COAKLEY OU 1+2
8.3
28537

Five-Year Review Report

Initial Five-Year Review Report
for
Coakley Landfill Superfund Site
Towns of North Hampton and Greenland
Rockingham County, New Hampshire

September 2001

Originals in color.

PREPARED BY:

United States Environmental Protection Agency
New England
Boston, Massachusetts

Approved by:

for Patricia L. Meaney, Director
Office of Site Remediation and Restoration
U.S. EPA, New England

Date:

9-25-01

Coakley Landfill Superfund Site
Initial Five-Year Review Report

I. 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 a review is documented in a five-year review report. In addition, five-year review reports identify deficiencies and recommend actions necessary to address them.

This review is required by statute. The U.S. Environmental Protection Agency (EPA) New England must implement five-year reviews consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA Sectioin 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.*

The NCP, Part 300.430(f)(4)(ii) of the Code of Federal Regulations (CFR) 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.*

Due to the fact that landfill wastes are still contained on-site and the ground water is still naturally attenuating, EPA has conducted the initial five-year review of the remedial actions implemented at the Coakley Landfill Superfund Site in North Hampton and Greenland, New Hampshire. The review was conducted from April through August, 2001. This report documents the results of the review. The trigger for this statutory review is the date of actual on-site mobilization for construction of the first operable unit, September 24, 1996.

II. Site Chronology

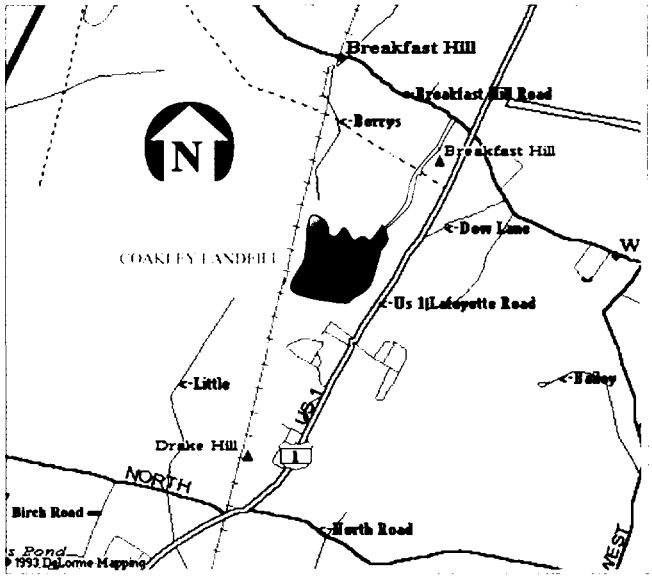
Table 1 lists the chronology of events for the Coakley Landfill Superfund Site.

Table 1: Chronology of Site Events

Date	Event
1972	Landfill operations begin
1979	Initial discovery of the problem
1983	Water main extension completed by the Rye Water District
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 24, 2001	First five-year review report

III. Background

The Coakley Landfill Superfund Site (the Site) includes approximately 92 acres located within the Towns of Greenland and North Hampton, Rockingham County, New Hampshire (See *Site Map*). The actual landfill covers approximately 27 acres of this property. 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.



SITE MAP

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 only 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.

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 (WSPCC) regarding the water quality from a domestic drinking water well. Testing revealed the presence of five different volatile organic compounds (VOCs).

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 and along Dow Lane. This extension brought the public water supply into the area due east and southeast of the Rye Landfill. In December 1983, the Coakley Landfill was proposed for listing on the National Priority List (NPL), and in 1986 it was listed.

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 was completed on March 2, 1990. The RI/FS for the Management of Migration operable unit (Operable Unit 2) was conducted by the EPA and completed on May 23, 1994. Both studies found contaminants in ground water beneath the landfill, as well as, outside the landfill boundaries. VOCs detected at the site include benzene, ethyl benzene, chloroethane, chlorobenzene and xylene. Semi-VOCs detected at the site include predominantly PAHs and dichlorinated benzenes. Inorganic compounds were detected in all sediment samples and include arsenic, barium, iron, lead, manganese, nickel, beryllium, selenium and vanadium.

IV. Remedial Actions

A. Remedy Selection

The remedial action objectives are to:

1. Prevent ingestion of ground water containing contamination in excess of Federal and State drinking water standards or criteria, or that poses a threat to public health and the environment.

2. Prevent the public from direct contact with contaminated soils, sediments, solid waste and surface water which may present a health risk.

