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Superfund Record of Decision:

North Sea Municipal Landfill, NY

50272-101

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First Remedial Action

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16. Abstract (Limit: 200 words)

The 131-acre North Sea Municipal Landfill site is on eastern Long Island in Southampton, Suffolk County, New York. The site is south of Little Peconic Bay, in an area of extensive ponds, coves, and wetlands. The 131-acre active landfill overlies two aquifers and neighbors private homes that obtain their drinking water from private domestic wells. Two landfill cells, a proposed cell and a series of 14 lagoons are also on the site. Municipal solid waste, refuse, debris, and septic system waste from residential, industrial, and commercial sources have been disposed of at the site since 1963. From the early 1960s to 1985 Cell #1 received approximately 1.3 million cubic yards of municipal waste and septic sludges. Subsequent ground water monitoring revealed a contaminated plume migrating from cell #1 toward a nearby cove. Cell #1 was closed and partially capped in 1985, and a storm water diversion system was also installed to collect storm water and recharge it. Cell #2, which was equipped with a leachate collection system and accepted approximately 80,000 tons of municipal waste annually, has been closed since October 1989. The town has constructed Cell #3, which is now in operation. From the late 1960s to 1986, 14 lagoons were used to dispose of approximately 11 million gallons of septic waste. The lagoons were subsequently excavated and backfilled. This is the first of two planned operable units and addresses source control through remediation of Cell #1 and the former sludge lagoons. A subsequent Record of Decision will address ground and (Continued on next page)

17. Document Analysis a. Descriptors
Record of Decision - North Sea Municipal Landfill, NY
First Remedial Action
Contaminated Media: soil, sludge
Key Contaminants: VOCs, other organics (PAHs), metals (arsenic, lead), other inorganics

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

Availability Statement	19. Security Class (This Report) None	21. No. of Pages 99
	20. Security Class (This Page) None	22. Price

16. Abstract (Continued)

face water contamination. The primary contaminants of concern affecting the soil and sludge are VOCs, other organics including PAHs, metals including arsenic and lead, and other inorganics.

The selected remedial action for this site includes covering Cell #1 with a low permeability cap; implementing site security and deed restrictions; sampling sludge/soil in the former sludge lagoons; and long-term air, surface water and ground water quality monitoring. The estimated present worth cost for this remedial action ranges from $7,700,000 to $8,300,000, depending on the type of landfill cap selected. These figures include an estimated annual O&M cost ranging between $190,000 and $200,000.

RECORD OF DECISION

SITE NAME AND LOCATION

North Sea Municipal Landfill
Town of Southampton
Suffolk County, New York

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the North Sea Municipal Landfill in the Town of Southampton, Suffolk County, New York, developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 U.S.C. Section 9601, et. seq., as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the administrative record for this site. The attached index identifies the items that comprise the administrative record upon which the selection of the remedial action is based.

The State of New York has concurred with the selected remedy.

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 public health or welfare or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The selected remedial alternative for the North Sea Municipal Landfill site, which includes the North Sea Landfill and those areas affected by the contamination, is a source control remedy. It consists of a) covering Cell #1 with a low permeability cap, while undertaking actions consistent with state sanitary landfill closure requirements, and b) confirmatory sampling on the former sludge lagoons. These source control activities constitute the first Operable Unit at this site; the second Operable Unit will deal with off-site ground water and its impact on Fish Cove. The "no action" alternative for the sludge lagoon area is contingent upon findings of both the confirmatory sludge/soil sampling and the second Operable Unit study. The alternative will be reviewed if either of the aforementioned studies indicate the presence of hazardous wastes or substances that may pose a health or environmental threat.

Land Disposal Restrictions (LDRs) are not applicable for this site because the landfill will be capped in place.

The major components of the selected remedial alternatives are:

A. For the low permeability cap on Cell #1:

1. Six inches of vegetated topsoil

2. Twenty-four inches of silty sand protective barrier

3. A 40 millimeter thick geosynthetic membrane (permeability 1 x 10^{-12} cm/sec) or 18 inches of low permeability soil (permeability 1 x 10^{-7} cm/sec)

4. Twelve inches of sand for gas control (permeability 1 x 10^{-3} cm/sec)

5. Two layers of filter fabric

6. Soil fill of varying thickness to construct a cap system foundation with a minimum 4.0 percent slope

7. Gas venting risers (maximum separation of one vent per acre)

8. Crushed stone backfill around gas venting risers

B. Installation of a six foot high chain link fence around the perimeter of the landfill property to restrict access to the site

C. Institutional control in the form of a deed restriction on future uses of the landfill and the former sludge lagoons

D. Sludge/soil sampling of the former sludge lagoons to confirm that no hazardous waste and/or substances that may pose a health or environmental threat are present in the area. Such sampling shall be conducted by drilling a minimum of one, and a maximum of three, borings into each of the fourteen identified sludge lagoons. Sludge/soil samples taken from the borings will be analyzed for EPA's and NYSDEC's full Target Compound List (TCL) parameters. Sludge samples will also undergo an EP Toxicity Test to determine the leaching potential of any hazardous constituents that may be present in the wastes.

E. Implementation of closure requirements of New York State Regulations, 6 NYCRR Part 360, Solid Waste Management Facilities for Cell #1

F. Long-term operation and maintenance to provide inspections and repairs to the landfill cap

G. Long-term air and water quality monitoring pursuant to the New York State closure requirements for Cell #1, and long-term air and water quality monitoring for the former sludge lagoons. Parameters to be monitored will include the EPA's and NYSDEC's Target Compound List (TCL). The TCL includes over 125 hazardous chemical parameters to be analyzed during the monitoring program.

The following action will be evaluated during the remedial design:

- Determination as to whether a flexible, synthetic membrane liner or a low permeability material (soil) is best suited for use as the barrier layer in the capping of Cell #1

The actions being taken are consistent with Section 121 of CERCLA 42 U.S.C. Section 9601. The State of New York has been consulted and concurs with the selected remedy.

DECLARATION

Consistent with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR part 300, I have determined that the selected remedy is protective of human health and the environment, attains Federal and State requirements that are applicable or relevant and appropriate to these remedial actions and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this site. Because treatment of the principal threats at the site was not found to be practicable, this remedy does not satisfy the statutory preference for treatment as a principal element of the remedy. Because this remedy will result in hazardous substances remaining on-site, a review will be conducted within five years after commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

9-29-89
Date

William J. Muszynski
Acting Regional Administrator
Region II

SITE NAME, LOCATION AND DESCRIPTION

The North Sea Municipal Landfill site, (the Landfill), which includes the North Sea Landfill and those areas affected by the contamination is located on eastern Long Island at the intersection of Majors Path and Old Fish Cove Road in the Township of Southampton, Suffolk County, New York (see Figure 1). The 131 acre Landfill is currently active landfill and it is owned and operated by the Town of Southampton (the Town).

The area between the Landfill and the nearest point of surface water (Fish Cove, about 1500 feet northwest of the Landfill) is moderately populated. There are approximately 15 homes within a one-quarter mile radius from the landfill and approximately 100 homes within a one-half mile radius. Most of the residents are located north, northwest and west of the Landfill and are thus hydrologically downgradient of it.

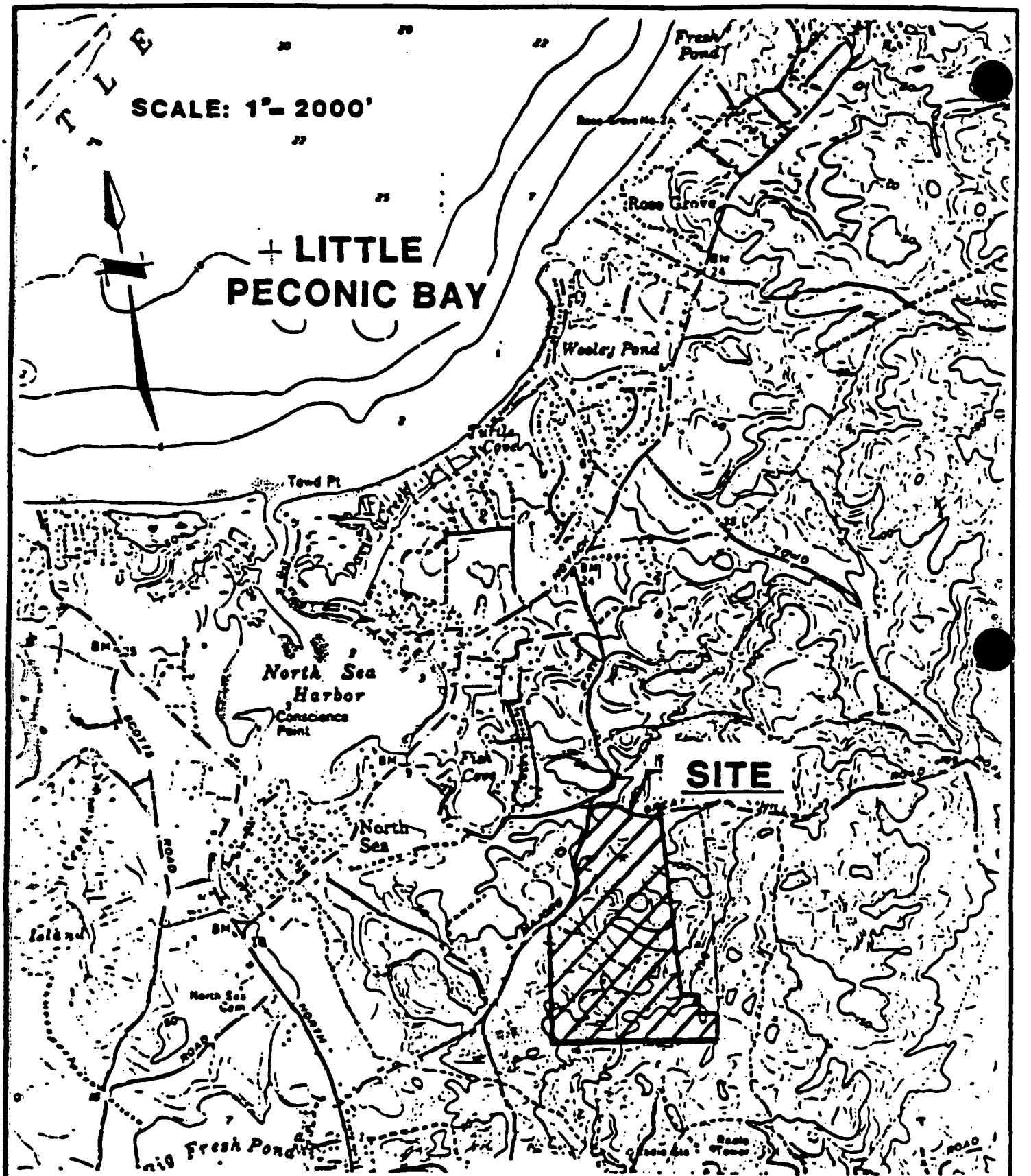
The Town of Southampton lies 2.4 miles to the south of the Landfill. There are no major population centers to the east. This area is predominantly wooded. Land use within a one-half mile radius of the Landfill generally consists of private homes. A junkyard is located on the east side of Majors Path, approximately 0.6 miles south of the landfill entrance. A sand/gravel borrow pit is located west of Majors Path, between the landfill and Fish Cove.

The Landfill is located in glacial till deposits north of the Ronkonkoma moraine. North of the moraine are kame deposits. These deposits reach a maximum altitude of about 100 feet and mark areas of disintegrated, stagnant ice from the last glacial period.

The Landfill is south of the southern shore of Little Peconic Bay, in an area with extensive ponds, coves and wetlands. The terrain is generally flat with elevations less than 100 feet above mean sea level. Slopes drop north to the bay. Soils in the area are sands and gravels, and ponds are surface expressions of ground water. The landfill cells and lagoons are unlined and the sandy soil allows rapid movement of contaminants through the soil to the ground water.

The landfill is situated above fresh water aquifers which overlie deeper salt water aquifers. The unconsolidated deposits of Cretaceous and Quaternary Age rest unconformably on the Precambrian-Upper Paleozoic basement complexes. The Upper Cretaceous deposits include, in ascending order: (1) the Raritan Formation consisting of the Lloyd sand member and an overlying clay member; (2) the Magothy Formation-Matawan Group, undifferentiated; and (3) the Monmouth Group. Except for the Monmouth Group, these units are continuous throughout the Landfill study area. The Cretaceous deposits are overlain by Pleistocene and Holocene (recent) deposits. The Pleistocene

FIGURE 1



NORTH SEA LANDFILL LOCATION MAP

SOURCE: USGS SOUTHAMPTON QUADRANGLE, 1956

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deposits consist of glaciofluvial deposits of the Upper Glacial aquifer. The North Sea Municipal Landfill is situated above two fresh water aquifers: the Cretaceous Magothy aquifer and the Upper Glacial aquifer.

The Magothy aquifer is the deepest fresh water bearing zone. The top of the Magothy occurs at a depth of about 150 to 180 feet below mean sea level at the study area. The Magothy is a water transmitting aquifer consisting of sand, fine to medium, clayey in part, interbedded with lenses and layers of coarse sand and sandy and solid clay.

The Upper Glacial fresh water aquifer (water table) is estimated to be about 200 to 300 feet thick in the area of the landfill. It directly overlies the Magothy aquifer. This aquifer primarily composed of Pleistocene sands and gravels. Like the Magothy aquifer, it also contains numerous silt and clay units. Most wells in the area are completed in this aquifer.

Ground water is replenished primarily from recharge via precipitation and lateral underground flow of fresh water. The precipitation which reaches the main aquifer continues to flow vertically through the zone of saturated gravel of the Upper Glacial aquifer at a rate of movement proportional to the slope of the water table and the permeability of the soils.

Most of the homes in the Southampton area obtain their drinking water from private domestic wells tapping the highly permeable Pleistocene deposits of the Upper Glacial aquifer. A plume of contaminated ground water in this aquifer, moving northwest from the Landfill, has resulted in the closure of several drinking water wells. Public water supplies have been extended to serve residence in the affected area. Ground water in this area ultimately discharges to Fish Cove, an arm of Peconic Bay.

Surficial soil associations within and surrounding the landfill are the Plymouth-Carver Association Sands and "made" land. The soils of Suffolk County were deposited as a result of glaciation during the Wisconsin Age. The glacial outwash consists of sorted sand and gravels. The Plymouth-Carver Association soils are found on rolling moraines and side slopes of drainage channels of outwash plains. These soils consist of deep, excessively drained, coarse textured soils that are not suitable as a source of topsoil. "Made" land consists of concrete, bricks, trash and wire; anything but natural soil. This defines the Landfill area.

Fish Cove is a body of saltwater with marshes connected via a tidal inlet to the North Sea Harbor. The low marshes are relatively stable and productive, supporting a variety of marine invertebrates, juvenile fish species, and water fowl. The intertidal marsh is dominated by salt marsh cord grass (spartina alterniflora). The marsh area is about 45,000 square feet consisting of both intertidal and high marsh.

The Landfill itself is located in the general vegetative biome referred to as an oak-dominated forest. Oaks are the dominant species. No surface water bodies (except puddles created by rain water accumulation) exist on the landfill property. The landfill is located near several naturally occurring surface water bodies. These are Fish Cove, Big Fresh Pond and Little Fresh Pond. The latter two are fresh surface waters. The following rare, threatened, and endangered species are identified by the by New York State for the North Sea area: 1) bird species: least tern and piping plover, 2) rare plant species: Bushy Rockrose, Hairy Woodrush and Lespedeza stueri 3) rare butterfly: Hessel's Hairstreak. Floral and faunal species which are present are typical of the respective habitats.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

The North Sea Municipal Landfill, owned and operated by the Town of Southampton, was initially constructed in 1963 for the disposal of municipal solid wastes, refuse, debris and septic system wastes from residential, industrial and commercial sources. Significant features of the site include landfill Cell #1 (inactive, partially capped, unlined); excavated/filled scavenger lagoons; landfill Cell #2 (soon to be capped and closed); and proposed Cell #3 (soon to be completed and receive materials). See Figure 2 for relative locations of these cells.

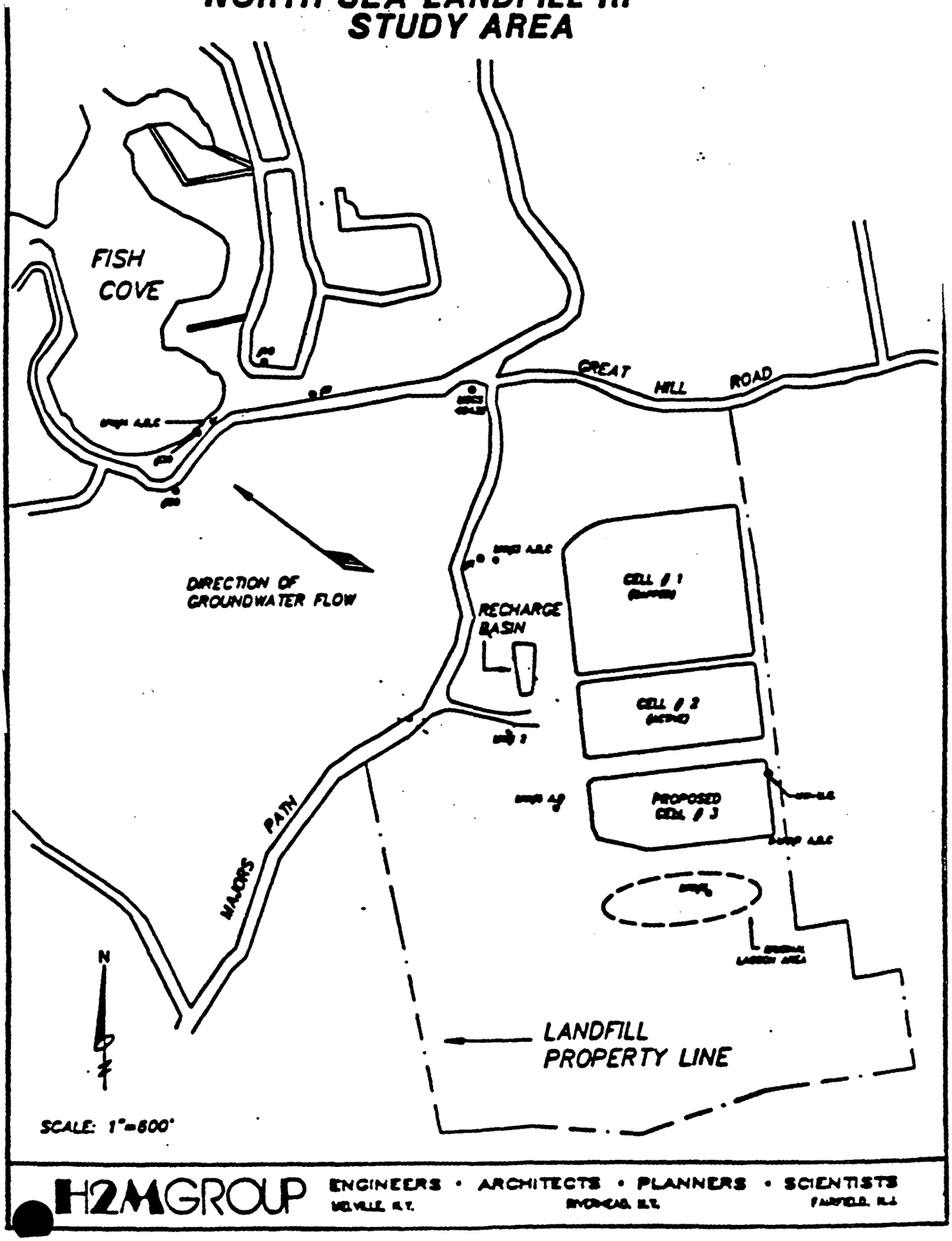
A ground water monitoring program, conducted by the Town of Southampton since 1979, revealed a plume containing lead, cadmium and manganese migrating from Cell #1 toward Fish Cove. As a result, the site was investigated and placed on the EPA's list of priority hazardous waste sites known as the Superfund National Priorities List (NPL) in June 1986.

Cell #1 consists of two earlier landfill areas and totals approximately 13 acres. It received septic system sludges in the early 1960's in addition to municipal solid wastes. The total quantity of wastes in Cell #1 is estimated to be 1.3 million cubic yards.

As a result of the site being placed on the NPL list, Cell #1 was subsequently closed in 1985. Closure of the cell consisted of capping the top flat portion (about eight acres) with a 20 milli-inch polyvinyl chloride membrane to minimize infiltration into the mound and covering it with a thick protective layer (approximately two feet thick) of silty sand on top of the geomembrane. A layer of topsoil was placed over this to maintain vegetative growth over the landfill.

The Town of Southampton also installed a storm water diversion and collection system to aid drainage. Manholes and a piping collection system along the haul road were installed before the recharge basin. The manholes, as provided for, were utilized as collection inlets with the runoff being transported into a

NORTH SEA LANDFILL RI STUDY AREA



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separate recharge basin, located west of the landfill in virgin ground. This system is currently still in operation and actively collecting storm water and recharging it. As a result of the steepness of the side slope of Cell #1, the sides were not capped. Infiltration of rainwater into the landfill is minimized due to the steepness of the side slopes. Also, vegetation has taken root along a good portion of the landfill side slopes. Since the collection inlets were installed above a synthetic membrane which is secured by a clean sand blanket, rain water falling on the top surface of Cell #1 is directed and recharged into virgin ground as noted above. Surface runoff from the relatively steep slopes is conveyed to the adjoining land surrounding the cell where it then follows existing contours and eventually recharges into the ground.

In the late 1960's, a series of 14 scavenger lagoons, approximately 50 feet long, 10 feet deep, 25 feet wide and 50 feet above the water table were constructed at the southern portion of the landfill property. The lagoons accepted septic system wastes from both commercial and residential sources. Sludge was allowed to drain and dry, and it was subsequently disposed of in landfill Cell #1. Throughout the active life of these lagoons, it is estimated that they received a total of 11 million gallons of septic waste.

