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Superfund Record of Decision:

Coakley Landfill, NH

50272-101

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16. Abstract (Limit: 200 words)

The 92-acre Coakley Landfill site is in the towns of Greenland and North Hampton, Rockingham County, New Hampshire. The site includes a 27-acre landfill, and borders farmland, undeveloped woodlands, and wetlands to the north and west and commercial and residential properties to the east and south. A drainage bounds the southern and western sides of the landfill, channeling surface water runoff into wetlands north of he landfill. Sand and gravel operations were conducted from 1968 to 1972 during which time rock quarrying and landfill operations also were conducted. From 1972 to 1985, the landfill primarily accepted refuse from Pease Air Force Base and neighboring municipalities and later accepted incinerator residue from the refuse-to-energy plant operated at Pease Air Force Base. Much of the refuse disposed of at the landfill was placed in open trenches created by the rock quarrying and sand and gravel operations. In 1979, the State received complaints concerning leachate breakouts in the area and, by 1983 VOC-contamination had been identified in a domestic drinking water well. Subsequent testing confirmed VOC-contamination in the ground water and public water was extended to area residents and business who had previously received water from private wells. This Record of Decision (ROD), the first of two operable units, addresses source control and ground water contamination near the landfill. A subsequent ROD will address (See Attached Sheet)

17. Document Analysis a. Descriptors

Record of Decision - Coakley Landfill, NH
First Remedial Action
Contaminated Media: soil, sediment, gw
Key Contaminants: VOCs (benzene, PCE), other organics (phenols), metals (arsenic, chromium)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

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(See ANSI-Z39.18) *See Instructions on Reverse* OPTIONAL FORM 272 (4-77) (Formerly NTIS-35) Department of Commerce

Abstract (Continued)

offsite ground water contamination should it be determined that a contaminated plume underlying wetlands to the north of the site requires remediation. The primary contaminants of concern affecting the soil, sediment, and ground water below the surface of the landfill are VOCs including benzene and PCE; other organics including phenols; and metals including arsenic and chromium.

The selected remedial action for this site includes excavating and consolidating approximately 2,000 cubic yards of wetlands sediment and 30,000 cubic yards of solid waste and depositing the material into the landfill prior to capping; collecting and treating landfill gases using a thermal destruction process; ground water pumping and treatment using chemical precipitation for metals removal, air stripping for VOC removal, and biological treatment, if necessary, prior to recharge into the aquifer or discharge to onsite surface water; treating air from the air stripper using incineration or activated carbon filtration prior to release to the atmosphere; implementing site access restrictions; and long-term environmental monitoring including air and ground water monitoring. The estimated present worth cost for the remedial action is $20,200,000 which includes an annual O&M cost of $245,000 for 30 years.

PERFORMANCE STANDARDS OR GOALS: Soil cleanup levels were established to measure contaminant levels in the sediment remaining in the wetlands following excavation and will protect the aquifer from potential soil leachate. Soil cleanup values are based on the Organic Leaching Model and incorporates SDWA MCLs/MCLGs and State standards. Chemical-specific soil cleanup goals include benzene 0.055 mg/kg (MCL), PCE 0.13 mg/kg State), and phenol 2.3 mg/kg (State). Ground water cleanup goals will meet SDWA MCLs/MCLGs, State standards, and health advisories and include benzene 5 ug/l (MCL), PCE 3.5 ug/l (State), arsenic 50 ug/l (MCL), phenol 280 ug/l (health advisory), and chromium 50 ug/l (MCL). In the absence of a chemical-specific cleanup standard, cleanup levels will be based on a 10-6 excess cancer risk level and/or a Hazard Index = 1.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203-2211

DECLARATION FOR THE RECORD OF DECISION

Coakley Landfill
North Hampton, New Hampshire

STATEMENT OF PURPOSE

This decision document represents the selected remedial action for the Coakley Landfill Site in North Hampton, New Hampshire, developed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986, and to the extent practicable, the National Oil and Hazardous Substances Contingency Plan (NCP), 40 CFR Part 300 et seq., as amended. The Region I Administrator has been delegated the authority to approve this Record of Decision.

The State of New Hampshire has concurred on the selected remedy.

STATEMENT OF BASIS

This decision is based on the Administrative Record which has been developed in accordance with Section 113 (k) of CERCLA and which is available for public review at the North Hampton Public Library in North Hampton, New Hampshire and at the Region I Waste Management Division Records Center in Boston, Massachusetts. The Administrative Record Index (Appendix E to the ROD) identifies each of the items comprising the Administrative Record upon which the selection of the remedial action is based.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to the public health or welfare or to the environment.

DESCRIPTION OF THE SELECTED REMEDY

This ROD sets forth the selected remedy for the first operable unit (OU) at the Coakley Landfill Site, which addresses source control to meet onsite cleanup goals. A second ROD will follow addressing the management of migration, the second operable unit. The source control operable unit one will consist of a multi-task remedy.

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The remedial measures for the first OU described in this ROD will protect the drinking water aquifer by minimizing further migration of contaminants to the groundwater and surface water, and will eliminate threats posed by direct contact with or ingestion of contaminated soils and wastes at the Site.

The major components of the selected remedy include:

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

DECLARATION

The selected remedy is protective of human health and the environment, attains Federal and State requirements that are applicable or relevant and appropriate for this remedial action and is cost-effective. This remedy satisfies the statutory preference for remedies that utilize treatment as a principal element to reduce the toxicity, mobility, or volume of hazardous substances. In addition, this remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

As this remedy will result in hazardous substances remaining onsite above health-based levels, a review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

June 28, 1990
Date

Julie Belaga
Julie Belaga
Regional Administrator
U.S. EPA, Region I

RECORD OF DECISION
COAKLEY LANDFILL SITE

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ROD DECISION SUMMARY

June 1990

I. SITE NAME, LOCATION AND DESCRIPTION

A. General Description

The Coakley Landfill Site (the Site) is situated on approximately 92 acres located within the Towns of Greenland and North Hampton, Rockingham County, New Hampshire (Appendix A, Figure 1). The actual landfill area covers approximately 27 acres of this property. The Site 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. Vehicles access the Site through an entrance gate located on Breakfast Hill Road, approximately 600 feet northwest of the intersection of Lafayette and Breakfast Hill Roads. The Greenland-Rye town line forms a major portion of the eastern boundary of the Site. A more detailed Site map is shown on Appendix A, Figure 2. There is a more complete description of the Site in the Remedial Investigation Report in Chapter 2, Pages 2-1 to 2-6.

Breakfast Hill Road forms the northern boundary of the Site. Privately owned properties border the Site to the west and north and include both farmland and undeveloped woodlands and wetlands. Properties abutting east and south of the Site are generally commercial or residential. The Rye Landfill, which was closed in 1987, abuts the Site directly to the northeast. The Lafayette Terrace housing development is directly southeast of the Site. The Granite Post Green Mobile Home Park lies approximately 500 feet to the south of the Site, west of Lafayette Terrace. The Boston & Maine Railroad, which runs north-south, forms the western border of the southern half of the Site.

The landfill is situated within the southernmost portion of the Site, almost completely within the Town of North Hampton. The Coakley Landfill covers approximately 27 acres, constituting the major portion of the southern section of the Site. Generally rectangular in shape, with an average width of approximately 900 feet and an average length of approximately 1,300 feet, the landfill extends to the western, southern, and eastern boundaries in the south direction.

The landfill forms a hill rising approximately 10 to 60 feet above the surrounding area. At its highest point the elevation is about 137 feet above mean sea level. Ground surface in the landfill area originally sloped gently westward. The landfill now forms a prominent raised plateau in that area, with a generally flat upper

surface. The landfill has moderately steep slopes along its western, eastern, and southern sides, and a gentle slope along the northern side.

Fine, sandy soil of variable thickness covers most of the landfill, and vegetative cover is essentially nonexistent. Along the top of the northern and western slopes, incinerator residue is visible in banks where wind and water action apparently removed the sand cover. A drainage bounds the southern and western sides of the landfill, channeling surface water runoff into a wetland area situated immediately to the north-northwest of the landfill. The wetland area generally extends from the northwest corner of the landfill area, along both sides of the B&M Railroad, to a point approximately 500 feet south of Breakfast Hill Road, The margins of the wetlands adjacent to the landfill have been partially filled with rock removed from the quarry and some native sand and gravel. Wetlands west of the railroad track drain both the north and the south. The landfill is located on a subregional drainage divide and contributes runoff in a generally radial pattern into the watersheds of four nearby streams west of the Site: Little River, Berry's Brook, North Brook, and Bailey Brook (Appendix A, Figure 2).

Natural resources in the area include the agricultural lands, woodlands, and wetlands which surround the Site. Surface water bodies feed the wetland area. The groundwater is available in aquifers formed by water saturated portions of sand and gravel deposits and in fractured bedrock. Sand and gravel deposits are found throughout the Site. Some bedrock outcrops were mined for crushed aggregate in a quarry operation. It is reasonable to expect that wetland and stream areas receive some hunting and fishing activity. This is considered minor recreational use. There is also occasional use of all-terrain recreational vehicles on and around the Site.

B. Geologic Characteristics

Portions of the landfill Site directly on fractured bedrock of the Rye Formation or on an undetermined thickness of unconsolidated sediments of the Pleistocene age. Bedrock consists of deformed igneous and metamorphic metasediments of the Precambrian to Ordovician Age intruded locally by pegmitites of the Hillsboro plutonic series.

Onsite drilling and geophysical work indicated the bedrock surface is irregular and appears to form a northeast/southwest ridge beneath the landfill.

Surficial geology in the Site vicinity varies from ice contact sand and gravel deposit on the easterly side of the landfill to marine sandy silt on the westerly side. Ice contact deposits also appear

to overlie the marine sediments on the northeastern side of the landfill.

The overburden materials onsite vary in thickness from three feet to almost fifty feet and grade from highly permeable sands and gravels to stiff, low permeability sandy silt.

C. Hydrogeological Characteristics

The generalized groundwater hydraulics of the Coakley Landfill Site are presented in Appendix A, Figure 3. Both the direction and magnitude of the hydraulic gradients appears to be similar in the overburden and bedrock units. In addition, the data suggest that the overburden is recharging bedrock over the topographic high area east of the Coakley Landfill, and that bedrock is discharging into the overburden in the wetlands area.

The primary directions of groundwater flow from the Coakley Landfill are southwest, west and northwest toward the wetlands. In the wetlands, an inferred east to west groundwater divide directly west of the landfill causes groundwater to flow south toward North Road and presumably north toward Breakfast Hill Road. Residential and commercial pumping, occurring prior to the installation of public water supplies, altered the natural hydraulic system shown in Appendix A, Figure 3. EPA interprets this pumping to be the primary reason for contaminant migration south, east, and northeast of the landfill. As of the last round of water level measurements on September 1987, essentially no hydraulic gradient was present from the Coakley Landfill toward the south, east, or northeast, including toward or from the Rye landfill.

Overburden groundwater flow appears to be radial from the Coakley Landfill and vertically downward into the bedrock aquifer. Surface drainage is also multidirectional since the landfill is near the headwaters of Berry's Brook to the north and the Little River to the south. Flow within the bedrock aquifer is a function of interconnected fractures and is affected locally by hydraulic gradients induced by bedrock water well usage within the area. At least one major fracture system positioned in a south/southeast direction has been documented to interconnect with the Coakley Landfill. This is located in the south/southwest boundary where substantial recharge to the bedrock aquifer may be occurring.

Groundwater recharge from the overburden to the bedrock aquifer occurs where overburden water levels are higher in elevation than those in bedrock and fine grained materials do not prohibit this recharge. Direct leachate discharge to the bedrock may take place beneath parts of the landfill, since the refuse is in direct contact with bedrock in areas where rock quarrying had previously occurred.

II. Site HISTORY AND ENFORCEMENT ACTIVITIES

A. Land Use

In approximately 1965 sand and gravel operations began on the Coakley property, which had previously consisted of wooded areas and open fields as evidenced by aerial photographs. These operations continued into the late 1970s.

Permitting for a landfill began in 1971 when the New Hampshire Department of Public Health granted the Town of North Hampton a permit to operate a landfill on the Coakley Site. Early in 1972, Coakley Landfill, Inc. and the Towns of North Hampton and the City of Portsmouth entered into an agreement which prohibited the dumping of shop and ordnance waste from Pease Air Force Base, located in Newington, NH, as well as demolished buildings, junk autos, machinery, and large tree stumps or butts.

Landfill operations began in 1972, with the southern portion of the Site used for refuse from the municipalities of Portsmouth, North Hampton, Newington, and New Castle, along with Pease Air Force Base. Coincident 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 sand and gravel mining.

In 1978 and 1979 oil-soaked debris from accidents in Portsmouth and Newington, was placed in what is known as the Oily Debris Area in the northern section of the Coakley Site (Appendix A, Figure 2). The precise volume of this material is unknown.

In 1981, the State of New Hampshire granted the Town of North Hampton permission to dispose of pesticide waste containers at the Coakley Landfill Site.

After the City of Portsmouth began operating a refuse-to-energy plant on leased property at Pease Air Force Base in 1982. From July 1982 through July 1985, Pease Air Force Base and the municipalities of Rye, North Hampton, Portsmouth, New Castle, and Derry began transporting their refuse to this plant for incineration. After that time, the Coakley Landfill generally accepted only incinerator residue from the new plant. In March 1983, the Bureau of Solid Waste Management ordered an end to the disposal of unburned residue at the Coakley Landfill.

Prior to incineration, the New Hampshire Waste Management Division estimated that approximately 120 tons per day were disposed of at

the landfill. The daily weight of incinerator residue was estimated to be approximately 90 tons. A more detailed description of the Site history can be found in the Remedial Investigation Report at pages 1-6 through 1-10.

B. Response History

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 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 from 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. The WSPCC submitted proposals to the U.S. Environmental Protection Agency (EPA) in May and October of 1983 recommending that the Coakley Site be included on the National Priority List (NPL). In December 1983, the Coakley Landfill was listed on the NPL, and ranked as No. 689.

In July 1985, after additional investigation conducted by the EPA and the WSPCC, the Coakley Landfill ceased operations. The nearby Rye Landfill ceased operations in 1987.

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 contractor, Roy F. Weston, Inc., completed the RI and the FS which were released for public comment on October 31, 1988 and March 2, 1990, respectively. The Proposed Plan which contains EPA's preferred alternative was released with the FS.

C. Enforcement History

The State of New Hampshire began discussions concerning the Site with Coakley, the owner, and with the municipalities as early as December, 1983. Information request letters were sent by EPA to these parties in September and October, 1987. Additional

information request letters were sent to approximately 300 parties during 1988.

On February 2, 1990, EPA notified approximately 59 parties who either owned or operated the facility, generated wastes that were shipped to the facility, arranged for the disposal of wastes at the facility, or transported wastes to the facility of their potential liability with respect to the Site. The PRPs formed a steering committee and initial negotiations are taking place. On March 14, 1990 EPA met with the potential responsible parties (PRPs) to discuss their potential liability at the Site.

Soon after the PRPs were noticed the City of Portsmouth, the Town of North Hampton and the Town of Newington notified the EPA of their suspicions that additional parties also dumped at the Coakley Site. These additional 126 parties were informed by letter that EPA may notice them in the future. Copies of the Proposed Plan was sent to parties to provide them with an opportunity to comment on the EPA's Preferred Remedial Alternative.

The PRPs have been active in the remedy selection process for this Site. The steering committee retained a technical consultant to review the RI/FS and to evaluate EPA's preferred alternative. The Coakley Landfill Steering Committee submitted technical comments to the EPA during the public comment period. Responses to these comments as well as comments from other members of the public are summarized in the attached Responsiveness Summary.

III. COMMUNITY RELATIONS

Throughout the Site's history, community concern and involvement has been high. EPA and the State have kept the community and other interested parties appraised of the Site activities through informational meetings, fact sheets, press releases and public meetings.

During January 1986, EPA released a community relations plan which outlined a program to address community concerns and keep citizens informed about and involved in activities during remedial activities. On May 14, 1986, EPA held an informational meeting at the North Hampton Town Hall, North Hampton, New Hampshire to describe the plan for the RI/FS. On November 3, 1988, EPA held an informational meeting at North Hampton Town Hall, North Hampton, New Hampshire to discuss the results of the Remedial Investigation (RI).

On May 10, 1988, EPA made the administrative record available for public review at EPA's offices in Boston and at the North Hampton Public Library. Additional materials were added to the Administrative Record on October 31, 1988 with release of the RI and on March 2, 1990 with release of the FS and the Proposed Plan.

Comments on the RI were received from Coakley, the Town of Newcastle and the City of Portsmouth. EPA published a notice and brief analysis of the Proposed Plan in Foster's Daily Democrat and in the Portsmouth Herald on March 9, 1990 and made the plan available to the public at the North Hampton Public Library.

On March 15, 1990, EPA held an informational meeting at the North Hampton Elementary School to discuss the results of the Remedial Investigation and the cleanup alternatives presented in the Feasibility Study and to present the Agency's Proposed Plan. Also during this meeting, the Agency answered questions from the public. From March 16 to May 14, 1990, the Agency held a 60-day public comment period to accept public comment on the alternatives presented in the Feasibility Study and the Proposed Plan and on any other documents previously released to the public. On April 3, 1990, the Agency held a public meeting at the North Hampton Elementary School to discuss the Proposed Plan and to accept any oral comments. A transcript of this meeting and comments from the general public and from the Coakley Landfill Steering Committee along with the Agency's response to comments are included in the attached Responsiveness Summary.

EPA has met with the potentially responsible parties at various times during the process to discuss the Site. More specifically, EPA met with the City of Portsmouth in February, 1988, with several municipalities involved with the Site in the Fall of 1989, and with the Coakley Landfill Steering Committee chairs in April, 1990.

IV. SCOPE AND ROLE OF THE RESPONSE ACTION

The selected remedy is the first operable unit of at least a two operable unit approach to the remediation of the Site and provides for the remediation of the source at the Coakley Site including the contaminated groundwater beneath and in the vicinity of the landfill (i.e., source control). The second operable unit will address any groundwater contamination which has migrated from the landfill and beyond the property boundary (i.e., management of migration). During this phase additional studies will be undertaken to better characterize the nature and extent of this offsite groundwater contamination and to develop and evaluate alternatives for remediation should it be required. The presence of a plume of low level contamination currently exists in the bedrock under the wetlands beyond the property boundary to the west of the Site. An environmental assessment will be performed at that time.

This first operable unit will address the following principal threats to human health and the environment posed by the Site:

1. The offsite migration of contaminants;

2. The future ingestion of contaminated groundwater offsite; and

3. The direct contact with contaminated soils, sediments and solid waste.

V. SITE CHARACTERISTICS

Chapter 1.0 of the "Draft Feasibility Study, Coakley Landfill", May 1989, contains an overview of the Remedial Investigation (RI). The study area, as defined in the RI, includes the land from about 1,600 feet to the south of North Road to about 1,600 feet north of Breakfast Hill Road and about 4,000 feet to the east and west of Lafayette Road. This study area is substantially larger than the Coakley Landfill Site itself in order to evaluate the extent of the contaminant migration. The significant findings of the RI are summarized below. Also shown is a summary of the hazardous substances found at the Site which are subject to Superfund remedial actions. A complete discussion of Site characteristics can be found in the Remedial Investigation Report at pages 7-1 through 7-44.

A. Air

Qualitative outdoor air sampling done at the Site detected low concentrations of some volatile organic compounds (VOCs). Observed concentrations ranged from 'not detected' to 48 parts per billion (ppb or ug/L). Also, data obtained from another survey instrument, an AID Model 580 organic vapor meter, during the initial Site walkover of the RI did not indicate VOCs above the background level that was set approximately 1/2 mile from the Site.

In 1986, the WSPCC conducted indoor air monitoring of three homes at Lafayette Terrace. Several VOC's were detected, but the concentrations were typical of those found in residential dwellings. Nevertheless, the concentrations of VOCs ranged from below measurable limits up to approximately 22 ppb. These results are below the outdoor air VOC concentrations at the landfill perimeter.

B. Soil

In soils below the surface of the landfill, laboratory and field analyses found VOCs, pesticides, metals and acid and base/neutral extractable compounds (ABNs), above detection limits. Soil samples were screened from nine test pits located at the landfill (Appendix A, Figure 4). Specific detected VOC's include tetrachloroethylene, ethylbenzene, acetone, chloromethane, and dichloromethane. Total

VOCs in the samples from the nine test pits ranged from minimal detection to 178 ppb. Phenanthrene, anthracene, flouroanthrene, benzo(a)anthracene, chrysene, benzo(k)-floranthrene, benzo(a)pyrene, fluorene, naphthalene, 4-methylphenol, and various phthalates were among the ABNs detected in several of the test pit samples, particularly at test pits TP-11 and TP-18. Pesticide compounds identified above their detection limits included 4,4'-DDD and 4,4'-DDT. No PCBs were observed at levels above the detection limits of the instruments used. Arsenic, cadmium, lead, mercury, iron, manganese, and zinc were among the trace metals that exceeded background levels at various test pits within the landfill.

Twelve (12) soil borings were sampled and screened for VOC's in and around the landfill. The highest concentration was observed in GZ-106 which was bored in the landfill with a total VOC concentration of 17 ppm. The VOC's observed include: tetrahydrofuran, benzene, methyl ethyl ketone (MEK), toluene, xylenes and chlorobenzene.

The principal route of offsite migration of these contaminants is from soil leaching into the groundwater. Because soils were sampled below the surface, migration from volatilization of chemical compounds and from wind and water erosion is unlikely.

C. Sediments

Sediment samples were obtained for quantitative chemical analyses at nine sampling points (Appendix A, Figure 5). Laboratory and field analyses performed were VOCs, pesticides/pcb, metals and acid and base/neutral extractable compounds (ABNs). Sediments with detectable limits of contaminants were observed within the Little River wetlands, and within the Berry's Brook wetland and at a location downstream in Berry's Brook.

The highest measured total VOC concentration in a surface sediment sample was located in the wetlands immediately adjacent to the northwest corner of the Site which is considered part of Berry's Brook wetland. Leachate breakout and eroded soils from the temporary cap of the landfill can be seen at this location. The predominant VOC's detected were acetone (300 ppb), ethylbenzene (240 ppb), xylene (140 ppb), and chlorobenzene (89 ppb). The total ABN concentration within this sediment sample was less than 123 ppb. The metals detected at this location included arsenic (46 ppm), chromium (57 ppm) and nickel (33 ppm).

D. Surface Water

Two rounds of surface water samples were taken at eight sampling station locations during the RI (Appendix A, Figure 5). Laboratory

and field analyses were performed for VOCs, pesticides/PBCs, metals and acid and base/neutral extractable compounds (ABN's).

Surface waters sampled in the vicinity of the Coakley Landfill indicated the presence of VOCs and elevated levels of metals. Overall, VOCs were detected in surface water samples at two of the eight locations, namely S-10 (Berry's Brook at Breakfast Hill Road) and S-11 (Berry's Brook, at the northwest corner of the Site). These VOCs, also detected in the landfill leachate, consist of six VOCs: toluene, MEK, MIBK, diethyl ether, tetrahydrofuran, and acetone.

The highest total VOC concentrations were observed in Berry's Brook, immediately northwest of the Coakley Landfill (sample location S-11), where total VOCs in the range of 459 ppb were detected. Data from the March 1987 sampling round indicate that tetrahydrofuran was detected at S-10 and S-11 at concentrations of 12 ppb and about 50 ppb, respectively. Data from the 1984 sampling round indicate that toluene, acetone, tetrahydrofuran, MEK and MIBK were detected at S-10 and S-11 at less than 10 ppb and 29 ppb, 89 ppb and 185 ppb, 11 ppb and 31 ppb, 130 ppb and 176 ppb, and 10 ppb and 19 ppb, respectively.

Southwest of Coakley Landfill, surface water samples obtained from the Little River (sample location S-1) by New Hampshire Department of Environmental Services (NH DES) in 1983 also indicated the presence of six VOCs consisting of toluene, acetone, trichloromethane, trichloroethylene, tetrachloroethylene, and tetrachloroethane, with a maximum observed total VOC concentration of 102 ppb.

Numerous metals at or above anticipated background levels were detected in samples obtained at stations S-10 and S-11. Elevated levels of aluminum were detected in a sample obtained from station S-16 located approximately 4,000 feet downstream of station S-10. The metal contaminants detected include iron, aluminum, barium, manganese and potassium. Measured maximum level of these contaminants are 100 ppm, 2.1 ppm, 0.23 ppm, 29.7 ppm and 25 ppm, respectively. Inorganic parameters included: iron (100 ppm), manganese (5.8 ppm), COD (40.6 ppm) and chloride (185 ppm). Since aluminum concentrations were high at stations located at headwaters of Little River (S-7 and S-17), these elevated levels could be from naturally high aluminum levels or an alternate source.

E. Groundwater

<u>Observed Contaminants in the Overburden Hydrogeological Unit</u>

Groundwater samples were obtained from 23 overburden monitoring wells in the study area (Appendix A, Figure 6). Concentrations of total VOCs detected in seven monitoring wells located within and

along the border of the Coakley Landfill ranged from 600 ppb (MW-1, MW-2) to 10,000 ppb (MW-3D). Commonly observed VOCs detected in these overburden wells and the observed concentration ranges detected were as follows:

COMPOUND	CONCENTRATION (PPB)
benzene	6-60.6
ethyl benzene	18-499
chlorobenzene	less than 5-182
toluene	21-1200
acetone	14-2800
methyl ethyl ketone	17-2700
methyl isobutyl ketone	11-1130
tetrahydrofuran	16-1650
diethyl ether	12-198.8
1,1-dichloroethane	7.3-20.8
1,2-dichloroethane	less than 5-72
1,2-dichloropropane	30
trans-1,2-dichloroethylene	11-16

Metals detected in these same seven overburden wells and their detected concentration ranges are presented below.

COMPOUND	CONCENTRATION
aluminum	152-337 ppb
barium	243-368 ppb
chromium	330 ppb
iron	21,000-280,000 ppb
manganese	2,620-27,000 ppb
nickel	122-200 ppb
potassium	16,000-480,000 ppb
sodium	1,000,000-1,460,000 ppb
arsenic	10-89 ppb
vanadium	23-45 ppb

Observed Contaminants in the Bedrock Hydrogeological Unit

Groundwater samples were obtained from 37 bedrock monitoring and bedrock domestic wells within the study area. Bedrock monitoring wells are those installed outside of the landfill itself by EPA and the State of New Hampshire. Bedrock domestic wells are also located offsite and are either current or past commercial and residential drinking water sources. Highest measured total VOC concentrations within the bedrock wells were detected in samples obtained from MW-5, MW-6 around the southern perimeter of the landfill and in GZ-105 located approximately 800 feet offsite in a westerly direction. Maximum total VOC concentrations were less than 2,400 ppb, 97 ppb and less than 807 ppb, respectively. Individual compounds comprising the bulk of the observed constituents in both the monitoring and domestic bedrock wells and the observed concentration ranges detected were as follows:

COMPOUND	CONCENTRATION
benzene	5.2-12.8 ppb
chloroethane	294 ppb
toluene	125-1,340 ppb
diethyl ether	180-350 ppb
methyl ethyl ketone	170-407 ppb
methyl isobutyl ketone	85-96 ppb
tetrahydrofuran	238-715 ppb
acetone	16-437 ppb
xylene	21-87 ppb
ethyl benzene	less than 34 ppb
1,1-dichloroethane	7-47 ppb

VOCs were detected in bedrock domestic wells located offsite to the southeast at Lafayette Terrace (R-25, R-26 and R-28). Observed total VOCs concentrations ranged from none detected (R-28) to less than 1,445 ppb (R-25). Observed compounds in these wells were similar to those observed within the offsite bedrock wells.

Metals detected in the bedrock monitoring and domestic wells located throughout the study area of the Coakley Landfill and the observed concentration ranges detected were as follows:

COMPOUND	CONCENTRATION
aluminum	119-200 ppb
barium	12-269 ppb
iron	14-140,000 ppb
manganese	100-120,000 ppb
nickel	8-65 ppb
potassium	2500-190,000 ppb
sodium	15,000-720,000 ppb
arsenic	5-9.6 ppb
vanadium	5-49 ppb

Monitoring Reports Previous to the RI

Groundwater samples collected prior to the RI from onsite monitoring wells in bedrock, overburden and from offsite residential drinking water supply wells indicated the presence of VOCs and are reported in the New Hampshire Water Supply and Pollution Control Commission (NHWS&PCC), "Hydrogeological Investigation of the Coakley Landfill Site". Ten VOCs were frequently detected in onsite and offsite wells, (toluene, MEK, diethyl ether, tetrahydrofuran, xylenes, ethylbenzene, dichlorobenzene, benzene, 1,1-dichloroethane and 1,2-dichloroethylene).

F. Summary of Contamination and Affected Media

Samples of surface water, stream sediment, soil, groundwater and air were obtained from the study area for evaluation of possible chemical contamination. Five basic types of chemical analyses were

performed on samples from various environmental media (excluding air). These analyses included methods for the detection of VOCs ABNs, metals, PCBs and pesticides and analyses for several other parameters considered to be indicators of landfill leachate.

In general, VOCs and metals were observed to be the predominant contaminants in the study area. The highest contaminant concentrations were typically detected within samples obtained from test pits, surface water/sediment stations, and monitoring wells located within the Coakley Landfill or in the portion of the Little River and Berry's Brook wetlands immediately west of the landfill. Analyses of environmental samples obtained elsewhere in the study area typically indicated significantly diminished contaminant levels.

Hydrogeological and water quality data indicate that contaminated groundwater has migrated radially from the Coakley Landfill in both overburden and bedrock hydrogeologic units. Although contaminants detected within samples obtained in the Site study area include VOCs, ABNs, PCBs, metals and inorganic; VOCs and metals were generally observed with the greatest frequency and distribution.

In general, VOCs are fairly mobile in groundwater and can expect to be transported in the natural flow of the overburden and bedrock groundwater. Although metals are usually considered fairly immobile they can become dissolved in the groundwater especially where bio-chemical changes in waste materials produce gross changes in groundwater geochemistry. Therefore, metal constituents in the groundwater beneath the Site can be transported with the natural flow of the overburden and bedrock groundwater.

Currently, the majority of this groundwater contamination is localized under the landfill in the overburden and bedrock hydrogeological units. However, prior to the introduction of public water, significant levels of contaminants, particularly VOC's, were found in the private water supply wells in the vicinity of the Coakley Landfill and particularly in the Lafayette Terrace area. This suggests that if the pumping wells for private water supply were reintroduced into this area, contaminants would once again be drawn out from under the landfill, potentially exceeding safe drinking water standards.

Although numerous contaminants were identified throughout the landfill, no areas were identified which could be considered "hot spots" (areas of high concentrations of contaminants) where special source control measures could be warranted.

VI. SUMMARY OF SITE RISKS

A risk assessment (RA) was performed to estimate the probability and magnitude of potential adverse human health effects from

exposure to contaminants associated with the Site. The public health risk assessment followed a four step process: 1) contaminant identification, which identified those hazardous substances which, given the specifics of the site, were of significant concern; 2) exposure assessment, which identified actual or potential exposure pathways, characterized the potentially exposed populations, and determined the extent of possible exposure; 3) toxicity assessment, which considered the types and magnitude of adverse human effects associated with exposure to hazardous substances, and 4) risk characterization, which integrated the three earlier steps to summarize the potential and actual risks posed by hazardous substances at the Site, including carcinogenic and noncarcinogenic risks. The results of the public health risk assessment for the Coakley Landfill Site are discussed below.

Seventeen contaminants of concern, listed in Appendix B, Tables 1 through 5, were selected for evaluation in the RA. These contaminants constitute a representative subset of the more than thirty-two contaminants identified at the Site during the Remedial Investigation. As shown in these tables, the seventeen contaminants of concern were selected to represent potential Site-related hazards based on toxicity, concentration, frequency of detection, and mobility and persistence in the environment. A summary of the health effects of each of the contaminants of concern can be found in Section 8, Pages 8-1 to 8-18 of the Risk Assessment.

Potential human health effects associated with exposure to the contaminants of concern were estimated quantitatively through the development of several hypothetical exposure pathways. These pathways were developed to reflect the potential for exposure to hazardous substances based on the present uses, potential future uses, and location of the Site. The following is a brief summary of the exposure pathways evaluated. A thorough discussion of exposure pathways and parameters can be found in Section 7.3 and 8.3 of the Risk Assessment. For incidental ingestion and direct contact of contaminated soil, the health risk was evaluated for a child between the ages of five and 18 years old who may be exposed to contaminated soils ten times per year for 14 years. For ingestion of groundwater used as a drinking water supply, the health risk was evaluated for an adult who may consume two liters per day for seventy years. For incidental ingestion and dermal absorption of surface water, the health risk was evaluated for a child between the ages of five and 18 years old who may accidently ingest or bathe in contaminated surface water once each year. For incidental ingestion and dermal absorption of sediments, the health risk was evaluated for a child between the ages of five and 18 years old who may accidently ingest or cover his or her self in contaminated sediment once a year. For each pathway evaluated, an exposure estimate was generated corresponding to exposure to the average concentration detected in that particular medium.

Excess lifetime cancer risks were determined for each exposure pathway by multiplying the exposure level with the chemical specific cancer potency factor. Cancer potency factors have been developed by EPA from epidemiological or animal studies to reflect a conservative "upper bound" of the risk posed by potentially carcinogenic compounds. That is, the true risk is very unlikely to be greater than the risk predicted. The resulting risk estimates are expressed in scientific notation as a probability (e.g. 1×10^{-6} for 1/1,000,000) and indicate (using this example), that an individual is not likely to have greater than a one in a million chance of developing cancer over 70 years as a result of Site-related exposure as defined to the compound at the stated concentration. Current EPA practice considers carcinogenic risks to be cumulative when assessing exposure to a mixture of hazardous substances.

The hazard index was also calculated for each pathway as EPA's measure of the potential for noncarcinogenic health effects. The hazard index is calculated by dividing the exposure level by the reference dose (RfD) or other suitable benchmark for noncarcinogenic health effects. Reference doses have been developed by EPA to protect sensitive individuals over the course of a lifetime. They reflect a daily exposure level that is likely to be without an appreciable risk of an adverse health effect. RfDs are derived from epidemiological or animal studies and incorporate uncertainty factors to help ensure that adverse health effects will not occur. The hazard index is often expressed as a single value (e.g. 0.3) indicating the ratio of the stated exposure as defined to the reference dose value (for this example of 0.3, the exposure as characterized is approximately one third of an acceptable exposure level for the given compound). The hazard index is only considered cumulative for compounds that have the same or similar toxic endpoints (the hazard index for a compound known to produce liver damage should not be added to a second whose toxic endpoint is kidney damage).

Table 6 below, depicts the cumulative risk summary for the carcinogenic and non-carcinogenic contaminants of concern for each exposure pathways analyzed. For a more detailed analysis on the risk for each contaminant of concern, see Tables 79 through 87 of the Remedial Investigation.

TABLE 6

CUMULATIVE CARCINOGENIC RISK ESTIMATES AND CUMULATIVE HAZARD INDICES BY EXPOSURE PATHWAY

Exposure Pathway	Cumulative Excess Lifetime Cancer Risk		Cumulative Hazard Index	
	Maximum	Average	Maximum	Average
Incidental Ingestion of Soils		$9x10^{-9}$		$8x10^{-5}$
Direct Contact (DC) with Soils		$4x10^{-7}$		$3x10^{-3}$
Ingestion of Groundwater (GW)	$1x10^{-3}$	$2x10^{-4}$	$2x10^{-1}$	$5x10^{-2}$
Ingestion of GW - Well 43		$1x10^{-4}$		$1x10^{-1}$
Ingestion of GW - Lafayette Terrace		$5x10^{-4}$		$2x10^{-6}$
DC with Surface Water (SW)		$5x10^{-9}$		$7x10^{-5}$
Incidental Ingestion of SW		$3x10^{-10}$		$2x10^{-4}$
DC with Sediment		$4x10^{-8}$		$2x10^{-1}$
Incidental Ingestion of Sediment		$4x10^{-9}$		$6x10^{-4}$

Cumulative potential cancer risks associated with incidental ingestion and direct contact with onsite soils, surface water, and sediments did not exceed EPA's target cancer risk range of 10^{-4} to 10^{-6}. Similarly, cumulative hazard indices as a measure of the potential for non-carcinogenic effects for each of the above exposure pathways did not exceed unity (1.0).

Potential risks associated with the ingestion of groundwater as a drinking water supply were estimated based on data from overburden/bedrock monitoring wells and domestic wells at Lafayette

Terrace and domestic well No. 43. These wells were located within the same hydrogeologic regime (i.e., between the same groundwater divides). The cumulative excess lifetime cancer risk predicted for the consumption of groundwater moving from overburden and bedrock monitoring wells exceeded EPA's target risk range of 10^{-4} to 10^{-6}. The principle contribution to these risk estimates was posed by arsenic whose maximum concentration 89 ug/L exceeded the Maximum Contaminant Levels of the Safe Drinking Water Act (MCLs) of 50 ug/L. Arsenic was also the major contributor to possible cancer risks for the ingestion of groundwater from monitoring wells in the vicinity of well 43 and monitoring wells in the vicinity of Lafayette Terrace. Predicted cancer risk for consumption of groundwater from monitoring wells in the vicinity of Lafayette Terrace also exceeded the 10^{-4} to 10^{-6} cancer risk range.

The cumulative hazard indices for each of the groundwater pathways evaluated were less than one indicating that the potential for non-cancer health effects resulting from exposure to contaminants in groundwater is unlikely.

Risks from the air pathway of exposure were not quantified because observed contaminant levels were found to be less than the occupational threshold limit value (TLV) adjusted to account for continuous exposure.

Based on the findings in the Base Line Risk Assessment, EPA has concluded that the risks posed by the ingestion of groundwater exceed the acceptable risk range 10^{-4} to 10^{-6}. The principle contribution to the carcinogenic groundwater risk was posed by arsenic. In addition, maximum concentrations of the following compounds exceed their respective MCLs, state drinking water standards or health advisories: arsenic, benzene, chlorobenzene, chromium, 1,2-dichloroethylene, nickel, 2-butanone, and tetrachloroethylene. Consequently, the cleanup at the Coakley Landfill Site will be based on protection of the groundwater beyond the compliance boundary as a future drinking water supply. Actual or threatened releases of hazardous substances in groundwater from this Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health or welfare or the environment.

VII. DOCUMENTATION OF NO SIGNIFICANT CHANGES

EPA presented a Proposed Plan (preferred alternative) for remediation of the Site on March 2, 1990. The source control preferred alternative included:

1. Consolidation of sediments in the wetlands;
2. Consolidation of solid waste;
3. Capping of the landfill;
4. Collection and treatment of landfill gases;

5. Groundwater extraction and treatment;
6. Long-term environmental monitoring; and
7. Institutional controls where possible.

No significant changes from the Proposed Plan briefly described above have been made to the selected remedy as detailed in the Record of Decision. However, at the time of the issuance of the Proposed Plan, EPA had not specifically identified the construction of a fence around the Site. The chain link fence was identified as part of the remedy in the FS and the costs associated were included in the cost estimate in the FS and Proposed Plan.

The cleanup level for arsenic has been revised to 50 ug/L from 30 ug/L to reflect consistency with MCLs set forth in the Safe Drinking Water Act. This revision remains protective of human health and the environment and does not impact the selection of the remedy. The groundwater extraction and treatment component of the remedy remains necessary since levels of arsenic detected at the compliance boundary exceed 50 ug/L.

As stated in the Proposed Plan, the preferred alternative does not include any action involving remediation of the oily debris area identified at the Site (Appendix A, Figure 2). However, costs for remediating this debris were included in the total cost for each alternative in both the Feasibility Study and the Proposed Plan. These amounts have been deducted in this ROD. For alternatives SC-3 and SC-4, the total cost remains the same after rounding the figures. For SC-5 the cost is reduced by $800,000; for SC-6 the cost is reduced by $500,000. Given the overall cost of each alternative, these amounts were insignificant to the remedy selection process.

The following is presented as a point of clarification. In the Proposed Plan EPA identified approximately 2000 cubic yards of "contaminated" sediments located in the wetlands adjacent to the northwest side of the landfill. The RI identified an area of wetlands adjacent to the northwest corner of the Site as needing remediation due to landfill operations and landfill temporary cap erosion, which caused subsequent filling and sedimentation in the wetlands. Sediments in the wetland, estimated to be approximately 2,000 cubic yards, would need to be excavated and redeposited in the existing landfill area to restore the wetlands to its beneficial use.

Although results from a sediment sample taken during the RI did not exceed the cleanup level discussed above, this action is justified on the basis of restoring the wetlands which were filled as a result of the landfill operation and temporary cap erosion. During excavation and restoration, appropriate steps will be taken such as using clean and appropriate fill and installing silt barriers to prevent damage to the wetlands downstream of the work area. Sediment samples will be taken in and around the perimeter of the

excavated area to confirm that the remaining sediments in the wetland are below cleanup levels. To promote wetland revegetation, soils similar to those of the natural wetlands will be used, and sedges and other species will be planted.

VIII. DEVELOPMENT AND SCREENING OF ALTERNATIVES

A. Statutory Requirements/Response Objectives

Under its legal authorities, EPA's primary responsibility at Superfund sites is to undertake remedial actions that are protective of human health and the environment. In addition, Section 121 of Comprehensive Environmental Response, Compensation, and Liability Act of 1980, (as amended by Superfund and Reauthorization Act of 1986) (CERCLA) establishes several other statutory requirements and preferences, including: a requirement that EPA's remedial action, when complete, must comply with all federal and more stringent state environmental standards, requirements, criteria or limitations, unless a waiver is invoked; a requirement that EPA select a remedial action that is cost-effective and that utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and a preference for remedies in which treatment which permanently and significantly reduces the volume, toxicity or mobility of the hazardous substances is a principal element over remedies not involving such treatment. Response alternatives were developed to be consistent with these Congressional mandates.

Based on preliminary information relating to types of contaminants, environmental media of concern, prior and potential use as a drinking water source and potential exposure pathways, remedial action objectives were developed to aid in the development and screening of alternatives. These remedial action objectives were developed to mitigate existing and future potential threats to public health and the environment. These response objectives were:

1. 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.

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 groundwater.

4. Prevent the offsite migration of contaminants above levels protective of public health and the environment.

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

B. Technology and Alternative Development and Screening

CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) set forth the process by which remedial actions are evaluated and selected. In accordance with these requirements, a range of alternatives was developed for the Site.

With respect to source control, which includes the groundwater under the landfill, the RI/FS developed a range of alternatives in which treatment that reduces the toxicity, mobility, or volume of the hazardous substances is a principal element. This range included an alternative that removes or destroys hazardous substances to the maximum extent feasible, eliminating or minimizing to the degree possible the need for long term management. This range also included alternatives that treat the principal threats posed by the Site but vary in the degree of treatment employed and the quantities and characteristics of the treatment residuals and untreated waste that must be managed; alternative(s) that involve little or no treatment but provide protection through engineering or institutional controls; and a no action alternative.

Section 2 of the Feasibility Study (FS) identified, assessed and screened technologies based on implementability, effectiveness, and cost. These technologies were combined into source control (SC) and management of migration (MM) alternatives. Section 3 of the FS presented the remedial alternatives developed by combining the technologies identified in the previous screening process in the categories identified in Section 300.430(e) (3) of the NCP. The purpose of the initial screening was to narrow the number of potential remedial actions for further detailed analysis while preserving a range of options. Each alternative was then evaluated and screened in Section 4 of the FS.

In summary, of the approximately 17 source control remedial alternatives screened in Section 2, five were retained for detailed analysis. Figure 3-1 in Section 3 of the Feasibility Study identifies the five alternatives that were retained through the screening process, as well as those that were eliminated from further consideration. Management of migration alternatives, although evaluated in the FS, will be reevaluated pending further studies of offsite groundwater migration.

IX. DESCRIPTION OF ALTERNATIVES

This section presents a narrative summary of each alternative evaluated. A detailed tabular assessment of each alternative can be found in Table 3-1 in Section 3 of the Feasibility Study.

A. Source Control (SC) Alternatives Analyzed

The source control alternatives analyzed for the Site include the following alternatives:

SC-1: No-action Alternative;

SC-3: Capping Including Consolidation (No Groundwater Treatment);

SC-4: Capping/Onsite Groundwater Treatment;

SC-5: Capping/Onsite Groundwater Pretreatment and Offsite Treatment and Disposal; and

SC-6: Onsite Solid Waste/Groundwater Treatment and Disposal/Capping.

SC-1
<u>No-Action</u>

This alternative is included in the Feasibility Study (FS), as required by CERCLA, to serve as a basis for comparison with the other source control alternatives being considered.

This source control alternative would involve no remedial action on the contaminated soil, solid waste or groundwater. However, the no-action alternative would entail some activity in order to provide minimal protection of human health and the environment. A chain-link fence would be installed around the landfill area to prevent all non-authorized personnel from entering the Site. Institutional controls would be established in order to restrict future land use. The landfill would be loamed and seeded to control dust and erosion from wind and rain. A long term monitoring program would be instituted that would involve periodic collection of air, surface water and groundwater samples to evaluate potential exposure routes.

This alternative does not meet any identified ARARs, particularly since MCLs are already exceeded at the Site.

ESTIMATED TIME FOR DESIGN AND CONSTRUCTION:	2 months
ESTIMATED TIME FOR OPERATION:	30 years
ESTIMATED CAPITAL COST:	$ 820,000
ESTIMATED OPERATION AND MAINTENANCE (PRESENT WORTH):	$ 1,300,000
ESTIMATED TOTAL COST (PRESENT WORTH):	$ 2,120,000

SC-3

Capping Including Consolidation

This alternative involves consolidating approximately 2000 cubic yards of eroded sediment in the wetland under a new multi-layer cap to be installed on the landfill. Additionally, approximately 30,000 cubic yards of material from the east, west and south sides of the landfill would be excavated to reduce the area needing to be covered by the cap (Appendix A, Figures 7 and 8). The excavated material would then be mixed with sand as needed and used in the cap construction. Emissions created by excavation will be minimized by wetting down the soil with water or foam. Air monitoring will ensure compliance with emission standards.

The multi-layer cap system will be constructed over the landfill and will include a vegetative layer, a drainage layer and impermeable barrier (low permeability barrier of clay or synthetic liner material). The cap will reduce the potential for direct contact with the contaminated materials onsite and will control further migration of contaminants by reducing precipitation could filtering through and away from the Site. This cap will conform with state and RCRA solid waste requirements. A typical cap construction diagram can be found as Appendix A, Figure 9. A chain-link fence would be installed around the landfill area to prevent access to all non-authorized personnel. A gas collection and treatment system would also be installed to collect the gases coming off the landfill. These gases would be treated onsite by a thermal destruction process such as incineration. A long term monitoring program would be instituted involving periodic collection of air, surface water and groundwater samples to evaluate potential exposure routes.

Because this alternative does not include a groundwater treatment system, it will not meet MCLs and other groundwater standards.

ESTIMATED TIME FOR DESIGN AND CONSTRUCTION:	9 Months
ESTIMATED TIME FOR OPERATION:	30 Years
ESTIMATED CAPITAL COSTS:	$ 8,800,000
ESTIMATED OPERATION AND MAINTENANCE (PRESENT WORTH):	$ 2,400,000
ESTIMATED TOTAL COST (NET PRESENT WORTH):	$ 11,200,000

SC-4
Capping/Onsite Groundwater Treatment

This alternative involves consolidation of the solid waste followed by capping the landfill and extracting and treating onsite groundwater. The treated groundwater would either be recharged into the aquifer and/or discharged to onsite surface water. Recharge trenches will be installed to alleviate draining the wetlands. The cap would be similar to the one described in alternative SC-3. This alternative would also be similar to SC-3 in that it includes fencing, excavating 30,000 cubic yards of material from the landfill, 2,000 cubic yards from the wetlands and installing a gas collection and treatment system.

The groundwater extraction system would consist of several overburden and bedrock wells located along the southern and eastern perimeters of the landfill and a drainage system around the perimeter of the landfill. Recharge trenches will be located on the toe of the slope on the northwest and westerly edges of the landfill adjacent to the wetlands. Groundwater would be treated onsite to remove metals, VOCs and biological oxygen demand (BOD) and ammonia through a series of technologies involving chemical, physical and biological processes to comply with federal and state drinking water and discharge standards. The exact treatment will be determined during the design phase after additional studies. A conceptual treatment process diagram is shown in Appendix A, Figure 10. The processes are summarized below.

-Chemical process:	Metals removed by adding lime or caustic to form a sludge for offsite disposal
-Physical process:	VOCs removed by air stripping. Off-gases removed by incineration or activated carbon filtration.
-Biological process:	BOD, ammonia and remaining VOCs removed by rotating biological contactors (RBC) or activated carbon filtration to meet discharge requirements.

A long term monitoring program would be instituted involving periodic collection of air, surface water and groundwater samples to evaluate potential exposure routes.

ESTIMATED TIME FOR DESIGN AND CONSTRUCTION: 2 years
ESTIMATED TIME FOR OPERATIONS: 10 years groundwater extraction and treatment; 30 years for cap maintenance and monitoring.

ESTIMATED CAPITAL COST:	$ 12,800,000
ESTIMATED OPERATION AND MAINTENANCE (PRESENT WORTH):	$ 7,400,000
ESTIMATED TOTAL COST (NET PRESENT WORTH):	$ 20,200,000

SC-5

Capping/Onsite Groundwater Pretreatment and Offsite Treatment and Disposal

This alternative involves capping of the landfill and groundwater collection followed by onsite pretreatment and offsite disposal. Fencing, capping and groundwater collection would be accomplished as described in alternatives SC-3 and SC-4.

Groundwater would be pumped to publicly owned treatment works (POTW). Onsite pretreatment would occur to meet municipal requirements. Subsequent treatment would occur at the municipal plant in the Town of Hampton. The extent of pretreatment could include metals removal by precipitation and/or VOC removal by air stripping as discussed for the previous alternative (SC-4). To implement offsite treatment and disposal of groundwater, a pumping station and a new sewer main extending along U.S. Route 1 to just south of the Hampton-North Hampton town line would be constructed.

A long term monitoring program would be instituted involving periodic collection of air, surface water and groundwater samples to evaluate potential exposure routes.