3. Eliminate or minimize the migration of contaminants from the soil into ground water.

4. Prevent the off-site migration of contaminants above levels protective of public health and the environment.

5. Restore ground water, surface water, soils and sediments to the levels which are protective of the public health and the environment.

On June 28, 1990, EPA issued a Record of Decision (ROD) for the source control operable unit of the Site. On March 2, 1991, EPA 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 major components of the source control remedy as modified by the three ESDs are:

1. Excavation with disposal onto the landfill of sediment in the wetlands;
2. Consolidation of solid waste;
3. Capping the landfill;
4. Fencing the landfill;
5. Collecting and venting landfill gases;
6. Long-term environmental monitoring; and
7. Institutional controls where possible.

The Record of Decision for Operable Unit 2 was issued on September 30, 1994 and called for natural attenuation of the contaminated ground water which had migrated from beneath the landfill with long-term environmental monitoring and institutional controls.

B. Remedy Implementation

A Consent Decree for the design, construction, operation and maintenance of the source control remedy became effective on May 5, 1992. The Coakley Landfill Group, representing parties potentially responsible for the contamination, completed the design of the Operable Unit 1 remedy and EPA approved the design on January 25, 1996. Construction began September 24, 1996 with the relocation of trash from along the perimeter of the landfill to the top of the landfill. Wetland sediments were removed and placed on the landfill during 1997. The landfill cover was completed in the fall of 1998 and a pre-final inspection was conducted by EPA 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 ground water quality and water levels continued throughout the remedial design, construction and post-construction phases. EPA evaluated that data and determined that the landfill cover is effective in reducing leachate generation such that the collection and treatment of contaminated ground water at the edge of the landfill was no longer necessary. EPA's decision was documented in the ESD issued on September 27, 1999.

A Consent Decree for the implementation of the management of migration remedy became effective on January 11, 1999. The Coakley Landfill Group, representing parties potentially responsible for the contamination, submitted an environmental monitoring plan for the OU-2 remedy which EPA approved March 10, 1999. An institutional control plan has been submitted and approved by EPA and the Coakley Landfill Group is currently negotiating with property owners to secure deed restrictions which will prevent the use of contaminated ground water. Environmental monitoring occurs three times per

year and includes ground water, surface water and sediments. Ambient air and landfill gas monitoring occurs quarterly. After each event, validated data are submitted to EPA and NHDES for review and an annual data assessment report is provided, as well.

C. System Operations

Required systems operations included in the operable unit 1 Operations and Maintenance Plan include: annual mowing and inspections of the landfill cover and surface water drainage systems; and quarterly ambient air and landfill gas monitoring. Additional monitoring required for both Operable Unit 1 and Operable Unit 2 include: tri-annual ground water, surface water and sediments sampling; and monitoring of the effectiveness of institutional controls, which will begin once institutional controls have been put in place.

V. Five-Year Review Findings

A. Five-Year Review Process

The Coakley Landfill Superfund Site five-year review was conducted by Roger Duwart, the EPA Remedial Project Manager, with assistance from Andrew Hoffman, NHDES Remedial Project Manager.

The five-year review consisted of a review of relevant documents (see Attachment A), an interview with a representative of the Coakley Landfill Group, and a site inspection. Completed copies of the review are being placed in the information repositories.

B. Interviews

Daniel MacRitchie of MacRitchie Construction Services, who provides management of site operations for the Coakley Landfill Group, was contacted by phone and also attended the site inspection. He indicated that there have been little or no problems with the implementation of the remedy.

C. Site Inspection

Representatives of EPA, NHDES, and the Coakley Landfill Group participated in the site inspection held on April 26, 2001. During the inspection, the integrity of the landfill cover and of the surface drainage systems was evaluated; the restoration of the wetland assessed; and the conditions of the landfill gas extraction and monitoring system, the ground water monitoring wells and the perimeter fence were observed.

D. Risk Information Review

The following applicable or relevant and appropriate requirements (ARARs) were reviewed for changes that could affect protectiveness:

Safe Drinking Water Act (40 CFR Part 141)
Resource Conservation and Recovery Act (40 CFR 264)
Clean Water Act (40 CFR 122)
New Hampshire Code of Administrative Rules Env-Wm 1403 (formerly Env-Ws 410)

ARARs for two contaminants of concern have become more stringent since the signing of the RODs in 1990 and 1994. The Federal MCL for 1,2-dichloropropane has been reduced from 50 μg/l to 5 μg/l. A State drinking water standard for 2-butanone (MEK) has been promulgated at 170 μg/l. The cleanup level was previously set at a health based level of 200 μg/l. Neither change has affected the protectiveness of this remedy since neither contaminant has been detected in the ground water at this site for several years. Finally, a state drinking water standard for arsenic has been proposed which would lower the allowable concentration from 50 μg/l to 10 μg/l. If this new standard is adopted the next Five-Year Review will need to evaluate it and determine if the remedy remains protective.

