Five-Year Review Report
North Sea Landfill Superfund Site
Southampton
Suffolk County, New York

Prepared by:

United States Environmental Protection Agency
Region 2
New York, New York

September 2008

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Executive Summary

The remedy for the North Sea Municipal Landfill site in Southampton, New York includes: the capping of contaminated soils on-site; methane recovery and gas migration control; air and groundwater monitoring; institutional controls; and no action for off-site groundwater. The remedy is fully in place. The site was deleted from the National Priorities List in September 2005. This five-year review found the remedy functioning as intended by the Records of Decision, and protective of human health and the environment.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (from WasteLAN): North Sea Landfill		
EPA ID (from WasteLAN): NYD980762520		
Region: 2	**State: NY**	**City/County**: Southampton , Suffolk

SITE STATUS	
NPL status: Final X Deleted ☐ Other (specify)	
Remediation status (choose all that apply): Under Construction Operating X Complete	
Multiple OUs? X YES NO	**Construction completion date**: 9/21/1994
Are portions of the Site and/or investigated adjacent properties in use or suitable for reuse? Has site been put into reuse? X YES NO ☐ N/A Site has three Closed cells but adjacent properties previously impacted are in use and the sludge lagoons are available for restricted use.	

REVIEW STATUS	
Lead agency: X EPA State ☐ Tribe ☐ Other Federal Agency	
Author name: Caroline Kwan	
Author title: Remedial Project Manager	**Author affiliation**: EPA
Review period: 09/20/2003 to 09/19/2008	
Date(s) of site inspection: June 16, 2008	
Type of review: ☐ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead X Statutory ☐ Regional Discretion	
Review number: ☐ 1 (first) ☐ 2 (second) 3X (third) ☐ Other (specify)	
Triggering action: ☐ Actual RA Onsite Construction at OU #____ ☐ Actual RA Start at OU#____ ☐ Construction Completion X Previous Five-Year Review Report ☐ Other (specify)	
Triggering action date (from WasteLAN): 09/30/2003	
Due date (five years after triggering action date): 09/30/2008	
Does the report include recommendation(s) and follow-up action(s)? yes X no **Is human exposure under control?** X yes ☐ no Is contaminated groundwater under control? X yes ☐ no ☐ not yet determined Is the remedy protective of the environment? X yes ☐ no ☐ not yet determined	

Five-Year Review Summary Form cont'd.
Issues, Recommendations and Follow-up Actions:
The selected remedy, described in two RODs, has been fully implemented. There are ongoing operation, maintenance and monitoring activities included as part of the selected remedy. As anticipated by the decision documents, these activities are subject to routine modification and adjustment. Section VI includes suggestions for improving, modifying and/or adjusting these activities. New York State requires annual certifications that institutional controls are in place and that remedy-related operation and maintenance (O&M) is being performed.
Protectiveness Statement:
The remedy for operable unit 1 (OU 1) protects human health and the environment. There are no exposure pathways that could result in unacceptable risks and none expected as long as the site use remains consistent with the engineering and institutional controls, and those controls are properly operated, maintained and monitored. The no action remedy for OU 2 is protective of human health and the environment since there are no unacceptable risks. Because OU1 and OU2 are protective, the site itself is considered protective of human health and the environment

I. Introduction

This is the third five-year review for the North Sea Landfill site, located in Southampton, Suffolk County, New York. This review was conducted by United States Environmental Protection Agency (EPA) Remedial Project Manager (RPM), Caroline Kwan. The five-year review was conducted pursuant to Section 121 (c) of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, 42 U.S.C. §9601 *et seq.* and 40 CFR 300.430(f)(4)(ii), and in accordance with the Comprehensive Five-Year Review Guidance, OSWER Directive 9355.7-03B-P (June 2001). The purpose of five-year reviews is to ensure that implemented remedies protect public health and the environment and that they function as intended by the decision documents. This document will become part of the site file.

The North Sea Landfill property includes three landfill cells and former sludge lagoons. Two of the landfill cells are being addressed under state regulatory programs. The Superfund site has two operable units (OUs). OU 1 covers one of the landfill cells, Cell No.1, the decommissioned sludge lagoons and on-site ground water. OU 2 covers off-site ground water and impacts to Fish Cove.

This is the third five-year review for the North Sea Landfill site. After completion of the OU 1 remedial action, contaminants remain on the site. This five-year review is being conducted as a statutory requirement. In accordance with the Section 1.3.3 of the five-year review guidance, a subsequent statutory five-year review is triggered by the signature date of the previous Five-Year Review report. The trigger for this subsequent five-year review is the date of the previous Five-Year Review report, September 30, 2003. The site was deleted from the National Priorities List (NPL) in September 2005. Five-year reviews are not required for OU 2; however, this review will consider the OU 2 no action remedy.

II Site Chronology

See Table 1 for the site chronology.

III. Background

Site Description

The North Sea Landfill, which is owned and operated by the Town of Southampton, was initially constructed in 1963 for the disposal of municipal solid waste, refuse and septic system waste. The landfill accepted waste from residential, industrial and commercial sources. Significant features of the 131-acre site include:

Landfill Cell No. 1 - an inactive, unlined landfill which has been capped and closed in accordance with 6 New York Conservation Rules and Regulations (NYCRR) Part 360.

Landfill Cell No. 2 - an inactive, lined landfill, with a leachate collection system which was capped and closed in 1990 in accordance with 6NYCRR Part 360.