The sludge lagoons were decommissioned in 1986 and most of their liquid and solid contents was removed. After this removal, an additional two feet of soil was excavated. The excavated material was dried out then mixed with sand. The dried mixture was then placed in landfill Cell #2 where it was used as a daily cover for the walls of the cell. The sludge lagoons were refilled to grade with sandy loam.

The remaining active landfill cell (Cell #2) is approximately seven acres in size and constructed approximately 20 feet above the water table with a leachate collection system. An underground fire destroyed the cell's leachate pumping system in 1987. However, a new well and pump has been installed to receive leachate. The new system is designed to pump leachate to a truck for off-site treatment. The cell currently accepts approximately 80,000 tons of municipal wastes annually. Seasonal disposal rates are approximately 400 tons per day in the summer months and 100 tons per day in the winter. Upon reaching capacity, the landfill cell will be closed pursuant to an administrative order on consent executed between the Town and New York State Department Environmental Conservation (NYSDEC). The Town is currently constructing Cell #3, pursuant to the NYSDEC Part 360 permit, which will serve the Town subsequent to the closure of Cell #2.

In December 1985, EPA sent a letter to the Town informing it that it was considered a potentially responsible party (PRP) for contamination occurring at the North Sea Municipal Landfill site and, as such, may be liable for funds spent by the EPA for

cleaning up the Landfill. The letter explained to the Town that it may participate in or undertake the Remedial Investigation/Feasibility Study (RI/FS) if they wished.

EPA presented an Administrative Order on Consent to the Town of Southampton in February 1987. The Town consented to the issuance and the Order was signed on March 31, 1987. Under this order, the Town took responsibility for conducting the RI/FS, which began on August 18, 1987.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI and FS Reports, prepared by Holzmacher, McLendon and Murrell, P.C. (H2M), and the Proposed Remedial Action Plan for the North Sea Municipal Landfill site were released to the public in September 1989. These documents were made available to the public at two information repositories: Southampton College Library located at Montauk Highway, Southampton, New York and Southampton Village Library located at Nine Job's Lane, Southampton, New York. Additional documentation regarding the remedy selection is available within the administrative record for the site, which was placed in the Southampton College Library. The notice of availability for these documents was published in Newsday on September 2, 1989. A public comment period was held from September 2, 1989 through September 22, 1989. In addition, a public meeting was held on September 11, 1989. At this meeting, representatives from the EPA answered questions about the problems at the site and the remedial alternatives under consideration. A response to comments received during the public comment period is included in the Responsiveness Summary, which is a part of this Record of Decision. This decision document presents the selected remedial action for the North Sea Municipal Landfill site in the Town of Southampton, Suffolk County, New York, chosen in accordance with CERCLA and, to the extent practicable, the National Oil and Hazardous Substances Contingency Plan. The decision regarding the selection of a particular remedy for this Landfill is based on the administrative record.

SCOPE AND ROLE OF OPERABLE UNIT

As with many Superfund sites, the problems at the North Sea Municipal Landfill site are complex. As a result, EPA and NYSDEC have divided the work into two operable units (OUs). The operable units are:

- OU One: Source control of Cell #1 and the former sludge lagoons
- OU Two: Off-site ground water and Fish Cove Study

The operable unit presently under consideration at the North Sea Municipal Landfill is Operable Unit One. Source control management of the landfill will address the closure of Cell #1 and the former sludge lagoons.

Additional RI data (the Phase II RI) includes, but is not limited to, resampling of all monitoring wells, sediment and surface water sampling of Fish Cove and flesh sampling of shellfish. The data are under review by state and federal agencies and upon completion of this review, an FS will be undertaken to address the ground water adjacent to the landfill as well as Fish Cove. This will comprise Operable Unit Two.

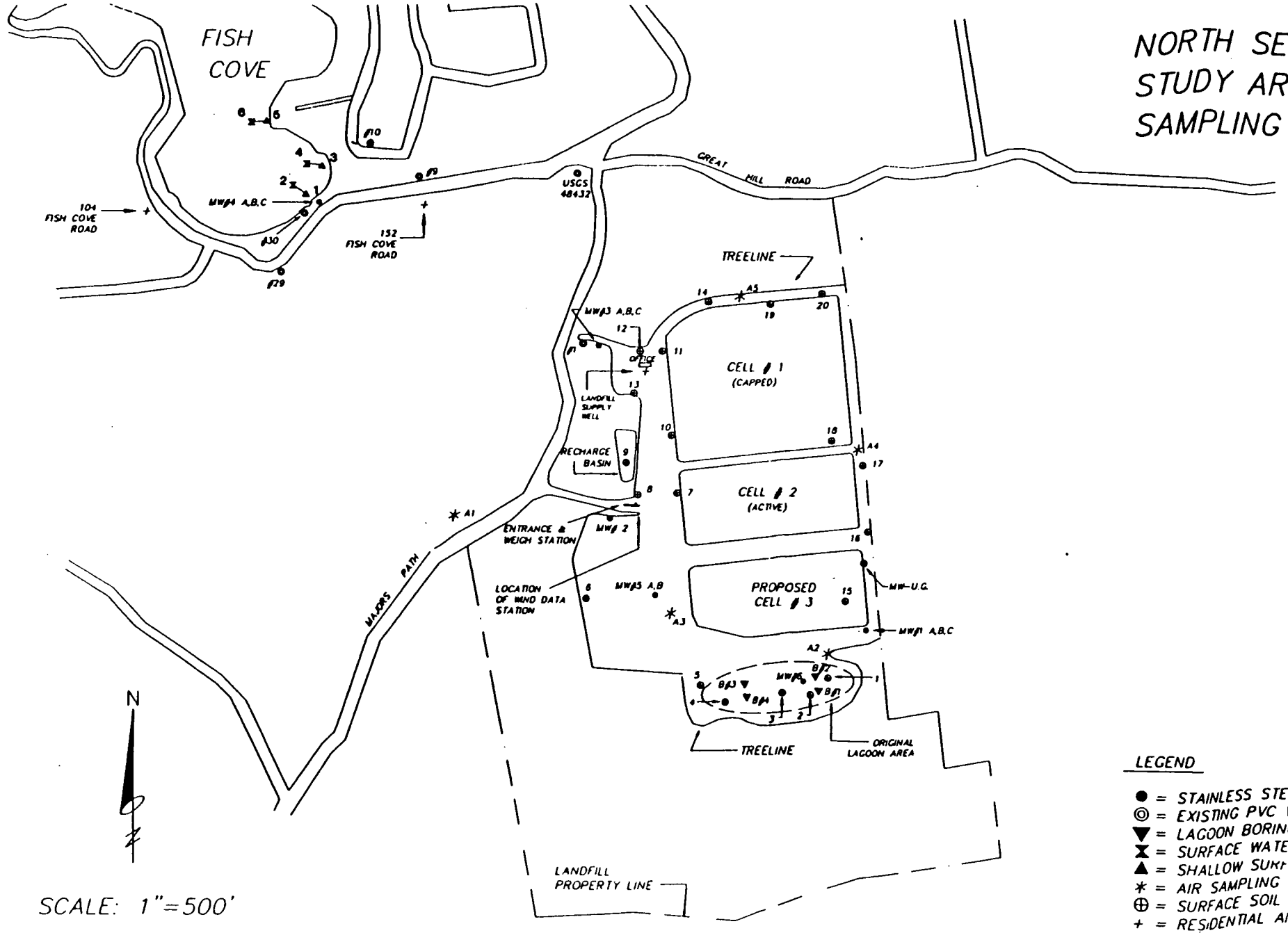
The alternatives considered for source control are presented under the section "Description of Alternatives" and were analyzed using the EPA's nine criteria for effective Superfund actions which are listed later in this document. The FS report presents a complete description and evaluation of the alternatives. The remedial alternatives recommended for implementation, namely confirmatory sludge/soil sampling for the filled scavenger lagoons and a low permeability cap (either a geosynthetic or a soil cover) on Cell #1, will control the sources of contamination and reduce contaminant migration from these sources. The preferred alternative for the sludge lagoon area is contingent upon the findings of both the confirmatory sludge/soil sampling and the Operable Unit Two study. This portion of the selected remedy will be reviewed if the above-referenced findings of the aforementioned studies indicate the presence of hazardous wastes or substances that may pose a health or environmental threat.

SITE CHARACTERISTICS

As part of the scoping for the remedial investigation, two suspected sources of contamination were identified for investigation. These two suspect source areas were the landfill Cell #1 (Source 1) and the former septic sludge lagoon areas (Source 2). Ground water flows to the northwest with localized discharge at Fish Cove. The key release mechanisms of site contaminants are via precipitation and infiltration of leachate to ground water at the source areas. Receptor areas are thus downgradient from these source areas. The key receptor areas are downgradient ground water and surface water (Fish Cove). Contaminants from Source 1 travel via the ground water environmental pathway northwest from the source area. The contaminant plume discharges (locally) at Fish Cove. It is expected that the contaminant plume from Source 2 runs parallel to the Source 1 plume and has the same receptor areas.

One plume, originating from Cell #1 on the North Sea Municipal Landfill, consists primarily of leachate constituents, such as ammonia, iron, manganese and total organic carbon. These parameters were used to identify the plume. At the Landfill, the

NORTH SEA PHASE I RI STUDY AREA AND SAMPLING LOCATIONS



LEGEND

- ● = STAINLESS STEEL MONITORING WELL
- ◎ = EXISTING PVC WELL
- ▼ = LAGOON BORING
- ⧗ = SURFACE WATER
- ▲ = SHALLOW SURFACE WATER AND SEDIMEN
- ✳ = AIR SAMPLING STATION
- ⊕ = SURFACE SOIL SAMPLING POINT
- \+ = RESIDENTIAL AND SUPPLY WELL

highest concentration of the leachate plume was evident in a mid-depth well just northwest of Cell #1 on the landfill property.

A second plume emanates from the filled septic lagoon at the Landfill. The presence of nitrate/nitrite (as nitrogen) in ground water from a monitoring well in the source area confirmed the presence of septics. A monitoring well installed downgradient from this area also indicated levels of nitrate/nitrite. It is expected that this plume will travel northwest with the ground water flow. Figure 3 shows the general study area for the site and sampling locations. Additional ground water data has been collected during the Phase II RI. The data will be evaluated and a FS will be generated.

In addition to the typical sanitary landfill leachate parameters mentioned above, these plumes contain heavy metals such as cadmium, chromium, lead, iron and manganese as well as volatile organics such as 1,1-dichloroethene, 1,2-dichloroethane, tetrachloroethene and trichloroethene. These constituents were detected at concentrations above the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and New York State Ground Water Class GA Standards (NYSDEC GA). The concentrations of chromium, lead, iron and manganese in the plume are considered significant (i.e., five times the background level). Concentrations of chromium and cadmium were detected above the MCLs and NYSDEC GA Standards in the filtered samples. Refer to Attachment 3 for ground water tables.

The concentrations of these constituents are not decreasing over time, and thus the leachate is still impacting the ground water. Therefore, it is evident that the present cap is inadequate to prevent infiltration into Cell #1 and prevent leachate generation. Cell #1 was capped with a 20 milli-inch polyvinyl chloride membrane and approximately two feet of sand. NYS Part 360 Regulations for closure require a geomembrane with greater than a 40 milli-inch thickness. In addition, the side slopes were never capped. Therefore, the EPA and NYSDEC believe that closure of Cell #1 pursuant to NYS Part 360 requirements is necessary to prevent further infiltration.

The objective of collecting surface water and sediment samples from Fish Cove was to determine whether the ground water contamination plume had any adverse impact on water and sediment quality in the Cove. Surface water samples were collected at different stations in Fish Cove during low tide and high tide. Sediment was collected at stations during low tide.

Ammonia, iron, and manganese were detected consistently at all surface water sampling locations. These are leachate indicators. Ammonia in particular was evident in other enclosed bay areas in the South Fork. These levels were similar to Fish Cove and of the same order of magnitude. Additional data has been collected

during the Phase II RI. The results will be analyzed and a separate FS report will be generated.

Soil samples were collected from the Landfill and Fish Cove and were tested to identify the nature, magnitude and extent of contamination from the possible disposal of industrial waste. The four types of soil samples obtained during the Phase I RI were: (1) surface soils at various locations throughout the landfill; (2) subsurface unsaturated soils from the filled lagoon area; (3) subsurface soils from the saturated zone in the well boreholes; and (4) sediment from Fish Cove.

None of the soil samples exceeded the recommended EP Toxicity concentration levels for metals. Mercury and silver were detected but the leachable metal concentrations were below EP Toxicity levels.

The key organic contaminants in soils were the phthalate esters and polycyclic aromatic hydrocarbons (PAHs). Phthalates were evident in most soils. The source may be common plastic materials. PAHs were evident in greatest variety at a surface soil location north of the inactive Cell #1. Otherwise, PAHs were not that common in soils.

Lagoon soils were analyzed for priority pollutant pesticides, PCBs, and volatile organics. Pesticides and PCBs were not detected at all in lagoon soils. Chloroform is the only positively detected priority pollutant volatile organic.

An air monitoring program was conducted at the site to monitor for airborne organic constituents that may pose a health hazard to the public. The air sampling program consisted of a general landfill soil gas survey at all proposed sampling/work area locations; collection of ambient air samples; and collection of on-site wind data.

The ambient air survey indicated acceptable air quality in the work zones at the landfill. Soil gas samples were taken during the Phase II RI and the results of the analysis have not been reported.

SUMMARY OF SITE RISKS

The media of concern at Landfill include ground water, soil, and surface water. There is a ground-water plume containing heavy metals (e.g., chromium, iron, lead, and manganese) and leachate indicator parameters (e.g., ammonia and total organic carbon). Soil samples collected from surface soil, subsoil, and sludge lagoon borings show metals (e.g., arsenic, cadmium, iron, lead, and magnesium). Surface water samples show elevated levels of inorganics (e.g., ammonia, chromium, iron, manganese).

H2M, the Town's consultant, and the EPA each conducted an Endangerment Assessment for the Landfill. The Endangerment

Assessment conducted by the EPA identified the most dangerous site contaminants through a screening process. The contaminants selected represent chemicals posing the most significant risk of adverse effect to human health or the environment. These "indicator" chemicals were selected based on the following properties: intrinsic toxicity, quantity present, and properties affecting the chemical's mobility in the environment.

The selection process conducted by the EPA for the Landfill identified seven metals and one inorganic compound upon which the assessment was based. The seven metals are: arsenic, cadmium, chromium, iron, lead, manganese and nickel. Ammonia was identified as an inorganic compound of interest.

The indicator chemical selection process focused on inorganic metals. This is supported by the fact that the Landfill is operated as a landfill and is the type of site where metal contamination is common. The RI for the Landfill also identified several metals as potential contaminants of concern.

Two of the metals identified in the RI were iron and manganese. Further study of the analysis results showed that the applicable standards or criteria for iron, manganese, cadmium and lead have been exceeded. Based on their high concentrations and prevalence at the site, their high toxicity and the previous concern expressed over them, these five metals were chosen to be indicator chemicals. Arsenic, nickel and ammonia were also chosen due to their concentration, prevalence and toxicity.

Although, at the concentrations found at the Landfill, ammonia is not generally considered a high toxicity concern to humans when compared to other chemicals, its toxicity to fish and other aquatic life merits consideration. Therefore, ammonia was chosen as an indicator chemical.

Environmental fate and transport mechanisms were evaluated for each chemical found during the RI. Seven exposure routes were identified: (1) ingestion of contaminated surface water, (2) ingestion of contaminated fish and shellfish, (3) ingestion of contaminated soil, (4) direct contact (dermal) exposure to contaminated surface water, (5) direct contact (dermal) exposure to contaminated soil, (6) ingestion of ground water, and (7) inhalation of dust from the Landfill.

For the purpose of evaluating risk from the sludge lagoons, the significant exposure routes are ingestion of contaminated soil and direct contact (dermal) exposure to contaminated surface soil. Direct contact with contaminated soils at the Landfill may lead to exposure to metals primarily through accidental ingestion. Oral exposure may occur from inadvertent transfer of contaminated soil from fingers and hands to the mouths of children and young adults trespassing onto the site or by poor hygiene habits of site workers. Most of the contaminants are generally adsorbed onto sediment particles and are not expected

to be highly available for uptake through the skin. For the purpose of evaluating risk from Cell #1, the significant exposure routes include ground-water ingestion, direct contact (dermal) exposure to contaminated surface water, ingestion of contaminated surface water, ingestion of contaminated fish and shellfish, and inhalation of dust from the site.

Exposed populations generally include site workers, visitors to the site, and residents of the Town in the area of the site. Individuals who may play, swim, or wade in Fish Cove near or topographically downgradient from the Landfill and neighborhood children venturing onto the site are also included.

Total body burden rates were computed based on all potential exposure routes using an average body mass of 70 kilograms (adults) or 20 kilograms (child), and an average 70 year lifetime. It was assumed that dermal exposures would occur in 20 out of the 70-year average lifetime, ingestion exposures would occur in 40 out of an average 70-year lifetime, and inhalation would occur in a 30 year working lifetime.

Toxicity profiles were developed for each of the indicator chemicals based on current U.S. EPA accepted health effects documents. Toxicological evaluation included pharmacokinetics, human and environmental health effects, and a dose-response assessment. Toxicity information is dependent to a large extent on animal models upon which any potential adverse human health effects must be extrapolated.

Cancer potency factors (CPFs) have been developed by EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CPFs, which are expressed in units of $(mg/kg\text{-}day)^{-1}$, are multiplied by the estimated intake of a potential lifetime cancer risk associated with exposure at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the CPF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. Cancer potency factors are derived from the results of human epidemiological studies of chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied. Tables 1 and 2 in Attachment 5 list the available carcinogenic potency factors for the selected chemicals at the Landfill.

Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals. Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty

factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse noncarcinogenic effects to occur. The Acceptable Intake for Subchronic Exposure (AIS) is the highest human intake of a chemical that does not cause adverse effects when exposure is short term (i.e., for an interval which does not constitute a significant portion of the life span). The Acceptable Intake for Chronic Exposure (AIC) is the highest human intake of a chemical that does not cause adverse effects when exposure is long term (i.e., for a lifetime). The AIS and AIC for the selected chemicals are listed in Attachment 5, Tables 1 and 2.

Risk characterization included an assessment of risk associated with exposures to noncarcinogens and carcinogens. Excess lifetime cancer risks are determined by multiplying the intake level with the cancer potency factor. These risks are probabilities that are generally expressed in scientific notation (e.g., 1 x 10^{-6} or 1E-6). An excess lifetime cancer risk of $1x10^{-4}$ indicates that, as a plausible upper bound, an individual has a one in one million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at a site. Acceptable target risks for carcinogens generally range from 10^{-4} to 10^{-7}. Table 3 in Attachment 5 shows the calculation of the total upper-bound carcinogenic risk for exposure to the indicator chemical. The cumulative upper bound risk for all carcinogens was $2.9x10^{-4}$. This was derived predominantly from oral exposures, with a minor contribution from inhalation exposures. This value is within the acceptable range.

Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient (HQ) (or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminant's reference dose). By adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the Hazard Index (HI) can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. Hazard indices for total oral and total inhalation exposures for the Landfill are presented in Attachment 5, Tables 4 and 5. In addition, Tables 6 and 7 in Attachment 5 present the hazard indices for soil ingestion and dermal adsorption. Both hazard indices for subchronic exposure are less than one, as is the hazard index for chronic inhalation. The hazard index for chronic oral exposure, however, is greater than one. The major contributor to this exceedance is the CDI:AIC ratio for iron at 34.9. This high ratio results primarily from the high iron intake in the groundwater ingestion exposure pathway.

For the sludge lagoons, the risk associated with exposure from soil ingestion and dermal adsorption is minimal; therefore, soil

remediation is not necessary. For source control from Cell #1, the risk is above acceptable levels; therefore, source remediation is necessary to alleviate risk from exposure to ground water and surface water.

DESCRIPTION OF ALTERNATIVES

The alternatives presented in the proposed plan were developed based upon a screening of possible remedial technologies and compliance of the alternatives with applicable or relevant and appropriate requirements (ARARs) of environmental statutes. Considerations at the North Sea Municipal Landfill site which entered into the screening process are as follows:

A. The ground water was utilized by private well owners as a drinking water source. Most residents have been provided with an alternative water supply.

B. An estimated 1.3 million cubic yards of waste are present in landfill Cell #1, some of which may be in direct contact with the water table.

Excavation of the landfill, including the destruction of the wastes by incineration and other treatment technologies, and its disposal off-site in a secure commercial landfill, (or re-disposal on-site in a lined landfill), was eliminated in the screening process as a result of the excessive cost and short-term impacts on human health. The contents of the landfill, approximately 1.3 million cubic yards, would require excavation and removal. In addition, the excavation, removal and transportation of the waste would cause significant impacts to the air quality and to the health and safety of the site workers.

In-place closure of the landfilled waste consisting of alternative cover systems was developed for detailed evaluation. The source control alternatives for Cell #1 and the former sludge lagoons are as follows:

ALTERNATIVE 1A: No Action - Cell #1

Capital Cost:	$ 20,000
Annual Operation & Maintenance:	$ 91,000
Estimated Present Worth:	$ 1.4 million

CERCLA requires that the "no action" alternative be considered at every site. At the North Sea Municipal Landfill site, the no action alternative would consist of leaving the cover on the landfill as it currently exists and continue monitoring the water and air quality at the landfill. A six-foot high fence would be placed around the entire perimeter of the landfill property to prohibit unauthorized access. Institutional controls in the form of a deed restriction would also be placed on the North Sea Municipal Landfill property to prohibit future development and

use of property which may increase the potential for public exposure.