ESTIMATED TIME FOR DESIGN AND CONSTRUCTION:	2 Years
ESTIMATED TIME FOR OPERATION:	10 Years for groundwater extraction; 30 years for cap maintenance and monitoring.
ESTIMATED CAPITAL COST:	$ 13,200,000
ESTIMATED OPERATION AND MAINTENANCE (PRESENT WORTH)	$ 5,700,000
ESTIMATED TOTAL COST	$ 18,900,000

SC-6

Onsite Solid Waste/Groundwater Treatment and Disposal/Capping

This alternative involves excavation of the entire landfill and treatment of contaminated wastes and solids by incineration and/or solidification. Emissions created by the extensive excavation will be minimized by wetting down the soil with water or foam. Fencing, regrading and capping of the landfill area as in alternative SC-3, as well as collection and treatment of the groundwater underlying the Site as in alternative SC-4 would also be required. Samples of soils and solid waste in the landfill would be collected and analyzed to determine which areas should be removed for

solidification and/or incineration to achieve the desired cleanup goals. Material containing high levels of organic compounds would be incinerated onsite through the use of a mobile incinerator. Emissions would be directly monitored to evaluate incinerator performance.

Material containing high levels of metals, which could include the incinerator ash, would be solidified and placed back into the landfill along with the materials that meet cleanup goals. Solidification of metals would be achieved by mixing the waste with a lime or concrete based material that sets into an easily handled solid product with reduced permeability. Incinerator ash containing metals at levels that could leach into the groundwater would also be solidified and placed in the landfill.

A long term monitoring program would be instituted involving periodic collection of air, surface water and groundwater samples to evaluate potential exposure routes.

ESTIMATED TIME FOR DESIGN AND CONSTRUCTION:	2 Years
ESTIMATED TIME FOR OPERATION:	Solid waste excavation and treatment, 20 months; groundwater, 10 years; cap maintenance and monitoring, 30 years.
ESTIMATED CAPITAL COST:	$ 45,300,000
ESTIMATED OPERATION AND MAINTENANCE (PRESENT WORTH)	$ 8,600,000
ESTIMATED TOTAL COST (NET PRESENT WORTH)	$ 53,900,000

B. Management of Migration (MM) Alternatives

The Feasibility Study (FS) analyzed management of migration alternatives to cleanup the contaminants that migrated offsite. However, EPA believes that insufficient data exist to properly characterize the extent and chemical makeup of the offsite groundwater. Additionally, since the plume is primarily in or under a major wetland, the implementation of a conventional groundwater extraction system would be extremely difficult, very costly and could result in extensive and irreversible damage to the wetland. The existence of a contaminant plume in the bedrock aquifer will further complicate any cleanup effort for the offsite ground.

As part of the implementation of the source control remedy, EPA proposes to expand the offsite groundwater monitoring system and undertake an investigation to better characterize the nature and extent of contamination in the offsite groundwater. The investigation will also include an evaluation of possible remediation technologies and their impact on the wetlands. An environmental assessment will also be performed. EPA will design the onsite remedy to capture as much as practicable of the contamination that has already migrated from the landfill.

The expanded monitoring program, which includes monitoring residential wells in the Coakley Landfill area, and the groundwater investigation of the offsite contamination will be one of the first actions taken as part of the Coakley Landfill remediation. The investigation will continue until sufficient data is obtained for EPA to make a decision regarding the remediation of offsite groundwater. That decision will be incorporated in a second Record of Decision (ROD).

Installing a well-designed source control remedy at the present time will minimize offsite migration of contaminants. Accordingly, a less extensive management of migration remedy will be necessary in the future. An effective source control remedy will result in lower costs and less time to achieve offsite groundwater cleanup goals.

X. SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

Section 121(b)(1) of CERCLA presents several factors that at a minimum EPA is required to consider in its assessment of alternatives. Building upon these specific statutory mandates, the NCP articulates nine evaluation criteria to be used in assessing the individual remedial alternatives.

A detailed analysis was performed on the five alternatives using the nine evaluation criteria in order to select a site remedy. The following is a summary of the comparison of each alternative's strength and weakness with respect to the nine evaluation criteria. These criteria and their definitions are as follows:

Threshold Criteria
An alternative must meet the two threshold criteria described below in order to be eligible for selection in accordance with the NCP.

1. **Overall protection of human health and the environment** addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced or controlled through treatment, engineering controls, or institutional controls.

2. **Compliance with Applicable or relevant and appropriate requirements (ARARS)** addresses whether or not a remedy meets all ARARs or other Federal and State environmental laws and/or provides grounds for invoking a waiver.

Primary Balancing Criteria
The following five criteria are used to compare and evaluate elements of alternatives which have met the threshold criteria to each other.

3. **Long-term effectiveness and permanence** refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up goals have been met.

4. **Reduction of toxicity, mobility, or volume through treatment** addresses the degree to which alternatives employ recycling or treatment that reduces toxicity, mobility, or volume including how treatment is used to address the principal threats posed by the site.

5. **Short term effectiveness** addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until clean-up goals are achieved.

6. **Implementability** addresses the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

7. **Cost** includes estimated capital and operation & maintenance (O&M) costs, as well as present-worth costs.

<u>Modifying Criteria</u>
The modifying criteria are factored into the final balancing of remedial alternatives. This generally occurs after EPA has received public comment on the RI/FS and Proposed Plan.

8. **State acceptance** addresses the state's position and key concerns related to the preferred alternative and other alternatives; and the state's comments on ARARs or the proposed use of waivers.

9. **Community acceptance** addresses public general response to the alternatives described in the Proposed Plan and RIFS report.

A detailed tabular assessment of the nine criteria applied to each alternative can be found in Section 4 in Tables 4-2 to 4-6 of the Feasibility Study.

Following the detailed analysis of each individual alternative, a comparative analysis, focusing on the relative performance of each alternative against the nine criteria, was conducted. This comparative analysis can be found in Table 4-12 of the Feasibility Study.

The following section balances the strengths and weaknesses of the five alternatives under each of the nine criteria set out above.—

1. Overall protection of human health and the environment

Alternatives SC-4, SC-5 and SC-6 use technologies that will be protective of human health and the environment by reducing contamination. These technologies include capping, gas collection and groundwater treatment. Alternative SC-1 is not protective since it anticipates no action onsite. Alternative SC-3 is not protective because it does not incorporate groundwater treatment, only gas collection and treatment and capping.

The combined capping and gas and groundwater treatment components of SC-4, SC-5 and SC-6 would treat already contaminated groundwater to federal and state drinking water standards at the Site compliance boundary. Further, downward and offsite migration of contaminants in the groundwater caused by precipitation and soil leachate would be controlled. Dust erosion, surface runoff and direct contact with contaminated soils, wastes and sediments would also be minimized by capping, removing and consolidating the sediments in the wetland into the landfill and fencing the landfill area.

Capping and gas treatment alone, without a groundwater treatment system as in SC-3, would allow contaminants to continue to migrate downward into the groundwater and offsite. Containment alone is normally used as a remedy at sites which have naturally occurring clay or till layers under the groundwater flow zone which act as a cap under the Site to contain this downward migration. The Coakley Landfill Site has no clay or till under the groundwater flow zone; rather the Landfill is situated on bedrock. Without groundwater treatment, SC-3 will not meet MCLs at the Site compliance boundary.[1] Similarly, alternative SC-1 will not meet MCLs at the Site boundary.

2. Compliance with ARARS

Each alternative was evaluated for compliance with ARARs, including chemical-specific, action-specific and location specific ARARs. These alternative specific ARARs are presented in Appendix B, Tables 7 through 16. Alternatives SC-4 and SC-6 meet their respective ARARs. SC-5 may not meet Executive Order 11990 (Protection of Wetlands) because of the negative impact groundwater pumping and offsite treatment may have on the wetlands. SC-4 has less impact on the wetlands in that treated groundwater is recharged to the aquifers or discharged directly to surface water. SC-1 and SC-3 do not attain the following applicable federal and

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[1]The Site compliance boundary is described in Section XI. A. 1 at page 33.

state ARARs for groundwater: Safe Drinking Water Act (SDWA), WS 410 NH Groundwater Quality Criteria, WS 300 NH Drinking Water Standards, and Federal Ambient Water Quality Criteria.

3. Long term effectiveness and permanence

Alternative SC-6 offers the greatest degree of long-term effectiveness and permanence. This alternative provides for onsite incineration and/or solidification of contaminated soil and wastes, onsite extraction and treatment of contaminated groundwater and capping of the landfill. Incineration and/or solidification destroys and/or immobilizes the source of contamination and meets cleanup goals for VOCs and metals. However, should subsurface conditions change significantly, metals bound into the solidification matrix may again become mobile and be released to the groundwater.

Alternative SC-4 and SC-5 also provide for long-term effectiveness and permanence in that they include capping and groundwater treatment. Capping will meet RCRA closure requirements; however, the design life of a cap is subject to some uncertainty. While cap replacement in the future is possible, proper installation and maintenance will extend the cap's life significantly. A long-term monitoring program, such as the programs included in SC-4, SC-5 and SC-6, would provide sufficient warning of a potential cap failure. Although SC-4 and SC-5 do not provide for direct treatment of the soils and wastes, the waste material under the cap should degrade naturally, over time, to levels which no longer pose a threat to public health and the environment.

Groundwater treatment will meet cleanup goals at the Site compliance boundary as long as the cap integrity is maintained. Capping and removing the groundwater from the Site as required by SC-4, SC-5 and SC-6 are most effective in minimizing the potential for further migration of contaminated groundwater. Since SC-3 does not include groundwater extraction and treatment, only the long-term effectiveness and permanence associated with capping would apply to this alternative. Contaminated groundwater would continue to migrate offsite for a significant period of time. Alternatives SC-1, is the No-Action Alternative, and as such provides very little, if any, long-term effectiveness and permanence.

4. Reduction of toxicity, mobility, or volume through treatment

Alternatives SC-4, SC-5, and SC-6 provide for some reduction of toxicity, mobility or volume through treatment. SC-6 provides for the most reduction of toxicity, mobility and volume in soil and in groundwater through incineration and/or solidification of contaminated soil and waste, extraction and treatment of contaminated groundwater under the Site, and collection and treatment of gases generated in the landfill.

Alternatives SC-4 and SC-5, although they do not include incineration/solidification, will also reduce toxicity, mobility, and volume of contaminants through groundwater extraction and treatment. Capping, which alternatives SC-3, SC-4, SC-5 and SC-6 incorporate to varying extents, reduces only mobility of the soil contaminants and does not involve treatment. The cap will limit infiltration of precipitation and control leaching of soil contamination into the groundwater. However, capping without groundwater treatment as in SC-3, does not reduce toxicity and volume of contaminants.

Alternative SC-3 will only reduce contamination associated with the treatment of the landfill gases. Alternative SC-1 provides no reduction in toxicity, mobility or volume through treatment since no treatment is included.

5. Short-term effectiveness

With respect to protection of the community, alternatives SC-4 and SC-5 pose a slight potential for adverse impact to community health from emissions during excavation and consolidation of waste material and sediments in the landfill prior to capping. However, strict engineering controls, wetting the soil and monitoring the air will be in effect to insure that negative impacts do not occur. Alternative SC-6 could prolong community exposure to air emissions because, unlike SC-4 and SC-5, most of the landfill will be excavated and treated through solidification and/or incineration. Excavation and treatment of waste and soils for SC-6 will last approximately 20 months. Excavation and consolidation for SC-4 and SC-5 will last only three months. Therefore, in addition to emissions from the extensive excavation, SC-6 may potentially expose the community to incineration emissions from the wastes as well as the captured gas emissions. The emissions from the gas treatment systems of SC-4 and SC-5 are minimal.

Risk to workers during remedial actions in alternatives SC-4 to SC-6 will be controlled with safe working practices. SC-6 may expose workers to potential emissions as described above.

With respect to long-term environmental impacts, SC-4 through SC-6 could potentially release contaminants to the wetlands during excavation. Removing groundwater from the Site, as required in SC-5, could temporarily dry up major portions of the wetlands. While groundwater will also be removed for onsite treatment in SC-4 and SC-6, impacts to the wetlands will be minimized by recharge to the aquifer or by discharge to onsite surface water.

For alternatives SC-4, SC-5, and SC-6 construction will be completed in two years; groundwater will meet cleanup levels in 10 year. Alternatives SC-1 and SC-3 will not be protective since migration of contamination is not addressed.

6. Implementability

While all of the alternatives can be implemented, some alternatives are technically easier to implement than others, based on their design and complexity.

SC-3, capping, would be implementable since the remedy is technically easy to design and construct. SC-4 capping and onsite groundwater treatment, is the simplest treatment alternative to implement. This technology, used on other Superfund sites, is not difficult to design and construct.

SC-5, capping with offsite groundwater treatment, may be very difficult to implement since acceptance by a municipal wastewater treatment facility of partially treated groundwater is required. Whether a municipality would be willing to accept treated groundwater is uncertain.

SC-6 would be the most difficult to implement since it involves extensive excavation of the solid waste and treatment, incineration and/or solidification, of the solid waste.

The no-action alternative would be difficult to implement effectively since there is no guarantee that the institutional controls will be complied with in the future.

Cost

The estimated present worth value of each alternative and the options are as follows:

COST COMPARISON OF SOURCE CONTROL ALTERNATIVES

		Capital Costs	O&M Costs ($/yr)	*Present Worth
SC-1	No Action	$ 820,000	43,000	2,120,000
SC-3	Capping Including Consolidation	8,800,000	80,000	11,200,000
SC-4	Capping/Onsite Groundwater Treatment	12,800,000	245,000	20,200,000
SC-5	Capping/Offsite Treatment and Disposal	13,200,000	190,000	18,900,000
SC-6	Onsite Solid Waste/ Treatment and Disposal/ Capping	45,300,000	285,000	53,900,000

State acceptance

The New Hampshire Department of Environmental Services (DES) has been involved with the Site from the beginning as summarized in Section II of this document "SITE HISTORY AND ENFORCEMENT ACTIVITIES". The Remedial Investigation and Feasibility Study was performed as a state lead through a cooperative agreement between the State and the EPA. The New Hampshire DES and the Attorney Generals Office have reviewed this document and concur with the alternative selected for a source control remedy as documented in the attached Declaration of Concurrence.

Community acceptance

The comments received during the public comment period and the discussions during the Proposed Plan and FS public meeting are summarized in the attached document entitled "The Responsiveness Summary" (Appendix C). Varied comments were received from residents living near the Site, environmental citizen groups, and from the Coakley Landfill Steering Committee. The citizens generally desire the EPA to choose the most stringent remedy, SC-6, or else excavate and remove onsite waste. The Steering Committee generally wants the EPA to choose the minimal remedy which is similar to SC-3.

XI. THE SELECTED REMEDY

EPA has selected alternative SC-4, Capping/Onsite Groundwater Treatment, for the first operable unit at the Coakley Landfill Site. Managing offsite migration of contaminated groundwater, the second operable unit, will be addressed in a later Record of Decision. A detailed description of the selected remedy along with cleanup levels is presented below.

A. Cleanup Levels

Cleanup levels have been established for contaminants of concern identified in the baseline risk assessment which have been found to pose an unacceptable risk to public health. Cleanup levels have been set based on the appropriate ARARs (e.g. Drinking Water MCLGs and MCLs) if available. In the absence of a chemical specific ARAR or other suitable criteria to be considered, a 10^{-6} excess cancer risk level for carcinogenic effects or a concentration corresponding to a hazard index of one for compounds with noncarcinogenic effects was used to set cleanup levels. Periodic assessments of the protection afforded by remedial actions will be made as the remedy is being implemented and at the completion of the remedial action. If the remedial action is not found to be protective or fails to meet the cleanup levels established in this Record of Decision, further action shall be required.

1. Groundwater

Because the aquifer at and beyond the compliance boundary of the Site is a potential source of drinking water, it is a Class IIA aquifer and the MCLs and non-zero MCLGs established under the Safe Drinking Water Act are ARARs. The compliance boundary established for groundwater cleanup levels is the perimeter of the Site which runs close to the current property boundary of the Coakley Landfill on the south, west and east sides and approximately 200 feet from the current toe of the slope of the landfill to the north and northeast within the Site boundary. EPA has no reason to believe that waste was disposed of beyond the property boundaries of the Coakley Landfill Site. However, the compliance boundary extends 200 feet beyond the edge of the apparent landfill to ensure that all wastes are incorporated in the remedy since the exact location of waste disposed of in this north and northeast area has not been fully documented. This point of compliance is protective of the public health and the environment in that it minimizes the possibility of offsite migration of contamination from waste which may extend beyond the apparent edge of the landfill.

Cleanup levels for known and probable carcinogenic compounds (Class A & B) have been set at the appropriate MCL or non-zero MCLG. Cleanup levels for the Class C, D and E compounds (possible carcinogens not classified and no evidence of carcinogenicity) have been set at the MCLG. In the absence of a MCLG, a MCL, or a proposed drinking water standard or other suitable criteria to be considered (i.e. health advisory, state standard), a cleanup level was derived for carcinogenic effects based on a 10^{-6} excess cancer risk level considering the ingestion of groundwater.

Cleanup levels for compounds in groundwater exhibiting noncarcinogenic effects have been set at the MCLG. In the absence of a MCLG or a proposed drinking water standard or other suitable criteria to be considered (i.e. health advisory, state standard), cleanup levels for noncarcinogenic effects have been set at a level thought to be without appreciable risk of an adverse effect when exposure occurs over lifetime (hazard index = 1).

Table 12 below summarizes the cleanup levels for carcinogenic and noncarcinogenic contaminants of concern identified in groundwater.

TABLE 12: GROUNDWATER CLEANUP LEVELS

Carcinogenic Contaminants of Concern	Cleanup Level (ug/L)	Basis[a]	Risk Level
Benzene	5	MCL	$7x10^{-6}$
Tetrachloroethene	3.5	NH	$5x10^{-6}$
Arsenic	50	MCL	$2x10^{-4}$*

Noncarcinogenic Contaminants of Concern	Cleanup Level (ug/L)	Basis[a]	HI Index
2-Butanone (MEK)	200	HA	0.1
Phenol	280	HA	0.01
Diethyl phthalate	2,800	HA	0.1
Chlorobenzene	100	pMCLG	0.1
Trans-1,2-dichloroethene	100	pMCLG	0.1
Chromium	50	MCL	0.3
Nickel	100	HA	0.1

KEY

[a] -

HA = Health Advisory
NH = NH Drinking Water Standard
MCL = Maximum Contaminant Level, Safe Drinking Water Act
pMCLG = Proposed Maximum Contaminant Level Goal, Safe Drinking Water Act

* The cleanup level for arsenic has been set at the MCL of 50 ug/L. The carcinogenic risk posed by arsenic at 50 ug/L in groundwater will approximate 2 in 1,000. However, in light of recent studies indicating that many skin tumors arising from oral exposure to arsenic are non-lethal in nature and in light of the possibility that the dose-response curve for the skin cancers may be sublinear (in which case the cancer potency factor used to generate risk estimates will be overstated), it is Agency policy to manage these risks downward by as much as an order of magnitude (x 10).[2] As a result, the carcinogenic risks for arsenic at this Site have been managed as if they were 2 in 10,000.

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[2]See EPA memorandum, "Recommended Agency Policy on the Carcinogenicity Risk Associated with the Ingestion of Inorganic Arsenic" dated June 21, 1988.

These cleanup levels must be met at the completion of the remedial action at the compliance boundary. EPA has estimated that these levels will be attained within approximately ten years.

The hazard index for the remaining compounds were each significantly less than 1. Consequently, the stated levels should be without appreciable risk of non-carcinogenic health effects.

When achieved, the stated cleanup levels for these 10 contaminants shall be protective of public health considering a lifetime of consumption of 2 liters per day of groundwater. EPA will review performance data periodically after the remedy is implemented to insure that the remedy remains protective.

2. Soil

Cleanup levels for the organic compounds in soils were established to measure contaminant levels in the remaining sediments in the wetlands after excavation. These cleanup levels are necessary to protect human health and the aquifer from potential soil leachate at the compliance boundary at the Coakley Landfill Site. The remaining sediments in the wetlands will meet these cleanup levels after excavation. Direct physical contact or the accidental ingestion of soils was not found to pose a significant health risk.

The Organic Leaching Model (OLM), 51 Fed. Reg. 41082, (1986), was used to estimate residual soil levels that are not expected to impair future groundwater quality. ARARs in groundwater (MCLGs and MCLs) were used as input into the leaching model. In the absence of an ARAR, the level corresponding to a 10^{-6} risk level (for carcinogens) or a hazard index of one (noncarcinogenic effects) was utilized. If the values described above were incapable of being detected or were below regional background values, then either the detection limit or background values was substituted. Table 13 below summarizes the soil cleanup values for the contaminants of concern developed to protect public health and the aquifer.

TABLE 13: SOIL CLEANUP LEVELS FOR THE PROTECTION OF HUMAN HEALTH AND THE AQUIFER BASED ON THE ORGANIC LEACHING MODEL

Carcinogenic Contaminants of Concern	Soil Cleanup Level (mg/kg)	Basis for Model Input[a]	Residual Groundwater Risk
Benzene	0.055	MCL	$7x10^{-6}$
Tetrachloroethene	0.13	NH	$5x10^{-6}$

Noncarcinogenic Contaminants of Concern	Soil Cleanup Level (mg/kg)	Basis for Model Input[a]	Residual Groundwater Hazard Index
2-Butanone (MEK)	0.8	HA	0.1
Phenol	2.3	NH	0.01
Diethyl phthalate	900	HA	0.1
Chlorobenzene	9.4	pMCLG	0.1
Trans-1,2-dichloroethene	2.2	pMCLG	0.1

KEY

[a] -

HA = Health Advisory
NH = NH Drinking Water Standard
MCL = Maximum Contaminant Level, Safe Drinking Water Act
pMCLG = Proposed Maximum Contaminant Level Goal, Safe Drinking Water Act

These cleanup levels for organic constituents in soils are consistent with ARARs for groundwater and attain EPA's goal for remedial actions. Soils exceeding these levels after testing will be excavated.

B. Description of Remedial Components

Capping/Onsite Groundwater Treatment

Alternative SC-4, Capping/Onsite Groundwater Treatment, involves consolidating sediments and solid waste followed by capping the landfill and extracting and treating of onsite groundwater and landfill gases. Below is a list of the major components of the remedy:

1. Consolidation of sediment in the wetlands
2. Consolidation of solid waste;
3. Capping of the landfill;

4. Fencing of the landfill;
5. Collection and treatment of landfill gases;
6. Groundwater extraction and treatment;
7. Long-term environmental monitoring; and
8. Institutional controls where possible.

Approximately 2,000 cubic yards of sediment in the wetlands adjacent to the northwest corner of the Site will be excavated and redeposited into the existing landfill area before the new cap is installed. During excavation and restoration of the wetlands, appropriate steps such as using clean and appropriate fill and installing silt barriers to prevent damage to the wetlands downstream of the work area will be taken. Sediment samples in and around the perimeter of the excavated area will also be taken to confirm that the remaining sediments are below cleanup levels. To promote wetland revegetation, soils similar to those of the natural wetlands will be used, and sedges and other species will be planted.

In addition, approximately 30,000 cubic yards of material from the east, west and south sides of the landfill will be excavated to reduce the area to be capped. This material will be mixed with sand as needed and used to construct the sub-base layer which lies below the impermeable layer of the cap to ensure proper grading of the landfill.

The landfill cap design will be consistent with NH DES and RCRA closure requirements. At a minimum, the cap would consist of a multi-layer system composed of a vegetative topsoil layer and a subsurface drainage layer overlying a low-permeability barrier of clay or synthetic liner material. The details of the materials of construction and the thickness of the layers will be left to the remedial design phase. This will give the designers the ability to incorporate state of the art construction materials and technology for site specific conditions as required by the EPA. A typical diagram of cap construction can be found as Appendix A, Figure 9.

Capping also involves collecting and treating landfill gases, such as methane, generated below the cap. Methane and other decomposing gases will be vented by means of an active interior gas collection/recovery system. The gas collection system will consist of small-diameter PVC pipe placed in a network of shallow trenches backfilled with crushed stone. The trenches will be located within the intermediate cover layer below the final cover. The collected gases will be treated onsite by a thermal destruction process. Emissions generated by this process will be minimized by using best available demonstrated technology and by monitoring. The technology used for this process will be evaluated during the design phase, which may include treatability studies.

A 6 foot chain link fence topped with barbed wire will encompass the landfill area which will be accessible only to authorized personnel. Approximately 6,000 linear feet of fencing will be required. Keys to the gates will be available to operators of the treatment plant and to regulating authorities.

The groundwater extraction system will consist of overburden and bedrock wells located within and along the perimeter of the landfill. A drainage system will also be located around the perimeter (Appendix A, Figure 11). Groundwater will be treated onsite to remove metals and organics (both VOCs and semi-VOCs) through a series of technologies involving chemical, physical and biological processes. The exact treatment will be determined during the design phase after additional studies, which may include additional groundwater sampling and pilot and/or treatability work. The treated groundwater will be recharged into the aquifer or discharged to onsite surface water during periods of high groundwater. Any drying effect on the wetlands will be minimized by recharging the treated groundwater to the aquifer or discharging it to onsite surface water.

A conceptual treatment process diagram is shown as Appendix A, Figure 10 and described in more detail below.

Extracted groundwater will first undergo removal of metals. Adding lime or caustic causes iron, arsenic and other metals to coagulate and settle into a sludge at the bottom of the tank. The sludge will be tested and properly disposed of at an appropriate offsite treatment or disposal facility.

The groundwater is then passed through an air stripping chamber to remove VOCs by forcing air up through the water. This causes the organic contaminants to be carried from the water into the air stream. Since air leaving the stripper will contain small quantities of VOCs, it will then be treated through incineration or activated carbon filtration prior to release to the atmosphere. The combined processes will effectively remove approximately 99 percent of VOCs from the groundwater and air stream.

After treatment the water will be discharged to a series of ten recharge structures located along the service road west and north of the landfill whenever feasible. Alternatively, during periods of high groundwater, some or all of the treated water may need to be discharged to the surface water. Should this occur, the treated groundwater will not only meet federal and state drinking water and discharge standards but also ambient water quality criteria through additional treatment such as activated carbon filtration or biological treatment. Biological treatment will effectively remove BOD and ammonia. Activated carbon filtration may effectively remove BOD and ammonia.

Periodic review and modification of the design, construction, maintenance and operation of the groundwater extraction and treatment system will be necessary. Performance of the system will be evaluated annually, or more frequently, to determine if the goals and standards of the design criteria are being met. If not, adjustment or modification may be necessary. These adjustments or modifications may include relocating or adding extraction wells or altering pumping rates. Switching from continuous pumping to pulsed pumping may improve the efficiency of contaminant recovery and should be evaluated should modification be necessary. Should new information regarding the extraction and treatment technology exist, it will be evaluated and applied as appropriate.

After the cleanup levels have been met and the remedy is determined to be protective, the groundwater system will be shut down. A groundwater monitoring system will then be utilized to collect information quarterly for three years to ensure that the cleanup levels have been met and the remedy is protective. Once these levels are maintained and the remedy is protective for this period of time, an additional monitoring program for the Site in accordance with New Hampshire Hazardous and Solid Waste rules will be implemented.

To the extent required by law, EPA will review the Site at least once every five years after the initiation of remedial action at the Site if any hazardous substances, pollutants or contaminants remain at the Site to assure that the remedial action continues to protect human health and the environment. If after 5 years there is no progress or, if after 10 years cleanup levels are not attained, the groundwater remedy shall be reconsidered. EPA will also evaluate risk posed by the Site at the completion of the remedial action (i.e., before the Site is proposed for deletion from the NPL).

XII. STATUTORY DETERMINATIONS

The remedial action selected for the Coakley Landfill Site is consistent with CERCLA and, to the extant practicable, the NCP. The selected remedy is protective of human health and the environment, attains ARARs, and is cost-effective. The selected remedy also satisfies the statutory preference for treatment which permanently and significantly reduces the toxicity, mobility or volume of hazardous substances as a principal element. Additionally, the selected remedy utilizes alternative treatment technologies to the maximum extent practicable.

A. The Selected Remedy is Protective of Human Health and the Environment

The remedy at this Site permanently reduces the risks posed to human health and the environment by reducing and controlling exposure to human and environmental receptors through treatment, engineering controls, and institutional controls. More specifically, capping the landfill will eliminate exposure to contaminants by direct contact and will control exposure from dust erosion and surface runoff. Capping will also limit infiltration of precipitation and control leaching of soil contaminants into the groundwater. Collecting and treating gas and pumping and treating the groundwater will control potential exposure to VOCs and semi-VOCs from the landfill. The selected remedy will attain remediation levels set in accordance with health-based ARARs. Moreover, the selected remedy will result in human exposure levels that are below the hazard index of one for noncarcinogens. Capping the landfill will eliminate further groundwater contamination from soil leachate. Groundwater and gas treatment will reduce the toxicity and concentration of contaminants and will contain contaminants landfill to eliminate contamination of the aquifer. Extracting and treating groundwater reduces cancer and chemical hazard risks. A long-term monitoring program will insure the remedy remains protective of human health and the environment. Finally, implementation of the selected remedy will not pose unacceptable short-term risks or cross-media impacts since the landfill will only be minimally disturbed during cap construction and relocating of sediment in the wetland.

B. The Selected Remedy Attains ARARs

This remedy will meet or attain all applicable or relevant and appropriate federal and state requirements that apply to the Site. Substantive portions of environmental laws identified as ARARs for the selected remedial action include:

<u>Chemical Specific</u>

New Hampshire Surface Water Quality Standards (Ws 430)
New Hampshire Air Quality Rules (RSA Chapter 125-C)
Safe Drinking Water Act - Maximum Contaminant Levels (SDWA)
Federal Ambient Water Quality Criteria
National Ambient Air Quality Standards
New Hampshire Drinking Water Standards

<u>Location Specific</u>

Clean Water Act (CWA)
Fish and Wildlife Coordination Act
Executive Order 11990 (Protection of Wetlands)
New Hampshire Solid Waste Regulations (He-P 1901)

New Hampshire Wetlands Regulations (Ws 300 and 400)
New Hampshire Hazardous Waste Regulations (He-P 1905)
New Hampshire Hazardous Waste Regulations

Action Specific

Resource Conservation and Recovery Act (RCRA)[1]
OSHA General Industry Standards
OSHA Safety and Health Standards
OSHA Recordkeeping, Reporting and Related Regulations
DOT Rules for Transportation of Hazardous Materials

To Be Considered

New Hampshire Protection of Ground Water Regulations (Ws 410)
EPA Risk Reference Doses
EPA Carcinogen Assessment Group Potency Factors
Threshold Limit Values
US EPA Offsite Policy
OSWER Directive 9355.0-28

[1] New Hampshire is a RCRA authorized State Program.

Tables 2-1 through 2-3 in Section 2.0 of the FS, lists all ARARs identified for the Site and whether they are applicable, relevant and appropriate or to be considered (See Appendix B, Tables 9, and 14 through 18). Appendix F of the FS contains a list of identified ARARs for all the alternatives. Appendix F also presents a brief synopsis of the requirements and notes whether or not they will be attained and what action, if any, is necessary to meet the ARAR (See Appendix B, Table 9). Any changes to applicability or appropriateness or relevance are discussed below.

The remedial action involves installing groundwater collection wells and trenches, constructing a groundwater treatment facility and placing a multi-layer cap with a gas collection recovery system incorporated over the source. An onsite thermal destruction unit will be constructed to treat the gas. During all construction and operation activities, OSHA requirements are applicable .

1. Chemical Specific

a. Federal and State Drinking Water Standards

The groundwater in the aquifer at and beyond the compliance boundary of the landfill would be a possible drinking water source were it not contaminated by leachate from the landfill. Maximum Contaminant Levels (MCLs) promulgated under the Safe Drinking Water

Act which regulate public drinking water supplies, are applicable to drinking water at the tap and are not applicable to groundwater. However, because the groundwater may be used as a potential drinking water source, MCLs are relevant and appropriate.

New Hampshire's Protection of the Groundwater of the State regulations do not establish groundwater quality standards, but do establish groundwater criteria. Included in this criteria is the requirement that no person shall cause the groundwater to contain a substance at a level that the state determines may be potentially harmful to human health or to the environment. Because New Hampshire's regulations do not contain a standard or level of control as required by § 121(d)(2)(A)(ii) of CERCLA, they will not be an ARAR. They are, however, to be considered (TBCs) and will be met. In addition, the State of New Hampshire Department of Public Health Service consumption advisories for water supplies have been determined to be considered (TBCs) and were used in absence of an MCLs in setting Site cleanup levels for: Phenol, 280 ppb and Tetrachloroethene, 3.5 ppb.

This remedy will attain these ARARs by meeting the groundwater cleanup goals at the compliance boundary through the groundwater treatment system and by capping the source of contamination. Capping will control further leachate of contaminants into the groundwater from the landfill itself. Treating the groundwater will reduce levels of contamination at the compliance boundary to the cleanup goals. Any leachate migrating from the landfill will not contaminate the groundwater at levels exceeding the ARARs. Treated groundwater will also meet federal standards and state criteria for drinking water.

2. Location Specific

a. Federal and State Surface Water Standards

The effluent standards of Title III of the Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977 (CWA) and state surface water discharge standards are applicable to the action since the selected remedy may involve direct discharge to surface water rather than recharge into the aquifer. The state's Water Quality Standards establish standards for surface water quality based on three use classifications. These standards incorporate by reference the Federal Ambient Water Quality Criteria. The surface waters in an around the Site are classified as Class B waters which are acceptable for swimming and other recreation, fish habitat and, after adequate treatment, use as water supplies.

Title III, along with Executive Orders 11990 (Protection of Wetlands) and state wetland standards are applicable to that portion of the action involving consolidation of 2,000 cubic yards of sediment in the wetland under the cap. These rules prohibit

activity adversely affecting a wetland if a practicable alternative which has less affect is available. Consolidating sediment in the wetland is necessary because soils have eroded from the temporary cap on the landfill and from landfill operation activities, thereby damaging portions of the wetlands. Leaving the wetlands in their present condition fails to restore wetlands to their original beneficial use and fails to maintain the adjacent wetlands' water storage capabilities. Removing less than 2,000 cubic yards fails to capture all of the eroded sediment presently in the wetlands. Consolidation will be conducted to avoid or minimize the destruction, loss and degradation of Site wetlands.

After reviewing the Federal Emergency Management Agency, Floodplain Insurance Rate Maps for Towns of North Hampton, Greenland and Rye, EPA has determined that the Site is not located in a 100-year floodplain. Executive Order 11988 (Floodplain Management) is therefore not an ARAR for the Coakley Landfill Site.

b. Federal Clean Air Act and New Hampshire Air Pollution Regulations

The National Ambient Air Quality Standards promulgated under the Clean Air Act are relevant and appropriate to the control of particulate matter during excavation, groundwater treatment and active gas collection and treatment. The New Hampshire air quality standards are slightly more stringent than federal regulations and are therefore applicable to the remedy. Although initial air sampling offsite indicated airborne VOCs were below threshold limit values, controls may be necessary to prevent fugitive dust and chemical emissions during remedial action. The use of Best Available Control Technology will meet these ARARs.

In addition, EPA guidance on control of air emissions (OSWER Directive 9355.0-28, June 15, 1989) is to be considered for the Site, which is in an non-attainment area. For such an area, the directive indicates the need for control of VOC emissions from Superfund air strippers and soil vapor extraction systems based upon actual emission rates of VOCs. Gases generated by air stripping during the groundwater treatment phase and gases generated by the landfill will be treated by either a carbon adsorption unit or a thermal destruction unit.

3. Action specific

a. Federal Hazardous and Solid Waste Amendments to the Resource Conservation and Recovery Act and New Hampshire Hazardous and Solid Waste Regulations

The State of New Hampshire has been authorized by EPA to administer and enforce RCRA programs in lieu of the federal authority. The

authorized state hazardous waste regulations are equivalent to or more stringent than the federal RCRA regulations. Compliance with New Hampshire's RCRA regulations is discussed below.

Compliance with RCRA depends on whether the wastes are RCRA hazardous wastes as defined under New Hampshire's RCRA program. Wastes at the Site are similar enough to RCRA waste to make these regulations appropriate and relevant to this Site.

These standards are appropriate and relevant to the design, monitoring and performance of the groundwater extraction and treatment system, which will handle, treat and dispose of hazardous materials. Closure standards are also appropriate and relevant to capping of the Site. Onsite hazardous and solid wastes will be managed in accordance with these ARARs, including adequate security and administrative measures, including inspections, a groundwater monitoring program, a site closure and post closure plan and a public notification plan. Specifically, this remedy will comply with the provisions of New Hampshire's Hazardous Waste Management Act at N.H. Admin. Code He-P Ch. 1905 and of the Solid Waste Management Act, RSA Ch. 149-M and the Solid Waste Management Rules, N.H. Admin. Rules He-P Ch. 1901 listed in Appendix B, Tables 17 and 18.

Sludge generated by the groundwater treatment unit will be treated and/or disposed of at an offsite RCRA facility in accordance with federal and state requirements.

RCRA includes specific provisions restricting the placement of hazardous waste into a land-based unit, which includes a landfill. The Land Disposal Restrictions (LDRs) are not ARARs for the consolidated sediment in the wetland under the cap since this action does not involve placing hazardous waste in a land-based unit. The area of contamination at Coakley is comprised of the southern end of the landfill as well as adjoining wetlands located at the northwestern part of the Site. The sediments in the wetlands to be consolidated are contiguous to the Site, uninterrupted by roads, paths, railroad tracks or other easements or rights of ways. Sediments in the wetland result primarily from the existing temporary cover which has eroded from the slopes of the landfill and has filled in the wetland. Given the contiguous location of the wetlands to the landfill subjecting it to erosion, the landfill and wetlands constitute one area of contamination for CERCLA purposes and thus one unit for land disposal purposes. Therefore, movement of the sediment in the wetland to the landfill does not qualify as placement but is merely movement within the unit.

C. The Selected Remedial Action is Cost-Effective

In the Agency's judgment, the selected remedy, SC-4, is cost effective, i.e., the remedy affords overall effectiveness proportional to its costs. Once EPA identified alternatives that were protective of human health and the environment and that either attain or waive ARARs, EPA evaluated the overall effectiveness of each alternative by assessing the relevant three criteria - long term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short term effectiveness. The relationship of the overall effectiveness of this remedial alternative was determined to be proportional to its costs.

A summary of the costs associated with each of the source control remedies are presented below. All costs are presented in net present costs.

COST COMPARISON OF SOURCE CONTROL ALTERNATIVES

		Capital Costs	O&M Costs ($/yr)	*Present Worth
SC-1	No Action	$ 820,000	43,000	2,120,000
SC-3	Capping Including Consolidation	8,800,000	80,000	11,200,000
SC-4	Capping/Onsite Groundwater Treatment	12,800,000	245,000	20,200,000
SC-5	Capping/Offsite Treatment and Disposal	13,200,000	190,000	18,900,000
SC-6	Onsite Solid Waste/ Treatment and Disposal/ Capping	45,300,000	285,000	53,900,000

Of the three alternatives that are protective and attain ARARs, SC-4, SC-5 and SC-6, EPA's selected remedy, SC-4, combines most cost-effective remedial alternative components that were evaluated. The remedy provides a degree of protectiveness proportionate to its costs. Groundwater extraction and treatment was estimated to be significantly less costly than incineration and/or solidification of the landfill waste which would cost approximately 265 percent more. Two of the less expensive alternatives, SC-1 (no-action) and SC-3 (capping with consolidation), did not meet ARARs since contamination above drinking water standards would have been allowed to migrate offsite. Alternative SC-5, offsite treatment

and disposal, although less expensive but comparable in costs to SC-4, was found to be more difficult to implement since it involves a municipal wastewater treatment facility accepting the groundwater. Additionally, this alternative may have an adverse impact on the wetlands adjacent to the Site due to the removal of significant amounts of groundwater from the area.

A summary of the costs for each of the elements of the selected remedy are presented below. All cost are net present costs.

TOTAL COSTS OF SELECTED REMEDY

Contaminated Media/Remedy	Capital	O&M	Total
Sediment	$ 42,000	0	42,000
Capping	5,205,000	953,000	6,158,000
Groundwater	7,523,000	6,447,000	13,970,000
TOTAL	12,770,000	7,390,000	20,160,000

TOTAL ESTIMATED COST: $ 20,200,000

D. The Selected Remedy Utilizes Permanent Solutions and Alternative Treatment or Resource Recovery Technologies to the Maximum Extent Practicable

Once the Agency identified those alternatives that attain ARARs and that are protective of human health and the environment, EPA identified which alternative utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. This determination was made by deciding which one of the identified alternatives provides the best balance of trade-offs among alternatives in terms of: 1) long-term effectiveness and permanence; 2) reduction of toxicity, mobility or volume through treatment; 3) short-term effectiveness; 4) implementability; and 5) cost. The balancing test emphasized long-term effectiveness and permanence and the reduction of toxicity, mobility and volume through treatment; and considered the preference for treatment as a principal element, the bias against offsite land disposal of untreated waste, and community and state acceptance. The selected remedy provides the best balance of trade-offs among the alternatives.

Alternative SC-4 was selected as the remedy because its long-term effectiveness and permanence and its ability to reduce toxicity, mobility and volume of contaminants through groundwater treatment was the most efficient of all alternatives in light of

implementability and cost concerns. The principal elements of the remedy consist of removing contamination from the groundwater under and around the landfill by collecting and treating the groundwater through air stripping prior to discharging it back to the ground or surface water. The air stripping process, along with capping, is a proven technique which provides a permanent solution for contaminated groundwater and has been used successfully at other hazardous waste cleanup sites.

This remedy was also selected over other alternatives because of its ability to achieve cleanup levels at a lower cost without the necessity of directly treating solid waste. As explained previously, there are no identifiable areas of high concentrations of contaminants onsite; thus there is no need to excavate and treat particular areas of the landfill. Groundwater treatment will effectively control migration of contaminants offsite.

Alterative SC-5 is similar to SC-4 in that it is effective in the long-term and will reduce toxicity, mobility and volume of contaminants. Alternative SC-6 is the most effective in both of these categories. However, when implementability and cost are factored in, SC-4 becomes the selected remedy. "When the alternatives provide similar long-term effectiveness and permanence and reduction of toxicity, mobility or volume, the other balancing criteria arise to distinguish the alternatives and play a more significant role in selecting the remedy. NCP Preamble, 55 Fed. Reg. 8725 (1990). Alternative SC-5 was not selected because it involves offsite treatment and disposal of groundwater at a publicly owned treatment plant. This component could be very difficult to implement since it involves municipal acceptance of groundwater. SC-6 was not selected because the large volume of low concentration levels of contaminants did not justify the cost of solidification/incineration.

E. The Selected Remedy Satisfies the Preference for Treatment Which Permanently and Significantly Reduces the Toxicity, Mobility or Volume of the Hazardous Substances as a Principal Element

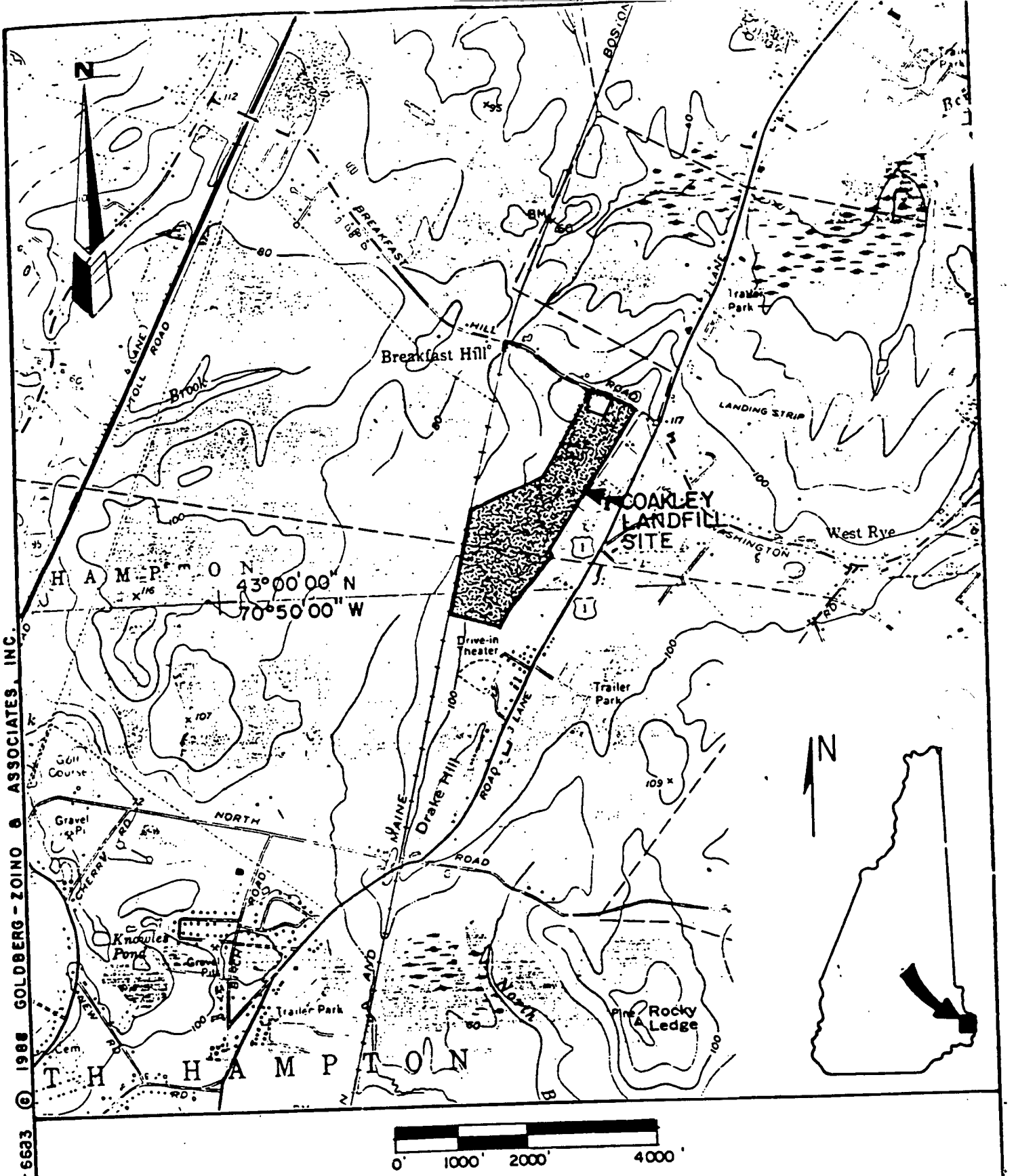
The principal element of the selected source control remedy is groundwater treatment. This element addresses the primary threat at the Site, contamination of the groundwater with VOCs and metals. The selected remedy satisfies the statutory preference for treatment as a principal element by treating the extracted groundwater in treatment processes which result in the removal of VOCs and metals.

XIII. STATE ROLE

The State of New Hampshire, Department of Environmental Services (DES) has reviewed the various alternatives and indicated its support for the selected remedy. The State has also reviewed the Remedial Investigation, Risk Assessment and the Feasibility Study to determine if the selected remedy is in compliance with applicable or relevant and appropriate State Environmental laws and regulations. The New Hampshire DES concurs with the selected remedy for the Coakley Landfill Superfund Site. A copy of the declaration of concurrence is attached as Appendix D.

APPENDIX A

FIGURES



FROM USGS: PORTSMOUTH, N.H. (1944)
HAMPTON, N.H. (1944)
QUADRANGLE MAPS

FILE No. D-6633 © 1988 GOLDBERG-ZOINO & ASSOCIATES, INC.