Landfill Cell No. 3 - an inactive, lined landfill with a leachate collection system which was capped and closed in 2001 in accordance with 6NYCRR Part 360.

Sludge Lagoons - septic lagoons located at the south end of the property which were excavated and refilled to grade with sandy loam in 1986.

For the purposes of the Federal Superfund Program, Cell No. 1 and the sludge lagoons make up the Superfund site; continued monitoring of the ground water and benthic community at nearby Fish Cove are also being addressed under the Superfund program. Cells No. 2 and 3 are closed and monitored by the New York State Department of Environmental Conservation (NYSDEC).

In the late 1960's, a series of 14 scavenger lagoons, approximately 50 feet long, 10 feet deep, 25 feet wide and 50 feet above the water table, were constructed at the southern portion of the landfill property. The lagoons accepted septic system wastes from both commercial and residential sources. Sludge was allowed to drain and dry, and it was subsequently disposed of in Cell No.1. It is estimated that 11 million gallons of septic wastes were disposed into the lagoons. The lagoons were decommissioned in 1985 and most of their solid and liquid contents were removed. After this removal, an additional two feet of soil was excavated. The sludge lagoons were refilled to grade with sandy loam.

The landfill is located in the Township of Southampton, at the intersection of Majors Path and Old Fish Cove Road. The nearest point of surface water is Fish Cove, located approximately 1500 feet northwest of the landfill. Groundwater in this area ultimately discharges to Fish Cove, which is an arm of the Little Peconic Bay. The area between Fish Cove and the landfill is moderately populated.

Most of the homes obtained 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, had resulted in the closure of several drinking water wells. Public water supplies have been extended to serve residents of the area. Subsequent groundwater sampling conducted for OU 2 did not find a measurable plume of contaminated ground water off-site.

Geology/Hydrogeology

The North Sea Municipal Landfill is situated on the north side of the South Fork of Long Island. The area surrounding the landfill has considerable natural topographic relief; there is a natural difference of about 100 feet in elevation between the eastern boundary of the landfill property and the banks of Fish Cove. The top of the capped landfill Cell No.1 is about 157 feet above sea level.

The unconsolidated deposits in the study area, which total about 1,300 feet in thickness, are of Cretaceous and Quaternary Age and rest unconformably on Precambrian-Upper Paleozoic bedrock. The Upper Cretaceous deposits include, in ascending order: (1) the Raritan Formation consisting of the Lloyd sand member, which forms the Lloyd aquifer, and an overlying clay member; (2) the Magothy Formation-Matawan Group, undifferentiated, which forms the Magothy aquifer; 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 sediments of Quaternary age (Pleistocene and Holocene); the Pleistocene deposits consist mostly of glacially-derived sediments that form the Upper Glacial aquifer.

The two major fresh-water aquifers in the study area are the Magothy aquifer and the Upper Glacial aquifer. The elevation of the top of the Magothy aquifer ranges from about 150 to 180 feet below mean sea level and it is about 600 feet thick in the study area. The Magothy sediments consist of layers of sand, silty sand, clay, sandy clay and silty clay, and the aquifer contains fresh water beneath the site, but deeper parts of the aquifer may contain salt water.

The Upper Glacial aquifer contains fresh water in the study area and directly overlies the Magothy aquifer. It is estimated to be about 200 to 300 feet thick in the area of the landfill and is primarily composed of variably-sorted sands and gravels, with some silt and clay layers. The sediments were formed as part of the terminal moraine and glaciofluvial outwash that was deposited during the Pleistocene glaciation. The water table is present within the Upper Glacial aquifer and most nearby wells in the area are completed in this aquifer. The unsaturated soil zone (measured by the depth to the water table) on the landfill property ranges from about 40 to 100 ft below land surface.

Ground water is replenished primarily from infiltration of precipitation. The fresh-water recharge, which reaches the saturated sand and gravel of the Upper Glacial aquifer, continues to flow laterally at a rate of movement proportional to the slope of the water table and the permeability of the soils, and some also flows vertically down through the Upper Glacial aquifer to the Magothy aquifer. Shallow ground water beneath the landfill flows to the northwest and ultimately discharges to Fish Cove. A downward vertical hydraulic gradient exists in monitoring well clusters 1 and 3. A strong upward gradient exists in monitoring well cluster 4. Average water level elevations are approximately four feet higher in the deepest well (MW-4C) than in the other two wells of the cluster.

Surficial soils within and surrounding the landfill are classified as 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.

The North Sea Municipal Landfill is located in an oak-dominated forest, where oak trees are the principal 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, North Sea Harbor, Big Fresh Pond and Little Fresh Pond. The latter two are fresh surface waters.

Ground water in this area ultimately discharges to Fish Cove. Fish Cove is a body of saltwater with marshes connected via a tidal inlet to the North Sea Harbor, which flows into Peconic Bay. The low marshes within Fish Cove 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 total marsh area at Fish Cove includes both the intertidal and high marsh and is about 45,000 square feet combined.

Land and Resource Use

According to the 2000 Census, the North Sea hamlet has a year-round population of approximately 4,493 residents. This represents an increase in the year-round population since the 1990 Census of 1,955. Southampton's overall year-round population is 55,216. It is estimated that the population of the entire Town doubles during the peak summer season.

The site is located near the southern shore of Little Peconic Bay in an area with extensive ponds, coves, and wetlands. The Peconic Bay system is a major recreational resource in this region. The Town of Southampton has built a Recreation Center within the landfill property.