ALTERNATIVE 1B: No Action - Sludge Scavenger Lagoons

Capital Cost:	$ 20,000
Annual Operation & Maintenance:	$ 91,000
Estimated Present Worth:	$ 1.4 million

The no action alternative for the sludge lagoons consists of leaving the scavenger lagoons as they currently exist. The lagoons were mostly emptied of their liquid and solid contents in 1986. Institutional controls, in the form of a deed restriction, as well as fencing and air and water quality monitoring would also be implemented under this alternative.

The "no action" alternative for the sludge lagoon area is contingent upon the findings of both the confirmatory sludge/soil sampling and the Operable Unit Two study. The alternative will be reviewed if either of the aforementioned studies indicate the presence of hazardous wastes or substances that may pose a health or environmental threat.

ALTERNATIVE 2A: New York State Rules for Closure Pursuant of Part 360 Regulations of a Municipal Landfill Using a Low Permeability Soil for Cell #1

Capital Cost:	$ 3.2 million
Annual Operation & Maintenance:	$ 200,000 (includes Cells #1, 2, 3)
Estimated Present Worth:	$ 6.3 million
Time to Implement Remedial Action:	nine months to one year

Alternative 2A consists of a cover system which will comply with the New York State regulations for closure of an existing municipal landfill. The cover system consists of the following components (see Figure 4):

- Six inches of vegetated topsoil
- Twenty-four inches of silty sand protective barrier
- Eighteen inches of low permeability soil (permeability 1×10^{-7} cm/sec)
- Twelve inches of sand for gas control (permeability 1×10^{-3} cm/sec)
- Two layers of filter fabric
- Soil fill of varying thickness to construct a cap system foundation with a minimum 4.0 percent slope

- o Gas venting risers (maximum separation of one vent per acre)

- o Crushed stone backfill around gas venting risers

As part of the NYSDEC closure requirements, post-closure operation and maintenance would be required to operate and maintain the vegetated cover, drainage structures, and gas venting systems. A gas monitoring program would be required. Activities, such as perimeter fencing and a deed restriction would be implemented.

ALTERNATIVE 2B: New York State Rules for Closure Pursuant of Part 360 Regulations of a Municipal Landfill Using a Geosynthetic Cover for Cell #1

Capital Cost:	$ 2.9 million
Annual Operation & Maintenance:	$ 190,000 (includes Cells #1, 2, 3)
Estimated Present Worth:	$ 5.8 million
Time to Implement Remedial Action:	nine months to one year

Alternative 2B consists of a cover system which will comply with New York State regulations for closure of an existing municipal landfill. This alternative is similar to Alternative 2A, except a geosynthetic membrane is substituted for the low permeability soil. The cover system consists of the following components (see Figure 5):

- o Six inches of vegetated topsoil

- o Twenty-four inches of silty sand protective barrier

- o A 40 mil thick geosynthetic membrane (permeability 1 x 10^{-12} cm/sec)

- o Twelve inches of sand for gas control (permeability 1 x 10^{-3} cm/sec)

- o Two layers of filter fabric

- o Soil fill of varying thickness to construct a cap system foundation with a minimum 4.0 percent slope

- o Gas venting risers (maximum separation of one vent per acre)

- o Crushed stone backfill around gas venting risers

As part of the NYSDEC closure requirements, post-closure operation and maintenance would be required to operate and maintain the vegetated cover, drainage structures and gas venting systems. A gas monitoring program would be required. Activities

such as perimeter fencing, institutional controls (i.e. deed restriction) would be implemented.

ALTERNATIVE 3A: Excavation/Backfill of Former Sludge Scavenger Lagoons

Capital Cost:	$ 1.1 million
Annual Operation & Maintenance:	$ 175,000 (includes Cells #1, 2, 3)
Estimated Present Worth:	$ 3.8 million
Time to Implement Remedial Action:	six to nine months

Alternative 3A consists of excavation of the existing material in the scavenger lagoons. The scavenger lagoons were closed for operation in the Summer of 1986. After most of the liquid and the solid contents of the lagoons were removed, an additional two feet of soil was excavated from the lagoons. All of the excavated material was placed in Cell #2 (active cell). The area of the former lagoons consisted of a series of 14 lagoons approximately 50 feet long, 10 feet deep and 25 feet wide. The total surface area which would be required to be removed, including the access road and lagoon cell dividers, is approximately 500 feet by 200 feet to a total depth of 15 feet below the bottom elevation of the scavenger lagoons. Approximately 56,000 cubic yards of material would have to be removed. The area would then be backfilled with clean material.

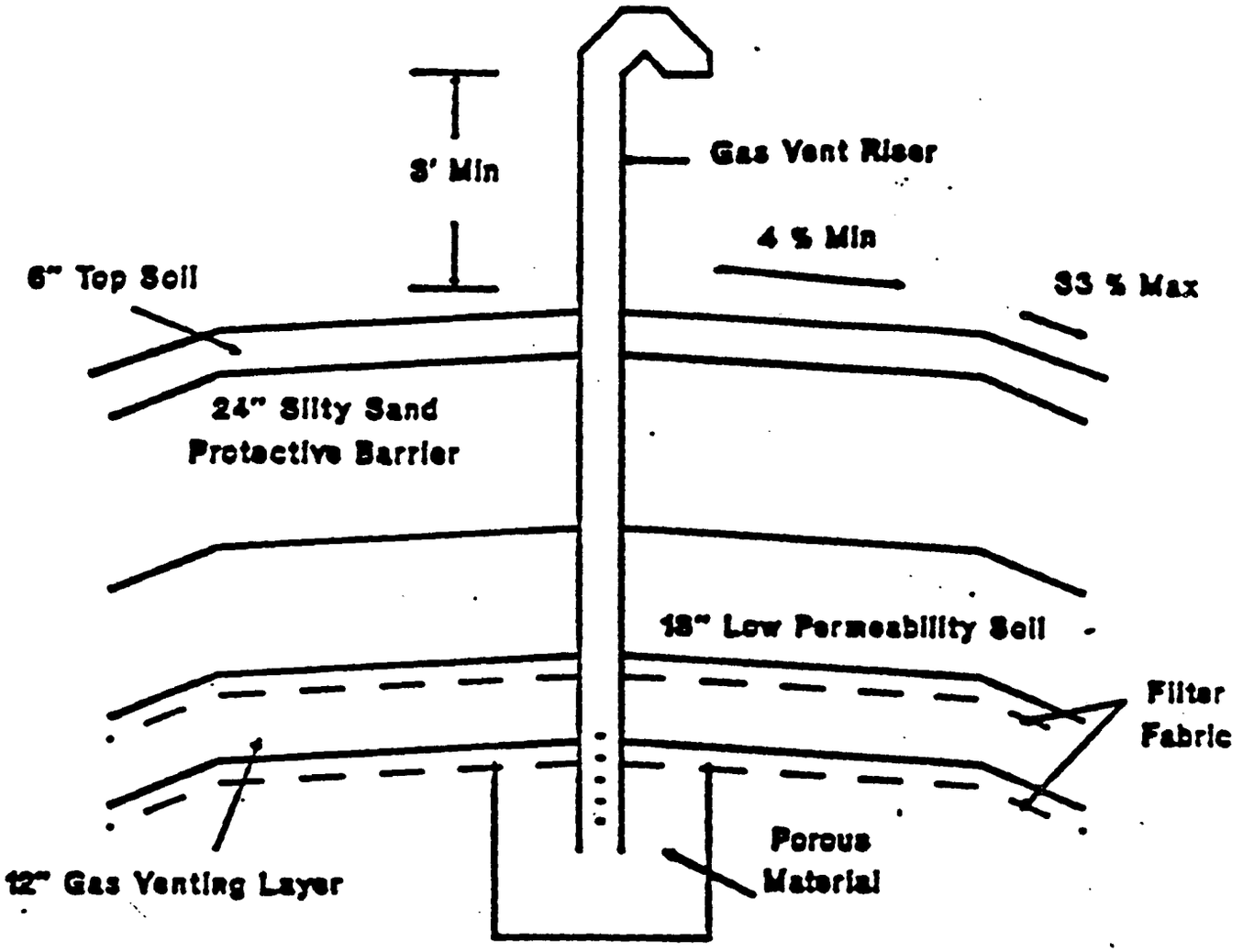
MMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

A. Overall Protection of Human Health and the Environment

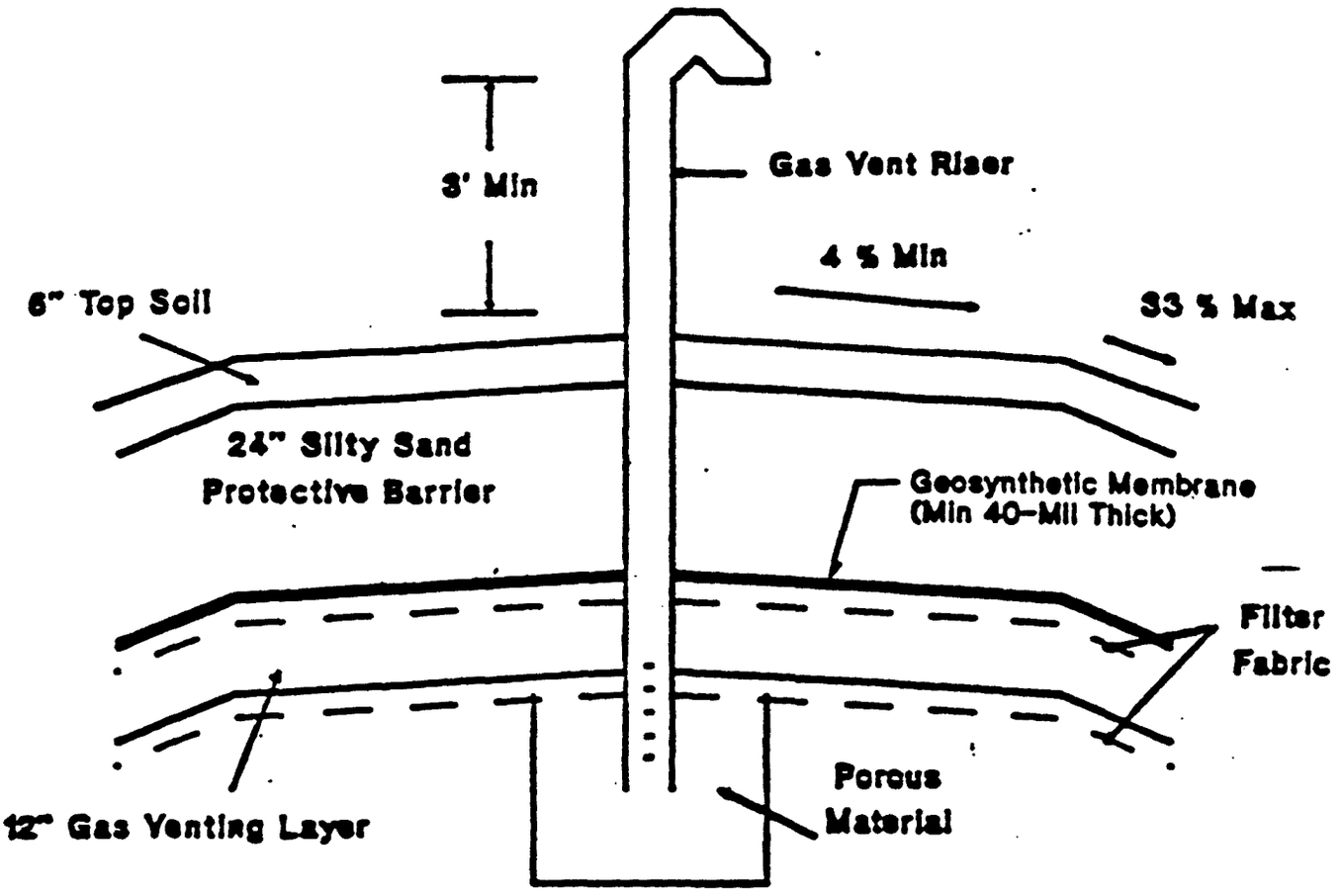
Alternative 2A or 2B will provide the greatest overall protection of human health and the environment with respect to the existing conditions. Installation of the multi-layer impermeable cap will effectively prevent public exposure to the landfill materials. Such a cap will also prevent infiltration of precipitation into Cell #1 which is considered a major contributing source of leachate to the ground water.

Most of the identified sludge in the lagoons was excavated in 1986. Based on current information available to the EPA, a significant portion of the source has been eliminated, and according to the EPA's endangerment assessment, the former sludge lagoons will not contribute contaminants to the ground water which will have any significant impact to public health and the environment. However, additional confirmatory sampling should be conducted to confirm that no hazardous constituents are leaching from this area.

The no action alternative 1A provides no protection. It is not protective because contaminants may continue to leach



NORTH SEA LANDFILL
FEASIBILITY STUDY
PROPOSED FINAL COVER
WITH LOW PERMEABILITY SOIL



NORTH SEA LANDFILL
FEASIBILITY STUDY
PROPOSED FINAL COVER
WITH GEOSYNTHETIC MEMBRANE

into ground water and surface water. Since, most of the sludge was excavated in 1986, alternative 1B with confirmatory sludge/soil sampling will be protective of human health and environment.

The degrees of protection provided by the alternatives and magnitude of risk resulting from use of surface or ground water as drinking water, is unknown. Exposure point contaminant concentrations may not exceed drinking water quality standards under any of the cover system alternatives, including no action.

B. Compliance with ARARs

CERCLA requires that remedial actions meet legally applicable or relevant and appropriate requirements of other environmental laws. These laws may include: the Toxic Substances Control Act, the Safe Drinking Water Act, the Clean Air Act, the Clean Water Act, the Solid Waste Disposal Act (RCRA), and any state law which has stricter requirements than the corresponding federal law.

Applicable requirements are cleanup standards, standards of controls, and other substantive environmental protection requirements, criteria or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance at a site. A requirement is "applicable" if the remedial action or circumstances at the site satisfy all of the jurisdictional prerequisites of the requirement.

Relevant and appropriate requirements are cleanup standards, standards of control, and other environmental protection requirements, criteria or limitations promulgated under federal or state law that, while not legally "applicable' to a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance at a site, address problems or situations sufficiently similar to those encountered at the site that their use is well-suited to that site.

"A requirement that is judged to be relevant and appropriate must be complied with to the same degree as if it were applicable. However, there is more discretion in this determination: it is possible for only part of a requirement to be considered relevant and appropriate, the rest being dismissed if judged not to be relevant and appropriate in a given case" (Interim Guidance on Compliance with Applicable or Relevant and Appropriate Requirements, 52 FR 32496, August 27, 1989).

Cell #1 will be closed in accordance with New York State Regulation, 6 NYCRR Part 360. Alternative 2A and 2B will

meet and exceed the New York State requirements for closure of an existing municipal solid waste facility. The closure of Cell #1 will also comply with the New York State Pollution Control Regulations (6 NYCRR Parts 201, 202 and 219) with regard to air emissions as well.

C. **Long-Term Effectiveness and Permanence**

Landfill capping (Alternatives 2A and 2B) is considered a reliable option, and if properly installed, a cap system is expected to continue to provide a high level of protection. Cap systems are effective in achieving their objective of isolating landfilled wastes and reducing the risk of contaminant migration as a result of leachate generated by surface precipitation.

The no action alternative 1A is not effective in controlling precipitation and corresponding leachate production. Since most of the sludge were excavated in 1986, the no action alternative with confirmatory sludge/soil sampling will be effective in protecting human health and environment.

The long-term adequacy of land disposal cover systems is unknown. Differential settling of the landfill wastes and subsequent detrimental effects on any cover system should be expected. Differential settling will place stress on Alternative 2B resulting in the possible damage of the geosynthetic membrane. This would result in free flow of water through any resulting holes and a decrease in the efficiency of this alternative. Decreased efficiency may also occur in the other cover system alternative as a result of differential settlement. The design life of the geosynthetic membrane has not been substantiated by long-term usage and may have to be replaced sometime in the future.

Surface erosion, burrowing animals and vegetation may all penetrate the barriers resulting in a localized failure of the barrier. The single geosynthetic layer, Alternative 2B, is the most likely to be fully penetrated by the above failure modes. Alternative 2A is the least likely to be fully penetrated based on the overall depth, but can also be damaged by these failure modes.

Frost action can damage the barrier layer and reduce its effectiveness. Alternative 2A has the greatest potential for frost damage because it is not protected by additional cover or a geosynthetic membrane. Alternative 2B should be the least affected by frost because it includes geosynthetic materials.

D. **Reduction of Toxicity, Mobility or Volume of the Contaminants**

None of the alternatives utilize treatment to reduce toxicity, mobility or volume. However, Alternatives 2A and 2B will reduce the volume of leachate being generated in the landfill by preventing infiltration of rain water into the waste. Alternative 3A will reduce any remaining sludge residuals once excavated.

E. Short-Term Effectiveness

Both cover system alternatives (2A and 2B) will have minimal potential impact on human health because construction activities should not disturb in-place wastes. The major impact on the nearby residents will be a substantial increase in truck traffic required to transport the large quantities of soil comprising the cover system components and drill rigs for installation of the passive venting system. This traffic will raise dust and increase noise levels locally. However, they will be of short duration, and measures can be taken to minimize these impacts. The cover system for both alternatives will require nine months to one year to design and construct, depending on the allowed bid period and seasonal weather conditions.

Alternative 3A will also pose minimal risks to the public. This alternative will generate truck traffic solely on-site. Fugitive emissions are also a concern, but can be minimized by construction restraints such as water sprays. The required time for design and construction is three to six months.

Workers may be exposed to air emissions of volatile organic compounds and methane during site grading and placement of initial layers. However, all cover systems share these activities. Air monitoring will be necessary and respiratory protection utilized if needed based upon the monitoring results.

F. Implementability

Both cover systems are technically feasible, and materials and required services are readily available in the New York State area. Competitive bidding by qualified contractors is expected for all alternatives with a number of national membrane liner manufacturers expected to bid as the manufacturer and installer of the geosynthetic membrane.

Both cover systems are administratively feasible, with minimal requirements for NYSDEC approvals or permits because no off-site actions are included.

Alternative 3A poses administrative and technical problems because additional sampling would be required to decide the disposal site of the excavated materials.

G. Cost

Alternatives 1A and 1B have minimal estimated construction costs ($20,000). The estimated construction costs for each of the remaining alternatives are as follows:

- Alternative 2A - $3,200,000
- Alternative 2B - $2,900,000
- Alternative 3A - $1,100,000

The estimated construction costs are sensitive to the unit costs for soil, topsoil and clay fill. Alternatives which require greater quantities of fill, such as 2A, are more sensitive to costs than alternatives which require lesser quantities, such as 2B. Alternative 3A has a high capital cost in relation to Alternative 1B for the scavenger lagoon source control evaluation.

The annual operation and maintenance costs for each alternative are estimated as follows:

- Alternative 1A - $ 91,000
- Alternative 1B - $ 91,000
- Alternative 2A - $200,000 (includes Cells #1, 2 and 3)
- Alternative 2B - $190,000 (includes Cells #1, 2 and 3)
- Alternative 3A - $175,000 (includes Cells #1, 2 and 3)

Detailed cost figures for each alternative are included in Attachment 1.

H. State Acceptance

The New York State Department of Environmental Conservation concurs with the selected remedy.

I. Community Acceptance

Representatives from the Town of Southampton believed that No-Action alternative for Cell #1 should be selected because 1) Cell #1 was capped with a 20 milli-inch PVC in 1985, although side slopes were never capped, 2) no hazardous waste were detected in the Landfill, therefore, DEC may be withholding Environmental Quality Bond Act funding to the Town for remediation and 3) since most of the homes are connected to the public water supply downgradient of the Landfill, no homes are being affected by the "alleged" plume.

SELECTED REMEDY

Based on the results of the Phase I RI/FS reports, and after careful consideration of all reasonable alternatives, EPA selects Alternative 1B and either Alternative 2A or 2B as the preferred choice for addressing source control management at the North Sea

Municipal Landfill. The selection of alternative 1B, or the "no action" alternative, for the sludge lagoon area is contingent upon the findings of both the confirmatory sludge/soil sampling and the Operable Unit Two study. Alternative 1B will be reviewed if either of the aforementioned studies indicate the presence of hazardous wastes or substances that may pose a health or environmental threat. A determination will be made during the remedial design phase as to whether a low permeability material (soil) or a flexible, synthetic membrane liner is best suited for use as the barrier layer. This determination will be made based upon performance criteria in the New York State regulations. Alternative 1B and 2A or 2B include:

A. Complete site fencing and posting to restrict access to the site.

B. The filing of a deed restriction designating the landfill and former sludge lagoons as a restricted use property.

C. Sludge/soil sampling of the former scavenger lagoons to confirm that no hazardous waste and/or substances that may pose a health or environmental threat are present in the area. Such sampling shall be conducted by drilling a minimum of one, and a maximum of three, borings into each of the fourteen identified sludge lagoons. Sludge/soil samples taken from the borings will be analyzed for EPA's and NYSDEC's full Target Compound List (TCL) parameters. Sludge samples will also undergo an EP Toxicity Test to determine the leaching potential of hazardous constituents that may be present in the wastes.

D. Implementation of closure requirements of New York State Regulations, 6 NYCRR Part 360, Solid Waste Management Facilities for Cell #1.

E. Long-term operation and maintenance to provide inspections and repairs to the landfill cap.

F. Long-term air and water quality monitoring pursuant to the New York State closure requirements for Cell #1 and long-term air and water quality monitoring for the former sludge lagoons. Parameters to be monitored would include EPA's and NYSDEC's Target Compound List (TCL). The TCL includes over 125 hazardous chemical parameters to be analyzed during the monitoring program.

The selected combination of alternatives provides the best balance among the nine criteria used by the EPA in evaluating remedial action alternatives. Land Disposal Restrictions (LDRs) are not applicable for this site because the Landfill will be capped in place.

Both variations of Alternative 2 use proven containment techniques and will minimize future contaminant migration by reducing the volume of precipitation which percolates through the landfilled wastes. The effectiveness of the selected cover system in protecting ground water quality will be verified by a monitoring network installed as part of the Operable Unit Two study which will be focusing on ground water at the site.

