N/A
<b>B. Other Site Conditions</b>				
Remarks: None				
<b>VII. LANDFILL COVERS</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A				
<b>A. Landfill Surface</b>				
1.	<b>Settlement (Low spots)</b> Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Settlement not evident	
2.	<b>Cracks</b> Lengths _____ Widths _____ Depths _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Cracking not evident	
3.	<b>Erosion</b> Areal extent _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Erosion not evident	
4.	<b>Holes</b> Areal extent _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Holes not evident	
5.	<b>Vegetative Cover</b> <input checked="" type="checkbox"/> Grass <input checked="" type="checkbox"/> Cover properly established <input checked="" type="checkbox"/> No signs of stress <input type="checkbox"/> Trees/Shrubs (indicate size and locations on a diagram) Remarks _____			
6.	<b>Alternative Cover (armored rock, concrete, etc.)</b> Remarks _____	<input checked="" type="checkbox"/> N/A		
7.	<b>Bulges</b> Areal extent _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Bulges not evident	
8.	<b>Wet Areas/Water Damage</b> <input type="checkbox"/> Wet areas <input type="checkbox"/> Ponding <input type="checkbox"/> Seeps <input type="checkbox"/> Soft subgrade Remarks _____	<input checked="" type="checkbox"/> Wet areas/water damage not evident		
		<input type="checkbox"/> Location shown on site map	Areal extent _____	
		<input type="checkbox"/> Location shown on site map	Areal extent _____	
		<input type="checkbox"/> Location shown on site map	Areal extent _____	
		<input type="checkbox"/> Location shown on site map	Areal extent _____	

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9.	<b>Slope Instability</b>	<input type="checkbox"/> Slides	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No evidence of slope instability
	Areal extent _____			
	Remarks _____			
B. Benches <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A				
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)				
1.	<b>Flows Bypass Bench</b>	<input type="checkbox"/> Location shown on site map		<input checked="" type="checkbox"/> N/A or okay
	Remarks _____			
2.	<b>Bench Breached</b>	<input type="checkbox"/> Location shown on site map		<input checked="" type="checkbox"/> N/A or okay
	Remarks _____			
3.	<b>Bench Overtopped</b>	<input type="checkbox"/> Location shown on site map		<input checked="" type="checkbox"/> N/A or okay
	Remarks _____			
C. Letdown Channels <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A				
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)				
1.	<b>Settlement</b>	<input type="checkbox"/> Location shown on site map		<input checked="" type="checkbox"/> No evidence of settlement
	Areal extent _____	Depth _____		
	Remarks _____			
2.	<b>Material Degradation</b>	<input type="checkbox"/> Location shown on site map		<input checked="" type="checkbox"/> No evidence of degradation
	Material type _____	Areal extent _____		
	Remarks _____			
3.	<b>Erosion</b>	<input type="checkbox"/> Location shown on site map		<input checked="" type="checkbox"/> No evidence of erosion
	Areal extent _____	Depth _____		
	Remarks _____			