The Town filed a deed restriction with the County Clerk office in June 2003 to limit the future uses of the landfill property. The site is currently zoned for Open Space Conservation and Park District.

History of Contamination

A groundwater monitoring program, initiated by the Town in 1979, revealed a plume of contamination migrating from Cell No. 1 to Fish Cove. The plume contained lead, manganese and cadmium. A second plume was discovered originating from the sludge lagoons. The presence of nitrate/nitrite in this plume confirmed the presence of septics. In addition to the typical landfill leachate parameters and heavy metals noted, organics (i.e., dichloroethane, tetrachloroethene and trichloroethene) were also detected in the ground water.

Initial Response

The detection of contaminated ground water migrating northwest from the landfill resulted in the closure of several private domestic wells. Public water supplies were extended to serve residents in the affected areas. Based on the above, Cell No.1 and the sludge lagoons (which will be referred to as the site) were investigated and placed on the NPL in 1986. As a result of EPA's initial efforts to place the landfill on the NPL, Cell No.1 was closed by the Town in 1985. Cell closure consisted of the following: capping the top flat portion of the landfill (approximately eight acres in area) with a 20-mil polyvinyl chloride (PVC) membrane to minimize infiltration, installation of a silty sand protective layer (approximately two feet thick) above the membrane and, placement of a topsoil cover to support vegetation. The Town also installed a storm water diversion/collection system to improve area drainage. The system, installed along the haul road, included: manholes (which were utilized for inlet collection), interconnecting piping and a recharge basin to which all runoff was routed.

Basis for Taking Action

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

Groundwater is replenished primary from recharge via precipitation and lateral underground flow of fresh water into the upper glacial aquifer. Most of the homes in the Southampton area obtain their drinking water from private domestic wells tapping the upper glacier aquifer.

IV. Remedial Objectives

Remedy Selection

A remedial investigation (RI) and feasibility study (FS) led to the first Record of Decision (ROD) for the site. In the first ROD, it was decided that a second OU for off-site ground and surface waters was appropriate. The OU 1 RI was initiated in August 1987. Following the completion of the RI/FS, EPA issued a ROD on September 29, 1989. In August 1990, the Town entered into a Consent Decree with EPA covering the remedial design and construction of the OU I remedy. The ROD selected:

(i) Covering Cell No.1 with a low-permeability cap while undertaking action consistent with New York State Part 360, sanitary landfill closure requirements.

(ii) No action at the former sludge lagoons with confirmatory sampling.

(iii) Installation of a six-foot high chain link fence around the site to restrict access.

(iv) Deed restrictions on future use of the landfill.

(v) Long-term operation and maintenance to provide inspection and repairs to the landfill cap.

(vi) Long-term air and water quality monitoring of both the former sludge lagoons and Cell No. 1. Parameters to be monitored included EPA's and NYSDEC's Target Compound List (TCL).

The OU 2 RI was initiated in June 1989. That RI did not find significant site-related contamination in the off-site ground and surface waters. In addition, there were no appreciable environmental impacts from the site to Fish Cove, a body of saltwater with marshes. The OU 2 risk assessment indicated that off-site groundwater contamination did not pose a threat to human health or the environment. Therefore, EPA issued a No Action ROD for OU 2 in September 1992.

V. Remedial Actions

OU I Remedy Implementation

Remedial Design (RD) included capping and the closure of Cell No.1, and conducting a confirmatory sludge/soil sampling program at the former sludge lagoons area.

Malcolm Pirnie, Inc. was retained by the Town to design the capping and closure of landfill Cell No. 1. A pre-design cap investigation was conducted in 1990. The resulting Cap Investigation Report was submitted to EPA and NYSDEC for review/approval in 1990. Based on the report findings, NYSDEC permitted landfill closure utilizing the existing 20-mil PVC liner located on

the plateau area of the cell. A Remedial Design Work Plan (RDWP) was submitted for review to EPA in April 1991 and was approved in July 1991. Since access to the 130-acre landfill is limited due to the wooded area surrounding the landfill, EPA granted a variance to the Town which allowed the perimeter landfill fence to be eliminated. Instead, the fence was installed at the perimeter of the recharge basin.

The H2M Group was retained by the Town to prepare the workplan for Confirmatory Sludge/Soil Sampling Program for the sludge lagoons. A Work/Quality Assurance Plan Short Form was prepared and submitted to EPA for approval in September 1991. Both plans were approved in November 1991.

RD Capping and Closure Cell No. 1

The RDWP identifies the final capping and closure requirements which are based upon existing site conditions. Final design details include: structural regrading, final cover composition and placement requirements, stability analysis, cover vegetation, storm water management, erosion control requirements, and a gas venting system.

The capping of Cell No.1 includes regrading and capping of the side slopes with a geomembrane. Approximately 0.5 acre on the east side slope required capping with a concrete revetment since the slopes are steeper than 33 percent. The structural regrading of Cell No. 1 included demolition of two concrete drainage manholes and regrading of the area to promote overland flow of storm water to the existing recharge basin.

EPA and NYSDEC approved the final RD in September 1992.

Confirmatory Soil/Sludge Sampling Program

The Confirmatory Sludge/Soil Sampling Program was performed by Malcolm Pirnie, Inc. during January 1992. The program (developed by the H2M Group) required installation of soil borings and implementation of a Sludge/Soil Sampling Program in the former sludge lagoons. The sampling included drilling borings (a minimum of one and a maximum of three) in each of the ten sludge lagoons which had not been sampled during the RI/FS. Data from this study was used to confirm the absence of hazardous waste and/or substances which could pose a health or environmental threat. All data collected was validated using full Contract Laboratory Program (CLP) analytical and quality assurance and quality control (QA/QC) procedures. The confirmatory sludge/soil sampling results were used to confirm the "no action" alternative for the Sludge Lagoon remediation.