STATUTORY DETERMINATIONS

A. Protection of Human Health and the Environment

The selected remedy is protective of human health and the environment. The fencing, deed restrictions, and capping all provide protection from direct contact with contaminated materials. Capping of the landfill also reduces the emissions of methane and VOCs, and it reduces percolation of precipitation through the landfill and thus the migration of hazardous substances into ground water. Monitoring of the ground water will identify any failures of the containment system.

The chosen alternative will only cause minimal potential impact on human health or cross-media impacts to the environment because in-place waste should not be disturbed during construction activities.

The former sludge lagoons were decommissioned in 1986. The area was then backfilled with clean soil. During the Phase I RI, soil borings at the former sludge lagoons were collected from locations identified by the landfill operator as "hot spots". Based on the RI soil boring results, contaminant levels detected in the soil were below the EP Toxicity levels specified in federal regulations, as set forth at 40 CFR 261. As a result of the previous excavation of the former sludge lagoons, the EPA believes that there is no significant impact to public health and the environment posed by the decommissioned lagoons. However, confirmatory sampling will be conducted to confirm that no hazardous wastes or substances that may pose a health or environmental threat are present in the area. The "no action" alternative for the sludge lagoon area is contingent upon the findings of both the confirmatory sludge/soil sampling and the Operable Unit Two study. The alternative will be reviewed if either of the aforementioned studies indicate the presence of hazardous wastes or substances that may pose a health or environmental threat.

B. Attainment of ARARs

The selected remedy will attain all applicable or relevant and appropriate Federal and State requirements.

The landfill capping and the long-term monitoring will meet and exceed the New York State requirements for closure of a solid waste facility.

Cell #1 will be closed in accordance with New York State Regulation, 6 NYCRR Part 360.

New York State Pollution Control Regulations, 6 NYCRR Parts 201, 202 and 219, with regard to air emissions will be complied with as well.

C. Cost-Effectiveness

The selected remedy is prescribed by compliance with applicable state and federal solid waste landfill closure ARARs. The chosen alternative will provide an overall effectiveness proportional to its cost such that it represents a cost effective remedy.

The proposed plan presents an estimated range of costs for construction and annual operation and maintenance. The range of estimated costs considers whether the cover materials are readily available in the landfill vicinity. The final construction cost is expected to fall within the range of costs provided.

D. Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

EPA and the State of New York have determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost effective manner for the Operable Unit One at the Landfill. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA and the State of New York have determined that the selected remedy provides the best balance of trade off in terms of long-term effectives and permanence, reduction of toxicity, mobility, or volume achieved through treatment, short-term effectiveness, implementability, cost and considering State and community acceptance.

The chosen remedy, either Alternative 2A or 2B, represents the most appropriate solution for this site. Based upon the information presented, the State of New York and EPA believe the selected remedy will protect ground water quality by reducing infiltration and leachate production. It provides the best balance among all nine evaluation criteria, with the following being the most important considerations for the site:

1. Compliance with state and federal ARARs for solid waste landfill closure.

2. Availability of equipment and materials.

3. Cost of construction, operation and maintenance.

4. Elimination of rain water infiltration and thus a reduction in the volume of leachate released to the ground water.

E. Preference for Treatment As A Principal Element

The selected remedy does not satisfy the statutory preference for treatment because it is impractical. The exact location of any hazardous waste that may have been disposed of at the Landfill is unknown. Therefore, the entire Landfill volume, approximately 1.3 million cubic yards, would require excavation and removal for the remedial technologies indicated below. These technologies were screened and eliminated from further development and analysis as being impractical for the reasons indicated.

1. Removal is cost-prohibitive for this site as a result of the excessive large volume which would need to be excavated. In addition, there is limited available space at the site to stage the waste during the excavation phase.

2. Treatment (on-site and off-site) methods such as incineration, solidification/stabilization, in-situ, biological and chemical treatment are costly options which would not necessarily provide for any added benefit in protecting the public from potential future exposure.

3. Off-site disposal would be cost-prohibitive and increase human exposure during transportation.

4. On-site disposal is impractical because sufficient area is not available for simultaneous excavation and waste staging. It is also cost-prohibitive.

ATTACHMENT 1 - COST SUMMARIES

TOWN OF SOUTHAMPTON

NORTH SEA LANDFILL

COST SUMMARY

Alternative 1A - No Action - Cell #1

Work Activity	Quantity	Unit Price[1]	Total
Site Fencing	800 lin. ft.	$ 20.00	$ 16,000
SUBTOTAL			$ 16,000
		Say	$ 16,000
Contingencies[2]			$ 4,000
TOTAL COST			$ 20,000

(1) - Installed unit price
(2) - Includes administration, legal and engineering - 25 percent

TOWN OF SOUTHAMPTON

NORTH SEA LANDFILL

COST SUMMARY

Alternative 1B - No Action - Scavenger Lagoons

Work Activity	Quantity	Unit Price[1]	Total
Site Fencing	800 lin. ft.	$ 20.00	$ 16,000
SUBTOTAL			$ 16,000
		Say	$ 16,000
Contingencies[2]			$ 4,000
TOTAL COST			$ 20,000

(1) - Installed unit price
(2) - Includes administration, legal and engineering - 25 percent

TOWN OF SOUTHAMPTON

NORTH SEA LANDFILL

COST SUMMARY

Operation & Maintenance Costs for Alternative 1A and 1B

A. Ground Water Monitoring	Cost (rounded to nearest $100)
Assume sampling event occurs twice a year Assume Full Target Compound List (TCL) analysis 2 times a year and leachate parameters 3 times a year Assume 12 monitoring wells to be sampled	$ 58,300
Assume (3 person)(8 hrs/day)(3 days) ($35/hr)(3 times a year)	7,600
Assume (1 cooler/day)(3 days)($100/cooler Fed Ex)(3 times a year)	900
Travel ($141/day)(3 person)(3 days) (2 times a year)	2,500
Safety and sampling equipment	1,200
	$ 70,500
B. Air Monitoring, Gas Monitoring	
Assume sampling event occurs times a year Assume Full TCL Volatile Organic Compound analysis Assume equipment such as explosimeter, OVA and HNu are leased Assume gas emissions are tested at passive landfill gas vents and landfill gas monitoring wells	$ 3,700
Assume (2 person)(8 hrs/day)(1 day)($35/hr) (2 times a year)	1,100
Travel ($141/day)(2 person)(1 day) (2 times a year)	600
	$ 5,400
C. Report Preparation	$ 7,000
	$ 82,900
D. Contingency 10%	$ 8,300
Total	$ 91,200

Capital Cost: $ 20,000
Annual O&M Cost: $ 91,200
Estimated Present Worth: $ 1.4 million

TOWN OF SOUTHAMPTON

NORTH SEA LANDFILL

COST SUMMARY

Alternative 2A - New York State Rules for Closure of Municipal Landfill with Low Permeability Soil - Cell #1

Work Activity	Quantity[1]	Unit Price[2]	Total
0.5′ of topsoil & sand	10,500 cu. yd.	$ 7.00	$ 74,000
2.0′ of silty sand	42,000 cu. yd.	12.00	504,000
1.5′ of low permeability soil	31,500 cu. yd.	28.00	882,000
Filter fabric (2 layers)	1,132,600 sq. ft.	0.40	453,000
1.0′ of sand	21,000 cu. yd.	12.00	252,000
Soil foundation fill[3]	21,000 cu. yd.	7.00	147,000
Gas venting risers[4]	25 units	750.00	19,000
Crushed stone backfill	400 cu. yd.	13.00	5,000
Site fencing	800 lin. ft.	20.00	16,000
Methane monitoring wells[5]	1,800 lin. ft.	54.00	97,000
Methane venting wells[6]	3,000 lin. ft.	40.00	120,000
SUBTOTAL			$ 2,569,000
		Say	$ 2,570,000
Contingencies[7]			640,000
TOTAL COST			$ 3,210,000

(1) - Closure area = 13 acres = 566,280 square feet
(2) - Installed unit price
(3) - Assume one foot average depth
(4) - Minimum one vent per acre
(5) - Assume methane monitoring wells to be spaced 100 feet on centers at perimeter of landfill site
(6) - Assume methane venting wells to be spaced 200 feet on centers at perimeter of Cells #1 and #2
(7) - Includes administration, legal and engineering - 25 percent

TOWN OF SOUTHAMPTON

NORTH SEA LANDFILL

COST SUMMARY

Alternative 2B - New York State Rules for Closure of Municipal Landfill with Geosynthetic Membrane - Cell #1

Work Activity	Quantity[1]	Unit Price[2]	Total
0.5' of topsoil & sand	10,500 cu. yd.	$ 7.00	$ 74,000
2.0' of silty sand	42,000 cu. yd.	12.00	504,000
1.5' of low permeability soil	650,000 sq. ft.	0.95	618,000
Filter fabric (2 layers)	1,132,600 sq. ft.	0.40	453,000
1.0' of sand	21,000 cu. yd.	12.00	252,000
Soil foundation fill[3]	21,000 cu. yd.	7.00	147,000
Gas venting risers[4]	25 units	750.00	19,000
Crushed stone backfill	400 cu. yd.	13.00	5,000
Site fencing	800 lin. ft.	20.00	16,000
Methane monitoring wells[5]	1,800 lin. ft.	54.00	97,[redacted]
Methane venting wells[6]	3,000 lin. ft.	40.00	120,[redacted]
SUBTOTAL			$ 2,305,000
		Say	$ 2,305,000
Contingencies[7]			575,000
TOTAL COST			$ 2,880,000

(1) - Closure area = 13 acres = 566,280 square feet
(2) - Installed unit price
(3) - Assume one foot average depth
(4) - Minimum one vent per acre
(5) - Assume methane monitoring wells to be spaced 100 feet on centers at perimeter of landfill site
(6) - Assume methane venting wells to be spaced 200 feet on centers at perimeter of Cells #1 and #2
(7) - Includes administration, legal and engineering - 25 percent

TOWN OF SOUTHAMPTON

NORTH SEA LANDFILL

COST SUMMARY

Alternative 3A - Excavation/Backfill of Scavenger Lagoons

Work Activity	Quantity[1]	Unit Price[2]	Total
Excavation	56,000 cu. yd.	$ 7.25	$ 406,000
Backfill	62,000 cu. yd.	3.25	202,000
Site fencing	800 lin. ft.	20.00	16,000
SUBTOTAL			$ 624,000
		Say	$ 625,000
Contingencies[7]			95,000
TOTAL COST			$ 720,000

(1) - Excavation area - 500' x 200' x 15' = 1,500,000 cu. ft. = 56,000 cu. yds.
(2) - Installed unit price
(3) - Includes administration, legal and engineering - 15 percent

TOWN OF SOUTHAMPTON

NORTH SEA LANDFILL

COST SUMMARY

Alternative 3A - Excavation/Backfill of Scavenger Lagoons

Work Activity	Quantity[1]	Unit Price[2]	Total
Excavation	56,000 cu. yd.	$ 11.00	$ 616,000
Backfill	62,000 cu. yd.	5.50	341,000
Site fencing	800 lin. ft.	20.00	16,000
SUBTOTAL			$ 973,000
		Say	$ 973,000
Contingencies[7]			147,000
TOTAL COST			$ 1,120,000

(1) - Excavation area - 500' x 200' x 15' = 1,500,000 cu. ft. = 56,000 cu. yds.
(2) - Installed unit price
(3) - Includes administration, legal and engineering - 15 percent

H2MGROUP

Holzmacher, McLendon and Murrell, P.C. • Holzmacher, McLendon and Murrell, Inc. • H2M Labs, Inc.
Engineers, Architects, Planners, Scientists

575 Broad Hollow Road, Melville, N.Y 11747-5076
(516) 756-8000 • (201) 575-5400

May 22, 1989

Supervisor Mardythe O. DiPirro
Town of Southampton
116 Hampton Road
Southampton, New York 11968

Re: North Sea Landfill
SHMP 89-04

Dear Supervisor DiPirro:

Enclosed is the Field Operations Plan (FOP) for Phase II Remedial Investigation (RI) activities for the above referenced site. These activities are required as per EPA's conditional approval letter to the Town dated March 27, 1989. The activities include collection of: one more round of groundwater samples (12 wells total), landfill soil gas samples, and a background surface soil sample. The analytical data generated would support the conclusions of the feasibility study (FS) now in progress and the health risk assessment.

As you are aware, a proposal for groundwater monitoring in 1989 was submitted for Town review on March 2, 1989 and was later approved on May 12, 1989. The estimated cost for this groundwater monitoring program is $93,200. However, the Phase II RI will require $28,759. worth of additional laboratory expenses, despite the overlap on certain annual groundwater parameters.

The additional groundwater costs total $21,900. The extra costs are related to: (1) extra cost for CLP (contract laboratory program) deliverables; (2) use of the new analytical method 524.2 for volatile organics analysis; and (3) extra analytical parameters which are not on the baseline groundwater parameter list. EPA was unwilling to allow these analyses to be performed non-CLP and has required method 524.2 for lower detection limits.

Seven landfill soil gas points will be sampled and results will support the remedial alternative selected for cell one. The laboratory costs for soil gas analysis are $2,500. One off-site surface soil sample will be collected to represent background soil and compared with results form the landfill. The total laboratory cost for surface soil analysis is $4,359.

Your expedient approval of this sampling program is requested. The EPA has set up a fairly tight schedule for the next few months. In order to comply with this schedule, groundwater samples must be obtained in late May or early June. The soil gas and surface soil samples can be obtained in early June. In all cases, the laboratory turnover must meet the five week turnaround for CLP analysis. If the schedule is met, we can expect results in mid July. These results will help finalize the RI/FS process.

Your cooperation in these matters is greatly appreciated.

Very truly yours,

HOLZMACHER, McLENDON & MURRELL, P.C.

Paul W. Grosser, Ph.D., P.E.
Vice President

PWG/CLV/lc

cc: Town Board
John Bennett, Esq.

H2MGROUP

Holzmacher, McLendon and Murrell, P.C. • Holzmacher, McLendon and Murrell, Inc. • H2M Labs, Inc.
Engineers, Architects, Planners, Scientists

575 Broad Hollow Road, Melville, N.Y. 11747-5076
(516) 756-8000 • (201) 575-5400
FAX: 516-694-4122

March 2, 1989

Supervisor Mardythe O. DiPirro
Town of Southampton
116 Hampton Road
Southampton, New York 11968

Re: Town of Southampton
North Sea Landfill
1989 Groundwater Monitoring Program

Dear Supervisor DiPirro:

As part of the Hydrogeologic Study for Cell 3 and the ongoing RI/FS, 22 groundwater monitoring wells were installed. During 1989, we propose that each well be sampled and analyzed on a quarterly basis. At the conclusion of one year of data gathering, an assessment should be undertaken as to whether some of the wells can be eliminated from future monitoring.

The list of parameters to be analyzed has been expanded significantly by NYSDEC as part of their changes to the Part 360 requirements. These changes have resulted in a significant increase in the analytical costs associated with each sample.

Specifically, we propose to provide the following services in connection with the 1989 groundwater monitoring program:

Task A - Monitoring and Sample Collection and Analysis

We will obtain and analyze samples of the 22 groundwater monitoring wells for the baseline and routine list of parameters. During 1989, the initial sample should be analyzed for the baseline parameters. During the remaining three quarters, the samples would be analyzed for the routine parameters. The baseline and routine parameters are shown in Table I. Subsequent to sampling and analysis, the data will be tabulated and forwarded to the Town of Southampton with a cover letter describing any anomalies. Sufficient copies will be provided to the Town in order that copies can be forwarded to the Suffolk County Department of Health Services and NYSDEC.

Task B - Monitoring Data Interpretation Report

The results of the baseline and routine sampling program performed during 1989 will be summarized in an annual report. In addition, the data will be analyzed as to trends and the report will recommend any changes that are necessary to the groundwater monitoring network.

Task C - Additional Analysis

NYSDEC requires that the groundwater samples be "whole and unfiltered" for the various metal analyses. It has been our experience that the samples obtained from the groundwater aquifer in the vicinity of the North Sea Landfill show higher levels of metals in unfiltered samples as compared to filtered samples. The reason for this is that when the sample is not filtered, the analysis will reveal not only the concentration of the metals in the water sample, but also the concentration of those metals attached to the sand/soil particles. Consequently, we propose that sufficient sample be obtained to analyze for each of the metals indicated in Table I in both filtered and unfiltered states.

Our lump sum fees for the above services, including labor, expenses, equipment and laboratory analyses, are as follows:

Task A

1) Baseline Sample:	$25,200
2) Three Routine Samples:	44,900
Task B	8,000
Task C	15,100
TOTAL	$93,200

We propose to invoice the Town on a percent complete basis during the course of the work.

At your convenience, representatives of our office are available to meet with you and the members of the Town Board to discuss any questions you may have concerning the above outlined monitoring program.

Very truly yours,

HOLZMACHER, McLENDON & MURRELL, P.C.

Gary E. Loesch, P.E.

GEL:mad
Enclosure
cc: Councilman Antonio L. Gil
Councilwoman Patricia F. Neumann
Councilwoman Marietta M. Seaman
Councilman George Stavropoulos

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TABLE I

WATER QUALITY ANALYSIS TABLE

	Groundwater	
	Baseline Parameters (1/year)	Routine Parameters (3/year)
Field Parameters		
Static water level (in wells and sumps)	x	x
Specific Conductance	x	x
Temperature	x	x
pH	x	x
Leachate Indicators		
Total Kjeldahl Nitrogen (TKN)	x	
Ammonia	x	x
Nitrate	x	x
Chemical Oxygen Demand (COD)	x	x
Biochemical Oxygen Demand (BOD-5)	x	
Total Organic Carbon (TOC)	x	x
Total Dissolved Solids (TDS)	x	x
Sulfate	x	x
Alkalinity	x	x
Phenols	x	x
Chloride	x	x
Total Hardness as $CaCO_3$	x	x
Turbidity	x	x
Color	x	
Boron	x	
Metals — unfiltered		
Potassium	x	x
Sodium	x	x
Iron	x	x
Manganese	x	x
Magnesium	x	x
Lead	x	x
Cadmium	x	x
Aluminum	x	
Calcium	x	x
Antimony	x	
Arsenic	x	

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TABLE I (CONT'D.)

WATER QUALITY ANALYSIS TABLE

	Groundwater	
	Baseline Parameters (1/year)	Routine Parameters (3/year)
Metals (cont'd.)		
Beryllium	x	
Barium	x	
Chromium (total and hexavalent)	x	
Copper	x	
Mercury	x	
Nickel	x	
Selenium	x	
Silver	x	
Thallium	x	
Zinc	x	
Cyanide	x	
Volatile Organics* 601/602 1H/VN14	x	

25,200

* Volatile organics are to be analyzed using EPA Methods 601 and 602 as described in 40 CFR Part 136 (see Section 360-1.3 of this Part).

All samples must be whole and unfiltered except as otherwise specified by the department.

SWMP 89-01

Town of Southampton

Southampton, Long Island, N. Y.

MARDYTHE O. DIPIRRO
SUPERVISOR

TOWN HALL — 116 HAMPTON ROAD
SOUTHAMPTON, L. I., NEW YORK 11968
516-283-6000

May 12, 1989

Mr. Gary E. Loesch
Holzmacher, McLendon, & Murrell
575 Broad Hollow Road
Melville, New York 11747-5076

Dear Mr. Loesch,

This is to confirm are previous conversation authorizing H2M to proceed immediately with the 1989 GroundWater Monitoring Program at the North Sea Landfill.

The total lump sum for the proposed services, including labor, expenses, equipment, and laboratory analyses, is accepted at a total cost of $93,200.

If you have any questions, please do not hesitate to contact my office.