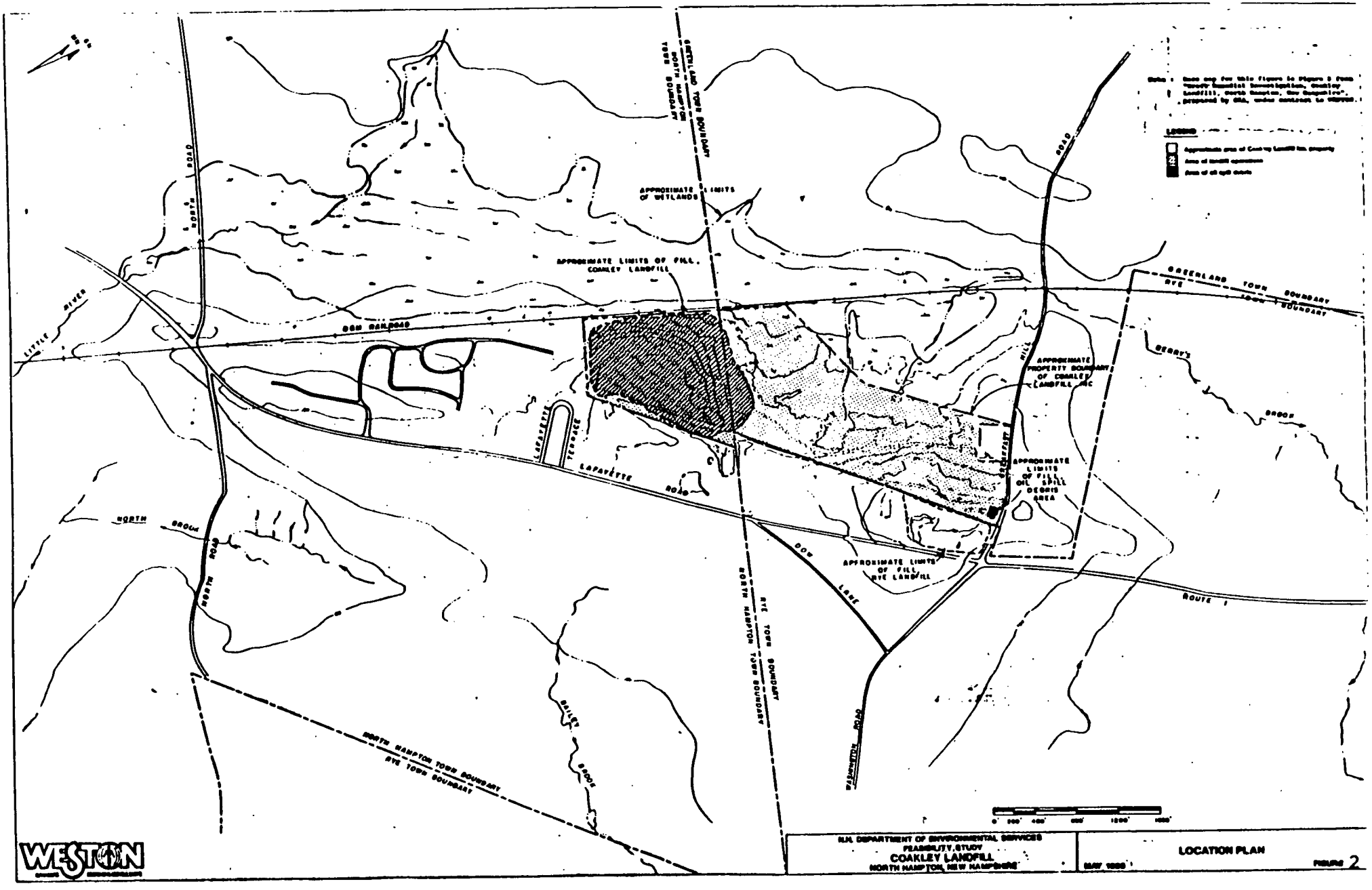
GZA / WESTON

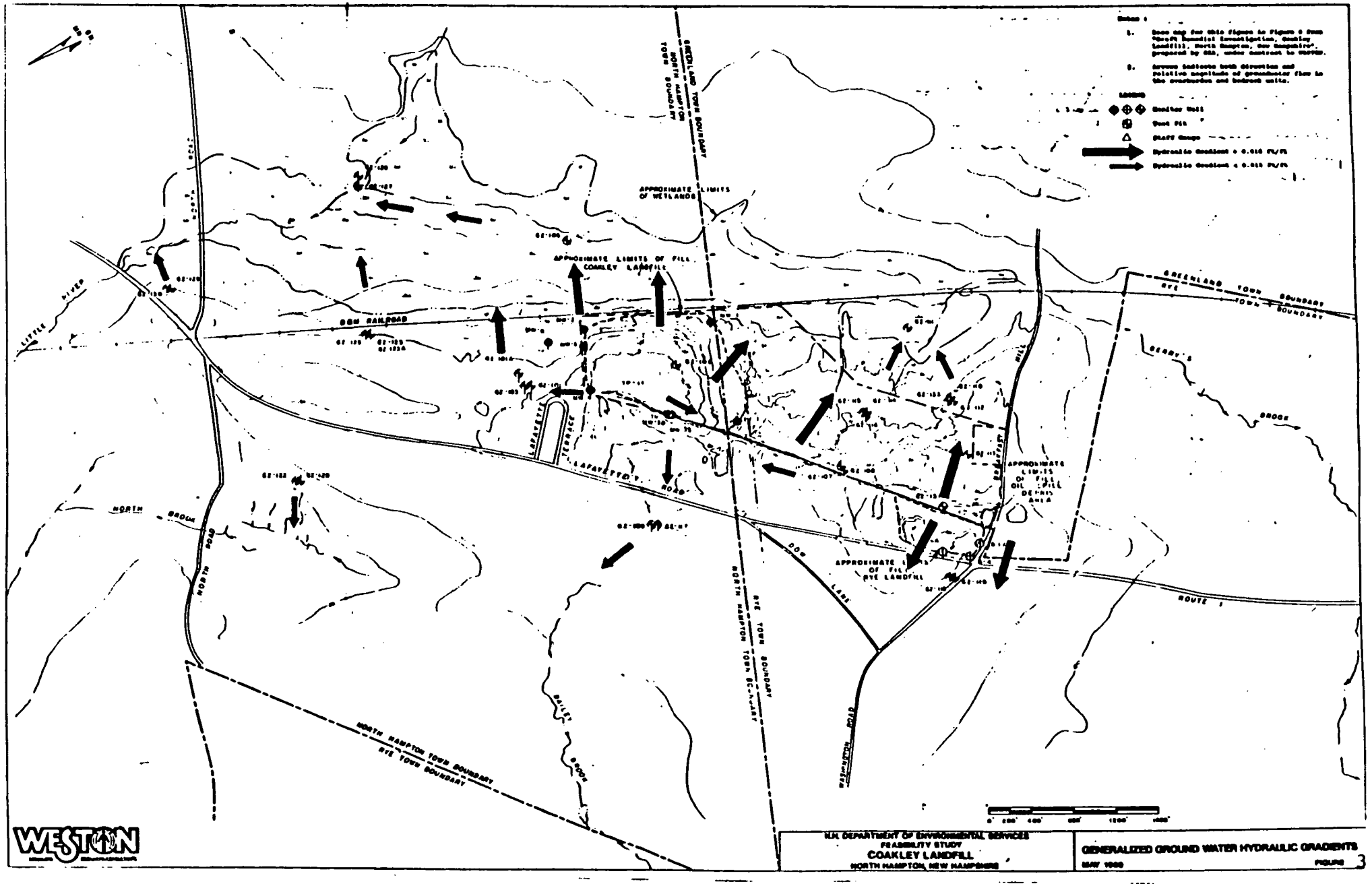
REMEDIAL INVESTIGATION
COAKLEY SANITARY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE

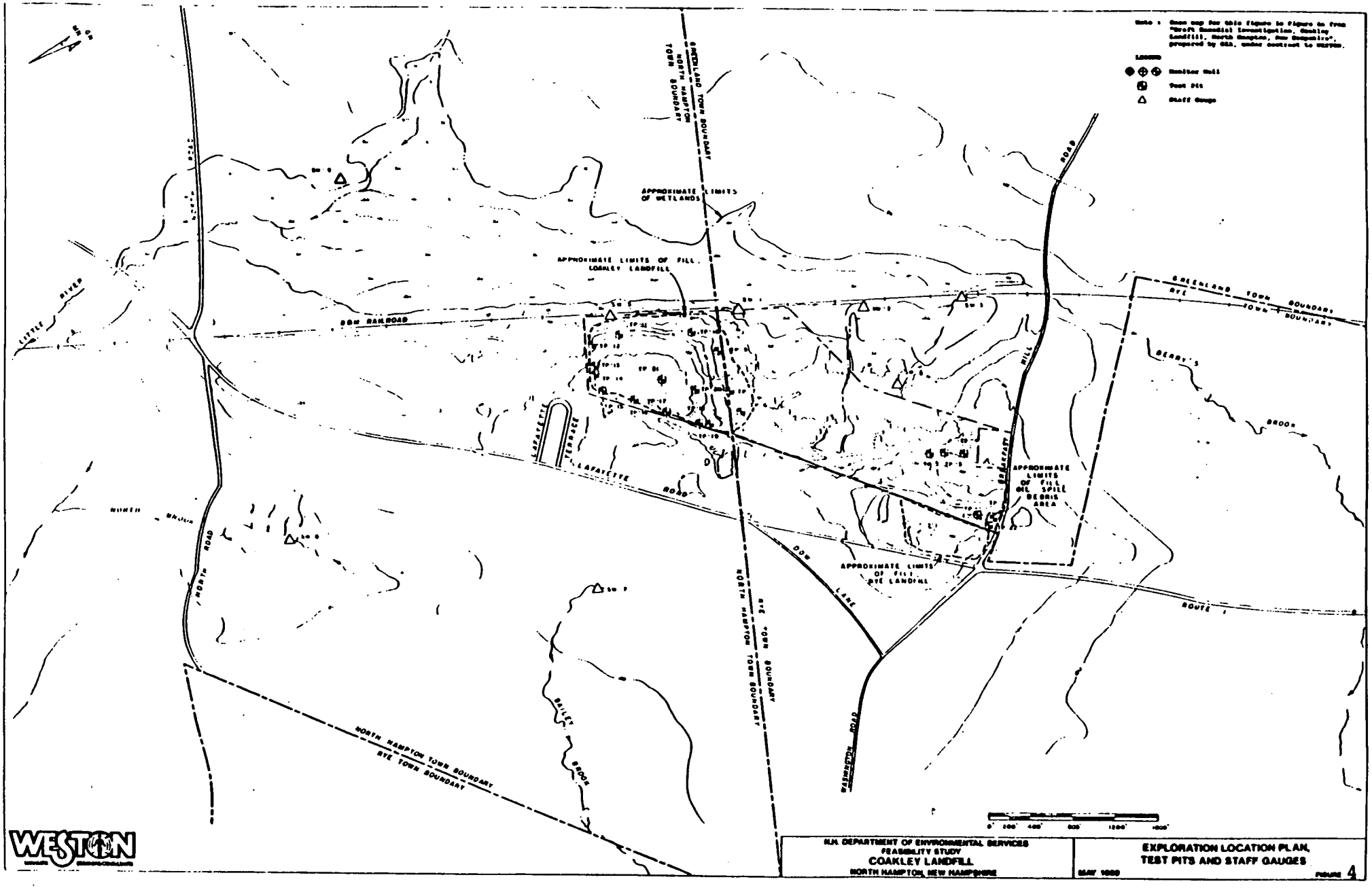
LOCUS PLAN

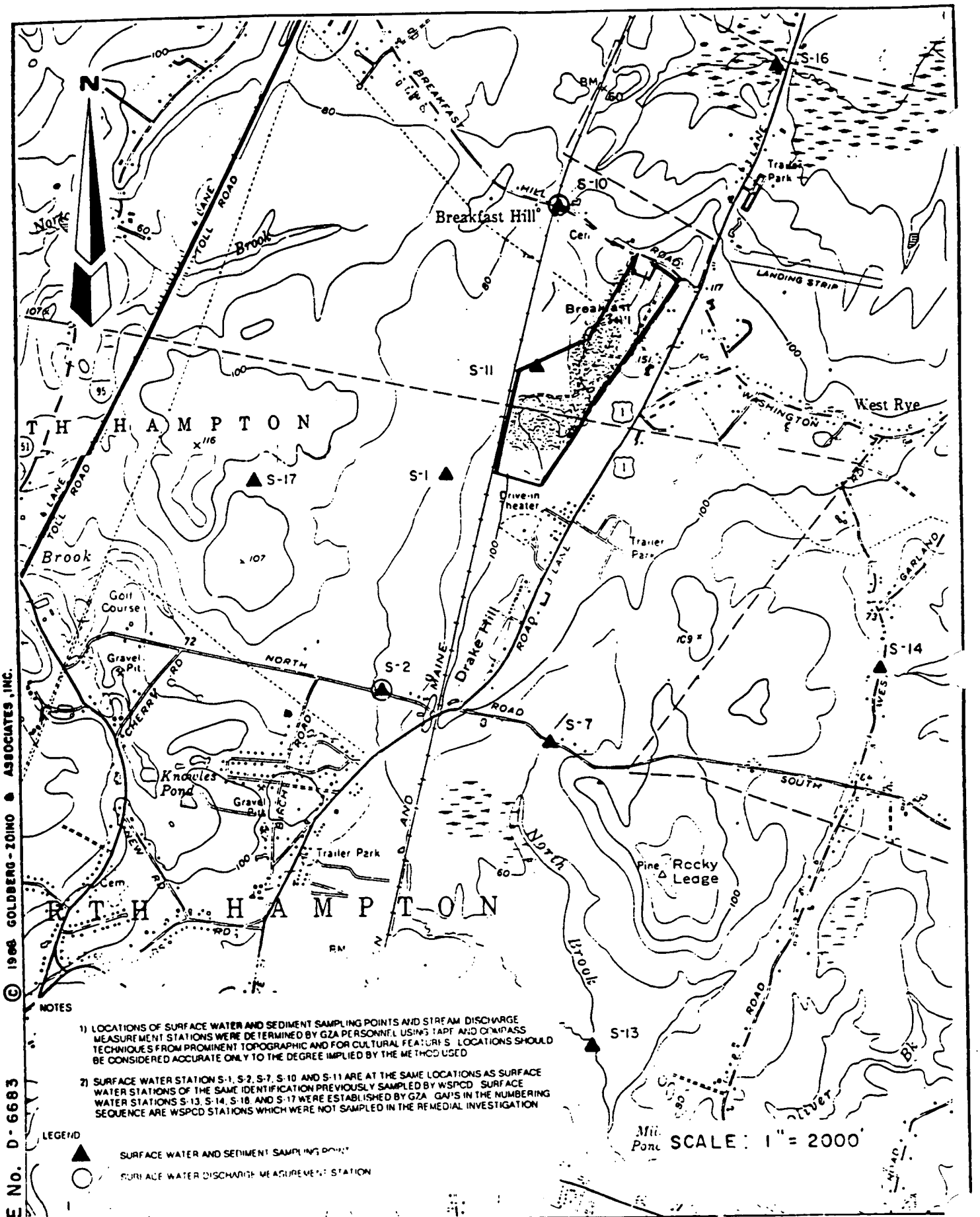
OCT. 1993

FIGURE No. 1


LOCATION PLAN
FIGURE 2
N.H. DEPARTMENT OF ENVIRONMENTAL SERVICES
FEASIBILITY STUDY
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE
WESTON
APPROXIMATE LIMITS OF WETLANDS
APPROXIMATE LIMITS OF FILL, COAKLEY LANDFILL
APPROXIMATE PROPERTY BOUNDARY OF COAKLEY LANDFILL, INC
APPROXIMATE LIMITS OF FILL OIL SPILL DEBRIS AREA
APPROXIMATE LIMITS OF FILL RYE LANDFILL
GREENLAND TOWN BOUNDARY
RYE TOWN BOUNDARY
NORTH HAMPTON TOWN BOUNDARY
BOSTON & MAINE RAILROAD
LITTLE RIVER
NORTH ROAD
LAFAYETTE ROAD
LAFAYETTE TERRACE
DOW LANE
FARMINGTON ROAD
ROUTE 1
BERRY'S BROOK
BAILEY'S BROOK
NORTH BROOK


Notes:
1. Base map for this figure is Figure 6 from "North Hampton Investigation, Coakley Landfill, North Hampton, New Hampshire", prepared by GZA, under contract to WESTON.
2. Arrows indicate both direction and relative magnitude of groundwater flow in the overburden and bedrock units.
LEGEND
Monitor Well
Test Pit
Staff Gauge
Hydraulic Gradient ≥ 0.010 FT/FT
Hydraulic Gradient < 0.010 FT/FT
APPROXIMATE LIMITS OF WETLANDS
APPROXIMATE LIMITS OF FILL COAKLEY LANDFILL
APPROXIMATE LIMITS OF FILL RYE LANDFILL
APPROXIMATE LIMITS OF FILL DEBRIS AREA
GREENLAND TOWN BOUNDARY
NORTH HAMPTON TOWN BOUNDARY
RYE TOWN BOUNDARY
BOSTON & MAINE RAILROAD
LITTLE RIVER
NORTH BROOK
NORTH ROAD
LAFAYETTE TERRACE
LAFAYETTE ROAD
DOW LANE
WASHINGTON ROAD
ROUTE 1
BERRY'S BROOK
BALLY BROOK
WESTON
N.H. DEPARTMENT OF ENVIRONMENTAL SERVICES
FEASIBILITY STUDY
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE
GENERALIZED GROUND WATER HYDRAULIC GRADIENTS
MAY 1988
FIGURE 3


Note : Base map for this figure is figure 4a from "Draft Remedial Investigation, Coakley Landfill, North Hampton, New Hampshire", prepared by GZA, under contract to WESTON.
LEGEND
Monitor Well
Test Pit
Staff Gauge
APPROXIMATE LIMITS OF WETLANDS
APPROXIMATE LIMITS OF FILL, COAKLEY LANDFILL
APPROXIMATE LIMITS OF FILL OIL SPILL DEBRIS AREA
APPROXIMATE LIMITS OF FILL RYE LANDFILL
SOUTHERN RAILROAD
LITTLE RIVER
NORTH BRANCH
NORTH ROAD
LAFAYETTE TERRACE
LAFAYETTE ROAD
DOW LANE
WASHINGTON ROAD
HILL ROAD
BEARY'S BROOK
BAILEY BROOK
ROUTE 1
NORTH HAMPTON TOWN BOUNDARY
RYE TOWN BOUNDARY
SHELDRAKE TOWN BOUNDARY
0' 200' 400' 800' 1200' 1600'
WESTON
N.H. DEPARTMENT OF ENVIRONMENTAL SERVICES
FEASIBILITY STUDY
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE
EXPLORATION LOCATION PLAN
TEST PITS AND STAFF GAUGES
MAY 1989
FIGURE 4



NOTES

1) LOCATIONS OF SURFACE WATER AND SEDIMENT SAMPLING POINTS AND STREAM DISCHARGE MEASUREMENT STATIONS WERE DETERMINED BY GZA PERSONNEL USING TAPE AND COMPASS TECHNIQUES FROM PROMINENT TOPOGRAPHIC AND FOR CULTURAL FEATURES. LOCATIONS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED

2) SURFACE WATER STATION S-1, S-2, S-7, S-10 AND S-11 ARE AT THE SAME LOCATIONS AS SURFACE WATER STATIONS OF THE SAME IDENTIFICATION PREVIOUSLY SAMPLED BY WSPCD. SURFACE WATER STATIONS S-13, S-14, S-16, AND S-17 WERE ESTABLISHED BY GZA. GAPS IN THE NUMBERING SEQUENCE ARE WSPCD STATIONS WHICH WERE NOT SAMPLED IN THE REMEDIAL INVESTIGATION

LEGEND

▲ SURFACE WATER AND SEDIMENT SAMPLING POINT

○ SURFACE WATER DISCHARGE MEASUREMENT STATION

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FILE No. D-6683

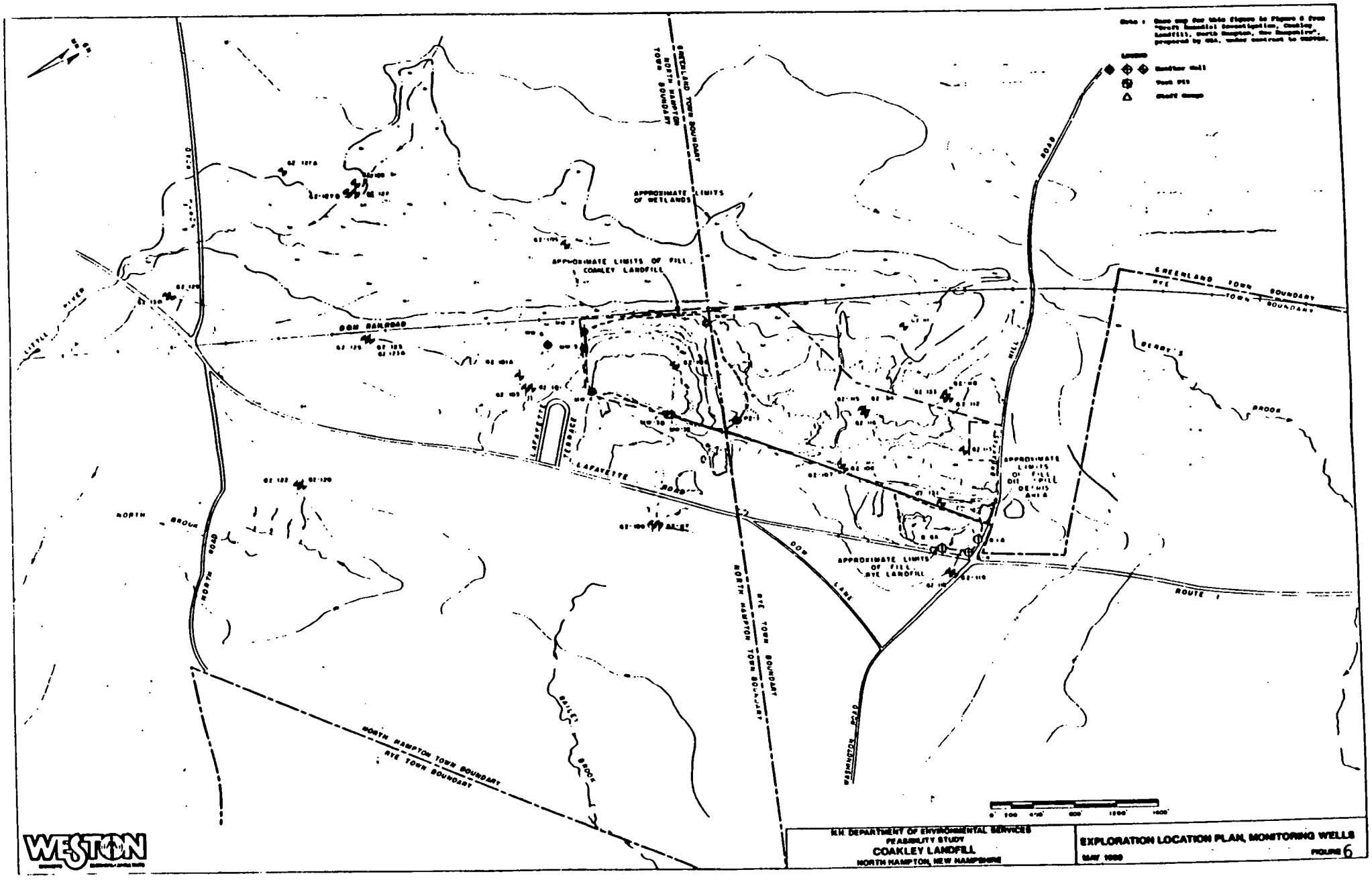
GZA WESTON

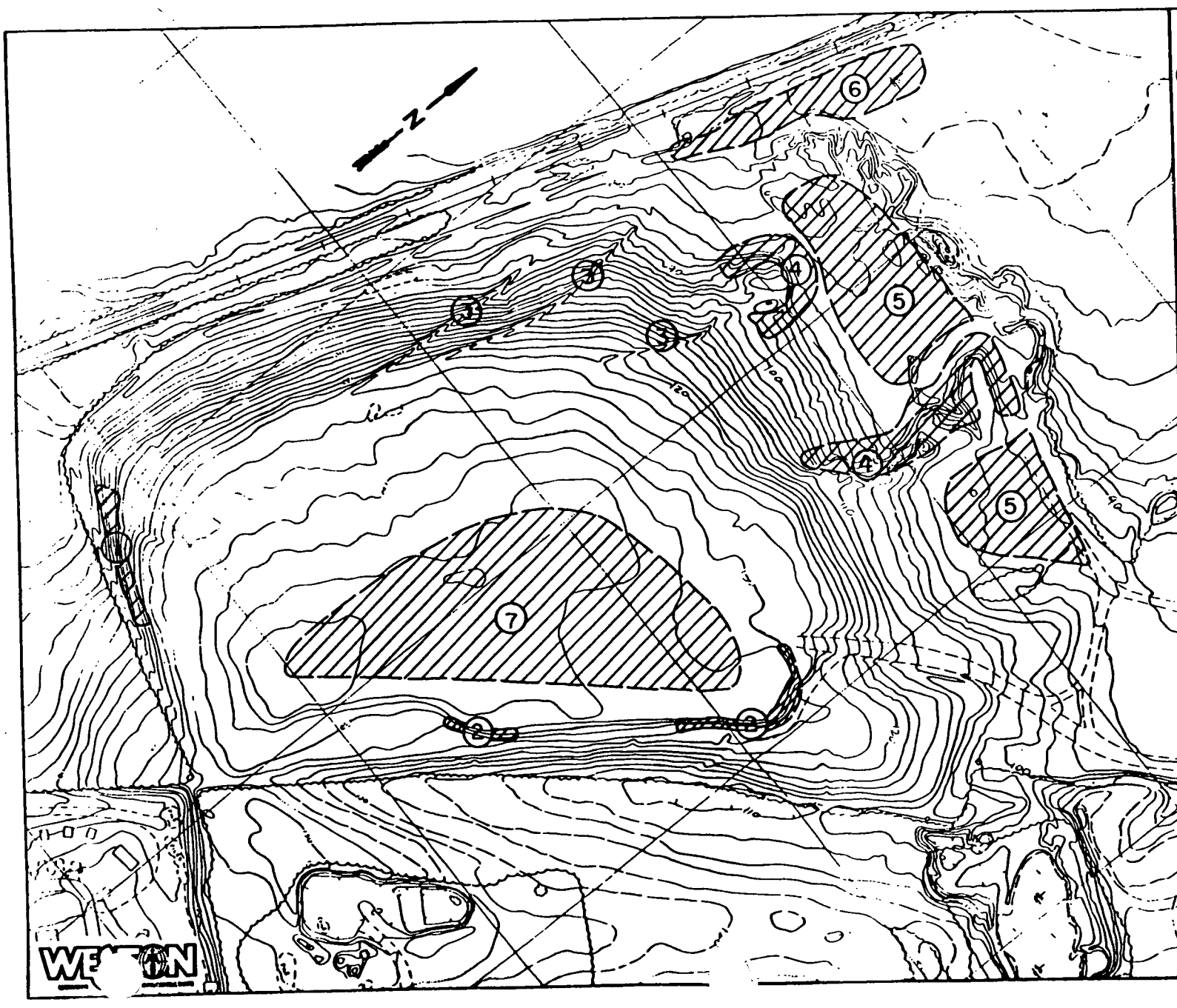
REMEDIAL INVESTIGATION
COAKLEY SANITARY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE

SURFACE WATER AND SEDIMENT SAMPLING LOCATIONS

OCT. 1988

FIGURE No. 5


Legend
Shallow well
Deep well
Staff gauge
APPROXIMATE LIMITS OF WETLANDS
APPROXIMATE LIMITS OF FILL COAKLEY LANDFILL
APPROXIMATE LIMITS OF FILL RYE LANDFILL
APPROXIMATE LIMITS OF FILL DEMOLITION AREA
GREENLAND TOWN BOUNDARY
NORTH HAMPTON TOWN BOUNDARY
RYE TOWN BOUNDARY
BOSTON & MAINE RAILROAD
LAFAYETTE ROAD
LAFAYETTE TERRACE
NORTH ROAD
LITTLE RIVER
NORTH BROOK
BAILEY BROOK
BERRY'S BROOK
WASHINGTON ROAD
ROUTE 1
0' 200' 400' 600' 1000' 1600'
N.H. DEPARTMENT OF ENVIRONMENTAL SERVICES
FEASIBILITY STUDY
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE
EXPLORATION LOCATION PLAN, MONITORING WELLS
MAY 1989
FIGURE 6
WESTON



LEGEND

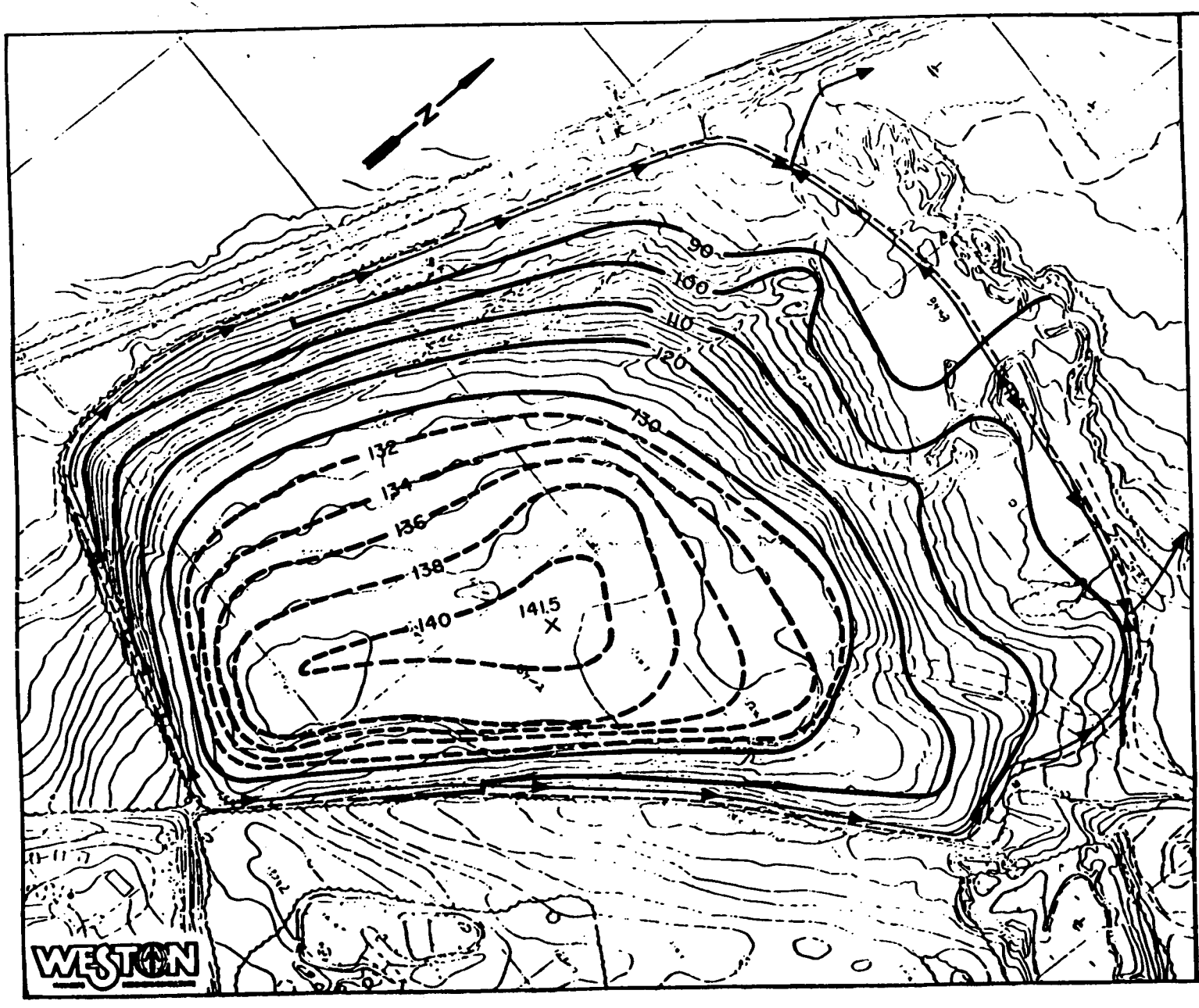
1. EXCESSIVE SLOPE. REGRADE TO 33% MAX.
2. REGRADE TO 25% SLOPE.
3. REGRADE TO REMOVE BERMS.
4. ADD SAND FILL AROUND ROCK OUTCROPS AND REGRADE TO 33% MAX. SLOPE.
5. ADD SAND FILL AS NECESSARY TO REGRADE TO 2% MIN. SLOPE.
6. EXCAVATE SEDIMENT.
7. PLACE EXCAVATED SEDIMENT AND DEBRIS, ADD INTERMEDIATE COVER AND GRADE TO 2% MIN. SLOPE.

150 0 150

SCALE (IN FEET)

N.H. DEPT. OF ENVIRONMENTAL SERVICES
FEASIBILITY STUDY
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE

FIGURE 7
SUBGRADE PREPARATION, LANDFILL CAP



LEGEND

—120— EXISTING GRADE

—120— PROPOSED GRADE

- - - - - LIMIT OF IMPERVIOUS CAP

→ PERIMETER SURFACE DRAIN

NOTE

25' (MIN.) CONSTRUCTION EASEMENT REQUIRED AT SOUTH AND EAST LANDFILL BOUNDARY.

150 0 150

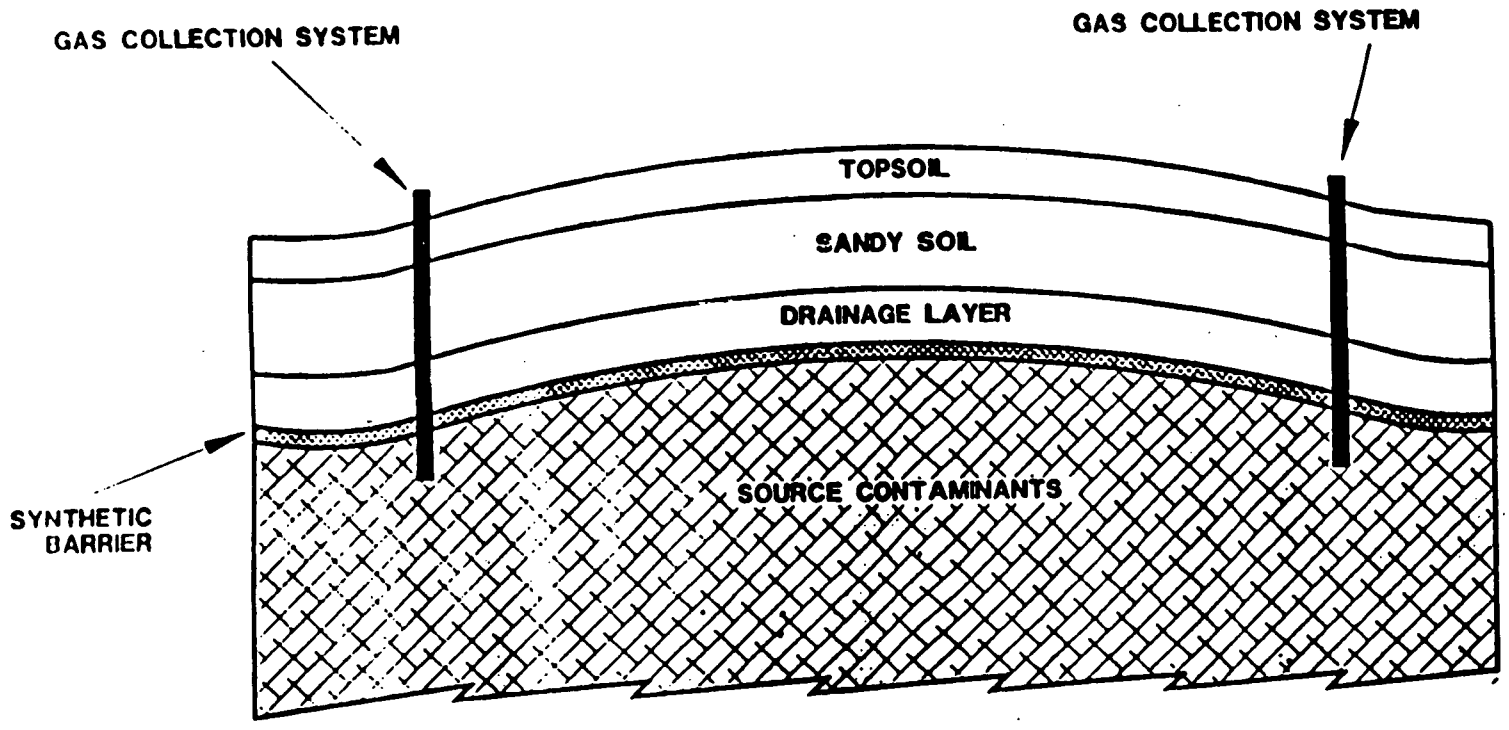
SCALE (IN FEET)

N.H. DEPT. OF ENVIRONMENTAL SERVICES
FEASIBILITY STUDY
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE

FIGURE 8

FINAL GRADE AND SURFACE DRAINAGE, LANDFILL CAP

FIGURE 9
CROSS-SECTION OF A TYPICAL MULTIMEDIA CAP



FWC COAK001

FIGURE 10
ON-SITE TREATMENT BY EXTRACTION/ CHEMICAL PRECIPITATION/ AIR STRIPPING/BIOLOGICAL TREATMENT

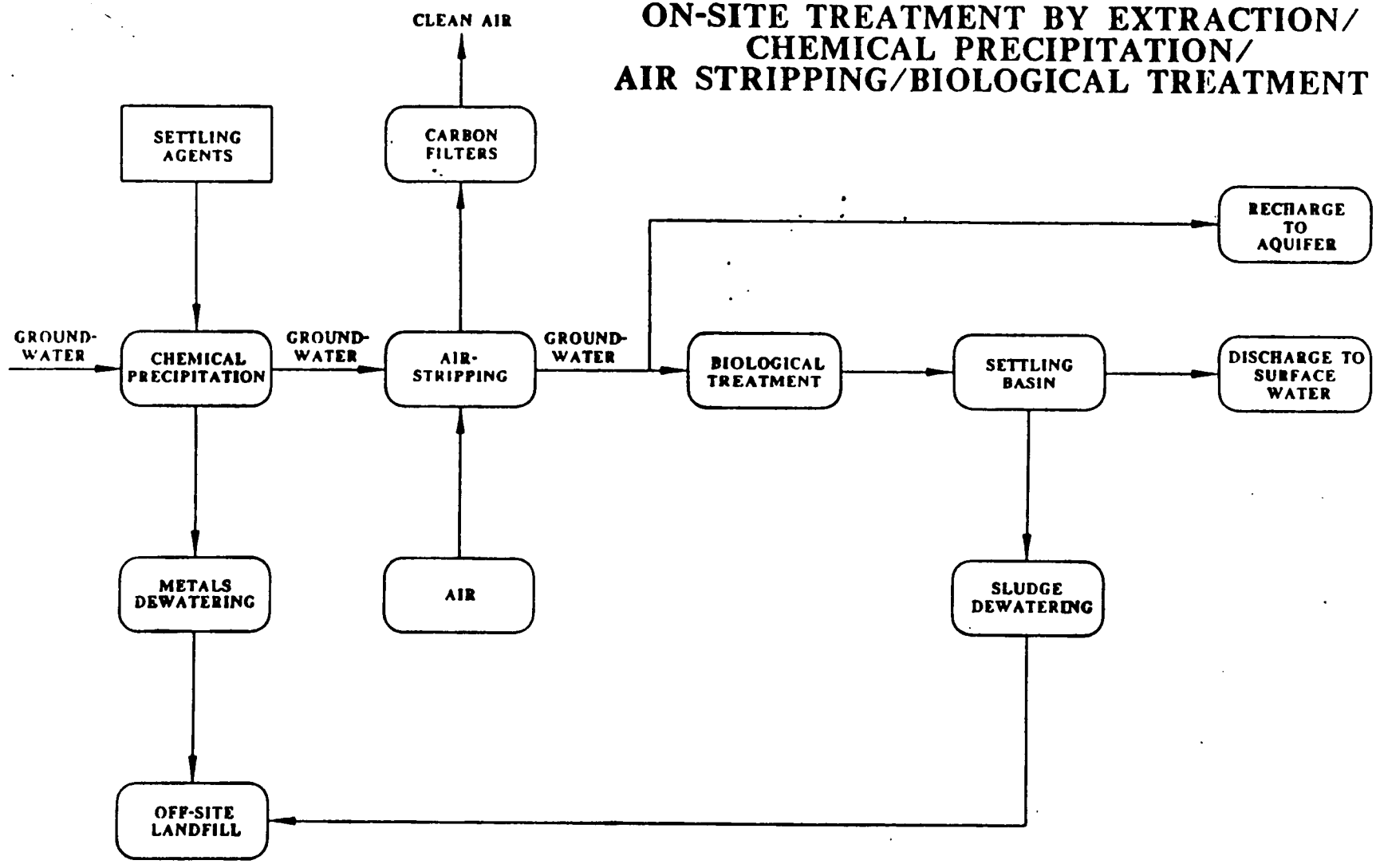
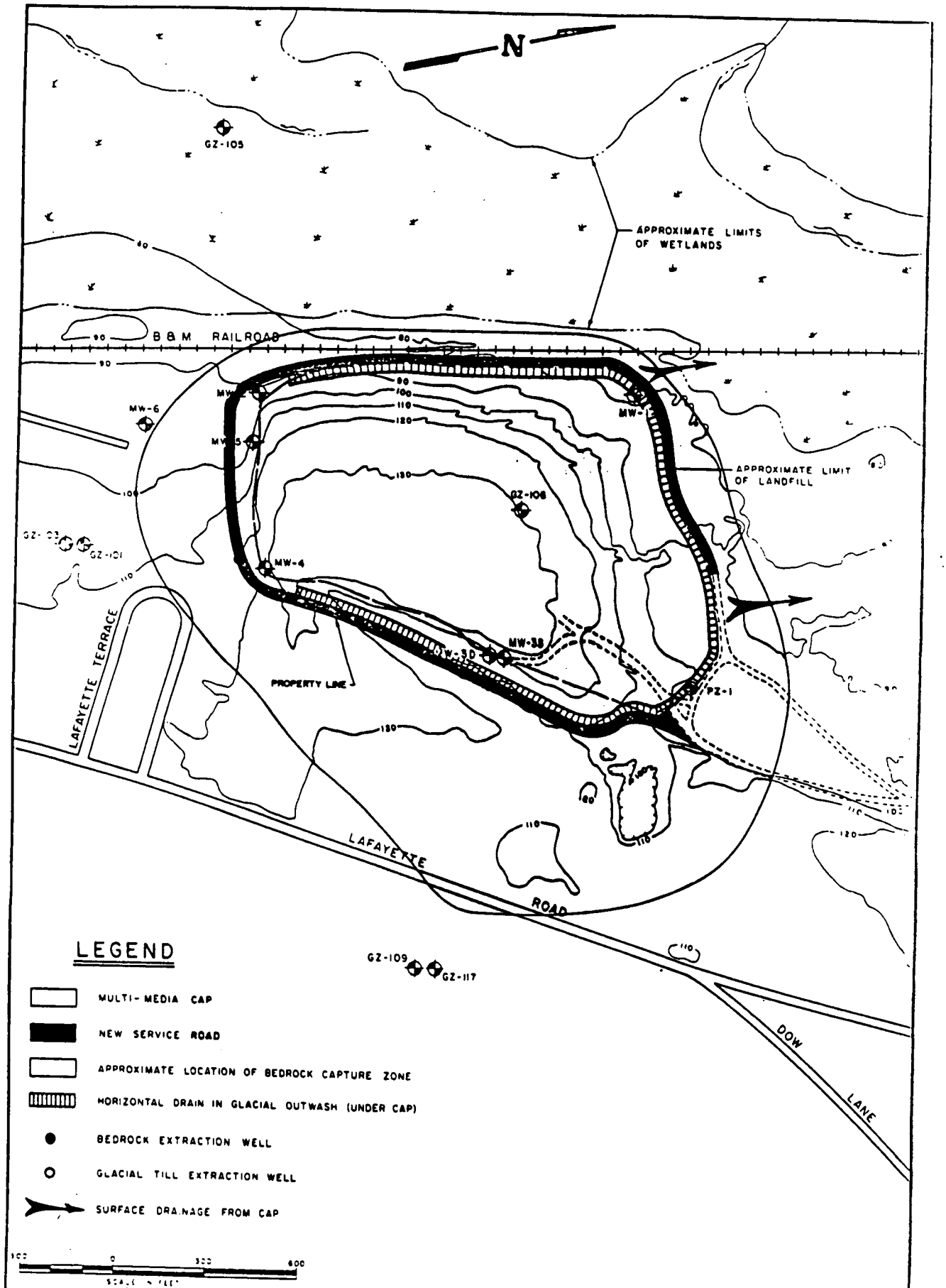


Table 11
ARARs FOR ALTERNATIVE SC-6
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE

ARAR's	Requirement Synopsis	Status/Action to be Taken to Attain ARAR's
GROUNDWATER		
SDWA - Maximum Contaminant Levels (MCLs) (40 CFR 141.11 - 141.16)	MCLs have been promulgated for a number of common organic and inorganic contaminants. These levels regulate the contaminants in public drinking water supplies, but may also be considered relevant and appropriate for groundwater aquifers potentially used for drinking water.	Attained
WS 410	New Hampshire Groundwater Quality Criteria have been promulgated for a number of contaminants.	Attained (a)
WS 300	New Hampshire drinking water standards regulate the concentration of contaminants in public drinking water supplies.	Attained (a)
EPA Risk Reference Doses (RfDs)	RfDs are dose levels developed based on the noncarcinogenic effects and are used to develop Hazard Indices. A Hazard Index of less than or equal to 1 is considered acceptable.	Attained
Federal Ambient Water Quality Criteria (AWQC) - Adjusted for Drinking Water	Federal AWQC are health-based criteria which have been developed for 95 carcinogenic and non-carcinogenic compounds.	Attained
EPA Carcinogen Assessment Group Potency Factors	Potency Factors are developed by the EPA from Health Effects Assessments or evaluation by the Carcinogenic Assessment Group and are used to develop excess cancer risks. A range of 10^-4 to 10^-7 is considered accepptable.	Attained
SURFACE WATER		
WS 430, Water Quality Standards	New Hampshire Surface Water Quality Standards are given for toxics, dissolved oxygen, temperature increase, pH, and total coliform. Federal AWQC were adopted by NH in Ws 430.	Attained (a)
Federal Ambient Water Quality Criteria (AWQC)	Federal AWQC are health-based criteria which have been developed for 95 carcinogenic and noncarcinogenic compounds.	Attained (a)



WESTON

N.H. DEPT. OF ENVIRONMENTAL SERVICES
FEASIBILITY STUDY
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE

FIGURE 11
GROUNDWATER EXTRACTION SYSTEM

APPENDIX B

TABLES

TABLE 1

SELECTED INDICATOR SUBSTANCES

FOR SOILS

Arsenic
Barium
Benzo(a)pyrene
Bis(2-ethylhexyl) phthalate
Cadmium
DDT
Lead
Nickel
Tetrachloroethylene

FOR GROUNDWATER

Arsenic
Barium
Benzene
Chlorobenzene
Chromium
1,2-Dichloroethylene
Diethyl phthalate
Nickel
Phenol

SURFACE WATER

Arsenic
Barium
Methyl Ethyl Ketone
Toluene

SEDIMENTS

Arsenic
Barium
Cadmium
Lead
Nickel

TABLE 2: SUMMARY OF CONTAMINANTS OF CONCERN IN SOIL

Contaminants of Concern	Geometric Mean (mg/kg)	Maximum (mg/kg)	Frequency of Detection
Arsenic	25	32	7/8
Barium	59	133	8/8
Benzo(a)pyrene	485	490	2/8
Cadmium	5	11	8/8
DDT	44	61	2/8
Lead	69	435	8/8
Nickel	57	96	8/8

TABLE 3: SUMMARY OF CONTAMINANTS OF CONCERN IN GROUND WATER

Contaminants of Concern	Geometric Mean (ug/l)	Maximum (ug/l)	Frequency of Detection
Arsenic	15.1	89	11/18
2-Butanone (MEK)	97.3	2700	13/88
Barium	68.9	368	14/15
Benzene	8.6	60	34/91
Chlorobenzene	9.7	182	12/88
Chromium	19.7	330	5/16
1,2-Dichloroethylene	15.7	72	4/88
Diethyl phthalate	16.7	230	5/15
Nickel	22.6	200	14/15
Phenol	39.0	120	3/15

TABLE 4: SUMMARY OF CONTAMINANTS OF CONCERN IN SURFACE WATER

Contaminants of Concern	Geometric Mean (ug/l)	Maximum (ug/l)	Frequency of Detection
Arsenic	1	2.2	4/7
Barium	85.2	227	2/7
2-Butanone (MEK)	-	8.4	1/9
Toluene	-	6.6	1/9

TABLE 5: SUMMARY OF CONTAMINANTS OF CONCERN IN SEDIMENTS

Contaminants of Concern	Geometric Mean (mg/kg)	Maximum (mg/kg)	Frequency of Detection
Arsenic	6.9	46	9/9
Barium	29	59	7/9
Cadmium	2.4	2.8	4/9
Lead	34.7	114	9/9
Nickle	22.2	33	6/9

Table 7
ARARs FOR ALTERNATIVE SC-1
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE

ARAR's	Requirement Synopsis	Status/Action to be Taken to Attain ARAR's
GROUNDWATER		
SDWA - Maximum Contaminant Levels (MCLs) (40 CFR 141.11 - 141.16)	MCLs have been promulgated for a number of common organic and inorganic contaminants. These levels regulate the contaminants in public drinking water supplies, but may also be considered relevant and appropriate for groundwater aquifers potentially used for drinking water.	Not Attained
WS 410	New Hampshire Groundwater Quality Criteria have been promulgated for a number of contaminants.	Not Attained (a)
WS 300	New Hampshire drinking water standards regulate the concentration of contaminants in public drinking water supplies.	Not Attained (a)
EPA Risk Reference Doses (RfDs)	RfDs are dose levels developed based on the noncarcinogenic effects and are used to develop Hazard Indices. A Hazard Index of less than or equal to 1 is considered acceptable.	Not Attained
Federal Ambient Water Quality Criteria (AWQC) - Adjusted for Drinking Water	Federal AWQC are health-based criteria which have been developed for 95 carcinogenic and non-carcinogenic compounds.	Not Attained
EPA Carcinogen Assessment Group Potency Factors	Potency Factors are developed by the EPA from Health Effects Assessments or evaluation by the Carcinogenic Assessment Group and are used to develop excess cancer risks. A range of 10^-4 to 10^-7 is considered accepptable.	Not Attained
SURFACE WATER		
WS 430, Water Quality Standards	New Hampshire Surface Water Quality Standards are given for toxics, dissolved oxygen, temperature increase, pH, and total coliform. Federal AWQC were adopted by NH in Ws 430.	Not Attained (a)
Federal Ambient Water Quality Criteria (AWQC)	Federal AWQC are health-based criteria which have been developed for 95 carcinogenic and noncarcinogenic compounds.	Not Attained (a)

Table 7
ARARs FOR ALTERNATIVE SC-1
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE

ARAR's	Requirement Synopsis	Status/Action to be Taken to Attain ARAR's
AIR		
CAA - National Ambient Air Quality Standards (NAAQS) - 40 CFR 52	Refer to State Implementation Plan and NHDES Air Pollution Regulations.	Attained
NH DES - Air Pollution Regulations (Air)	a	Attained (a)
Threshold Limit Values (TLVs)	These standards were issued as consensus standards for controlling air quality in work place environments.	Attained
RCRA - Groundwater Protection (40 CFR 264.30 - 264.31)	This regulation details requirements for a groundwater monitoring program to be installed at the site.	A groundwater monitoring program consistent with this regulation will be developed and implemented.
OSHA - General Industry Standards (29 CFR Part 1910)	This regulation specifies the 8-hour time-weighted average concentration for various organic compounds.	Proper respiratory equipment will be worn if it is impossible to maintain the work atmosphere below the TWA's
OSHA - Safety and Health Standards (29 CFR Part 1926)	This regulation specifies the type of safety equipment and procedures to be followed during site remediation.	All appropriate safety equipment will be on-site. In addition, safety procedures will be followed during on-site activities.
OSHA - Recordkeeping, Reporting, and Related Regulations	This regulation outlines the record- keeping and reporting requirements for an employer under OSHA.	These requirements apply to all site contractors and subcontractors and must be followed during all site work.

a: State of New Hampshire ARARs are included in Appendix H.