EPA approved the final report in September 1992.

The Town awarded the Remedial Action (RA) construction contract to Tully Construction, and the construction engineering contract to Dvirka and Bartilucci in April 1993.

Work began in June 1993 and was completed in August 1994. Construction completion was determined by EPA in September 1994, and the Remedial Action documentation was approved by EPA in September 1995.

Benthic Survey

Benthic surveys were performed at Fish Cove in 1989 and September 2001 The first survey was performed in 1989 as part of the RI for OU 2 and did not find any significant environmental impacts from site contamination. This second survey was required as part of the operations and maintenance procedures for the post-closure care of the Cell No. 1 cap at the landfill. The purpose of the September 2001 Fish Cove benthic survey was to:

- Evaluate the effectiveness of the source control measures implemented at the landfill, namely the capping of Cell No. 1, and
- Assess the potential toxicity of leachate-impacted groundwater entering Fish Cove on the surface waters and sediments.

When compared to previous surveys, an improvement in the surface water quality was observed in 2001. Data indicate that an impacted zone is no longer present; locations previously defined as transition are at background levels.

Institutional Controls

Institutional controls have been put in place at the site. EPA has been provided with a copy of restrictive covenants placed on the real property at the site by the Town, filed with the local land records office on June 11, 2003. The restrictions require, "Owner shall not suffer or allow any development or other use of the property that would create an unacceptably high risk to human health or the environment relating directly to the conditions that led to the issuance of the September 1989 ROD, without first obtaining the express written consent of EPA and the concurrence of the New York State Department of Environmental Conservation." This item completes the institutional controls requirement of the ROD.

Currently, the residential properties downgradient of the site as well as other nearby properties are connected to a public water supply. The public supply is required to meet appropriate state and federal drinking water standards. The recommendation that deed and well restrictions prevent the installation of drinking water wells in impacted areas has been addressed by the Suffolk County Department of Health Services, Private Water Systems Standards. In addition, NYSDEC Part 602 requires well permits for any private well with a total capacity of over 45 gallons per minute. These institutional controls and the monitoring of off-landfill ground water provide an extra protection above federal requirements under CERCLA.

System Operations/Operation and Maintenance

Groundwater monitoring of the leachate plume and the nearby Fish Cove have been conducted quarterly by P.W. Grosser Consulting, Inc. and its subcontractors until December 2004. Since 2005, groundwater monitoring has been switched to a semi-annual basis. The groundwater data indicate an improvement in the groundwater quality since Cell 1's closure and the subsequent completion of the landfill cap.

Monitoring of the perimeter methane gas monitoring wells is performed on a monthly basis by the Southampton Fire Marshall. An analysis of the data is included in the P.W. Grosser's quarterly reports submitted to EPA and NYSDEC. In June 2007, the Town installed a passive venting system in the landfill.

The landfill cap is scheduled for a physical inspection a minimum of twice yearly. Informal visual inspections of the entire landfill site are conducted monthly. These inspections determine when landscape maintenance work is needed, such as clearing vegetation from the swales, removing overgrown planting that may affect the cap, and maintaining access roads and paths. Cell No.1 is included in an overall vector control system in place for the entire North Sea Landfill property. Controls are in place for ticks, mosquitoes and rodents.

VI. Progress Since the Last Five-Year Review

During the past five-year reporting period, the monitoring and maintenance of the North Sea Landfill's Cell No.1 progressed concurrently with monitoring and maintenance performed at Cells No. 2 and 3.

Groundwater monitoring of the leachate plume and conditions in nearby Fish Cove had been conducted quarterly by P.W. Grosser Consulting Engineers and Hydrogeologist (PWGC), and its subcontractors, until 2005 when NYSDEC reduced the sampling and monitoring to a semi-annual frequency. Groundwater monitoring was performed on a semi-annual basis for the remainder of the reporting period.

Cell No.1 is included in an overall vector control system in place for the entire North Sea Landfill site. Controls are in place for ticks, mosquitoes and rodents.

During the first half of 2007, several groundwater monitoring wells, no longer required as part of the monitoring program, were abandoned. Monitoring well MW-6AR was installed to replace MW-6A, which was damaged beyond repair. In addition, protective casings were repaired, caps and locks were replaced, and all wells (gas and groundwater monitoring wells) were painted and labeled. In June 2007, the Town implemented a passive venting system at the landfill.

PWGC conducted sediment samples at five locations in Fish Cove in July 2004. This was the fourth study performed for Fish Cove since 1989, and based upon the results of the survey, it appears that the remedy performed for Cell No.1 was effective in reducing the flow of contaminants into Fish Cove. Since the results of each investigation continue to show improvement, no further studies are warranted.

From the First Semi-Annual Post-Closure Monitoring and Maintenance Operation Report, dated August 21, 2008, PWGC recommends that the Town calibrate the flow meter on the storage tank discharge and perform a pump test to determine the accuracy of the flow meters on the primary and secondary leachate collection system. An Allowable Leakage Rate Corrective Action Plan has been submitted to NYSDEC for review and should be implemented during the second half of 2008.

