United States
Environmental Protection
Agency

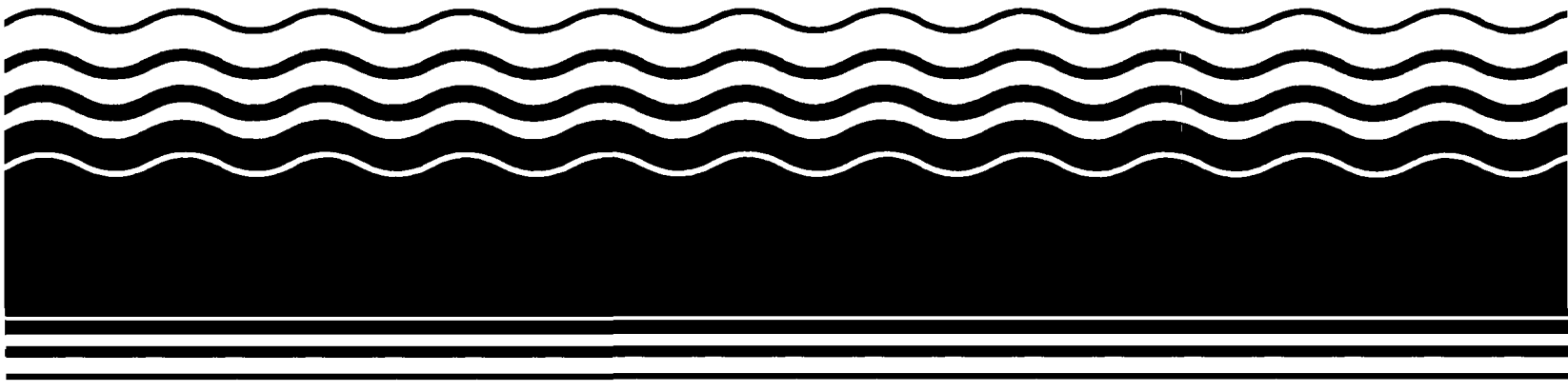
Office of
Emergency and
Remedial Response

EPA/ROD/R02-92/175
September 1992

EPA

# Superfund Record of Decision:

# North Sea Municipal Landfill, NY



## NOTICE

The appendices listed in the index that are not found in this document have been removed at the request of the issuing agency. They contain material which supplement, but adds no further applicable information to the content of the document. All supplemental material is, however, contained in the administrative record for this site.

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SUPERFUND RECORD OF DECISION
North Sea Municipal Landfill, NY
Second Remedial Action - Final

**5. Report Date**
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**15. Supplementary Notes**
PB93-963811

**16. Abstract (Limit: 200 words)**

The 131-acre North Sea Municipal Landfill site is an active landfill that is owned and operated by the Town of Southampton in Suffolk County, New York. Land use in the area is predominantly residential, with approximately 15 homes located within a one-quarter mile radius of the site. The site overlies a fresh water aquifer, which overlies a deeper saltwater aquifer. Most of the adjacent homes obtain their drinking water from private domestic wells, which tap into the fresh water Upper Glacial aquifer. Fish Cove, a body of saltwater with marshes connected via a tidal inlet to the North Sea Harbor, is located 1,500 feet northwest of the landfill. In 1963, a landfill was constructed for the disposal of municipal solid waste, refuse, debris, and septic system wastes from residential, industrial, and commercial sources. There are three main landfill areas: a 13 acre area encompassing Cell #1 and related septic sludge lagoons, which received septic system sludge in the early 1960's in addition to municipal solid waste; Cell #2, which is 7 acres in size and was closed in 1990; and Cell #3, which is currently active, and accepts 80,000 tons of municipal waste annually. In 1986, the septic sludge lagoons were decommissioned, and sludge and 2 feet of soil were removed.

(See Attached Page)

**17. Document Analysis a. Descriptors**
Record of Decision - North Sea Municipal Landfill, NY
Second Remedial Action - Final
Contaminated Media: None
Key Contaminants: None

**b. Identifiers/Open-Ended Terms**

**c. COSATI Field/Group**

| 18. Availability Statement | 19. Security Class (This Report) None | 21. No. of Pages 54 |
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| | 20. Security Class (This Page) None | 22. Price |

EPA/ROD/R02-92/175
North Sea Municipal Landfill, NY
Second Remedial Action - Final

Abstract (Continued)

A ground water monitoring program, which has been conducted by the Town of Southampton since 1979, revealed a large ground water plume containing heavy metals that was migrating from Cell #1 toward Fish Cove. As a result, several drinking water wells were closed in 1981, and the town connected all residents in the area to a public water supply. A 1989 ROD addressed onsite source contamination as OU1 and provided for capping Cell #1 to reduce the potential threat to human health and the environment by reducing the risk of contaminant migration. This ROD addresses onsite ground water, as OU2. Studies conducted during the risk assessment for OU2 confirmed that the risks to human health are within EPA's acceptable risk range; therefore, there are no contaminants of concern affecting this site.

The selected remedial action for this site is no further action, with air and ground water monitoring. There are no costs associated with this no action remedy.

PERFORMANCE STANDARDS OR GOALS: Not applicable.

# ROD FACT SHEET

## SITE

Site name: North Sea Municipal Landfill

Site location: Southampton, Suffolk County, New York

HRS score: 33.74

## ROD

Date Signed: September 28, 1992

Selected remedy: No Action for Groundwater remediation

Capital cost: None

O & M cost: None

Present-worth cost: None

## LEAD

U.S. Environmental Protection Agency

Primary Contact: Caroline Kwan, (212) 264-0151

Secondary Contact: Melvin Hauptman, (212) 264-7681

Main PRPs: The Town of Southampton

## WASTE

Waste type: heavy metals (lead, chromium, cadmium, manganese, iron)

Waste origin: landfill activities

Estimated waste quantity: 1.3 million cubic yards in Cell #1

Contaminated medium: groundwater

# RECORD OF DECISION

## NORTH SEA MUNICIPAL LANDFILL
## TOWN OF SOUTHAMPTON
## SUFFOLK COUNTY, NEW YORK

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION II

NEW YORK

# DECLARATION FOR THE 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 Operable Unit Two site (the Site), located in the Town of Southampton, Suffolk County, New York, which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. §§ 9601-9675, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300. This decision document explains the factual and legal basis for selecting the remedy for the Site.

The New York State Department of Environmental Conservation (NYSDEC) concurs with the selected remedy. A letter of concurrence from NYSDEC is attached to this document (Appendix IV).

The information supporting this remedial action decision is contained in the administrative record for the Site. The administrative record index is attached (Appendix III).

## Description of the Selected Remedy: No Further Action

The United States Environmental Protection Agency (EPA) bases the no action decision for the Site ground water contamination and its impact on Fish Cove on the results of the Operable Unit (OU) I and II remedial investigations conducted at the Site from 1987 to 1992, the OU II risk assessment dated May 1992, and the OU I source control activities at Cell #1 that are scheduled to be implemented at the Site in 1993. Confirmatory sampling of the decommissioned sludge lagoons was conducted in January 1992 and no additional sludge was found. Furthermore, the OU II risk assessment determined that the risks to human health are within EPA's acceptable risk range. The source control action of capping Cell #1 will reduce the potential threat to human health and the environment by isolating the landfill and reducing the risk of contaminant migration from Cell #1 to Fish Cove which results from leachate generated by surface precipitation. Thus, "No Action" is the selected remedy for the second operable unit for the Site.

Declaration

In accordance with the requirements of CERCLA, as amended, and the NCP, it has been determined that no further remedial action is necessary to protect human health and the environment at the North Sea Municipal Landfill Site. Source control activities conducted in accordance with the OU I Record of Decision will be implemented in 1993.

The EPA, in consultation with the State of New York has determined that the North Sea Municipal Landfill OU II does not pose a significant threat to human health or the environment and, therefore, further remediation of the ground water on and off the landfill property is not appropriate.

Although a five year review will be conducted at the landfill pursuant to the OU I ROD, no five-year review is required for OU II because no hazardous substances have been identified in this OU above health-based levels.

Constantine Sidamon-Eristoff
Regional Administrator

September 28, 1992
Date

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ATTACHMENTS

**SITE NAME, LOCATION AND DESCRIPTION**

The North Sea Municipal Landfill 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 Site is an active landfill owned and operated by the Town of Southampton.

The area between the Site 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 hydrologically downgradient of it. (see Figure 2)

The Town of Southampton lies 2.4 miles to the south of the Site. There are no major population centers to the east. This area is predominantly wooded. Land use within a one-half mile radius of the Site 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 North Sea Municipal 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. 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 North Sea study area. The Cretaceous deposits are overlain by Pleistocene and Holocene (recent) deposits. The Pleistocene 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 clay, sandy clay and silty clay.

The Upper (water table) Glacial fresh water aquifer is estimated to be about 200 to 300 feet thick in the area of the landfill. It directly overlies the Magothy aquifer. It is 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 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 residents of the area. Ground water in this area ultimately discharges to Fish Cove, an arm of Peconic Bay. The plume is contaminated with low levels of heavy metals.

Surficial soils associated 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 North Sea Municipal Landfill 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 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. There are no identified federal endangered or threatened species in the vicinity of the Site.

**SITE HISTORY AND ENFORCEMENT ACTIVITIES**

The North Sea Municipal Landfill, owned and operated by the Town of Southampton (Town), was initially constructed in 1963 for the disposal of municipal solid waste, 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 (capped); and Cell #3 (active). See Figure 3 for relative locations of these cells.

A ground water monitoring program, conducted by the Town of Southampton since 1979 has revealed a plume containing heavy metals migrating from Cell #1 toward Fish Cove. As a result, the Site was investigated and proposed on the EPA's list of priority hazardous waste sites known as the Superfund National Priorities List (NPL) in June 1984.

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 (Cell 1 and former scavenger lagoons) 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 mil polyvinyl chloride membrane to minimize infiltration into the mound and covering it with a thick protective layer (two feet thick) of silty sand on top of the geomembrane. A layer of topsoil was placed over this to maintain vegetative growth and prevent soil erosion.

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 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, the sides of Cell #1 were not capped. Infiltration of rainwater into the landfill is minimized as a result of the steepness of the side slopes. Also, vegetation has taken root along a good portion of the landfill side slopes. Absorption of water by this plant growth further minimizes infiltration.

Since the collection inlets were installed above the synthetic membrane, which is kept in place by a protective layer of sand, 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 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. After this removal, an additional two feet of soil was excavated. The excavated material was dried out, then mixed with sand prior to disposal. The sludge lagoons were refilled to grade with sandy loam.

Cell #2 is approximately seven acres in size and constructed about 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 handle leachate. The new system is designed to pump leachate to a truck for off-site treatment. Cell #2 was closed pursuant to an administrative order on consent executed between the Town and the New York State Department of Environmental Conservation (NYSDEC) in 1990. Cell #3 is currently active. The cell accepts approximately 80,000 tons of municipal waste annually. Seasonal disposal rates are approximately 400 tons per day in the summer months and 100 tons per day in the winter.

In December 1985, the EPA sent a letter to the Town of

Southampton informing the Town that it was considered a potentially responsible party (PRP) under Superfund for the Site and, as such, may be liable for funds spent by the EPA for addressing conditions at the Site. The letter explained to the Town that they may participate in or undertake the Remedial Investigation/Feasibility Study (RI/FS) if they wished.

The Town of Southampton entered into an Administrative Order on Consent with EPA which was issued on March 31, 1987. Under this order, the Town took responsibility for conducting the RI/FS, which began on August 18, 1987. A Record Of Decision (ROD) was issued for OU I in September 1989 for the source control of Cell #1. This ROD calls for capping of Cell #1 pursuant to the NYSDEC Part 360 requirements and conducting confirmatory sampling on the decommissioned sludge lagoons. The Town entered into a Consent Decree with EPA in February of 1990 to implement the OU I ROD. Confirmatory sampling of the former sludge lagoons was conducted in January 1992 and no sludge was found. The remedial design is expected to be completed by the Fall of 1992 and the remedial construction will commence in the Spring of 1993.

**HIGHLIGHTS OF COMMUNITY PARTICIPATION**

The RI report, Risk Assessment and the Proposed Plan for the Site were released for public comment on July 22, 1992 pursuant to the requirements ser forth in CERCLA Sections 113(k)(2)(i-v) and 117. These documents were made available to the public in the administrative record file at the EPA Docket Room in Region II, New York and the information repositories at the Southampton College Library in the Town of Southampton. All Site files are also located in the EPA Docket Room, the Southampton College Library and the Southampton Village Library. A public notice was published on July 22, 1992 in the New York Newsday, Suffolk edition, announcing EPA's proposed no action plan, the availability of these documents for review and notice of the August 5, 1992 public meeting. The same notice was also published in the Southampton Press, a local newspaper.

A public participation meeting was conducted by EPA on August 5, 1992, at the auditorium of the Southampton Town Hall, Southampton, New York to discuss the summary of the RI report and the Risk Assessment and to provide an opportunity for interested parties to present oral comments and questions to EPA.

A summary of the significant comments relating to the selection of the remedy received during the public meeting and public comment period and EPA's responses to these comments are presented in the Responsiveness Summary (see Appendix V).

**SCOPE AND ROLE OF RESPONSE ACTION**

The primary objective of this second operable unit was to

determine the nature and extent of Site ground water contamination and its impact on Fish Cove.

This is the second and final operable unit planned for the Site. Under the Consent Decree for OU I, the Town of Southampton will cap Cell #1 pursuant to the NYSDEC Part 360 requirements to reduce leachate generation. This Consent Decree also calls for confirmatory sampling of the former sludge lagoons. Confirmatory sampling of the decommissioned sludge lagoons was conducted in January 1992. No additional sludge was found. Cell #1 is scheduled to be capped by the fall of 1993. Post-closure monitoring of air and water will be implemented. The following will also be included in this post-closure monitoring: five homes on the periphery of the plume will be monitored and/or connected to public water supply; ammonia flux measurements and benthos and hard clam recruitment will be conducted at Fish Cove. This source control action will reduce the threat to human health and the environment by isolating the landfill and reducing the risk of contaminant migration from Cell #1. Currently, a water quality monitoring program is being implemented pursuant to NYSDEC's Administrative Order for closure of Cell #2 and potential future expansion of the North Sea Landfill.