Table 8
ARARs FOR ALTERNATIVE SC-3
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE

ARAR's	Requirement Synopsis	Status/Action to be Taken to Attain ARAR's
GROUNDWATER		
SDWA - Maximum Contaminant Levels (MCLs) (40 CFR 141.11 - 141.16)	MCLs have been promulgated for a number of common organic and inorganic contaminants. These levels regulate the contaminants in public drinking water supplies, but may also be considered relevant and appropriate for groundwater aquifers potentially used for drinking water.	Not Attained
WS 410	New Hampshire Groundwater Quality Criteria have been promulgated for a number of contaminants.	Not Attained (a)
WS 300	New Hampshire drinking water standards regulate the concentration of contaminants in public drinking water supplies.	Not Attained (a)
EPA Risk Reference Doses (RfDs)	RfDs are dose levels developed based on the noncarcinogenic effects and are used to develop Hazard Indices. A Hazard Index of less than or equal to 1 is considered acceptable.	Attained
Federal Ambient Water Quality Criteria (AWQC) - Adjusted for Drinking Water	Federal AWQC are health-based criteria which have been developed for 95 carcinogenic and non-carcinogenic compounds.	Not Attained
EPA Carcinogen Assessment Group Potency Factors	Potency Factors are developed by the EPA from Health Effects Assessments or evaluation by the Carcinogenic Assessment Group and are used to develop excess cancer risks. A range of 10^-4 to 10^-7 is considered accepptable.	Not Attained
SURFACE WATER		
WS 430, Water Quality Standards	New Hampshire Surface Water Quality Standards are given for toxics, dissolved oxygen, temperature increase, pH, and total coliform. Federal AWQC were adopted by NH in Ws 430.	Attained (a)
Federal Ambient Water Quality Criteria (AWQC)	Federal AWQC are health-based criteria which have been developed for 95 carcinogenic and noncarcinogenic compounds.	Attained (a)

Table 8
ARARs FOR ALTERNATIVE SC-3
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE

ARAR's	Requirement Synopsis	Status/Action to be Taken to Attain ARAR's
AIR		
CAA - National Ambient Air Quality Standards (NAAQS) - 40 CFR 52	Refer to State Implementation Plan and NHDES Air Pollution Regulations.	Attained
NH DES - Air Pollution Regulations (Air)	a	Attained (a)
Threshold Limit Values (TLVs)	These standards were issued as consensus standards for controlling air quality in work place environments.	Attained
WETLANDS		
Clean Water Act (CWA) - Section 404	Under this requirement, no activity that adversely affects a wetland shall be permitted if a practicable alternative that has less affect is available.	Excavation of contaminated sediments west of the landfill will be accomplished with minimal effects on the wetland.
Fish and Wildlife Coordination Act (16 U.S.C. 661)	This regulation requires that any Federal Agency that proposes to modify a body of water must consult with the U.S. Fish and Wildlife Services. This requirement is addressed under CWA Section 404 requirements.	Prior to excavation of contaminated sediments EPA will consult the U.S. Fish and Wildlife Service.
Wetlands Executive Order (EO 11990)	Under this regulation, Federal agencies are required to minimize the destruction, loss or degradation of wetlands and preserve and enhance natural and beneficial values of wetlands.	Excavation of contaminated sediments west of the landfill will be accomplished with minimal effects on the wetland.
Floodplains Executive Order (EO 11888)	Federal Agencies are required to reduce the risk of flood loss, to minimize impact of floods, and to restore and preserve the natural and beneficial value of floodplains.	Excavation of contaminated sediments west of the landfill will be accomplished such that no flood hazard is created and the area is restored to its previous condition.

Table 8
ARARs FOR ALTERNATIVE SC-3
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE

ARAR's	Requirement Synopsis	Status/Action to be Taken to Attain ARAR's
RCRA - Standards for Owners and Operators of Permitted Hazardous Waste Facilities (40 CFR 264)	General facility requirements outline general waste analysis, security measures, inspections, and training requirements.	The cap and gas incineration system will be constructed, and operated in accordance with these requirements. All workers will be properly trained.
RCRA - Groundwater Protection (40 CFR 264.30 - 264.31)	This regulation details requirements for a groundwater monitoring program to be installed at the site.	A groundwater monitoring program consistent with this regulation will be developed and implemented.
RCRA - Closure and Post-closure (40 CFR 264.110 - 264.120)	This regulation details specific requirements for closure and post-closure of hazardous waste facilities.	A monitoring and maintenance program for the capping system will be implemented in accordance with this regulation.
OSHA - General Industry Standards (29 CFR Part 1910)	This regulation specifies the 8-hour time-weighted average concentration for various organic compounds.	Proper respiratory equipment will be worn if it is impossible to maintain the work atmosphere below the TWA's
OSHA - Safety and Health Standards (29 CFR Part 1926)	This regulation specifies the type of safety equipment and procedures to be followed during site remediation.	All appropriate safety equipment will be on-site. In addition, safety procedures will be followed during on-site activities.
OSHA - Recordkeeping, Reporting, and Related Regulations	This regulation outlines the record- keeping and reporting requirements for an employer under OSHA.	These requirements apply to all site contractors and subcontractors and must be followed during all site work.
US EPA Off-site Policy	This regulation requires that off-site treatment and/or disposal be performed at a facility which is in compliance with EPA regulations.	Off-site disposal of perched leachate will be performed in accordance with this policy.
DOT Rules for Transportation of Hazardous Materials (49 CFR Parts 107, 171.10171.5)	This regulation outlines procedures for the packaging, labeling, manifesting, and transporting of hazardous materials.	Perched leachate will be manifested and transported in bulk to a licensed off-site TSD facility in compliance with these regulations.
N.H. DES New Hampshire Solid Waste Regulations He-P 1901.	This regulation provides standards for solid waste disposal facilities.	Standards for solid waste disposal facilities will be followed when the landfill is capped. (a)
N.H. DES - Air Pollution Regulations (Air)	This regulation outlines the standards and requirements for air pollution control in the State of New Hampshire; all provisions,	Emissions from excavation and gas incineration system will be maintained below standards using emissions controls, as necessary. (a)

Table 8
ARARs FOR ALTERNATIVE SC-3
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE

ARAR's	Requirement Synopsis	Status/Action to be Taken to Attain ARAR's
	procedures, and definitions are described.	
New Hampshire Wetlands Board, RSA 483-A, and RSA 149-8a.	These regulations are promulgated under the N.H. Wetlands Board which regulates dredging, filling, altering or polluting inland wetlands.	Excavation of contaminated sediments west of the landfill will be accomplished with minimal effects on the wetland. (a)
New Hampshire Hazardous Waste Rules, He-P 1905.	These regulations outline the criteria for the construction, operations, and maintenance of a new facility or increase in an existing facility for the storage, treatment, or disposal of hazardous waste.	The disposal of material on-site and the constuction and operation of the treatment facility will be performed in accordance with these regulations. (a)

a: State of New Hampshire ARARs are included in Appendix H.

Table 9
ARARs FOR ALTERNATIVE SC-4
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE

ARAR's	Requirement Synopsis	Status/Action to be Taken to Attain ARAR's
GROUNDWATER		
SDWA - Maximum Contaminant Levels (MCLs) (40 CFR 141.11 - 141.16)	MCLs have been promulgated for a number of common organic and inorganic contaminants. These levels regulate the contaminants in public drinking water supplies, but may also be considered relevant and appropriate for groundwater aquifers potentially used for drinking water.	Attained
WS 410	New Hampshire Groundwater Quality Criteria have been promulgated for a number of contaminants.	Attained (a)
WS 300	New Hampshire drinking water standards regulate the concentration of contaminants in public drinking water supplies.	Attained (a)
EPA Risk Reference Doses (RfDs)	RfDs are dose levels developed based on the noncarcinogenic effects and are used to develop Hazard Indices. A Hazard Index of less than or equal to 1 is considered acceptable.	Attained
Federal Ambient Water Quality Criteria (AWQC) - Adjusted for Drinking Water	Federal AWQC are health-based criteria which have been developed for 95 carcinogenic and non-carcinogenic compounds.	Attained
EPA Carcinogen Assessment Group Potency Factors	Potency Factors are developed by the EPA from Health Effects Assessments or evaluation by the Carcinogenic Assessment Group and are used to develop excess cancer risks. A range of 10^-4 to 10^-7 is considered accepptable.	Attained
SURFACE WATER		
WS 430, Water Quality Standards	New Hampshire Surface Water Quality Standards are given for toxics, dissolved oxygen, temperature increase, pH, and total coliform. Federal AWQC were adopted by NH in Ws 430.	Attained (a)
Federal Ambient Water Quality Criteria (AWQC)	Federal AWQC are health-based criteria which have been developed for 95 carcinogenic and noncarcinogenic compounds.	Attained (a)

Table 9
ARARs FOR ALTERNATIVE SC-4
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE

ARAR's	Requirement Synopsis	Status/Action to be Taken to Attain ARAR's
AIR		
CAA - National Ambient Air Quality Standards (NAAQS) - 40 CFR 52	Refer to State Implementation Plan and NHDES Air Pollution Regulations.	Attained
NH DES - Air Pollution Regulations (Air)	a	Attained (a)
Threshold Limit Values (TLVs)	These standards were issued as consensus standards for controlling air quality in work place environments.	Attained
WETLANDS		
Clean Water Act (CWA) - Section 404	Under this requirement, no activity that adversely affects a wetland shall be permitted if a practicable alternative that has less affect is available.	Excavation of contaminated sediments west of the landfill will be accomplished with minimal effects on the wetland.
Fish and Wildlife Coordination Act (16 U.S.C. 661)	This regulation requires that any Federal Agency that proposes to modify a body of water must consult with the U.S. Fish and Wildlife Services. This requirement is addressed under CWA Section 404 requirements.	Prior to excavation of contaminated sediments and discharge of treated groundwater to the onsite surface water, EPA will consult the U.S. Fish and Wildlife Service.
Wetlands Executive Order (EO 11990)	Under this regulation, Federal agencies are required to minimize the destruction, loss or degradation of wetlands and preserve and enhance natural and beneficial values of wetlands.	Excavation of contaminated sediments west of the landfill will be accomplished with minimal effects on the wetland.
Floodplains Executive Order (EO 11888)	Federal Agencies are required to reduce the risk of flood loss, to minimize impact of floods, and to restore and preserve the natural and beneficial value of floodplains.	Excavation of contaminated sediments west of the landfill and discharge of treated groundwater will accomplished such that no flood hazard is created and the area is restored to its previous

Table 9
ARARs FOR ALTERNATIVE SC-4
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE

ARAR's	Requirement Synopsis	Status/Action to be Taken to Attain ARAR's
		condition.
RCRA - Standards for Owners and Operators of Permitted Hazardous Waste Facilities (40 CFR 264)	General facility requirements outline general waste analysis, security measures, inspections, and training requirements.	The cap, gas incineration groundwater treatment system will be designed, constructed, and operated in accordance with these requirements. All workers will be properly trained.
RCRA - Groundwater Protection (40 CFR 264.30 - 264.31)	This regulation details requirements for a groundwater monitoring program to be installed at the site.	A groundwater monitoring program consistent with this regulation will be developed and implemented.
RCRA - Closure and Post-closure (40 CFR 264.110 - 264.120)	This regulation details specific requirements for closure and post-closure of hazardous waste facilities.	A monitoring and maintenance program for the capping system will be implemented in accordance with this regulation.
OSHA - General Industry Standards (29 CFR Part 1910)	This regulation specifies the 8-hour time-weighted average concentration for various organic compounds.	Proper respiratory equipment will be worn if it is impossible to maintain the work atmosphere below the TWA's
OSHA - Safety and Health Standards (29 CFR Part 1926)	This regulation specifies the type of safety equipment and procedures to be followed during site remediation.	All appropriate safety equipment will be on-site. In addition, safety procedures will be followed during on-site activities.
OSHA - Recordkeeping, Reporting, and Related Regulations	This regulation outlines the record- keeping and reporting requirements for an employer under OSHA.	These requirements apply to all site contractors and subcontractors and must be followed during all site work.
RCRA - Land Disposal Restrictions (40 CFR 268)	This regulation outlines land disposal requirements and restrictions for hazardous wastes.	Sludge from the groundwater treatment unit which fails the TCLP extraction procedure will be treated to the Best Demonstrated Available Technology levels before being placed into a at an off-site facility.
US EPA Off-site Policy	This regulation requires that off-site treatment and/or disposal be performed at a facility which is in compliance with EPA regulations.	Off-site disposal of sludge from the groundwater treatment unit will be performed in accordance with this policy.
DOT Rules for Transportation of Hazardous Materials (49 CFR Parts 107, 171.10171.5)	This regulation outlines procedures for the packaging, labeling, manifesting, and transporting of hazardous materials.	Sludge from the groundwater treatment unit will be packaged, manifested, and transported to a licensed off-site TSD facility in compliance with these regulations.

Table 9
ARARs FOR ALTERNATIVE SC-4
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE

ARAR's	Requirement Synopsis	Status/Action to be Taken to Attain ARAR's
N.H. DES New Hampshire Solid Waste Regulations He-P 1901.	This regulation provides standards for solid waste disposal facilities.	Standards for solid waste disposal facilities will be followed when the landfill is capped. (a)
N.H. DES - Air Pollution Regulations (Air)	This regulation outlines the standards and requirements for air pollution control in the State of New Hampshire; all provisions, procedures, and definitions are described.	Emissions from excavation, air stripper and gas incineration system will be maintained below standards using emissions controls, as necessary. (a)
New Hampshire Wetlands Board, RSA 483-A, and RSA 149-8a.	These regulations are promulgated under the N.H. Wetlands Board which regulates dredging, filling, altering or polluting inland wetlands.	Excavation of contaminated sediments west of the landfill will be accomplished with minimal effects on the wetland. (a)
New Hampshire Hazardous Waste Rules, He-P 1905.	These regulations outline the criteria for the construction, operations, and maintenance of a new facility or increase in an existing facility for the storage, treatment, or disposal of hazardous waste.	The disposal of material on-site and the constuction and operation of the treatment facility will be performed in accordance with these regulations. (a)

a: State of New Hampshire ARARs are included in Appendix H.

Table 10
ARARs FOR ALTERNATIVE SC-5
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE

ARAR's	Requirement Synopsis	Status/Action to be Taken to Attain ARAR's
GROUNDWATER		
SDWA - Maximum Contaminant Levels (MCLs) (40 CFR 141.11 - 141.16)	MCLs have been promulgated for a number of common organic and inorganic contaminants. These levels regulate the contaminants in public drinking water supplies, but may also be considered relevant and appropriate for groundwater aquifers potentially used for drinking water.	Attained
WS 410	New Hampshire Groundwater Quality Criteria have been promulgated for a number of contaminants.	Attained (a)
WS 300	New Hampshire drinking water standards regulate the concentration of contaminants in public drinking water supplies.	Attained (a)
EPA Risk Reference Doses (RfDs)	RfDs are dose levels developed based on the noncarcinogenic effects and are used to develop Hazard Indices. A Hazard Index of less than or equal to 1 is considered acceptable.	Attained
Federal Ambient Water Quality Criteria (AWQC) - Adjusted for Drinking Water	Federal AWQC are health-based criteria which have been developed for 95 carcinogenic and non-carcinogenic compounds.	Attained
EPA Carcinogen Assessment Group Potency Factors	Potency Factors are developed by the EPA from Health Effects Assessments or evaluation by the Carcinogenic Assessment Group and are used to develop excess cancer risks. A range of 10^-4 to 10^-7 is considered accepptable.	Attained
SURFACE WATER		
WS 430, Water Quality Standards	New Hampshire Surface Water Quality Standards are given for toxics, dissolved oxygen, temperature increase, pH, and total coliform. Federal AWQC were adopted by NH in Ws 430.	Attained (a)
Federal Ambient Water Quality Criteria (AWQC)	Federal AWQC are health-based criteria which have been developed for 95 carcinogenic and noncarcinogenic compounds.	Attained (a)

Table 10
ARARs FOR ALTERNATIVE SC-5
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE

ARAR's	Requirement Synopsis	Status/Action to be Taken to Attain ARAR's
AIR		
CAA - National Ambient Air Quality Standards (NAAQS) - 40 CFR 52	Refer to State Implementation Plan and NHDES Air Pollution Regulations.	Attained
NH DES - Air Pollution Regulations (Air)	a	Attained (a)
Threshold Limit Values (TLVs)	These standards were issued as consensus standards for controlling air quality in work place environments.	Attained
WETLANDS		
Clean Water Act (CWA) - Section 404	Under this requirement, no activity that adversely affects a wetland shall be permitted if a practicable alternative that has less affect is available.	Excavation of contaminated sediments west of the landfill will be accomplished with minimal effects on the wetland.
Fish and Wildlife Coordination Act (16 U.S.C. 661)	This regulation requires that any Federal Agency that proposes to modify a body of water must consult with the U.S. Fish and Wildlife Services. This requirement is addressed under CWA Section 404 requirements.	Prior to excavation of contaminated sediments and construction of the discharge sewer, EPA will consult the U.S. Fish and Wildlife Service.
Wetlands Executive Order (EO 11990)	Under this regulation, Federal agencies are required to minimize the destruction, loss or degradation of wetlands and preserve and enhance natural and beneficial values of wetlands.	Excavation of contaminated sediments west of the landfill will be accomplished with minimal effects on the wetland.
Floodplains Executive Order (EO 11888)	Federal Agencies are required to reduce the risk of flood loss, to minimize impact of floods, and to restore and preserve the natural and beneficial value of floodplains.	Excavation of contaminated sediments west of the landfill and construction of the discharge sewer will accomplished such that no flood hazard is created and the area is restored to its previous

Table 10
ARARs FOR ALTERNATIVE SC-5
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE

ARAR's	Requirement Synopsis	Status/Action to be Taken to Attain ARAR's
		condition.
RCRA - Standards for Owners and Operators of Permitted Hazardous Waste Facilities (40 CFR 264)	General facility requirements outline general waste analysis, security measures, inspections, and training requirements.	The cap, gas incineration system and groundwater treatment system will be designed constructed, and operated in accordance with these requirements. All workers will be properly trained.
RCRA - Groundwater Protection (40 CFR 264.30 - 264.31)	This regulation details requirements for a groundwater monitoring program to be installed at the site.	A groundwater monitoring program consistent with this regulation will be developed and implemented.
RCRA - Closure and Post-closure (40 CFR 264.110 - 264.120)	This regulation details specific requirements for closure and post-closure of hazardous waste facilities.	A monitoring and maintenance program for the capping system will be implemented in accordance with this regulation.
OSHA - General Industry Standards (29 CFR Part 1910)	This regulation specifies the 8-hour time-weighted average concentration for various organic compounds.	Proper respiratory equipment will be worn if it is impossible to maintain the work atmosphere below the TWA's
OSHA - Safety and Health Standards (29 CFR Part 1926)	This regulation specifies the type of safety equipment and procedures to be followed during site remediation.	All appropriate safety equipment will be on-site. In addition, safety procedures will be followed during on-site activities.
OSHA - Recordkeeping, Reporting, and Related Regulations	This regulation outlines the record- keeping and reporting requirements for an employer under OSHA.	These requirements apply to all site contractors and subcontractors and must be followed during all site work.
RCRA - Land Disposal Restrictions (40 CFR 268)	This regulation outlines land disposal requirements and restrictions for hazardous wastes.	Sludge from the groundwater treatment unit and material from the Oily Debris Area which fails the TCLP extraction procedure will be treated to the Best Demonstrated Available Technology levels at an off-site facility.
CWA - 40 CFR Part 403	This regulation specifies pretreatment standards for discharges to a publicly-owned treatment works (POTW).	General prohibition standard will be met.
TSCA - PCB Requirements (40 CFR 761)	This regulation outlines the requirements for the disposal of materials containing PCB's.	The material excavated from the Oily Debris Area will be analyzed for PCB's prior to shipment off-site.
US EPA Off-site Policy	This regulation requires that off-site treatment	Off-site disposal of sludge from the groundwater

Table 10
ARARs FOR ALTERNATIVE SC-5
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE

ARAR's	Requirement Synopsis	Status/Action to be Taken to Attain ARAR's
	and/or disposal be performed at a facility which is in compliance with EPA regulations.	treatment unit, waste from the Oily Debris Area and pretreated groundwater will be performed in accordance with this policy.
DOT Rules for Transportation of Hazardous Materials (49 CFR Parts 107, 171.10171.5)	This regulation outlines procedures for the packaging, labeling, manifesting, and transporting of hazardous materials.	Sludge from the groundwater treatment unit and waste from the Oily Debris Area will be packaged, manifested, and transported to a licensed off-site TSD facility in compliance with these regulations.
NHDES Pretretment Regulations (Ws 904)	This regulation specifies preteatment requirements for discharges to a POTW.	A permit would be obtained from the Town prior to discharging the pretreated groundwater. Pretreatment limitations will be used as design basis for groundwater treatment. (a)
N.H. DES New Hampshire Solid Waste Regulations He-P 1901.	This regulation provides standards for solid waste disposal facilities.	Standards for solid waste disposal facilities will be followed when the landfill is capped. (a)
N.H. DES - Air Pollution Regulations (Air)	This regulation outlines the standards and requirements for air pollution control in the State of New Hampshire; all provisions, procedures, and definitions are described.	Emissions from excavation, air stripper and gas incineration system will be maintained below standards using emissions controls, as necessary. (a)
New Hampshire Wetlands Board, RSA 483-A, and RSA 149-8a.	These regulations are promulgated under the N.H. Wetlands Board which regulates dredging, filling, altering or polluting inland wetlands.	Excavation of contaminated sediments west of the landfill will be accomplished with minimal effects on the wetland. (a)
New Hampshire Hazardous Waste Rules, He-P 1905.	These regulations outline the criteria for the construction, operations, and maintenance of a new facility or increase in an existing facility for the storage, treatment, or disposal of hazardous waste.	The disposal of material on-site and the constuction and operation of the treatment facility will be performed in accordance with these regulations. (a)

a: State of New Hampshire ARARs are included in Appendix H.

Table 11
ARARs FOR ALTERNATIVE SC-6
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE

ARAR's	Requirement Synopsis	Status/Action to be Taken to Attain ARAR's
AIR		
CAA - National Ambient Air Quality Standards (NAAQS) - 40 CFR 52	Refer to State Implementation Plan and NHDES Air Pollution Regulations.	Attained
NH DES - Air Pollution Regulations (Air)	a	Attained (a)
Threshold Limit Values (TLVs)	These standards were issued as consensus standards for controlling air quality in work place environments.	Attained
WETLANDS		
Clean Water Act (CWA) - Section 404	Under this requirement, no activity that adversely affects a wetland shall be permitted if a practicable alternative that has less affect is available.	Excavation of contaminated sediments west of the landfill will be accomplished with minimal effects on the wetland.
Fish and Wildlife Coordination Act (16 U.S.C. 661)	This regulation requires that any Federal Agency that proposes to modify a body of water must consult with the U.S. Fish and Wildlife Services. This requirement is addressed under CWA Section 404 requirements.	Prior to excavation of contaminated sediments and discharge of treated groundwater to the onsite surface water, EPA will consult the U.S. Fish and
Wetlands Executive Order (EO 11990)	Under this regulation, Federal agencies are required to minimize the destruction, loss or degradation of wetlands and preserve and enhance natural and beneficial values of wetlands.	Excavation of contaminated sediments west of the landfill will be accomplished with minimal effects on the wetland.
Floodplains Executive Order (EO 11888)	Federal Agencies are required to reduce the risk of flood loss, to minimize impact of floods, and to restore and preserve the natural and beneficial value of floodplains.	Excavation of contaminated sediments west of the landfill and discharge of treated groundwater will accomplished such that no flood hazard is created and the area is restored to its previous

Table 11
ARARs FOR ALTERNATIVE SC-6
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE

ARAR's	Requirement Synopsis	Status/Action to be Taken to Attain ARAR's
		condition.
RCRA - Standards for Owners and Operators of Permitted Hazardous Waste Facilities (40 CFR 264)	General facility requirements outline general waste analysis, security measures, inspections, and training requirements.	The cap, gas incineration, groundwater treatment, soil incineration and solidification units will be designed, constructed, and operated in accordance with these requirements. All workers will be properly trained.
RCRA - Groundwater Protection (40 CFR 264.30 - 264.31)	This regulation details requirements for a groundwater monitoring program to be installed at the site.	A groundwater monitoring program consistent with this regulation will be developed and implemented.
RCRA - Closure and Post-closure (40 CFR 264.110 - 264.120)	This regulation details specific requirements for closure and post-closure of hazardous waste facilities.	A monitoring and maintenance program for the capping system will be implemented in accordance with this regulation.
OSHA - General Industry Standards (29 CFR Part 1910)	This regulation specifies the 8-hour time-weighted average concentration for various organic compounds.	Proper respiratory equipment will be worn if it is impossible to maintain the work atmosphere below the TWA's
OSHA - Safety and Health Standards (29 CFR Part 1926)	This regulation specifies the type of safety equipment and procedures to be followed during site remediation.	All appropriate safety equipment will be on-site. In addition, safety procedures will be followed during on-site activities.
OSHA - Recordkeeping, Reporting, and Related Regulations	This regulation outlines the record- keeping and reporting requirements for an employer under OSHA.	These requirements apply to all site contractors and subcontractors and must be followed during all site work.
RCRA - Land Disposal Restrictions (40 CFR 268)	This regulation outlines land disposal requirements and restrictions for hazardous wastes.	Soil and solid waste from the landfill or sludge from the groundwater treatment unit which fails the TCLP extraction procedure will be treated to the Best Demonstrated Available Technology levels at an off-site facility.
TSCA - PCB Requirements (40 CFR 761)	This regulation outlines the requirements for the disposal of materials containing PCB's.	The material excavated from the landfill will be analyzed for PCB's prior to redisposal in the landfill.
US EPA Off-site Policy	This regulation requires that off-site treatment and/or disposal be performed at a facility which is in compliance with EPA regulations.	Off-site disposal of sludge from the groundwater treatment unit will be performed in accordance with this policy.
DOT Rules for Transportation	This regulation outlines procedures for the	Sludge from the groundwater treatment unit will

Table 11
ARARs FOR ALTERNATIVE SC-6
COAKLEY LANDFILL
NORTH HAMPTON, NEW HAMPSHIRE

ARAR's	Requirement Synopsis	Status/Action to be Taken to Attain ARAR's
of Hazardous Materials (49 CFR Parts 107, 171.10171.5)	packaging, labeling, manifesting, and transporting of hazardous materials.	be packaged, manifested, and transported to a licensed off-site TSD facility in compliance with these regulations.
N.H. DES New Hampshire Solid Waste Regulations He-P 1901.	This regulation provides standards for solid waste disposal facilities.	Standards for solid waste disposal facilities will be followed when the landfill is capped. (a)
N.H. DES - Air Pollution Regulations (Air)	This regulation outlines the standards and requirements for air pollution control in the State of New Hampshire; all provisions, procedures, and definitions are described.	Emissions from excavation, air stripper, soil/solid waste incinerator and gas incineration system will be maintained below standards using emissions controls, as necessary. (a)
New Hampshire Wetlands Board, RSA 483-A, and RSA 149-8a.	These regulations are promulgated under the N.H. Wetlands Board which regulates dredging, filling, altering or polluting inland wetlands.	Excavation of contaminated sediments west of the landfill will be accomplished with minimal effects on the wetland. (a)
New Hampshire Hazardous Waste Rules, He-P 1905.	These regulations outline the criteria for the construction, operations, and maintenance of a new facility or increase in an existing facility for the storage, treatment, or disposal of hazardous waste.	The disposal of material on-site and the constuction and operation of the treatment facility will be performed in accordance with these regulations. (a)

a: State of New Hampshire ARARs are included in Appendix H.

Table

Chemical-Specific ARAR's and Criteria, Advisories, and Guidance
Coakley Landfill Site, North Hampton, New Hampshire

Medium/Authority	Requirement	Status	Requirement Synopsis	Consideration in the RI/FS
GROUNDWATER				
Federal Regulatory Requirements	SDWA - Maximum Contaminant Levels (MCL's) (40 CFR 141.11 - 141.16)	Relevant and appropriate	MCL's have been promulgated for a number of common organic and inorganic contaminants. These levels regulate the contaminants in public drinking water supplies but may also be considered relevant and appropriate for groundwater aquifers potentially used for drinking water.	When the risks to human health due to consumption of groundwater were assessed, concentrations of contaminants of concern were compared to their MCL's. MCL's were used to set cleanup levels for these contaminants (see Table 2-4).
State Regulatory Requirements	RSA 149:8, III/ Ws 410	Applicable[a]	New Hampshire Groundwater Quality Standards have been promulgated for a number of contaminants.	When the state standards were more stringent than Federal levels, the state standards were used.
Federal Criteria, Advisories, and Guidance	U.S. EPA Risk Reference Doses (RfD's)	To be considered	RfD's are dose levels developed based on the noncarcinogenic effects.	U.S. EPA RfD's were used to characterize risks due to exposure to contaminants in groundwater.
	Federal Ambient Water Quality Criteria (AWQC) - Adjusted for Drinking Water	Relevant and appropriate	Federal AWQC are health-based criteria that have been developed for 95 carcinogenic and noncarcinogenic compounds.	AWQC were used to characterize health risks due to contaminant concentrations in drinking water.
	U.S. EPA Carcinogen Assessment Group Potency Factors	To be considered	Potency factors are developed by the EPA from Health Effects Assessments or evaluation by the Carcinogenic Assessment Group.	U.S. EPA Carcinogenic Potency Factors were used to compute the individual incremental cancer risk resulting from exposure to site contaminants.
	SDWA - Maximum Contaminant Level Goals (MCLG's)	To be considered	Similar to MCL's; unenforceable goals based on the health risk.	MCLG's may be used as cleanup goals if deemed more appropriate than MCL's by U.S. EPA.

Table 14
(continued)

Medium/Authority	Requirement	Status	Requirement Synopsis	Consideration in the RI/FS
SURFACE WATER				
State Regulatory Requirements	Ws 430/RSA: 149:8. I; Water Quality Classifications	Applicable	New Hampshire Surface Water Quality Standards are given for toxics, dissolved oxygen, temperature increase, pH, and total coliform. Federal AWQC were adopted by NH in WS 430.	NH requirements for dissolved oxygen, temperature increase, pH, and total coliform will be attained if state standards are more stringent (see Table 2-5).
	Ws 400, Surface Water Quality Standards	Applicable	Protects surface water from degradation and protects aquatic life.	Remedial action to eliminate discharge that may cause degradation or endangerment of aquatic life.
Federal Criteria, Advisories, and Guidance	Federal Ambient Water Quality Criteria (AWQC)	Relevant and appropriate	Federal AWQC are health-based criteria that have been developed for 95 carcinogenic and noncarcinogenic compounds.	AWQC were considered in characterizing human health risks and toxic effects on aquatic organisms due to concentrations in surface water. Because this water is not used as a drinking water source, the criteria for aquatic organism protection and ingestion of contaminate aquatic organisms were considered (see Table 2-4).
CONTAMINATED SOILS AND SOLID WASTE				
Federal Criteria, Advisories, and Guidance	U.S. EPA Risk Reference Doses (RfDs)	To be considered	RfD's are dose levels developed based on the noncarcinogenic effects.	U.S. EPA RfD's were used to characterize risks due to exposure to contaminants in groundwater.
	U.S. EPA Carcinogenic Assessment Group Potency Factors	To be considered	Potency factors are developed by the U.S. EPA from Health Effects Assessments or evaluation by the Carcinogenic Assessment Group.	U.S. EPA Carcinogenic Potency Factors were used to compute the individual incremental cancer risk resulting from exposure to site contaminants.
	U.S. EPA Off-site Policy	To be considered	Specifies appropriate method of off-site treatment on disposal of waste from a Superfund site.	Off-site disposal costs were calculated based on compliance with the present off-site policy.

T. 14
(continued)

Medium/Authority	Requirement	Status	Requirement Synopsis	Consideration in the RI/FS
AIR				
Federal Regulatory Requirements	CAA - National Ambient Air Quality Standards (NAAQS) - 40 CFR 52	Relevant and appropriate	These standards were primarily developed to regulate stack and automobile emissions.	Standards for particulate matter will be used when assessing excavation and emission controls for soil treatments.
State Regulatory Requirements	RSA 125-C/AIR 100, NH DES - Air Pollution Regulations (Air)	Applicable	Establishes standards for release of VOC's and hazardous pollutants.	Applicable for alternatives involving excavation and emission controls for incineration, soil treatment, and groundwater treatment.
Federal Criteria, Advisories, and Guidance	Threshold Limit Values (TLVs)	To be considered	These standards were issued as consensus standards for controlling air quality in work place environments.	TLV's could be used for assessing site inhalation risks for soil removal operations.

[a]A more detailed description of this regulation and its requirements can be found in Appendix H.

Table 15

Location-Specific ARAR's and Criteria, Advisories, and Guidance
Coakley Landfill Site, North Hampton, New Hampshire

Medium/Authority	Requirement	Status	Requirement Synopsis	Consideration in the RI/FS
WETLAND/FLOOD PLAINS				
Federal Regulatory Requirements	Clean Water Act (CWA) - Section 404	Applicable	Under this requirement, no activity that adversely affects a wetland shall be permitted if a practicable alternative that has less effect is available.	During the identification, screening, and evaluation of alternatives, the effects on wetlands are evaluated.
	Fish and Wildlife Coordination Act (16 U.S.C. 661)	Applicable	This regulation requires that any Federal agency that proposes to modify a body of water must consult with the U.S. Fish and Wildlife Service. This requirement is addressed under CWA Section 404 requirements.	During the identification, screening, and evaluation of alternatives, the effects on wetlands are evaluated. If an alternative modifies a body of water, U.S. EPA must consult the U.S. Fish and Wildlife Service.
	RCRA Location Standards (40 CFR 264.18)	Applicable	This regulation outlines the requirements for constructing a RCRA facility on a 100-year flood plain.	A facility located on a 100-year flood plain must be designed, constructed, operated, and maintained to prevent washout or any hazardous waste by a 100-year flood, unless waste may be removed safely before flood water can reach the facility or no adverse effects on human health and the environment would result if washout occurred. Applicable alternatives involve removing, filling, dredging, or altering a NH-defined wetland.
	Wetlands Executive Order (EO 11990)	Applicable	Under this regulation, Federal agencies are required to minimize the destruction, loss, or degradation of wetlands and preserve and enhance natural and beneficial values of wetlands.	Remedial alternatives that involve construction must include all practicable means of minimizing harm to wetlands. Wetlands protection considerations must be incorporated into the planning and decision making about remedial alternatives.
	Flood Plains Executive Order (EO 11988)	Applicable	Federal agencies are required to reduce the risk of flood loss, to minimize impact of floods, and to restore and preserve the natural and beneficial value of flood plains.	The potential effects of any action must be evaluated to ensure that the planning and decision making reflect consideration of flood hazards and flood plain management, including restoration and preservation of natural underdeveloped flood plains.

Table 15
(continued)

Medium/Authority	Requirement	Status	Requirement Synopsis	Consideration in the RI/FS
	40 CFR 6.	Applicable	Promulgated the foregoing wetlands and flood plains executive orders.	Considered with the foregoing executive orders.
State Regulatory Requirements	New Hampshire Wetlands Board RSA 483-A and RSA 149-8A.	Applicable	These regulations are promulgated under the New Hampshire Wetlands Board, which regulate dredging, filling, altering, or polluting inland wetlands.	May be relevant and appropriate if alternatives involve removing, filling, dredging, or altering a NH-defined wetland.
	N.H. DES - Hazardous Waste Regulations, He-P 1905	Applicable	These regulations outline the criteria for the construction, operation, and maintenance of facilities for the storage, treatment, or disposal of hazardous waste.	Applicable for final disposal of hazardous wastes generated on-site.
	New Hampshire Solid Waste Management Rules, He-P Ch. 1901.	Applicable	This regulation outlines procedures for establishing a solid waste facility in the State of New Hampshire.	Nonhazardous waste may remain on-site after treatment, requiring solid waste facility management and closure.

Table 16

Potential Action-Specific ARAR's
Coakley Landfill Site, North Hampton, New Hampshire

ARAR's	Requirement Synopsis	Action to Be Taken to Attain ARAR's
RCRA - Standards for Owners and Operators of Permitted Hazardous Waste Facilities (40 CFR 264)	General facility requirements outline general waste analysis, security measures, inspections, and training requirements.	Any facilities will be constructed, fenced, posted, and operated in accordance with this requirement. All workers will be properly trained. These standards would apply to any treatment or disposal facility operated on-site.
RCRA - Groundwater Protection (40 CFR 264.30 - 264.31)	This regulation details requirements for a groundwater monitoring program to be installed at the site.	A groundwater monitoring program is a component of all alternatives. RCRA regulations will be considered during development of this program.
RCRA - Closure and Post-Closure (40 CFR 264.110 - 264.120)	This regulation details specific requirements for closure and post-closure of hazardous waste facilities.	Those parts of the regulation concerned with long-term monitoring and maintenance of the site will be considered during remedial design.
OSHA - General Industry Standards (29 CFR Part 1910)	This regulation specifies the 8-hour, time-weighted average concentration for various organic compounds.	Proper respiratory equipment will be worn if it is impossible to maintain the work atmosphere below the concentrations.
OSHA - Safety and Health Standards (29 CFR Part 1926)	This regulation specifies the type of safety equipment and procedures to be followed during site remediation.	All appropriate safety equipment will be on-site. In addition, safety procedures will be followed during on-site activities.
OSHA - Recordkeeping, Reporting, and Related Regulations	This regulation outlines the recordkeeping and reporting requirements for an employer under OSHA.	These requirements apply to all site contractors and subcontractors and must be followed during all site work.
RCRA - Land Disposal Restrictions (40 CFR 268)	This regulation outlines land disposal requirements and restrictions for hazardous wastes.	Soils that fail the TCLP extraction procedure will be treated to the Best Demonstrated Available Technology levels before being placed into a landfill or replaced onto the land.
CWA - 40 CFR Part 403	This regulation specifies pretreatment standards for discharges to a publicly owned treatment works (POTW).	If a leachate collection system is installed and the discharge is sent to a POTW, a permit would be obtained from the POTW prior to discharge.
CWA - Section 404	This regulation outlines requirements for discharges of dredged or fill material. Under this requirement, no activity that affects a wetland shall be permitted if a practicable alternative that has less impact on the wetland is available. If there is no other practicable alternative, impacts must be mitigated.	During the final selection of remedial alternatives, the effects on wetlands must be evaluated.

Tab. 16
(continued)

ARAR's	Requirement Synopsis	Action to Be Taken to Attain ARAR's
TSCA - PCB requirements (40 CFR 761)	This regulation outlines the requirements for disposal of materials containing PCB's.	Any alternative that includes treatment or disposal will have representative samples analyzed for PCB's. PCB treatment would be performed off-site.
CAA-NAAQS (40 CFR 52)	This regulation specifies maximum primary and secondary 24-hour concentrations for particulate matter.	Fugitive dust emissions from site excavation activities will be maintained below standards using dust suppressants, if necessary.
Fish and Wildlife Coordination Act 16 USC661 et seq.	This act requires that before undertaking any Federal action that causes impoundment, diversion, or other modification of any body of water the following agencies must be consulted: the appropriate state agency exercising jurisdiction over wildlife resources and the U.S. Fish and Wildlife Service.	Before discharging treated groundwater to surface water, the appropriate agencies will be consulted.
Protection of Archeological Resources (32 CFR Part 229,229.4; 43 CFR Parts 107, 171.1-171.5)	This regulation develops procedures for the protection of archeological resources.	If archaeological resources are encountered during soil excavation, work will stop until the area has been reviewed by Federal and state archaeologists.
DOT Rules for Transportation of Hazardous Materials (49 CFR Parts 107, 171.1-171.5)	This regulation outlines procedures for the packaging, labeling, manifesting, and transporting of hazardous materials.	Contaminated materials will be packaged, manifested, and transported to a licensed off-site disposal facility in compliance with these regulations.
N.H. DES New Hampshire Solid Regulations He-P 1901.	This regulation provides standards for solid waste disposal facilities.	Standards for solid waste disposal facilities will be followed.
N.H. DES - Air Pollution Regulations AIR 604-604, 1002	This regulation outlines the standards and requirements for air pollution control in the State of New Hampshire; all provisions, procedures, and definitions are described.	Particulate matter emissions from site activities must be maintained within acceptable limits.
New Hampshire Wetlands Board, RSA 483-A, and RSA 149-8a.	These regulations are promulgated under the NH Wetlands Board, which regulates dredging, filling, altering, or polluting inland wetlands.	If applicable alternatives involve removing, filling, dredging, or altering a New Hampshire-defined wetland.
New Hampshire Hazardous Waste RSA MIA/He-P 1905.	These regulations outline the criteria for the construction, operation, and maintenance of a new facility or increase in an existing facility for the storage, treatment, or disposal of hazardous waste.[a]	These regulations supplement RCRA hazardous waste regulations and, therefore, must also be considered at the Coakley Landfill Site.

[a]A more detailed description of this regulation and its requirements can be found in Appendix H.

Table 16
(continued)

ARAR's	Requirement Synopsis	Action to Be Taken to Attain ARAR's
Groundwater Protection Limits		
RSA 149:8, III; N.H. Admin Code Ws Ch. 410	These provisions establish criteria for groundwater protection.	Remedial alternatives involving discharges to groundwater must comply with these standards.
Surface Water Protection Standards		
RSA Ch. 149, N.H. Admin Code Ws Ch. 430	These provisions establish criteria for surface water protection.	Remedial alternatives involving the discharge to surface water of contaminants, treated effluents or treated groundwater must comply with these standards.
RSA 149:4-a; N.H. Admin Code Ws Ch. 900, part 904, Pre-treatment Standards for Publicly Owned Treatment Works (POTW)	These provisions establish standards for discharges to publicly owned sewage treatment facilities.	Remedial alternatives involving discharges of treated groundwater or other effluent to any POTW must comply with these standards.
N.H. Safe Drinking Water Act		
RSA Ch. 148-B; N.H. Admin Code Ws Part 300	These provisions establish state drinking water standards and govern the location and operation of public water systems.	Remedial alternatives involving the establishment of alternative public drinking water supplies must comply with these standards.

TABLE 17

I. CONTAMINANT A LOCATION-SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, COAKLEY LANDFILL SITE, NORTH HAMPTON, NEW HAMPSHIRE[1]

	Applicable[2]	Relevant & Appropriate[2]
A. GROUNDWATER:		
1. RSA 149:8,III; N.H. Admin. Ws Ch. 410 - Protection of Groundwater.	X	
a. Ws 410.05(a) Discharges to Groundwater.	X	
b. Ws 410.09 Groundwater Discharge Criteria, incorporating by reference Ws Part 302 (Maximum Contaminant Levels [MCL's] and Suggested No Adverse Response Levels [SNARLS])	X	

1 See Appendix A for synopsis of each requirement and discussion of action necessary to attain ARAR's.

2 The absence of any symbol in the columns designated "Applicable" or "Relevant and Appropriate" indicates that, in the circumstances present at this site, the requirement is not applicable or relevant and appropriate.

TABLE 17

I. CONTAMINANT AND LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE STATE REQUIREMENTS, COAKLEY LANDFILL SITE, NORTH HAMPTON, NEW HAMPSHIRE[1]

	Applicable	Relevant & Appropriate
c. Ws 410.10, Additional Groundwater Criteria.	X	
d. Ws 410.05(e) Groundwater Quality Criteria; Health-based groundwater protection standards.	X	
e. Ws 410.05(g) Groundwater Quality Criteria; Nondegradation of Surface Water.	X	

TABLE 17

I. CONTAMINANT AND L(ION-SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, COAKLEY LANDFILL SITE, NORTH HAMPTON, NEW HAMPSHIRE[1]

	Applicable	Relevant & Appropriate
B. SURFACE WATER		
1. RSA 149:8,I - Enforcement of Surface Water Classifications.	X	
2. Ws Ch. 400, Part 437 - Water Quality Standards - Fish Life	X	
3. Ws Ch. 400, Part 439 - Antidegradation Policy.	X	
C. WETLANDS IMPACT		
1. RSA 149:8-a, Dredging and Control of Run-Off; Ws Ch. 400 Part 415, Dredging Rules.	X	

TABLE 17

I. CONTAMINANT AND LOCATION-SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, COAKLEY LANDFILL SITE, NORTH HAMPTON, NEW HAMPSHIRE[1]

	Applicable	Relevant & Appropriate
2. Fill and Dredge in Wetlands, RSA Ch. 483-A and Wt. Ch. 300, Criteria and Conditions.	X	
D. AIR EMISSIONS		
1. RSA Ch. 125-C, Air Pollution Control; N.H. Admin. Code Air Ch. 100 Parts 604 through 606; Part 1002.	X	
E. HISTORIC PRESERVATION		
1. New Hampshire Historic Preservation Act, RSA 227-C.		
2. Local Historic Districts, RSA 31:89-a-31:89-k.		

TABLE 17

I. CONTAMINANT AND LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE STATE REQUIREMENTS, COAKLEY LANDFILL SITE, NORTH HAMPTON, NEW HAMPSHIRE[1]

	Applicable	Relevant & Appropriate
E. HAZARDOUS WASTE REQUIREMENTS		
N.H. Hazardous Waste Management Act, RSA Ch. 147-A; Hazardous Waste Management Rules, N.H. Admin. Rules He-P Ch. 1905.	X	
G. SOLID WASTE REQUIREMENTS		
N.H. Solid Waste Management Act, RSA Ch. 149-M; Solid Waste Management Rules, N.H. Admin. Rules He-P Ch. 1901.	X	

TABLE 18

II. ACTION-SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, COAKLEY LANDFILL SITE, NORTH HAMPTON, NEW HAMPSHIRE[1]

Requirement	No Action SC-1	Capping SC-3	Capping/On-Site Treatment & Disposal SC-4	Capping/On-Site Treatment Off-Site TSD SC-5	On-Site/Treatment & Disposal (SW & Grwater)/Capping SC-6	No Action MM-1	Groundwater Treatment/ Disposal MM-2	Alternate Water Supply MM-3
A. HAZARDOUS WASTE REQUIREMENTS								
1. RSA Ch. 147-A, New Hampshire Hazardous Waste Management Act; N.H. Admin. Code He-P Ch. 1905.	X	X	X	X	X	X	X	X
a. Hazardous Waste Facility Security requirements, He-P 1905.08(d), incorporating by reference 40 C.F.R. §264.14.	X	X	X	X	X	X	X	X
b. General Inspection Requirements, He-P 1905.08(d)(4)(c)	X	X	X	X	X	X	X	X

KEY: X - Applicable
O - Relevant and Appropriate

The absence of any symbol in the column below a designated alternative indicates that the requirement is not applicable, or relevant and appropriate, with regard to the alternative.

TABLE 18

II. ACTI SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, COAKLEY LANDFILL SITE, NORTH HAMPTON, NEW HAMPSHIRE[1]

Requirement	No Action SC-1	Capping SC-3	Capping/On-Site Treatment & Disposal SC-4	Capping/On-Site Treatment Off-Site TSD SC-5	On-Site/Treatment & Disposal (SW & Grwater)/Capping SC-6	No Action MM-1	Groundwater Treatment/ Disposal MM-2	Alternate Water Supply MM-3
incorporating by reference 40 C.F.R. §264.15.								
c. Personnel Training, He-P 1905.08(a)(4)(e) incorporating by reference 40 C.F.R. §264.16.	X	X	X	X	X	X	X	X
d. Location standards, He-P 1905.08(d)(4)(g) incorporating by reference 40 C.F.R. §264.18 and He-P 1905.08(2)j.	X	X	X	X	X	X	X	X
e. Preparedness and Prevention Requirements, He-P 1905.08 (d)(4)(h) incorporating by reference 40 C.F.R. §264, Subpart C.	X	X	X	X	X	X	X	X

TABLE 18

II. ACTION-SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, COAKLEY LANDFILL SITE, NORTH HAMPTON, NEW HAMPSHIRE[1]

Requirement	No Action SC-1	Capping SC-3	Capping/On-Site Treatment & Disposal SC-4	Capping/On-Site Treatment Off-Site TSD SC-5	On-Site/Treatment & Disposal (SW & Grwater)/Capping SC-6	No Action MM-1	Groundwater Treatment/ Disposal MM-2	Alterna Water Supply MM-3
f. Contingency Plan, He-P 1905.08(d)(4)(i)incorporating by reference 40 C.F.R. 264, Subpart D.	X	X	X	X	X	X	X	X
g. Groundwater Protection, He-P 1905.08 (d)(4)(j), incorporating by reference 40 C.F.R. 264, Subpart F.	X	X	X	X	X	X	X	X
h. Closure and Post-Closure, He-P 1905.08(d)(4)(k)incorporating by reference 40 C.F.R. §264, Subpart G.	X	X	X	X	X	X	X	X
i. Transfer of facility, He-P 1905.08(d)(5).	X	X	X	X	X	X	X	X

TABLE 18

II. ACTION-SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, COAKLEY LANDFILL SITE, NORTH HAMPTON, NEW HAMPSHIRE[1]

Requirement	No Action SC-1	Capping SC-3	Capping/On-Site Treatment & Disposal SC-4	Capping/On-Site Treatment Off-Site TSD SC-5	On-Site/Treatment & Disposal (SW & Grwater)/Capping SC-6	No Action MM-1	Groundwater Treatment/ Disposal MM-2	Alternat Water Supply MM-3
j. Monitoring, He-P 1905.08(d)(6);	X	X	X	X	X	X	X	X
k. Public Notification Plan, He-P 1905.08(d)(9).	O	O	O	O	O	O	O	O
l. General environmental standards, He-P 1905.08(d)(1).	X	X	X	X	X	X	X	X
m. General design standards, He-P 1905.08(d)(2).	X	X	X	X	X	X	X	X
n. Technical Standards for Landfills, He-P 1905.08(f)(1)(f) incorporating by reference 40 C.F.R. §264, Subpart N, and He-P 1905.08(f)(2)(d)	X	X	X	X	X	X		

TABLE 18

II. ACTION-SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, COAKLEY LANDFILL SITE, NORTH HAMPTON, NEW HAMPSHIRE[1]

Requirement	No Action SC-1	Capping SC-3	Capping/On-Site Treatment & Disposal SC-4	Capping/On-Site Treatment Off-Site TSD SC-5	On-Site/Treatment & Disposal (SW & Grwater)/Capping SC-6	No Action MM-1	Groundwater Treatment/ Disposal MM-2	Alternate Water Supply MM-3
o. Additional Technical Standards for Treatment He-P 1905.08(f)(2)(a).		X	X	X	X		X	
p. He-P 1905.08(f)(2)(c) Storage Standards.		X		X	X			
q. Technical Standards for Waste Piles, He-P 1905.08(f)(1)(d) incorporating by reference 40 C.F.R. 264 Subpart L.					X			
r. Technical Standards for Use and Management of Containers, He-P 1905.08(f)(1)(a) incorporating by reference 40 C.F.R. 264, Subpart I.		X	X	X	X			

TAB 18

II. ACTION-SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, COAKLEY LANDFILL SITE, NORTH HAMPTON, NEW HAMPSHIRE[1]

Requirement	No Action SC-1	Capping SC-3	Capping/On-Site Treatment & Disposal SC-4	Capping/On-Site Treatment Off-Site TSD SC-5	On-Site/Treatment & Disposal (SW & Grwater)/Capping SC-6	No Action MM-1	Groundwater Treatment/ Disposal MM-2	Alternate Water Supply MM-3
s. Technical Standards for Tanks, He-P 1905.08(f)(1)(b) incorporating by reference 40 C.F.R. 264, Subpart J.		X	X	X	X			
t. Standards for Generators, He-P 1905.06.		X	X	X	X		X	
u. Manifesting Requirements He-P 1905.04.		X	X	X	X		X	
v. Packaging and Labelling Requirements, He-P 1905.05, incorporating by reference N.H. Admin. Code Saf-C-600 and 40 C.F.R. §§ 172, 173, 178, and 179.		X	X	X	X		X	

TABLE 18

II. ACTION-SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, COAKLEY LANDFILL SITE, NORTH HAMPTON, NEW HAMPSHIRE[1]

Requirement	No Action SC-1	Capping SC-3	Capping/On-Site Treatment & Disposal SC-4	Capping/On-Site Treatment Off-Site TSD SC-5	On-Site/Treatment & Disposal (SW & Grwater)/Capping SC-6	No Action MM-1	Groundwater Treatment/ Disposal MM-2	Alternate Water Supply MM-3
B. SOLID WASTE REQUIREMENTS								
1. RSA Ch. 149-M, New Hampshire Solid Waste Management Act; N.H. Admin. Code He-P Ch. 1901.	X	X	X	X	X	X	X	X
C. ACTION-SPECIFIC AIR EMISSION LIMITS								
1. N.H. Admin. Code Air Parts 604 through 606.	X	X	X	X	X	X	X	X
2. Fugitive Dust Emission Control, N.H. Admin. Code Air Part 1002.		X	X	X	X		X	
D. ACTION-SPECIFIC GROUNDWATER PROTECTION STANDARDS								

TABLE 18

II. ACTION-SPEC.
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, COAKLEY LANDFILL SITE, NORTH HAMPTON, NEW HAMPSHIRE[1]

Requirement	No Action SC-1	Capping SC-3	Capping/On-Site Treatment & Disposal SC-4	Capping/On-Site Treatment Off-Site TSD SC-5	On-Site/Treatment & Disposal (SW & Grwater)/Capping SC-6	No Action MM-1	Groundwater Treatment/ Disposal MM-2	Alternate Water Supply MM-3
1. RSA 149:8,III; N.H. Admin Code Ws Ch. 410.	X	X	X	X	X	X	X	X
E. ACTION-SPECIFIC								
SURFACE WATER PROTECTION STANDARDS								
1. RSA Ch. 149; N.H. Admin Code WS Ch. 430.	X	X	X	X	X	X	X	X
2. RSA 149:4-a; N.H. Admin. Code Ws Ch. 900, Part 904, Pretreatment		X		X			X	

TABLE 18

II. ACTION-SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, COAKLEY LANDFILL SITE, NORTH HAMPTON, NEW HAMPSHIRE[1]

Requirement	No Action SC-1	Capping SC-3	Capping/On-Site Treatment & Disposal SC-4	Capping/On-Site Treatment Off-Site TSD SC-5	On-Site/Treatment & Disposal (SW & Grwater)/Capping SC-6	No Action MM-1	Groundwater Treatment/ Disposal MM-2	Alternate Water Supply MM-3
Standards for publicly owned treatment works (POTW).								
F. STANDARDS FOR PUBLIC WATER SYSTEMS								
1. N.H. Safe Drinking Water Act, RSA 148-B								X

APPENDIX C

RESPONSIVENESS SUMMARY

COAKLEY LANDFILL

RESPONSIVENESS SUMMARY

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COAKLEY LANDFILL RESPONSIVENESS SUMMARY

Preface

The U.S. Environmental Protection Agency (EPA) held a 60 day public comment period from March 16, 1990 to May 14, 1990 to provide an opportunity for interested parties to comment on the Remedial Investigation (RI), Health Assessment, Feasibility Study (FS) and the Proposed Plan prepared for the Coakley Landfill Superfund Site (the Site) in North Hampton, New Hampshire. EPA made a preliminary recommendation of its preferred alternative for site remediation in the Proposed Plan issued on March 2, 1990, before the start of the public comment period.