VII. Five-Year Review Process

Administrative Components

The five-year review team consisted of Caroline Kwan (RPM), Michael Scorca (Hydrogeologist), Amanda Gallagher (Hydrogeologist) and Julie McPherson (Risk Assessor) of EPA, and Alex Moskie (RPM) of NYSDEC.

Community Involvement

The EPA Community Involvement Coordinator (CIC) for the North Sea Landfill site, Cecilia Echols, published a notice in The Southampton Press on July 24, 2008, notifying the community of the initiation of the five-year review process. The notice indicated that EPA would be conducting a five-year review of the remedy for the site to ensure that the implemented remedy remains protective of public health and is functioning as designed. It was also indicated that once the five-year review is completed, the results will be made available in the local site repositories. In addition, the notice included the RPM's and the CIC's addresses and telephone numbers for questions related to the five-year review process for the North Sea Landfill site. A similar notice will be sent when the review is completed. There were no comments received from the public or from stakeholders during this review.

Data Review

Reduction-oxidation (redox) conditions of a landfill leachate plume usually differ from the surrounding aquifer. When organic matter and other reduced compounds are leached from a landfill, a chemically-reducing environment develops beneath and downgradient of the landfill. The sequential use of electron receptors during the degradation of the reduced material results in the development of a redox gradient within the plume along the main groundwater flow direction. On the outskirts of the plume, redox conditions will approach the redox conditions of the actual aquifer.

In order to evaluate the extent of the plume and the quality of ground water in the aquifer for the five-year review, groundwater trends from four well clusters were evaluated. The following redox sensitive parameters from groundwater samples were considered in the review process: dissolved oxygen, redox potential (measured as Eh), iron, manganese, ammonia, nitrate, sulfate, total organic carbon, and alkalinity (measured as the concentration of bicarbonate).

A tendency toward a more oxidizing (less reducing) environment will result from a decreasing volume of leachate entering the ground water beneath the landfill cell and can be identified by an increase in Eh corresponding with a decrease in dissolved iron, dissolved manganese, ammonia, and total organic carbon concentrations. Under oxidizing conditions, dissolved iron and manganese precipitate as iron and manganese oxides and are adsorbed onto sediment particles. Ammonia, sulfide, and total organic carbon will be converted to their less reduced forms: nitrate, sulfate, and carbonate, respectively.

Specific conductance, which is an indicator of the amount of dissolved solids in groundwater, and the trace metal arsenic were also considered in the review. Decreasing values of these parameters generally indicates improving conditions in the aquifer. In addition, chloride was analyzed because it is only attenuated by dilution and, therefore, is considered a conservative tracer.

Monitoring Well Cluster 1

Monitoring well cluster 1 (MW-1A, MW-1B and MW-1C) is located upgradient of Cell No. 3 and has been considered to reflect background conditions at the site during previous investigations and reviews. Geochemical conditions in the two deeper wells (MW-1B and MW-1C) have been stable and continue to reflect background water-quality conditions. However, the review of the data in 2003 suggests that ground water in shallow well MW-1A has been influenced by the leachate plume. Specific conductivity, chloride, sulfate, iron, and total organic carbon levels are up to three times higher in this well than the other two wells of the cluster, and are of similar magnitude as groundwater from wells sampled within the leachate plume at the downgradient clusters. During the last five years, water quality conditions at well MW-1A have been improving as evidence by: 1) a decrease in arsenic and ammonia levels to non-detect, 2) low dissolved iron concentration, and 3) an overall increase in Eh values.

Monitoring Well Cluster 12

Monitoring well cluster 12 (MW-12A and MW-12B) is located on the north-west side of Cell No.1, immediately adjacent to the landfill. MW-12A is screened at the top of the water table from 60 – 80 feet below grade (fbg) and MW-12B is screened within the contaminant plume from 92 – 102 fbg.

Groundwater quality conditions are generally improving in both wells at monitoring well cluster 12. Specific conductivity has shown an overall decreasing trend in MW-12A and MW-12B, although levels have increased in MW-12A since 2005.

Several trends are indicative of increased oxidizing conditions, including increasing redox potential in both wells of the cluster, and decreasing ammonia and dissolved iron concentrations in both wells of the cluster. Manganese levels are stable in MW-12A and have decreased substantially in MW-12B. Total organic carbon and alkalinity concentrations are stable in both wells of the cluster.

Arsenic concentrations in MW-12A fluctuate seasonally from below to slightly above the maximum contaminant level (MCL, 10 µg/L); only one sample at well MW-12B had arsenic concentrations above the detection limit since 2000.

Monitoring Well Cluster 3

Monitoring well cluster 3 (MW-3A, MW-3B and MW-3C) is located on the west side of Cell No.1, near Majors Path, and is approximately 600 feet downgradient of the landfill. MW-3A is screened above the contaminant plume from 40 – 60 fbg;MW-3B is screened within the contaminant plume from 90 – 110 fbg; and MW-3C is screened beneath the contaminant plume from 159 – 179 fbg.

Groundwater quality has declined in MW-3A. Iron levels are stable, but above New York State Groundwater Quality Standards (NYS GWQS). Specific conductance, alkalinity, and total organic carbon have increased, while Eh has decreased. Chloride levels are significantly higher in this well than the other wells of the cluster and are above background conditions for Long Island.

Groundwater conditions in MW-3B, which is within the groundwater plume, are stable to improving. Although, historically MW-3B has had the highest specific conductance, it has continued to show an overall decreasing trend. (Most recently specific conductance in MW-3A has risen.) Ammonia levels have also decreased. Eh levels have increased in this well overall, but have been fluctuating throughout this review period. Arsenic concentrations have also decreased over time, although they have increased during the review period. Total organic carbon, alkalinity, and sulfate levels are stable. Dissolved iron concentrations have decreased, but are higher than the other two wells of the cluster.