**SUMMARY OF SITE CHARACTERISTICS**

Several investigations have been conducted to characterize ground water quality near the North Sea Municipal Landfill. These studies were performed by both the Suffolk County Department of Health Services (SCDHS) and the Town of Southampton. In 1979, SCDHS established the presence of a leachate plume emanating from the landfill. As part of its study, SCDHS installed 14 monitoring wells on-Site and downgradient of Cell #1. The result of the study indicated that a plume was migrating in a northwesterly direction away from Cell #1. The plume contained primarily elevated levels of iron and manganese.

The Town hired H2M Group in 1979 to conduct its own study. H2M Group sampled 16 private residential wells downgradient of the landfill for various water parameters. The results showed that several wells has been impacted by the ground water plume (i.e. iron and manganese). The Town connected these homes to the public water supply in 1981.

In September 1981, the Town initiated a quarterly sampling and analysis program to determine the approximate extent of leachate migration from the landfill. This was required pursuant to the NYSDEC Part 360 Solid Waste Management Facility Permit.

In 1987, the Town commenced the OU I RI. Eleven ground water monitoring wells were installed. Surficial and subsurface soils were sampled and analyzed. Surface water and sediment were

sampled and analyzed from Fish Cove. Results of the OU I RI indicated that heavy metals were contained in a plume emanating from Cell #1. Results of the surface water samples showed ammonia, iron, and manganese detected at all sample locations.

The Site was then separated into two OUs. The OU II remedial investigation commenced in July 1989. Two additional wells were constructed northwest and downgradient of Cell #1; all of the RI/FS wells were re-surveyed and re-sampled; residential wells were sampled; baseline air emission rates for the Site in its undisturbed state were calculated; flux measurements, surface water and clams were sampled and analyzed and a benthic survey was also performed in Fish Cove. The results of the RI are summarized below.

Ground water

The eleven original and the two newly installed (12A and 12B) monitoring wells (MW) (see Figure 3) were sampled for the total analyte list of metals and volatile organic compounds (VOCs). Leachate parameters and phenols were included in the analysis. Table 1 (unfiltered) and Table 1A (filtered) show the results of June 1991 sampling for inorganics. Table 2 shows the results of VOCs detected in the June 1991 sampling event. Table 3 shows the results of inorganics for MW 12A and 12B in the September 1991 sampling round and Table 4 shows the results of VOCs in MWs 12A and 12B.

In the June 1991 sampling event, an unfiltered concentration of 37 parts per billion (ppb) of arsenic was detected in MW#3b. This is slightly higher than the NYSDEC drinking water standard (25) but below the Federal drinking water standard (50)(also referred to as a Maximum Contaminant Level (MCL)). The other sampling events showed arsenic was detected below the NYSDEC drinking water standard.

Chromium (Cr) was detected in seven out of twelve MWs including upgradient wells. The ranges were from 53 ppb to 1310 ppb. The highest concentrations were detected at MW 12A and 12B which are immediately downgradient of Cell #1. Cr was detected in only one well downgradient of the landfill (4C) at 53 ppb which is slightly higher than the NYSDEC drinking water standard and the MCL (50 ppb).

Lead was detected above EPA's Action Level for lead in ground water at Superfund sites (15 ppb) in two upgradient and two on-Site wells during the OU 1 sampling events. During the OU 2 sampling events, lead was detected at 37 ppb in MW12A, 25 ppb in MW12B (which are both located immediately adjacent to the landfill) and 26 ppb in a upgradient well. This is higher than the NYSDEC drinking water standard (25 ppb) and EPA's Action Level for lead in ground water. All filtered samples and

residential well samples that were taken during both OU investigations were below the EPA's Action Level for lead.

Both iron and manganese were detected in the ground water monitoring wells at levels which exceeded the NYSDEC drinking water standards. However, these standards are based on aesthetic qualities rather than health concerns.

Five VOCs were detected in MW12A on one sampling event. They are chlorobenzene, ethylbenzene, 1,4- dichlorobenzene, benzene and 1,1,2-trichloroethane. The concentrations ranged up to 8, 10, 11, 4 and 16 ppb respectively. The other sampling event showed non-detectable levels of these contaminants. The NYSDEC drinking water standard is 5 ppb for each of these compounds with the exception of benzene (0.7 ppb). There are no MCLs for these compounds except benzene which is 5 ppb. Methlene chloride was detected at 14 ppb in MW12B on one sampling event. The NYSDEC drinking water standard is 5 ppb and there is no MCL for this compound.

In September 1991, residential wells utilized for potable water were sampled in the vicinity of the Site to ensure that the water met the Federal and State drinking water standards. Results of the sampling indicated that no contaminants above Federal and State drinking water standards were detected with the exception of iron and manganese which exceeded the NYSDEC drinking water standard slightly. As stated previously, these standards are secondary MCLs established for aesthetic qualities and public acceptance of drinking water (e.g. taste and odor) and/or not based on health or hazardous effects. See Table 5.)

BASELINE AIR EMISSION RATES

Baseline air emissions were calculated in the OU II RI using soil gas vapor concentration data collected during the first operable unit RI. The "worst case scenario" emissions were calculated using the highest concentration of contaminants detected. The actual annual impact, maximum potential annual impact, and maximum short-term impact were calculated using baseline emissions estimates for each contaminant. These values were compared to EPA's contaminant specific Ambient Guideline Concentration (AGC) and Short-term Guideline Concentration (SGC). Comparison of the calculated downwind concentrations with each respective guideline concentration indicated that ambient concentrations of all contaminants evaluated were within acceptable levels. Table 6 shows the results of the Baseline Emissions Estimates and Table 7 shows the results of the Ambient Air Impacts.

FISH COVE STUDY & BENTHIC SURVEY

An initial study of Fish Cove was conducted with the State

University of New York, Stony Brook Marine Science Research Center (MSRC), in coordination with the Town's consultant, H2M Group in the Summer of 1989. The purpose of this investigation was to determine the impact of leachate discharges at the Site on water quality, to determine the movement (or flux) of leachate solutes across the sediment-water interface in the ground water discharge area at Fish Cove and to determine the mortality and chemical content of the hard clam, Mercenaria mercenaria, in Fish Cove.

Twenty-two surface water samples were collected in Fish Cove and analyzed for iron, manganese, hydrogen phosphate, chloride and ammonia. Five sediment core samples were collected for measurement of flux across the sediment-water interface. Short and long term bioassays on the larvae of hard clams were conducted. (See Figure 4.)

As a result of this study, elevated concentrations of ammonia, iron and manganese were identified in the southeast region of Fish Cove. The results of the bioassays that were done for this study suggested that hard clam larvae that spawned in or were transported to the southeast region of Fish Cove would not survive. In addition, no live adult clams were recovered by MSRC from the southeast region of Fish Cove although numerous dead and articulated shells were discovered. The results of the flux study showed a consistent trend of decreasing solute flux across the sediment/water interface with increasing distance from the southeast area of Fish Cove. Data from the dissolved oxygen and carbon dioxide flux measurements indicated that a source area of decomposing manmade materials should exist. (See Table 8.)

As a result of its location upgradient of the southeast portion of Fish Cove, MSRC considered the North Sea Landfill as the most likely candidate for causing the high organic matter decomposition rates necessary to yield elevated carbon dioxide fluxes. However, high iron and manganese fluxes from the Fish Cove sediments may be indirectly related to organic matter decomposing in the North Sea Landfill and at the bottom of Fish Cove as a result of natural processes. It was not clearly demonstrated that the high iron and manganese fluxes recorded in the Fish Cove sediment were caused entirely by the activities at the North Sea Landfill.

Based on comments received from EPA and NYSDEC, additional analyses were performed on surface water, sediment and shellfish samples from Fish Cove by H2M, consultant to the Town, during July 1989. A total of six surface water/sediment samples were analyzed for priority pollutant purgeable organics, metals, phenols, iron and manganese. In addition, sediment samples were analyzed for base neutral compounds. In the surface water samples, all priority pollutant organics were within the standards, with the exception of acetone. Acetone was found both

inside and outside of the impacted area, and is most likely a laboratory contaminant. Concentrations of copper, iron, selenium, silver and zinc were measured in the surface water samples and cadmium, copper, iron, and zinc were measured in the background samples. Low levels of 1,1,1-trichloroethane were detected in the sediment samples and in the background sample. It is possible that the presence of 1,1,1 trichloroethane may be attributed to cesspool cleaning fluids which are commonly used in cesspools, many of which are located around Fish Cove. Priority pollutant metals that were quantified in the sediment samples included arsenic, cadmium, chromium, copper, iron, lead, manganese, nickel, thallium and zinc. The majority of these metals were also present in the background sample. (See Tables 9 and 10.)

As a result of the uncertainty related to the conclusion drawn by MSRC as to the mortality of the hard clam within the southeast section of Fish Cove, additional investigatory activities were conducted in January 1992. Specifically, in an attempt to assess the nature of the ecosystem within this "impacted zone", the Town performed a benthic survey.

A total of 336 hard clams were harvested in 2 hours and 3 minutes from the southeast region of Fish Cove using conventional harvesting methods along predetermined transects. Additionally, 16 other aquatic species representing the classes of pelecypoda, gastropoda, crustacea, annelida, elasmobranchiomorphi, osteichthyes, porifera, merostomata and echinodermata were incidentally caught. Finally, much of the bottomlands found within the southeastern region of Fish Cove were found to support extensive stands of sea lettuce and other aquatic flora.

The benthic study conducted in January 1992 revealed that commercial quantities of hard clams, representing different size and age classes were present in the southeast region of Fish Cove. In addition, numerous other aquatic species were also discovered existing in the southeast region of Fish Cove. The reported diversity of these species suggests that the ecosystem in the southeast region as a whole has not been affected significantly. However, a small area within the southeast region does appear to have been more impacted than the region as a whole. This area did not yield any clams during sampling conducted by NYSDEC and NYSDOH on August 5, 1992.

During the August 1992 sampling event, the NYSDOH in conjunction with the NYSDEC and EPA, collected nine (9) composite samples of hard clams throughout Fish Cove. The nine composite samples were analyzed for priority pollutant metals. The results indicate that clam samples from Fish Cove contain levels of metals generally within the range of those collected from New York State waters and do not appear to present any significant increase health risks to consumers. (See Appendix II)

## SUMMARY OF SITE RISKS

A baseline risk assessment was conducted for the OU I RI. The baseline risk assessment estimates the human health risk which could result from the contamination at the Site if no remedial action were taken. The OU I risk assessment examined the following scenarios: ingestion of ground water, ingestion of chemical in soils, dermal contact with chemicals in soils, inhalation of volatile organic compounds from soils, inhalation of fugitive dust generated from Site soils, ingestion of contaminated fish tissue, incidental surface water ingestion and dermal absorption of surface water. At the time of the OU I risk assessment, it was determined that without implementing source control action at Cell #1, a significant riaks to human health and the environmental would exist. The identified risks to human health from these exposure scenarios as examined in the OU I risk assessment have been addressed in the OU I ROD and are currently being implemented by the Town.

For the OU II RI, EPA conducted a baseline Risk Assessment to evaluate the potential risks to human health and the environment associated with the Site in its current state. The Risk Assessment focused on contaminants in the ground water and surface water which are likely to pose significant risks to human health and the environment. Additional data had been collected since the OU I risk assessment was conducted and these data were incorporated into the OU II risk assessment. The summary of the contaminants of concern (COC) in sampled matrices is listed in Table 11.

The ground water contaminant screening process for OU II identified 14 chemicals of concern: 13 metals and ammonia. The chemicals of concern choseh for this risk assessment were ammonia, antimony, arsenic, barium, beryllium, cadmium, chromium (III and VI), iron, lead, manganese, nickel, vanadium, and zinc. The compounds or elements were selected because of their toxicological properties, potentially critical exposure routes, and higher concentrations present in comparison to other contaminants.

The OU II baseline risk assessment evaluated the health effects that could result from exposure to contamination at the Site under current and future use scenarios. Four possible exposure scenarios were evaluated: (1) residential ingestion of contaminated ground water from future off-site wells (potential future), (2) ingestion of contaminated fish from adjacent ponds and streams (potential current), (3) accidental ingestion of surface water during recreational activities in on-site and adjacent streams (potential current), and (4) dermal absorption of contaminated surface water during recreational activities at local streams and ponds (potential current).

Populations who may be exposed to contaminants migrating from the Site include future residents who may use ground water for their potable water supply (e.g., drinking), residents who presently use the surrounding surface waters for recreation and residents who presently consume fish caught in the surface waters surrounding the Site.

Total body burden rates were computed based on all potential exposure routes using an average adult body weight of 70 kg and a child body weight of 15 kg. It was assumed that ingestion of ground water from on-site would occur for 30 years for adults and 6 years for children. The noncarcinogenic exposures were averaged over a 6-year period for children. For adults, the noncarcinogenic exposures were averaged over a 30-year period. An exposure period of 70 years was used for carcinogenic compounds.

Under current EPA guidelines, the likelihood of carcinogenic (cancer causing) and non-carcinogenic effects as a result of exposure to Site chemicals are considered separately. It was assumed that the toxic effects of the site-related chemicals would be additive. Thus, carcinogenic and non-carcinogenic risks associated with exposures to individual compounds of concern were summed to indicate the potential risks associated with mixtures of potential carcinogens and non-carcinogens, respectively. Non-carcinogenic risks were assessed using a hazard index ("HI") approach, based on a comparison of expected contaminant intakes and safe levels of intake (Reference Doses). Reference doses ("RfDs") have been developed by EPA for indicating the potential for adverse health effects. RfDs, which are expressed in units of mg/kg-day, are estimates of daily exposure levels for humans which are though to be safe over a lifetime (including sensitive individuals). Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) are compared with the RfD to derive the hazard quotient for the contaminant in the particular medium. The hazard index is obtained by adding the hazard quotients for all compounds within a media that impact a particular receptor population.

A hazard index greater than 1 indicates that the potential exists for non-carcinogenic health effects to occur as a result of site-related exposures. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. The reference dose for the compounds of concern at the Site are presented in Table 12. A summary of the non-carcinogenic risks associated with these chemicals within/across various exposure pathways is found in Table 13. All hazard indices for adults under current and future use scenarios were below the threshold level of one indicating that noncarcinogenic health effects are not likely to occur based on potential exposures to surface and ground water.