Sincerely,

Mardythe O. DiPirro

MOD/tvz

ATTACHMENT 2 - INDEX OF ADMINISTRATIVE RECORD

Document Number: SEA-001-0001 To 0281 Date: 10/01/87

Title: Analytical Data Report Package for North Sea Landfill Part I - Surface Soil

Type: DATA
Author: none: H2M Group (Holzmacher McLendon & Murrell)
Recipient: none: none

Document Number: SEA-001-0282 To 0570 Date: 10/01/87

Title: Analytical Data Report Package for North Sea Landfill Part I - Sat Soil Sample MW6

Type: DATA
Condition: MARGINALIA
Author: none: H2M Group (Holzmacher McLendon & Murrell)
Recipient: none: none

Document Number: SEA-001-0571 To 1016 Date: 10/01/87

Title: Analytical Data Report Package for North Sea Landfill Part I - Sat Soil Samples MW3A, MW3B, MW4A, MW4B, MW4C

Type: DATA
Author: none: H2M Group (Holzmacher McLendon & Murrell)
Recipient: none: none

Document Number: SEA-001-1017 To 1177 Date: 10/01/87

Title: Analytical Data Report Package for North Sea Landfill Part I - Round 1 10,29,30 Supply Well, Mahoney

Type: DATA
Author: none: H2M Group (Holzmacher McLendon & Murrell)
Recipient: none: none

Document Number: SEA-001-1178 To 1485 Date: 10/01/87

Title: Analytical Data Report Package for North Sea Landfill Part I - Samples MW2 & MW6 Orgs & Inorgs

Type: DATA
Author: none: H2M Group (Holzmacher McLendon & Murrell)
Recipient: none: none

Document Number: SEA-001-1486 To 1862 Date: 10/01/87

Title: Analytical Data Report Package for North Sea Landfill Part I - Surface Water/Sediment

Type: DATA
Author: none: H2M Group (Holzmacher McLendon & Murrell)
Recipient: none: none

Document Number: SEA-001-1863 To 2013 Date: 10/01/87

Title: Analytical Data Report Package for North Sea Landfill Part I - Surface Water

Type: DATA
Author: none: H2M Group (Holzmacher McLendon & Murrell)
Recipient: none: none

Document Number: SEA-001-2014 To 2341 Date: 10/01/87

Title: Analytical Data Report Package for Town of Southampton North Sea Landfill Part I - Sat Soil Samples MW2 & MW3C

Type: DATA
Author: none: H2M Group (Holzmacher McLendon & Murrell)
Recipient: none: none

Document Number: SEA-002-0001 To 0393 Date: 12/01/87

Title: Analytical Data Report Package for North Sea Landfill - Round 2

Type: DATA
Author: none: H2M Group (Holzmacher McLendon & Murrell)
Recipient: none: none

Document Number: SEA-002-0394 To 0591 Date: 10/01/87

Title: Analytical Data Report Package for North Sea Landfill Part II -Round 1 MW2 & MW6 Org & Inorg

Type: DATA
Author: none: H2M Group (Holzmacher McLendon & Murrell)
Recipient: none: none

Document Number: SEA-002-0592 To 0968 Date: 10/01/87

Title: Analytical Data Report Package for North Sea Landfill Part II -MW1ABC, MW3ABC, MW4ABC

Type: DATA
Author: none: H2M Group (Holzmacher McLendon & Murrell)
Recipient: none: none

Document Number: SEA-002-0969 To 1366 Date: 10/01/87

Title: Analytical Data Report Package for North Sea Landfill Part II -Lagoon Borings

Type: DATA
Author: none: H2M Group (Holzmacher McLendon & Murrell)
Recipient: none: none

Document Number: SEA-002-1367 To 1617 Date: 10/01/87

Title: Analytical Data Report Package for North Sea Landfill Part II

Type: DATA
Condition: MARGINALIA
Author: none: H2M Group (Holzmacher McLendon & Murrell)
Recipient: none: none

Document Number: SEA-002-1618 To 1883 Date: 10/01/87

Title: Analytical Data Report Package for North Sea Landfill Part II -Field Blank

Type: DATA
Condition: MARGINALIA
Author: none: H2M Group (Holzmacher McLendon & Murrell)
Recipient: none: none

Document Number: SEA-002-1884 To 2155 Date: 10/01/87

Title: Analytical Data Report Package for North Sea Landfill Part III - MW1ABC, MW3ABC, MW4ABC

Type: DATA
Author: none: M2M Group (Holzmacher McLendon & Murrell)
Recipient: none: none

Document Number: SEA-002-2156 To 2418 Date: 10/01/87

Title: Analytical Data Report Package for North Sea Landfill Part III

Type: DATA
Author: none: M2M Group (Holzmacher McLendon & Murrell)
Recipient: none: none

Document Number: SEA-003-0001 To 0350 Date: 10/01/87

Title: Analytical Data Report Package for North Sea Landfill Part IV -MW1ABC, MW3ABC, MW4ABC

Type: DATA
Author: none: M2M Group (Holzmacher McLendon & Murrell)
Recipient: none: none

Document Number: SEA-003-0351 To 0458 Date: 08/01/87

Title: Analytical Data Report Package for North Sea Landfill - MW1C

Type: DATA
Condition: INCOMPLETE
Author: none: M2M Group (Holzmacher McLendon & Murrell)
Recipient: none: none

Document Number: SEA-003-0459 To 0566 Date: 08/01/87

Title: Analytical Data Report for North Sea Landfill - MW1B

Type: DATA
Author: none: M2M Group (Holzmacher McLendon & Murrell)
Recipient: none: none

Document Number: SEA-003-0567 To 0724 Date: 00/01/87

Title: Analytical Data Report Package for North Sea Landfill - Metals Data

Type: DATA
Author: none: M2M Group (Holzmacher McLendon & Murrell)
Recipient: none: none

Document Number: SEA-003-0725 To 1102 Date: 12/01/87

Title: Analytical Data Report Package for North Sea Landfill Part II - MW4B

Type: DATA
Author: none: M2M Group (Holzmacher McLendon & Murrell)
Recipient: none: none

Document Number: SEA-003-1103 To 1391 Date: 12/01/87

Title: Analytical Data Report Package for North Sea Landfill Part III

Type: DATA
Author: none: M2M Group (Holzmacher McLendon & Murrell)
Recipient: none: none

Document Number: SEA-003-1392 To 1590 Date: 07/01/87

Title: Field Operations Plan, North Sea Landfill, Phase I Remedial Investigation

Type: PLAN
Author: none: M2M Group (Holzmacher McLendon & Murrell)
Recipient: none: Southampton NY, Town of

Document Number: SEA-003-1591 To 1686 Date: 01/01/87

Title: Health and Safety Plan, North Sea Landfill, Phase I Remedial Investigation

Type: PLAN
Author: none: M2M Group (Holzmacher McLendon & Murrell)
Recipient: none: Southampton NY, Town of

Document Number: SEA-083-1687 To 1687 Date: / /

Title: (Business card)

Type: OTHER
Author: Harwell, M L: Cheesultants Inc
Recipient: none: none

Document Number: SEA-083-1688 To 1704 Date: 03/31/87

Title: Administrative Consent Order (requiring the town to undertake a Remedial Investigation/Feasibility Study at the site).

Type: LEGAL DOCUMENT
Author: Daggett, Christopher J: US EPA
Recipient: Lang, Martin: Southampton NY, Town of

Document Number: SEA-083-1705 To 1728 Date: 12/13/83

Title: North Sea Municipal Landfill Documentation Records for NPL Hazard Ranking System

Type: PLAN
Author: McCarty, Robert: NY Dept of Environmental Conservation
Recipient: none: US EPA

Document Number: SEA-083-1729 To 1755 Date: 07/20/84

Title: Quality Assurance Team Documentation Records for NPL Hazard Ranking System

Type: PLAN
Author: Haus, Stuart: US EPA
Recipient: DiForte, Nicoletta: US EPA

Document Number: SEA-083-1756 To 1781 Date: 05/25/83

Title: Potential Hazardous Waste Site Preliminary Assessment & Site Inspection Report

Type: PLAN
Author: McTiernan, Edward F: NUS Corporation
Recipient: none: US EPA

Document Number: SEA-003-1782 To 1981 Date: 05/27/86

Title: Work Plan - Phase 1 Remedial Investigation, North Sea Landfill

Type: PLAN
Author: none: Ebasco Services
Recipient: none: US EPA
Attached: SEA-003-1843

Document Number: SEA-003-1843 To 1981 Parent: SEA-003-1782 Date: 05/27/83

Title: Guidance for Preparation of Combined Work/Quality Assurance Project Plans for Water Monitoring

Type: PLAN
Author: Brossaan, Martin W: US EPA
Recipient: none: none

Document Number: SEA-003-1982 To 1952 Date: 06/01/88

Title: Site Analysis, North Sea Municipal Landfill Volume I

Type: PLAN
Author: Norton, Douglas J: Bionetics Corporation
Recipient: none: US EPA

Document Number: SEA-003-1953 To 1969 Date: 06/01/88

Title: Site Analysis, North Sea Municipal Landfill Volume II

Type: GRAPHIC
Author: Norton, Douglas J: Bionetics Corporation
Recipient: none: US EPA

Document Number: SEA-003-1970 To 2102 Date: 04/01/88

Title: North Sea Landfill - Draft Remedial Investigation Report Volume I

Type: PLAN
Condition: DRAFT; ILLEGIBLE; MARGINALIA
Author: Grosser, Paul W: H2M Group (Holzmacher McLendon & Murrell)
Recipient: none: Southampton NY, Town of
Attached: SEA-003-1971

Document Number: SEA-003-1971 To 1971 Parent: SEA-003-1970 Date: 04/29/88

Title: (Cover letter forwarding attached draft of Remedial Investigation Report - North Sea Landfill)

Type: CORRESPONDENCE
Author: Grosser, Paul W: HZM Group (Holzmacher McLendon & Murrell)
Recipient: Kuan, Caroline: US EPA

Document Number: SEA-003-2103 To 2373 Date: 03/01/88

Title: North Sea Landfill - Remedial Investigation Report Volume II

Type: PLAN
Author: none: HZM Group (Holzmacher McLendon & Murrell)
Recipient: none: Southampton NY, Town of
Attached: SEA-003-2215 SEA-003-2305 SEA-003-2315 SEA-003-2356 SEA-003-2362 SEA-003-2365 SEA-003-2372 SEA-003-2373

Document Number: SEA-003-2215 To 2292 Parent: SEA-003-2103 Date: 02/18/88

Title: (Letter forwarding attached copies of Reduced Wind Data for site)

Type: CORRESPONDENCE
Author: Smith, Jim C: R&R International
Recipient: Villardi, Christine: HZM Group (Holzmacher McLendon & Murrell)

Document Number: SEA-003-2305 To 2314 Parent: SEA-003-2103 Date: 08/05/86

Title: (Letter forwarding attached results of the analyses performed on samples taken from the scavenger waste lagoons at subject site)

Type: CORRESPONDENCE
Author: Fisher, Anthony P: HZM Group (Holzmacher McLendon & Murrell)
Recipient: Johnsen, John I: Louis K McLean Associates

Document Number: SEA-003-2315 To 2321 Parent: SEA-003-2103 Date: 11/02/87

Title: (Letter forwarding attached data from 06/22/87 sampling of Flanders Bay and the point sources to the bay)

Type: CORRESPONDENCE
Author: Minei, Vito: Suffolk NY, County of
Recipient: Fisher, Anthony P: HZM Group (Holzmacher McLendon & Murrell)

Document Number: SEA-003-2356 To 2356 Parent: SEA-003-2103 Date: 07/25/78

Title: (Letter detailing analysis of water sample collected at addressee's home on 07/12/78)

Type: CORRESPONDENCE
Author: Moran, Dennis: Suffolk NY, County of
Recipient: Baecker, Walter: resident

Document Number: SEA-003-2362 To 2364 Parent: SEA-003-2103 Date: 10/30/79

Title: (Letter forwarding attached copy of analysis of water sample collected at addressee's home on 08/28/79)

Type: CORRESPONDENCE
Author: Slade, William V: Suffolk NY, County of
Recipient: Baecker, Walter: resident

Document Number: SEA-003-2365 To 2366 Parent: SEA-003-2103 Date: 05/06/80

Title: (Letter forwarding attached Drinking Water Analysis for ALDKARB)

Type: CORRESPONDENCE
Author: Martin, Tom: Suffolk NY, County of
Recipient: Baecker, Walter: resident

Document Number: SEA-003-2372 To 2372 Parent: SEA-003-2103 Date: 03/01/80

Title: (Map detailing location of Monitoring Wells and Test Borings at Site)

Type: GRAPHIC
Author: none: H2M Group (Holzmacher McLendon & Murrell)
Recipient: none: none

Document Number: SEA-003-2373 To 2373 Parent: SEA-003-2103 Date: 03/01/80

Title: (Map detailing geophysical and geologic logs of well boreholes at Site)

Type: GRAPHIC
Author: none: H2M Group (Holzmacher McLendon & Murrell)
Recipient: none: none

Document Number: SEA-003-2374 To 2439 Date: 12/01/88

Title: North Sea Landfill - Remedial Investigation Response Document

Type: PLAN
Condition: MARGINALIA
Author: none: M2M Group (Holzmacher McLendon & Murrell)
Recipient: none: Southampton NY, Town of
Attached: SEA-003-2375

Document Number: SEA-003-2375 To 2375 Parent: SEA-003-2374 Date: 01/04/89

Title: (Cover letter accompanying Response Document)

Type: CORRESPONDENCE
Condition: MISSING ATTACHMENT
Author: Grosser, Paul W: M2M Group (Holzmacher McLendon & Murrell)
Recipient: Kwan, Caroline: US EPA

Document Number: SEA-004-0001 To 0470 Date: 12/01/88

Title: North Sea Landfill - Remedial Investigation Supporting Documents

Type: PLAN
Author: none: M2M Group (Holzmacher McLendon & Murrell)
Recipient: none: Southampton NY, Town of
Attached: SEA-004-0107 SEA-004-0122 SEA-004-0147 SEA-004-0176 SEA-004-0223 SEA-004-0251 SEA-004-0428

Document Number: SEA-004-0107 To 0120 Parent: SEA-004-0001 Date: 07/18/88

Title: (Letter forwarding attached analytical data for groundwater monitoring program at site, June 1988)

Type: CORRESPONDENCE
Author: Loesch, Gary E: M2M Group (Holzmacher McLendon & Murrell)
Recipient: Morganelli, Daniel: NY Dept of Environmental Conservation

Document Number: SEA-004-0122 To 0131 Parent: SEA-004-0001 Date: 08/01/87

Title: (Article titled: "Should Groundwater Samples from Monitoring Wells Be Filtered Before Laboratory Analysis?")

Type: OTHER
Author: Braids, Olin C: Geraghty & Miller
Recipient: none: none

Document Number: SEA-004-0147 To 0174 Parent: SEA-004-0001 Date: 09/01/85

Title: Bacteriological Water Quality North Sea Harbor Shellfish Land 863, 1984 and 1985 data

Type: PLAN
Condition: MARGINALIA
Author: Redman, James: NY Dept of Environmental Conservation
Recipient: none: none

Document Number: SEA-004-0176 To 0182 Parent: SEA-004-0001 Date: 11/02/87

Title: (Letter forwarding attached data from 06/22/87 sampling of Flanders Bay and Point Sources)

Type: CORRESPONDENCE
Author: Minei, Vito: Suffolk NY, County of
Recipient: Fisher, Anthony P: H2M Group (Holzmacher McLendon & Murrell)

Document Number: SEA-004-0223 To 0250 Parent: SEA-004-0001 Date: 02/26/88

Title: Evaluation of Metals Data for the Contract Laboratory Program

Type: PLAN
Author: Sheikh, Hanif: none
Recipient: none: US EPA

Document Number: SEA-004-0251 To 0295 Parent: SEA-004-0001 Date: 02/01/88

Title: Laboratory Data Validation, Functional Guidelines for Evaluating Organic Analyses

Type: PLAN
Author: Bleyler, Ruth: US EPA
Recipient: none: US EPA

Document Number: SEA-004-0428 To 0436 Parent: SEA-004-0001 Date: 00/05/86

Title: (Letter forwarding attached analyses performed on samples taken from the scavenger waste lagoons on site)

Type: CORRESPONDENCE
Author: Fisher, Anthony P: H2M Group (Holzmacher McLendon & Murrell)
Recipient: Johnsen, John I: Louis K McLean Associates

Document Number: SEA-004-0471 To 0647 Parent: SEA-004-0473 Date: 07/01/89

Title: North Sea Landfill Remedial Investigation - Public Health Evaluation

Type: PLAN
Author: none: H2M Group (Holzmacher McLendon & Murrell)
Recipient: none: Southampton NY, Town of

Document Number: SEA-004-0473 To 0473 Date: 07/12/89

Title: (Letter forwarding North Sea Landfill RI Public Health Evaluation)

Type: CORRESPONDENCE
Author: Grosser, Paul W: H2M Group (Holzmacher McLendon & Murrell)
Recipient: Kwan, Caroline: US EPA
Attached: SEA-004-0471

Document Number: SEA-004-0648 To 0833 Date: 06/01/89

Title: North Sea Landfill Feasibility Study

Type: PLAN
Author: none: H2M Group (Holzmacher McLendon & Murrell)
Recipient: none: Southampton NY, Town of

Document Number: SEA-004-0834 To 0848 Date: 08/07/89

Title: (Letter forwarding attached final comments in response to EPA's conditional approval/comment letter for Phase I RI)

Type: CORRESPONDENCE
Author: Grosser, Paul W: H2M Group (Holzmacher McLendon & Murrell)
Recipient: Kwan, Caroline: US EPA

Document Number: SEA-004-0849 To 0877 Parent: SEA-004-0851 Date: 05/05/86

Title: Final Community Relations Plan

Type: PLAN
Author: Condie, Alison: ICF Incorporated
Recipient: none: US EPA

Document Number: SEA-004-0851 To 0851 Date: 05/05/86

Title: (Letter forwarding copies of the Final Community Relations Plan)

Type: CORRESPONDENCE
Author: Sachdev, Dev R: Ebasco Services
Recipient: Johnson, Lillian D: US EPA
Attached: SEA-004-0849

Document Number: SEA-004-0878 To 1224/A Date: 06/01/89

Title: North Sea Landfill Feasibility Study - Operable Unit I

Type: PLAN
Author: none: H2M Group (Holzmacher McLendon & Murrell)
Recipient: none: Southampton NY, Town of

Document Number: SEA-004-1225 To 1413 Date: 11/01/87

Title: Analytical Data Report Package for North Sea Landfill Purgeable Organics in Air - Part 1

Type: DATA
Author: none: H2M Group (Holzmacher McLendon & Murrell)
Recipient: none: none

Document Number: SEA-004-1414 To 1414 Date: 07/05/89

Title: (Memo regarding ATSDR review of the final report of the Endangerment Assessment)

Type: CORRESPONDENCE
Author: Nelson, William D: Agency for Toxic Substances & Disease Registry (ATSDR)
Recipient: Kwan, Caroline: US EPA

Document Number: SEA-004-1415 To 1416 Date: 07/26/89

Title: (Memo regarding Air Programs Branch review of the Endangerment Assessment)

Type: CORRESPONDENCE
Author: Musumeci, Grace: US EPA
Recipient: Kwan, Caroline: US EPA

Document Number: SEA-004-1417 To 1418 Date: 07/20/89

Title: (Memo regarding Ground Water Management Division review of the Draft Endangerment Assessment)

Type: CORRESPONDENCE
Condition: DRAFT
Author: Mallect, John S: US EPA
Recipient: Peterson, Carole: US EPA

Document Number: SEA-004-1419 To 1420 Date: 07/06/89

Title: (Memo commenting on 06/29/89 Final Report Endangerment Assessment)

Type: CORRESPONDENCE
Condition: DRAFT
Author: Hardcastle, Glenn J: US EPA
Recipient: Kwan, Caroline: US EPA

Document Number: SEA-004-1421 To 1421 Date: 08/30/89

Title: (Letter forwarding Final Endangerment Assessment)

Type: CORRESPONDENCE
Author: Goltz, Robert D: Camp Dresser & McKee (CDM)
Recipient: Hoyit, Cathy: US EPA
Attached: SEA-004-1422

Document Number: SEA-004-1422 To 1553 Parent: SEA-004-1421 Date: 08/30/89

Title: Final Report - Final Endangerment Assessment

Type: PLAN
Author: Goltz, Robert D: Camp Dresser & McKee (CDM)
Recipient: Kwan, Caroline: US EPA

Document Number: SEA-004-1554 To 1561 Date: 09/01/89

Title: Superfund Update - Announcement of Proposed Remedial Action Plan for North Sea Municipal Landfill Superfund Site

Type: PLAN
Author: Kwan, Caroline: US EPA
Recipient: none: none

ATTACHMENT 3 - GROUND WATER DATA TABLES

Total Ground-water Concentrations (ug/l) at North Sea Landfill

Well	SCREEN ELEV. (MSL)	Date	Cadmium EPA	Cadmium H2M	Chromium EPA	Chromium H2M	Iron EPA	Iron H2M
ARARs								
NYSDEC GW STDS			10		50		300	
SDWA MCLs			5		100		NA	
NYSDEC PUBLIC			10		50		300 *	
BACKGROUND								
MW1A	0	OCT 87	4.8 U	10	61]	20	11900 E	8500
		DEC 87	NA	10	NA	90	NA	18800
		JUN 89		5 U		59 *		1700 E
MW1B	-50	OCT 87	4.8 U	10	29]	10	9510 E	6500
		DEC 87	5 U	10	62	60	14700	21000
		JUN 89		17 *		28 *		5380 E
MW1C	-83	OCT 87	4.8 U	20	198]	30	24000 E	16500
		DEC 87	5 U	5	4 U	180	R	9100
		JUN 89		5 U		27 *		945 E
UG	NA	OCT 87	4.8 U	10	7.8 U	10 E	R	150
DOWNGRADIENT								
MW2	-10	OCT 87	NA	40	NA	550	61400	13500
		DEC 87	NA	20	NA	2720	32700	22300
MW3A	0	OCT 87	4.8 U	20 E	43]	10 U	16100 E	13000
		DEC 87	5 U	5 U	78	60	36700	33800
		JUN 89		5 U		688 *		31500 E
MW3B	-55	OCT 87	4.8 U	10 E	14]	10 U	30200 E	29100
		DEC 87	5 U	5 U	19	10 U	36100	36400
		JUN 89		5 U		21 *		15800 E
MW3C	-130	OCT 87	4.8 U	20 E	83]	20	50500 E	45800
		DEC 87	5 U	5 U	47	30	3200	2700
		JUN 89		5 *		80 *		2690 E
		JUN 89		5 U		46 *		2170 E
MW4A	-20	OCT 87	4.8 U	5	60]	30 E	26900 E	25800
		DEC 87	5 U	5 U	98	220	13500	29700
		JUN 89		5 U		111 *		2660 *
MW4B	-68	OCT 87	4.8 U	5 U	51]	30 E	2140 E	2180
		DEC 87	5 U	5 U	104	110	2130	2060
		JUN 89		5 U		155 *		3950 E
MW4C	-140	OCT 87	4.8 U	5	31]	10 U	2180 E	1630
		DEC 87	5 U	5 U	11.5	20	1390	2600
		JUN 89		5 U		46 *		542 E
MW6A	NA	OCT 87	NA	20	NA	20	NA	16200
		DEC 87	5 U	10	243	50	27100	16500
		JUN 89		5 U		44 *		13700 E
104 Fish Cov		OCT 87	4.8 U	10	8.7 #	10 U	2040 E	280
	NA	JUN 89		5 U		9 U		27]
152 Fish Cov		OCT 87	NA	5 U	NA	10 *	NA	17700
	NA	JUN 89		5 U		9 U		9430 E
#9	NA	OCT 87	NA	11	NA	30 *	NA	5090
#10	NA	OCT 87	4.8 U	5 U	24 #	50	3490 E	3700
#29	NA	OCT 87	4.8 U	10	70 #	30	R	760
#30	NA	OCT 87	4.8 U	10	22 #	30	39900 E	39400