Conditions in MW-3C are stable to improving and still indicate little to no effect from the plume. Iron, Eh, chloride, and alkalinity levels are stable. Arsenic, ammonia, and sulfate levels are non-detect, and total organic carbon levels have decreased.

Monitoring Well Cluster 4

Monitoring well cluster 4 (MW-4A, MW-4B and MW-4C) is located on the north side of Fish Cove Road, adjacent to Fish Cove. Cluster 4 is the furthest downgradient well cluster from Cell No.1 (approximately 2000 feet downgradient) and is near the discharge zone of the groundwater. MW-4A is screened above the contaminant plume, from 10 – 30 fbg; intermediate well MW-4B is screened within the contaminant plume, from 58 – 78 fbg; and deep well MW-4C is screened below the contaminant plume, from 130 – 150 fbg.

MW-4A has stable to improving groundwater conditions as demonstrated by stable iron, Eh, chloride, alkalinity, and sulfate levels, non-detectable ammonia levels and decreased manganese concentrations. Currently, Eh levels in MW-4A are well above MW-4B and MW-4C.

Water quality conditions in MW-4B, screened within the downgradient plume, are improving. Iron, total organic carbon, alkalinity, ammonia, chloride, and conductivity levels have decreased. Eh, manganese, and sulfate levels are stable. Alkalinity concentrations are higher in MW-4B than in the other wells of the cluster, but the levels have been decreasing.

Overall, water quality conditions in MW-4C generally are stable as indicated by stable levels of iron, Eh, and alkalinity and non-detectable concentrations of ammonia, total organic carbon, and sulfate. An increased specific conductance at this well could be attributed to an increase in chloride concentrations, but its immediate cause is not known.

Site Inspection

A site inspection was conducted on June16, 2008. The following parties were in attendance:

Caroline Kwan, EPA, Region 2 RPM
Julie McPherson, EPA, Region 2 Risk Assessor
Amanda Gallagher, EPA, Region 2 Hydrogeologist
Paul Grosser, P.W. Grosser Consulting, Inc.
Paul DiMaria, Town of Southampton
Alex Moskie, New York State Department of Environmental Conservation

The purpose of the site inspection was to gather information about the current status of the site and to visually confirm and document the conditions of the remedy, the site, and the surrounding area. Interviews were also conducted as a component of the site inspection. Individuals who were interviewed included the Environmental Facilities Manager from the Town of Southampton and the President of P.W. Grosser Consulting, Inc., consultant to the Town.

Institutional Controls Verifications and Effectiveness

Institutional controls have been put in place at the site. EPA has been provided with a copy of restrictive covenants placed on the real property at the site by the Town, filed with the local land records office on June 11, 2003. The restrictions require, "Owner shall not suffer or allow any development or other use of the Property that would create an unacceptably high risk to human health or the environment relating directly to the conditions that led to the issuance of the September 1989 ROD, without first obtaining the express written consent of EPA and the concurrence of the New York State Department of Environmental Conservation." This item completes the institutional controls requirement of the ROD. This restriction does not cover on-site groundwater contamination. The remedial action objectives for on-site ground water are drinking water and state groundwater standards. While it may take some time to reach these objectives, it is believed that the current property restriction and access controls provide sufficient protection against exposures during the period of on-site groundwater remediation. OU 2 found there to be no significant risks to public health without institutional controls and that conclusion remains valid.

VIII. Technical Assessment

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

The 1989 ROD identified six components of the remedy: 1) Covering Cell No.1 with a low permeability cap while undertaking action consistent with 6NYCRR Part 360, sanitary landfill closure requirements; 2) No further action at the former sludge lagoons with confirmatory sampling; 3) Installation of a six-foot high chain link fence around the site to restrict access; 3) Deed restrictions on future use of the landfill; 5) Long-term operation and maintenance to provide inspection and repairs to the landfill cap; and 6) Long-term air and water quality monitoring of both the former sludge lagoons and Cell No.1. Parameters to be monitored included EPA's and NYSDEC's Target Compound List. All components of the remedy have been implemented. Implementation of deed restrictions on the future land use, installation of a fence around the recharge basin and well restrictions downgradient from the landfill have interrupted the exposure to any site-related contamination. All residents downgradient of the site

are connected to the public water supply. Groundwater use is not expected to change in this area within the next five years, the period of time considered in this review. Therefore, the remedy is functioning as intended by the decision documents.

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

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. The landfill cap and previous activities to provide potable water supplies to residents have interrupted the exposure pathways to both current/future on-site workers and residents. This assessment addresses the contaminants in Cell No.1 only since the remaining cells and associated groundwater wells are being addressed by NYSDEC.

The land use considerations, exposure assumptions, and potential exposure pathways considered in the baseline human health risk assessment for this pathway are still valid.

The toxicity values used to calculate the non-cancer health hazards and cancer risks have changed. Some chemical-specific toxicity values have increased and some new toxicity values were developed for other contaminants since the site was originally assessed. In order to account for changes in toxicity values since the baseline human health risk assessment was performed, the site groundwater maximum detected concentrations during the sampling period from 2004-2008, identified in the Quarterly and Semi-Annual Groundwater Monitoring Reports (P.W. Grosser), were compared to residential groundwater Preliminary Remediation Goals (i.e., MCLs). This analysis indicates that arsenic, manganese and iron continue to exceed their respective MCLs in several wells downgradient of Cell No.1. In 2004, Fish Cove was sampled and based on the results, it was determined that it has not been impacted by site-related constituents.