All hazard indices for children, except for potential future ground water ingestion, were also below the threshold level of one. The ground water hazard index for children is 1.29, with antimony, arsenic and cadmium contributing the majority of the hazard. These metals chiefly affect different target organs; therefore, the hazards would not be additive. The hazard quotients for these individual metals are below the threshold level of one and would not be expected to result in deleterious effects. Table 11 shows the summary of Site carcinogenic and noncarcinogenic health effects for the exposure scenarios evaluated.

Potential carcinogenic risks were evaluated using the cancer slope factors developed by EPA for the contaminants of concern. Cancer slope factors (SFs) have been developed by EPA's Carcinogenic Risk Assessment Verification Endeavor for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. SFs, which are expressed in units of (mg/kg-day), are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to generate an upper bound estimate of the excess lifetime cancer risk associated with exposure to the compound at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the SF. Use of this approach makes the underestimation of the risk highly unlikely. The SF for the compounds of concern are presented in Table 12.

For known or suspected carcinogens, EPA considers excess upper bound individual lifetime cancer risks of between $10^{-4}$ to $10^{-6}$ to be acceptable. This range indicates that an individual has approximately a one in ten thousand to one in a million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year period under specific exposure conditions at the Site. Estimated carcinogenic risks under current and future use scenarios are within or less than EPA's acceptable risk range for both adults and children. The carcinogenic risk for the potential future ground water ingestion exposure pathway is $5.9 \times 10^{-5}$ for adults and $2.2 \times 10^{-5}$ for children. The major contaminants contributing to this potential carcinogenic risk are arsenic and beryllium.

Uncertainties

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis
- environmental parameter measurement
- fate and transport modeling

- exposure parameter estimation
- toxicological data.

Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the actual levels present. Environmental chemistry analysis error can stem from several sources including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the chemicals of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the chemicals of concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the Risk Assessment provides upper bound estimates of the risks to populations at the Site, and is highly unlikely to underestimate actual risks related to the Site. More specific information concerning public health risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in the Risk Assessment Report.

**State Acceptance**

The State of New York concurs with EPA's selected no action alternative. Their letter of concurrence is attached as Appendix IV.

**Community Acceptance**

All comments received during the public comment period from July 22, 1992 to August 21, 1992 are summarized in the attached Responsiveness Summary. Although most comments favored the no action decision, several comments disagreed with the decision.

**DESCRIPTION OF THE "NO ACTION" REMEDY**

Based upon the review of all available data and the findings of the RI conducted at the Site, a no action decision is protective of human health and the environment. The no action decision complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost effective.

The OU II Risk Assessment indicates that the levels of contaminants present in the ground water at the Site present risks which are within EPA's acceptable risk range. In addition, although ground water sampling results indicate the infrequent occurrence of contaminants exceeding MCLs, the majority of contaminants do not exceed primary (health-based) MCLs in the ground water. In addition, capping of Cell #1 will reduce the risk of contaminant migration from Cell #1 which results from leachate generated by surface precipitation. Furthermore, monitoring of air and water will be conducted to ensure that the cap is effective at reducing the risk of contaminant migration. This monitoring will include sampling of five homes on the periphery of the plume and/or connection to the public water supply. Currently, all homes within the plume have been connected to the public water supply. In addition, ammonia flux measurements and benthos and hard clams recruitment will be conducted at Fish Cove.

Although a five year review will be conducted at the landfill pursuant to the OU I ROD, no five-year review is required for OU II because no hazardous substances have been identified in this OU above health-based levels.

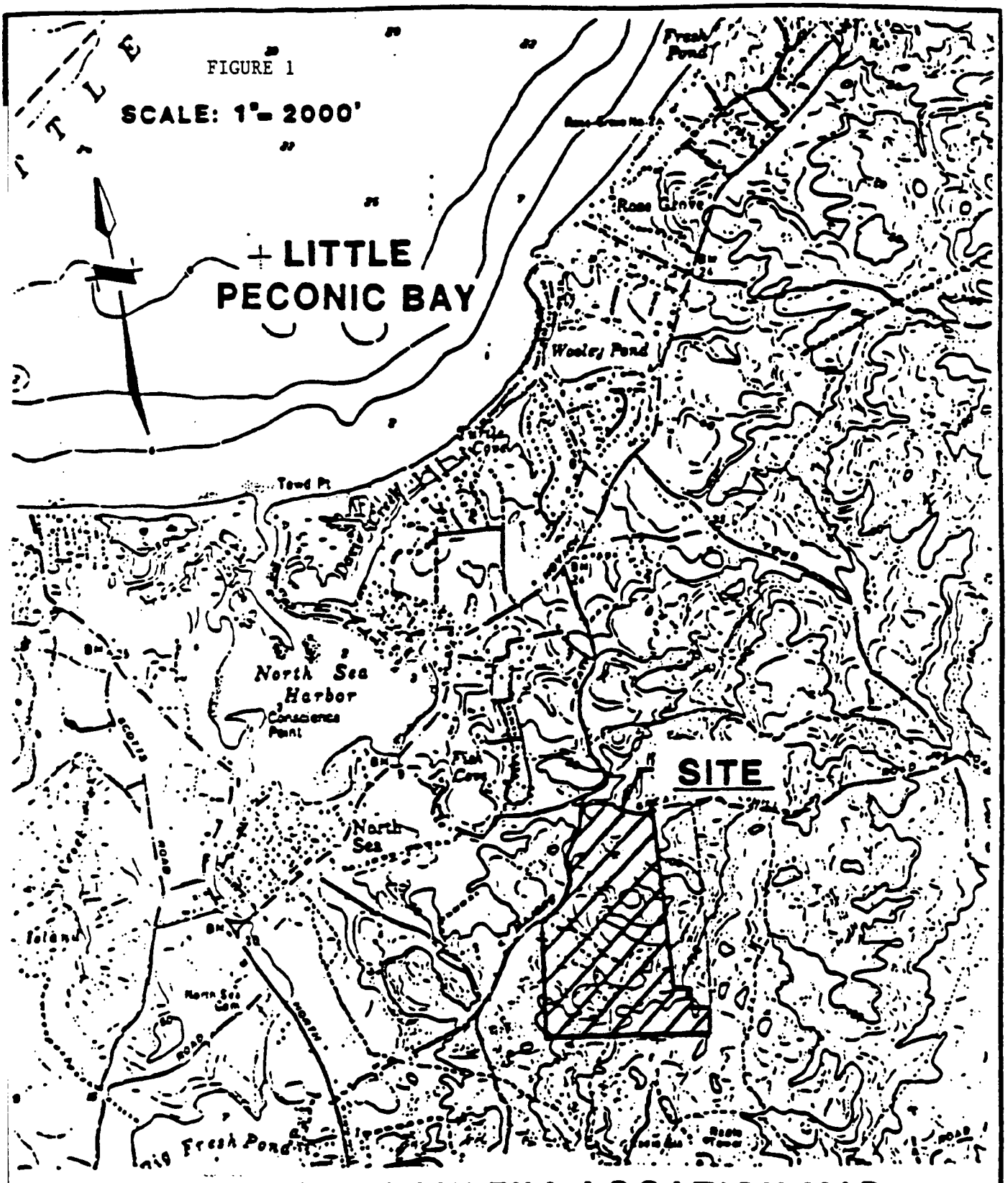
**DOCUMENTATION OF SIGNIFICANT CHANGES**

There are no significant changes from the preferred alternative presented in the Proposed Plan.

# APPENDIX I

FIGURE 1

SCALE: 1" = 2000'




# NORTH SEA LANDFILL LOCATION MAP

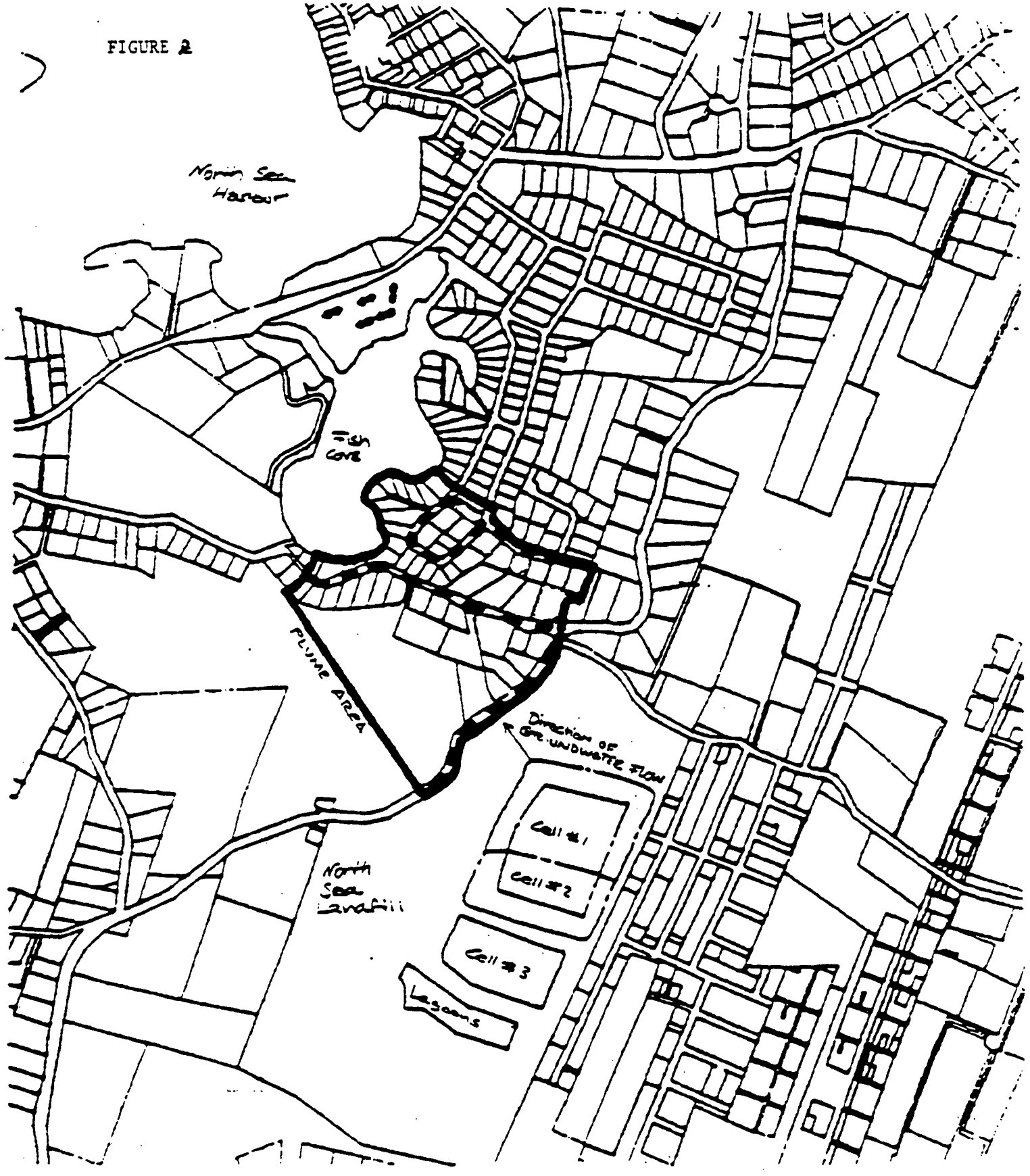
SOURCE: USGS SOUTHAMPTON QUADRANGLE, 1956

H2MGROUP ENGINEERS • ARCHITECTS • PLANNERS • SCIENTISTS
MELVILLE, N.Y. RIVERHEAD, N.Y. FAIRFIELD, N.J.