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

E. Data Review

Review of records and monitoring reports through April of 2001, indicates that the remedy is performing as designed. Ground water levels beneath the landfill have been lowered as a result of the installation of the cover, causing the direction of ground water flow to be towards the wetlands and away from the developed area along Lafayette Road (Route1). Radial flow away from the landfill no longer occurs.

For the Site, sixteen ground water Chemicals of Concern were identified and had cleanup levels set. Twenty-six compliance wells were sampled in the latest ground water sampling round for which data is available (April, 2001). Only three Chemicals of Concern did not meet their specified cleanup levels. Three wells exceeded the benzene cleanup level (MCL of 5 µg/l) ranging from 7 µg/l to 22 µg/l; five exceeded the arsenic cleanup level (MCL of 50 µg/l) ranging from 63 µg/l to 570 µg/l; and twenty-three exceeded the manganese cleanup level (health advisory of 180 µg/l) ranging from 190 µg/l to 5100 µg/l.

Landfill gas monitoring has shown sporadic violations of State soil gas standards for methane. No indication of methane in nearby occupied buildings has been found, however. Turbine vents have been installed on several landfill gas vents in order to prevent the off-site migration of landfill gas. Additional actions to eliminate the sporadic off-site soil gas violations will be necessary.

I. Assessment

The following conclusions support the determination that the remedy at the Coakley Landfill Superfund Site remains protective of human health and the environment.

- There are no current or proposed changes in land use on the Site. A large church has been built adjacent to the Site, but public water is provided and access to the Site is restricted.

- No new contaminants, sources or exposure pathways were identified during this five-year review.

- The contaminant levels and ground water flow patterns are consistent with the expectations at the time of the decision documents.

- The operation and maintenance plan is in place, sufficient to control risks and properly implemented.

- The remedy is performing as expected and there are no indications of a potential failure.

- This five-year review identified two more stringent health-based standards, however the remedy has already achieved these. A proposed change in the State's arsenic standard will, if promulgated, require an evaluation of the issue either at or prior to the next five-year review.

VII. Deficiencies

On August 1, 2001, EPA approved the Institutional Control Plan for the Site. This plan requires that the Coakley Landfill Group obtain deed restrictions prohibiting ground water use on those properties without public water which overlie the contaminated ground water. These restrictions must be in place by February 1, 2002 (six months following the approval).

Off-site soil gas levels must be brought into compliance with State regulations for methane concentrations. EPA has sent the Coakley Landfill Group a letter requesting submission of a proposal to do so.

VIII. Recommendations and Required Actions

In accordance with the approved Institutional Control Plan, deed restrictions must be obtained by February 1, 2002. This will ensure no contact with contaminated ground water.

The arsenic cleanup level must be reviewed and a determination made as to the 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.

IX. Protectiveness Statements

☛ 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 the institutional controls.

X. Next Review

This is a statutory site that requires ongoing five-year reviews. The next review will be issued either in or prior to September, 2006, five years from the date of signature of this report.

ATTACHMENT A

DOCUMENTS REVIEWED

"OU-1 Operations and Maintenance Plan," Golder Associates, Inc., January 1999.

"1999 Annual Monitoring Plan Data Assessment Report," Aries Engineering, Inc., February, 2000.

"Wetlands Restoration Monitoring," Normandeau Associates, August 2000.

"2000 Annual Monitoring Plan Data Assessment Report," Aries Engineering, Inc., February, 2001.

"April 2001 Monitoring Plan Data Submittal," Aries Engineering, Inc., July 2001, includes groundwater elevations from April 1993 through April 2001 and groundwater, surface water and sediment data for April 2001.

"June 2001 Landfill Gas Probe Monitoring Results Summary," Aries Engineering, Inc., July 11, 2001, includes monitoring results from 3/24/99 through 6/15/01.

"Settlement Plate Elevations," MacRitchie Construction Services, Inc., July 27, 2001, includes data from 9/98 through 12/00.