Groundwater use is not expected to change in the next five years. Currently, the residential properties within the potential down-gradient plume area and some properties outside the down gradient plume area are connected to the public water supply. The public water supply meets the appropriate state and federal drinking water standards and current local requirements prevent the installation of drinking water wells in impacted areas. These requirements are carried out in part by compliance with Suffolk County Department of Health Services, Private Water Systems Standards. In addition, NYSDEC's Part 602, Applications for Long Island wells, states that all new private wells with total property capacity over 45 gallons per minute are required to obtain a well permit. Residences down-gradient of the North Sea Landfill site are supplied with public water, and there are no longer any known private water supplies near the site that are currently being used for drinking. Therefore, the remedy is protective for these receptors since routes of exposure have been interrupted.

Soil vapor intrusion pathway was assessed as part of the 2003 Five-Year review. It was determined that this pathway is not expected to be of concern at the site.

The land use of the landfill and surrounding property has changed since the last five-year review. As mentioned previously, the Town of Southampton built a recreational center on the property adjacent to the landfill. In addition, a recycling facility is located on a portion of the property. The Town has built a fence separating the landfill and recycling facility from the recreational facility; thereby preventing potential trespassing onto the landfill. In addition, the landfill has

been capped with a 20-mil polyvinyl chloride membrane to minimize infiltration into the mound, covered with a silty sand layer two feet thick on top of the geomembrane, and covered with a layer of top soil (one foot thick) to prevent soil erosion and maintain vegetative growth, thereby preventing direct exposure (i.e., ingestion or dermal contact of soil) to potential receptors.

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

Recent data collected from several monitoring wells suggest that the concentrations of iron and manganese have increased in 2008. It has been suggested that the increase in concentrations in the downgradient wells may be attributable the leachate systems of Cells No. 2 and 3 and/or the recharge basin. Although the concentrations of iron and manganese have increased in 2008, all residents are connected to the municipal water supply line. There is no new information that calls into question the protectiveness of the remedy.

IX. Recommendations and Follow-Up Actions

The site has ongoing activities including operation, maintenance and monitoring of the OU 1 remedy. As anticipated by the decision documents, these activities are subject to routine modification and adjustment. Section VI includes suggestions for improving, modifying and/or adjusting these activities. These suggestions are consistent with the selected remedy and do not appear to impact the short-term or long-term protectiveness of the site.

X. Protectiveness Statement

The remedy for OU 1 protects human health and the environment. There are no exposure pathways that could result in unacceptable risks and none expected as long as the site use remains consistent with the engineering and institutional controls, and those controls are properly operated, maintained and monitored. The no action remedy for OU 2 is protective of human health and the environment since there are no unacceptable risks. Because OU1 and OU2 are protective, the site itself is considered protective of human health and the environment.

XI. Next Review

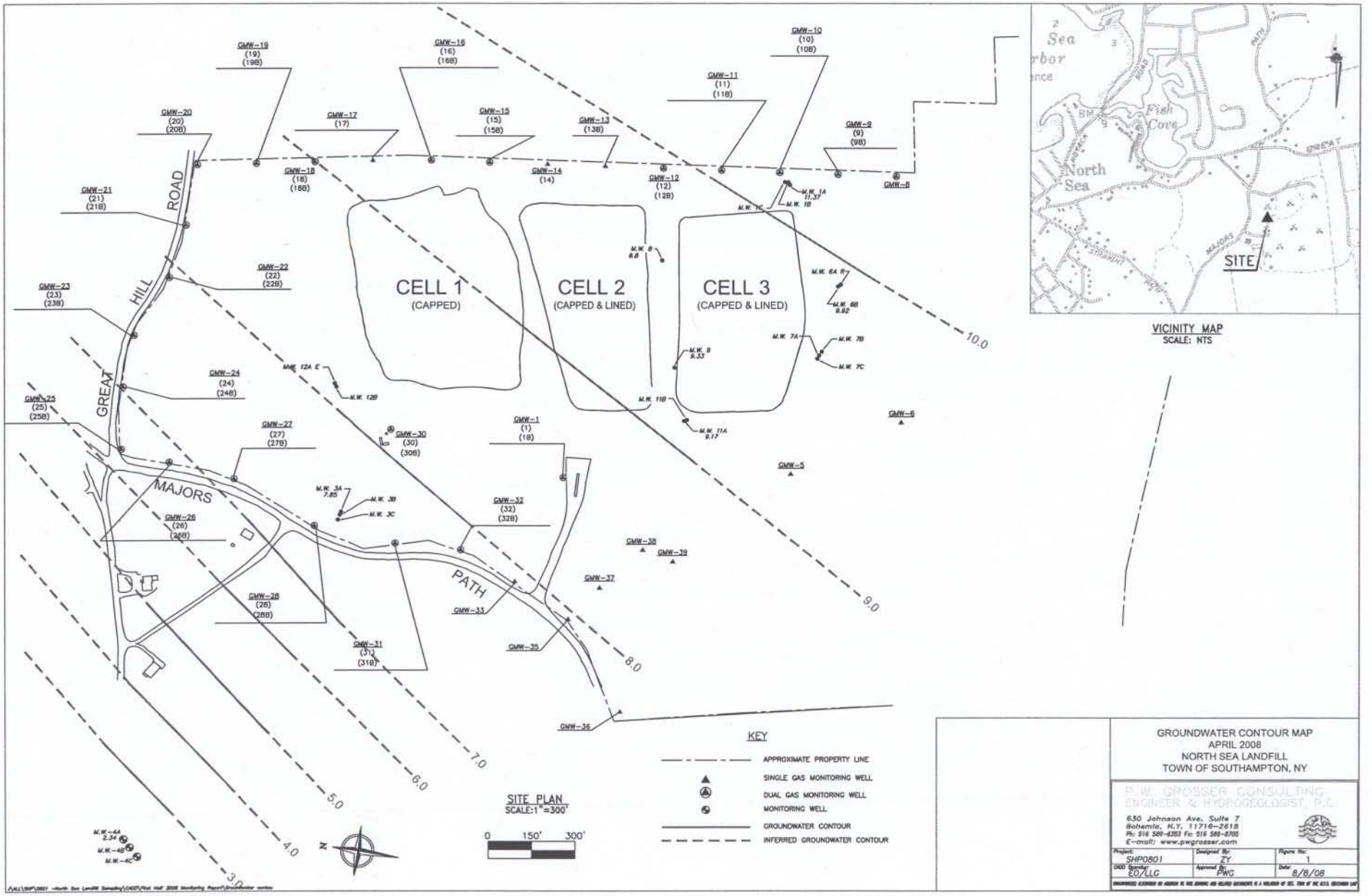
The next five-year review for the North Sea Landfill site should be completed before September 2013.