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4.	<b>Undercutting</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No evidence of undercutting
	Areal extent _____	Depth _____	
	Remarks _____		
5.	<b>Obstructions</b>	Type _____	<input checked="" type="checkbox"/> No obstructions
	<input type="checkbox"/> Location shown on site map	Areal extent _____	
	Size _____		
	Remarks _____		
6.	<b>Excessive Vegetative Growth</b>	Type _____	
	<input checked="" type="checkbox"/> No evidence of excessive growth		
	<input type="checkbox"/> Vegetation in channels does not obstruct flow		
	<input type="checkbox"/> Location shown on site map	Areal extent _____	
	Remarks _____		
<b>D. Cover Penetrations</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
1.	<b>Gas Vents</b>	<input type="checkbox"/> Active	<input checked="" type="checkbox"/> Passive
	<input checked="" type="checkbox"/> Properly secured/locked	<input checked="" type="checkbox"/> Functioning	<input checked="" type="checkbox"/> Good condition
	<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs Maintenance	
	<input type="checkbox"/> N/A		
	Remarks _____		
2.	<b>Gas Monitoring Probes</b>		
	<input checked="" type="checkbox"/> Properly secured/locked	<input checked="" type="checkbox"/> Functioning	<input checked="" type="checkbox"/> Good condition
	<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs Maintenance	<input type="checkbox"/> N/A
	Remarks _____		
3.	<b>Monitoring Wells</b> (within surface area of landfill)		
	<input checked="" type="checkbox"/> Properly secured/locked	<input checked="" type="checkbox"/> Functioning	<input checked="" type="checkbox"/> Good condition
	<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs Maintenance	<input type="checkbox"/> N/A
	Remarks _____		
4.	<b>Leachate Extraction Wells</b>		
	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Good condition
	<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs Maintenance	<input checked="" type="checkbox"/> N/A
	Remarks _____		
5.	<b>Settlement Monuments</b>	<input type="checkbox"/> Located	<input type="checkbox"/> Routinely surveyed <input checked="" type="checkbox"/> N/A
	Remarks _____		



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<b>E. Gas Collection and Treatment</b>			<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	<b>Gas Treatment Facilities</b> <input type="checkbox"/> Flaring <input type="checkbox"/> Good condition Remarks N/A	<input type="checkbox"/> Thermal destruction <input type="checkbox"/> Needs Maintenance	<input type="checkbox"/> Collection for reuse	
2.	<b>Gas Collection Wells, Manifolds and Piping</b> <input checked="" type="checkbox"/> Good condition Remarks	<input type="checkbox"/> Needs Maintenance		
3.	<b>Gas Monitoring Facilities</b> (e.g., gas monitoring of adjacent homes or buildings) <input checked="" type="checkbox"/> Good condition Remarks	<input type="checkbox"/> Needs Maintenance	<input type="checkbox"/> N/A	
<b>F. Cover Drainage Layer</b>			<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	<b>Outlet Pipes Inspected</b> Remarks	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A	
2.	<b>Outlet Rock Inspected</b> Remarks	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A	
<b>G. Detention/Sedimentation Ponds</b>			<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	<b>Siltation</b> Areal extent _____ Depth _____ <input type="checkbox"/> Siltation not evident Remarks		<input type="checkbox"/> N/A	
2.	<b>Erosion</b> Areal extent _____ Depth _____ <input type="checkbox"/> Erosion not evident Remarks			
3.	<b>Outlet Works</b> Remarks	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A	
4.	<b>Dam</b> Remarks	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A	

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<b>H. Retaining Walls</b>		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	<b>Deformations</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Deformation not evident
	Horizontal displacement _____	Vertical displacement _____	
	Rotational displacement _____		
	Remarks _____		
<hr/>			
2.	<b>Degradation</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Degradation not evident
	Remarks _____		
<hr/>			
<b>I. Perimeter Ditches/Off-Site Discharge</b>		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	<b>Siltation</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Siltation not evident
	Areal extent _____	Depth _____	
	Remarks _____		
<hr/>			
2.	<b>Vegetative Growth</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A
	<input type="checkbox"/> Vegetation does not impede flow		
	Areal extent _____	Type _____	
	Remarks _____		
<hr/>			
3.	<b>Erosion</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Erosion not evident
	Areal extent _____	Depth _____	
	Remarks _____		
<hr/>			
4.	<b>Discharge Structure</b>	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
	Remarks _____		
<hr/>			
<b>VIII. VERTICAL BARRIER WALLS</b>		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	<b>Settlement</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Settlement not evident
	Areal extent _____	Depth _____	
	Remarks _____		
<hr/>			
2.	<b>Performance Monitoring</b>	Type of monitoring _____	
	<input type="checkbox"/> Performance not monitored		
	Frequency _____	<input type="checkbox"/> Evidence of breaching	
	Head differential _____		
	Remarks _____		