POOR QUALITY
ORIGINAL

FIGURE 2




Residences Downgradient of Cell No. 1

Existing Public Water Main

POOR QUALITY ORIGINAL

FIGURE 3

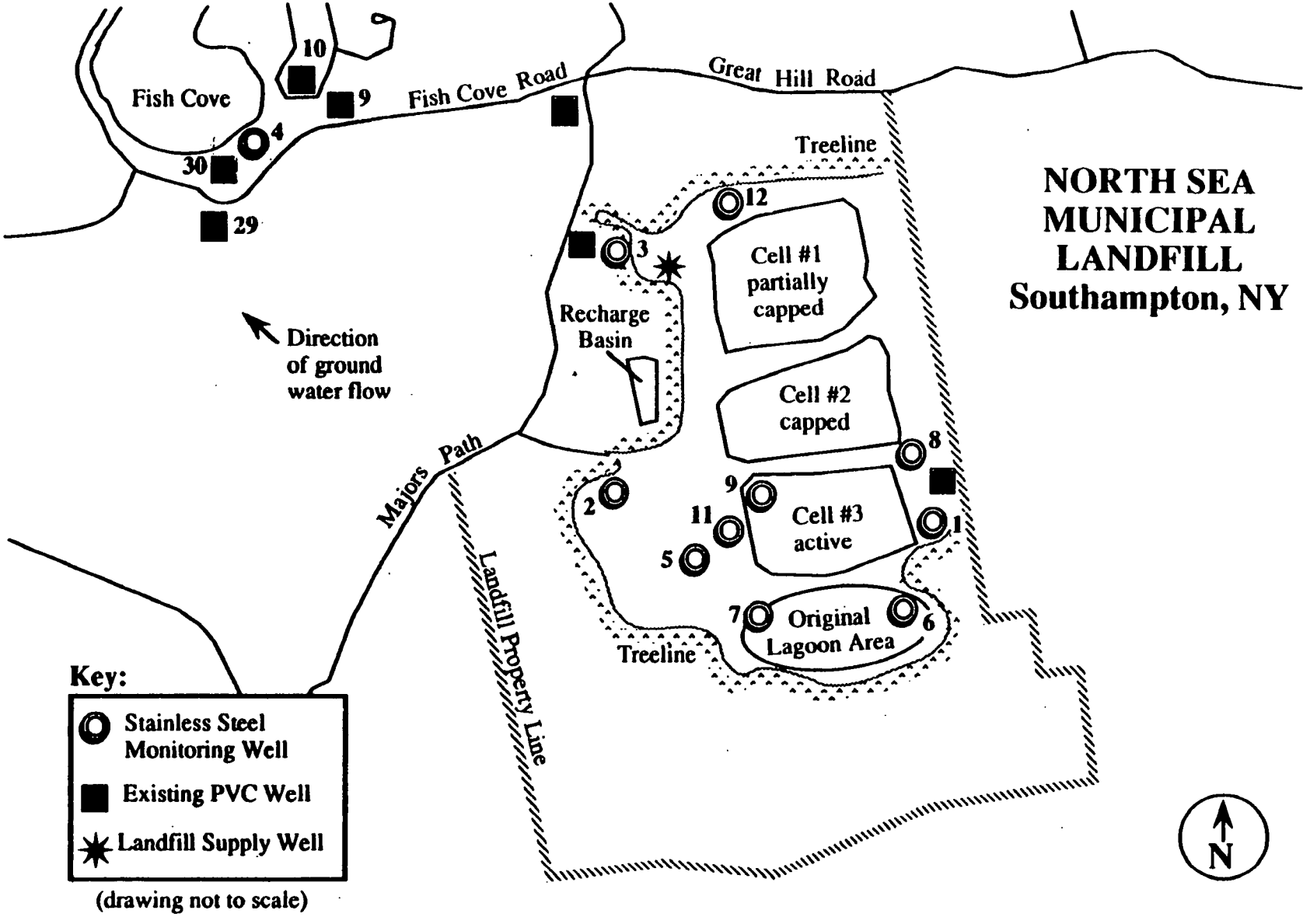
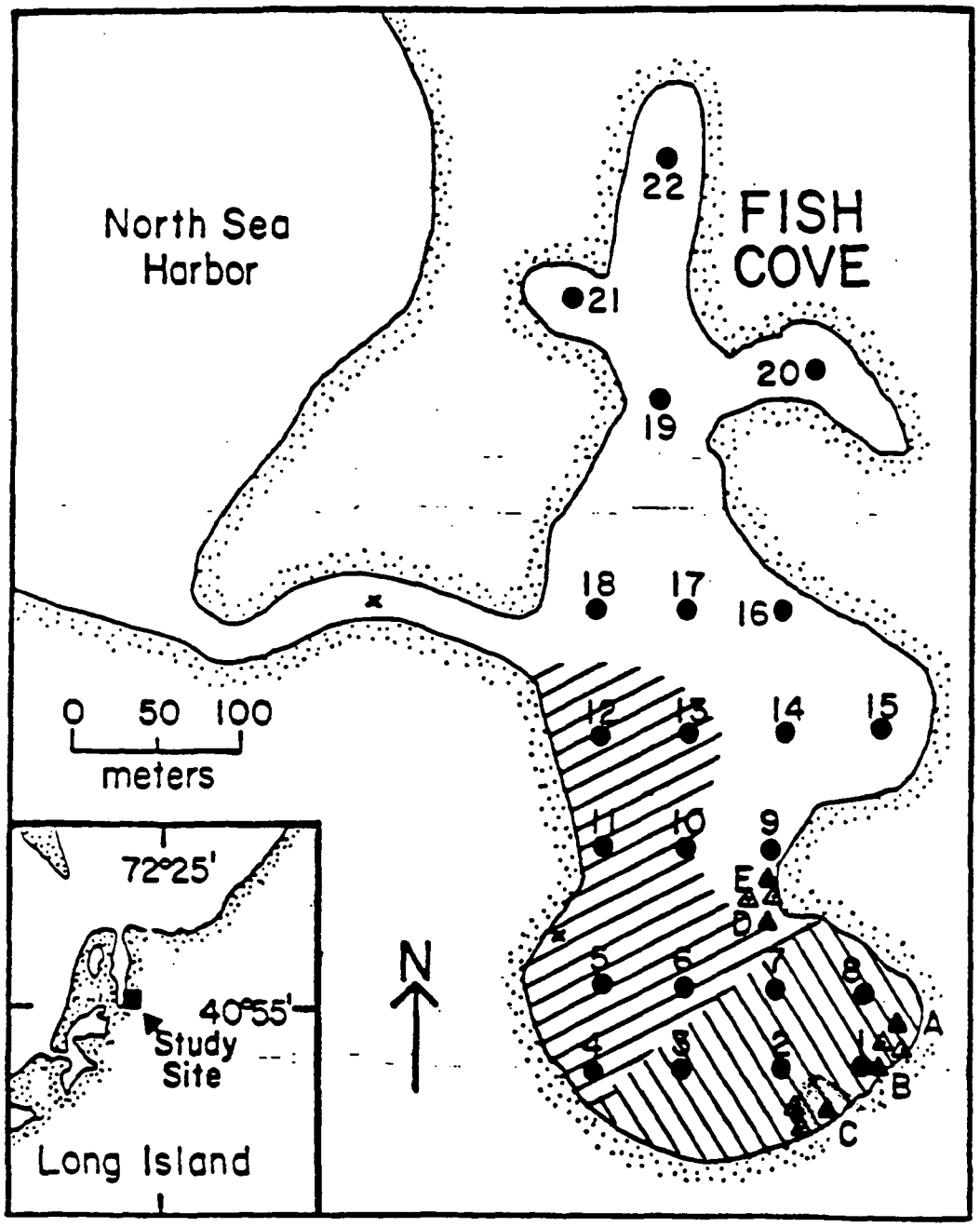

NORTH SEA
MUNICIPAL
LANDFILL
Southampton, NY
Fish Cove
Fish Cove Road
Great Hill Road
Treeline
Cell #1
partially
capped
Recharge
Basin
Cell #2
capped
Cell #3
active
Original
Lagoon Area
Treeline
Majors Path
Landfill Property Line
Direction
of ground
water flow
10
9
4
30
29
12
3
8
2
9
11
5
1
7
6
Key:
Stainless Steel
Monitoring Well
Existing PVC Well
Landfill Supply Well
(drawing not to scale)
N

FIGURE 4

## NORTH SEA PHASE II RI "ISH COVE STUDY AREA




**LEGEND**

- ● SURFACE WATER SAMPLING LOCATIONS (SUNY)
- ▲ SEDIMENT SAMPLING LOCATIONS (SUNY)
- ◬ SURFACE WATER/SEDIMENT SAMPLING LOCATIONS (H2M)
- × CLAM SAMPLING LOCATIONS (H2M)

THE STIPPLED REGION INDICATES THE AREAL EXTENT OF THE GROUNDWATER DISCHARGE AREA, INFERRED FROM THE PRESENCE OF IRON-STAINED BOTTOM SEDIMENTS.

TRANSITION ZONE

IMPACTED ZONE

H2MGROUP ENGINEERS • ARCHITECTS • PLANNERS • SCIENTISTS • SURVEYORS
MELVILLE, N.Y. RIVERHEAD, N.Y. FAIRFIELD, N.J.

# APPENDIX II

TABLE 1

NORTH SEA LANDFILL
METALS - TOTAL
JUNE, 1991
MG/L

| PARAMETER | MW1A | MW1B | MW1C | MW2 | MW3A | MW3B |
|---|---|---|---|---|---|---|
| ALUMINUM | .40 N | .30 N | .50 N | 2.90 N | 2.10 N | .30 N |
| ANTIMONY | U | .40 B | U | U | U | U |
| ARSENIC | U | U | U | .003 BW | U | .037 |
| BARIUM | .089 B | .026 B | .032 B | .166 B | .032 B | .258 |
| BERYLLIUM | U | U | U | .004 B | <.001 B | .001 B |
| CADMIUM | U | U | U | .011 | U | U |
| CALCIUM | 8.5 | 4.48 B | 8.99 | 194 | 4.25 B | 32.4 |
| CHROMIUM | 0.3 | .020 | .180 | 16.7 | .114 | .031 |
| COBALT | U | U | U | .162 | U | .008 B |
| COPPER | .029 | .043 | .090 | .302 | .016 B | .036 |
| IRON | 2.41 | 1.68 | 2.65 | 179 | 7.89 | 47.6 |
| LEAD | .008 | .026 | .014 | .160 | .008 | .005 |
| MAGNESIUM | 6.06 | 1.48 B | 1.87 B | 55.20 | 2.45 B | 14.2 |
| MANGANESE | 2.48 | .041 | .032 | 5.61 | .063 | 2.88 |
| MERCURY | U | U | U | .0016 | U | U |
| NICKEL | .031 B | .040 | .036 B | 9.55 | U | .032 B |
| POTASSIUM | 1.68 B | 1.06 B | .764 B | 8.95 | .814 B | 31.2 |
| SELENIUM | U | U | U | U | U | U |
| SILVER | U | U | U | U | U | U |
| SODIUM | 8.06 | 7.39 | 6.94 | 2630 | 19.5 | 41.6 |
| THALLIUM | U | .002 B | U | .024 B | U | U |
| VANADIUM | U | U | U | .112 | .007 B | .008 B |
| ZINC | .031 | .088 | .101 | .203 | .056 | .060 |

## TABLE 1 CONT'D

NORTH SEA LANDFILL
METALS - TOTAL
JUNE, 1991
MG/L

| PARAMETER | MW3C | MW4A | MW4B | MW4C | MW6A | MW12A |
|---|---|---|---|---|---|---|
| ALUMINUM | .50 N | .50 N | .20 N | U | .40 N | 5.20 N |
| ANTIMONY | U | U | U | U | U | U |
| ARSENIC | U | U | U | U | .007 B | .015 |
| BARIUM | .05 B | .036 B | .186 B | .001 B | .108 B | .299 |
| BERYLLIUM | .001 B | <.001 B | .001 B | <.001 B | <.001 B | .002 B |
| CADMIUM | U | U | U | U | U | U |
| CALCIUM | 44.2 | 6.04 | 19.3 | 6.63 | 29.8 | 82.9 |
| CHROMIUM | .211 | .034 | .035 | .053 | .020 | 1.0 |
| COBALT | U | U | U | U | .009 B | .031 B |
| COPPER | .042 | .016 B | .024 B | .027 | .068 | .104 |
| IRON | 3.66 | 1.29 | 3.37 | 1.2 | 6.41 | 51.5 |
| LEAD | .013 | .002 B | .004 | .003 | .015 | .037 |
| MAGNESIUM | 6.80 | 3.02 B | 10.2 | 2.89 B | 9.35 | 23.9 |
| MANGANESE | .161 | .489 | 1.45 | .024 | .418 | .484 |
| MERCURY | U | U | U | U | U | U |
| NICKEL | .309 | U | .03 B | .036 B | .068 | .09 |
| POTASSIUM | 1.31 B | 1.52 B | 12.4 | .582 B | 2.49 B | 55 |
| SELENIUM | U | U | U | U | U | U |
| SILVER | U | U | U | U | U | U |
| SODIUM | 11.9 | 15.7 | 37.7 | 6.93 | 17.1 | 48.5 |
| THALLIUM | U | U | U | U | U | U |
| VANADIUM | U | U | U | U | U | .047 B |
| ZINC | .114 | .049 | .085 | .198 | .068 | .069 |

H2MGROUP

TABLE 1 CONT'D

NORTH SEA LANDFILL
METALS - TOTAL
JUNE, 1991
MG/L

| PARAMETER | MW12B | MW13* | FIELD BLANK 1 | FIELD BLANK 2 | EPA(a) | NYSDEC(b) |
|---|---|---|---|---|---|---|
| ALUMINUM | 1.80 N | .30 N | U | U | NA | NA |
| ANTIMONY | U | U | U | U | NA | NA |
| ARSENIC | .009 B | U | U | U | .05 | .025 |
| BARIUM | .043 B | .03 B | U | U | 2 | 1 |
| BERYLLIUM | <.001 B | U | <.001 B | <.001 B | NA | NA |
| CADMIUM | U | U | U | U | 0.005** | .01 |
| CALCIUM | 19.40 | 8.36 | U | U | NA | NA |
| CHROMIUM | 1.31 | .13 | U | U | .10** | .05 |
| COBALT | U | U | U | U | NA | NA |
| COPPER | .086 | .074 | .015 B | .013 B | 1 | .20 |
| IRON | 21.8 | 2.10 | U | .025 B | 0.3 | 0.3 |
| LEAD | .025 | .011 | .001 B | U | .05/ .015** | .025 |
| MAGNESIUM | 4.92 B | 1.83 B | U | .043 B | NA | NA |
| MANGANESE | .279 | .029 | U | U | .05 | 0.3 |
| MERCURY | U | U | U | U | .002 | .002 |
| NICKEL | .066 | .058 | U | U | NA | NA |
| POTASSIUM | 7.36 | .812 B | .709 B | .499 B | NA | NA |
| SELENIUM | U | U | U | U | .01 | .01 |
| SILVER | U | .005 B | U | U | .10** | .05 |
| SODIUM | 15.2 | 6.51 | .628 B | .673 B | NA | 20 |
| THALLIUM | U | U | U | U | NA | NA |
| VANADIUM | U | U | U | U | NA | NA |
| ZINC | .167 | .079 | .039 | .022 | 5 | 0.30 |

U - Undetected
B - Entered if reported value is less than the Contract Required Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL)
N - Matrix Spike not within limits
(a) - USEPA Drinking Water Standards, Maximum Contaminant Levels (MCL), 40 CFR 141, February, 1992
(b) - NYSDEC Water Quality Regulations 6 NYCRR Part 703, September, 1991
NA - Not Applicable
* - Blind Duplicate
** - The USEPA cleanup level for lead in groundwater is 15 ppb
The USEPA MCL for cadmium, chromium and silver become effective July, 1992.