The purpose of this Responsiveness Summary is to document EPA's responses to comments and questions raised during the public comment period. EPA considered all of the comments summarized in this document before selecting a final remedial alternative to address contamination at the Site.

This Responsiveness Summary is organized into the following sections:

I. Overview of Remedial Alternatives Considered in the Feasibility Study and Proposed Plan - This section briefly outlines the remedial alternatives evaluated in the FS and Proposed Plan, including EPA's preliminary recommendation of a preferred alternative.

II. Site History and Background on Community Involvement and Concerns - This section provides a brief Site history, and a general overview of community interests and concerns regarding the Site.

III. Summary of Comments Received During the Public Comment Period and EPA Responses to These Comments - This section summarizes and provides EPA's responses to the comments received from residents and other interested parties during the public comment period. Additionally, comments received from the Potentially Responsible Parties (PRPs) are summarized and EPA's responses to the comments are provided.

IV. Remaining Concerns - This section summarizes comments raised during the public comment period that cannot be fully addressed at this stage of the Superfund process but which continue to be of concern during the design

and implementation of EPA's selected remedy for the Site. EPA responds to these comments and will address these concerns during the Remedial Design and Remedial Action (RD/RA) phase of the cleanup process.

Attachment A - List of community relations activities that EPA has conducted to date at the Site.

Attachment B - Potentially Responsible Parties' comments.

Attachment C - Transcript of the April 3, 1990 informal public hearing on the Site, held in North Hampton, New Hampshire.

I. OVERVIEW OF REMEDIAL ALTERNATIVES CONSIDERED IN THE FEASIBILITY STUDY AND PROPOSED PLAN

Using information gathered during the Remedial Investigation (RI) (an investigation of the nature and extent of both onsite and offsite contamination) and the Risk Assessment (an assessment of the potential risks to human health and the environment associated with Site contamination), EPA identified several cleanup objectives for the Site.

The primary cleanup objective is to reduce the risks to public health and the environment posed by exposure to the source of contamination onsite or to contamination that may potentially migrate, offsite. Cleanup goals for groundwater and soils are set at levels that EPA considers to be protective of public health and the environment.

After identifying the cleanup objectives, EPA developed and evaluated potential cleanup alternatives, called remedial alternatives. The Feasibility Study (FS) describes the remedial alternatives considered to address contamination from soil waste, onsite groundwater and sediment contamination and offsite migration. The FS also describes the criteria EPA used to narrow the range of alternatives to five potential source control (SC) remedial alternatives. The three potential management of migration (MM) remedial alternatives reviewed in the FS are not addressed by this Record of Decision. However, an additional study and a second Record of Decision will follow in order to properly define the extent of contamination and, subsequently, to remediate the migrated contamination related to the Coakley Landfill.

EPA's preliminary recommendation of a preferred alternative to address the Site contamination involves consolidation of the solid waste and sediments in the wetlands followed by capping of the landfill, collection and treatment of landfill gases and the extraction and treatment of onsite groundwater.

REMEDIAL ALTERNATIVES EVALUATED IN THE FS

The five remedial alternatives considered for source control by EPA are listed below. The February 1990 Proposed Plan should be consulted for a detailed explanation of these remedial alternatives as well as EPA's preferred alternative.

ALTERNATIVES TO ADDRESS SOURCE CONTROL

Alternative SC-1:	No Action
Alternative SC-3:	Consolidation and Capping
Alternative SC-4:	Capping/Onsite Groundwater Treatment/Onsite Disposal (EPA has recommended this as the preferred alternative.)
Alternative SC-5:	Capping/Onsite Groundwater Pretreatment/Offsite Groundwater Treatment and Disposal
Alternative SC-6:	Onsite Solid Waste/Groundwater Treatment and Disposal/Capping

II. SITE HISTORY AND BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

The Coakley Landfill Superfund Site is situated on approximately 92 acres of land within the Towns of Greenland and North Hampton, New Hampshire. It is located west of Lafayette Road (U.S. Route 1) and bordered on the north by Breakfast Hill Road. The landfill itself covers approximately 27 acres and is situated within the southernmost portion of the Site.

In 1971, the New Hampshire Department of Public Health granted the Town of North Hampton a permit to operate a landfill on the Coakley Site. The Coakley Landfill accepted municipal and industrial waste from the Portsmouth area from early 1972 through 1983 and incinerator residue generated by an incinerator located at Pease Air Force Base from 1982 through 1985. The landfill stopped accepting material in July 1985. A temporary cap was eventually placed on the landfill.

In early 1983 the New Hampshire Department of Environmental Services (DES) (formerly the Water Supply and Pollution Control Commission, or WSPCC) received a complaint from a resident of Lafayette Terrace, near the southeastern corner of the Coakley Landfill, concerning drinking water quality in a residential well.

DES analysis determined that the well was contaminated with volatile organic compounds (VOCs).

Subsequent sampling of residential wells by DES detected additional areas of VOC contamination to the south, northeast, and southeast, of the Coakley Landfill site. As a result of these findings, water supply distribution lines were extended into the area in March 1983.

In December 1983 the site was placed on EPA's National Priorities List (NPL) making it eligible to receive Federal Superfund money for investigation and cleanup. The RI was conducted at the Site from April 1986 to May 1987.

In general, results of the RI indicated that VOCs and metals were observed to be the predominant contaminants within the landfill and in the overburden and bedrock wells under and immediately adjacent to the landfill.

Using data collected during the RI, EPA developed a FS that included the initial screening of the source control (SC) remedial alternatives and the management of migration (MM) remedial alternatives.

Foremost concerns of Town residents focus on the potential health risks to residents living near the Site, the delay in action toward site cleanup, the cost and responsibility for cleaning up the Site, and the proposed cleanup method. Residents believe that contamination from the Site caused and may cause serious health problems in the area and feel that the health assessment completed in October 1988 by Agency for Toxic Substances and Disease Registry (ATSDR) is insufficient. Residents are also concerned that continued delays in Site cleanup may result in further migration of contamination from the Site, causing an increase in potential health risks. Another concern of area residents is cost and responsibility for Site cleanup. Residents feel that the State and EPA are spending too much time and money to determine cost and responsibility rather than taking action to clean up the Site. Finally, many residents have expressed concern that EPA's proposed remedial alternative will not address site cleanup effectively.

The Coakley Landfill Steering Committee (Committee) raised concerns about migration and commingling of contamination, the cost of the remedial action, and overestimation of the risk assessment. In particular, the Committee feels that the selected remedy will draw in contamination from sources other than the Coakley Landfill. The Committee also feels that the selected remedy is too costly in that it incorporates groundwater treatment without justification. The Committee claims that the risk assessment is exaggerated because of overestimates of exposure to contaminant levels found at the Site.

A complete list of community relations activities conducted at the Site is included in Attachment A at the end of this document.

III. SUMMARY OF COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA RESPONSES TO THESE COMMENTS

This Responsiveness Summary summarizes the comments received during the public comment period held from March 16, 1990 to May 14, 1990. Ten sets of written comments were received: five from individual residents (including a petition with 14 signatures presented by a local youth), three from representatives of citizens' groups (including a petition with approximately 568 signatures from the citizens' group, C.O.A.S.T), one from a public drinking water supplier, and one from the Coakley Landfill Steering Committee (PRP comments). Five sets of the written comments received by EPA, were also presented orally at the informal public hearing held on April 3, 1990. In addition, four other people made comments orally at the informal public hearing. All of these comments are summarized below. The PRP comments are included as Attachment B. A copy of the transcript from the informal public hearing is included as Attachment C of this document and is available in the Administrative Record located at the Site information repositories at the North Hampton Public Library North Hampton, New Hampshire and at the EPA Records Center, 90 Canal Street, Boston, Massachusetts.

A. Summary of Resident and Citizen Group Comments

Comments from residents and concerned citizens' groups are summarized below. The comments are organized into the following categories:

1. Comments Regarding EPA and State Response to Site Cleanup
2. Comments Regarding Site Testing Procedures
3. Comments Regarding Remedial Alternatives
4. Comments Regarding Health Risks
5. Comments Regarding PRPs

1. Comments Regarding EPA and State Response to Site Cleanup

Comment a: Several commentors stated that EPA and the State of New Hampshire are not addressing site cleanup in a timely manner and requested that cleanup begin immediately to avoid possible spread of contamination to the municipal water supply or eventually to the seacoast.

EPA Response: EPA recognizes public frustration with the lengthy Superfund process; however, EPA and the State are required to conduct the investigation of the Coakley Landfill in accordance with the Superfund Law (CERCLA) and with the regulations and guidance documents promulgated under that law. The investigation and cleanup process is complex and lengthy. This ensures thoroughness in addressing site contamination. EPA evaluates all Superfund sites during various investigatory stages to ensure that no releases occur which could exacerbate any potential public health or environmental problems. Should such a release occur, or if one is likely to occur, EPA can take immediate action under its Emergency Removal Program.

The immediate threat to the local public health is from consumption of groundwater from private wells in the area of the Coakley Landfill. This threat was eliminated when the Town of North Hampton extended public drinking water lines to affected residents of Lafayette Terrace in March 1983 and to Birch and North Roads in 1986. The Rye Water District completed a water main in 1983 along Washington and Dow Lanes. Households choosing not to hook up to public waters and which were located within a potential impact area were monitored during the RI/FS process. They continue to be sampled to date.

In 1988 concerns were raised regarding incinerator ash exposed by wind and rain erosion at the surface of the landfill. Following testing by the EPA and a health risk analysis of the site by the Agency for Toxic Substances and Disease Registry (ATSDR), the site's temporary cover was repaired under an Administrative Order issued by the NH DES.

Comment b: One commentor expressed concern that the State might be withholding information about site contamination, has not been responsive to citizens' requests for information about the site, and has generally ignored the needs and demands of local residents.

EPA Response: This comment is directed at the State, not EPA. However, EPA is not aware that NH DES is withholding any information regarding the extent of contamination at the Coakley Landfill Site.

NH DES Response: All information generated by NH DES with respect to the Site, including domestic well water quality analysis, health risk assessments, inspection reports, and investigation reports done by state or federal agencies are available to the public, either at the Concord offices of the NH DES or at the Site information repository in the North Hampton Library. Request for file reviews at the Concord

office can be made through the Waste Management Division at 271-2919. Some documents are not available to the public due to their enforcement sensitive nature or as specified by state law.

Comment c: One commentor requested that the qualifications and past experience of the project managers be placed in the public record as proof of qualifications for the position.

EPA Response: EPA does not consider it appropriate or necessary to release personal information regarding its employees including qualifications of Superfund site managers. Region I has established a management process for evaluating major decisions by review teams on all Superfund sites. These review teams consist of employees with a range of expertise to ensure appropriateness and conformity with the Superfund Law and its regulations.

Comment d: One commentor stated that more than the Superfund Law and regulations should be used to resolve the problems at the site. He wanted EPA to report on other regulations, procedures, state and local agencies, and other organizations that could be used to analyze and implement remedies for site cleanup.

EPA Response: The Superfund Law requires EPA to comply with all federal and state laws which are applicable or appropriate and relevant to the Site cleanup. Included in Tables 2-1, 2-2 and 2-3, pages 2-2 to 2-9 of the Feasibility Study are extensive lists of all the various laws, regulations and guidances which have been identified and included in the decision-making process for the Coakley Landfill.

In addition to identifying these state laws, NH Department of Environmental Services has been an integral part in developing technical information at the Site and in choosing the preferred alternative. An environmental engineering firm, Roy F. Weston, Inc., performed the RI/FS under a state contract.
Local agencies, other organizations and interested parties were given the opportunity to comment during designated comment periods as prescribed by the Superfund Law. Finally, the EPA held a Public Comment Period lasting 60-days from March 16 to May 14, 1990 to accept comments on EPA's preferred alternative as outlined in the Proposed Plan and the RI/FS.

Comment e: A commentor asked if the transcript from this meeting, the chemical analysis results from samples taken at the landfill, and other EPA findings would become public information.

EPA Response: Information concerning the Site has been available since the Administrative Record was issued in May, 1988. The transcript of the April 3, 1990 Informal Public Hearing is attached to this document in Attachment C. Validated results of chemical analyses performed at the site for the RI/FS are in the Administrative Record. Results of additional sampling performed on local residential wells can be obtained by contacting the NH DES in Concord, New Hampshire. The Administrative Record is located at the North Hampton Library, North Hampton, New Hampshire and at the EPA Records Center in Boston, Massachusetts.

2. Comments Regarding Site Testing Procedures

Comment a: Two commentors questioned whether the State and EPA documented well testing on a regular basis from 1983 to the present. The commentors stated that wells RW-25, 26, 27, and 28 were tested in February and March of 1983, and that these were the only tests ever actually done.

EPA Response: The dates for the various sampling events at the Site during the RI, the resulting data and additional sampling are in the RI. This information is included in the Administrative Record.

NH DES Response: Residential wells identified in the Remedial Investigation as RW-25, 26, 27 and 28 were all wells on Lafayette Terrace. RW-25, 26 and 28 were sampled twice in 1983, RW-27 was sampled three times in 1983. A fourth sampling of RW-27 reported in Table 37 in the RI and shown on Figure No. 20, listing another analysis in 1987, is not substantiated by records in the project files. Although there was a sampling round taken July 28 and 29, 1987 neither the chain of custody form nor the lab reports mention a well sampled at Lafayette Terrace.

Comment b: One commentor questioned the accuracy of contamination levels reported based on testing done while the ground was frozen. The commentor also asked what possible health risks may exist from having drunk contaminated well water over an extended period of time.

EPA Response: Seasonal weather conditions do not adversely effect the quality and accuracy of groundwater data collection. Fluctuations in air and near surface soil temperatures have minimal effect on groundwater quality.

The health risk from drinking the contaminated groundwater over an extended period of time has actually been calculated in the risk assessment portion of the RI. Risk estimates were based on conservative assumptions. Specifically, the health risks for consumption of groundwater were based on an adult consuming two liters of water per day for seventy years. Since the Coakley Landfill started operation in 1972 and local residents were supplied municipal drinking water by March 1983, any possible exposures from drinking contaminated groundwater during this period are expected to pose risks less than those quantified in the risk assessment. The ATSDR stated there is no test available to evaluate past exposure.

Comment c: A commentor wanted to know specifically what was dumped into the North Hampton landfill by government installations.

EPA Response: Ash from an incinerator operated by the City of Portsmouth was disposed of at the Site. Trash and wastes from surrounding communities as well as from Pease A.F.B. were sent to this incinerator. EPA has reason to believe that Pease AFB and Portsmouth Naval Yard disposed of material at the Site. Specifically what was dumped at the Site is currently considered enforcement sensitive and cannot be released at this time.

Comment d: A commentor expressed concern about contamination found in a monitoring well abutting his property. He had planned to dig two new water supply wells on his property but is worried about possible contamination of these new wells. The commentor also expressed concern that he was unable to sell or rent his property due to its proximity to the Coakley Landfill site.

EPA Response: EPA believes contaminants in the wells located to the north/northeast of the Coakley Landfill property may come from other sources. Trihalomethanes, which were found in the commentor's drinking water well, were not found in the groundwater under and around the Coakley Landfill. Also, groundwater flow from the landfill tends to move in a westerly direction.

3. Comments Regarding Remedial Alternatives

Comment a: Several commentors asked if EPA has analyzed the risk of cap failure or damage and the procedures necessary to maintain protectiveness in such a situation.

EPA Response: EPA is aware that cap failure or damage may occur. However, proper cap installation and maintenance will extend the cap's life significantly. Specific details of operation and maintenance will be directly addressed in Remedial Design when an "Operation and Maintenance Plan" is developed for the cap. The operation and maintenance costs developed for all "capping" alternatives include costs for maintenance, erosion control and fence repair. Maintenance includes inspection and replacement, as necessary, of cap components, and repair of damage to the cap as it occurs.

Comment b: Several commentors requested that all residents within a half-mile of the site be evacuated if soil excavation takes place at the site.

EPA Response: The remedy includes the excavation and consolidation of 2000 cubic yards of sediments from the wetlands on the west side of the landfill and 30,000 cubic yards of material from the edges of the landfill. While there is a potential for releases to the atmosphere during this work, the remedy will be designed to best control such releases and to ensure public health is not adversely affected. Additionally, state and federal laws concerning air emissions have been identified for the Site and will be attained during the remedial action. Evacuation during this work will be considered; however, EPA believes it will not be necessary in light of the engineering controls identified in the FS.

Comment c: One commentor disapproved of EPA's plan to move soil from around the site to the area where it will be capped without first cleaning the soil.

EPA Response: EPA does not believe treating the 30,000 cubic yards of excavated soils prior to consolidation on the landfill proper would significantly improve the remedy since the landfill area represents a much larger volume of contaminated material. Additionally, prior testing has revealed that the sediment to be excavated from the wetlands and from the edges of the landfill has only low levels of contamination.

Comment d: Two commentors requested the removal and proper disposal of the "nuclear black silt" and oil spill debris areas. One commentor stated that the oil spill debris, the disposal of which had originally been authorized by the State, was to have been removed by the State within three weeks of its disposal.

EPA Response: There is currently no evidence of a black silt with a nuclear, radioactive makeup exists in or on the site. Several radioactive surveys done on the site during the Remedial Investigation found only background (normal) radioactivity. There have been unconfirmed reports of "black beauty," a sand blasting material, from the Portsmouth Naval Yard ship painting activities being disposed of at the site. However, no evidence of its existence or of radioactivity was found during test pit testing.

As stated in the Proposed Plan, EPA, under the Superfund Law, cannot take any action with regard to the oily "debris" since the law specifically excludes petroleum products from the definition of hazardous substances. Remediation of this area has been referred to the NH DES and their oil spills program.

Comment e: Several commentors stated that "Pump and Treat" technology to clean contaminated groundwater does not work for the following reasons: 1) using water samples does not effectively estimate the amount of contamination; 2) using average flow rate does not effectively estimate the rate of contaminant flow through the aquifer; 3) it is not possible to locate all significant contamination using the current site investigation technologies; 4) many contaminants do not mix with water; and 5) carbon filtering does not remove acetone and tetrahydrofurans. Other commentors questioned the feasibility of "Cap and Treat" to achieve cleanup goals.

EPA Response: In general there is no absolute guarantee that a groundwater extraction and treatment system will be completely effective at the Coakley Landfill Site or any other site where it may be recommended. This system was selected as part of the remedy after EPA assessed all available information which was gathered by widely accepted and proven methods. Based on this site-specific data, EPA believes the system will attain the cleanup goals set in the Record of Decision for this Site. Moreover, additional studies, including treatability and/or pilot studies, contaminant concentrations and aquifer response under pumping

conditions will be conducted during the Remedial Design/Remedial Action phase of the remedy to insure that all identified standards, requirements, criteria and limitations are met.

The commentor is correct that it cannot be stated with absolute certainty that all contaminants present within the landfill were detected during the RI. To eliminate all uncertainty regarding sources within the landfill, however, complete excavation and sampling would be required. One of the alternatives evaluated in the Feasibility Study (SC-6) included this activity, but this alternative was not found to be more protective than the preferred alternative in proportion to the cost of the two remedies. The information collected during the RI is believed to be representative of the overall contaminant profile of the landfill.

While it is true that most of the organic indicator compounds do not "mix" with water, all of the indicator compounds do dissolve to some extent in water. None of the compounds have been found at levels approaching their solubility limit, indicating they are present in the groundwater in dissolved form, not in their pure form. Indicator compounds that have been detected in the landfill but have not been detected in the groundwater would be expected to be released to the groundwater over time if no action is taken.

The commentor is also correct that activated carbon does not effectively remove acetone and tetrahydrofuran from groundwater. However, activated carbon has not been included in the Proposed Plan for the purpose of removing these compounds from groundwater, but rather as a treatment technology for contaminants in the off-gases from the air stripper. In addition, incineration was presented in the Feasibility Study for treatment of off-gases from the air stripper. Incineration would effectively destroy these contaminants if this is determined to be necessary.

The technologies selected for cleanup at the Coakley Landfill site have been used effectively at other similar sites to achieve cleanup levels. The remedy is expected to be effective based on best professional judgement at this time. Further information as to the adequacy of the technologies will be gathered during Remedial Design. If information is collected which suggests that the proposed alternative will not achieve cleanup levels, the design will be modified to include processes that will achieve those cleanup goals.

EPA assumes that "Cap and Treat" refers to the selected remedy of capping and groundwater extraction and treatment. In addition to the above discussion on the effectiveness of groundwater extraction and treatment, the Record of Decision

for the first operable unit of the Coakley Landfill Site discusses the effectiveness of the selected remedy.

Comment f: One commentor asked if EPA has analyzed the risk, damages, and cost of cleanup for "Pump and Treat" failure and requested to see a cost analysis before a ROD is signed.

EPA Response: Cost estimates for the various components of all the alternatives carried through the detailed analysis are included in the Feasibility Study. EPA is not required to conduct any additional cost analysis. Costs associated with a failure of the pump and treat system would depend upon the type of failure. It could range from replacement of the entire system, which is highly unlikely, to replacement of some of the system components. Operation and maintenance costs are included in the overall cost of the remedy to address failure. While it may be necessary to replace some of the components within the system during the planned ten year operation, EPA does not anticipate the need for a major or total replacement.

Additionally, groundwater monitoring will be conducted throughout the remedial action to evaluate the effectiveness of the treatment.

Comment g: Several commentors expressed concern about contamination affecting Little River and wetlands to the west of the site; particularly contaminant affects on habitats for wildlife, fish, and birds as well as on hunting and recreational areas. One commentor was concerned about possible contaminant migration north, northeast, and west of the site. Commentors requested that contaminant migration be addressed in the cleanup alternative.

EPA Response: There is some information that a plume of relatively low level contamination exists under these wetlands which partially discharges through some low permeability soils into the wetlands. The extent and characteristics of this plume must be better defined before a cleanup is undertaken, if warranted. Further studies, including an environmental assessment, will be conducted concerning migration of contaminants. A second Record of Decision will be issued if necessary. Currently, there is no evidence of significant impacts to the aquatic environment in these areas.

Comment h: Two commentors requested that alternative SC-6 be chosen as the preferred cleanup method because it is the most permanent alternative to address the source of contamination.

EPA Response: EPA's rationale for not selected alternative SC-6 is contained in the Record of Decision for the first operable unit of the Coakley Landfill Site.

While EPA does agree that SC-6 is a somewhat more effective remedy in terms of permanence and reduction of toxicity, mobility and volume through treatment, EPA does not believe the increased effectiveness is commensurate with the increased cost. We base this belief on the following observations:

- The residual risk to public health and the environment after capping and groundwater extraction and treatment is low as long as cap integrity is maintained.

- The cap will be consistent with RCRA closure requirements and will therefore be adequate to prevent contact with any contaminated material within the landfill. Offsite migration of contaminants will be mitigated by the groundwater portion of both cleanup alternatives. Under either alternative that the contaminated groundwater under the landfill will meet safe drinking water requirements at the compliance boundary.

- In addition, § 300.430(a)(1) of the NCP has established program goals for identifying and implementing appropriate remedial actions. These goals include:

  1) Treating principal threats, wherever practicable;

  2) Combining treatment and containment in appropriate remedies; and

  3) Considering containment for wastes that pose a relatively low long-term threat or where treatment is impracticable.

While compliance with these program expectations is not required and does not in itself constitute sufficient grounds for the selection of a remedy, they are presented as guidance for developing cleanup options.

Comment i: A landowner located north of the Coakley property, commented that testing has shown VOCs in his water supply, suggesting evidence of possible contaminant migration to the west, north and northeast. The commentor requested that municipal water supply lines be extended to residents of Breakfast Hill Road.

EPA Response: EPA believes contaminants in the wells located to the north of the Coakley Landfill property may come from other sources. Trihalomethanes, which were found in the commentor's drinking water well, were not found in the groundwater under and around the Coakley Landfill. Also, groundwater flow from the landfill tends to move in a westerly direction. The request to extend the water supplies must be addressed at a local level.

Comment j: One commentor noted that alternative SC-4 includes an extraction system of overburden and bedrock wells on the southern and eastern perimeters of the landfill. The commentor requested that the groundwater extraction system also be extended to the north and west perimeters.

EPA Response: The conceptual design of the groundwater extraction system includes recovery wells on the east and south perimeters of the landfill because these locations were the most practical extraction points for developing a groundwater capture zone to control the source of contamination. This system does not attempt to collect contaminated groundwater that has migrated away from the source or which may be coming from other sources. The exact location of the extraction system will be finalized during the Remedial Design phase. This final design may include extraction wells at the north and west perimeters.

Comment k: Several commentors questioned the level of effectiveness of the preferred cleanup method, and, more specifically, how EPA's preferred alternative SC-4 protects bedrock wells in the area.

EPA Response: Alternative SC-4 was selected for the effectiveness of the technologies in addressing site conditions and contaminants based on their use at other similar sites. Actual information as to their effectiveness at the Coakley Landfill Site will be collected during Remedial Design treatability studies and operation of the facility.

This remedy was also selected to minimize the risks associated with the source of contamination (the landfill) and to prevent further offsite migration of contaminants from the source. While SC-4 will not clean up offsite wells, it will minimize any further contamination of these wells which is attributable to the Coakley Landfill, and will decrease the amount of time required for the natural reduction of contamination levels.

Comment l: A commentor asked if a fence could be constructed around the landfill in North Hampton.

EPA Response: The preferred alternative includes a fence around the perimeter of the landfill.

Comment m: Several commentors requested that the land at the site be returned to a safe and usable environment, as determined and agreed upon by local citizens and their chosen advisors.

EPA Response: The selected remedy is, in EPA's opinion, the best remedy when judged against all applicable statutory and regulatory criteria (see ROD, Section X). The remedy required to meet the goals suggested by this comment appears to be significantly more costly than alternative SC-6 which provides for excavation and treatment of all the wastes and redeposition on the site under a cap at an estimated cost of approximately $52,000,000, yet the overall protectiveness in proportion to the cost is not better than SC-4. Returning the Site to a safe and usable environment would involve offsite disposal of the waste and groundwater treatment and extraction at a substantial cost. In addition, such measure would not absolutely guaranty the site would be safe and usable for all purposes. In fact, § 300.430(f) of the NCP states that a remedy is cost-effective if its "costs are proportional to its overall effectiveness."

The Superfund Law gives EPA the responsibility to make cleanup decisions with appropriate input from the community as specified in the NCP.

EPA sponsors a program called Superfund Technical Assistance Grants (TAG). A TAG award to a group affected by the Coakley Landfill would provide the group with funds to hire a technical advisor to assist them in interpreting and commenting on site findings and further proposed actions. A fact sheet on the TAG program is attached which contains general information and contacts for further information.

Comment n: The Hampton Water Works Company (HWWCo) commented that it is currently developing a production well field for an additional water supply in the area of North Road and Birch Road, southwest of the Coakley Landfill site, in North Hampton. HWWCo stated that the Coakley Remedial Investigation Report indicated that the area of this well site is not likely to be contaminated in the near future. HWWCo expressed concerned that the remedial action chosen for cleanup may contaminate this new potential water supply source in the future. HWWCo stated that it is continuing

extensive groundwater testing and modeling in the area as a result of the new well's relative proximity to the landfill and expects that EPA, through its monitoring program, will alert HWWCo of any contaminant migration toward HWWCo's production well.

EPA Response: EPA will continue to monitor the groundwater in and around the Coakley Landfill during implementation of the remedy and for a period of time thereafter. EPA does not anticipate nor envision that the remedial action will result in any contamination to the well site because the remedial action selected is designed to control migration of offsite contaminants from the source area. The future studies of the contamination under the wetlands west of the site called for in the Proposed Plan will also address HWWCo.'s concerns. EPA will keep HWWCo advised of any monitoring results that could have a bearing on this matter. EPA also suggests that HWWCo obtain the results of tests that the NH DES has periodically performed on residential wells in the area.

4. Comments Regarding Health Risks

Comment a: Several commentors stated that the health assessment conducted by the State was inadequate and requested a thorough health study.

EPA Response: A health assessment report dated October 13, 1988, by ATSDR is included in the Administrative Record. Because most of the residents and businesses surrounding the site have been serviced by municipal water lines since 1983, and indoor air monitoring conducted in 1986 did not detect concentrations of VOCs that would be expected to cause adverse health effects, the Coakley Landfill is not being considered for follow-up health studies at this time. –

Comment b: Several commentors stated their concerns for the health and well-being of children living in the area of the site and asked about the possible future health risks facing these children.

EPA Response: Based upon data collected during the RI/FS and evaluated in the Risk Assessment, children who play in the water, sediments or soils on or near the landfill are not expected to be more susceptible to the risk of developing cancer. The remedial action will minimize future risks from groundwater contamination.

5. Comments Regarding PRPs

Comment a: Several commentors stated that the State of New Hampshire should be held responsible for site cleanup because it was the State that originally permitted the landfill. Two commentors alleged that the State was aware of and allowed illegal dumping at the site, ignoring Class II landfill laws.

EPA Response: EPA is continuing its investigation regarding parties which could be considered potentially responsible for the Coakley Landfill site as they are defined under the Superfund Law (CERCLA). At this time EPA does not consider the State to be a potentially responsible party (PRP).

Comment b: A commentor requested that reparations be made to residences and businesses affected by the site even if this requires evacuation and relocation and/or purchase of property.

EPA Response: There is no provision in CERCLA that allows for compensation to residents and property owners in the vicinity of a Superfund site to sell, rent or buy their homes.

Comment c: Several commentors stated that federal law required EPA to take action against toxic sites first, and then to recover cleanup costs from polluters. Commentors feel that EPA has compromised an effective permanent remedy because of costs and have requested that EPA not wait to negotiate settlements with PRPs before taking action to cleanup the site.

EPA Response: The immediate threat to public health from the Coakley site was removed from the site when the residents were supplied public water in March 1983. All previous, current and future response actions at Coakley Landfill site have been and will continue to be undertaken as required by the Superfund Law (CERCLA) and its regulations (NCP).

Comment d: Two commentors requested an investigation into government and business practices that caused this problem in order to determine who should be held ultimately responsible. The commentors suggested public disclosure, and civil and criminal prosecution of those found responsible.

EPA Response: The EPA is continuing to investigate potentially responsible party (PRPs) practices which may have some relationship to problems at the Coakley Landfill Site.

Appropriate action will be taken against parties found to be liable for contamination at the site.

Comment e: One commentor requested that EPA consider the Departments of the Air Force and Navy as major PRPs.

EPA Response: The EPA has sent general notice letters to the U.S. Air Force and the U.S. Navy naming them as potentially responsible parties (PRPs) as well as to 58 other PRPs.

B. Summary of Potentially Responsible Parties Comments

One set of written comments was received from a group of PRPS, known as the Coakley Landfill PRP Group. The main points made by this group of PRPs are summarized briefly below. The PRP comments are included in Attachment B. PRP comments are divided into the following four categories:

1. Evaluation of Site Characterization
2. Evaluation of EPA's Preferred Alternative
3. Evaluation of Other Remedial Alternatives
4. Alternative Proposal for Staged Remedial Actions

1. Evaluation of Site Characterization

Comment a: The possible impact of contaminant migration from Rye Landfill during groundwater extraction under the proposed remedial plan has not been characterized by the EPA.

EPA Response: Commingling of contaminants from the Coakley and Rye landfills is unlikely under natural or stressed (pumping) conditions. The contamination attributed to the Coakley and Rye landfills is separated by the presence of high bedrock and groundwater levels in the area between the two landfill. The overburden aquifer was found to be dry in this area during the RI, precluding contaminant migration from Rye Landfill from mixing with Coakley contaminants via an overburden pathway.

For contaminants from the Rye Landfill to enter the groundwater collection system at Coakley, the bedrock pumping wells would have to cause a gradient reversal extending beyond the groundwater high north of the landfill. Given the anticipated placement of the wells, the pumping rate and the conductivity of the bedrock, this seems unlikely. This supposition will be confirmed during Remedial Design. Groundwater gradients will be monitored during operation of the groundwater collection system. Pumping rates from

individual wells will be adjusted routinely to control the boundaries of the capture zone of the groundwater collection system.

Comment b: The possible impact of contaminant migration from other source areas (several body shops and auto dealerships that generate hazardous waste, and a number of establishments that have underground storage tanks) during groundwater extraction under the proposed remedial plan has not been characterized.

EPA Response: The EPA has not disputed the possibility of other sources of chemical constituents in groundwater in the general area of the Coakley Landfill. The focus during remediation will be to limit the collection of groundwater to "source control", i.e. water within and immediately adjacent to the compliance boundary. Groundwater contamination at GZ-122 would be addressed under the implementation of a management of migration alternative. As discussed in the Proposed Plan, the selection of a management of migration alternative has been delayed pending the collection of further data. The groundwater extraction system will be designed and operated so as to minimize the collection of groundwater potentially contaminated by sources other then Coakley Landfill.

Comment c: Of the seven organic indicator chemicals, none have been detected in offsite overburden monitoring wells directly attributable to Coakley Landfill.

EPA Response: This comment is very specific to existing offsite overburden wells. Onsite overburden wells have shown contamination above cleanup goals. The contamination appears to be migrating to the bedrock groundwater both on and offsite. The majority of this groundwater contamination is localized under the landfill in the overburden and bedrock hydrogeological units. However, the indicator compounds have been detected in numerous offsite bedrock wells and have been found at levels exceeding the cleanup goals in two offsite bedrock monitoring wells and five former domestic wells. It is also possible there is some contamination of overburden groundwater close to the site boundary, however, the offsite overburden monitor well network was not established close to the boundary.

The list of wells chosen by the PRP group as "offsite" wells is very limited. They have eliminated wells that they feel are potentially affected by sources other than Coakley. To ignore downgradient wells installed for the purpose of monitoring offsite migration is clearly slanting the

information to the desired view.

Comment d: Of the seven organic indicator chemicals, only benzene, 2-Butanone (MEK) and chlorobenzene were detected in on-site overburden wells at concentrations that exceed their respective cleanup goal.

EPA Response: This comment fails to mention that trans-1,2-dichloroethene and the three inorganic indicator chemicals (arsenic, chromium, and nickel) were also detected on-site in concentrations greater than their respective cleanup goals. Dichloroethene is listed in the data table as the combined total of the cis and trans isomers, however it should be conservatively assumed that this concentration represents the trans isomer (an indicator chemical). The other three indicator compounds (tetrachloroethene, phenol, and diethyl phthalate) were chosen as indicator compounds due to their presence in test pit samples collected within the landfill. They were retained as groundwater indicator chemicals and cleanup goals were developed based on the potential for leaching to the groundwater.

Comment e: Only two organic indicator chemicals have been detected in bedrock monitoring wells at concentrations that exceed their respective cleanup goals.

EPA Response: Indicator chemicals were not selected based solely on their presence in bedrock groundwater monitoring wells. All indicator chemicals have been detected in at least one of the media sampled during the RI. The use of the word "only" is inappropriate in this comment since it is significant that the cleanup goals for two of the indicator chemicals are exceeded in two bedrock monitor wells. The indicator chemicals have been detected in four off-site bedrock monitoring wells and in numerous former residential wells including wells at Lafayette Terrace.

Comment f: Even if one assumes that the Lafayette Terrace wells were affected by the landfill due to past pumping of the wells, rather than from natural gradients, these residential wells are now closed and additional migration from the landfill to Lafayette Terrace would not be expected.

EPA Response: This comment seems to imply that it would be necessary for a groundwater mound to exist to the east of the landfill in order to allow contamination to migrate towards Lafayette Terrace. Data from the RI suggest that a gradient existed, while the residential wells were pumping, towards Lafayette Terrace. It is impossible to determine, using RI

data, the impact of discontinued use of these wells on groundwater gradients. It was assumed that groundwater would continue to flow in the direction of Lafayette Terrace, but at a shallower gradient, due the fact that the landfill sits on several watershed divides. There is an expected diminished flow in the direction of Lafayette Terrace but this would not remove the potential risk for use of the groundwater as a drinking water source in the future. The groundwater collection system design effort will include measurement of flow gradients under pumping conditions.

Even if the assertion made were correct, EPA would be required, under several regulations and/or policies including RCRA, the Groundwater Protection Strategy and the Safe Drinking Water Act, to undertake a remedy which would insure that the migration of contaminants above MCLs and/or levels protective of public health would not occur under any scenario. The groundwater in the Coakley Landfill area would be required to be returned to a quality consistent with previous highest beneficial use, i.e. drinking water.

Comment g: The stated groundwater cleanup goal for arsenic, 30 ug/L, should be updated to 50 ug/L to reflect current EPA policy.

EPA Response: As explained in the Record of Decision for the first operable unit of the Coakley Landfill Site, the cleanup level for arsenic in groundwater has been set at 50 ug/L in accordance with the MCL.

Comment h: Only two monitoring wells have had arsenic values above 50 ug/L and no wells outside the compliance boundary have levels of arsenic above 50 ug/L.

EPA Response: An objective of the source control remedy is to prevent future offsite migration of contaminants which are presently within the capture zone. The chosen alternative is a source control remedy which includes the prevention of migration of onsite contaminants. The two monitoring wells with levels exceeding 50 ug/L are located at the compliance boundary of the Site. Because of the potential use of the aquifer at and beyond the compliance boundary as a drinking water source, EPA will meet MCLs at the compliance boundary.

Comment i: Based on the data collected, no monitoring wells outside the compliance boundary have levels of chromium and nickel above their respective cleanup goal.

EPA Response: While the comment is correct that nickel and

chromium have not been found in offsite wells above the cleanup goals, these metals were detected in onsite wells above cleanup levels. It is EPA's contention that this represents a source of these metals which must be controlled from migrating off-site. As discussed in the FS, the proposed treatment system is designed for removal of metals.

Comment j: The risks are overestimated because they are based on ingesting water from wells located within the boundaries of the landfill and are based on overly conservative exposure assumptions.

EPA Response: Consistent with EPA guidance, EPA has made a conservative estimate of existing and potential public health risks under a "no action" alternative. As part of this analysis, it is EPA practice to use monitoring information from both within and beyond the boundary of the landfill as needed to fully characterize the extent of contamination and thus possible exposure. Assumptions used to estimate exposure including exposure duration, were made consistent with the EPA guidance available at the time the risk assessment was written (Superfund Public Health Evaluation Manual, October 1986) and with assumptions made by EPA's Office of Drinking Water regarding exposure duration. EPA Region I views a 70-year exposure period to be a reasonably conservative estimate for the duration of possible exposure over a lifetime under the "no-action" alternative. While the recent guidance referred to by the PRP group (EPA Exposure Factors Handbook, 1989) suggests that exposure durations of less than 70 years may be suitable in some instances, it also affords the risk manager the opportunity to select an exposure duration of his choice depending on site specific information, consideration of policy or precedent factors. Furthermore, the publication date of this report was such that it was not available at the time the risk assessment was written (Oct. 1988) thus it could not have been considered for the Coakley Landfill risk assessment.

Comment k: The risks are overestimated because they are driven by the ingestion of arsenic which is subject to considerable scientific uncertainty.

EPA Response: Much of the "scientific uncertainty" regarding the carcinogenic potential posed by the ingestion of arsenic referred to by the PRP group has been resolved. In a memo from the EPA Administrator to Assistant Administrators (June 21, 1988) summarizing the work of EPA's Risk Assessment Forum Special Report on Arsenic he states that, "the Forum concluded... that arsenic is a human carcinogen by the oral route, which puts the chemical in Category A of the Agency's

scheme for designating the weight-evidence". As a known human carcinogen EPA Region I does not believe that a discussion of the scientific uncertainty on the carcinogenic potential of arsenic is warranted. The extent to which arsenic causes cancer (cancer potency estimate) and the nature of the cancer induced (skin) influenced the selection of a cleanup level for this compound and were the subject of discussion in the Record of Decision (Section XI).

Comment l: EPA has not demonstrated that the metals selected as indicator chemicals are above background levels or are, in fact, site contaminants.

EPA Response: The selection of indicator chemicals was performed during the RI in accordance with accepted procedure at the time it was performed. Contaminants were selected based on frequency of detection, concentration, toxicological effects, and chemical and physical properties. The selection of the three metals was based primarily on elevated levels in soil and/or groundwater. As noted by the PRP group, several wells exist which do not appear to have been impacted by Coakley Landfill. In several of these "background" wells none of the three indicator metals were found in concentrations above the detection limit. However, significant concentrations were detected in wells immediately adjacent to the landfill. This supports the selection of these metals as indicator chemicals of site contamination. These metals, therefore, may have been directly disposed of in the landfill.

It is EPA's belief that arsenic may be emanating from waste materials in the landfill or may be mobilized from naturally occurring arsenic in contact with leachate, thereby causing contamination of the groundwater. The phenomena of iron mobilization from soils within organic rich leachate plumes is well documented. The geochemistry of arsenic is such that it tends to adsorb on iron oxide deposits in soil. Thus arsenic may be released from soil when iron is mobilized. Elevated levels of iron have been noticed in groundwater and iron staining is evident on surface soils and sediments in the area surrounding Coakley landfill. Review of the data indicates the occurrence of arsenic above the detection limit typically coincides with elevated VOC and iron concentrations. Arsenic levels in excess of the clean up levels have been found in overburden wells at the compliance boundary along the southern and eastern edge of the landfill.

Comment m: All of the seven comments in Part II. D of the PRP group's written comments and all of the five comments in Part III. D of their written comments relate to the

conceptual groundwater extraction system design and the groundwater simulation conducted to evaluate the alternatives.

EPA Response: In general our response to these comments is as follows:

The final groundwater flow model configuration provides a conceptual recovery system design based on both the field data collected and on the model "calibration" process. Calibration of a steady state groundwater flow model based on unstressed water level data (non-pumping conditions) is difficult, and will provide only qualitative estimates of stressed conditions (pumping). However, the estimates obtained were deemed sufficient for cost purposes (plus 50 percent to minus 30 percent of estimated cost). The EPA recognizes that additional field work will be required prior to final design. Bedrock aquifer pumping tests are recommended in the FS in order to provide more accurate values of transmissivity and hydraulic conductivity, and provide additional data on leakage between layers, potential bedrock well pumping rates and eventual recovery well spacing.

An additional evaluation of some of the comments with respect to the number, location, and pumping rates (as related to treatment plant costs and design) of the groundwater recovery system using a Theis type drawdown analysis of the groundwater capture zone was performed. This analysis assumed a 100 foot thick aquifer with a hydraulic conductivity of 0.8 ft/day, storage coefficient of 0.05 and a 365 day pumping period. Eight bedrock wells were included in the analysis, each well pumping about 10 gpm. This analysis results in drawdowns in each of the eight recovery wells of approximately 60 feet with drawdowns of 20 feet or more extending more than 200 feet from the recovery wells. If we assume, as the commentors suggest, that the bedrock recovery system will dry up the shallow overburden aquifer and recovery trench, the 100 gallon per minute flow included in the FS is a reasonable, if somewhat conservative conceptual design flow.

It should be noted that the Theis analysis performed to review the design used the geometric mean of the field derived hydraulic conductivities of the bedrock. These values may be somewhat higher than the bulk aquifer conductivities determined during a pumping test because the field tests were performed on what was interpreted to be the more productive zones of the bedrock. Also because it was noted in the RI that the fracture zones may be less open below a depth of 50 feet in rock, serious consideration should be given to test the upper 50 feet of bedrock during

the pumping tests. This may result in reduced pumping rates and still affect complete contaminant capture.

The commentors suggest that the groundwater recovery system is over designed. The final design of the recovery well and trench system may differ from the conceptual design, but the final optimal design cannot be determined until the field work and analysis is complete during the design phase. The total flow from the recovery system appears to be somewhat conservative but within the range of a reasonable design flow given the field data available.

2. Evaluation of EPA's Preferred Alternative (SC-4)

Comment a: EPA has not justified that every element of the proposed multi-media cap over the landfill area is necessary.

EPA Response: The cap described in the FS and in the Proposed Plan, was designed based on compliance with both RCRA and State of New Hampshire regulations. The State of New Hampshire hazardous waste regulations, and solid waste regulations for landfills, were deemed to be ARARs for the Coakley site by EPA. As noted in the FS, the proposed cap is simply a conceptual model for the capping technology. Therefore, any cap proposed during the Remedial Design phase which is as effective as the one described and meets all ARARs, would be acceptable.

Further, the only difference between the cap described by the PRP group and the one in the Proposed Plan is the inclusion of a drainage net between the liner and the sub-base and a drainage mesh along the top of the landfill. The drainage net is provided to assist the sand in draining infiltration away from the landfill, while the drainage mesh is included to prevent erosion and settling in the cap layers. Both of these features have been included in several cap designs recently approved by NH DES.

Comments b: EPA has not justified the need for active collection and treatment of landfill gases generated below the cap. These comments focused on active landfill gas collection and treatment, which was included with all capping alternatives in the FS.

EPA Responses: The overriding factor influencing the decision to perform active gas collection was the proximity of the landfill to residential and commercial properties to the east and south. The risk assessment performed relative to air emissions was based on present (uncapped) conditions

which detected up to 48 ppb of VOCs. The presence of a cap will alter gas migration patterns. Without active gas collection, gas could potentially migrate horizontally under the cap and across the site boundary in the vadose zone. Also, gas collected by gravity vents (in a passive collection system) would be emitted at higher concentrations at discrete points on the site. The unknown and potential risks associated with these scenarios makes it reasonable to include active gas collection as a component of the alternatives evaluated, and as an integral part of the Proposed Plan.

Treatment of collected gas is proposed for the following reasons:

- Treatment provides reduction in toxicity in accordance with CERCLA, and

- The treatment methods selected, thermal destruction, provide economic benefit for on-site groundwater treatment alternative by making available a heat source. This benefit would be in the form of reduced capital and operation and maintenance cost for treatment of air emissions from the groundwater treatment system.

Another potential benefit which could be derived from active gas collection, but which was not included in the cost evaluations presented, is cogeneration of electricity. This on-site generated electricity could decrease the O&M cost of gas and groundwater collection and treatment systems.

Comment c: The groundwater treatment system is significantly overdesigned since the influent concentrations are based on average levels found in the most contaminated wells instead of all wells.

EPA Response: The groundwater treatment system design presented in the FS and Proposed Plan is a conceptual design for the purpose of alternative evaluation. The influent concentrations used in designing the proposed system, while conservative, were used as a common design basis for all alternatives evaluated. Further information as to expected influent concentrations will be collected during pump tests and any bench or pilot-scale testing performed during Remedial Design. This information will then be used to design an efficient cost-effective groundwater treatment system for the site.