Total Ground-water Concentrations (ug/l) at North Sea Landfill

Well	SCREEN ELEV. (MSL)	Date	Lead EPA	Lead H2M	Manganese EPA	Manganese H2M	1,1 Dichloroethene EPA	1,1 Dichloroethene H2M
ARARs								
NYSDEC GW STDS			25		300		0.07(G)	
SDWA MCLs			5		NA		7	
NYSDEC PUBLIC			50		300 *		NA	
BACKGROUND								
MW1A	0	OCT 87		R 30	708 E	700	5U	5U
		DEC 87	NA	52	NA	840	NA	5U
		JUN 89		NA		1170		0.5U
MW1B	-50	OCT 87		R 155	324 E	290	5U	5U
		DEC 87	277	227	510	540	5U	5U
		JUN 89		NA		197		0.5U
MW1C	-83	OCT 87		R 48	598 E	590	5U	5U
		DEC 87	2 U	29	17	220	5U	5U
		JUN 89		NA		41		0.5U
UG	NA	OCT 87	4.1 U	5 U	6.1]	20 U	5U	NA
DOWNGRADIENT								
MW2	-10	OCT 87	185	5 U	NA	9600 E	NA	16B
		DEC 87	254	165	NA	4900	NA	5U
MW3A	0	OCT 87	23	21 E	215 E	310	5U	5U
		DEC 87	63	50	491	380	5U	5U
		JUN 89		NA		182		0.5U
MW3B	-55	OCT 87	4.1 U	6 E	2720 E	3030	5U	5U
		DEC 87	8.1	17	3350	3040	5U	5U
		JUN 89		NA		2250		1.1
MW3C	-130	OCT 87	62	50 U	1445 E	1610	5U	5U
		DEC 87	21	42	134	90	5U	5U
		JUN 89		NA		51		0.5U
		JUN 89		NA		46		0.5U
MW4A	-20	OCT 87		R 50 U	695 E	930	5U	5U
		DEC 87	10	44	853	1010	5U	5U
		JUN 89		NA		527		0.5U
MW4B	-68	OCT 87		R 6	185 E	210	5U	5U
		DEC 87	5.2	8	1620	1340	5U	5U
		JUN 89		NA		162		0.5U
MW4C	-140	OCT 87		R 10	57 E	60	5U	5U
		DEC 87	5.9	10	36	60 U	5U	5U
		JUN 89		NA		19		0.5U
MW6A	NA	OCT 87	NA	31	NA	1380 E	NA	4JB
		DEC 87	30	23	1130	850	5U	5U
		JUN 89		NA		895		0.5U
104 Fish Cov		OCT 87	4.1 U	100 U	18 E	20	NA	NA
	NA	JUN 89		NA		2]	NA	NA
152 Fish Cov		OCT 87	NA	10	NA	1400	NA	NA
	NA	JUN 89		NA		950	NA	NA
#9	NA	OCT 87	NA	11	NA	870	NA	NA
#10	NA	OCT 87	4.1 U	11	402 E	450	NA	NA
#29	NA	OCT 87	4.1 U	5	64 E	40	NA	NA
#30	NA	OCT 87	4.1 U	6	4420 E	4800	NA	NA

Total Ground-water Concentrations (ug/l) at North Sea Landfill

Well	SCREEN ELEV. (MSL)	Date	Tetrachloro-ethene EPA	Tetrachloro-ethene H2M	Trichloro-ethene EPA	Trichloro-ethene H2M	1,2 Dichloro-ethane EPA	1,2 Dichloro-ethane H2M
ARARs								
NYSDEC GW STDS			0.7(G)		10		0.8(G)	
SDWA MCLs			5		5		5	
NYSDEC PUBLIC			NA		NA		NA	
BACKGROUND								
MW1A	0	OCT 87	5U	5U	5U	5U	5U	5U
		DEC 87	NA	5U	NA	5U	NA	5U
		JUN 89		0.5U		0.5U		0.5U
MW1B	-50	OCT 87	5U	5U	5U	5U	5U	5U
		DEC 87	5U	5U	5U	5U	5U	5U
		JUN 89		0.5U		0.5U		0.5U
MW1C	-83	OCT 87	5U	5U	5U	5U	5U	5U
		DEC 87	5U	5U	5U	5U	5U	5U
		JUN 89		0.53		0.5U		0.5U
UG	NA	OCT 87	5U	NA	5U	NA	5U	NA
DOWNGRADIENT								
MW2	-10	OCT 87	NA	5U	NA	5U	NA	5U
		DEC 87	NA	5U	NA	5U	NA	5U
MW3A	0	OCT 87	5U	5U	5U	5U	5U	5U
		DEC 87	5U	5U	5U	5U	5U	5U
		JUN 89		0.5U		0.5U		0.5U
MW3B	-55	OCT 87	5	7	4J	7	5U	5U
		DEC 87	8	4J	4J	3J	5U	5U
		JUN 89		3		3.8		1.6
MW3C	-130	OCT 87	5U	5U	5U	5U	5U	5U
		DEC 87	5U	5U	5U	5U	5U	5U
		JUN 89		0.5U		0.5U		0.5U
		JUN 89		0.5U		0.5U		0.5U
MW4A	-20	OCT 87	5U	5U	5U	1J	5U	5U
		DEC 87	5U	5U	5U	5U	5U	5U
		JUN 89		0.5U		0.5U		0.5U
MW4B	-68	OCT 87	5U	5U	5U	5U	5U	1J
		DEC 87	5U	5U	5U	5U	5U	5U
		JUN 89		0.5U		0.5U		0.5U
MW4C	-140	OCT 87	5U	5U	5U	5U	5U	2J
		DEC 87	5U	5U	5U	5U	5U	5U
		JUN 89		0.5U		0.5U		0.5U
MW6A	NA	OCT 87	NA	5U	NA	5U	NA	5U
		DEC 87	5U		5U	5U	5U	5U
		JUN 89		0.5U		0.5U		0.5U
104 Fish Cov		OCT 87	NA	NA	NA	NA	NA	NA
	NA	JUN 89	NA	NA	NA	NA	NA	NA
152 Fish Cov		OCT 87	NA	NA	NA	NA	NA	NA
	NA	JUN 89	NA	NA	NA	NA	NA	NA
#9	NA	OCT 87	NA	NA	NA	NA	NA	NA
#10	NA	OCT 87	NA	NA	NA	NA	NA	NA
#29	NA	OCT 87	NA	NA	NA	NA	NA	NA
#30	NA	OCT 87	NA	NA	NA	NA	NA	NA

Dissolved Ground-water Concentrations (ug/l) at North Sea Landfill

Well	BOTTOM SCREEN ELEV. (MSL)	Date	Cadmium	Chromium	Iron	Lead	Manganese
ARARs							
NYSDEC GW STDS			10	50	300	25	300
SDWA MCLs			5	100	NA	5	NA
NYSDEC PUBLIC			10	50	300 *	50	300 *
BACKGROUND							
MW1A	0	OCT 87	10	10 U	50	7	380
		DEC 87	5 U	10 U	220	30	390
		MAR 88	NA	NA	110	5 U	630
		APR 88	NA	NA	70	5 U	100
		JUN 89	5 U	9 U	227	NA	948
MW1B	-50	OCT 87	10	10 U	80	7	30
		DEC 87	10	20	320	24	20 U
		MAR 88	NA	NA	110	5 U	20 U
		APR 88	NA	NA	170	27	20 U
		JUN 88	5 U	20 U	40	6	20 U
		JUN 89	49 *	9 U	150	NA	16
MW1C	-83	OCT 87	5 U	10 U	30	50	20 U
		DEC 87	5 U	10 U	160	6	20 U
		MAR 88	NA	NA	190	11	20 U
		APR 88	NA	NA	140	7	20 U
		JUN 88	5 U	20 U	30	5 U	30
		JUN 89	6 *	9 U	61]	NA	19
UG	NA	MAR 87	5 U	NA	340	2 U	20 U
		JUL 87	NA	NA	90	23	NA
		OCT 87	9 U	30	140	5 U	20 U
DOWNGRADIENT							
MW2	-10	OCT 87	20	10	13500	5 U	9100
		DEC 87	20	530	22300	165	4400
MW3A	0	OCT 87	5 U	10 U	280	5 U	110
		DEC 87	5 U	10 U	600	5 U	170
		JUN 89	14 *	9]	136	NA	13]
MW3B	-55	OCT 87	10	10 U	25300	5 U	2940
		DEC 87	5 U	10 U	30000	5 U	3010
		JUN 89	9 *	13	306	NA	1360
MW3C	-130	OCT 87	5 U	10 U	150	5 U	120
		DEC 87	5 U	10	180	5 U	30
		JUN 89	8 *	20	70]	NA	3]
		JUN 89	5 U	37	256	NA	5]
MW4A	-20	OCT 87	5 U	10 U	70	5	60
		DEC 87	5 U	20	90	5 U	320
		JUN 89	5 U	9 U	158	NA	1070
MW4B	-68	OCT 87	5 U	10 U	120	5 U	170
		DEC 87	5 U	20	1330	10	1870
		JUN 89	5 U	9 U	72	NA	95
MW4C	-140	OCT 87	5 U	10 U	100	9	20
		DEC 87	5 U	10	130	5 U	20 U
		JUN 89	5 U	9 U	14	NA	6]

Dissolved Ground-water Concentrations (ug/l) at North Sea Landfill

Well	BOTTOM SCREEN ELEV. (MSL)	Date	Cadmium	Chromium	Iron	Lead	Manganese
ARARs							
NYSDEC GW STDS			10	50	300	25	300
SDWA MCLs			5	100	NA	5	NA
NYSDEC PUBLIC			10	50	300 *	50	300 *
MW5A	-15	OCT 87	5 U	20 U	20 U	5 U	900
		MAR 88	NA	NA	140	5 U	570
		APR 88	NA	NA	70	5 U	480
MW5B	-150	OCT 87	5 U	20 U	150	5 U	20 U
		MAR 88	NA	NA	220	5 U	40
		APR 88	NA	NA	70	6	20
MW5C	NA	MAR 88	5 U	20	150	5 U	380
		APR 88	5 U	20 U	360	5 U	20
MW6A	NA	OCT 87	5 U	10 U	40	6	1050
		DEC 87	5 U	10 U	170	5 U	490
		MAR 88	NA	NA	1700	10	330
		APR 88	NA	NA	40	5 U	290
		JUN 89	12 *	9 U	1450	NA	851
MW6B	NA	MAR 88	5 U	20 U	2600	5 U	280
		APR 88	5 U	30	110	7	30
MW7A	NA	MAR 88	8	20 U	860	5 U	2800
		APR 88	5 U	20 U	50	5 U	340
MW7B	NA	MAR 88	6	20 U	660	5 U	20 U
		APR 88	5 U	30	1400	5 U	20 U
		JUN 88	5 U	20 U	40	5 U	20 U
MW7C	NA	MAR 88	5 U	20 U	160	5 U	20 U
		APR 88	5 U	20	110	5 U	20 U
		JUN 88	5 U	20 U	30	5 U	20 U
MW8	NA	MAR 88	5 U	40	1300	5 U	4200
		APR 88	5 U	20 U	1400	17	300
MW9	NA	MAR 88	5 U	40	26000	24	6200
		APR 88	5 U	20 U	210	5 U	1500
#1	NA	MAR 87	5 U	NA	41200	2 U	4130
#9	NA	MAR 87	5 U	NA	4040	25	1230
		JUL 87	NA	NA	7600	38	NA
		OCT 87	5 U	20	160	5 U	550
#10	NA	MAR 87	5 U	NA	3240	9	460
		JUL 87	NA	NA	4200	19	NA
		OCT 87	10	30	140	5	20 U
#29	NA	MAR 87	5 U	NA	1390	9	200
		JUL 87	NA	NA	1800	17	NA
		OCT 87	5 U	30	300	5 U	30
#30	NA	MAR 87	5 U	NA	4380	17.5	3850
		JUL 87	NA	NA	32200	30	NA
		OCT 87	10	30	20600	5	4500
S-4843	NA	MAR 87	NA	NA	33400	22	NA
		JUL 87	NA	NA	22800	11	NA

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FIGURE D-1 DATA QUALIFIERS

NOTES:

(g) - Indicates that the standard provided is not a N.Y.S. promulgated standard, but a guidance value.

N.C.- Indicates that the relative percent difference (RPD) between the split samples was not calculated because one or both of the split samples results were not reported, not detected, or rejected.

RNA - Analysis was requested, but samples were not analyzed for the corresponding analyte(s).

ANR - Analysis was not requested for the corresponding analyte(s).

NR - Analytical results for the corresponding analyte(s) was not reported, indicating that either the analyte was not analyzed for, or that the analyte was not identified in the sample.

U - Indicates that the analyte was analyzed for but was not detected; the reported value is the minimum attainable detection limit for the sample.

J - Indicates that the reported value is an estimate due to some QC criteria not being met. For inorganic analyses, values are considered estimates if holding times are exceeded (for analytes >IDL), if QC samples (e.g., blanks, spikes, and duplicates) are analyzed too infrequently, if check standards and matrix spike recoveries do not meet QC criteria, if the calibration blank contains an analyte at a concentration >CRDL, or if a field blank was used as the matrix spike. For organics analyses, values are considered estimates if they are tentatively identified and quantified assuming a 1:1 response, or if the mass spectral data indicate the presence of a compound that meets identification criteria, but the result is less than the specified detection limit but greater than zero.

N - Indicates that the spiked sample recovery was not within control limits.

B - Indicates that the analyte was found in the blank as well as the sample.

E - Indicates that the duplicate injection results exceeded the control limits.

E - Indicates that either ICP serial dilution results are not within control limits, or the reported value was estimated or not reported due to interference.

B - Indicates that the reported concentration value is between the CRDL and the IDL.

W - Indicates that the results of the duplicate sample analyses are not within control limits.

S - Indicates that the correlation coefficient for the method of standard additions is less than 0.995.

R - Indicates that the reported value was rejected, but the reason for the rejection was not documented.

R1 - Indicates that the reported value was rejected because of contamination in the method blank or the preparation blank.

R2 - Indicates that the reported value was rejected because the concentration of the analyte in the sample is less than 5 or 10 times (depending on the analyte) the concentration found int the field blank, equipment blank, or trip blank.

R3 - Indicates that the reported value was rejected because the spike recovery did not meet control limits, and the sample concentration was less than four times the spike concentration.

R4 - Indicates that the reported value was rejected because the recovery of the laboratory control sample exceeded QC criteria.

R5 - Indicates that the reported value was rejected because the difference between the sample and duplicate exceeded QC criteria.

R6 - Indicates that the reported value was rejected because the RPD of the ICP serial dilutions exceeded QC criteria.

R7 - Indicates that the reported value was rejected because the sample holding time was exceeded.

R8 - Indicates that the reported value was rejected because the calibration standard response factor was not in control.

R9 - Indicates that the reported value was rejected because the percent relative standard deviation between initial and continuing calibration response factors exceeded QC criteria.

R10 - Indicates that the reported value was rejected because the correlation coefficient for the method of standard additions was less than required.

ATTACHMENT 4 - SOIL DATA

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ARSENIC

SURFACE SOIL	TOTAL CONC. (mg/kg)	EP.TOX. CONC. (mg/l)	FIELD BLANK (mg/l)	TRIP BLANK (mg/l)	DETECTION LIMIT (mg/kg)	EP. TOX LIMIT (mg/l)	HEALTH BASED CRITERIA CARCINOGEN (A) (mg/kg)	HEALTH BASED CRITERIA SYSTEMATIC TOXICANTS (B) (mg/kg)
1	ND	ND	ND	ND	1.0	5.0	UR	NA
2	1.5	ND	ND	ND	1.0	5.0	UR	NA
3	ND	ND	ND	ND	1.0	5.0	UR	NA
4	8.10 S	ND	ND	ND	1.0	5.0	UR	NA
5	6.50 S	ND	ND	ND	1.0	5.0	UR	NA
6	7.8	ND	ND	ND	1.0	5.0	UR	NA
7	ND	ND	ND	ND	1.0	5.0	UR	NA
8	3.3	ND	ND	ND	1.0	5.0	UR	NA
9	ND	ND	ND	ND	1.0	5.0	UR	NA
10	ND	ND	ND	ND	1.0	5.0	UR	NA
11	<11.0 NEJR3	ND	NDJR3	NDJR3	1.0	5.0	UR	NA
12	8.7NE+JR3	ND	NDJR3	NDJR3	1.0	5.0	UR	NA
13	<11.0 NEJR3	ND	NDJR3	NDJR3	1.0	5.0	UR	NA
14	<1.0 NEJR3	ND	NDJR3	NDJR3	1.0	5.0	UR	NA
15	<1.0 NEJR3	ND	NDJR3	NDJR3	1.0	5.0	UR	NA
16	<1.0 NEJR3	ND	NDJR3	NDJR3	1.0	5.0	UR	NA
17	<1.1NEJR3	ND	NDJR3	NDJR3	1.0	5.0	UR	NA
18	<11.0 NEJR3	ND	NDJR3	NDJR3	1.0	5.0	UR	NA
19	<1.1NEJR3	ND	NDJR3	NDJR3	1.0	5.0	UR	NA
20	<11.0 NEJR3	ND	NDJR3	NDJR3	1.0	5.0	UR	NA
LAGOON BORING								
1(0-25')	12.0SNE	ND	ND	ND	1.0	5.0	UR	NA
1(25-55')	ND	ND	ND	ND	1.0	5.0	UR	NA
1(55-75')	13.0	ND	ND	ND	1.0	5.0	UR	NA
2(0-25')	14.0SNER	ND	ND	ND	1.0	5.0	UR	NA
2(25-55')	23.0SNEJ	ND	ND	ND	1.0	5.0	UR	NA
2(55-75')	13.0SNE	ND	ND	ND	1.0	5.0	UR	NA
3(0-25')	ND	ND	ND	ND	1.0	5.0	UR	NA
3(25-55')	ND	ND	ND	ND	1.0	5.0	UR	NA
3(55-75')	31.0SNE	ND	ND	ND	1.0	5.0	UR	NA
4(0-25')	15.3SNE	ND	ND	ND	1.0	5.0	UR	NA
4(25-55')	<15.0SNE	ND	ND	ND	1.0	5.0	UR	NA
4(55-75')	17.7	ND	ND	ND	1.0	5.0	UR	NA
SATURATED SOIL								
MW1A	ND	ND	ND	ND	1.0	5.0	UR	NA
MW1B	<1.0 NER7	<0.01NER7	NDR7	NDR7	1.0	5.0	UR	NA
MW1C	NDR7	NDR7	NDR7	NDR7	1.0	5.0	UR	NA
MW2	ND	ND	ND	ND	1.0	5.0	UR	NA
MW3A	ND	ND	ND	ND	1.0	5.0	UR	NA
MW3B	ND	ND	ND	ND	1.0	5.0	UR	NA
MW3C	ND	ND	ND	ND	1.0	5.0	UR	NA
MW4A	ND	ND	ND	ND	1.0	5.0	UR	NA
MW4B	ND	ND	ND	ND	1.0	5.0	UR	NA
MW4C	4.5S	ND	ND	ND	1.0	5.0	UR	NA
MW6	ND	ND	ND	ND	1.0	5.0	UR	NA
SEDIMENT								
1	NDJR3	NDJR3	ND	ND	1.0	5.0	UR	NA
2	NDJR3	NDJR3	ND	ND	1.0	5.0	UR	NA
3	NDJR3	NDJR3	ND	ND	1.0	5.0	UR	NA

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CADMIUM

SURFACE SOIL	TOTAL CONC. (mg/kg)	EP. TOX. CONC. (mg/l)	FIELD BLANK (mg/l)	TRIP BLANK (mg/l)	DETECTION LIMIT (mg/kg)	EP. TOX LIMIT (mg/l)	HEALTH BASED TBC SOIL CRITERIA: CARCINOGEN (A) (mg/kg)	HEALTH BASED TBC SOIL CRITERIA: SYSTEMATIC TOXICANTS (B) (mg/kg)
1	0.5	ND	ND	ND	0.5	1.0	-	NA
2	1.0	ND	ND	ND	0.5	1.0	-	NA
3	0.7	ND	ND	ND	0.5	1.0	-	NA
4	1.0	ND	ND	ND	0.5	1.0	-	NA
5	2.2	ND	ND	ND	0.5	1.0	-	NA
6	1.0	ND	ND	ND	0.5	1.0	-	NA
7	1.0	ND	ND	ND	0.5	1.0	-	NA
8	1.0	ND	ND	ND	0.5	1.0	-	NA
9	ND	ND	ND	ND	0.5	1.0	-	NA
10	0.8	ND	ND	ND	0.5	1.0	-	NA
11	0.8	ND	ND	ND	0.5	1.0	-	NA
12	0.8	ND	ND	ND	0.5	1.0	-	NA
13	0.6	ND	ND	ND	0.5	1.0	-	NA
14	0.5	ND	ND	ND	0.5	1.0	-	NA
15	0.6	ND	ND	ND	0.5	1.0	-	NA
16	ND	ND	ND	ND	0.5	1.0	-	NA
17	ND	ND	ND	ND	0.5	1.0	-	NA
18	0.8	ND	ND	ND	0.5	1.0	-	NA
19	ND	ND	ND	ND	0.5	1.0	-	NA
20	ND	ND	ND	ND	0.5	1.0	-	NA
LAGOON BUNDING								
1(0-25')	1.1	ND	ND	ND	0.5	1.0	-	NA
1(25-55')	ND	ND	ND	ND	0.5	1.0	-	NA
1(55-75')	ND	ND	ND	ND	0.5	1.0	-	NA
2(0-25')	0.9	ND	ND	ND	0.5	1.0	-	NA
2(25-55')	1.6	ND	ND	ND	0.5	1.0	-	NA
2(55-75')	ND	ND	ND	ND	0.5	1.0	-	NA
3(0-25')	ND	ND	ND	ND	0.5	1.0	-	NA
3(25-55')	ND	ND	ND	ND	0.5	1.0	-	NA
3(55-75'	2.0	ND	ND	ND	0.5	1.0	-	NA
4(0-25')	ND	ND	ND	ND	0.5	1.0	-	NA
4(25-55')	2.3	ND	ND	ND	0.5	1.0	-	NA
4(55-75')	ND	ND	ND	ND	0.5	1.0	-	NA
SATURATED SOIL								
RW1A	ND	ND	ND	ND	0.5	1.0	-	NA
RW1B	1.1R7	NDR7	NDR7	NDR7	0.5	1.0	-	NA
RW1C	NDR7	NDR7	NDR7	NDR7	0.5	1.0	-	NA
RW2	1.2	0.005	ND	ND	0.5	1.0	-	NA
RW3A	ND	ND	ND	ND	0.5	1.0	-	NA
RW3B	ND	ND	ND	ND	0.5	1.0	-	NA
RW3C	1.2	0.006	ND	ND	0.5	1.0	-	NA
RW4A	ND	0.005	ND	ND	0.5	1.0	-	NA
RW4B	ND	ND	ND	ND	0.5	1.0	-	NA
RW4C	0.8	ND	ND	ND	0.5	1.0	-	NA
RWL	1.2	0.01	0.01	0.01	0.5	1.0	-	NA