**TABLE 1A**

NORTH SEA LANDFILL
METALS-DISSOLVED
JUNE 1991
MG/L

| PARAMETER | MW1A | MW1B | MW1C | MW2 | MW3A | MW3B |
|---|---|---|---|---|---|---|
| ALUMINUM | U | U | U | .40 N | 0.70 N | 0.20 N |
| ANTIMONY | U | U | U | U | U | U |
| ARSENIC | U | U | U | U | U | .017 |
| BARIUM | .083 B | .017 B | .015 B | .140 B | .022 B | .227 |
| BERYLLIUM | U | U | U | .003 B | <.001 B | <.001 B |
| CADMIUM | U | U | U | .009 | U | U |
| CALCIUM | 8.12 | 3.72 B | 4.64 B | 187 | 4.83 B | 31.0 |
| CHROMIUM | .071 | U | .07 | 11.6 | .095 | .023 |
| COBALT | U | U | U | .180 | U | .006 B |
| COPPER | .009 B | .014 B | .016 B | .362 | .009 B | .011 B |
| IRON | .324 | .072 B | .297 | 80.2 | 2.37 | 41.2 |
| LEAD | .005 | .001 B | U | .059 S | .005 B | .005 B |
| MAGNESIUM | 57.7 | 1.46 B | 1.6 B | 52 | 2.46 B | 13.6 |
| MANGANESE | 2.03 | .021 | .015 B | 5.59 | .032 | 2.82 |
| MERCURY | U | U | U | U | U | U |
| NICKEL | .053 | | .042 | 10.3 | .030 B | .032 B |
| POTASSIUM | 1.75 B | 1.14 B | .765 B | 8.37 | .833 B | 30.6 |
| SELENIUM | U | U | U | U | <.001 B | U |
| SILVER | U | U | U | U | U | U |
| SODIUM | 8.50 | 7.67 | 6.67 | 25.2 | 20.8 | 41.0 |
| THALLIUM | .002 B | .002 B | U | .028 B | U | U |
| VANADIUM | U | U | U | .016 B | U | .009 B |
| ZINC | .025 | .058 | .042 | .189 | .046 | .067 |

## TABLE 1A CONT'D

NORTH SEA LANDFILL
METALS-DISSOLVED
JUNE 1991
MG/L

| PARAMETER | MW3C | MW4A | MW4B | MW4C | MW6A | MW12A |
|---|---|---|---|---|---|---|
| ALUMINUM | .2 N | .2 N | U | U | .20 N | 4.3 N |
| ANTIMONY | U | U | U | U | U | U |
| ARSENIC | U | .003 B | .003 B | .003 B | .006 B | .013 |
| BARIUM | .041 B | .027 B | .225 | .011 B | .092 B | .184 B |
| BERYLLIUM | <.001 B | <.001 B | .001 B | <0.10 B | <.001 B | .001 B |
| CADMIUM | U | U | U | U | U | U |
| CALCIUM | 36.3 | 5.9 | 22.8 | 7.38 | 23 | 75.1 |
| CHROMIUM | .028 | .015 | .019 | .079 | .009 B | .318 |
| COBALT | U | U | U | U | U | .023 B |
| COPPER | .010 B | .005 B | .009 B | .021 B | .018 B | .046 |
| IRON | .632 | .200 | 2.71 | .890 | 5.22 | 11 |
| LEAD | .006 | .006 | .001 B | .006 | .007 | .010 |
| MAGNESIUM | 6.57 | 2.38 B | 11.9 | 2.89 B | 9.54 | 22.1 |
| MANGANESE | .124 | .268 | 1.67 | .035 | .400 | .354 |
| MERCURY | U | U | U | U | U | U |
| NICKEL | .237 | U | .026 B | .054 | U | .222 |
| POTASSIUM | 1.49 B | 1.22 B | 15.1 | .706 B | 2.91 B | 52.1 |
| SELENIUM | U | U | U | U | U | U |
| SILVER | .020 | U | .020 | U | U | U |
| SODIUM | 10.9 | 11.9 | 44.3 | 6.83 | 18 | 50.4 |
| THALLIUM | U | U | U | U | U | U |
| VANADIUM | U | U | U | U | U | .021 B |
| ZINC | .07 | .055 | .091 | .310 | .164 | .046 |

H2MGROUP

## TABLE 1A CONT'D

NORTH SEA LANDFILL
METALS-DISSOLVED
JUNE 1991
MG/L

| PARAMETER | 12B | MW13* | FIELD BLANK 1 | FIELD BLANK 2 | EPA (a) | NYSDEC (b) |
|---|---|---|---|---|---|---|
| ALUMINUM | .50 N | U | U | U | NA | NA |
| ANTIMONY | U | U | U | U | NA | NA |
| ARSENIC | .008 B | U | U | U | .05 | .025 |
| BARIUM | .022 B | .011 B | U | U | 2 | 1 |
| BERYLLIUM | U | U | <.001 B | <.001 B | NA | NA |
| CADMIUM | U | U | U | U | .005** | .01 |
| CALCIUM | 28.6 | 3.97 B | U | U | NA | NA |
| CHROMIUM | .091 | .016 | .095 | .020 | .10** | .05 |
| COBALT | U | U | U | U | NA | NA |
| COPPER | .035 | .012 B | .008 B | .009 B | 1 | .20 |
| IRON | .795 | .055 B | .599 | .088 B | 0.3 | 0.3 |
| LEAD | .003 B | U | U | .002 B | .05/ .015** | .025 |
| MAGNESIUM | 3.62 B | 1.63 B | U | U | NA | NA |
| MANGANESE | .059 | .007 B | .010 B | U | .05 | 0.3 |
| MERCURY | U | U | U | U | .002 | .002 |
| NICKEL | .061 | .021 | .088 | U | NA | NA |
| POTASSIUM | 13.2 | .645 B | 1.22 B | .753 B | NA | NA |
| SELENIUM | U | U | U | U | .01 | .01 |
| SILVER | U | U | U | U | .10** | .05 |
| SODIUM | 23 | .654 | .384 B | .276 B | NA | 20 |
| THALLIUM | U | U | U | U | NA | NA |
| VANADIUM | U | U | U | U | NA | NA |
| ZINC | .035 | .039 | .039 | .011 B | 5 | 0.3 |

U - Undetected
B - Entered if reported value is less than the Contract Required Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL)
(a) - USEPA Drinking Water Standards, Maximum Contaminant Levels (MCL), 40 CFR 141, February, 1992
(b) - NYSDEC Water Quality Regulations 6 NYCRR Part 703, September, 1991
* - Blind Duplicate
** - The USEPA cleanup level for lead in groundwater is 15 ppb
The USEPA MCL for cadmium, chromium and silver became effective July 1992

TABLE 2

NORTH SEA LANDFILL
VOLATILE ORGANICS
JUNE 1991

| ARAMETER | MW1A | MW1B | MW1C | MW2 | MW3A | MW3B | MW3C | MW4A | MW4B | MW4C | MW6A | MW12A | MW12B | MW13* | FIELD BLANK 1 | FIELD BLANK 2 | EPA (a) | NYSDEC (b) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OLATILE ORGANICS UG/L | | | | | | | | | | | | | | | | | | |
| HLOROMETHANE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | NA | NA |
| ROMOMETHANE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | NA | NA |
| INYL CHLORIDE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | 2 | NA |
| HLOROETHANE | U | U | U | 4 | U | U | U | U | U | U | U | U | U | U | U | U | NA | NA |
| ETHYLENE CHLORIDE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | NA | NA |
| CETONE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | NA | NA |
| ARBON DISULFIDE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | NA | NA |
| ,1-DICHLOROETHENE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | 7 | NA |
| ,1-DICHLOROETHANE | | | | 2 | | | U | U | U | U | U | U | U | U | U | U | 7 | 5 |
| ,2-DICHLOROETHENE (TOTAL) | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | NA | NA |
| HLOROFORM | | 2 | 2 | | | | U | U | U | U | U | U | | 2 | | | NA | NA |
| ,2-DICHLOROETHANE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | 5 | NA |
| -BUTANONE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | NA | NA |
| ,1,1-TRICHLOROETHANE | U | U | U | 2 | U | U | U | U | U | U | U | 16 B | 1 | | | | 200 | 5 |
| ARBON TETRACHLORIDE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | 5 | NA |
| ROMODICHLOROMETHANE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | NA | NA |
| ,2-DICHLOROPROPANE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | 5 | NA |
| is-1,3-DICHLORO-PROPANE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | NA | NA |
| RICHLOROETHENE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | 5 | NA |
| IBROMOCHLOROMETHANE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | NA | NA |
| ,1,2-TRICHLOROETHANE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | NA | NA |
| ENZENE | U | U | U | U | U | 1 | U | U | U | U | U | U | U | U | U | U | 5 | 0.7 |
| rans-1,3-DICHLORO-PROPANE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | NA | NA |
| ROMOFORM | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | NA | NA |
| -METHYL-2-PENTANONE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | NA | NA |
| -HEXANONE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | NA | NA |
| ETRACHLOROETHENE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | NA | NA |
| ,1,2,2-TETRACHLORO-ETHANE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | NA | NA |
| OLUENE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | 1000 | NA |
| HLOROBENZENE | U | U | U | U | U | 4 | U | U | U | U | U | U | U | U | U | U | NA | 5 |
| ,1,2-TRICHLORO-122 TRIFLUOROETHANE | U | U | U | U | U | U | U | U | 2 J | 2 J | 2 J | U | U | U | U | U | NA | NA |
| CTANE ISOMER | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | NA | NA |
| THYLBENZENE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | NA | 5 |
| TYRENE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | 100 | NA |
| YLENE (TOTAL) | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | 10,000 | NA |
| ,3-DICHLOROBENZENE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | NA | NA |
| ,4-DICHLOROBENZENE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | NA | 5 |
| ,2-DICHLOROBENZENE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | NA | NA |
| ,2-DIBROMO-3-CHLORO-PROPANE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | NA | NA |
| ,2-DIBROMOETHANE | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | NA | NA |

U - Undetected
B - Entered if reported value is less than the Contract Required Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL)
M - Matrix Spike not within limits

(a) - USEPA Drinking Water Standards, Maximum Contaminant Levels (MCL), 40 CFR 141, February, 1992
(b) - NYSDEC Water Quality Regulations 6 NYCRR Part 703, September, 1991
NA - Not Applicable
* - Blind Duplicate

POOR QUALITY ORIGINAL

TABLE 3

NORTH SEA LANDFILL
WELLS 12A/12B
SEPTEMBER 1991
METALS TOTAL AND DISSOLVED

| | MW 12A | | MW 12B | |
|---|---|---|---|---|
| PARAMETER | TOTAL | DISSOLVED | TOTAL | DISSOLVED |
| Aluminum | .555 | .128 B | 1.41 | .088 B |
| Antimony | .031 B | U | U | U |
| Arsenic | .02 | .003 B | .007 B | .003 B |
| Barium | .483 | .215 | .053 B | .033 B |
| Beryllium | <.001 B | <.001 B | <.001 B | <.001 B |
| Cadmium | .019 | U | .008 | U |
| Calcium | 73.4 | 68.8 | 22.5 | 23.2 |
| Chromium | .237 N | .011 | .332 | U |
| Cobalt | U | U | .013 B | .007 B |
| Copper | .038 | .02 B | .060 | .011 B |
| Iron | 110 | 3.70 | 12.9 | 1.31 |
| Lead | .004 | .002 B | .011 | U |
| Magnesium | 15.70 | 15 | 6.34 | 5.44 |
| Manganese | 2.25 | 1.95 | .333 | .209 |
| Mercury | U | U | U | U |
| Nickel | .165 | .03 B | .207 | U |
| Potassium | 33.5 | 31.6 | 9.16 | 7.85 |
| Selenium | <.001 B | U | <.001 B | U |
| Silver | U | U | U | U |
| Sodium | 32 | 30.7 | 15.5 | 14.6 |
| Thallium | U | U | U | U |
| Vanadium | .017 B | U | U | U |
| Zinc | .045 | .043 | .069 | .03 |

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## TABLE 3 CONT'D

NORTH SEA LANDFILL
WELLS 12A/12B
SEPTEMBER 1991
METALS TOTAL AND DISSOLVED

| | MW 12C* | | | | | |
|---|---|---|---|---|---|---|
| PARAMETER | TOTAL | DISSOLVED | FIELD BLANK TOTAL | RINSE BLANK TOTAL | EPA (a) | NYSDEC (b) |
| Aluminum | 1.10 | .071 B | .197 B | .04 B | NA | NA |
| Antimony | U | U | U | U | NA | NA |
| Arsenic | .007 B | .004 B | U | U | .05 | .025 |
| Barium | .053 B | .033 B | U | U | 2 | 1 |
| Beryllium | <.001 B | <.001 B | <.001 B | U | NA | NA |
| Cadmium | U | .012 | U | U | .005** | .01 |
| Calcium | 20.4 | 22.5 | U | U | NA | NA |
| Chromium | .273 | U | U | U | .10** | .05 |
| Cobalt | .01 B | U | U | .008 B | NA | NA |
| Copper | .049 | .054 | .01 B | .027 | 1 | .20 |
| Iron | 12.1 | 2.46 | .163 | .034 B | 0.3 | 0.3 |
| Lead | .01 | U | U | .001 B | .05<br>.015** | .025 |
| Magnesium | 6.38 | 5.44 | .038 B | U | NA | NA |
| Manganese | .337 | .232 | U | U | .05 | .3 |
| Mercury | U | U | U | U | .002 | .002 |
| Nickel | .170 | U | U | U | NA | NA |
| Potassium | 9.44 | 7.48 | .375 B | 1.38 B | NA | NA |
| Selenium | U | U | U | U | .01 | .01 |
| Silver | U | .011 N | U | .005 B | .10** | .05 |
| Sodium | 15.7 | 13.2 | .645 B | 1.57 B | NA | 20 |
| Thallium | U | U | U | U | NA | NA |
| Vanadium | U | U | U | U | NA | NA |
| Zinc | .079 | .024 | .011 B | 1.21 | 5 | 0.30 |

U - Undetected
B - Entered if reported value is less than the Contract Required Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL)
N - Matrix Spike not within limits
(a) - USEPA Drinking Water Standards, Maximum Contaminant Levels (MCL), 40 CFR 141, February, 1992
(b) - NYSDEC Water Quality Regulations 6 NYCRR Part 703, September, 1991
NA - Not Applicable
* - Blind Duplicate
** - The USEPA cleanup level for lead in groundwater is 15 ppb
The USEPA MCL for cadmium, chromium and silver became effective July 1992