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<b>C. Treatment System</b>		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	<b>Treatment Train</b> (Check components that apply) <input type="checkbox"/> Metals removal <input type="checkbox"/> Oil/water separation <input type="checkbox"/> Bioremediation <input type="checkbox"/> Air stripping <input type="checkbox"/> Carbon adsorbers <input type="checkbox"/> Filters _____ <input type="checkbox"/> Additive (e.g., chelation agent, flocculent) _____ <input type="checkbox"/> Others _____ <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> Sampling ports properly marked and functional <input type="checkbox"/> Sampling/maintenance log displayed and up to date <input type="checkbox"/> Equipment properly identified <input type="checkbox"/> Quantity of groundwater treated annually _____ <input type="checkbox"/> Quantity of surface water treated annually _____ Remarks _____ _____		
2.	<b>Electrical Enclosures and Panels</b> (properly rated and functional) <input type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
3.	<b>Tanks, Vaults, Storage Vessels</b> <input type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Proper secondary containment <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
4.	<b>Discharge Structure and Appurtenances</b> <input type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
5.	<b>Treatment Building(s)</b> <input type="checkbox"/> N/A <input type="checkbox"/> Good condition (esp. roof and doorways) <input type="checkbox"/> Needs repair <input type="checkbox"/> Chemicals and equipment properly stored Remarks _____ _____		
6.	<b>Monitoring Wells</b> (pump and treatment remedy) <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells located <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks _____ _____		
<b>D. Monitoring Data</b>			
1.	<b>Monitoring Data</b> <input checked="" type="checkbox"/> Is routinely submitted on time <input checked="" type="checkbox"/> Is of acceptable quality		
2.	<b>Monitoring data suggests:</b> <input type="checkbox"/> Groundwater plume is effectively contained <input checked="" type="checkbox"/> Contaminant concentrations are declining (some are higher within the proposed GMZ, will continue to monitor)		

<b>D. Monitored Natural Attenuation</b>			
1.	<b>Monitoring Wells</b> (natural attenuation remedy)		
	<input checked="" type="checkbox"/> Properly secured/locked	<input checked="" type="checkbox"/> Functioning	<input checked="" type="checkbox"/> Routinely sampled
	<input checked="" type="checkbox"/> All required wells located	<input type="checkbox"/> Needs Maintenance	<input checked="" type="checkbox"/> Good condition
			<input type="checkbox"/> N/A
Remarks: <b>Easements required as part of the ICs to protect the monitoring wells</b>			
<b>X. OTHER REMEDIES N/A</b>			
<b>XI. OVERALL OBSERVATIONS</b>			
<b>A.</b>	<b>Implementation of the Remedy</b>		
<p>Remedy is functioning as designed, but continued monitoring will be required for many years. The first OU (source control) provides for the remediation of the source of contamination at the Coakley site, including the contaminated groundwater beneath and in the vicinity of the landfill. The remedy for the second OU (management of migration) addresses groundwater contamination which has migrated from the site. The response action includes using institutional controls to prevent use of contaminated groundwater; using natural attenuation for the contaminated groundwater plume; and groundwater monitoring.</p>			
<b>B.</b>	<b>Adequacy of O&amp;M</b>		
<p>O&amp;M plan adequate. Required systems operations included in the OU1 Operations and Maintenance Plan (OMP) include: annual mowing and inspection of the landfill cover and surface water drainage systems; and quarterly ambient air and landfill gas monitoring. Annual sampling and monitoring of groundwater, surface water and sediments sampling is required for OUs 1 and 2. Once ICs are in place, annual monitoring of the effectiveness of ICs will be required.</p>			

<b>C. Early Indicators of Potential Remedy Problems</b>
Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.  NONE
<b>D. Opportunities for Optimization</b>
Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.  N/A



### APPENDIX G – PROPOSED GROUNDWATER MANAGEMENT ZONE BOUNDARY