REMOVED RANGE

<1-4.5

H2MGROUP

SURFACE SOIL	TOTAL CONC. (mg/kg)	EP.TOX. CONC. (mg/l)	FIELD BLANK (mg/l)	TRIP BLANK (mg/l)	DETECTION LIMIT (mg/kg)	EP. TOX LIMIT (mg/l)	HEALTH BASED TBC SOIL CRITERIA: CARCINOGEN (A) (mg/kg)	HEALTH BASED TBC SOIL CRITERIA: SYSTEMATIC TOXICANTS (B) (mg/kg)
	CHROMIUM							
1	ND	ND	ND	ND	1.2	5.0	NA	NA
2	2.2	ND	ND	ND	1.2	5.0	NA	NA
3	ND	ND	ND	ND	1.2	5.0	NA	NA
4	1.0	ND	ND	ND	1.2	5.0	NA	NA
5	4.4	ND	ND	ND	1.2	5.0	NA	NA
6	4.4	ND	ND	ND	1.2	5.0	NA	NA
7	1.0	ND	ND	ND	1.2	5.0	NA	NA
8	2.0	ND	ND	ND	1.2	5.0	NA	NA
9	2.2	ND	ND	ND	1.2	5.0	NA	NA
10	ND	ND	ND	ND	1.2	5.0	NA	NA
11	4.8	ND	ND	ND	1.2	5.0	NA	NA
12	4.8	ND	ND	ND	1.2	5.0	NA	NA
13	7.2	ND	ND	ND	1.2	5.0	NA	NA
14	2.3	ND	ND	ND	1.2	5.0	NA	NA
15	3.6	ND	ND	ND	1.2	5.0	NA	NA
16	2.1	ND	ND	ND	1.2	5.0	NA	NA
17	1.9	ND	ND	ND	1.2	5.0	NA	NA
18	03.9	ND	ND	ND	1.2	5.0	NA	NA
19	1.7	ND	ND	ND	1.2	5.0	NA	NA
20	4.4	ND	ND	ND	1.2	5.0	NA	NA
LAGOON BORING								
1(0-25')	7.7J	ND	ND	NDJ	1.2	5.0	NA	NA
1(25-55')	11.0J	ND	ND	NDJ	1.2	5.0	NA	NA
1(55-75')	11.0J	ND	ND	NDJ	1.2	5.0	NA	NA
2(0-25')	8.4J	ND	ND	NDJ	1.2	5.0	NA	NA
2(25-55')	12.0J	ND	ND	NDJ	1.2	5.0	NA	NA
2(55-75')	12.0J	ND	ND	NDJ	1.2	5.0	NA	NA
3(0-25')	5.1J	ND	ND	NDJ	1.2	5.0	NA	NA
3(25-55')	6.4J	ND	ND	NDJ	1.2	5.0	NA	NA
3(55-75')	14.0J	ND	ND	NDJ	1.2	5.0	NA	NA
4(0-25')	8.2J	ND	ND	NDJ	1.2	5.0	NA	NA
4(25-55')	16.0J	ND	ND	NDJ	1.2	5.0	NA	NA
4(55-75')	8.1J	ND	ND	NDJ	1.2	5.0	NA	NA
SATURATED SOIL								
RW1A	2.8	ND	ND	ND	1.2	5.0	NA	NA
RW1B	5.7R7	NDR7	NDR7	NDR7	1.2	5.0	NA	NA
RW1C	4.2R7	NDR7	NDR7	NDR7	1.2	5.0	NA	NA
RW2	6.0	0.01	ND	ND	1.2	5.0	NA	NA
RW3A	1.2	ND	ND	ND	1.2	5.0	NA	NA
RW3B	2.4	ND	ND	ND	1.2	5.0	NA	NA
RW3C	6.0	ND	ND	ND	1.2	5.0	NA	NA
RW4A	ND	ND	ND	ND	1.2	5.0	NA	NA
RW4B	1.3	ND	ND	ND	1.2	5.0	NA	NA
RW4C	5.3	ND	ND	ND	1.2	5.0	NA	NA
RW5	3.5	ND	ND	ND	1.2	5.0	NA	NA
SEDIMENT								
1	1.3	ND	ND	ND	1.2	5.0	NA	NA
2	2.6	ND	ND	ND	1.2	5.0	NA	NA
3	ND	ND	ND	ND	1.2	5.0	NA	NA

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H2MGROUP

	LEAD						HEALTH BASED TBC SOIL CRITERIA	
SURFACE SOIL	TOTAL CONC. (mg/kg)	EP.TOX. CONC. (mg/l)	FIELD BLANK (mg/l)	TRIP BLANK (mg/l)	DETECTION LIMIT (mg/kg)	EP. TOX LIMIT (mg/l)	CARCINOGEN (A) (mg/kg)	SYSTEMATIC TOXICANTS (B) (mg/kg)
1	<0.5ME	ND	ND	ND	0.5	5.0	NA	NA
2	<0.5ME	ND	ND	ND	0.5	5.0	NA	NA
3	<0.5ME	ND	ND	ND	0.5	5.0	NA	NA
4	<0.5ME	ND	ND	ND	0.5	5.0	NA	NA
5	<0.5ME	ND	ND	ND	0.5	5.0	NA	NA
6	3.3MES	ND	ND	ND	0.5	5.0	NA	NA
7	2.4ME	0.12	ND	ND	0.5	5.0	NA	NA
8	5.5ME	ND	ND	ND	0.5	5.0	NA	NA
9	6.8MES	ND	ND	ND	0.5	5.0	NA	NA
10	5.5MES	0.006	ND	ND	0.5	5.0	NA	NA
11	4.6	ND	ND	ND	0.5	5.0	NA	NA
12	17.1	ND	ND	ND	0.5	5.0	NA	NA
13	6.9	ND	ND	ND	0.5	5.0	NA	NA
14	10.4	ND	ND	ND	0.5	5.0	NA	NA
15	0.7	ND	ND	ND	0.5	5.0	NA	NA
16	4.3	ND	ND	ND	0.5	5.0	NA	NA
17	25	ND	ND	ND	0.5	5.0	NA	NA
18	1.9	ND	ND	ND	0.5	5.0	NA	NA
19	1.2	ND	ND	ND	0.5	5.0	NA	NA
20	17.4	ND	ND	ND	0.5	5.0	NA	NA
LAGOON BORING								
1(0-25')	13.0SME	ND	ND	ND	0.5	5.0	NA	NA
1(25-55')	3.3SME	ND	ND	ND	0.5	5.0	NA	NA
1(55-75')	4.1SME	ND	ND	ND	0.5	5.0	NA	NA
2(0-25')	5.5SME	ND	ND	ND	0.5	5.0	NA	NA
2(25-55')	4.8SME	ND	ND	ND	0.5	5.0	NA	NA
2(55-75')	4.0+MER	ND	ND	ND	0.5	5.0	NA	NA
3(0-25')	2.8SME	ND	ND	ND	0.5	5.0	NA	NA
3(25-55')	3.3SME	ND	ND	ND	0.5	5.0	NA	NA
3(55-75')	5.1SME	ND	ND	ND	0.5	5.0	NA	NA
4(0-25')	5.6SME	ND	ND	ND	0.5	5.0	NA	NA
4(25-55')	7.2SME	ND	ND	ND	0.5	5.0	NA	NA
4(55-75')	5.0SME	ND	ND	ND	0.5	5.0	NA	NA
SATURATED SOIL								
RM1A	1.6	0.05	ND	ND	0.5	5.0	NA	NA
RM1B	3.5R10	NDR10	NDR10	NDR10	0.5	5.0	NA	NA
RM1C	<0.5MER7	0.025R7	NDR7	NDR7	0.5	5.0	NA	NA
RM2	3.8	0.009	ND	ND	0.5	5.0	NA	NA
RM3A	16.0	ND	ND	ND	0.5	5.0	NA	NA
RM3B	12.0	ND	ND	ND	0.5	5.0	NA	NA
RM3C	3.3	0.0125	ND	ND	0.5	5.0	NA	NA
RM4A	7.0	ND	ND	ND	0.5	5.0	NA	NA
RM4B	15.0	ND	ND	ND	0.5	5.0	NA	NA
RM4C	14.0	ND	ND	ND	0.5	5.0	NA	NA
RM5	1.2	ND	ND	ND	0.5	5.0	NA	NA
SEDIMENT								
1	5.15S	ND	ND	ND	0.5	5.0	NA	NA
2	4.91S	0.007	ND	ND	0.5	5.0	NA	NA
3	2.3	0.012	ND	ND	0.5	5.0	NA	NA

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ORGANIC CONTAMINANTS QUANTIFIED
LAGOON BORING SAMPLES
RESULTS IN (ppb)

PRIORITY POLLUTANT* CONTAMINANTS QUANTIFIED	LAGOON BORING NO.1			LAGOON BORING NO.2			LAGOON BORING NO.3			LAGOON BORING NO.4			HEALTH BASED TBC SOIL CRITERIA (ug/kg)	
													CARCINOGENS (A)	SYSTENIC TOXICANTS (B)
VOLATILE ORGANICS (ug/kg)	5-7'	35-37'	60-62'	10-12'	35-37'	70-72'	20-22'	45-47'	70-72'	10-12'	45-47'	60-62'		
METHYLENE CHLORIDE	48BR2	61BR2	58BR2	120B	120B	140B	39BR2	7JBR2	62BR2	110B	39BR2	75BR2	93000	5000000
1,1 DICHLOROETHENE	4JBR2	4JBR2	4JBR2	8JBR2	8JBR2	21JBR2	5JBR2	6JBR2	ND	13JBR2	11JBR2	8JR2	12000	700000
CHLOROFORM	ND	ND	ND	ND	ND	ND	ND	ND	ND	10J	4J	4J	110000	800000
1,1 DICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
COMPOSITE SAMPLES	0-25'	30-50'	55-72'	0-25'	30-50'	55-72'	0-25'	30-50'	55-72'	0-25'	30-50'	55-72'		
SEMI-VOLATILES (ug/kg)														
DIETHYLPHTHALATE	ND	290J	120J	270J	ND	290J	170J	130J	ND	190J	170J	ND	NA	60000000
BIS(2-ETHYLHEXYL)-PHTHALATE	1300B	1600B	3000B	5800B	4900B	1400B	4500B	7700B	2900B	6000B	3400B	6600B	83000	2000000

HZMGROUP

ORGANIC CONTAMINANTS QUANTIFIED IN SURFACE SOILS & NORTH SEA LANDFILL RESULTS IN (ug/kg)

PRIORITY POLLUTANT* CONTAMINANTS QUANTIFIED	SURFACE SOIL #1	SURFACE SOIL #2	SURFACE SOIL #3	SURFACE SOIL #4	SURFACE SOIL #5	SURFACE SOIL #6	SURFACE SOIL #7	SURFACE SOIL #8	SURFACE SOIL #9	SURFACE SOIL #10	FIELD BLANK	HEALTH BASED TBC SOIL CRITERIA (ug/kg) CARCINOGENS (A)	HEALTH BASED TBC SOIL CRITERIA (ug/kg) SYSTEMIC TOXICANTS (B)
SEMI-VOLATILES													
DI-N-BUTYLPHTHALATE	ND	ND	ND	ND	ND	ND	49J	ND	61J	51J	2J	NA	NA
DIETHYLPHTHALATE	ND	52J	ND	ND	ND	63J	61J	ND	ND	ND	ND	NA	60000000
BIS(2-ETHYLHEXYL)-PHTHALATE	1800B	350JBR2	910B	2300B	1300B	9900B	1600B	3300B	2200B	2700B	110B	83000	2000000
SEMI-VOLATILES	SURFACE SOIL #11	SURFACE SOIL #12	SURFACE SOIL #13	SURFACE SOIL #14	SURFACE SOIL #15	SURFACE SOIL #16	SURFACE SOIL #17	SURFACE SOIL #18	SURFACE SOIL #19	SURFACE SOIL #20	FIELD BLANK		
DI-N-BUTYLPHTHALATE	57J	ND	72J	350J	ND	ND	ND	ND	160J	ND	1J	NA	NA
DIETHYLPHTHALATE	ND	ND	ND	48J	ND	ND	ND	ND	ND	ND	ND	NA	60000000
BIS(2-ETHYLHEXYL)-PHTHALATE	2600B	3100B	790B	3700B	300JB	1800B	ND	740B	620B	8100B	130B	83000	2000000
FLUORANTHENE	ND	ND	ND	140J	ND	ND	ND	ND	ND	ND	ND	NA	NA
PYRENE	ND	ND	ND	140J	ND	ND	ND	ND	ND	ND	ND	NA	NA
BUTYLBENZYLPHTHALATE	ND	ND	ND	170J	ND	ND	ND	ND	ND	ND	ND	NA	NA
BENZO(a)ANTHRACENE	ND	ND	ND	95J	ND	ND	ND	ND	ND	ND	ND	224	NA
CHRYSENE	ND	ND	ND	150J	ND	ND	ND	ND	ND	ND	ND	NA	NA
BENZO(b)FLUORANTHENE	ND	ND	ND	250J	ND	ND	ND	ND	ND	ND	ND	NA	NA
BENZO(k)FLUORANTHENE	ND	ND	ND	110J	ND	ND	ND	ND	ND	ND	ND	NA	NA
BENZO(a)PYRENE	ND	ND	ND	110J	ND	ND	ND	ND	ND	ND	ND	60.9	NA
INDENO(123cd)PYRENE	ND	ND	ND	71J	ND	ND	ND	ND	ND	ND	ND	NA	NA
BENZO(ghi)PERYLENE	ND	ND	ND	57J	ND	ND	ND	ND	ND	ND	ND	NA	NA

ATTACHMENT 5 - RISK TABLES

TABLE 1
CRITICAL TOXICITY VALUES FOR INGESTION ROUTE
FOR INDICATOR CHEMICALS AT NORTH SEA LANDFILL SITE

Chemical	Subchronic Acceptable Intake (mg/kg/day)	Chronic Acceptable Intake (mg/kg/day)	Carcinogenic Potency Factor (mg/kg/day)
1. Ammonia	NA	NA	NC
2. Arsenic	1.00E-03	NA	1.80E+08(A)[1]
3. Cadmium	NA	1.00E-03 (food) 5.00E-04 (water)	NA
4. Chromium (III)	1.4E+01	1.00E+00	NC
(VI)	2.5E-02	5.00E-03	NA
5. Iron	NA	8.57E-03	NC
6. Lead	NA	1.4E-03	NC
7. Manganese	5.00E-01	2.00E-01	NC
8. Nickel	2.00E-02	2.00E-02	NA

NOTES:
NA - Not available
NC - Noncarcinogenic

1 - Letter in parentheses represents EPA Weight of Evidence classification.

Cadmium has 2 AIC values, one for food and one for water.

TABLE 2

CRITICAL TOXICITY VALUES FOR INHALATION ROUTE

FOR INDICATOR CHEMICALS AT NORTH SEA LANDFILL

CHEMICAL	AIS (mg/kg/day)	AIC (mg/kg/day)	Carcinogenic Potency Factor 1/(mg/kg/day)
	INHALATION		
Ammonia	NA	NA	NC
Arsenic	NA	NA	1.50E+01
Cadmium	NA	NA	6.10E+00
Chromium	NA	5.10E-03 (+3)	4.10E+01 (+6)
Iron	NA	8.60E-03	NC
Lead	NA	4.30E-04	NC
Manganese	3.00E-02	3.00E-02	NC
Nickel	NA	NA	1.19E+00

Notes:
NA - Not Available
NC - Noncarcinogenic

TABLE 3

RISK ESTIMATES FOR CARCINOGENS

CHEMICAL	Exposure Route	CDI (mg/kg.day)	Carcinogenic Potency Factor 1/(mg/kg.day)	Route-Specific Risk	Total Chemical-specific Risk
Ammonia	Oral	1.05E-01	U	U	U
	Inhalation	0.00E+00	U	U	
Arsenic	Oral	1.45E-04	1.80E+00	2.61E-04	2.70E-04
	Inhalation	6.27E-07	1.50E+01	9.40E-06	
Cadmium	Oral *	1.15E-04	U	U	8.11E-07
	Inhalation	1.33E-07	6.10E+00	8.11E-07	
Chromium	Oral	1.28E-03	U	U	2.10E-05
	Inhalation	5.12E-07	4.10E+01	2.10E-05	
Iron	Oral	2.99E-01	U	U	U
	Inhalation	6.54E-04	U	U	
Lead	Oral	3.71E-04	U	U	U
	Inhalation	9.40E-07	U	U	
Manganese	Oral	2.81E-02	U	U	U
	Inhalation	1.19E-05	U	U	
Nickel	Oral	7.37E-04	U	U	1.53E-06
	Inhalation	1.28E-06	1.19E+00	1.53E-06	
			Total Upper Bound Risk =		2.93E-04

Notes: U Unavailable or not applicable
* Oral CDI for cadmium is total of food and water CDIs.

TABLE 4
CALCULATION OF SUBCHRONIC HAZARD INDEX
NORTH SEA LANDFILL SITE

CHEMICAL	Inhalation			ORAL		
	SDI	AIS	SDI:AIS	SDI	AIS	SDI:AIS
Ammonia	0.00E+00	NA	NA	6.20E-01	NA	NA
Arsenic	9.52E-05	NA	NA	5.15E-04	0.001	5.15E-01
Cadmium	1.91E-05	NA	NA	1.97E-04	NA	NA
Chromium	7.77E-05	NA	NA	2.99E-03	14	2.13E-04
Iron	6.22E-02	NA	NA	1.17E+00	NA	NA
Lead	3.64E-04	NA	NA	1.00E-03	NA	NA
Manganese	1.17E-03	3.00E-02	3.89E-02	1.33E-01	0.5	2.65E-01
Nickel	1.82E-04	NA	NA	1.55E-03	0.02	7.73E-02
	Hazard Index:		3.89E-02	Hazard Index:		8.58E-01

Notes:
NA - Not available or not applicable

TABLE 5.
CALCULATION OF CHRONIC HAZARD INDEX
NORTH SEA LANDFILL SITE

CHEMICAL	Inhalation			ORAL		
	CDI	AIC	CDI:AIC	CDI	AIC	CDI:AIC
Ammonia	0.00E+00	NA	NA	1.05E-01	NA	NA
Arsenic	6.27E-07	NA	NA	1.45E-04	NA	NA
Cadmium	1.33E-07	NA	NA	4.11E-06 1.11E-04	1.00E-03 5.00E-04	4.11E-03 (food)* 2.22E-01 (water)
Chromium	5.12E-07	5.10E-03	1.00E-04	1.28E-03	1.00E+00	1.28E-03
Iron	6.54E-04	8.60E-03	7.61E-02	2.99E-01	8.57E-03	3.49E+01
Lead	9.40E-07	4.30E-04	2.19E-03	3.71E-04	1.40E-03	2.65E-01
Manganese	1.19E-05	3.00E-02	3.98E-04	2.81E-02	2.00E-01	1.40E-01
Nickel	1.28E-06	NA	NA	7.37E-04	2.00E-02	3.69E-02
	Hazard Index:		7.87E-02	Hazard Index:		3.56E+01

Notes: NA - Not available or not applicable
* Cadmium has AIC values for food and water. Food CDI is total of fish and soil ingestion, and water CDI is total of the remaining intakes.