TABLE 4

NORTH SEA LANDFILL
WELLS 12A/12B
SEPTEMBER 1991 SAMPLING
QUANTIFIED ORGANICS

| PARAMETER (µG/L) | MW 12A | MW 12B | MW 12C* | FIELD BLANK | TRIP BLANK | EPA (a) | NYSDEC (b) |
|---|---|---|---|---|---|---|---|
| CHLOROMETHANE | U | U | U | U | U | NA | NA |
| BROMOMETHANE | U | U | U | U | U | NA | NA |
| VINYL CHLORIDE | U | U | U | U | U | 2 | NA |
| CHLOROETHANE | U | U | U | U | U | NA | NA |
| METHYLENE CHLORIDE | 2B | 14B | 17B | 2B | U | NA | 5 |
| ACETONE | U | U | U | U | 16 | NA | NA |
| CARBON DISULFIDE | U | U | U | U | U | NA | NA |
| 1,1-DICHLOROETHENE | U | U | U | U | U | 7 | NA |
| 1,1-DICHLOROETHANE | U | U | U | U | U | 7 | 5 |
| 1,2-DICHLOROETHENE (TOTAL) | U | U | U | U | U | NA | NA |
| CHLOROFORM | U | U | U | U | U | NA | NA |
| 1,2-DICHLOROETHANE | U | U | U | U | U | 5 | NA |
| 2-BUTANONE | U | U | U | U | U | NA | NA |
| 1,1,1-TRICHLOROETHANE | U | U | U | U | U | 200 | 5 |
| CARBON TETRACHLORIDE | U | U | U | U | U | 5 | NA |
| BROMODICHLOROMETHANE | U | U | U | U | U | NA | NA |
| 1,2-DICHLOROPROPANE | U | U | U | U | U | 5, | NA |
| cis-1,3-DICHLORO-UU PROPANE | U | U | U | U | U | NA | NA |
| TRICHLOROETHENE | U | U | U | U | U | 5 | NA |
| DIBROMOCHLOROMETHANE | U | U | U | U | U | NA | NA |
| 1,1,2-TRICHLOROETHANE | U | U | U | U | U | NA | NA |
| BENZENE | 4 | U | U | U | U | 5 | 0.7 |
| trans-1,3-DICHLORO-U PROPANE | U | U | U | U | U | NA | NA |
| BROMOFORM | U | U | U | U | U | NA | NA |
| 4-METHYL-2-PENTANONE | U | U | U | U | U | NA | NA |
| 2-HEXANONE | U | U | U | U | U | NA | NA |
| TETRACHLOROETHENE | U | U | U | U | U | NA | NA |
| 1,1,2,2-TETRACHLORO-ETHANE | U | U | U | U | U | NA | NA |
| TOLUENE | U | U | U | U | U | 1000 | NA |
| CHLOROBENZENE | 8 | U | U | U | U | NA | 5 |
| ETHYLBENZENE | 10 | U | U | U | U | NA | 5 |
| STYRENE | U | U | U | U | U | 100 | NA |
| XYLENE (TOTAL) | U | U | U | U | U | 10,000 | NA |
| 1,3-DICHLOROBENZENE | U | U | U | U | U | NA | NA |
| 1,4-DICHLOROBENZENE | 11 | 2 | 1 | U | U | NA | 5 |
| 1,2-DICHLOROBENZENE | U | U | U | U | U | NA | NA |
| 1,2-DIBROMO-3-CHLORO-PROPANE | U | U | U | U | U | NA | NA |
| 1,2-DIBROMOMETHANE | U | U | U | U | U | NA | NA |

U - Undetected
B - Entered if reported value is less than the Contract Required Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL)
N - Matrix Spike not within limits
(a) - USEPA Drinking Water Standards, Maximum Contaminant Levels (MCL), 40 CFR 141, February, 1992
(b) - NYSDEC Water Quality Regulations 6 NYCRR Part 703, September, 1991
NA - Not Applicable
* - Blind Duplicate

TABLE 5

# RESIDENTIAL WELL SURVEY SEPTEMBER 1991

mg/l

TOTAL METALS

| LOCATION | ALUMINUM | ANTIMONY | ARSENIC | BARIUM | BERYLLIUM | CADMIUM | CALCIUM | CHROMIUM | COBALT | COPPER | IRON | LEAD | MAGNESIUM | MANGANESE | MERCURY | NICKEL | POTASSIUM | SELENIUM | SILVER | SODIUM | THALLIUM | VANADIUM | ZINC | CYANI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SWANSON | .09 | .04 | U | .02 | U | U | 4.27 | U | U | .05 | .15 | .006 | 2.18 | 006 | U | U | .57 | U | .005 | 6.78 | U | U | .692 | U |
| BEGY | .03 | U | U | .03 | U | U | 4.68 | U | U | .11 | .17 | .005 | 2.24 | .007 | U | U | .72 | U | U | 12.9 | U | U | .19 | U |
| APPUZO | .03 | .04 | U | .04 | U | U | 2.39 | U | U | .17 | (.46) | .006 | 1.74 | .03 | U | U | .74 | U | U | 14.7 | .002 | U | .25 | U |
| BRADLEY | .06 | U | U | .04 | U | U | 2.57 | U | U | .06 | .20 | .01 | 1.27 | .02 | U | U | .43 | U | .01 | 5.55 | U | U | .384 | U |
| KIRK | U | U | U | .03 | U | U | 2.43 | U | U | .03 | .17 | .007 | 1.37 | .005 | U | U | .40 | U | .005 | 5.43 | U | U | .04 | U |
| MITSUTA | .03 | U | U | .16 | U | U | 10.6 | U | 008 | .01 | (14.7) | .008 | 4.82 | (1.18) | U | U | 5.08 | U | U | 10.5 | U | U | .21 | U |
| FINNERTY | .04 | U | U | .03 | U | .005 | 3.07 | U | U | .04 | .30 | .004 | 1.64 | .02 | U | U | .64 | U | U | 10.4 | U | U | .369 | U |
| ZORKO | U | U | U | .03 | U | U | 3.54 | U | U | .14 | (.63) | .008 | 1.64 | .02 | U | .02 | .62 | U | U | 8.66 | U | U | .22 | U |
| REIGLER | .03 | U | U | .04 | U | U | 6.55 | U | U | .314 | (.537) | (.02) | 5.76 | .09 | U | U | .56 | U | U | 8.02 | U | U | .07 | U |
| LAVINO | .04 | U | U | .06 | U | .008 | 3.37 | U | U | .02 | .16 | (.02) | 1.74 | .02 | U | U | .59 | U | U | 6.36 | U | U | (7.01) | U |
| ALUSKEWICZ | .03 | U | U | .05 | U | U | 3.49 | U | U | .10 | (.37) | .01 | 1.75 | .02 | U | U | .57 | U | U | 8.83 | U | U | .06 | U |
| CASSIDY | .02 | U | U | .04 | U | U | 2.01 | U | U | .18 | .12 | .006 | 2.31 | .01 | U | U | .70 | U | U | 8.32 | U | U | .095 | U |
| BEGO | .03 | U | U | .04 | U | U | 3.71 | U | U | .007 | .21 | .004 | 1.9 | .004 | U | U | .58 | U | .02 | 6.95 | U | U | .08 | U |
| CASTLE* | .04 | .03 | U | .04 | U | U | 6.61 | U | U | .241 | (7.98) | .005 | 5.77 | .12 | U | U | .55 | U | U | 7.87 | U | U | .09 | U |
| NYS SANITARY CODE DRINKING WATER SUPPLY (1) | NA | NA | 0.05 | 1.0 | NA | 0.01 | NA | 0.05 | NA | 1.0 | (2) 0.3 | 0.05 | NA | (2) 0.3 | 0.002 | NA | NA | 0.01 | 0.05 | NA | NA | NA | 5.0 | NA |
| FEDERAL DRINKING WATER STANDARDS (3) | NA | NA | 0.05 | 2.0 | NA | .005 | NA | 0.10 | NA | 1.0 | 0.3 | 005/ 0015 ** | NA | 0.5 | 0.002 | NA | NA | 0.01 | 0.10 | NA | NA | NA | 5.0 | NA |

U = UNDETECTED
NA = NOT APPLICABLE
* = BLIND DUPLICATE
** = USEPA CLEANUP LEVEL FOR LEAD IS 15 PPB

(1) NYS MAXIMUM CONTAMINANT LEVELS CHAPTER I OF THE NYS SANITARY CODE, PARTS, SUBPART 5-1 (FEB. 1992)

(2) IF IRON AND MANGANESE ARE PRESENT TOTAL CONCENTRATION OF BOTH SHOULD NOT EXCEED 0.5 mg/l

(3) USEPA DRINKING WATER STANDARDS MAXIMUM CONTAMINANT LEVELS (MCL) 40 CFR 141 (FEB. 1992)

[illegible] WELLS.WK1

TABLE 5 CONT'D

# RESIDENTIAL WELL SURVEY SEPTEMBER 1991

| | INORGANICS | | | | | | ORGANICS | |
|---|---|---|---|---|---|---|---|---|
| LOCATION | CHLORIDE mg/l | AMMONIA mg/l | NITRITE mg/l | NITRATE mg/l | TOTAL PHENOLS µg/l | TOTAL DISSOLVED SOLIDS mg/l | CHLOROFORM µg/l | ACETONE µg/l |
| SWANSON | 12 | < 0.02 | < 0.1 | < 0.01 | < 1 | 62 | | |
| BEGY | 20 | 0.81 | < 0.1 | 1.3 | < 1 | 70 | | |
| APPUZO | 18 | 0.02 | < 0.1 | 0.5 | < 1 | 63 | | |
| BRADLEY | 7 | < 0.02 | < 0.1 | < 0.1 | < 1 | 40 | | |
| KIRK | 8 | < 0.02 | < 0.1 | < 0.1 | < 1 | 35 | 2 | |
| MITSUTA | 11 | 0.87 | < 0.1 | 0.7 | < 1 | 127 | | |
| FINNERTY | 19 | < 0.02 | < 0.1 | < 0.1 | < 1 | 56 | | 8 |
| ZORKO | 11 | < 0.02 | < 0.1 | 0.1 | < 1 | 40 | 1 | |
| REIGLER | 11 | < 0.02 | < 0.1 | 1.2 | < 1 | 82 | | |
| LAVINO | 8 | < 0.02 | < 0.1 | 0.4 | < 1 | 50 | | |
| ALUSKEWICZ | 8 | < 0.02 | < 0.1 | < 0.1 | < 1 | 36 | 1 | |
| CASSIDY | 12 | < 0.02 | < 0.1 | 0.3 | < 1 | 40 | | |
| BEGG | 10 | < 0.02 | < 0.1 | 0.9 | < 1 | 50 | | |
| CASTLE* | 8 | < 0.02 | < 0.1 | 1.4 | < 1 | 80 | | |
| PART 5 NYS SANITARY CODE-DRINKING WATER SUPPLY (1) | 250 | NA | NA | 10 | NA | NA | 5 | 5 |
| FEDERAL DRINKING WATER STANDARDS (2) | 250 | NA | NA | 10 | NA | 500 | 5 | 5 |

* = BLIND DUPLICATE

(1) NYS MAXIMUM CONTAMINANT LEVELS CHAPTER 1 OF THE NYS SANITARY CODE, PART 5, SUBPART 5-1 (FEB. 1992)

(2) USEPA DRINKING WATER STANDARDS MAXIMUM CONTAMINANT LEVELS (MCL) 40 CFR 141 (FEB. 1992)

## TABLE 6

## BASELINE EMISSIONS ESTIMATES

| CONTAMINANT | MAXIMUM SOIL GAS CONCENTRATION ($\mu g/cm^3$) | DIFFUSIVITY IN AIR ($cm^2/day$) | VOLATILIZATION FLUX ($\mu g/cm^2$-day) | TOTAL EMISSIONS (kg/day) |
|---|---|---|---|---|
| Toluene | 0.0049 | 7517 | 9.72E-02 | 5.83E-02 |
| Methoxy Butene Isomer | 0.0046 | 6912 | 8.39E-02 | 5.04E-02 |
| Ethylbenzene | 0.0039 | 6480 | 6.67E-02 | 4.00E-02 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | 0.003 | 7171 | 5.68E-02 | 3.41E-02 |
| 1,2-Dichlorobenzene | 0.0023 | 5962 | 3.62E-02 | 2.17E-02 |
| Methyl Cyclohexane | 0.0016 | 6912 | 2.92E-02 | 1.75E-02 |
| Chlorobenzene | 0.0012 | 6307 | 2.00E-02 | 1.20E-02 |
| Chlorodifluoromethane | 0.00085 | 7171 | 1.61E-02 | 9.66E-03 |
| Dichlorodifluoromethane | 0.00065 | 7171 | 1.23E-02 | 7.38E-03 |
| Benzene | 0.00055 | 8052 | 1.17E-02 | 7.01E-03 |
| 1,1,1-Trichloroethane | 0.00041 | 6739 | 7.29E-03 | 4.38E-03 |
| 2-Butene | 0.0002 | 6912 | 3.65E-03 | 2.19E-03 |
| 2,2,3,4-Tetramethylpentane | 0.00016 | 6912 | 2.92E-03 | 1.75E-03 |
| Trichlorofluoromethane | 0.00015 | 7517 | 2.98E-03 | 1.79E-03 |
| Alkyl Alkane | 0.00011 | 6912 | 2.01E-03 | 1.20E-03 |
| 1,2-Dichoroethane | 0.0001 | 7836 | 2.07E-03 | 1.24E-03 |
| Acetone | 0.000083 | 10714 | 2.35E-03 | 1.41E-03 |
| Chloroethane | 0.000049 | 7171 | 9.28E-04 | 5.57E-04 |
| 1,2-Dichloroethene | 0.000049 | 7171 | 9.28E-04 | 5.57E-04 |
| Vinyl Chloride | 0.000038 | 9331 | 9.36E-04 | 5.62E-04 |
| Chloroform | 0.000031 | 7672 | 6.28E-04 | 3.77E-04 |
| 1,1-Dichloroethene | 0.000024 | 7171 | 4.54E-04 | 2.73E-04 |
| Trichloroethene | 0.000007 | 6826 | 1.26E-04 | 7.57E-05 |
| Tetrachloroethene | 0.000005 | 6221 | 8.21E-05 | 4.93E-05 |