Comment d: The groundwater treatment system is likely to be overdesigned because it was based on a flow rate of about 100,000 gallons per day.

EPA Response: As previously discussed, a groundwater model was used to develop a common conceptual design basis for evaluating alternatives. The groundwater extraction rate estimated by the model (75 gpm) is a reasonable estimate, as discussed in response 1.m. The design flow rate for the groundwater treatment system cost estimate was 100 gpm, which conservatively incorporated a safety factor of one-third of the flow predicted by the model. The actual design basis for the final design of the groundwater treatment system will be set following pumping tests conducted during the Remedial Design.

Comment e: No analysis has been advanced to suggest that activated carbon or an incinerator are necessary for air pollution controls for public health or environmental protection.

EPA Response: There is currently an OSWER Directive 9355.0-28 that requires air emissions control for air strippers at Superfund groundwater sites in ozone non-attainment areas as established by the National Ambient Air Quality Standards. Coakley Landfill in Rockingham County is in a ozone non-attainment area which requires an air emissions control.

Comment f: It is not apparent that both an air stripper and a biological treatment units are needed to attain water quality objectives.

EPA Response: The unit operations presented in EPA's selected remedy are representative process options selected from applicable technologies during the screening phase of the FS process. As such, different process options from the same technology type which are capable of meeting cleanup goals could be implemented during Remedial Design and Remedial Action. Representative process options are selected to limit the screening process and are not meant as a final required design. Further, if a surface water discharge is required during high groundwater periods, the effluent from the air stripper would require further treatment to meet the more stringent requirements for surface water discharge. Additional treatment would likely include nitrification of ammonia and removal of biochemical oxygen demand (BOD).

If biological treatment were used as the representative process option in the FS alternative screening process,

excessive treatment would occur for alternatives SC-4 with only recharge to aquifer and SC-5. Neither of the alternatives require the level of treatment provided by biological treatment and therefore the cost increase could not be justified. The cost savings to SC-4 with surface water discharge due to the PRP group's proposed modification would be less than $150,000, consisting mostly of the capital cost of the air stripper. Minimal savings of O&M costs would be realized.

Many of the compounds detected at the site are biodegradable, therefore, biological treatment is possibly applicable and will be investigated during the Remedial Design phase for the Site. Although biological treatment will be considered, air-stripping remains the selected process for removing VOCs because of the following uncertainties with biological treatment:

- Air emission controls;
- Potential toxicity problems arising due to site contaminants which would limit the effectiveness of biological treatment; and
- Chlorinated volatile organics (e.g. trans-1,2-dichloroethene) often convert to vinyl chloride by biological processes. Vinyl chloride is a known carcinogen which could not be discharged to surface water at a concentration above the detection limit or the groundwater above its MCL of 2 ppb.

Comment q: The levels of metals present in the groundwater at the Site are insufficient to justify their pretreatment.

EPA Response: The metals pretreatment process described in the Proposed Plan was designed to meet two objectives: (1) To remove indicator metals to cleanup goals and (2) To remove metals which would limit the effectiveness of the organics treatment process(es). The level of treatment required to meet these two objectives would be finalized during Remedial Design. The major metal of concern for an air stripper/biological system would be iron. The levels of iron found in wells on-site indicates difficulty operating either of these treatment scenarios without metals removal. While air strippers have been installed for groundwater treatment without iron removal, depending on the iron concentration they either require frequent acid washing to remove iron from the packing or frequent replacement of the packing. O&M cost may be greatly increased if metal pretreatment is not performed.

Comment h: The PRP group refers to a memorandum regarding a study that suggests that it may be difficult to achieve cleanup concentration goals in groundwater extraction systems. Additionally, the PRP group claims that inadequate data has been collected by EPA at the Coakley Landfill site to allow for an adequate design of an efficient cleanup approach.

EPA Response: The findings of the study referred to in the memorandum states that "extractions systems are generally effective in containing contaminant plumes, thus preventing further migration of contaminants." As a source control remedy and as stated in the FS, an objective of the remedial action is to "Prevent the off-site migration of contaminants above levels protective of public health and the environment." The study suggests that the chosen alternative would meet this objective. Data collected to date is adequate for conceptual design of the groundwater extraction system part of the remedy. Additional data needed for final design will be collected during the Remedial Design phase.

3. Evaluation of Other Remedial Alternatives

Comment a: EPA does not adequately demonstrate that alternative SC-3 would not meet federal and state ARARs and would not minimize the migration of contaminants from soils into groundwater.

EPA Response: EPA acknowledges in the FS that migration of contaminants is lowered to some extent by construction and maintenance of the cap. However, as stated, this alternative would not allow ARARs to be achieved in an acceptable time period. Based on the preamble in the new National Contingency Plan published March 8, 1990, it is EPA's policy to, "return usable groundwaters to their beneficial uses within a time frame that is reasonable".

The assumption that MCLs would not be met for several decades without groundwater collection and treatment was based on the following:

(1) Elevated levels of indicator compounds were observed offsite (particularly west of the landfill) as well as onsite; and

(2) After the cap is placed, contaminants will migrate and/or degrade at a slower rate due to the decrease of infiltration. Slower percolation of contaminants to groundwater causes longer sustained contaminant level above MCLs.

Given that the significant migration pathway for the site is through the bedrock, that indicator compounds above cleanup goals have been found in bedrock wells both on and off-site, and that the conductivity of the bedrock is very low, the conclusion is drawn that contaminants would take a long time to reach cleanup goals at the compliance boundary.

No acceptable modelling tool was found for contaminant transport which could be applied to the site. Given the heterogeneity of the material in the landfill, it would be difficult to accurately predict source characteristics. The HELP model referenced in this comment is a tool for estimating the flow vertically through a landfill, and does not provide information regarding contaminant transport.

Comment b: EPA does not demonstrate that alternative SC- 4 is superior to alternative SC-5.

EPA Response: Alternative SC-5 was evaluated to the maximum extent possible during the FS process and was evaluated appropriately relative to other alternatives. As discussed in the Proposed Plan, it was not selected due to concerns with the administrative implementability of the alternative, (i.e. whether approval could be obtained from the Town of Hampton to discharge to their sewerage system), and in part due to uncertainty regarding impact on the wetland. Each of the individual topics bulleted by the PRP group are discussed below:

During the FS process, inquiries were made to the Town of Hampton concerning their willingness to take pretreated groundwater from the Coakley site, the estimated user charge for such a hookup, and the most appropriate location to connect to the sewerage system. The estimated cost and connection location were used to perform the conceptual design and costing of Alternative SC-5. The Town personnel contact indicated that the acceptance and actual cost would have be negotiated before permission would be given. The negotiation process is a post-ROD activity and not part of the FS process.

The Portsmouth POTW was not considered to be an acceptable treatment facility for the groundwater from Coakley. The Portsmouth POTW has only primary treatment and currently

experiences permit compliance problems. This POTW would not provide the necessary residual organic and ammonia removal.

Based on calculations performed on all data from Table 13 of the RI, it is estimated that during semi-annual low flow cycles the groundwater extraction system may extract 100% of the surface water leaving the wetland via Berry's Brook and up to 20% of the surface water leaving the wetland via Little River, based on an extraction rate of 100 gpm. If SC-5 were to be selected, further study would be needed during Remedial Design to predict what effect will occur.

While the Proposed Plan does not specifically cite reduction of residual organic carbon and ammonia at an off-site POTW, it does discuss that a reduction of toxicity, mobility and volume of contaminants would occur if SC-5 were implemented. However, removal of organic carbon and ammonia is not unique to SC-5, as this comment implies. This feature is included also in SC-4 and in the Proposed Plan.

Finally, the total costs for SC-5 and SC-4 are relatively close ($18,900,000 versus $20,200,000) making the basis for selection something other than costs. EPA has determined that the potential implementation problems and possible negative impacts to the adjacent wetlands (short-term effectiveness) associated with SC-5 make it a less desirable alternative.

Comment c: Cost analyses presented in the FS Appendix B are not consistent between alternatives for certain line items.

EPA Response: The oily debris is not included as part of EPA's Proposed Plan and has been referred to NH DES. The overall cost differential to Alternative SC-5 would be a reduction of approximately $800,000, reducing the overall cost of the alternative to approximately $18,900,000. This cost is less than that of SC-4 as shown in the Proposed Plan by just over $1 million dollars. In the overall assessment, alternatives SC-4 and SC-5 would be considered to have similar costs leaving other criteria (i.e., implementability and short-term effectiveness) as the basis for selection.

4. Alternative Proposal for Staged Remedial Actions

Comment a: The PRP group states that the most effective remedial action would be installation of a cap that meets New Hampshire municipal landfill closure standards and assessing the feasibility of a "pump and treat" system.

EPA Response: This proposal essentially provides for the capping of the landfill and deferral of the groundwater remedy until a evaluation of the impact of the cap on migration of contaminants is conducted. Discussion relevant to this proposal is included in part in response numbers 2.a and 3.a and as follows:

- The cap included in the selected remedy (SC-4) is consistent with the State of New Hampshire, Department of Environmental Services current requirements for closure of a solid waste landfill. EPA has determined that the New Hampshire hazardous and solid waste regulations are ARARs for the Coakley Landfill. Therefore, the cap must be consistent with these requirements.

- As discussed in comment 1.c and in the ROD, EPA believes that the majority of groundwater contamination is under and beyond the landfill in the overburden and bedrock hydrogeological units and is migrating radially out beyond the compliance boundary established in the Proposed Plan. Capping of the landfill may, and probably will, slow this migration. However, we have no evidence to suggest it will be retarded such that cleanup levels (ARARs) will be met at the compliance boundary within a reasonable timeframe. Further, EPA believes that if water supply wells are reintroduced to the area in the vicinity of the Coakley Landfill, the groundwater gradients will be significantly altered. Such alteration will accelerate migration of contaminated groundwater from the landfill beyond the compliance boundary in concentrations exceeding cleanup levels.

- The alternative proposed by the PRP group does not satisfy the preference for treatment that reduces toxicity, mobility or volume as a principal element of the remedy as set forth in Section 121 of CERCLA.

- The construction of an effective groundwater extraction system would be significantly more complicated if done after the cap were in place and the integrity of the cap could be seriously compromised during that construction.

ATTACHMENT A

COMMUNITY RELATIONS ACTIVITIES
CONDUCTED AT THE LANDFILL SUPERFUND SITE
IN NORTH HAMPTON, NEW HAMPSHIRE

EPA/DES have conducted the following community relations activities at the Coakley Landfill Superfund Site:

- August 18, 1983 - Site Tour (presentations by NH WSPCC, North Hampton Selectmen, US EPA, and Senator Gordon Humphrey).
- November 4, 1985 - North Hampton Board of Selectmen hold a Public Informational Meeting to receive State input about the hydrogeological study to assist the town in planning water line extensions.
- January 1986 - DES/WSPCC prepared a Community Relations Plan.
- April 1986 - DES issues a Press Release announcing the Public Meeting to kickoff the RI/FS.
- May 14, 1986 - DES holds the RI/FS kickoff Public Informational Meeting.
- July 8, 1988 - NH Division of Public Health Services issues Report #88-007, "Evaluation of Cancer Incidence and Mortality."
- October 13, 1988 - ATSDR issues a Health Assessment Report.
- October 25, 1988 - EPA issues a Press Release announcing the Public Meeting to discuss DES/EPA Remedial Investigation results.
- October 1988 - EPA issues a Fact Sheet on the RI results.
- October 1988 - DES issues a Fact Sheet on the RI results.
- November 3, 1988 - DES/EPA hold a Public Informational Meeting on the results of the RI.
- November 30, 1988 - EPA issues a Public Notice in the Portsmouth Herald announcing the availability of the Administrative Record.

- February 1990 - EPA issues the Proposed Plan for Site cleanup.

- March 7, 1990 - EPA issues a Press Release announcing the availability of the Proposed Plan, the dates of the Public Informational Meeting and Informal Public Hearing and the beginning of the Public Comment Period.

- March 9, 1990 - EPA issues Public Notices in the Portsmouth Herald and Foster's Daily Democrat announcing the Proposed Plan, the dates of the Public Informational Meeting and Informal Public Hearing, and the beginning of the Public Comment Period.

- March 15, 1990 - EPA/DES hold a Public Informational Meeting on the Proposed Plan for site cleanup.

- March 16, 1990 - May 14, 1990 - Public Comment Period on the Proposed Plan.

- March 30 1990 - EPA issues a press release announcing the extension of the Public Comment Period.

- April 3, 1990 - EPA/DES hold an Informal Public Hearing on the Proposed Plan.

ATTACHMENT B

POTENTIALLY RESPONSIBLE PARTY COMMENTS

COMMENTS ON EPA's
PROPOSED REMEDIAL PLAN FOR THE
COAKLEY LANDFILL SUPERFUND SITE
NORTH HAMPTON, NEW HAMPSHIRE

Prepared by
ENVIRON Corporation
Arlington, Virginia

May 14, 1990

I. INTRODUCTION

A. Background

ENVIRON Corporation (ENVIRON) was retained by the Coakley Landfill Steering Committee, a group of potentially responsible parties (PRPs) at the Coakley Landfill Superfund Site (the Site), to review the Remedial Investigation (RI) and Feasibility Study (FS) reports prepared for the Site and to evaluate the Site remedy proposed by the U.S. Environmental Protection Agency (EPA).

A major conclusion of EPA's effort is that the Site poses no current potential risks to public health and the environment. In its analysis of potential future risks, EPA concludes that no significant adverse health effects are expected from Site contaminants present in soils, surface water, sediments, and air. Under a worst-case scenario where a drinking water well is installed adjacent to the landfill, EPA concludes that there is a low-level future carcinogenic risk to humans through the ingestion of ground water, primarily due to arsenic.

Based on the above, the EPA has proposed a source control remedy (the SC-4 alternative in the FS) for the Site, consisting of the following major elements:

- construction and maintenance of a multi-media cap over the landfill area;
- excavation of sediments and their placement underneath the cap;
- construction and operation of a trench and extraction well system around the perimeter of the landfill for removal of ground water;
- on-site treatment of the ground water; and
- disposal of the treated ground water by ground water recharge or surface water discharge.

EPA has delayed a decision regarding a remedial alternative for the off-site ground water contamination until the nature and extent of the contamination in this media is better characterized.

Additional source control alternatives considered but not selected by EPA include alternatives SC-3 and SC-5. Alternative SC-3 consists of the following major elements:

- construction and maintenance of a multi-media cap over the landfill area;
- excavation of sediments and their placement underneath the cap; and
- collection and off-site treatment of ground water perched in the quarry area of the landfill.

Alternative SC-5 is identical to alternative SC-4, except that extracted ground water would be pretreated on-site, and then sent off-site for treatment and disposal at a publicly owned treatment works (POTW).

B. **Executive Summary**

Because EPA has not adequately characterized the nature and extent of contamination at the Site, has not justified each element of its preferred alternative, and has poorly analyzed other remedial alternatives, the following remedial alternative is proposed:

- construction and maintenance of a multi-media cap, which meets current New Hampshire municipal landfill closure standards, over the landfill area;
- excavation of sediments and their placement underneath the cap;
- following installation of the cap, evaluate the feasibility of and need for collection and off-site treatment of ground water that may be perched in the quarry area of the landfill; and
- ground water monitoring to assess the beneficial effects of the remedial alternative on ground water migration and contaminant attenuation.

Comments are organized into three sections, as follows:

1. Evaluation of Site Characterization

- All sources of ground water contamination in the vicinity of the Site have not been well characterized. The EPA cannot be certain, therefore, that its source control remedy addresses all major sources of ground water contamination. In addition, EPA has not analyzed the impact of contaminant migration from these sources during the proposed ground water extraction.

- EPA has established the compliance boundary for attainment of site-specific ground water cleanup goals as the current boundary of the Coakley landfill on the south, west, and east; and approximately 200 feet from the limits of the landfill on the north and northeast. EPA has not adequately described the minimal nature and extent of contamination inside and outside the compliance boundary. The extensive remedial action proposed by EPA is not consistent with the low level of observed contamination.

- EPA has overestimated the hypothetical future risks to humans via the ingestion of ground water.

- EPA's ground water flow model, MODFLOW, is seriously flawed and provides poor representation of actual Site flow conditions. Therefore, conclusions regarding the preferred remedial alternative, which are directly based on this model, are invalid.

2. Evaluation of EPA's Preferred Alternative (SC-4)

- EPA has not justified that every element of the proposed multi-media cap over the landfill area is necessary.

- EPA has not justified the need for active collection of landfill gases generated below the cap.

- EPA has not justified the need for treatment of landfill gases generated below the cap.

- Because the proposed ground water extraction system is based on a seriously flawed and unreliable model, the preferred remedial alternative itself is likely to be flawed and unreliable.

- EPA proposes to treat extracted ground water on-site to remove metals and organics through chemical precipitation, air stripping, and biological treatment. EPA has not justified the need for such extensive treatment.

- EPA has not adequately discussed the large uncertainties associated with the effectiveness of ground water extraction systems.

3. Evaluation of Other Remedial Alternatives

- EPA does not adequately demonstrate that alternative SC-3 would not meet Federal and State ARARs and would not minimize the migration of contaminants from soils into ground water.

- EPA does not demonstrate that alternative SC-4 is superior to alternative SC-5.

- Cost analyses presented in FS Appendix B are not consistent between alternatives for certain line items.

II. EVALUATION OF SITE CHARACTERIZATION

A. **All sources of ground water contamination in the vicinity of the Site have not been well characterized. The EPA cannot be certain, therefore, that its source control remedy addresses all major sources of ground water contamination. In addition, EPA has not analyzed the impact of contaminant migration from these sources during the proposed ground water extraction.**

1. As stated in several places of the RI (pp 7-33, 7-34, 7-39 and 7-40), the Rye Landfill is a potential contaminant source area within the northern portion of the Coakley study area. In fact, the RI states (p 7-27) that the actual downgradient and ultimate fate of ground water contamination within the study area is extremely difficult to assess in part because of the effect of the Rye Landfill. The possible impact of contaminant migration from Rye Landfill during ground water extraction under the proposed remedial plan has not been characterized by EPA.

2. The RI states (p 7-28) that extensive commercial activity in the immediate area of the Site results in the possibility of additional contaminant source areas. These include several auto body shops and auto dealerships that generate hazardous waste, and a number of establishments that have underground storage tanks. The nature and type of contaminants at these potential sources may be different than those identified at the Site.

   For example, possible contamination of bedrock well GZ-122, located across Lafayette Road approximately 3000 feet southeast of the landfill, may be attributable to sources other than Coakley Landfill. The contaminants present during one sampling event (out of three) in this well were dichloromethane, benzene, and acetone. These do not match the suite of major contaminants, such as toluene, xylene, tetrahydrofuran, diethyl ether, 2-butanone, and methyl isobutyl ketone, present in the

landfill area. In two other sampling events, GZ-122 was uncontaminated.

The possible impact of contaminant migration from other source areas during ground water extraction under the proposed remedial plan has not been characterized.

B. **EPA has established the compliance boundary for attainment of site-specific ground water cleanup goals as the current boundary of the Coakley landfill on the south, west, and east; and approximately 200 feet from the limits of the landfill on the north and northeast. EPA has not adequately described the minimal nature and extent of contamination inside and outside the compliance boundary. The extensive remedial action proposed by EPA is not consistent with the low level of observed contamination.**

1. Of the seven organic indicator chemicals (e.g., benzene, 2-butanone, chlorobenzene, diethyl phthalate, phenol, tetrachloroethylene, and trans-1,2-dichloroethylene), none have been detected in off-site overburden monitoring wells directly attributable to Coakley Landfill (see Table 1).

2. Of the seven organic indicator chemicals, only benzene, 2-butanone and chlorobenzene were detected in on-site overburden wells at concentrations that exceed their respective cleanup goal (see Table 2).

3. Only two organic indicator chemicals (benzene and 2-butanone) have been detected in bedrock monitoring wells at concentrations that exceed their respective cleanup goals. Both chemicals were detected at the sole on-site bedrock monitoring well (MW-5, as shown in Table 1) and only in a single off-site bedrock monitoring well (GZ-105, as shown in Table 1).

Table 1
Contaminant Levels in Off-site Groundwater
Coakley Landfill
North Hampton, New Hampshire

Indicator Chemical	Groundwater Cleanup Goal (ug/L)	Overburden Wells: Arithmetic Avg (ug/L)	Overburden Wells: Max (ug/L)	Overburden Wells: Frequency of Detection	Bedrock Wells: Arithmetic Avg (ug/L)	Bedrock Wells: Max (ug/L)	Bedrock Wells: Frequency of Detection
Benzene	5	--	--	0/6	6	6.7	2/10 (2)
2-Butanone	200	--	--	0/6	249.5	282	2/10 (2)
Phenol	280	--	--	0/1	--	--	0/1
Diethyl phthalate	2800	--	--	0/1	--	--	0/1
Tetrachloroethylene	3.5	--	--	0/6	--	--	0/10
Chlorobenzene	100	--	--	0/6	--	--	0/10
trans-1,2-Dichloroethylene	100	--	--	0/6	--	--	0/10
Arsenic	50 (1)	--	--	0/1	--	--	0/1
Chromium	50	2.7	2.7	1/1	--	--	0/1
Nickel	100	5.5	5.5	1/1	10	10	1/1

Notes: Offsite overburden wells summarized here are GZ-101, GZ-117, and GZ-123. There are no offsite overburden wells to the west of the landfill. Those to the north are impacted by additional sources.

Offsite bedrock wells summarized here are MW-6, GZ-103, GZ-105, and GZ-109. Those to the north are impacted by additional sources.

(1) The FS erroneously uses 30 ug/L as the MCL for arsenic.
(2) Detected in GZ-105 only.

Table 2
Contaminant Levels in On-site Groundwater
Coakley Landfill
North Hampton, New Hampshire

Indicator Chemical	Groundwater Cleanup Goal (ug/L)	Overburden Wells: Arithmetic Avg (ug/L)	Overburden Wells: Max (ug/L)	Overburden Wells: Frequency of Detection	Bedrock Well MW-5: Arithmetic Avg (ug/L)	Bedrock Well MW-5: Max (ug/L)	Bedrock Well MW-5: Frequency of Detection
Benzene	5	21.4	60.6	16/22	13.7	19.4	4/4
2-Butanone	200	745.7	2700	6/22	277.5	407	3/4
Phenol	280	110	120	2/5	--	--	0/1
Diethyl phthalate	2800	136.3	230	3/5	--	--	0/1
Tetrachloroethylene	3.5	--	--	0/22	--	--	0/4
Chlorobenzene	100	166.5	182	2/22 (2)	10.7	14.1	3/4
trans-1,2-Dichloroethylene	100	13.3	15.8	2/22	--	--	0/4
Arsenic	50 (1)	40.1	89	6/7	7.95	8	2/2
Chromium	50	170.5	330	2/7	--	--	0/1
Nickel	100	99.8	200	5/5	65	65	1/1

Notes: Onsite overburden wells are MW-1, MW-2, MW-3S, MW-3D, MW-4, PZ-1, and GZ-106.

(1) The FS erroneously uses 30 ug/L as the MCL for arsenic.
(2) Chlorobenzene was detected only in well GZ-106.

4. Based upon available data, it is difficult to determine whether a ground water mound exists to the east of the landfill. Thus, it is also difficult to determine whether the residential wells in the vicinity of Lafayette Terrace (RW-25, RW-26, RW-27 and RW-28) were contaminated by the landfill or by off-site sources. However, even if one assumes that the Lafayette Terrace wells were affected by the landfill due to past pumping of the wells, rather than from natural gradients, these residential wells are now closed and additional migration from the landfill to Lafayette Terrace would not be expected.

5. The stated ground water cleanup goal for arsenic, 30 ug/L, should be updated to 50 ug/L to reflect current EPA policy. The maximum contaminant level (MCL) for arsenic is 50 ug/L. At the time of the publication of the RI, the proposed MCL for arsenic, 30 ug/L, was used as a cleanup level. Due to the uncertainty over health effects from arsenic ingestion, EPA is no longer proposing to change the MCL for arsenic. Therefore, the ground water cleanup goal for arsenic should be 50 ug/L.

6. Only two monitoring wells have had arsenic values above 50 ug/L (MW-3D at 89 ug/L; and MW-4 at 59 ug/L). Monitoring well MW-4 was resampled on May 26, 1987 following the initial sampling of December 4, 1985, resulting in arsenic concentrations less than 50 ug/L. Monitoring well MW-3D has not been resampled. Based on the above, resampling of MW-3D would possibly show arsenic concentrations below the cleanup goal. No wells outside the compliance boundary have levels of arsenic above 50 ug/L.

7. Based on the data collected, no monitoring wells outside the compliance boundary have levels of chromium and nickel above their respective cleanup goal.

C. **EPA has overestimated the hypothetical future risks to humans via the ingestion of ground water.**

EPA concludes that there is a low-level future carcinogenic risk to humans through the ingestion of ground water from a hypothetical well installed adjacent to the landfill (Tables 81, 82, and 87 of the RI). These risks are overestimated for the following reasons:

1. They are based on ingesting water from wells located within the boundaries of the landfill, rather than from wells located outside the boundaries of the landfill. Although arsenic has been detected in wells outside the landfill perimeter only in concentrations less than 10 ug/L, the average arsenic concentration used by EPA (Table 87 of the RI) in the risk characterization is 38 ug/L. Benzene has been detected outside the landfill perimeter at a maximum concentration of 6.7 ug/L (not including wells impacted by sources other than the landfill); however, the average benzene concentration used by EPA (Table 87) in the risk characterization is 28 ug/L. Because risk is linearly related to contaminant concentration, the risks due to ingestion of arsenic and benzene in ground water have been overestimated by approximately a factor of four.

2. They are based on overly conservative exposure assumptions. For example, current EPA guidance (EPA 1989a) suggests that a risk assessment be based on a nine year exposure for typical case scenarios and a thirty year exposure for reasonable worst case scenarios, rather than the seventy year exposure assumed in the RI. Because risk is linearly related to exposure duration, the use of a seventy year exposure period has resulted in overestimation of risks by more than a factor of two.

3. They are primarily driven by the ingestion of arsenic. Whether and to what extent ingested arsenic poses a human risk of cancer has been the subject of considerable scientific debate within EPA (EPA 1988a, EPA 1989b). A full discussion of the scientific uncertainty of this issue should be included in the RI.

4. EPA has not demonstrated that the metals selected as indicator chemicals (e.g., arsenic, chromium, and nickel) are above background levels and are, in fact, site contaminants. No ground water well was installed by EPA to determine the background level of metals in the ground water. Based on a review of data retrieved from STORET, a water quality database supported by the EPA, ambient background ground water arsenic concentrations are as high as 43 ug/L in Strafford and Rockingham Counties, New Hampshire.

D. **EPA's ground water flow model, MODFLOW, is seriously flawed and provides poor representation of actual Site flow conditions. Therefore, conclusions regarding the preferred remedial alternative, which are directly based on this model, are invalid.**

1. A ground water flow model is a mathematical representation of the actual ground water flow regime of the modeled site. In general, the objective of the model is to conduct simulations to evaluate the impact of various imposed stresses such as pumping on the site's ground water flow. If such a model does not provide accurate and reliable representation of the observed field conditions, then any simulation obtained from the model will be unreliable. Poor agreement between measured and predicted ground water elevations resulted from MODFLOW's calibration effort. As shown in Table C-1 of the FS,

differences between modeled and actual water levels were often as large as one to four feet.

2. In order to "calibrate" the model, EPA used input values of hydraulic conductivity (Kh) that greatly differ from values measured during field tests.

   - For the upper outwash zone, the Kh value (50 ft/day) used uniformly in the model is within the range of values measured at the site. However, because the three measured values were 2.1, 2.5, and 510 ft/day, it is likely that the Kh value chosen is too high for the majority of the site.

   - For the bedrock aquifer, the range of Kh values (3×10^{-5} to 5×10^{-3} ft/day) is approximately three orders of magnitude less than the range of values measured at the site (see RI Table 4).

3. The uniform annual recharge rate of 11 inches to the upper layer used in the model represents only 30% of the 37 inch average annual precipitation in the area (NOAA 1984), rather than the 50% infiltration rate quoted elsewhere in the report (see page 4-42). In addition, applying a uniform recharge rate throughout the Site is an unrealistic approach because a significant portion of the modeled area is occupied by wetlands.

4. As shown in Figure C-2 of the FS, the model predicts flow directions that are in conflict with the RI water level data (see Figure 12 of the RI), particularly east and south of the landfill.

5. The landfill area was modeled with no-flow boundaries assumed to the north and south. Because water level data indicate that there is a

substantial southerly flow component from the landfill, this approach is not representative of observed conditions.

6. Prior to conducting model simulations, a ground water model should be calibrated, using one set of water level data, and validated, using a second set of water level data. The model was only calibrated with data from 2 September, 1987, but was never validated.

7. Based on the above, conclusions reached with regard to the preferred remedial alternative, which are directly based on this model, are invalid.

III. EVALUATION OF EPA's PREFERRED ALTERNATIVE (SC-4)

A. EPA has not justified that every element of the proposed multi-media cap over the landfill area is necessary.

The multi-media cap proposed by EPA consists of a six-inch vegetative topsoil layer, a sub-base layer of two feet of sand, a drainage net, a low-permeability barrier of clay or synthetic liner material, a six inch layer of sand, and a drainage mesh (see Figure 4-6 of the FS). No analyses are presented to demonstrate whether or not a less stringent cap would be sufficiently effective in minimizing the migration of contaminants from the landfill. For example, current New Hampshire's closure requirements for municipal landfills consist of a six-inch vegetative topsoil layer, a sub-base layer of two feet of sand, and a low-permeability barrier of clay or synthetic liner material. This and other cap alternatives should have been analyzed by EPA to determine their effectiveness. EPA has conducted these analyses at many Superfund sites. After conducting such analyses at the Mason County Landfill, Michigan Superfund Site, EPA stated in its ROD (EPA 1988b, p. 16) that the risk of contaminant release to the ground water at the site did not warrant the extra protection and concurrent high capital and replacement costs associated with the multi-media cap.

B. EPA has not justified the need for active collection of landfill gases generated below the cap.

The need for active collection of landfill gas has not been justified by EPA. Passive collection of landfill gas has been used by EPA at many Superfund Sites (e.g., Mason County Landfill, Michigan (EPA 1988b); Volney Landfill, New York (EPA 1987a); Dorney Road Landfill, Lehigh City, Pennsylvania (EPA 1988c)). In addition, a passive venting system is currently used at Rye Landfill. There is no reason to believe that a passive system

would not be effective at Coakley, since similar wastes were likely disposed at Rye and Coakley. EPA should evaluate the use of a passive gas venting system at Coakley Landfill.

C. **EPA has not justified the need for treatment of landfill gases generated below the cap.**

The treatment of landfill gas cannot be justified on the basis of health benefits, when the risk assessment concluded that the site currently poses no risks due to air emissions and inhalation of toxics. At the Landfill & Resource Recovery, Rhode Island Superfund Site, EPA proposed treatment of landfill gas only after a risk assessment was performed (EPA 1988d). At the Laurel Park Site in Naugatuck, Connecticut, EPA delayed a decision on whether to treat landfill gas until emissions could be tested (EPA 1988e). At the Mason County Landfill, Michigan Superfund Site (EPA 1988b), EPA proposed a vent system without an incinerator because of negligible risks.

D. **Because the proposed ground water extraction system is based on a seriously flawed and unreliable model, the preferred remedial alternative itself is likely to be flawed and unreliable.**

1. EPA has proposed the construction and operation of a collection trench and extraction well system around the perimeter of the landfill for removal of ground water. This system includes seven overburden wells and eight bedrock wells and is primarily based on capture zones derived from simulation of the ground water flow model. Because the model is flawed, this design likely represents a redundant and unnecessarily costly extraction system.

2. Because the steepest gradients and most of the bedrock aquifer contamination are to the west, bedrock extraction wells need not have

been proposed for the east side of the landfill. Contamination migration to the east may have occurred in the past due to pumping of residential wells; however, based on the RI water quality and water level data, contaminant migration is now primarily to the west. Simulation using a reliable model would likely have resulted in similar conclusions.

3. Because the conductivity of the upper sand and gravel zone in some portions of the Site is substantially less than the value used in the modelling, the trenches will likely not intercept as much flow as the model suggests. Therefore, the estimate of the volume captured by the trench is likely unreliable and cannot be used for designing the ground water treatment system.

4. Because the bedrock conductivity values used in the model were much too low, the bedrock extraction system is likely overdesigned and will result in a greater discharge than that assumed in the preferred alternative.

5. Placement of bedrock extraction wells directly underneath the overburden recovery trenches, as proposed by the EPA, could lead to dewatering of the trenches. The marine clay layer, which would otherwise serve as an aquitard between the shallow and bedrock zones, is absent in the landfill area. Pumping from the deep zones could quickly reduce the shallow ground water levels and provide a rapid pathway for the introduction of contaminants to the bedrock aquifer.

E. **EPA proposes to treat extracted ground water on-site to remove metals and organics through chemical precipitation, air stripping, and biological treatment. EPA has not justified the need for such extensive treatment.**

1. The ground water treatment system design influent concentrations were based on the average levels of contamination found in the most contaminated wells (MW-5, MW-3S, MW-3D, and GZ-106). Based on FS Figure 4-13, four additional wells (MW-1, MW-2, MW-4, and PZ-1) are located within the capture zone of the collection trenches and bedrock wells. The lower levels of contamination in these wells should have been included in the calculation of design influent concentrations. In addition, because the extraction system will capture ground water from less contaminated areas outside the landfill perimeter, the quality of the water obtained will be substantially better, i.e. less contaminated, than that represented by the four most contaminated wells. The proposed treatment system is therefore significantly overdesigned.

2. The ground water treatment system was based on a flow rate of about 100,000 gallons per day, eighty percent of which is from the collection trenches. As discussed above, less ground water will likely be intercepted by the trenches and more will be extracted by the bedrock system. No reliable model is available to estimate the water quality of the effluent. Therefore, the proposed treatment system is likely overdesigned.

3. Activated carbon or an "incinerator" are mentioned as possible air pollution controls for an air stripper. No analysis has been advanced, however, to suggest that these controls are necessary for public health or environmental protection.

4. Both an air stripper and a biological treatment unit are suggested for reducing concentrations of volatile and semi-volatile organics in extracted ground water. Benzene, the organic compound of greatest concern, is readily biodegradable and volatilized (stripped) in biological treatment units. Therefore, it is not apparent that a separate air stripper is needed to attain water quality objectives.

5. The levels of metals present in the ground water at the Site are not sufficient to justify their pretreatment. Only a limited number of metals are present in on-site leachate at levels that exceed cleanup levels. As discussed above, the quality of the water obtained by the extraction system will be substantially better than that represented by the four most contaminated wells.

F. **EPA has not adequately discussed the large uncertainties associated with the effectiveness of ground water extraction systems.**

In a recent memorandum (EPA 1989c), EPA discusses findings from a study of several sites where ground water extraction is being conducted to contain or reduce levels of contaminants in ground water. This study suggested that in many cases, it may be difficult, if not impossible, to achieve cleanup concentration goals in ground water. EPA should include a discussion of these large uncertainties when presenting its preferred alternative. In the memorandum, EPA also encourages the collection of data to allow for the design of an efficient cleanup approach that more accurately estimates time frames required for remediation and the practicability of achieving cleanup goals. Adequate data have not been collected by EPA at the Site to allow for an adequate design of an efficient cleanup approach.

IV. EVALUATION OF OTHER REMEDIAL ALTERNATIVES

A. EPA does not adequately demonstrate that alternative SC-3 would not meet Federal and State ARARs and would not minimize the migration of contaminants from soils into ground water.

SC-3 involves construction and maintenance of a cap over the landfill area; excavation of sediments and their placement underneath the cap; and collection and off-site treatment of ground water. In the Proposed Plan, EPA states that this alternative would not meet Federal and State ARARs and minimize the migration of contaminants from soils into ground water.

- EPA states that (FS page 4-47) "compliance with MCL's in groundwater at the site boundary would not be achieved for several decades." However, EPA does not provide any analysis, such as the use of the Hydrologic Evaluation of Landfill Performance (HELP) model, to support this statement. Given the low level of contamination observed at the Site, it is certainly possible that ARARs would be met at a time frame considerably less than that proposed by EPA. EPA is being premature by proposing this alternative and then dismissing it from further consideration because the agency did not perform an adequate analysis.

- In the FS (p 4-47), EPA states that a cap would, in fact, minimize the percolation of contaminants to surface water and ground water. This fact is not acknowledged in the Proposed Plan.

B. **EPA does not demonstrate that alternative SC-4 is superior to alternative SC-5.**

In the detailed analysis of remedial alternatives, EPA qualitatively discusses the differences between alternatives SC-4 and SC-5. SC-5 involves the capping of the landfill and ground water collection followed by on-site pretreatment and off-site disposal. Capping and ground water collection would be accomplished as described in the preferred alternative (SC-4). Apparently, SC-5 was not selected because a municipality may not accept the extracted ground water for treatment and because the off-site disposal of ground water could have the adverse environmental impact of temporarily drying up major portions of the adjacent wetlands. The validity of these hypotheses have not been demonstrated.

- As stated in the FS (P 4-74), the Town of Hampton has a wastewater treatment plant with secondary treatment and over 1 million gallons per day in excess capacity. EPA apparently did not inquire whether the Town might accept the extracted ground water for treatment. EPA is being premature by proposing this alternative and then dismissing it from further consideration because the agency did not perform an adequate analysis.

- Similarly, EPA has not adequately analyzed the alternative that would include pretreatment of extracted ground water on-site and discharge to the Portsmouth POTW.

- The effect of ground water collection and recharge on the wetlands has not been adequately studied or modeled. No analysis or data are provided to support EPA's statement (p 4-75 of the FS) that adverse impacts on the wetlands would result if extracted ground water is removed from the wetland hydrological system. A preliminary water

balance shows that about 2300 acre-feet per year of water leave the wetlands from Berry's Brook and Little River (Table 13 of the RI). If the total volume of extracted ground water (108,000 gallons per day or 120 acre-feet per year) is conservatively assumed to discharge to the wetlands, then only five percent of the water entering the wetlands would be diverted to the off-site treatment system.

- EPA states in the FS (p 4-75) that off-site treatment of ground water would remove residual organic carbon plus a percentage of the ammonia and trace metals remaining in the pretreated ground water from reaching the surface waters in the wetlands. This benefit of off-site treatment is not considered in EPA's Proposed Plan.

C. **Costs analyses presented in FS Appendix B are not consistent between alternatives for certain line items.**

- It is unclear why off-site disposal of the oily debris as proposed in SC-5 is necessary. Under alternative SC-4, the debris is excavated and disposed on-site under the landfill cap. Because off-site disposal is significantly more costly than on-site, this inconsistency results in an overestimate of the cost of the POTW option (SC-5) as compared to the on-site treatment option (SC-4).

V. ALTERNATIVE PROPOSAL FOR STAGED REMEDIAL ACTIONS

The above comments point out several areas of significant concern regarding EPA's analyses of remedial alternatives and their final selection of a preferred alternative. Given that EPA has not demonstrated that all elements of its proposed remedy are required to provide overall protection of human health and the environment, it is proposed to implement a modified alternative SC-3 and defer construction of the trench/well extraction system until the benefits of a site cap can be assessed. The modification would be the installation of a cap that will meet New Hampshire municipal landfill closure standards rather than the cap proposed by EPA. In addition, the feasibility of and need for collection and off-site treatment of ground water that may be perched in the quarry area of the landfill would be evaluated. As stated above, EPA has found that in many cases it may be difficult, if not impossible to reach cleanup goals by pump and treat methods. EPA itself states on page 4-48 of the FS that "the effectiveness of the capping system would be easily monitored by visual inspection and sampling the groundwater around it."

Temporarily deferring remedial action for on-site ground water would create the opportunity to monitor how an impermeable cover impacts ground water contamination and migration. Furthermore, additional studies on the nature and extent of off-site ground water contamination could be undertaken. To the extent that either on-site and/or off-site ground water remediation is necessary, deferral will allow for the design and implementation of a comprehensive plan.

At several other Superfund sites, EPA cited the potentially beneficial effects a site cap can have on ground water migration and contaminant attenuation and proposed deferring ground water recovery and decontamination (see RODs for South Brunswick, New Jersey (EPA 1987b); Mason County Landfill, Michigan (EPA 1988b); Kummer Sanitary Landfill (EPA 1988f); and Marion/Bragg Landfill (EPA 1987c)).

EPA itself proposes to defer action on <u>off-site</u> ground water remediation, in part because of the uncertainties in the hydrologic characterization of the site vicinity. Any harm to long-term protectiveness caused by deferring cleanup of off-site ground water should be no less than the harm of deferring the pumping and treatment of on-

site ground water, given the minimal impact on off-site ground water to date and the beneficial impacts that the cap can have.

REFERENCES

U.S. Department of Commerce. National Oceanic and Atmospheric Administration. (NOAA). 1984. Comparative Climatic Data for the United States.

U.S. Environmental Protection Agency (EPA). 1987a. Superfund Record of Decision: Volney Landfill, NY. EPA/ROD/R02-87/040.

U.S. Environmental Protection Agency (EPA). 1987b. Superfund Record of Decision: South Brunswick, NJ. EPA/ROD/R02-87/052.

U.S. Environmental Protection Agency (EPA). 1987c. Superfund Record of Decision: Marion/Bragg Landfill, IN. EPA/ROD/R05-87/055.

U.S. Environmental Protection Agency (EPA). 1988a. Special report on ingested inorganic arsenic: Skin Cancer; Nutritional Essentiality. Risk Assessment Forum. EPA/625/3-87/013.

U.S. Environmental Protection Agency (EPA). 1988b. Superfund Record of Decision: Mason County Landfill, MI. EPA/ROD/R05-88/080.

U.S. Environmental Protection Agency (EPA). 1988c. Superfund Record of Decision: Dorney Road Landfill Superfund Site, Lehigh County, Pennsylvania. EPA/ROD/R03-88/056.

U.S. Environmental Protection Agency (EPA). 1988d. Superfund Record of Decision: Landfill & Resource Recovery, RI. EPA/ROD/R01-88/032.

U.S. Environmental Protection Agency (EPA). 1988e. Superfund Record of Decision: Laurel Park, CT. EPA/ROD/R01-88/025.

U.S. Environmental Protection Agency (EPA). 1988f. Superfund Record of Decision: Kummer Sanitary Landfill, MN. EPA/ROD/R05-88/082.

U.S. Environmental Protection Agency (EPA). 1989a. Exposure factors handbook. Exposure Assessment Group. Office of Health and Environmental Assessment. EPA/600/8-89/043.

U.S. Environmental Protection Agency (EPA). 1989b. Science Advisory Board's review of the ARSENIC issues relating to the Phase II proposed regulations from the Office of Drinking Water. EPA-SAB-EHC-89-038.

U.S. Environmental Protection Agency (EPA). 1989c. Directive No. 9355.4-03. Considerations in Ground Water Remediation at Superfund Sites.

U.S. Environmental Protection Agency (EPA). 1990. Memorandum to File. Backup For Costing of Groundwater Treatment, Coakley Landfill Site, North Hampton, NH. February 22, 1990.

U.S. Environmental Protection Agency (EPA). 1990. Proposed Plan, EPA Region I Superfund Program, Coakley Landfill Site, North Hampton, New Hampshire. February 1990.

Roy F. Weston (Weston). 1988. Remedial Investigation, Coakley Landfill, North Hampton, New Hampshire.

Roy F. Weston (Weston). 1989. Draft Feasibility Study, Coakley Landfill, North Hampton, New Hampshire.

Roy F. Weston (Weston). 1990. Addendum to Coakley Landfill Feasibility Study: Revised Table 2-7. February 27, 1990.

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ATTACHMENT C

TRANSCRIPT OF THE APRIL 3, 1990 INFORMAL PUBLIC HEARING

STATE OF NEW HAMPSHIRE

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HEARING RE: :
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E.P.A. REGION I :
SUPERFUND PROGRAM :
COAKLEY LANDFILL SITE :
NORTH HAMPTON, NEW HAMPSHIRE :
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BEFORE: Dennis Hueber, N.H. and R.I. Waste Management Branch
Steven Calder, Remedial Project Manager
Michael Robinette, Remedial Project Manager
Dan Coughlin, Chief, New Hampshire Superfund

North Hampton Elementary School
201 Atlantic Avenue
North Hampton, New Hampshire
Tuesday, April 3, 1990
7:40 p.m.

**********COMPUTER-AIDED*TRANSCRIPTION**********

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1 P R O C E E D I N G S

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3

4 MR. HUEBNER: Okay. If I can

5 have your attention. Can everybody hear me okay up

6 here? Again thank you for coming. My name is

7 Dennis Huebner. I am the Chief of the Rhode Island

8 and New Hampshire Waste Management Branch for the

9 U.S. Environmental Protection Agency in Boston,

10 Massachusetts. My staff and I are responsible for

11 the implementation of the E.P.A. Superfund Program

12 in New Hampshire and in the State of Rhode Island.

13 I am going to serve as the presiding officer over

14 this hearing today, and my sole purpose is to make

15 sure that we have orderly conduct and make sure we

16 accomplish the objectives of this hearing.

17 Also present here this evening and on the

18 hearing panel are Dan Coughlin. Dan is sitting in

19 the middle over here to my left. Dan works for me.

20 He is the chief of the New Hampshire Superfund

21 Section. Steve Calder. Steve is the remedial site

22 manager on this site. Steve is sitting to my

23 immediate left. And Mike Robinette.

1 Mike Robinette works for the State of
2 New Hampshire. He has played a very active role
3 over the life of the study for this particular
4 site. Mike works in the Department of
5 Environmental Services in the State of
6 New Hampshire.
7 The purpose of this hearing is to formally
8 receive your comments on the cleanup alternatives
9 under consideration at this site.
10 E.P.A. conducted a public information meeting
11 on Thursday evening, March 15, in which E.P.A.
12 presented the results of its remedial investigation
13 and feasibility study and presented the proposed
14 cleanup plan. A question and answer period
15 followed that meeting, and I believe each of the
16 three gentlemen sitting up here at the front of the
17 room attended that meeting and spoke.
18 The public comment period began Friday, March
19 16, 1990; and in a letter dated March 23, 1990,
20 E.P.A. was requested by the public to extend the
21 public comment period an additional 30 days.
22 E.P.A. has responded in writing to this request.
23 The revised public comment period will now run from

1 Friday, March 16, 1990 to Monday, May 14, 1990, a
2 total of 60 days.
3 Before beginning, I would like to describe for
4 you the format for the hearing. Essentially, the
5 evening will be structured as follows: First, I am
6 going to ask Steve Calder -- he was the remedial
7 site manager that I introduced a couple of minutes
8 ago -- I am going to ask Steve to give a brief
9 overview of the E.P.A. proposed cleanup plan.
10 Following his presentation, we are going to accept
11 any oral comments you wish to make for the record.
12 This hearing is an opportunity for E.P.A. to listen
13 to what you have to say and your concerns with
14 respect to the study that was done here at the site
15 as well as our proposed cleanup plan. If I find
16 that the comments are wandering from the purpose of
17 the meeting, I will try to remind you to focus your
18 comments more sharply. This is not an attempt on
19 my part to limit what you have to say, but rather
20 to assure that we accomplish the objectives of this
21 hearing. In summary, the purpose of the hearing is
22 to receive your comments, not to engage in an
23 information exchange as we did during that public

1 information meeting that was held a couple of weeks
2 ago.
3 Those of you wishing to comment should have
4 already done so by filling out the index cards
5 available at the desk in the rear of this room.
6 Also available, I believe we have copies of the
7 proposed cleanup plan, which you can -- did we
8 bring extra copies of the cleanup plan? The answer
9 is yes. So if any of you would now like to go down
10 and get a copy of it, or at your leisure, please so
11 do. If you have not completed one of the cards,
12 and you wish to speak, the cards are at the rear of
13 the room. Again, I would ask you to go down there
14 and get a card.
15 Does anyone need a card at this point in time?
16 Has everyone filled one out that desires to speak
17 here this evening?
18 What I am going to do is to call upon you in
19 the order in which you signed in this evening,
20 unless when you signed in you indicated you needed
21 to speak earlier because of other commitments.
22 When called on, I will ask you to come to the
23 middle of this room. There is a microphone there.

1 So that everyone will have a chance to speak, I am
2 going to ask you if you plan on speaking longer
3 than 15 minutes, if you would try to summarize your
4 comments in 15 minutes.
5 The cards that I have received so far are -- it
6 appears that we have nine people that are
7 interested in making a statement here this evening,
8 and I see some more people down back of the room
9 right now probably filling out the cards, so we may
10 have 10 to 12 or more people wishing to make a
11 comment.
12 The text in its entirety from this hearing
13 tonight is being transcribed. It will become part
14 of the hearing record. Again, following your
15 comments, I or another member of the panel will
16 have the opportunity to ask you clarifying
17 questions, if we feel we need to do that regarding
18 your comments, and hopefully that will help us to
19 further clarify exactly what you would have im mind
20 should we choose to do so.
21 After all the comments have been heard, I am
22 going to close the formal hearing. If you wish to
23 submit written comments, and I will encourage you

1 to do so, these must be postmarked no later than
2 Monday, May 14, 1990. Monday, May 14, 1990 is the
3 date to which we have extented the public comment
4 period due to the request from you, the public.
5 Those comments must be mailed to our office in
6 Boston. The appropriate address can be found on
7 page two of the proposed cleanup plan. Again, if
8 you need a copy of that cleanup plan, it's on the
9 table in the rear of the room.
10 At the conclusion of the hearing, if you have
11 any additional questions or comments concerning
12 what we are doing here this evening, please speak
13 to some of the staff. They will be here as well as
14 I will be here.
15 The summary of the hearing will be included in
16 a report -- we will be responding to the comments
17 made here tonight in a document called a
18 responsiveness summary. That responsiveness
19 summary is part of the Record of Decision process
20 that we will be going through and deciding what the
21 remedy will be for the cleanup of this site.
22 I am now going to ask Steve Calder to present a
23 brief overview of E.P.A.'s proposed cleanup plan.

I have asked him to be quick about this and to present his summary.

MR. CALDER: Good evening. Again, my name is Steven Calder. I work for the E.P.A. as the Remedial Project Manager for the Coakley Landfill Superfund Site. The purpose of my presentation is to summarize the proposed cleanup plan which was presented at the public information meeting on March 15, 1990.