TABLE 6

CALCULATION OF SUBCHRONIC HAZARD INDEX
(FOR SOIL INGESTION AND DERMAL ABSORPTION ONLY)

CHEMICAL	Inhalation			ORAL		
	SDI	AIS	SDI:AIS	SDI	AIS	SDI:AIS
Ammonia	0.00E+00	NA	NA	0.00E+00	NA	NA
Arsenic	0.00E+00	NA	NA	6.62E-05	0.001	6.62E-02
Cadmium	0.00E+00	NA	NA	1.67E-05	NA	NA
Chromium	0.00E+00	NA	NA	6.84E-05	14	4.89E-06
Iron	0.00E+00	NA	NA	5.47E-02	NA	NA
Lead	0.00E+00	NA	NA	3.19E-04	NA	NA
Manganese	0.00E+00	3.00E-02	0.00E+00	1.03E-03	0.5	2.05E-03
Nickel	0.00E+00	NA	NA	1.60E-04	0.02	7.98E-03
	Hazard Index:		0.00E+00	Hazard Index:		7.62E-02

Notes:
NA - Not available or not applicable

TABLE . 7

CALCULATION OF CHRONIC HAZARD INDEX
(FOR SOIL INGESTION AND DERMAL ABSORPTION ONLY)

CHEMICAL	Inhalation			ORAL			
	CDI	AIC	CDI:AIC	CDI	AIC	CDI:AIC	
Ammonia	0.00E+00	NA	NA	1.29E-06	NA	NA	
Arsenic	0.00E+00	NA	NA	8.39E-07	NA	NA	
Cadmium	0.00E+00	NA	NA	7.64E-08	1.00E-03	7.64E-05	(food)*
				1.02E-09	5.00E-04	2.04E-06	(water)
Chromium	0.00E+00	5.10E-03	0.00E+00	6.97E-07	1.00E+00	6.97E-07	
Iron	0.00E+00	8.60E-03	0.00E+00	8.78E-04	8.57E-03	1.02E-01	
Lead	0.00E+00	4.30E-04	0.00E+00	1.26E-06	1.40E-03	9.02E-04	
Manganese	0.00E+00	3.00E-02	0.00E+00	1.63E-05	2.00E-01	8.14E-05	
Nickel	0.00E+00	NA	NA	1.72E-06	2.00E-02	8.61E-05	
	Hazard Index:		0.00E+00	Hazard Index:		1.04E-01	

Notes: NA - Not available or not applicable
* Cadmium has AIC values for food and water. Food CDI is total of fish and soil ingestion, and water CDI is total of

ATTACHMENT 6 - RESPONSIVENESS SUMMARY

NORTH SEA MUNICIPAL LANDFILL
OPERABLE UNIT ONE
TOWN OF SOUTHAMPTON, NEW YORK
RESPONSIVENESS SUMMARY

A. OVERVIEW

This document presents the United States Environmental Protection Agency's (EPA) responses to questions and comments raised during the public comment period on the Proposed Remedial Action Plan (PRAP) for the North Sea Municipal Landfill Superfund site in the Town of Southampton, New York. The PRAP only addresses contamination of Cell #1 and the former sludge lagoons at the site, known as Operable Unit One (OU1). Off-site ground-water contamination and possible impacts on Fish Cove will be addressed at a later time as Operable Unit Two (OU2).

The preferred alternative outlined in the PRAP includes no action at the former sludge lagoons and closure of Cell #1 of the landfill using either a low permeability soil or a flexible synthetic membrane cover. The decision on the type of cover (soil or synthetic) will be made during the remedial design phase of the cleanup. In addition, confirmatory sludge/soil sampling will be conducted in the lagoon area to assure that no hazardous constituents that may pose a health or environmental threat are present in the area.

Comments received during the public comment period suggest that the Town of Southampton, the potentially responsible party (PRP) for the site, strongly objects to the proposed remedy on the basis of its cost. Several questions were raised about the quality of the sampling data used to decide upon the proposed remedy. Citizen involvement at this site has been low, therefore, it is not possible to determine if the views of the Town reflect those of the local residents.

These sections follow:

- Background on Community Involvement
- Summary of Agency Comments Received during the Public Comment Period and Agency Responses
- Remaining Concerns.

B. BACKGROUND ON COMMUNITY INVOLVEMENT

Community interest at the North Sea Municipal Landfill dates back to 1978, when local residents near North Sea became aware of the Town of Southampton's intention of closing its dump at Quioque and shifting all municipal solid waste disposal to the North Sea Landfill. Led by two local residents, community members counted trucks entering the landfill and discovered that the number of

commercial trucks using the facility was greater than the number permits issued.

These local residents, concerned that commercial wastes were being disposed of at the landfill, periodically inspected the facility between 1978 and 1984. On one occasion they found that large number of apparently empty pesticide containers had been buried at the landfill. They were told by the town that this was done with the permission of the Suffolk County Health Department.

Recent community involvement has mostly centered around the cost issue for the cleanup. Town officials and some local residents have expressed concern about the environmental benefit of a multi-million dollar cleanup at the North Sea site. They claim that the level of environmental improvement is outweighed by the economic cost burden the town would have to bear for the cleanup. [The town expressed concern about their inability to get bond money from the State to pay for the cleanup because the landfill is not a hazardous waste site.]

C. SUMMARY OF COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD

Comments received during the North Sea public comment period on the Feasibility Study and the PRAP are summarized below. Similar questions have been consolidated and categorized by topic. The comment period was held from September 2, 1989 to September 22, 1989.

PUBLIC PARTICIPATION PROCESS

The Town Attorney for the Town of Southampton asked several questions regarding the public participation process, specifically related to the public comment period and the public meeting.

1. The Town Attorney expressed some confusion about the purpose of the meeting. He wanted to know:

   - Was the meeting a public hearing or a public meeting?

   - Will the public have input after the meeting?

   Agency Response: EPA has a regulatory requirement to hold a 21-day public comment period for consideration of the Proposed Remedial Action Plan. During the public comment period, EPA must provide the opportunity for a public meeting, if there is local interest. The purpose of the meeting is for interested citizens to ask questions and offer oral comments on the proposed plan. Written questions and comments can be sent to EPA at any time during

the public comment period. Although the public is encouraged to ask questions or to offer comments at any time, questions and comments on the proposed plan must be received by the end of the public comment period in order to be included in the Responsiveness Summary.

2. Several questions were asked about the transcript for the meeting, specifically:

   - What was the purpose of the stenographer?
   - Will a copy of the transcript be available to the Regional Administrator before he makes his decision on the proposed plan?
   - Will a copy of the transcript be available to the public?

   Agency Response: The purpose of the stenographer is to allow EPA to accurately respond to the oral questions and comments offered at the public meeting. The transcript, along with the Responsiveness Summary, will be available to the Regional Administrator when he makes his decision on the proposed plan. The decision document he will sign is known as the Record of Decision (ROD). The Responsiveness Summary and the transcript of the public meeting will become part of the Administrative Record for the site and will be placed in the information repositories located in the Southampton College Library and the Southampton Village Library.

3. Several questions were asked about the comment period and public notification of the meeting, specifically:

   - How was the public notified of the meeting?
   - Will comments made at the meeting and those sent to EPA during the comment period have any impact on the decision-making process at EPA?

   Agency Response: Public notification for the public comment period and the public meeting included a paid advertisement summarizing the PRAP in the Suffolk County edition of Newsday on September 2, 1989, a press release from the EPA Office of External Programs, and material distributed to the information repositories for the site. Town officials and interested citizens on

EPA's mailing list were also notified about the meeting. EPA will consider and respond to all comments received during the comment period, both oral and written, before making any decision on the remedial action for Operable Unit One of the North Sea Municipal Landfill Superfund site.

4. A citizen asked what events would follow the public meeting and if there was a time-frame for these activities?

   Agency Response: The public comment period for OU1 will run until September 22, 1989. Soon after that date EPA will prepare a Responsiveness Summary. This document will be included in the Record of Decision for the site and will be placed in the information repositories. The next step is to negotiate with the potentially responsible parties (PRPs), in this case the Town of Southampton, to pay for or perform the actual cleanup.

5. What is the difference between primary source and sole source aquifers?

   Agency Response: The Safe Drinking Water Act designates an aquifer a sole source aquifer if no alternative drinking water supply exists in the area of that aquifer. Primary water supply aquifers are defined as highly productive aquifers. Primary source aquifer is a NYSDEC designation for an unconsolidated vulenerable aquifer. The Magothy is designated a primary aquifer.

6. What is the difference between primary and secondary drinking water standards.

   Agency Response: Primary drinking water standards are protective of human health, whereas secondary standards are based on taste or odor. The secondary standards are aesthetic, not health based.

The Town Attorney, the Chairman of the North Sea Landfill Committee, and other participants asked several questions about the Superfund process and how it related to other NPL sites on Long Island:

7. How many landfills on Long Island have as much protection in terms of liners and caps as the North Sea Municipal Landfill? Are they on the NPL?

Agency Response: There are four Long Island landfills on the National Priorities List: North Sea, Old Bethpage, Port Washington, and Syosset. Only Port Wanshington Landfill which is an NPL site has a liner. Syosset, North Sea Landfill Cell #1 and Old Bethpage NPL sites do not have liners.

8. How many Long Island sites are on the NPL?

Agency Response: There are 23 NPL sites on Long Island at this time. Twelve of the sites are in Suffolk County and 11 are in Nassau County.

9. Is Brookhaven Landfill on the NPL?

Agency Response: Brookhaven Landfill is not on the NPL, but the Brookhaven National Lab was proposed for the NPL in July 1989

D. REMAINING CONCERNS

I. **FILTERED VERSUS UNFILTERED GROUNDWATER SAMPLE**

COMMENT: The Chairman of the North Sea Landfill and Solid Waste Management Committee of Southampton and the Southampton Town Board commented that unfiltered groundwater data distorts the true character of the metals actually present in the groundwater contributed by leachate flowing from Cell No. 1 at the North Sea Landfill site.

RESPONSE: The use of unfiltered samples for groundwater analyses can give false positive, or at least elevated readings of metals if the samples are of high turbidity. Excessive concentrations of total metals in ground water may indeed be reflected in environments with naturally high concentrations of metals in soils, such as at Southampton. However, there are additional considerations regarding the results of metals analyses in the ground water at North Sea Landfill that should not be ignored: concentrations of dissolved (filtered) metals in wells downgradient from the landfill are also above the established ARARs and concentrations of total (unfiltered) metals in wells downgradient from the landfill are substantially higher (i.e., 5 times the upgradient levels) than concentrations of total metals in upgradient wells. Support for these considerations is provided under the response concerning the groundwater plume.

The comment incorrectly quotes the NYSDEC Solid Waste Management Facilities Rules. As stated in the comment, Section 360-2.11 (a) (12) of the NYSDEC Solid Waste

Management Facilities Rules which became effective December 31, 1988 does state that water quality samples must be low in turbidity. In addition, Section 360-2.11 (a) (12) (iv) states that "all samples must be whole and unfiltered and must be collected in a manrer which produces the least possible turbidity".

The wells at North Sea Landfill were developed, purged, and sampled according to EPA Region II protocol and the samples collected from the wells, as observed by EPA's oversight contractor, were not turbid. As the comment states, unfortunately the turbidities of the samples are not available to substantiate either claim.

The comment also states that the samples were not low in turbidity as substantiated by the erratic unfiltered data in the upgradient wells (i.e., MW1-A, MW1-B, and MW1-C). The data presented in the comment is for the three zones of the aquifer. Only when one compares the results for different zones is the data erratic. If the data is examined by zone (i.e., upper, middle, and deep), then the data is not erratic; therefore, the claim that the samples were not low in turbidity is not substantiated.

Finally, the comment states that the concentrations at MW1 indicate that the analyses are in error, because the upgradient well MW1 exceeds the established ARARs. As the comment states, metal concentrations in ground water may reflect the environment, but the significant consideration is that downgradient well concentrations are significantly higher than upgradient well concentrations.

II. GROUNDWATER PLUME

COMMENT: The Town Attorney, the Chairman of the North Sea Landfill and Solid Waste Management Committee of Southampton, the Southampton Town Board, and the Board of the League of Women Voters of Southampton dispute the presence of a groundwater plume containing heavy metals.

RESPONSE: The following considerations from groundwater sampling during the Remedial Investigation indicate a groundwater plume exists: concentrations of dissolved (filtered) metals in wells downgradient from the landfill are above the established ARARs and concentrations of total (unfiltered) metals in wells downgradient from the landfill are substantially higher (i.e., 5 times the upgradient levels) than concentrations of total metals in upgradient wells. Again, concentrations for dissolved (filtered) metals in wells downgradient from the landfill are above the established ARARs [i.e., Safe Drinking Water Act Maximum Contaminant Level (MCLs) and New York State Groundwater Class

GA Standards]. Dissolved concentrations for cadmium, chromium, iron, and manganese exceed the established ARARs in several downgradient wells. In addition, downgradient concentrations of filtered metals are consistently higher than the upgradient concentrations of filtered metals. The comparison for upgradient and downgradient wells are restricted to wells that are screened at roughly the same elevation in the ground water column, in order to avoid faulty comparisons among different zones in the aquifer. Also, the filtered samples yielded equivalent results to the unfiltered samples.

Concentrations of total (unfiltered) metals in wells downgradient from the landfill are substantially higher than concentrations of total metals in upgradient wells. Downgradient concentrations are substantially greater than concentrations found in wells screened upgradient from the landfill. In some instances, concentrations are more than six times greater in downgradient a well than in a well screened in a corresponding elevation upgradient from the landfill. Although high naturally-occurring concentrations of metals in the soil at the North Sea Landfill can contribute to excessively high total concentrations of metals in ground water, the disproportionate ratio of total metals in ground water downgradient from the landfill to total metals in ground water upgradient from the landfill suggests that the landfill is contributing to groundwater contamination.

The Town Attorney and the chairman of the North Sea Landfill Committee question the evidence that a ground water contamination plume really exists. The elevated concentrations of both total and dissolved metals in ground water downgradient from Cell No. 1 provides significant evidence that a plume is migrating from the landfill toward the direction of Five Cove. In addition, the organic compounds tetrachloroethene (PCE) and trichloroethene (TCE) were detected in downgradient wells in concentrations above the established ARARs (i.e., MCLs) for both these compounds. No organic compounds were detected in any of the wells upgradient of the landfill. Other contaminants including ammonia and total organic carbon which are indicative of landfill leachate were detected in concentrations above background levels.

II. PUBLIC DRINKING WATER SUPPLY

COMMENT: The Town Attorney, the Town Board, and the Board of the League of Women Voters of Southampton state that the capping of Cell No. 1 is not justified because public drinking water has been provided to residents in the path of the plume and that the aquifer is not a sole source aquifer.

Ground-water Concentrations at North Sea Landfill

Pollutant	ARAR ug/l	Sample Type	Upgradient Well	Upgradient ug/l	Downgradient Well	Downgradient ug/l		down gradient % Increase Over upgradient
SHALLOW WELLS WITH SCREEN ELEVATION 0 MSL TO -40 MSL								
Cadmium	5	Filt.	MW1-A	10	MW3-A	14		140
					MW2	20		200
					#10	10		100
					#30	10		100
		Unfilt.	MW1-A	10	MW3-A	20		200
					MW2	40		400
					#10	5	U	50
					#30	10		100
Chromium	50	Filt.	MW1-A	10	U MW3-A	10	U	100
					MW2	530		5300
					#10	NA		0
					#30	30		300
		Unfilt.	MW1-A	90	MW3-A	688		764
					MW2	2720		3022
					#10	50		56
					#30	30		33
Iron	300	Filt.	MW1-A	227	MW3-A	600		264
					MW2	22300		9824
					#10	4200		1850
					#30	32200		14185
		Unfilt.	MW1-A	18800	MW3-A	33800		180
					MW2	22300		119
					#10	3700		20
					#30	39900		212
Manganese	300	Filt.	MW1-A	490	MW3-A	170		35
					MW2	9100		1857
					#10	460		94
					#30	4500		918
		Unfilt.	MW1-A	900	MW3-A	380		42
					MW2	9600		1067
					#10	450		50
					#30	4800		533

Ground-water Concentrations at North Sea Landfill

Pollutant	ARAR ug/l	Sample Type	Upgradient Well	Upgradient ug/l	Downgradient Well	Downgradient ug/l		downgradient % Increase Over upgradient
MID-LEVEL WELLS WITH SCREEN ELEVATION -50 MSL TO -70 MSL								
Cadmium	5	Filt.	MW1-B	10	MW3-B	10		100
					MW4-B	5	U	50
		Unfilt.	MW1-B	10	MW3-B	10		100
					MW4-B	5	U	50
Chromium	50	Filt.	MW1-B	10	U MW3-B	13		130
					MW4-B	20		200
		Unfilt.	MW1-B	30	MW3-B	21		23
					MW4-B	155		172
Iron	300	Filt.	MW1-B	140	MW3-B	30000		13216
					MW4-B	1330		586
		Unfilt.	MW1-B	11400	MW3-B	36400		194
					MW4-B	3950		21
Manganese	300	Filt.	MW1-B	16	MW3-B	3010		614
					MW4-B	1870		382
		Unfilt.	MW1-B	370	MW3-B	3350		372
					MW4-B	1620		180

U - The material was analyzed for, but was not detected.

RESPONSE: EPA feels that additional information is needed before that claim that public drinking water has been provided to residents in the path of the plume. Only a limited residential well survey was conducted as part of the Remedial Investigation. The Town has supplied an alternate public drinking water supply to identified residences whose wells have been contaminated from the landfill. As part of the additional investigation for Operable Unit 2, EPA will perform a thorough residential well survey to verify that all wells have been located. For the residences on public water supply, this is not a sole source supply. However, the aquifer is a sole source and drinking water aquifer. Contaminants are still being released from the North Sea Landfill, therefore, remedial action such as capping the landfill pursuant to NYS Part 360 requirements are justified to mitigate and control the source of the contamination. The Operable Unit 2 RI/FS study will address the groundwater plume.

IV. EXISTING LANDFILL CAP

COMMENT: The Chairman of the North Sea Landfill and Solid Waste Management Committee of Southampton, the Town Board, and the Board of the League of Women Voters of Southampton dispute the statement in the Proposed Remedial Action Plan that "the current existing cap is not adequate to prevent infiltration due to precipitation".

RESPONSE: The concentration of contaminants are not decreasing over time; therefore, the leachate is still impacting the ground water, because the present cap is inadequate to prevent further infiltration from precipitation to Cell No. 1. Cell No. 1 was capped with a 20 milli-inch polyvinylchloride membrane and approximately 2 feet of sand. If a geomembrane is used, the NYS Part 360 Regulations for closure requires a geomembrane with greater than 40 milli-inch thickness rather than 20 milli-inch. In addition, the side slopes were never capped. Therefore, EPA believes that closure of Cell No. 1 pursuant to NYS Part 360 requirements is necessary to prevent further infiltration.

V. PREFERRED ACTION

COMMENT: The Chairman of the North Sea Landfill and Solid Waste Management Committee of Southampton states that the preferred action should be to continue monitoring and to pass appropriate ordinance prohibiting the drilling of any well in this area.

RESPONSE: The no action alternative does not meet the NYS Part 360 Requirements.

VI. ESTIMATED REMEDIAL ACTION COST

COMMENT: The Town Attorney, the Town Board, and the Board of the League of Women Voters of Southampton believe that the estimated cost presented in the Proposed Remedial Action Plan for capping Cell No. 1 is unrealistic.

RESPONSE: The costs estimates in a Feasibility Study are pre-design estimates and are only required to be accurate to within -30 percent to +50 percent of the anticipated actual costs. The 2.9 million dollar estimate is for capital costs only for the installation of the synthetic cap. This cost does not include operation and maintenance costs or monitoring costs for 30 years. It is not clear what the alternate costs provided by the comments represent. EPA suspects that the alternate costs are design estimates and may include operation and maintenance. It should be noted that costs would not be directly related to surface area (e.g., volume discounts).

VII. SOURCE OF CONTAMINATION

COMMENT: The Chairman of the North Sea Landfill and Solid Waste Management Committee of Southampton states that the Endangerment Assessment does not measure the contribution of contaminants to the ground water and to Fish Cove by the landfill only.

RESPONSE: The Superfund Public Health Evaluation Manual suggests that if background chemical contamination is significant, then it should be accounted for in the public health evaluation. EPA's Final Endangerment Assessment did not compare the contaminant levels of downgradient wells to those found in background wells, because, the remedial investigation did not collect data from a background well. The well cluster located at MW1 is upgradient from Cell No. 1, but it is downgradient from the sludge lagoons; therefore, the impact to ground water was determined using ground water from wells both upgradient and downgradient to the landfill. Instead, the Endangerment Assessment examined risk based on ARARs, a carcinogenic risk range of 10^{-6} to 10^{-7}, and acceptable noncarcinogenic intake levels.

Analyses on surface water samples collected from the hydraulically downgradient surface water (Fish Cove) show evidence of contamination from landfill leachate. Surface water samples were collected at 6 locations (i.e., three close to shore assumed to be impacted by groundwater interception and three away from the shore). The impacted locations show concentrations of iron greater than the

established ARARs (i.e., NYS Surface Water Standards (Class B) and at concentrations 3 time greater than at the unimpacted locations. Chromium was not detected at the unimpacted locations (i.e., <10 ug/l), but was detected at 34 ug/l at the impacted locations. An additional leachate indicator parameter identified in the downgradient monitoring well is total organic carbon (TOC). The maximum TOC concentration at unimpacted locations was 2.7 mg/l. The concentrations detected at impacted locations were from 8.5 mg/l to 13 mg/l.

VIII. GROUNDWATER MODELING

COMMENT: The Chairman of the North Sea Landfill and Solid Waste Management Committee of Southampton states that the modeling used in the EPA Endangerment Assessment overstates the true groundwater condition.

RESPONSE: The exposure pathway that poses the greatest potential health threat is the groundwater ingestion pathway. The contribution to health risk from groundwater ingestion carried the most influence over all of the exposure pathways evaluated; therefore, the groundwater ingestion exposure pathway was evaluated using direct monitoring well data from wells near residences, not modeled or "summed" data as in the other exposure routes. The concentrations found in these wells are higher than those predicted for concentrations entering Fish Cove. The assumptions used to calculate the concentration of contaminated water into Fish Cove from ground water do produce a conservative estimate of potential offsite contaminant concentration, but the risk from this route is small compared to groundwater ingestion; therefore, the overestimation has a small impact on the overall risk.

IX. POTENTIAL RISK

COMMENT: The Town Board states that the Public Health Evaluation indicates the risk to the public and to the environment from direct contact with soil is low.

RESPONSE: The EPA Final Endangerment Assessment Report included an assessment of risk associated with short and long term exposures to noncarcinogens and carcinogens. As with the Public Health Evaluation, the EPA's Endangerment Assessment Report concludes that minimal risk exists for exposure from only soil ingestion and dermal adsorption, but EPA's assessment also concludes that a noncarcinogenic risk exists at levels above the acceptable level for long term oral groundwater ingestion exposure. Therefore, although the Public Health Evaluation concludes that soil remediation is not necessary, EPA believes that remediation is necessary to

alleviate risk from oral groundwater ingestion exposure.