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# TABLE 7

## AMBIENT AIR IMPACTS

| CONTAMINANT | HOURLY EMISSIONS (LBS/HR) | ANNUAL EMISSIONS (LBS/YR) | ACTUAL ANNUAL IMPACT ($\mu g/m^3$) | MAXIMUM POTENTIAL ANNUAL IMPACT ($\mu g/m^3$) | MAXIMUM SHORT-TERM IMPACT ($\mu g/m^3$) | SHORT-TERM AMBIENT GUIDELINE CONCENTRATION (SGC) ($\mu g/m^3$) | LONG-TERM AMBIENT GUIDELINE CONCENTRATION (AGC) ($\mu g/m^3$) | COMPLIANCE STATUS |
|---|---|---|---|---|---|---|---|---|
| oluene | 5.37E-03 | 4.64E+01 | 1.06E-02 | 1.08E-02 | 1.08E+00 | 89,000 | 2,000 | In Compliance |
| ethoxy Butene Isomer | 4.64E-03 | 4.01E+01 | 9.20E-03 | 9.36E-03 | 9.36E-01 | NA | 0.1* | In Compliance |
| thylbenzene | 3.68E-03 | 3.18E+01 | 7.30E-03 | 7.43E-03 | 7.43E-01 | 103,333 | 1,033 | In Compliance |
| ,2-Dichloro-1,1,2,2-tetrafluoroethane | 3.14E-03 | 2.71E+01 | 6.23E-03 | 6.33E-03 | 6.33E-01 | 1,664,286 | 16,643 | In Compliance |
| ,2-Dichlorobenzene | 2.00E-03 | 1.73E+01 | 3.96E-03 | 4.03E-03 | 4.03E-01 | 30,000 | 200 | In Compliance |
| ethyl Cyclohexane | 1.61E-03 | 1.39E+01 | 3.20E-03 | 3.25E-03 | 3.25E-01 | 380,000 | 3,800 | In Compliance |
| hlorobenzene | 1.11E-03 | 9.55E+00 | 2.19E-03 | 2.23E-03 | 2.23E-01 | 11,000 | 20 | In Compliance |
| hlorodifluoromethane | 8.90E-04 | 7.69E+00 | 1.76E-03 | 1.79E-03 | 1.79E-01 | 9,524 | 95 | In Compliance |
| ichlorodifluoromethane | 6.80E-04 | 5.87E+00 | 1.35E-03 | 1.37E-03 | 1.37E-01 | 1,178,571 | 11,786 | In Compliance |
| enzene | 6.46E-04 | 5.58E+00 | 1.28E-03 | 1.30E-03 | 1.30E-01 | 30 | 0.12 | In Compliance |
| ,1,1-Trichloroethane | 4.03E-04 | 3.48E+00 | 8.00E-04 | 8.13E-04 | 8.13E-02 | 450,000 | 1,000 | In Compliance |
| -Butene | 2.02E-04 | 1.74E+00 | 4.00E-04 | 4.07E-04 | 4.07E-02 | NA | 0.1* | In Compliance |
| richlorofluoromethane | 1.65E-04 | 1.42E+00 | 3.27E-04 | 3.32E-04 | 3.32E-02 | 560,000 | 700 | In Compliance |
| ,2,3,4-Tetramethylpentane | 1.61E-04 | 1.39E+00 | 3.20E-04 | 3.25E-04 | 3.25E-02 | NA | 0.1* | In Compliance |
| lkyl Alkane | 1.11E-04 | 9.55E-01 | 2.19E-04 | 2.23E-04 | 2.23E-02 | NA | 0.1* | In Compliance |
| ,2-Dichoroethane | 1.14E-04 | 9.87E-01 | 2.26E-04 | 2.30E-04 | 2.30E-02 | 950 | 0.039 | In Compliance |
| cetone | 1.30E-04 | 1.12E+00 | 2.57E-04 | 2.62E-04 | 2.62E-02 | 140,000 | 14,000 | In Compliance |
| hloroethane | 5.13E-05 | 4.43E-01 | 1.02E-04 | 1.03E-04 | 1.03E-02 | NA | 0.1* | In Compliance |
| ,2-Dichloroethene | 5.13E-05 | 4.43E-01 | 1.02E-04 | 1.03E-04 | 1.03E-02 | 190,000 | 1,900 | In Compliance |
| Vinyl Chloride | 5.18E-05 | 4.47E-01 | 1.03E-04 | 1.04E-04 | 1.04E-02 | 1,300 | 0.02 | In Compliance |
| hloroform | 3.47E-05 | 3.00E-01 | 6.88E-05 | 7.00E-05 | 7.00E-03 | 980 | 23 | In Compliance |
| ,1-Dichloroethene | 2.51E-05 | 2.17E-01 | 4.98E-05 | 5.07E-05 | 5.07E-03 | 4,762 | 48 | In Compliance |
| richloroethene | 6.97E-06 | 6.02E-02 | 1.38E-05 | 1.41E-05 | 1.41E-03 | 33,000 | 0.45 | In Compliance |
| etrachloroethene | 4.54E-06 | 3.92E-02 | 9.00E-06 | 9.16E-06 | 9.16E-04 | 81,000 | 0.075 | In Compliance |

* DeMinimis concentration substituted as no guideline concentration is available for this compound.

# TABLE 8

## SURFACE WATER CONCENTRATIONS NEAR

## SOUTHEAST REGION OF FISH COVE

| DATE | STATION | $Cl^{-}$* | $NH_4$* | Fe | Mn | $HPO_4$* |
|---|---|---|---|---|---|---|
| 5/23/89 | 1 | 6 | 3.56 | 0.675 | 1.73 | 0.003 |
| | 2 | 6 | 5.49 | 0.714 | 3.13 | 0.006 |
| | 3 | 20 | 0.922 | 0.109 | 0.781 | 0.005 |
| | 4 | 24 | 0.441 | 0.069 | 0.34 | 0.007 |
| | 5 | 24 | 0.419 | 0.061 | 0.33 | 0.005 |
| | 6 | 26 | 0.189 | 0.057 | 0.23 | <0.002 |
| | 7 | 26 | 0.508 | 0.093 | 0.33 | 0.005 |
| | 8 | 24 | 1.25 | 0.303 | 0.583 | 0.002 |
| | 9 | 26 | 0.091 | 0.046 | 0.18 | 0.003 |
| | 10 | 28 | 0.10 | 0.059 | 0.21 | 0.002 |
| | 11 | 26 | 0.32 | 0.055 | 0.27 | 0.003 |
| | 12 | 28 | 0.174 | 0.054 | 0.25 | 0.004 |
| | 13 | 28 | 0.173 | 0.046 | 0.22 | <0.002 |
| | 14 | 26 | 0.093 | 0.055 | 0.18 | 0.002 |
| | 15 | 24 | 0.086 | 0.005 | 0.15 | 0.002 |
| | 16 | 26 | 0.07 | 0.041 | 0.16 | 0.003 |
| | 17 | 28 | 0.059 | 0.041 | 0.15 | <0.002 |
| | 18 | 28 | 0.029 | 0.044 | 0.16 | 0.003 |
| | 19 | 28 | 0.024 | 0.048 | 0.16 | 0.006 |
| | 20 | 26 | 0.043 | 0.05 | 0.15 | 0.004 |
| | 21 | 30 | 0.017 | 0.052 | 0.14 | 0.003 |
| | 22 | 26 | 0.034 | 0.096 | 0.18 | 0.002 |
| 6/8/89 | A | 26 | 0.491 | 0.121 | 0.307 | -- |
| | B | 26 | 1.87 | 0.522 | 0.627 | -- |
| | C | 20 | 8.89 | 1.21 | 2.22 | -- |
| 6/15/89 | "Beach" | 0.4 | 0.509 | 0.083 | 0.699 | -- |
| | D | 24 | 0.088 | 0.028 | 0.338 | -- |
| | E | 24 | 0.051 | 0.028 | 0.219 | -- |
| State SA[1] | | NA | NA | NA | NA | NA |
| State B[1] | | NA | 0.015** | 0.30 | NA | NA |
| Federal[2] | | NA | NA | NA | NA | NA |

* Concentrations in 1,000 mg/L; all other results in mg/L

** Based on pH of 7.25 and temperature of 20 degrees C.

(1) 6 NYCRR Part 700-705 - New York State Department of Environmental Conservation, September 1, 1991.

(2) USEPA Criterion Maximum Concentration for Saltwater, November 1991.

H2MGROUP

# TABLE 9

## PARAMETERS QUANTIFIED IN FISH COVE SURFACE WATER (UG/L)

| | LOCATION | | | | BACKGROUND | | STANDARDS | |
|---|---|---|---|---|---|---|---|---|
| PARAMETER | SW-1 | SW-2 | SW-3 | SW-4 | SW-5 | SW-6 | NYSDEC CLASS SA (1) | FEDERAL (2) |
| ACETONE | ND | 27 | 26 | 26 | ND | 33 | NA | NA |
| BERYLLIUM | 3.0B | 3.0B | 4.0B | 4.0B | 4.0B | 5.0 | NA | NA |
| CADMIUM | ND | ND | ND | ND | ND | 7.0 | 7.7 | 43 |
| CHROMIUM | ND | 13.0 | 44.0 | 17.0 | ND | ND | 54* | NA |
| COPPER | 7.0B | 15.0B | 8.0B | 8.0B | 10.0B | 5.0B | 2.9 | 2.9 |
| IRON | 978E | 1490E | 968E | 499E | 338E | 617E | NA | NA |
| MANGANESE | 976E | 557E | 90.0E | 129E | 109E | 156E | NA | NA |
| SELENIUM | 12.0 | ND | ND | ND | ND | ND | NA | 300 |
| SILVER | 10.0 | 10.0 | ND | ND | ND | ND | NA | 2.3 |
| ZINC | 18.0B | 17.0B | 20.0 | 21.0 | 26.0 | 22.0 | 58 | 95 |

ND Indicates "Not Detected"
(1) 6 NYCRR Parts 700-705, NYSDEC, September 1, 1991
(2) Saltwater Criterion Maximum Concentation
* Class SA standard for hexavalent chromium
E The reported value is estimated because of the presence of interference
B Entered if the reported value is less than the Contract Required Detection Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL)

TABLE 10

PARAMETERS QUANTIFIED IN FISH COVE SEDIMENTS

| Parameter | Location SD-1 | SD-2 | SD-3 | SD-4 | Background SD-5 | SD-6 |
|---|---|---|---|---|---|---|
| (in µg/kg): | | | | | | |
| Methylene Chloride | 2J | ND | ND | ND | ND | ND |
| Acetone | 130J | 180J | 93J | ND | ND | 170J |
| Chloroform | 1J | ND | ND | ND | ND | ND |
| 1,1,1-TCA | 69 | 43 | 33 | ND | ND | 39 |
| TCE | ND | ND | ND | ND | ND | ND |
| (in mg/kg): | | | | | | |
| Arsenic | ND | .40BN | .36BN | 1.1N | .33BN | ND |
| Cadmium | ND | ND | 1.6 | 1.4 | ND | ND |
| Chromium | 3.5 | ND | 2.7 | 4.9N | ND | 2.2B |
| Copper | 3.8B | 1.0B | 2.4B | 3.3BN | 2.9B | 1.5B |
| Iron | 1400 | 3600 | 1800 | 3100 | 1700 | 1000 |
| Lead | 1.6 | 1.7 | 1.8 | 4.9 | 1.9 | 1.8 |
| Manganese | 61.0 | 24.0 | 22.0 | 17.0 | 200 | 200 |
| Nickel | ND | 29.0 | ND | ND | ND | ND |
| Thallium | .76B*N | 1.4B*N | .53B*WN | .66B*WN | .50BN* | 6.6BN* |
| Zinc | 8.6 | 4.4 | 9.1 | 13.5N* | 4.0 | 3.1B |
| Phenols | ND | ND | ND | ND | .581 | ND |

ND indicates "Not Detected"

TABLE 1-1

CONTAMINANT CONCENTRATION TO FISH COVE
THROUGH GROUND WATER SEEPAGE FROM NORTH SEA LANDFILL
(DETERMINED BY SOCEM)

| CONTAMINANT | Wells near Fish Cove (ug/L) |
|---|---|
| AMMONIA | 1722.251 |
| ANTIMONY | 5.775 |
| ARSENIC | 1.817 |
| BARIUM | 26.589 |
| BERYLLIUM | 0.430 |
| CADMIUM | 1.366 |
| CHROMIUM III | 38.816 |
| CHROMIUM VI | 6.469 |
| MANGANESE | 158.183 |
| NICKEL | 23.608 |
| VANADIUM | 3.932 |
| ZINC | 33.296 |

TABLE 12

CRITICAL TOXICITY VALUES FOR ORAL ROUTE

| CHEMICAL | RfD * (mg/kg-day) | RfDs ** (mg/kg-day) | SF*** 1/(mg/kg-day) | Weight of Evidence Classification |
|---|---|---|---|---|
| Ammonia(NC) | 9.71E-01 (4) | NA | NA | NA |
| Antimony(NC) | 4.00E-04 (3) | 4.00E-04 (2) | NA | NA |
| Arsenic (NC) | 3.00E-04 (3) | 1.00E-03 (2) | NA | NA |
| Arsenic (C) | NA | NA | 1.75E+00 (1) | A |
| Barium(NC) | 7.00E-02 (3) | 5.00E-02 (2) | NA | NA |
| Beryllium (NC) | 5.00E-03 (3) | 5.00E-03 (2) | NA | NA |
| Beryllium (C) | NA | NA | 4.30E+00 (3) | B2 |
| Cadmium(NC) | 5.00E-04 (3) | NA | NA | NA |
| Chromium III(NC) | 1.00E+00 (2) | 1.00E+01 (2) | NA | NA |
| Chromium VI(NC) | 5.00E-03 (3) | 2.00E-02 (2) | NA | NA |
| Chromium VI(C) | NA | NA | NA | NA |
| Manganese (NC) | 1.00E-01 (3) | 1.00E-01 (2) | NA | NA |
| Nickel (NC) | 2.00E-02 (3) | 2.00E-02 (2) | NA | NA |
| Vanadium(NC) | 7.00E-03 (2) | 7.00E-03 (2) | NA | NA |
| Zinc (NC) | 2.00E-01 (2) | 2.00E-01 (2) | NA | D |

(C) - Carcinogen
(NC) - Noncarcinogen

NA - Not Analyzed, Not Applicable, or Not Available
* Reference Dose/Reference Concentration
** RfDs = subchronic reference dose used for exposure periods less than seven years.
*** Oral Carcinogenic Slope Factor
(1) Value derived from a unit risk of 5.0E-05 ug/L proposed in HEAST FY1991.
(2) Values obtained from HEAST FY1991.
(3) Values obtained from IRIS on April 17, 1992.
(4) Derived from 34 mg/l for organoleptic threshold in HEAST FY1991.
A - Sufficient evidence of human carcinogenicity.
B2 - Sufficient evidence of carcinogenicity in animals with inadequate evidence in humans.
D - Not classifiable as to human carcinogenicity (inadequate or no evidence).