Here is a map of the site. In the northern most part of the site is an oily debris area (indicating). Although the feasibility study discussed options of redisposal of this material in the landfill in conjunction with the cleanup of the landfill proper, Superfund Law specifically excludes petroleum products. Therefore, E.P.A.'s preferred alternative does not address this material. The decision on the final disposition of this material has been referred to the State of New Hampshire.

The objective of the remedy is to prevent the off-site migration of the contaminated groundwater. During the remedial investigation and feasibility

1 study, we found that the contaminated groundwater
2 over the landfill proper were the areas of most
3 risk.
4 I will now briefly review the five remedial
5 alternatives that were analyzed in detail in the
6 feasibility study and are also presented in the
7 proposed cleanup plan.
8 The first alternative that was reviewed in
9 detail was the "No Action" alternative. Although
10 this option is called the "No Action" alternative,
11 there would be a fence installed, the landfill
12 would be loamed and seeded, and a long-term
13 monitoring program would be instituted to evaluate
14 the potential exposure routes. This alternative
15 provides a baseline for comparison and is required
16 to be reviewed by law. The estimated cost for this
17 remedial alternative is approximately $2 million.
18 The second alternative reviewed in detail is
19 the capping, including consolidation. The capping
20 of a landfill typically involves the covering of
21 the surface with a multi-layer cap system. A cap
22 typically includes a vegetative layer on top, a
23 subsurface drainage layer, and an underlying low

1 permeability barrier of clay or a synthetic liner.
2 The cost of this remedial alternative estimate was
3 to be $11 million.
4 The third alternative that was reviewed in
5 detail was the capping with off-site treatment and
6 disposal. This alternative involves the capping of
7 the site and the construction of a sewer and pump
8 station for treatment of the extracted groundwater
9 from the site at the local wastewater treatment
10 facility. The cost of this remedial alternative
11 was estimated to be $20 million.
12 The fourth alternative that was reviewed in
13 detail was the on-site solid waste and groundwater
14 treatment and disposal and capping. This
15 alternative involves digging up the refuse for
16 treatment, either incineration and/or
17 solidification, pumping and treating the
18 groundwater and the capping of the landfill. The
19 cost of this remedial alternative was estimated to
20 be $54 million.
21 The fifth and preferred alternative is the
22 capping and on-site groundwater treatment. This
23 alternative involves capping the landfill and

1 pumping and treating the groundwater before
2 recharging it to the ground and/or locally
3 discharging to surface waters. The cost estimate
4 for this remedial alternative was estimated to be
5 $20 million.
6 The positive aspects to this alternative
7 includes the reduction of the mobility, volume and
8 toxicity of the contaminants. This alternative
9 would be protective to human health and the
10 environment, and meets all state and federal
11 regulations. And this alternative would be
12 implementable. A negative aspect of this
13 alternative is the potential of exposure to the
14 local residents and the workers during the
15 excavation of the 30 -- estimated 30 cubic yards
16 [sic] of material that would need to be
17 transplanted -- moved about to put the cap on
18 properly. This is necessary in order to properly
19 construct the cap. However, emissions would be
20 controlled by applying strict engineering controls,
21 and the monitoring of the air would confirm the
22 controls are affective.
23 At this time, the E.P.A. is not selecting an

alternative for the off-site contaminated groundwater at this time, therefore meaning the management of the migration. Although the data in the remedial investigation indicates that a plume of low-level contamination exists off-site to the west of the landfill, insufficient data was collected to determine the full extent of the plume. Additionally, the E.P.A. is concerned that serious damage and alterations to the wetlands would occur if a conventional groundwater pump and treatment system were to be installed. Therefore, E.P.A. will continue to expand its investigation of the off-site groundwater. A second Record of Decision will be issued once we have a better understanding of the off-site groundwater system.

I want to thank you.

MR. HUEBNER: Steve, do you want to clarify one thing? You mentioned 30 cubic yards. It's 30,000 not 30.

MR. CALDER: Yes. I said thirty cubic?

MR. HUEBNER: Yes.

MR. CALDER: I am sorry.

1 30,000 cubic yards.

2 MR. HUEBNER: Did everybody hear

3 that? Steven mentioned 30 cubic yards. I believe

4 the information you have in front of you says

5 30,000 cubic yards of material would have to be

6 moved.

7 Okay. Thank you, Steve.

8 I would like to begin. I am going to be

9 working off the cards here. I will go in the order

10 in which people have signed in. The first person

11 wishing to make comment on the proposed cleanup

12 plan is Lillian Wylie. If I pronounce your name

13 wrong, I apologize. I probably will, and I think I

14 will try to spell the last names for the court

15 reporter here. W-Y-L-I-E. Lillian Wylie.

16 LILLIAN WYLIE: Hello. I am

17 here tonight, and I hope -- as you know, I have

18 been living with the contamination problem for

19 going on 15 years now, and I expect this to be

20 justice for you to listen to our feelings.

21 Well, we hope that this information on the

22 informal hearing has become a little more formal

23 tonight. I will repeat myself in some cases,

1 because the March 15, 1990 was not a matter of
2 record. I consider myself to be a peaceful
3 resident of North Hampton. I have had public
4 servants in my family. I have been brought up to
5 be respectful. Under these circumstances, you can
6 understand my disrespect to you tonight.
7 In 1983, Ruth Martin, a former Lafayette
8 Terrace resident, and I were known as the two crazy
9 ladies of Lafayette Terrace, screaming for nothing.
10 At that time, it was known as a Lafayette Terrace
11 problem. Now our nightmare has become a
12 frightening reality not only for Lafayette Terrace
13 residents, but also for over 80,000 other residents
14 of the Seacoast area.
15 Clearly knowing the facts surrounding the
16 Coakley Landfill - North Hampton toxic site, the
17 State of New Hampshire and the United States
18 Environmental Protection Agency should implement
19 the best method of isolating and removing the
20 toxics and waste-plumes, restoring and making the
21 land usable again, protecting the aquifers and
22 environment, and recognizing and eliminating the
23 health problems and future threats associated with

1 this site. We at Lafayette Terrace and the people
2 of the surrounding area demand that a more
3 effective plan be sought and put into action
4 without waiting any further for the Environmental
5 Protection Agency to negotiate costs with the
6 suspected responsible parties.
7 May I stress again that there are five
8 municipal water supplies within 13,000 feet of this
9 site: Greenland Well, 12,000 feet; Garland Well,
10 3,800 feet; and the Crenshaw, Jenness and Coakley
11 Wells owned and operated by the Hampton Water
12 Works, 12,000 to 13,000 feet from the site.
13 Here are some facts surrounding the toxic site.
14 (1) We know that the bedrock that protects our
15 aquifers which feeds our wells and municipal water
16 supplies was blown up and sold for crushed rock.
17 (2) We know that in 1975 a complaint was made
18 to the State of New Hampshire, although nothing was
19 done until 1983. Fourteen years have passed
20 without any protection or solutions to the serious
21 matter whatsoever. The only action being done is
22 testing wells, bureaucracy and connecting area
23 residents to municipal wells which are also in

1 serious danger. More than 80,000 residents will be
2 affected if the toxics hit the area municipal
3 wells.
4 (3) In 1987, a test well at the landfill only a
5 few hundred yards from Lafayette Terrace was
6 tested, and benzene was detected at 60 parts per
7 billion, twelve times higher than E.P.A.,
8 Environmental Protection Agency, standards.
9 Benzene also is known to be one of the most lethal
10 cancer-causing chemicals.
11 (4) It was reported to the press by the State
12 of New Hampshire and the Environmental Protection
13 Agency that our wells were being tested on a
14 regular basis from 1983 to present. Wells RW-25,
15 26 and 28 were tested in February and March of
16 1983. These wells were the only -- these tests
17 were the only tests actually ever done. According
18 to Figure 20, Volume 1 of the Remedial
19 Investigation Coakley Landfill - North Hampton
20 Toxic Site, done by the State of New Hampshire,
21 Department of Environmental Services Waste
22 Management Division, dated October, 1988: Well
23 RW-28 was tested July 29, 1987 showing nothing

1 toxic. This alleged test on Well RW-28 was never
2 done. This well lies on my property and formerly
3 served 12 homes. It was shut off and closed in
4 1983 and has never been reopened or tested since.
5 (5) My home has been tested three times when
6 the ground was frozen and still showed low levels
7 of carcinogens: Acetone, benzene,
8 1,1,1-Trichloroethane, Trichloroethylene, Toluene
9 and others. Taking into consideration that we
10 drank several toxic chemicals in our well water
11 over an extended period of time, and have been and
12 still are breathing low levels of carcinogens in
13 our home, we do not know what all these toxic
14 combinations can do to our body metabolism, our
15 health, our personality or our children's learning
16 ability.
17 (6) It is known that radioactive waste called
18 Black Silt was dumped at the Coakley
19 Landfill -- North Hampton toxic waste site from the
20 Portsmouth Naval Shipyard, and also we found out
21 that asbestos has been also dumped there. There is
22 also serious reason to believe that midnight
23 dumping from dumping via trucks and helicopters

1 occurred.

2 (7) A health study was requested for the area
3 surrounding Coakley Landfill - North Hampton toxic
4 site. Instead we got a health assessment which
5 presented only what the State chose to present and
6 was a disgusting injustice to the entire Seacoast
7 area.

8 (8) There is a health risk to the area, and
9 it's very likely it has already destroyed lives and
10 families. Explain the little boy with neo-blastema
11 cancer, or the tragedies in Ruth Martin's family,
12 her husband dead from enlarged kidney, heart and
13 liver; her adopted son, the same symptoms. Lynne
14 and Roberta Martin have kidney disease and cannot
15 bear children. They are not expected to live past
16 the age of 40. An entire family destroyed. In
17 other homes, tumors have been detected and
18 increased amounts of cancer-related deaths and
19 illnesses.

20 As a victim of this tragic disaster, I demand
21 that the State and Federal Government agencies stop
22 their beating around the bush and their games and
23 do something about this disaster that is

1 constructive, unlike what they have proposed and
2 done so far. Enough have suffered. Stop
3 pretending this isn't a problem of unbelievable
4 proportions. Stop playing chess with the laws and
5 money and help the people. This isn't a political
6 game. This a human issue.
7 Again, I repeat to you, we are innocent
8 victims, who aren't just eating too much peanut
9 butter. Give us and our future generations a
10 future we can enjoy. What you propose so far only
11 spells more nightmares, tragedy and disaster.
12 And I have something personal to the State of
13 New Hampshire that I would like to express. What
14 bothers me about the State of New Hampshire and the
15 whole Coakley mess is that the State knew they were
16 contaminating our wells and letting us drink from
17 it. The State wasn't going to tell us that they
18 were poisoning us, or what could have been
19 thousands of residents in the Seacoast area. The
20 State of New Hampshire didn't care about my family
21 or anyone else's. In the State of New Hampshire, I
22 thought it was against the law to commit negligent
23 homicide or to be an accomplice to murder. They

1 put my family and many other families through a
2 living hell. The State should have sat us all down
3 and gave us a glass full of arsenic, benzene, lead
4 mixed with all the other toxic chemicals instead of
5 the slow death they have now sentenced us with.
6 These kinds of cover-ups by the State and condoned
7 by the Federal Government must stop. People are
8 angry all over the United States. This is not just
9 happening in North Hampton, but all over the
10 country.
11 Here in this State of New Hampshire alone there
12 are 15 hazardous waste Superfund sites.
13 New Hampshire's cancer rates are ten times higher
14 than any other state. People are concerned about
15 their loved ones. As long as the records have been
16 kept, it is against the law to kill thy neighbor.
17 The State of New Hampshire and the polluters must
18 pay and dig deep so this won't happen in this state
19 or in any other state. What the E.P.A. and the
20 State of New Hampshire have proposed and done so
21 far is a criminal act and must not continue. Stop
22 this nightmare at once and start doing what your
23 name stands for, protect the people.

1 And in closing, I would like the Federal
2 officials to Fax a message to President Bush and
3 John Sununu. Read my lips. When are you going to
4 wake up. No nuclear power plants. No toxic sites.
5 Now the children would like to say something.
6 TAMMY WYLIE: Hi. My name is
7 Tammy Wylie, and I --
8 MR. HUEBNER: Excuse me for one
9 second.
10 Let me indicate to the group here who had
11 requested to speak, it was Tammy Wylie, W-Y-L-I-E;
12 Jay Chase, C-H-A-S-E; and Shawn Wylie, W-Y-L-I-E.
13 TAMMY WYLIE: My name is
14 Tammy Wylie. I am nine years old. I live at
15 Lafayette Terrace. The children are victims, too.
16 We are always sick. One little boy has cancer.
17 This isn't right. Chemicals can kill me and my
18 friends.
19 JAY CHASE: Hi. My name is
20 Jay Chase. I am 17. I, like the other children
21 and young adults have lived in North Hampton almost
22 my whole life. We are gathered here to ask you for
23 help. We, like the adults, are very curious and

1 sometimes very scared what might happen to us or
2 our families if something is not done about the
3 toxic waste that is at Coakley Landfill right now.
4 This is why we are asking for (1) The toxic waste
5 does not get covered up, but actually taken away to
6 a designated toxic waste dump. (2) That the land
7 will not be taken away. We would like the valuable
8 wetlands to be cleaned and restored for future use.
9 The victims of -- (3) The victims from the dumps
10 should be compensated; and (4) We just want
11 something done.
12 The children of Coakley Landfill are not
13 pointing fingers at anyone. We just want some
14 results.
15 Last of all, us children are considered
16 tomorrow's future. Please do not take this future
17 from us.
18 Thank you.
19 SHAWN WYLIE: Hi. My name is
20 Shawn Wylie. I live at Lafayette Terrace.
21 Our voice should be accepted for the record. I
22 am here in defense of the babies, children and
23 young adults. We want the best possible solution

1 to a problem and agree with the petition to be
2 presented by John Burns. Before he speaks, the
3 children and young adults have their own petition
4 with 17 signatures. Before the deadline of
5 May 14th, we will have more signatures.
6 Thank you.
7 MR. HUEBNER: Thank you. Thank
8 you very much for each of your comments.
9 The next person I would like to call on is
10 John Burns, B-U-R-N-S.
11 JOHN BURNS: My name is
12 John Burns. I am a Co-Chairperson for Citizens
13 Organized Against Seacoast Toxics.
14 First, I would like to thank the federal, state
15 and town officials present here tonight that are
16 interested and concerned in this matter.
17 The Coakley Landfill - North Hampton toxic site
18 has been on the national priority list now for
19 about seven years and still no action has been
20 taken to clean up the site or protect the Seacoast.
21 The Federal and State authorities have wasted
22 critical time doing nothing except covering up
23 important facts and delaying every Superfund

1 process with their bureaucratic red tape.

2 The State of New Hampshire waited eight years
3 after the first complaint was filed concerning
4 leachate coming from the site in 1975 before they
5 even investigated the site. The complaint was so
6 noted in the State's records. It has also been
7 confirmed by many town and state officials where
8 they are aware of illegal dumping that was
9 occurring at the site.

10 Class II landfill laws and ordinances are
11 clearly defined. It was quite obvious and apparent
12 that these were being blatantly ignored. As an
13 example, the State of New Hampshire directed a
14 gentleman to dump his oil and debris from the South
15 Hampton area at the site.

16 The E.P.A. and the State of New Hampshire, the
17 Department of Environmental Services have
18 continuously stood hand in hand saying the toxic
19 site has minimal health and environmental impacts.
20 Both have consistently ignored the needs and
21 demands of local residents. Now once again they
22 continue their inhumane procedures by proposing a
23 preferred alternative that does nothing to protect

1 the Seacoast future health and well-being. The cap
2 and treat method that was proposed has been shown
3 to be completely ineffective and unreliable. In
4 fact, the Congressional Office of Technology
5 Assessment has completely discredited this form of
6 so-called cleanup in their publication, Coming
7 Clean.
8 When there is a house fire, the fire department
9 immediately comes and extinguishes the fire. After
10 it's put out, they determine the cause and
11 responsibility. They wouldn't let the fire burn
12 while they make these determinations. At Coakley,
13 this fire has been burning for 15 years. Meanwhile
14 the State of New Hampshire, D.E.S. and the E.P.A.
15 focus on who is going to pay for it and how they
16 can cover the State's backside by using Superfund
17 Laws to hide their responsibility in using small
18 towns and businesses as scapegoats. When will
19 State and Federal agencies provide and protect the
20 public and environment, start doing their duties
21 and stop being evasive and unreliable.
22 What we have here in North Hampton is just a
23 chapter of a nation-wide toxic crimewave that is

1 socially and environmentally destructive.

2 As a concerned citizen, I demand that all

3 involved begin to provide answers and solutions,

4 not Band-Aids and cover-ups. There are

5 88,000 residents on the seacoast in danger of being

6 affected by the site and many who have already

7 been. Stop whimpering and hiding and start

8 protecting the people.

9 On behalf of C.O.A.S.T. and the Concerned

10 Citizens of the Seacoast area, I now would like to

11 present to the United States Environmental

12 Protection Agency, the State of New Hampshire

13 Department of Environmental Services and the State

14 of New Hampshire Attorney General's office this

15 petition that has been signed by 270 local

16 residents so far. C.O.A.S.T. will continue to

17 circulate this petition until shortly before the

18 May 14 comment period deadline, and we will forward

19 all additional copies to the three parties stated

20 at that time.

21 It reads as follows: As representatives of the

22 best interests of the concerned citizens affected

23 by the Coakley Landfill - North Hampton toxic site,

1 Citizens Organized Against Seacoast Toxics,
2 C.O.A.S.T., hereby petitions the following terms
3 which are endorsed by those signing below.
4 (1) Getting the job done. We need the best
5 solution for all the problems at and around the
6 Coakley Landfill- North Hampton Toxic Site. To us
7 this means more than the cap and treat cleanup
8 proposed by the United States Environmental
9 Protection Agency. The toxics and waste-plumes
10 must be isolated and removed; the landfill itself
11 must be restored to safe and usable condition; the
12 aquifers and environment must be protected and the
13 health problems and future threats must be
14 recognized and eliminated.
15 (2) Human issues. The Coakley Landfill - North
16 Hampton toxic site is not only an environmental
17 problem, but also a serious health and
18 economic issue of major proportions. Immediate
19 and full-value relief and assistance to the
20 individuals, families and homes most affected by
21 the site in North Hampton, Greenland and Rye must
22 be part of any plan plus additional help for other
23 victims: Residents, businesses, water companies,

towns and others. Even if this requires evacuation and relocation and/or purchase of property.

(3) Health study. The United States Government sponsored Health Assessment done in 1988 is totally unacceptable as a picture of past, present and future problems caused by the Coakley Landfill - North Hampton toxic site. A new government-funded comparative health study that is scientific, impartial and agreed to and participated in by the residents and their own expert advisors must be done. This is as urgent and important as any work that may be considered on the toxic site itself.

(4) Horses before carts. Federal Law requires the United States Environmental Protection Agency to take action first against the toxic sites, and then to recover cleanup costs from polluters, not the reverse. Therefore, we will not wait until the U.S. E.P.A. negotiates a settlement with the suspected responsible parties. This is unlawful and inhumane.

(5) The State of New Hampshire. The question of responsibility is more involved than just

1 identifying those who ultimately deposited toxics
2 at the Coakley Landfill - North Hampton toxic site.
3 Because it was responsible for reviewing,
4 licensing, permitting, monitoring and otherwise
5 managing affairs concerning the site, the State of
6 New Hampshire must be held as a major party in this
7 serious matter, including the financial burden of
8 the entire plan.
9 (6) Accountability. The Coakley
10 Landfill - North Hampton toxic site did not
11 magically become one of our countries most
12 contaminated and dangerous locations. There must
13 be a complete investigation into the government and
14 business practices that caused this problem. Who
15 is involved and what, when and how were local,
16 state and federal laws violated, followed by public
17 disclosure and civil and criminal prosecution.
18 (7) No loss of land. We will not accept the
19 loss or sacrifice of this valuable site and
20 wetlands to any cleanup action. The land must be
21 returned to safe and agreeable conditions,
22 determined and agreed to by the concerned citizens
23 of North Hampton, Rye and Greenland and their

1 chosen experts and advisors.

2 Is there someone here from the State of

3 New Hampshire Attorney General's Office?

4 VOICE: Yes, I am.

5 JOHN BURNS: Here is copies.

6 Should I bring them up there?

7 MR. HUEBNER: Are they copies of

8 the petition?

9 JOHN BURNS: Yes.

10 (Documents handed to the Hearing

11 Committee.)

12 MR. HUEBNER: Okay. Thank you

13 for your comments.

14 The next person that requested to speak was

15 Martha Bailey, B-A-I-L-E-Y.

16 MARTHA BAILEY: I am

17 Martha Bailey of the New Hampshire Toxic Hazards

18 Campaign.

19 The essential goal of the Superfund Program is

20 to clean up land and water that are so contaminated

21 that they constitute threats to human health and

22 the environment. On paper, the program is supposed

23 to set up goals -- wait a minute -- the program is

1 supposed to set up cleanup goals that will protect
2 human health and the environment, then select
3 remedies that will meet these goals, and finally
4 find the responsible parties to pay for cleanup, or
5 otherwise use government funds. In reality, the
6 program is working backwards here. An amount of
7 money for partial cleanup has been chosen that
8 responsible parties might be willing to spend, and
9 then cleanup technologies were selected that could
10 be carried out within the budget. Superfund as
11 amended (SARA) requires permanent cleanup, wherever
12 it is feasible. By law, the E.P.A. is allowed to
13 consider cost only after having chosen effective
14 permanent alternatives and solutions that will
15 adequately protect health and the environment. The
16 E.P.A. is never justified in selecting a short-term
17 remedy, that is capping, simply because it is
18 cheaper than a permanent alternative. Has the
19 E.P.A. analyzed the risk of cap failure, damage and
20 cleanups for this containment? The tide from the
21 Atlantic Ocean ebbs and flows twice a day acting
22 like an oscillating pump at this site. Here the
23 E.P.A. is using cost/benefit analysis on

1 containment, when SARA says cost-effectiveness
2 analysis is to be used. The fact that the E.P.A.
3 has no intention of cleaning the soil that will be
4 removed from around the site before being placed
5 atop the landfill is criminal. All residents
6 within a half mile should be evacuated while this
7 operation takes place.
8 The first oil spill dumped at Coakley, now
9 covered up in Greenland and next to the nuclear
10 black silt dumping, now covered up near the
11 railroad tracks, should be removed, as well as the
12 second oil spill dumped at the left of the main
13 gate as you enter Coakley, and to be disposed of
14 properly. We will know you have removed the
15 nuclear waste when you can show us a picture of a
16 shoe that became stuck in the goo and had to be
17 abandoned in the goo. Incidently, the second oil
18 spill was to be removed by the State of
19 New Hampshire within three weeks. The dumping of
20 the oil spills were permitted by the State.
21 Groundwater moves because it is pulled by
22 gravity. Its ultimate destination is the nearest
23 ocean. When groundwater becomes contaminated, it

1 will not cleanse itself as surface water does.
2 There is very little bacteria, no sunlight, and the
3 water is relatively cool. For these reasons,
4 contaminated groundwater tends to remain
5 contaminated for eons of time. The E.P.A. began
6 using pump and treat technology at many groundwater
7 contaminated sites years ago. Pump and treat means
8 that the groundwater is pumped to the surface and
9 is treated in some fashion to remove contaminants.
10 A large body of scientific evidence has now
11 accumulated showing that pump and treat does not
12 work, and given today's knowledge cannot work for
13 the following reasons:
14 Much contamination attaches itself to the soil
15 particles, therefore using water samples to
16 estimate the amount of contamination will result in
17 major underestimates of the size of the problem.
18 Number two, soil and rock formations below
19 ground are not uniform. Using an average flow rate
20 could greatly underestimate the time it will take
21 to flush contaminents out of parts of the aquifer
22 through which water moves slowly.
23 Using current site investigation and

1 remediation technologies, it is not possible to
2 locate all significant contamination, nor can
3 anyone predict contaminant movement, fate, exposure
4 or remedial technology performance.
5 Number four. Many contaminents do not mix
6 readily with water. Chlorinated solvents are an
7 example. We should expect to have to pump and
8 treat in the foreseeable future with no end in
9 sight. If most of the contamination is not being
10 removed by pump and treat, someday the money will
11 run out for maintaining the pumps; and on that day,
12 the contamination will resume its natural movement,
13 and citizens will be threatened again.
14 A carbon filter will not remove acetone and
15 Tetrahydrofurans. They go right through the
16 filter, as the E.P.A. experienced at the Tibbets
17 Road Superfund site. Therefore, an afterburner
18 must be used to destroy these volitiles. Pump and
19 treat is not a permanent remedy. Has the
20 E.P.A. analyzed the risk, the damages and cost of
21 cleanup for pump and treat failure? Before any
22 Record of Decision is signed, we would like to see
23 the analyzed dollar figures from the E.P.A. of the

1 pump and treat and containment failures.

2 At one time it could -- and it could still be

3 happening when the tide was coming in you could see

4 the contamination bubbling up into the river. The

5 Little River is in the wetlands to the west of the

6 site. This will probably continue cap or no cap,

7 pump and treat or no pump and treat. At the same

8 time, you could see the contamination from Coakley

9 at low tide at the ocean.

10 There are five municipal wells around Coakley

11 supplying drinking water to 88,000 people. We do

12 not find your solution to the cleanup of Coakley

13 Landfill anywhere near adequate. The wetlands

14 where the contamination is being pushed to are

15 being completely ignored. Many types of game

16 animals and birds live in these wetlands, and much

17 hunting and fishing in the river takes place in

18 these wetlands. There is a human exposure here as

19 well as an environmental exposure. You are not

20 addressing this issue, yet you repeatedly say,

21 "Protective of human health and the environment".

22 Alternative SC-6 is the most permanent of the

23 alternatives given. Once this source of

1 contamination is removed, it leaves only the
2 surrounding groundwater and wetlands to be cleaned.
3 Because of the potential risks from air emissions,
4 we recommend evacuation of residents within a
5 radius of a half mile during the excavation and
6 soil treatment process.
7 On December 7, 1987, Lillian Wylie wrote
8 Doctor Barry Johnson, head of the A.T.S.D.R.
9 program and asked him for a health study at Coakley
10 Landfill/Lafayette Terrace area. She received only
11 a health assessment from A.T.S.D.R. We are now
12 formally asking the E.P.A. to demand a comparative
13 health study that is scientific, epidemiological
14 and impartial as stated in the petition.
15 (Applause.)
16 MR. HUEBNER: Okay. Thank you
17 very much.
18 The next person that requested to speak was a
19 John Doggett, D-O-G-G-E-T-T.
20 JOHN DOGGETT: Thank you. I am
21 really concerned. I just found out that I am a
22 member of the Superfund, and therefore I guess we
23 are all going to pay greatly on this.

1 I would like to know has there been any input
2 brought from the Federal Government in regard to
3 what the Pease Air Force Base has contributed to
4 this dilemma that we know we have, and also I have
5 a question for the State pertaining to the dump.
6 Why is this dump not corraled by way of a chain
7 link fence, and nobody can get in there?
8 MR. HUEBNER: Okay. Just to
9 clarify again. The purpose of the hearing is
10 really not for us at this point in time to respond
11 to a lot of the questions that you had. There was
12 a public information meeting that took place a week
13 and a half or two weeks ago, which I don't know
14 whether or not you were in attendance.
15 JOHN DOGGETT: Yes, I came
16 March 15th, and this is a carbon copy of the
17 March 15th meeting.
18 MR. HUEBNER: Okay.
19 JOHN DOGGETT: And I was
20 wondering if you had any input from the March 15th
21 meeting back to us townspeople.
22 MR. HUEBNER: Okay. Could you
23 at the conclusion of this hearing speak to -- Dan

1 and Steve, are you aware of what this gentleman is
2 talking about?
3 DAN COUGHLIN: Yes.
4 MR. HUEBNER: Could you speak to
5 these two gentleman at the conclusion of the
6 hearing?
7 JOHN DOGGETT: Thank you.
8 MR. HUEBNER: Okay.
9 AUDIENCE PARTICIPANT: We all
10 want to hear.
11 AUDIENCE PARTICIPANT: All the
12 answers were presented on behalf of the entire
13 audience. The answer should be given to the entire
14 audience.
15 MR. HUEBNER: Okay. At the
16 conclusion of the hearing -- all right -- let's
17 answer those questions; is that acceptable?
18 AUDIENCE PARTICIPANT: Sure.
19 AUDIENCE PARTICIPANT: Will it
20 go on record?
21 MR. HUEBNER: It will go on
22 record. All right. I don't want this to get out
23 of hand in terms of opening this up. I want

1 everyone to have the opportunity to speak. So I
2 will tell you what. How about if we run through
3 the remaining people that have asked to speak, and
4 then we will come back to you.
5 Yes, sir.
6 AUDIENCE PARTICIPANT: I was
7 going to suggest that Mr. Doggett be called the
8 last, if you place his card in the back.
9 MR. HUEBNER: I will do that. I
10 will do that.
11 AUDIENCE PARTICIPANT: Thank
12 you.
13 MR. HUEBNER: Okay. The next
14 person is Elmer Sewall, S-E-W-A-L-L.
15 ELMER SEWALL: My name is
16 Elmer Sewall. I live on Breakfast Hill Road in
17 Greenland.
18 I own the land that is north and west of the
19 Coakley Landfill. I have a monitor well in one of
20 my fields, which has shown some evidence of
21 contamination. I have a house in a field opposite,
22 which I rent which is now without water, and I
23 would like to put a well in but hesitate because of

1 the possible contamination problem. I had had
2 opportunities twice to sell a piece of land, and it
3 has fallen through because of this being adjacent
4 to the landfill and because there has been evidence
5 of contamination in that field, and it also appears
6 that my own well has shown recently some evidence
7 of contamination which presumably comes from the
8 Coakley fill.
9 Now it also seems to me that in reviewing the
10 proposals much of this is predicated on the fact
11 that areas to the south and east have already been
12 supplied with municipal water. On Breakfast Hill
13 Road, we do not have that privilege, and I am a
14 little concerned that these proposals don't take
15 that into account, and the migration factor is not
16 at this point being considered.
17 It would seem to me that these plans fall a
18 little short of protecting us on Breakfast Hill
19 Road. There aren't that many of us, and perhaps we
20 don't speak loud enough, but I would like to put
21 this on the record that we have these concerns.
22 MR. HUEBNER: Okay. Thank you
23 very much for your comments.

1 The next person is Greg Lincoln, L-I-N-C-O-L-N.

2 JEAN GREGG LINCOLN: Jean Gregg.

3 MR. HUEBNER: Jean Gregg. I am

4 sorry.

5 JEAN GREGG LINCOLN: I am

6 Jean Gregg Lincoln from North Hampton, and I just

7 would like to go on record and say I don't think we

8 have the very best technology today to bring us to

9 this cleanup. I doubt that the current proposal is

10 that. I am particularly concerned for the wells

11 that Mrs. Wylie spoke of. I think that some of

12 those wells probably draw water as far away as

13 Seabrook.

14 I also would like to just read some small

15 things that concern me about what happens to the

16 water that goes down into the marshes into the

17 ocean. I think we have to do a particularly fine

18 job because of the people who live all the way down

19 through that estuary and all the people who come to

20 our beaches. This comes from a study done this

21 year in January. It's called Objectives and

22 Concepts of Contaminated Underwater Sediment or

23 Distillation, The Natural Contaminate Works Group,

1 January 1990. I will just take a small piece out
2 of it. Findings, according to a 1987 study
3 conducted by the Environmental Protection Agency,
4 E.P.A., it is likely that every major river and all
5 types of water bodies in the United States have
6 contaminated underwater sediments. These sediments
7 pose a threat to the health of fish, shellfish,
8 wildlife and humans through food chain and/or
9 direct exposure. Sediments can be a primary source
10 of contamination exposing living organisms and the
11 environment to toxics. Many examples exist of fish
12 contamination warnings or bans due to contamination
13 by PCBs, mercury and dioxins and other pollutants
14 released from sediments.
15 When I was here at the last meeting, I spoke of
16 some concern about the runoff from this site, this
17 toxic site, and a gentleman from the D.E.S. said
18 that there was nothing to worry about, that down
19 the river the birds and the bunnies would be fine,
20 and I found that a little shocking, and I just want
21 to put it on the record that I don't accept that
22 kind of comment with this sort of serious toxic
23 waste situation.

1 Thank you.

2 MR. HUEBNER: Thank you for your

3 comment.

4 Do we have any other cards?

5 All right. Is there anybody else that wishes

6 to make some comments at this point in time?

7 You do, sir.

8 Okay. Stuart Leiderman, L-E-I-D-E-R-M-A-N.

9 STUART LEIDERMAN: I just have a

10 couple of brief remarks. The first is I think that

11 it's very important to put it on the public record

12 the qualifications and past experience and history

13 of success as project manager for this particular

14 project. I think there probably won't be any

15 objection to something like that. Because of the

16 way in which the projects are delegated first to

17 the regional offices and then to the various people

18 who are competent and experienced, the fate of the

19 project really must rest in the hands of the

20 project manager, and I am glad that Mike is here

21 tonight, and I am sure that it makes a lot of

22 difference to those of us affected by this problem

23 if we had the actual facts, evidence and were

1 entirely satisfied that he was the person for the
2 job and we were in good hands. So I think that
3 would go a long way towards having a good rapport.
4 It goes on in a period of time.
5 The second thing I would like to say is that
6 it's very clear to me that following the letter of
7 the law of the Superfund per se will not entirely
8 solve the problem and I do believe that the only
9 thing that will be satisfactory is a composite
10 attack on this problem, where E.P.A. is acting not
11 only on the Superfund area but enacting laws and
12 regulations and other ways to address problems not
13 specifically in regard or reference to Superfunds.
14 I think it's very important for the E.P.A. to
15 report to us all the other ways that it can use
16 congressionally delegated powers, executively
17 delegated powers, regulations, administrative
18 procedures, so on and so forth, to address what we
19 have been describing as basically loose ends, but
20 significant loose ends that surround this entire
21 problem.
22 I also believe that we need to bring in other
23 federal agencies. I think the text of the petition

1 alone describes this as more than a Superfund
2 problem, and I believe the solutions would rest
3 with many other agencies and levels of government
4 involved in it, and certainly public health areas
5 and planning and development in the Federal
6 Government and many others. At the State level,
7 there is no question that their corresponding
8 agencies must be involved, because of the
9 additional things other than just the Superfund
10 site itself that is defined in the Federal
11 Superfund Law. Also local government must be
12 involved with this. Also business organizations,
13 such as Chambers of Commerce, planning and
14 development organizations and agencies,
15 quasi-governmental groups in this area, all who
16 have entered in advocating, permitting, allowing,
17 watching, monitoring of any area in promoting the
18 use of that site as the place for which -- for I
19 suppose 10 to 12, 13 years was the place where
20 waste was permitted to go.
21 So that point addresses the need for a
22 solution. The solution does hold to the Superfund,
23 and because of it, the decision has to be made on

1 what office, what agency and which person. Will it
2 be the project manager that is here before us
3 tonight, someone who may not be here, or someone
4 who is not designated yet? There must be a lead
5 person or an agency to develop a comprehensive
6 solution to this, because beyond simply what is
7 covered under Superfund, I think it has been a lot
8 that E.P.A. has responded finally to this official
9 end to what it considers it to be its perhaps most
10 topical way of responding to the problem. And, you
11 know, you deserve our respect for that; however, it
12 does not respond to the problem as it's presented,
13 and we expect that the number of people sitting at
14 the tables at hearings from now on will probably
15 have to be broadened quite a bit, which would
16 include also some kind of meaningful public
17 participation program similar to the
18 Clean Water Act. I continue to be surprised,
19 shocked, dismayed that there isn't already a
20 designated citizens' committee that would work
21 alongside with officials, as is customary in water
22 pollution control areas involving the environment,
23 and I would hope in the future we could get to that

1 at least three plus a number of people involved and
2 concerned would be a great help.
3 The last thing I would like to say is a
4 historical note that may help put this in
5 perspective and perhaps help us evoke from you the
6 kind of information we need, which is what we are
7 going through right now is preventing you from
8 being on our side in every way. We need to know
9 that.
10 It was only about -- oh, it was about two years
11 ago early March when myself and three associates
12 drove into Ponca City, Oklahoma on a rainy, cold
13 morning very much like we have today. For many
14 years Ponca City -- the residents of Ponca City,
15 Oklahoma have been involved in a similar type of a
16 problem. I am sure some of you are familiar with
17 what happened there. It's the home to a Conoco oil
18 refinery that got out of control. Contamination
19 there went uphill. In the center of that town was
20 an iron casket to name the people who have died in
21 that town as a cause of the operating of the
22 refinery. People died of rare, exotic metabolic
23 diseases. Over 400 families demonstrated for

1 years, and in recent years they even camped out on
2 the lawn at the State Capitol; and this morning it
3 was announced that Conoco was offering to buy out
4 that town, essentially a $23 million purchase of at
5 least 400 homes. Now I believe that that is
6 totally without precedent and history of those who
7 have been experiencing these kinds of problems. I
8 also believe it's totally without precedent in
9 terms of raising defiance of the public spirit,
10 which we are all good neighbors and must live as
11 good neighbors. I believe that offer will be
12 rejected out of hand. It doesn't begin to solve
13 the problem, and it will only move the people out
14 and pollution in there, and I certainly don't want
15 to see that kind of thing befall this part of the
16 country as well.
17 Those of us who are concerned about these
18 things, some qualified experienced people,
19 technical people, citizens who are lay people have
20 been raising these issues for years, and I cannot
21 recall one time when we have ever really known, and
22 it's just a matter of time where all of us will
23 recognize how serious this is, how serious the one

down the road may be, and the ones that haven't yet been discovered. We have got to decide on working together on these things and using all of the resources and solving the problem the way it presents to us, not redefining the problem. So if one is to be helpful, I think that we may be able to find a solution.

Thank you.

MR. HUEBNER: Thank you. Are there other people that wish to comment at this time? Anybody else?

Okay. John Doggett.

JOHN DOGGETT: Number one, I just want to know from the E.P.A. are they going to do anything about putting a fence around that? That is just a question. That is the first one.

MR. HUEBNER: Okay. Could you repeat that again, please.

JOHN DOGGETT: We have a problem here. We have got a dump in our Town of North Hampton. We all know we have problems, and it's polluted. Can the State and not the town do anything by encompassing this area with a fence to

1 keep anybody from going in there until something is
2 done?
3 MR. HUEBNER: Okay. We
4 understand the question. Can we give this
5 gentleman an answer now or --
6 MR. COUGHLIN: I can give you
7 the answer that we gave about a year ago relative
8 to the fence. Our removal people evaluated the
9 site and the condition of the cover that was on the
10 site. The people from the A.T.S.D.R. evaluated the
11 site and wrote a report, which the site would be
12 protected from public health if the cover was
13 properly maintained, and there were signs posted
14 around the site. They do not feel that a fence at
15 this point in time was absolutely necessary. Now a
16 fence is part of the final remedy here as we get
17 into the process and start implementing the
18 cleanup.
19 JOHN DOGGETT: So it's posted
20 then.
21 MR. COUGHLIN: It's in posted
22 areas of a six-inch cover over the entire site.
23 JOHN DOGGETT: And that would be

1 to the western side?

2 MR. COUGHLIN: I am sorry.

3 JOHN DOGGETT: Is that on the

4 western side of the dump?

5 MR. ROBINETTE: That is the

6 entire landfill. The towns of North Hampton,

7 Portsmouth, and Coakley Landfill, Incorporated

8 received an administrative order telling them to

9 cover those portions of the ash that were exposed

10 with six inches of cover and then to maintain that

11 cover.

12 JOHN DOGGETT: The ash came in

13 from Pease Air Force Base?

14 MR. ROBINETTE: Yes.

15 JOHN DOGGETT: Second question

16 is can the Federal Government who represents Pease

17 Air Force Base represent what is in the ash, the

18 chemicals from Pease Air Force Base? And the

19 reason I ask this is prior to the Coakley dump, in

20 this little Town of North Hampton we had a dump in

21 South Hampton, which was filled up over the years,

22 and we had to have a new one. Hence we moved the

23 Coakley down, and we brought in Portsmouth and

1 Pease Air Force Base. There was never any
2 pollution before, but now all of a sudden we have a
3 lot of it. A lot of it is coming from outside the
4 town dumping there. So therefore, my question is
5 once again: Can they tell -- can the
6 Federal Government tell us specifically what was
7 dumped there from government installations?
8 MR. COUGHLIN: We can tell you,
9 as you already know, it was ash deposited there
10 from the resource recovery facility of the trash
11 incinerator on the Pease Air Force Base.
12 AUDIENCE PARTICIPANT: How about
13 speaking into the microphone.
14 MR. COUGHLIN: I am sorry.
15 JOHN DOGGETT: Thank you.
16 MR. COUGHLIN: We can tell you,
17 as you have already suggested, that there was ash
18 disposed of at the site from the Pease Air Force
19 Base. It was from an incinerator run by the City
20 of Portsmouth taking trash and waste from
21 surrounding communities as well as Pease itself.
22 We have in the administrative record at the library
23 the chemical analyses of all that ash material. We

1 also are aware of suggestions that other waste
2 materials were disposed of in landfills from the
3 Pease Air Force Base. We are still in the process
4 of evaluating and investigating those allegations.
5 That is all I can tell you. We can show you what
6 is in the landfill based on the data that we got
7 during the investigation.
8 JOHN DOGGETT: The other items
9 that we mentioned will that become a public record?
10 MR. COUGHLIN: It's all part of
11 an enforcement case that is being developed not
12 only just for the involvement of Pease but all the
13 responsible parties. How much actually would be
14 made public is really subject to question at this
15 time.
16 JOHN DOGGETT: Thank you.
17 MR. HUEBNER: Okay. Are there
18 any other people that wish to make comment at this
19 point in time?
20 AUDIENCE PARTICIPANT: I have a
21 question if I can get an answer. Is this
22 transcript going to be made available to the
23 people? Is the chemical analysis going to be made

1 available and all the results of your findings? I
2 am wondering if this transcript and the results of
3 your findings are going to be made available here
4 to the public.
5 MR. COUGHLIN: The transcript,
6 yes, will be made available. The data that I am
7 referring to is available already.
8 AUDIENCE PARTICIPANT: I mean
9 the transcript of this.
10 MR. COUGHLIN: Yes. Yes,
11 absolutely. No question about it.
12 MR. HUEBNER: Okay. Any other
13 comments?
14 Again I thank you all for coming. Remember I
15 reminded you that the deadline for getting your
16 written comments in is March 14, 1990.
17 AUDIENCE PARTICIPANT: May.
18 May. May.
19 MR. HUEBNER: May 14. Sorry.
20 Thank you. May 14, 1990.
21 Thank you for coming.
22
23 (Whereupon, at 8:50 p.m., the

1 hearing was adjourned.)

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1 C E R T I F I C A T E

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3 I, Marianne Kusa-Ryll, Registered Professional

4 Reporter, hereby certify the foregoing to be a true

5 and complete transcript of the proceedings held at

6 North Hampton Elementary School, 201 Atlantic Avenue,

7 North Hampton, New Hampshire, on Tuesday, April 3, 1990.

8

9 Marianne Kusa-Ryll

10 Marianne Kusa-Ryll, CSR, RPR

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ATTACHMENT D

SUPERFUND TECHNICAL ASSISTANCE GRANTS

United States
Environmental Protection
Agency

Office of
Solid Waste and
Emergency Response

Publication No. 9230.1-05/FS

January 1990

EPA Superfund Technical Assistance Grants

Office of Emergency and Remedial Response
Hazardous Site Control Division (OS-220)

Quick Reference Fact Sheet

WHAT ARE TECHNICAL ASSISTANCE GRANTS

Background of Program -- In 1980, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) -- otherwise known as "Superfund" -- established a trust fund for the cleanup of hazardous waste sites in the United States. CERCLA was amended and reauthorized when Congress passed the Superfund Amendments and Reauthorization Act (SARA) of 1986. The U.S. Environmental Protection Agency (EPA), working in concert with the States, is responsible for administering the Superfund program.

An important aspect of the Superfund program is citizen involvement at the local level in decision-making that relates to site-specific cleanup actions. For this reason, community outreach activities are underway at each of the 1,200 sites that are presently on, or proposed for listing on, the National Priorities List (NPL). The NPL is EPA's published list of the most serious abandoned or otherwise uncontrolled hazardous waste sites nationwide, which have been identified for possible remedial cleanup under Superfund.

Recognizing the importance of community involvement and the need for citizens living near NPL sites to be well-informed, Congress included provisions in SARA to establish a Technical Assistance Grant (TAG) Program intended to foster informed public involvement in decisions relating to site-specific cleanup strategies under Superfund.

In addition to regulatory and legal requirements, decisions concerning cleanup initiatives at NPL sites must take into account a range of technical considerations. These might include:

- Analytical profiles of conditions at the site;
- The nature of the wastes involved; and
- The kinds of technology available for performing the necessary cleanup actions.

The TAG Program provides funds for qualified citizens' groups to hire independent technical advisors to help them understand and comment on such technical factors in cleanup decisions affecting them.

Basic Provisions of the Technical Assistance Grants Program

- Grants of up to $50,000 are available to community groups for the purpose of hiring technical advisors to help citizens understand and interpret site-related technical information.
- The group must cover 20 percent of the total costs of the project to be supported by TAG funds.
- The group must budget the expenditure of grant funds to cover the entire cleanup period (which averages six years).
- There may be only one TAG award per NPL site; however, the grant may be renewed.

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USES OF TECHNICAL ASSISTANCE GRANTS

Citizen groups may use grant funds to hire technical advisors to help them understand information that already exists about the site or information developed during the Superfund cleanup process. Acceptable uses of these grant funds include payments to technical advisors for services such as:

- Reviewing site-related documents, whether produced by EPA or others;
- Meeting with the recipient group to explain technical information;
- Providing assistance to the grant recipient in communicating the group's site-related concerns;
- Disseminating interpretations of technical information to the community;
- Participating in site visits, when possible, to gain a better understanding of cleanup activities; and
- Traveling to meetings and hearings directly related to the situation at the site.

TAG funds may not be used to develop new information (for example, additional sampling) or to underwrite legal actions in any way, including the preparation of testimony or the hiring of expert witnesses.

You can obtain a complete list of eligible and ineligible uses of grant funds by contacting your EPA Regional Office or the Headquarters information number listed at the end of this pamphlet. In addition, this information is included in the EPA publication entitled *The Citizens' Guidance Manual for the Technical Assistance Grant Program* (OSWER Directive 9230.1-03), also available from your Regional EPA Office.

WHO MAY APPLY

As stated in the 1986 Superfund amendments, groups eligible to receive grants under the TAG program are those whose membership may be affected by a release or threatened release of toxic wastes at any facility listed on the NPL or proposed for listing, and where preliminary site work has begun. In general, eligible groups are groups of individuals who live near the site and whose health, economic well-being, or enjoyment of the environment are directly threatened. Any group applying for a TAG must be nonprofit and incorporated or working towards incorporation under applicable State laws. Applications are encouraged from:

- Groups that have a genuine interest in learning more about the technical aspects of a nearby hazardous waste site; and
- Groups that have, or intend to establish, an organization to manage a grant efficiently and effectively.

For example, such groups could be:

- Existing citizens' associations;
- Environmental or health advocacy groups; or
- Coalitions of such groups formed to deal with community concerns about the hazardous waste site and its impact on the surrounding area.

Groups that are not eligible for grant funds are:

- Potentially responsible parties: any individuals or companies (such as facility owners or operators, or transporters or generators of hazardous waste) potentially responsible for, or contributing to, the contamination problems at a Superfund site;
- Academic institutions;
- Political subdivisions; and
- Groups established and/or sustained by governmental entities (including emergency planning committees and some citizen advisory groups).

HOW TO APPLY FOR A GRANT

Requirements -- When applying for a TAG, a group must provide information to EPA (or to the State, if the State is administering the TAG program) to determine if the group meets specific administrative and management requirements. The application also must include a description of the group's history, goals, and plans for using the technical assistance funds. Factors that are particularly important in this evaluation process include:

- The group's ability to manage the grant in compliance with EPA grant and procurement regulations;
- The degree to which the group members' health, economic well-being, and enjoyment of the environment are adversely affected by a hazardous waste site;
- The group's commitment and ability to share the information provided by the technical advisor with others in the community;
- Broad representation of affected groups and individuals in the community; and;
- Whether the applicant group is nonprofit and incorporated for TAG purposes. (Only incorporated groups may receive grants. Groups must either be incorporated specifically for the purpose of addressing site-related problems or incorporated for broader purposes if the group has a substantial history of involvement at the site.)

In general, a group must demonstrate that it is aware of the time commitment, resources, and dedication needed to successfully manage a TAG. Applicant groups should consult *The Citizens' Guidance Manual For The Technical Assistance Grant Program* for detailed instructions on how to present such information.

Notification Procedures and Evaluation Criteria -- The 1986 Superfund amendments state that only one TAG may be awarded per site. To ensure that all eligible groups have equal access to technical assistance and an equal opportunity to compete for a single available grant (if a coalition of groups proves to be impossible), EPA has established a formal notification process, which includes the following steps:

- Groups wishing to apply for a technical assistance grant must first submit to EPA a short letter stating their group's desire to apply and naming the site(s) involved. If site project work is already underway or scheduled to begin, EPA will provide formal notice through mailings, meetings, or other public notices to other interested parties that a grant for the site soon may be awarded.
- Other potential applicants would then have 30 days to contact the original applicant to form a coalition.
- If potential applicants are unable to form a coalition, they will notify EPA within this time period and EPA will accept separate applications from all interested groups for an additional 30-day period.
- EPA would then award a grant to the application that best meets the requirements described above.

The maximum grant that can be awarded to any group is $50,000. The actual amount depends on what the group intends to accomplish. A group's minimum contribution of 20 percent of the total costs of the technical assistance project can be covered with cash and/or "in-kind" contributions, such as office supplies or services provided by the group. These services might include, for example, publication of a newsletter or the time an accountant donates to managing the group's finances. The value of donated professional services is determined based on rates charged for similar work in the area.

In special cases where an applicant group intends to apply for a single grant covering multiple sites in close proximity to each other, EPA can allow a waiver of the $50,000 grant limit. In such cases, however, the recipient cannot receive more than $50,000 for each site to which it intends to apply funds (example: 3 sites x $50,000 = maximum grant amount of $150,000).

CHOOSING A TECHNICAL ADVISOR

When choosing a technical advisor, a group should consider the kind of technical advice the group needs most and whether a prospective advisor has the variety of skills necessary to provide all of the advice needed. Each technical advisor must have:

- Knowledge of hazardous or toxic waste issues;
- Academic training in relevant fields such as those listed above; and
- The ability to translate technical information into terms understandable to lay persons.