## Table 13
## Summary of Site Cancer Risks and Noncancer Health Effects

| Noncarcinogenic | Adult | Children |
|---|---|---|
| Ground-water Ingestion | 8.30E-01 | 1.29E+00* |
| Surface Water | | |
| Fish Ingestion | 1.08E-02 | 2.42E-02 |
| Incidental Ingestion | 3.91E-05 | 6.13E-04 |
| Dermal Absorption | 1.19E-05 | 9.52E-05 |
| Total: | 8.41E-01 | 1.31E+00* |

| Carcinogenic | | |
|---|---|---|
| Ground-water Ingestion | 5.90E-05 | 2.20E-05 |
| Surface Water | | |
| Fish Ingestion | 1.82E-06 | 1.70E-06 |
| Incidental Ingestion | 5.73E-09 | 3.21E-08 |
| Dermal Absorption | 1.75E-09 | 4.99E-09 |
| Total: | 6.08E-05 | 2.37E-05 |

*Above the threshold level of one

**STATE OF NEW YORK - DEPARTMENT OF HEALTH**

**INTEROFFICE MEMORANDUM**

**TO:** Joseph Crua
Bureau of Environmental Exposure Investigation

**FROM:** Donald H. Brown
Bureau of Toxic Substance Assessment

**SUBJECT:** Metals in Clams from Fish Cove

**DATE:** September 1, 1992

I have reviewed the data on metals in nine composites of Mercenaria mercenaria collected from Fish Cove; these data are summarized in Table 1.

I compared the results to NYS DEC data on metals in M. mercenaria collected from New York waters during 1982 to 1991. Although some of these data are from clams collected from areas closed to recreational, as well as commercial clamming, they appear to be fairly representative of typical levels of metals from New York waters. The mean level for six of the eight metals in Fish Cove clams is at or below the mean level in the DEC database. The mean cadmium level in clams from Fish Cove is about 40% higher and the mean arsenic level is roughly twice as high. In general, however, results are within range of the DEC data. An assessment of the risks to consumers posed by heavy metals in bivalves from New York's marine waters does not indicate that these levels would be expected to generate doses above levels of concern for clam consumers. This is based on a dose calculated for a 70 Kg individual consuming 20 g clams per day (approximately 1/2 dozen per week) and comparing that dose to a risk reference dose (RfD) reported in the literature (ATSDR, 1988-1991; DOH, 1988). The ratio of dose to RfD (hazard index) is well below 1 for the six elements for which an RfD can be used; these are shown in Table 2.

This approach cannot be used for lead since no RfD exists for lead and no discernable threshold has been observed for health effects of lead ingestion (ATSDR, 1988). The common unit of body burden measurement is blood-lead (PbB), expressed as micrograms per deciliter (ug/dL). The mean PbB level for adults in the United States is estimated to be between 10.8 and 17.7 ug/dL (US EPA, 1989). A means of predicting an increase in PbB due to dietary intake for adults is provided in the following equation (US EPA, 1989):

$$\Delta \text{ PbB} = (0.032 \text{ day/dL}) * (\text{ug/day dietary intake}) \qquad (1)$$

Clinical data have shown this relationship to be valid for daily intakes of less than 200 ug lead. Using a mean of 0.11 ug/g (Table 1), a daily intake is determined as follows: 0.11 ug/g * 20 g/day = 2.2 ug/day. Using this in Equation (1) gives an estimated increase in PbB:

$$\Delta \text{ PbB} = ((0.032 \text{ day/dL}) * 2.2 \text{ ug/day}) = 0.07 \text{ ug/dL}$$

This indicates that consumption of M. mercenaria from these waters is not expected to significantly increase an individual's blood-lead level.

The oral reference dose for arsenic is for inorganic arsenic. Research has shown that the chemical forms of arsenic found in clams and other marine life are unusual and complex organic molecules (ATSDR, 1992; US EPA, 1984). These organic arsenicals are considered relatively nontoxic and are substantially less toxic than the inorganic forms of arsenic that have

caused toxic effects in humans and animals. They are mainly derivatives of arsenobetaine and arsenocholine and are extensively absorbed, but are resistent to metabolism and are rapidly excreted intact. Therefore, its toxicity is greatly reduced compared to inorganic arsenic (Foa et al., 1984; ATSDR, 1987). Consequently, the risks of ingesting arsenic in M. mercenaria are not considered to be substantial.

In conclusion, clam samples from Fish Cove contain levels of metals generally within range of those collected from other waters and do not appear to present any significant increased health risk to consumers.

References

Agency for Toxic Substances and Disease Registry (ATSDR). Toxicological Profile for Arsenic 1991; Cadmium, 1989; Lead, 1988; Mercury, 1988; Copper, 1990; Chromium, 1989; Nickel, 1988; Zinc, 1989. Oak Ridge National Laboratory, Oak Ridge, TN.

NYS DOH, 1988. Ambient Water Quality Human Health Fact Sheets on Mercury. BTSA, NYS DOH, Albany, New York.

Foa, V., A. Columbi, M. Maroni, M. Buratti and G. Calzaferri. 1984. Speciation of the Chemical Forms of Arsenic in the Biological Monitoring of Exposure to Inorganic Arsenic. Science Total Environ., 34: 241-259.

U.S. Environmental Protection Agency (US EPA). 1989. Review of the National Ambient Air Quality Standards for Lead: Exposure Analysis Methodology and Validation. EPA-450/2-89=011.

U.S. Environmental Protection Agency (US EPA). 1984. Health Assessment Document for Inorganic Arsenic. EPA-600/8-83-021F. Washington, D.C.: Office of Health and Environmental Assessment.

djv/22370231

Attachment

cc: Dr. Horn
Mr. Chinery

## Table 1
## Metals in Clams, North Sea Landfill

| Sample ID | Pb | Cd | As | Hg | Cr | Cu | Ni | Zn |
|---|---|---|---|---|---|---|---|---|
| 9096 | 0.1* | 0.14 | 1.38 | 0.006 | 0.2* | 1.36 | 0.2* | 9.24 |
| 9097 | 0.1* | 0.18 | 1.22 | 0.011 | 0.2* | 1.52 | 0.2* | 8.14 |
| 9098 | 0.1* | 0.22 | 2.18 | 0.021 | 0.2* | 2.10 | 0.4 | 8.38 |
| 9099 | 0.1* | 0.26 | 2.90 | 0.054 | 0.2* | 3.60 | 0.56 | 9.20 |
| 9100 | 0.1* | 0.28 | 0.74 | 0.086 | 0.2* | 4.06 | 0.2* | 13.3 |
| 9101 | 0.1* | 0.32 | 2.22 | 0.026 | 0.2* | 2.24 | 0.4 | 9.60 |
| 9102 | 0.15* | 0.55 | 1.85 | 0.021 | 0.25* | 2.02 | 0.53 | 10.1 |
| 9103 | 0.1* | 0.42 | 2.04 | 0.038 | 0.2* | 2.16 | 0.56 | 8.06 |
| 9104 | 0.15* | 0.25 | 2.03 | 0.018 | 0.5* | 2.03 | 0.5* | 8.20 |
| mean | 0.11 | 0.29 | 1.84 | 0.03 | 0.24 | 2.34 | 0.40 | 9.36 |
| DEC Database | | | | | | | | |
| Mean | 0.363 | 0.207 | 0.942 | 0.037 | 0.383 | 2.41 | 0.878 | 18.2 |
| n | 126 | 116 | 63 | 67 | 116 | 63 | 61 | 50 |
| min | 0.08 | 0.08 | 0.04 | 0.01 | 0.01 | 1.33 | 0.50 | 12.1 |
| max | 1.04 | 0.37 | 2.17 | 0.173 | 1.05 | 3.76 | 1.77 | 32.8 |

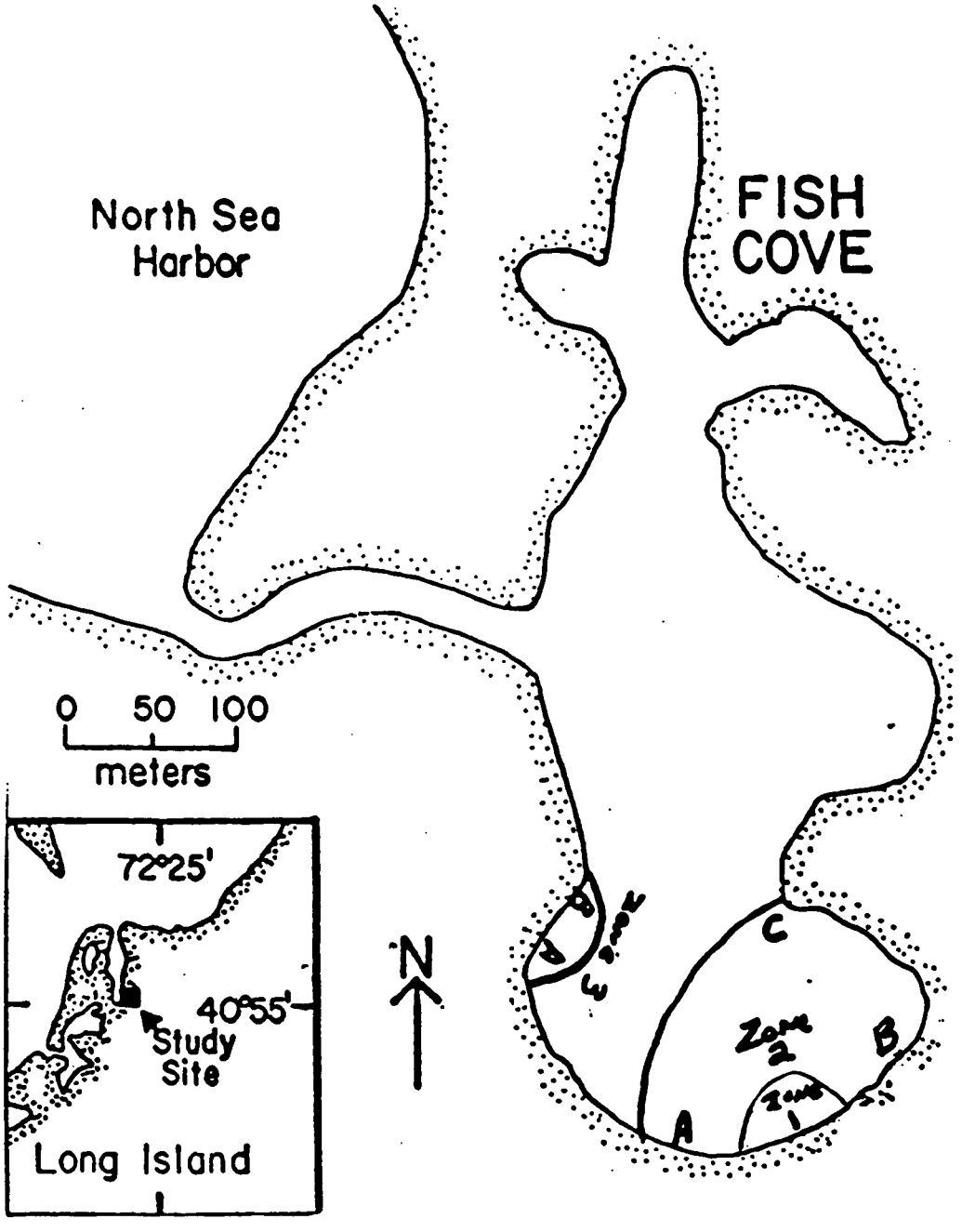
* - 1/2 detection limit

## Table 2
## Comparison of Dose to RfD

| Element | Mean (ppm) | Dose (mg/Kg/day) | Oral RfD | Hazard Index |
|---|---|---|---|---|
| Cadmium | 0.29 | 8.29E-5 | 6.9E-4 | 0.12 |
| Chromium III | 0.24 | 6.86E-5 | 1.0 | <0.01 |
| Mercury (organic) | 0.03 | 8.57E-6 | 9.0E-5 | 0.10 |
| Copper | 2.34 | 6.69E-4 | 3.7E-2* | 0.02 |
| Nickel | 0.40 | 1.14E-4 | 2.0E-2 | <0.01 |
| Zinc | 9.36 | 2.67E-3 | 2.0E-1 | 0.01 |

Dose is calculated for a 70 Kg individual consuming 20 g clams per day

* - surrogate RfD calculated from 1.3 mg/L drinking water standard




| Zone | No. of Clams Analyzed | Range of the Size of Clams in Millimeters | Sample Number |
|---|---|---|---|
| 1* | - | - | - |
| 2A-1 | 5 | 70 - 85 | 9096 |
| 2A-2 | 5 | 52.5 - 57.5 | 9097 |
| 2B | 2 | 65 and 70 | 9098 |
| 2C-1 | 5 | 72.5 - 90 | 9099 |
| 2C-2 | 5 | 52.5 - 65 | 9100 |
| 3A-1 | 5 | 52.5 - 60 | 9101 |
| 3A-2 | 5 | 45 - 47.5 | 9102 |
| 3B-1 | 5 | 55 - 67.5 | 9103 |
| 3B-2 | 5 | 45 - 50 | 9104 |

# APPENDIX IV

Carol McCabe #1619

Carol

**New York State Department of Environmental Conservation**
**50 Wolf Road, Albany, New York 12233-7010**

EPA-REGION II
REMEDIAL BRANCH
1992 SEP -1 AM 8 54

**Thomas C. Jorling**
**Commissioner**

SEP 2 1992

Ms. Kathleen Callahan
Director
Emergency & Remedial Response Division
U.S. Environmental Protection Agency
Region II
26 Federal Plaza
New York, NY 10278

Re: North Sea Landfill ID No. 152052 Operable Unit 2
Record of Decision

Dear Ms. Callahan:

The New York State Department of Environmental Conservation (NYSDEC) has reviewed the referenced document and finds the no action alternative to be acceptable.

If you have any questions regarding this matter, please contact Michael J. O'Toole, Jr., at (518) 457-5861.

Sincerely,

Ann DeBarbieri
Deputy Commissioner