In addition, a technical advisor should have:

- Experience working on hazardous waste or toxic waste problems;
- Experience in making technical presentations and working with community groups; and
- Good writing skills.

Technical advisors will need specific knowledge of one or more of these subjects:

Chemistry: Analysis of the chemical constituents and properties of wastes at the site;

Toxicology: Evaluation of the potential effects of site contaminants upon human health and the environment;

Epidemiology: Evaluation of the pattern of human health effects potentially associated with site contaminants;

Hydrology and Hydrogeology: Evaluation of potential contamination of area surface water and ground-water wells from wastes at the site;

Soil Science: Evaluation of potential and existing soil contamination;

Limnology: Evaluation of the impact of site runoff upon the plant and animal life of nearby streams, lakes, and other bodies of water;

Meteorology: Assessment of background atmospheric conditions and the potential spread of contaminants released into the air by the site; and/or

Engineering: Analysis of the development and evaluation of remedial alternatives and the design and construction of proposed cleanup actions.

A grant recipient may choose to hire more than one technical advisor to obtain the combination of skills required at a particular site. For example, a group may be unable to find a single advisor experienced in both hydrology and epidemiology, two of the skills most needed at its site. Another approach would be to hire a consulting firm that has experience in all the needed areas. *The Citizens' Guidance Manual for the Technical Assistance Grant Program* identifies other issues that citizens' groups may wish to consider in hiring a technical advisor.

ADDITIONAL INFORMATION

For further information on the application process or any other aspect of the TAG program, please contact your EPA Regional Office or call the national information number, both of which are listed below. An application package is available free by calling the EPA Regional Office for your State (see map on back cover). Each application package includes all the necessary application and certification forms as well as a copy of *The Citizen's Guidance Manual For The Technical Assistance Grant Program*. This manual contains sample forms with detailed instructions to assist you in preparing a TAG application.

EPA Superfund Offices

EPA Headquarters
Office of Emergency & Remedial Response
401 M Street, SW
Washington, DC 20460
(202) 382-2449

EPA Region 1
Emergency and Remedial Response Division
John F. Kennedy Building
Boston, MA 02203
(617) 573-5701
Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont

EPA Region 2
Superfund Branch
26 Federal Plaza
New York, NY 10278
(212) 264-4534
New Jersey, New York, Puerto Rico, Virgin Islands

EPA Region 3
Superfund Branch
841 Chestnut Building
Philadelphia, PA 19106
(215) 597-3239
Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia

EPA Region 4
Emergency and Remedial Response Branch
345 Courtland Street, NE
Atlanta, GA 30365
(404) 347-2234
Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee

EPA Region 5
Emergency and Remedial Response Branch
230 S. Dearborn Street
Chicago, IL 60604
(312) 886-1660
Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin

EPA Region 6
Superfund Program Branch
Allied Bank Tower
1445 Ross Avenue
Dallas, TX 75202-2733
(214) 655-2200
Arkansas, Louisiana, New Mexico, Oklahoma, Texas

EPA Region 7
Superfund Branch
726 Minnesota Avenue
Kansas City, KS 66101
(913) 236-2803
Iowa, Kansas, Missouri, Nebraska

EPA Region 8
Waste Management Division
1 Denver Place
999 18th Street
Denver, CO 80202-2413
(303) 564-7040
Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming

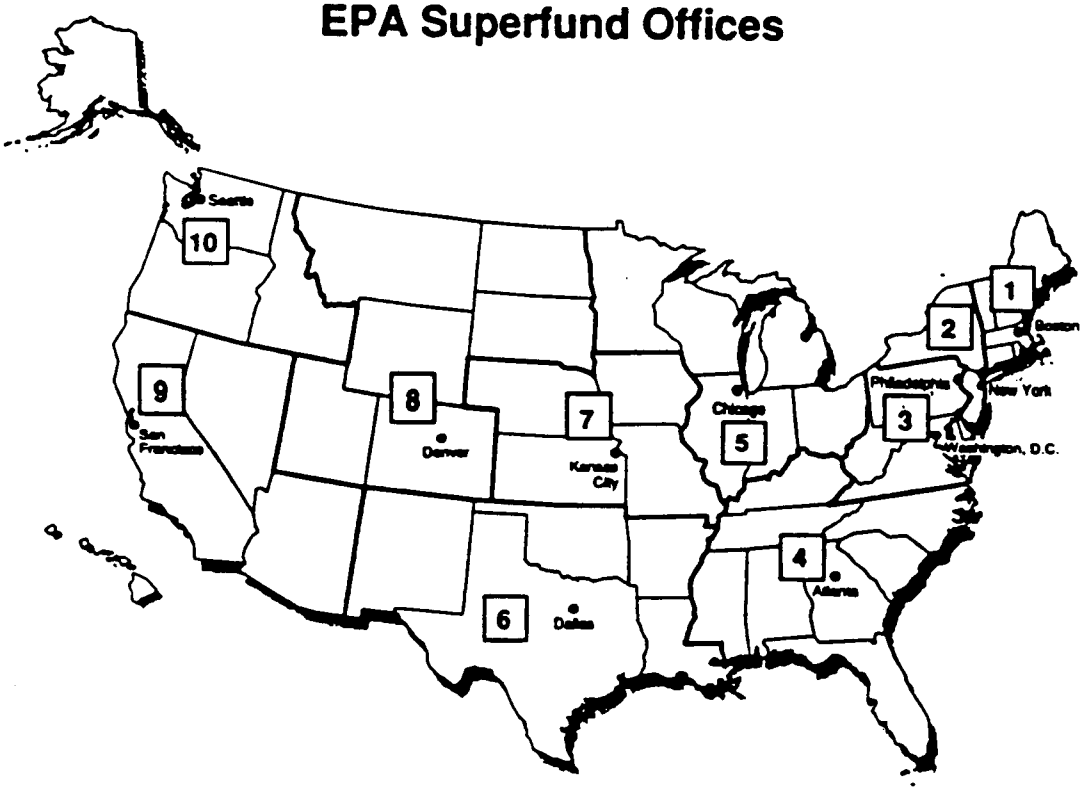
EPA Region 9
Superfund Programs Branch
215 Fremont Street
San Francisco, CA 94105
(415) 454-744-1766
Arizona, California, Guam, Hawaii, Nevada, American Samoa

EPA Region 10
Superfund Branch
1200 6th Avenue
Seattle, WA 98101
(206) 442-0603
Idaho, Oregon, Washington, Alaska

Superfund/RCRA Hotline
(800) 424-9346 or 382-3000
in the Washington, DC, metropolitan area (for information on programs)

National Response Center (800) 424-8802
(to report releases of oil and hazardous substances)

EPA Superfund Offices



APPENDIX D

STATE CONCURRENCE

State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES
WASTE MANAGEMENT DIVISION
6 Hazen Drive, Concord, NH 03301-6509
603-271-2900
TTY/TDD 1-800-992-3312 or 225-4033

ROBERT W. VARNEY
COMMISSIONER

PHILIP J. O'BRIEN
DIRECTOR

MICHAEL A. SILLS, Ph.D., P.E.
CHIEF ENGINEER

WASTE MANAGEMENT COUNCIL
G. BRADLEY RICHARDS, Chairman
ROBERT WHEELER, Vice-Chairman
WILLIAM ARNOLD
ROBERT BURROWS
VIRGINIA IRWIN
WILLIAM JENNESS
JOHN LAVALLEE
JOHN LECRAW
FREDERICK MCGARRY
JOHN OSGOOD
LORRAINE SANDER
T. TAYLOR EIGHMY, Ph.D.

June 28, 1990

Ms. Julia Belaga
Regional Administrator
U.S. Environmental Protection Agency
JFK Federal Building
Boston, MA 02203

Re: Declaration of Concurrence with Record of Decision
Coakly Landfill Site
North Hampton, NH

Dear Ms. Belaga:

This office has reviewed the above referenced Record of Decision and concurs with the USEPA that the selected remedy is consistent with the rules and regulations of applicable or relevant and appropriate state standards. Furthermore, if the project utilizes the trust fund, the state will provide a 50 percent match and operational support for the project if state funds are available.

Very truly yours,

Philip J. O'Brien, Ph.D.,
Director
Waste Management Division

Robert W. Varney
Commissioner

PJO/RWV/jd/12820
cc: Michael A. Sills, Ph.D, P.E., NHDES-WMD
Carl W. Baxter, P.E., NHDES-WMEB
Anne Renner, Esq., NHAGO

PRINTED ON RECYCLED PAPER

APPENDIX E

ADMINISTRATIVE RECORD INDEX

Coakley Landfill

NPL Site Administrative Record

Index

Compiled: May 10, 1988
Updated: December, 1988
Updated: March 2, 1990
ROD Signed: June 28, 1990

Prepared for

Region I
Waste Management Division
U.S. Environmental Protection Agency

With Assistance from

AMERICAN MANAGEMENT SYSTEMS, INC.
One Kendall Square, Suite 2200 • Cambridge, Massachusetts 02139 • (617) 577-9915

Coakley Landfill
NPL Site Administrative Record

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NPL Site Administrative Record

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Administrative Record Index

Introduction

This document is the Index to the Administrative Record for the Coakley Landfill National Priorities List (NPL) site. Section I of the Index cites site-specific documents, and Section II cites guidance documents used by EPA staff in selecting a response action at the site.

The Administrative Record is available for public review at EPA Region I's Office in Boston, Massachusetts, and at the North Hampton Public Library, 235 Atlantic Avenue, North Hampton, New Hampshire 03862. Questions concerning the Administrative Record should be addressed to the EPA Region I site manager.

The Administrative Record is required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA).

Section I

Site-Specific Documents

ADMINISTRATIVE RECORD INDEX

for the

Coakley Landfill NPL Site

1.0 Pre-Remedial

1.2 Preliminary Assessment

1. "Potential Hazardous Waste Site - Preliminary Assessment" Form, EPA Region I (August 25, 1983).

1.7 Correspondence Related to Proposal of a Site to the NPL

1. Letter from Gordon J. Humphrey and Warren B. Rudman, U.S. Senate to Michael R. Deland, EPA Region I (July 26, 1983). Concerning the submission of sites for inclusion on the EPA National Priorities List for Superfund.
2. Letter from Norman E. D'Amours, U.S. House of Representatives to Lee M. Thomas, EPA Headquarters (July 28, 1983). Concerning the consideration of the Coakley Landfill site for National Priorities List inclusion.
3. Letter from Michael R. Deland, EPA Region I to Rex Lambert (August 25, 1983). Concerning assistance and continuing efforts on issues related to the Coakley Landfill Site.
4. Letter from Alan Cranston, U.S. Senate to Lee M. Thomas, EPA Headquarters (August 29, 1983). Concerning support for the inclusion of the Coakley Landfill Site on the National Priorities List.
5. Letter from Norman E. D'Amours, U.S. House of Representatives to Michael R. Deland, EPA Region I (September 14, 1983). Concerning well contamination.
6. Letter from Gordon J. Humphrey, U.S. Senate to William D. Ruckelshaus, EPA Headquarters (September 21, 1983). Concerning proposed update to the National Priorities List.
7. Letter from Rex Lambert to Michael R. Deland, EPA Region I (September 30, 1983). Concerning the request for inclusion of the Coakley Landfill Site on the National Priorities List.
8. Letter from Dudley W. Dudley, State of New Hampshire Executive Department to William D. Ruckleshaus, EPA Headquarters (October 11, 1983). Concerning the addition of the Coakley Landfill Site to the National Priorities List.
9. Letter from John H. Sununu, Governor of the State of New Hampshire to Russell H. Wyer, EPA Headquarters (October 18, 1983). Concerning proposed update to the National Priorities List.
10. Letter from William A. Healy, State of New Hampshire Water Supply and Pollution Control Commission to Russell H. Wyer, EPA Headquarters (October 31, 1983). Concerning the request for inclusion of the Coakley Landfill Site on the National Priorities List.
11. Letter from Robert A. Shatten, EPA Region I to Michael P. Donahue, State of New Hampshire Water Supply and Pollution Control Commission (October 5, 1984). Concerning the attached site description for the Coakley Landfill.

1.8 Responses to Comments on the Proposal

1. Letter from Jack W. McGraw and Lee M. Thomas, EPA Headquarters to Gordon J. Humphrey, U.S. Senate (October 25, 1983). Concerning the discovery of new information on the Coakley Landfill Site.
2. Letter from John F. Zipeto, EPA Region I to Rex Lambert (November 1, 1983). Concerning a revised calculation of the Hazard Ranking System (HRS) score for the site.
3. Letter from John F. Zipeto, EPA Region I to Alice F. Buckley (November 3, 1983). Concerning the proposed amendment to the Superfund National Priorities List.
4. Letter from John F. Zipeto, EPA Region I to Edmond F. Gauron (November 3, 1983). Concerning the proposed amendment to the Superfund National Priorities List.
5. Letter from John F. Zipeto, EPA Region I to Ruth C. Martin (November 3, 1983). Concerning the proposed amendment to the Superfund National Priorities List.
6. Letter from William N. Hedeman, Jr., EPA Headquarters to Dudley W. Dudley, State of New Hampshire Executive Department (November 3, 1983). Concerning the discovery of new information on the Coakley Landfill Site.
7. Letter from Russell H. Wyer, EPA Headquarters to John H. Sununu, Governor of the State of New Hampshire (December 16, 1983). Concerning the discovery of new information on the Coakley Landfill Site.
8. Letter from Jack W. McGraw for Lee M. Thomas, EPA Headquarters to Norman E. D'Amours, U.S. House of Representatives (December 29, 1983). Concerning the discovery of new information on the Coakley Landfill Site.

1.12 Hazard Ranking Package

1. Letter from Andrew M. Platt, The MITRE Corporation to Peter McGlew, EPA Region I (December 1, 1983). Concerning the scoring of Coakley Landfill and attached HRS worksheets and documentation (September 20, 1983).

1.18 FIT Technical Direction Documents (TDDs) and Associated Records

1. Draft "Information Summary on the Coakley Landfill Site," NUS Corporation (August 12, 1983).

3.0 Remedial Investigation (RI)

3.1 Correspondence

1. Letter from Michael P. Donahue, State of New Hampshire Water Supply and Pollution Control Commission to Stanley Knowles, Town of North Hampton Board of Selectmen (October 1, 1985). Concerning update on Coakley Landfill Hydrogeological Activities.
2. Letter from Michael J. Robinette, State of New Hampshire Water Supply and Pollution Control Commission to Stanley Knowles, Town of North Hampton Board of Selectmen (March 31, 1986). Concerning monthly summary of Coakley Landfill Remedial Investigation/Feasibility Study.
3. Meeting Agenda and Notes, State of New Hampshire Water Supply and Pollution Control Commission, EPA Region I, Roy F. Weston, Inc. and GZA Corporation (April 10, 1986).

3.1 Correspondence (cont'd.)

4. Letter from Carl W. Baxter for Michael J. Robinette, State of New Hampshire Water Supply and Pollution Control Commission to Town of North Hampton Board of Selectmen (May 5, 1986). Concerning monthly update of Coakley Landfill Remedial Investigation/Feasibility Study.
5. Letter from Michael J. Robinette, State of New Hampshire Water Supply and Pollution Control Commission to Walter Lermer, Town of North Hampton Board of Selectmen (June 2, 1986). Concerning monthly summary of Coakley Landfill Remedial Investigation/Feasibility Study.
6. Letter from Michael J. Robinette, State of New Hampshire Water Supply and Pollution Control Commission to Walter Lermer, Town of North Hampton Board of Selectmen (July 2, 1986). Concerning monthly summary of Coakley Landfill Remedial Investigation/Feasibility Study.
7. Letter from Michael J. Robinette, State of New Hampshire Water Supply and Pollution Control Commission to Walter Lermer, Town of North Hampton Board of Selectmen (August 1, 1986). Concerning monthly summary of Coakley Landfill Remedial Investigation/Feasibility Study.
8. Letter from Michael J. Robinette, State of New Hampshire Water Supply and Pollution Control Commission to Walter Lermer, Town of North Hampton Board of Selectmen (October 3, 1986). Concerning monthly summary of Coakley Landfill Remedial Investigation/Feasibility Study.
9. Letter from Michael J. Robinette, State of New Hampshire Water Supply and Pollution Control Commission to Walter Lermer, Town of North Hampton Board of Selectmen (December 15, 1986). Concerning monthly summary of Coakley Landfill Remedial Investigation/Feasibility Study.
10. Letter from Paul N. Marchessault, EPA Region I to Michael J. Robinette, State of New Hampshire Water Supply and Pollution Control Commission (December 23, 1986). Concerning revisions to the proposed monitoring well installation, chemical quality sampling, and test pitting plans.
11. Letter from Michael J. Robinette, State of New Hampshire Water Supply and Pollution Control Commission to Walter Lermer, Town of North Hampton Board of Selectmen (February 20, 1987). Concerning monthly summary of Coakley Landfill Remedial Investigation/Feasibility Study.
12. Letter from Michael J. Robinette, State of New Hampshire Office of Waste Management to Town of North Hampton Board of Selectmen (June 30, 1987). Concerning monthly summary of Coakley Landfill Remedial Investigation/Feasibility Study.
13. Letter from Michael J. Robinette, State of New Hampshire Office of Waste Management to Town of North Hampton Board of Selectmen (August 11, 1987). Concerning monthly summary of Coakley Landfill Remedial Investigation/Feasibility Study.
14. Letter from Michael J. Robinette, State of New Hampshire Office of Waste Management to Town of North Hampton Board of Selectmen (September 8, 1987). Concerning monthly summary of Coakley Landfill Remedial Investigation/Feasibility Study.
15. Letter from Barry L. Johnson, U.S. Department of Health and Human Services Public Health Service Agency for Toxic Substances and Disease Registry (ATSDR) to Lillian E. Wylie (January 14, 1988). Concerning request for Health Assessment.

3.2 Sampling and Analysis Data

1. Letter from Kevin H. Hopkins, State of New Hampshire Department of Environmental Services to Peter H. Thompson (March 30, 1987). Concerning attached solid waste ash test results.

3.4 Interim Deliverables

The record cited in entry 1 may be reviewed, by appointment only, at EPA Region I, Boston, Massachusetts.

1. "Draft Project Operation Plan," Roy F. Weston, Inc. (May 28, 1986).
2. Letter from Wayne T. Wirtanen, EPA Region I to Dan Coughlin, EPA Region I (September 16, 1986). Concerning attached Project Operations Plan "Quality Assurance Acceptance" Form.

3.5 Applicable or Relevant and Appropriate Requirements (ARARs)

1. Letter from Emily S. Bernheim, State of New Hampshire, Office of the Attorney General to Paul N. Marchessault, EPA Region I (September 14, 1988). Concerning attached contaminant and location-specific ARARs, with synopsis and discussion of necessary action to attain ARARs.

3.6 Remedial Investigation (RI) Reports

Reports

1. "Remedial Investigation - Coakley Landfill - Volume One," Roy F. Weston, Inc. and Goldberg-Zoino and Associates, Inc. for the State of New Hampshire Department of Environmental Services (October 1988).
2. "Remedial Investigation - Coakley Landfill - Volume Two," Roy F. Weston, Inc. and Goldberg-Zoino and Associates, Inc. for the State of New Hampshire Department of Environmental Services (October 1988).
3. "Remedial Investigation - Coakley Landfill - Volume Three," Roy F. Weston, Inc. and Goldberg-Zoino and Associates, Inc. for the State of New Hampshire Department of Environmental Services (October 1988).

Comments

4. Comments Dated December 13, 1988 from Robert J. Gallo, McNeill, Taylor & Dolan (Attorney for the Towns of New Castle and North Hampton) with attached Comments Dated December 9, 1988 from David Woodhouse, Quest Environmental Sciences, Inc. on the October 1988 "Remedial Investigation," Roy F. Weston, Inc. and Goldberg-Zoino and Associates Inc. for the State of New Hampshire Department of Environmental Services.
5. Comments Dated December 20, 1988 from Kevin C. Devine, Devine & Nyquist (Attorney for Coakley Landfill, Inc.) on the October 1988 "Remedial Investigation," Roy F. Weston, Inc. and Goldberg-Zoino and Associates Inc. for the State of New Hampshire Department of Environmental Services.
6. Comments Dated January 6, 1989 from E. Tupper Kinder, Ransmeier & Spellman (Attorney for the City of Portsmouth) with attached Comments Dated December 19, 1988 from Thomas E. Roy and George G. Draper III, Aries Engineering, Inc. on the October 1988 "Remedial Investigation," Roy F. Weston, Inc. and Goldberg-Zoino and Associates Inc. for the State of New Hampshire Department of Environmental Services.

3.9 Health Assessments

1. Memorandum from Marilyn R. DiSirio, U.S. Department of Health and Human Services Public Health Service Agency for Toxic Substances and Disease Registry (ATSDR) to Dennis Huebner and Donald Berger, EPA Region I (August 18, 1988). Concerning site access and posting.
2. "Health Assessment for Coakley Landfill, North Hampton, New Hamphshire," Department of Health and Human Services Public Health Service Agency for Toxic Substances and Disease Registry (ATSDR) (October 13, 1988).

4.0 Feasibility Study (FS)

4.2 Sampling and Analysis Data

1. Memorandum from Peter R. Kahn, EPA Region I to Paul N. Marchessault, EPA Region I (May 23, 1989) with attached "Residential Indoor Air Study Sampling Results," EPA Region I (May 1989).
2. Letter from Paul N. Marchessault, EPA Region I to Lillian E. Wylie (June 26, 1989). Concerning "Residential Indoor Air Study Sampling Results," EPA Region I (May 1989) and attached Memorandum from Louise House, U.S. Department of Health and Human Services Public Health Service Agency for Toxic Substances and Disease Registry (ATSDR) to Paul N. Marchessault, EPA Region I (June 8, 1989).

4.5 Applicable or Relevant and Appropriate Requirements (ARARs)

1. Letter from Michael J. Robinette, State of New Hampshire Department of Environmental Services to Steven J. Calder, EPA Region I (February 12, 1990). Concerning action level for phenols.

4.6 Feasibility Study (FS) Reports

Reports

1. "Draft Feasibility Study," Roy F. Weston, Inc. for the State of New Hampshire Department of Environmental Services (May 1989).
2. Memorandum from Steven J. Calder, EPA Region I to File (February 22, 1990). Concerning updated information on the estimated costs of the ground water treatment preferred remedy.

Comments

Comments on the Feasibility Study (FS) Report received by EPA Region I during the formal public comment period are filed and cited in 5.3 Responsiveness Summaries.

4.9 Proposed Plans for Selected Remedial Action

Reports

1. "EPA Proposes Cleanup Plan for Coakley Landfill Site," EPA Region I (February 1990).

Comments

Comments on the Proposed Plan received by EPA Region I during the formal public comment period are filed and cited in 5.3 Responsiveness Summaries.

5.0 Record of Decision (ROD)

5.3 Responsiveness Summaries

1. Cross Reference: Responsiveness Summary is Appendix "C" of the Record of Decision [Filed and cited as entry number 1 in 5.4 Record of Decision (ROD)].

The following citations indicate written comments received by EPA Region I during the formal public comment period.

2. Comments Dated March 15, 1990 from Citizens Organized Against Seacoast Toxics (COAST) on the February 1990 "EPA Proposes Cleanup Plan for Coakley Landfill Site," EPA Region I.
3. Comments Dated April 3, 1990 from Lillian E. Wylie on the February 1990 "EPA Proposes Cleanup Plan for Coakley Landfill Site," EPA Region I.
4. Comments Dated April 3, 1990 from Tammy Wylie on the February 1990 "EPA Proposes Cleanup Plan for Coakley Landfill Site," EPA Region I.
5. Letter from Susan Frank, EPA Region I to Pam Schwotzer, North Hampton Public Library (April 19, 1990). Concering transmittal of the attached transcript of April 3, 1990 Proposed Plan public hearing at North Hampton Elementary School.
6. Comments Dated May 2, 1990 from Judith C. Melvin on the February 1990 "EPA Proposes Cleanup Plan for Coakley Landfill Site," EPA Region I.
7. Comments Dated May 3, 1990 from Elmer M. Sewall on the February 1990 "EPA Proposes Cleanup Plan for Coakley Landfill Site," EPA Region I.
8. Comments Dated May 12, 1990 from Laurel Flax, Hampton Water Works Co. on the February 1990 "EPA Proposes Cleanup Plan for Coakley Landfill Site," EPA Region I.
9. Cross Reference: Letter from Thomas G. Fiore, Morrison, Mahoney & Miller (Attorney for Coakley Landfil Steering Committee) to Steven J. Calder, EPA Region I (May 14, 1990). Concerning transmittal of attached comments dated May 14, 1990 from ENVIRON Corporation for the Coakley Landfill Steering Committee on the February 1990 "EPA Proposes Cleanup Plan for Coakley Landfill Site," EPA Region I. [Filed as an attachment to entry number 1 in 5.3 Responsiveness Summaries].
10. Comments (Petition) from Citizens Organized Against Seacoast Toxics (COAST) on the February 1990 "EPA Proposes Cleanup Plan for Coakley Landfill Site," EPA Region I.
11. Comments from Lillian E. Wylie on the February 1990 "EPA Proposes Cleanup Plan for Coakley Landfill Site," EPA Region I.
12. Comments from Lillian E. Wylie on the February 1990 "EPA Proposes Cleanup Plan for Coakley Landfill Site," EPA Region I.
13. Comments (Petition) from Shawn Wylie, et al. on the February 1990 "EPA Proposes Cleanup Plan for Coakley Landfill Site," EPA Region I.
14. Comments from Doug Bogen, Great Bay Region Greens on the February 1990 "EPA Proposes Cleanup Plan for Coakley Landfill Site," EPA Region I.

5.4 Record of Decision (ROD)

1. Record of Decision, EPA Region I (June 28, 1990).

9.0 State Coordination

9.2 Cooperative Agreements

1. Memorandum from David G. Scott, State of New Hampshire, Office of State Planning to EPA Region I (June 11, 1985). Concerning concurrence with the Intergovernmental Review Process and the attached "Request for Review."
2. Memorandum from Merrill S. Hohman, EPA Region I to Michael R. Deland, EPA Region I (August 12, 1985). Concerning recommendation to award Cooperative Agreement to the State of New Hampshire.
3. "EPA Assistance Agreement/Amendment" Form, State of New Hampshire (August 12, 1985).
4. "EPA Assistance Agreement/Amendment" Form, State of New Hampshire (April 9, 1987).

10.0 Enforcement

10.3 State and Local Enforcement Records

1. Letter from Brian C. Strohm, State of New Hampshire Department of Health and Welfare to Town of North Hampton Board of Selectmen (December 6, 1983). Concerning the arrangement of an upcoming meeting.
2. Letter from Brian C. Strohm, State of New Hampshire Department of Health and Welfare to Calvin Canney, Town of North Hampton (December 6, 1983). Concerning the arrangement of an upcoming meeting.
3. Letter from Brian C. Strohm, State of New Hampshire Department of Health and Welfare to Ronald C. Coakley, Coakley Landfill, Inc. (December 6, 1983). Concerning the arrangement of an upcoming meeting.
4. Letter from Brian C. Strohm, State of New Hampshire Department of Health and Welfare to Ronald C. Coakley, Coakley Landfill, Inc. (February 29, 1984). Concerning the summary of the January 23, 1984 meeting.
5. Letter from Brian C. Strohm, State of New Hampshire Department of Health and Welfare to Town of North Hampton Board of Selectmen (February 29, 1984). Concerning the summary of the January 23, 1984 meeting.
6. Letter from Brian C. Strohm, State of New Hampshire Department of Health and Welfare to Calvin Canney, Town of North Hampton (February 29, 1984). Concerning the summary of the January 23, 1984 meeting.
7. Letter from George Dana Bisbee, State of New Hampshire, Office of the Attorney General to Paul Kent, Town of Newington Board of Selectmen (December 28, 1984). Concerning the state's request for funding a Remedial Investigation/Feasibility Study.
8. Letter from George Dana Bisbee, State of New Hampshire, Office of the Attorney General to Robert A. Southworth, Town of North Hampton Board of Selectmen (December 28, 1984). Concerning the state's request for funding a Remedial Investigation/Feasibility Study.
9. Letter from George Dana Bisbee, State of New Hampshire, Office of the Attorney General to Richard Carroll, Pease Air Force Base (December 28, 1984). Concerning the state's request for funding a Remedial Investigation/Feasibility Study.
10. Letter from George Dana Bisbee, State of New Hampshire, Office of the Attorney General to James Flynn, City of Portsmouth (December 28, 1984). Concerning the state's request for funding a Remedial Investigation/Feasibility Study.

10.3 State and Local Enforcement Records (cont'd.)

11. Letter from George Dana Bisbee, State of New Hampshire, Office of the Attorney General to Kevin C. Devine, Devine, Millimet, Stahl & Branch, Professional Association (December 28, 1984). Concerning the state's request for funding a Remedial Investigation/Feasibility Study.
12. Letter from George Dana Bisbee, State of New Hampshire, Office of the Attorney General to Douglas Woodward, Town of New Castle (December 28, 1984). Concerning the state's request for funding a Remedial Investigation/Feasibility Study.
13. Letter from George Dana Bisbee, State of New Hampshire, Office of the Attorney General to John Moebes, EPA Region I (December 28, 1984). Concerning the State of New Hampshire's request for EPA funding and technical assistance to carry out a Remedial Investigation/Feasibility Study.

11.0 Potentially Responsible Party (PRP)

11.9 PRP-Specific Correspondence

1. Letter from Merrill S. Hohman, EPA Region I to Jeremy Waldron, Coakley Landfill, Inc. (February 2, 1990). Concerning notice of potential liability with attached mailing list of Potentially Responsible Parties.
2. Letter from Merrill S. Hohman, EPA Region I to Potentially Interested Parties (March 2, 1990). Concerning special interest and remedy selection.
3. Letter from Merrill S. Hohman, EPA Region I to Potentially Interested Parties (March 21, 1990). Concerning special interest and remedy selection.
4. Letter from E. Tupper Kinder, Ransmeier & Spellman (Attorney for the Temporary PRP Steering Committee) to Steven J. Calder, EPA Region I and Timothy E. Williamson, EPA Region I (March 23, 1990) with "Attachment A - Temporary Steering Committee - Coakley Landfill". Concerning request for thirty-day extension on deadline for submission of comments on proposed remedial plan.

13.0 Community Relations

13.1 Correspondence

1. Letter from Michael R. Deland, EPA Region I to Raymond F. Hennessey, Mayor of the City of Dover, New Hampshire (October 3, 1983). Concerning the assessment for Superfund ranking and support for the state's negotiations with Ronald C. Coakley.
2. Letter from John F. Zipeto, EPA Region I to Ruth Martin, New Hampshire People's Alliance (March 1, 1984). Concerning the attached concerns of Ruth Martin and Dale McLeod about the Coakley Landfill Site.
3. Letter from John F. Zipeto, EPA Region I to Ruth Martin, New Hampshire People's Alliance (January 11, 1985). Concerning responses to questions about the Coakley Landfill Site raised at the November 1, 1984 meeting.
4. Letter from Robert J. Ankstitus, EPA Region I to Ruth Martin, Citizens Organized Against Seacoast Toxics (COAST) (January 22, 1985). Concerning the July 20, 1984 site investigation and assessment activities at Coakley Landfill Site.
5. Letter from Lillian E.Wylie, Citizens Organized Against Seacoast Toxics (COAST) to Michael R. Deland, EPA Region I (February 9, 1985). Concerning the attached newspaper clippings.
6. Letter from Lillian E. Wylie, Citizens Organized Against Seacoast Toxics (COAST) to Michael R. Deland, EPA Region I (February 20, 1985). Concerning the clean-up of Coakley Landfill Site.

13.1 Correspondence (cont'd.)

7. "New Hampshire Questions," Martha Bailey, New Hampshire Hazards Campaign (June 26, 1985). Concerning municipal and private drinking water wells.
8. Cross-Reference: Letter from Paul N. Marchessault, EPA Region I to Lillian E. Wylie (June 26, 1989). Concerning "Residential Indoor Air Study Sampling Results," EPA Region I (May 1989) and attached Memorandum from Louise House, U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR) to Paul N. Marchessault, EPA Region I (June 8, 1989) [Filed and cited as entry number 2 in 4.2 Sampling and Analysis Data].
9. "Coakley Landfill," New Hampshire Toxic Hazards Campaign Inc. Concerning testing of four residential bedrock wells and air sampling in three homes.

13.2 Community Relations Plans

1. "Community Relations Plan," State of New Hampshire Department of Environmental Services (January 1986).

13.3 News Clippings/Press Releases

News Clippings

1. "The United States Environmental Protection Agency Invites Public Comment on the Feasibility Study and Proposed Plan for the Coakley Landfill Site in North Hampton, New Hampshire and Announces the Availability of the Site Administrative Record," Portsmouth Herald - Portsmouth, NH (March 9, 1990).
2. "The United States Environmental Protection Agency Invites Public Comment on the Feasibility Study and Proposed Plan for the Coakley Landfill Site in North Hampton, New Hampshire and Announces the Availability of the Site Administrative Record," Foster's Daily Democrat - Dover, NH (March 9, 1990).

Press Releases

3. "Environmental News - Media Advisory," EPA Region I (October 25, 1988).
4. "Environmental News - EPA Announces Public Meeting to Explain Proposed Cleanup Plan for the Coakley Landfill Superfund Site," EPA Region I (March 7, 1990).
5. "Environmental News - EPA Announces Extension of Public Comment Period on Cleanup Plan for the Coakley Landfill Superfund Site," EPA Region I (March 30, 1990).
6. "Environmental News - Coakley Landfill Remedial Investigation Announced," State of New Hampshire Department of Environmental Services.

13.4 Public Meetings

1. Draft "Hydrogeological Investigation of the Coakley Landfill Site, North Hampton, New Hampshire," EPA Region I (January 9, 1986).
2. "Informational Notice," State of New Hampshire Water Supply and Pollution Control Commission (April 1986).
3. State of New Hampshire Water Supply and Pollution Control Commission Meeting Agenda, Public Meeting for the Coakley Landfill Site (May 14, 1986). Concerning the Remedial Investigation/Feasibility Study.

13.4 Public Meetings (cont'd.)

4. State of New Hampshire Department of Environmental Services Meeting Agenda, Public Informational Meeting for the Coakley Landfill Site (November 3, 1988). Concerning Remedial Investigation presentation and representatives available for question and answer period.
5. Letter from Jill M. Paradis, Ebasco Services Incorporated to Paul N. Marchessault, EPA Region I (March 1, 1989). Concerning transmittal of attached "Final Public Meeting Summary," of the November 3, 1988 Remedial Investigation Public Meeting.
6. "Public Meeting Summary - Coakley Landfill Site," (March 15, 1990).
7. Cross-Reference: Letter from Susan Frank, EPA Region I to Pam Schwotzer, North Hampton Public Library (April 19, 1990). Concerning transmittal of the attached transcript of April 3, 1990 Proposed Plan public hearing at North Hampton Elementary School. [Filed and cited as entry number 5 in 5.3 Responsiveness Summaries].

13.5 Fact Sheets

1. "State of New Hampshire Releases Results of Remedial Investigation," EPA Region I (October 1988).

14.0 Congressional Relations

14.1 Correspondence

1. "Coakley Landfill Tour," Agenda, EPA Region I (August 18, 1983).
2. Letter from Michael R. Deland, EPA Region I to Norman E. D'Amours, U.S. House of Representatives (September 14, 1983). Concerning assessment for Superfund ranking and support for the state's negotiations with Ronald C. Coakley.
3. Letter from Gordon J. Humphrey, U.S. Senate to Michael R. Deland, EPA Region I (September 27, 1988). Concerning attached letter from Dean Merchant, State of New Hampshire House of Representatives to Gordon J. Humphrey, U.S. Senate (September 19,1988) regarding construction of a fence at the Coakley Landfill.
4. Letter from Paul Keough for Michael R. Deland, EPA Region I to Gordon J. Humphrey, U.S. Senate (October 25, 1988). Concerning construction of a fence at the Coakley Landfill.
5. Letter from Paul Keough for Michael R. Deland, EPA Region I to Gordon J. Humphrey, U.S. Senate (March 20, 1989). Concerning soil sample results.

16.0 Natural Resource Trustee

16.1 Correspondence

1. Letter from Gordon E. Beckett, U.S. Department of the Interior, Fish and Wildlife Service to Paul N. Marchessault, EPA Region I (July 21, 1987). Concerning the development and review of draft documents and activities relating to Department of the Interior trust resources.
2. Letter from Kenneth Finkelstein, U.S. Department of Commerce National Oceanic and Atmospheric Administration to Paul N. Marchessault, EPA Region I (June 30, 1988). Concerning anadromous species and off-site migration of contaminants.

16.4 Trustee Notification Form and Selection Guide

1. Letter from Patricia L. Meaney for Merrill S. Hohman, EPA Region I to William Patterson, U.S. Department of the Interior (May 15, 1987). Concerning the attached "Trustee Notification Form," EPA Region I.

16.5 Technical Issue Papers

1. "Preliminary Natural Resource Survey - Findings of Fact," U.S. Department of Commerce National Oceanic and Atmospheric Administration (August 23,1989).

17.0 Site Management Records

17.4 Site Photographs/Maps

The record cited below may be reviewed by appointment only, at EPA Region I, Boston, Massachusetts.

1. "Site Analysis Coakley Landfill," EPA Environmental Monitoring Systems Laboratory (March 1985).

17.8 State and Local Technical Records

1. Letter from Michael P. Donahue, State of New Hampshire Water Supply and Pollution Control Commission to Mark Aldrich, Office of the U.S. Senator Gordon S. Humphrey (March 17, 1983). Concerning the chronology of events following the discovery of volatile organic chemicals in well water near the Coakley Landfill Site.
2. Letter from Dan H. Allen, State of New Hampshire Water Supply and Pollution Control Commission to Robert A. Southworth, Town of North Hampton Board of Selectmen (July 18, 1983). Concerning water sampling of Little River and North Brook.
3. Letter from Michael P. Donahue, State of New Hampshire Water Supply and Pollution Control Commission to Stanley Knowles, Town of North Hampton Board of Selectmen (May 29, 1985). Concerning drilling program for Coakley Landfill Study.
4. Letter from Patricia L. Meaney for Merrill S. Hohman, EPA Region I to Martha Bailey (June 28, 1985). Concerning specific questions regarding three NPL sites.
5. Letter from Michael P. Donahue, State of New Hampshire Water Supply and Pollution Control Commission to North Hampton Public Library (June 28, 1985). Concerning additional documents to be made available for public review.

The record cited in entry 6 may be reviewed, by appointment only, at EPA Region I, Boston, Massachusetts.

6. "Hydrogeological Report on the Town of Rye Sanitary Landfill," DuBois & King, Inc. (June 1985).
7. Letter from Michael P. Donahue for Michael A. Sills, State of New Hampshire Water Supply and Pollution Control Commission to Stanley Knowles, Town of North Hampton Board of Selectmen (July 26, 1985). Concerning the attached "Organic Chemical Analysis."
8. Letter from Michael P. Donahue, State of New Hampshire Water Supply and Pollution Control Commission to Stanley Knowles, Town of North Hampton Board of Selectmen (August 30, 1985). Concerning update on the Coakley Landfill Hydrogeological Study.

17.8 State and Local Technical Records (cont'd.)

9. Letter from Michael A. Sills, State of New Hampshire Water Supply and Pollution Control Commission to Stanley Knowles, Town of North Hampton Board of Selectmen (November 1, 1985). Concerning Coakley Landfill Remedial Investigation/Feasibility Study monthly update.
10. Letter from Michael A. Sills, State of New Hampshire Water Supply and Pollution Control Commission to Stanley Knowles, Town of North Hampton Board of Selectmen (December 3, 1985). Concerning Coakley Landfill Study monthly update.
11. Letter from Michael A. Sills, State of New Hampshire Water Supply and Pollution Control Commission to Stanley Knowles, Town of North Hampton Board of Selectmen (December 17, 1985). Concerning the attached "Inorganic Chemical Analysis."
12. Letter from Michael A. Sills, State of New Hampshire Water Supply and Pollution Control Commission to North Hampton Town Library (January 8, 1986). Concerning hydrogeological investigation of the Coakley Landfill Site.
13. Letter from Michael A. Sills, State of New Hampshire Water Supply and Pollution Control Commission to Stanley Knowles, Town of North Hampton Board of Selectmen (January 23, 1986). Concerning approval of a warrant article for a waterline extension.
14. Letter from Michael A. Sills, State of New Hampshire Water Supply and Pollution Control Commission to Martha Bailey, WASTE, Inc. (January 24, 1986). Concerning transmittal of Draft Commission Report #147.
15. Letter from Michael A. Sills, State of New Hampshire Water Supply and Pollution Control Commission to Lillian E. Wylie, Citizens Organized Against Seacoast Toxins (COAST) (January 24, 1986). Concerning transmittal of Draft Commission Report #147.
16. Letter from Michael A. Sills, State of New Hampshire Water Supply and Pollution Control Commission to Stanley Knowles, Town of North Hampton Board of Selectmen (February 28, 1986). Concerning monthly summary of Coakley Landfill Hydrogeological Investigation.
17. "Hydrogeological Investigation of the Coakley Landfill Site, North Hampton, New Hampshire," New Hampshire Water Supply and Pollution Control Commission (February 1986).
18. Memorandum from William T. Wallace, Jr., State of New Hampshire Division of Public Health Services to Alden H. Howard, State of New Hampshire Department of Environmental Services (July 14, 1988) with attached "Evaluation of Cancer Incidence and Mortality in North Hampton, New Hampshire, 1980-1986," State of New Hampshire Division of Public Health Services (July 8, 1988).
19. Letter from Michael J. Robinette, State of New Hampshire Department of Environmental Services to Board of Selectmen, Town of North Hampton (August 8, 1988). Concerning transmittal of "Evaluation of Cancer Incidence and Mortality in North Hampton, New Hampshire, 1980-1986," State of New Hampshire Division of Public Health Services (July 8, 1988).

Section II

Guidance Documents

GUIDANCE DOCUMENTS

EPA guidance documents may be reviewed at EPA Region I, Boston, Massachusetts.

General EPA Guidance Documents

1. U.S. Environmental Protection Agency. Office of Research and Development. Municipal Environmental Research Laboratory. Biodegradation and Treatability of Specific Pollutants (EPA-600/9-79-034), October 1979.

2. U.S. Environmental Protection Agency. Office of Research and Development. Municipal Environmental Research Laboratory. Carbon Adsorption Isotherms for Toxic Organics (EPA-600/8-80-023), April 1980.

3. U.S. Environmental Protection Agency. Office of Water and Waste Management. Evaluating Cover Systems for Solid and Hazardous Waste, 1980.

4. U.S. Environmental Protection Agency. Office of Research and Development. Municipal Environmental Research Laboratory. Handbook for Evaluating Remedial Action Technology Plans (EPA-600/2-83-076), August 1983.

5. "National Oil and Hazardous Substances Pollution Contingency Plan," (40 CFR Part 300), November 20, 1985.

6. U.S. Environmental Protection Agency. Office of Ground-Water Protection. Ground-Water Protection Strategy, August 1984.

7. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response, Office of Emergency and Remedial Response, and Office of Research and Development. Review of In-Place Treatment Techniques for Contaminated Surface Soils - Volume 1: Technical Evaluation (EPA-540/2-84-003a), September 1984.

8. "Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act; Final Rule and Interim Final Rule and Proposed Rule" (40 CFR Part 136), October 26, 1984.

9. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Hazardous Response Support Division. Standard Operating Safety Guides, November 1984.

10. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Guidance Document for Cleanup of Surface Tank and Drum Sites (OSWER Directive 9380.0-3), May 28, 1985.

11. U.S. Environmental Protection Agency. Office of Research and Development. Environmental Research Laboratory. EPA Guide for Minimizing the Adverse Environmental Effects of Cleanup of Uncontrolled Hazardous Waste Sites, (EPA-600/8-85/008), June 1985.

12. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Guidance on Feasibility Studies under CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) (EPA/540/G-85/003, OSWER Directive 9355.0-05C), June 1985.

13. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Guidance on Remedial Investigations under CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) (EPA/540/G-85/002, OSWER Directive 9355.0-06B), June 1985.

14. Memorandum from Gene Lucero to the U.S. Environmental Protection Agency, August 28, 1985 (discussing community relations at Superfund Enforcement sites).

15. U.S. Environmental Protection Agency. Office of Waste Programs Enforcement. The Endangerment Assessment Handbook, August 1985.

16. U.S. Environmental Protection Agency. Office of Waste Programs Enforcement. Toxicology Handbook, August 1985.

17. Covers for Uncontrolled Hazardous Waste Sites, September 1985.

18. U.S. Department of Health and Human Services. National Institute for Occupational Safety and Health, and Occupational Safety and Health Administration. Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, October 1985.

19. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Handbook of Remedial Action at Waste Disposal Sites (EPA/625/6-85/006), October 1985.

20. U.S. Environmental Protection Agency. Office of Research and Development. Hazardous Waste Engineering Research Laboratory. Handbook: Remedial Action at Waste Disposal Sites (Revised) (EPA/625/6-85/006), October 1985.

21. U.S. Environmental Protection Agency. Office of Research and Development. Hazardous Waste Engineering Research Laboratory. Handbook for Stabilization/Solidification of Hazardous Wastes (EPA/540/2-86/001), June 1986.

22. U.S. Environmental Protection Agency. Office of Research and Development. Hazardous Waste Engineering Research Laboratory. Treatment Technology Briefs: Alternatives to Hazardous Waste Landfills (EPA/600/8-86/017), July 1986.

23a. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Draft Guidance on Remedial Actions for Contaminated Groundwater at Superfund Sites (OSWER Directive 9283.1-2), September 20, 1986.

23b. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Guidance on Remedial Actions for Contaminated Groundwater at Superfund Sites (OSWER Directive 9283.1-2), December 1988.

24. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response and Office of Emergency and Remedial Response. Mobile Treatment Technologies for Superfund Wastes (EPA 540/2-86/003 (f)), September 1986.

25. Comprehensive Environmental Response, Compensation, and Liability Act of 1980, amended October 17, 1986.

26. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Superfund Public Health Evaluation Manual (OSWER Directive 9285.4-01), October 1986.

27. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Draft Guidance on Remedial Actions for Contaminated Groundwater at Superfund Sites (OSWER Directive 9283.1-2), October 1986.

28. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Interim Guidance on Superfund Selection of Remedy (OSWER Directive 9355.0-19), December 24, 1986.

29. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Superfund Federal-Lead Remedial Project Management Handbook (EPA/540/G-87/001, OSWER Directive 9355.1-1), December 1986.

30. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Superfund State-Lead Remedial Project Management Handbook, (EPA/540/G-87/002), December 1986.

31. U.S. Environmental Protection Agency. Office of Research and Development. Hazardous Waste Engineering Research Laboratory. Technology Briefs: Data Requirements for Selecting Remedial Action Technology (EPA/600/2-87/001), January 1987.

32. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Data Quality Objectives for Remedial Response Activities: Development Process (EPA/540/G-87/003), March 1987.

33. Letter from Lee M. Thomas to James J. Florio, Chairman, Subcommittee on Consumer Protection and Competitiveness, Committee on Energy and Commerce, U.S. House of Representatives, May 21, 1987 (discussing EPA's implementation of the Superfund Amendments and Reauthorization Act of 1986).

34. Memorandum from J. Winston Porter to Addressees ("Regional Administrators, Regions I-X; Regional Counsel, Regions I-X; Director, Waste Management Division, Regions I, IV, V, VII, and VIII; Director, Emergency and Remedial Response Division, Region II; Director, Hazardous Waste Management Division, Regions III and VI; Director, Toxics and Waste Management Division, Region IX; Director, Hazardous Waste Division, Region X; Environmental Services Division Directors, Region I, VI, and VII"), July 9, 1987 (discussing interim guidance on compliance with applicable or relevant and appropriate requirements).

35. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Additional Interim Guidance for Fiscal Year 1987 Record of Decisions, July 24, 1987.

36. U.S. Environmental Protection Agency. Office of Health and Environmental Assessment. A Compendium of Technologies Used in the Treatment of Hazardous Waste (EPA/625/8-87/014), September 1987.

37a. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Draft Guidance on CERCLA Compliance with Other Laws Manual (OSWER Directive 9234.1-01), November 25, 1987.

37b. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Draft Guidance on CERCLA Compliance with Other Laws Manual (OSWER Directive 9234.1-01), August 8, 1988.

38. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. A Compendium of Superfund Field Operations Methods (EPA/540/P-87/001, OSWER Directive 9355.0-14), December 1987.

39a. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Draft Guidance on Conducting Remedial Investigations and Feasibility Studies under CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act), March 1988.

39b. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Interim Final Guidance on Conducting Remedial Investigations and Feasibility Studies under CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act), October 1988.

40. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Draft Guidance on Remedial Actions for Contaminated GroundWater at Superfund Sites (OSWER Directive 9283.1-2), April 1988.

41a. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Community Relations in Superfund: A Handbook (Interim Version) (EPA/HW-6, OSWER Directive 9230.0-3A), September 1983.

41b. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Community Relations in Superfund: A Handbook (Interim Version) (EPA/HW-6, OSWER Directive 9230.0-3A), June 1988.

42. Memorandum from Henry L. Longest II, U.S. Environmental Protection Agency Office of Emergency and Remedial Response and Gerald Emison, U.S. Environmental Protection Agency Office of Air Quality Planning and Standards to Addressees ("Regional Waste Management Division Directors, Regional Superfund Branch Chiefs, Regional Air Division Directors, Regional Air Branch Chiefs, OERR Division Directors, OAQPS Division Directors"), June 15, 1989 (discussing control of air emissions from Superfund air strippers at Superfund groundwater sites).

43. U.S. Environmental Protection Agency, Region 1. Supplemental Risk Assessment Guidance for the Superfund Program, (EPA 901/5-89-001), June 1989.

44. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Risk Assessment Guidance for Superfund. Human Health Evaluation Manual Part A, July 1989.

45. Memorandum from Don R. Clay, U.S. Environmental Protection Agency Office of Solid Waste and Emergency Response to Regional Administrators Regions I - X, December 6, 1989 (discussing CERCLA settlements involving municipalities or municipal wastes).

46. Memorandum from Don R. Clay, U.S. Environmental Protection Agency Office of Solid Waste and Emergency Response to Regional Administrators Regions I - X, January 29, 1990 (discussing delegation of remedy selection authority).

47. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Personnel Protection and Safety.