Approved:

John S. Fusco — 9/23/08

for George Pavlou, Acting Director — Date
Emergency and Remedial Response Division

FIGURE I


CELL 1
(CAPPED)
CELL 2
(CAPPED & LINED)
CELL 3
(CAPPED & LINED)
GREAT HILL ROAD
MAJORS PATH
GMW-1 (1) (1B)
GMW-5
GMW-6
GMW-8
GMW-9 (9) (9B)
GMW-10 (10) (10B)
GMW-11 (11) (11B)
GMW-12 (12) (12B)
GMW-13 (13B)
GMW-14 (14)
GMW-15 (15) (15B)
GMW-16 (16) (16B)
GMW-17 (17)
GMW-18 (18) (18B)
GMW-19 (19) (19B)
GMW-20 (20) (20B)
GMW-21 (21) (21B)
GMW-22 (22) (22B)
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GMW-24 (24) (24B)
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GMW-26 (26) (26B)
GMW-27 (27) (27B)
GMW-28 (26) (28B)
GMW-30 (30) (30B)
GMW-31 (31) (31B)
GMW-32 (32) (32B)
GMW-33
GMW-35
GMW-36
GMW-37
GMW-38
GMW-39
M.W. 1A 11.37
M.W. 1B
M.W. 1C
M.W. 6A R
M.W. 6B 9.92
M.W. 7A
M.W. 7B
M.W. 7C
M.W. 8 9.8
M.W. 9 9.33
M.W. 11A 9.17
M.W. 11B
M.W. 12A E
M.W. 12B
M.W. 3A 7.85
M.W. 3B
M.W. 3C
M.W.-4A 2.34
M.W.-4B
M.W.-4C
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
KEY
APPROXIMATE PROPERTY LINE
SINGLE GAS MONITORING WELL
DUAL GAS MONITORING WELL
MONITORING WELL
GROUNDWATER CONTOUR
INFERRED GROUNDWATER CONTOUR
SITE PLAN
SCALE:1"=300'
0 150' 300'
N
Sea
Fish Cove
North Sea
SITE
VICINITY MAP
SCALE: NTS
GROUNDWATER CONTOUR MAP
APRIL 2008
NORTH SEA LANDFILL
TOWN OF SOUTHAMPTON, NY
P.W. GROSSER CONSULTING
ENGINEER & HYDROGEOLOGIST, P.C.
630 Johnson Ave. Suite 7
Bohemia, N.Y. 11716-2618
Ph: 516 589-6353 Fx: 516 589-8705
E-mail: www.pwgrosser.com
Project: SHP0801
Designed By: ZY
Figure No: 1
CADD Operator: EO/LLG
Approved By: PWG
Date: 8/8/08

Table 1 : Chronology of Site Events

Event	Date
Site placed on National Priorities List	1986
Administrative Consent order No. II CERCLA-issued by EPA to Town of Southampton to conduct RI/FS	March 1987
Operable Unit 1 Record of Decision signed by EPA	September 1989
Consent Decree CV-90-3309 to perform the OU 1 ROD entered with the Eastern District Court	February 1991
Operable Unit 2 ROD signed by EPA	September 1992
Notice of Contract Award issued to Tully Construction by the Town of Southampton	April 1993
Mobilization and start of construction activities	May 1993
Pre-final inspection conducted by EPA, NYSDEC and all contractors	January 1994
Final Operation and Maintenance Plan submitted by Dvirka and Bartilucci	September 1995
Final As-Built Drawings submitted by Dvirka and Bartilucci	June 1995
Remedial Action Report	September 1995
Benthic Survey Investigation performed	April 1997
First Five-Year Review Report signed by EPA	September 1998
Groundwater monitoring sampling performed	December 1998 to Present
Quarterly Groundwater Monitoring Report submitted by PWGC (Town Contractor)	March 1999 to August 2005
Monthly gas monitoring performed	January 2002 to present
Second Five-Year Review Inspection / meeting with Town officers	July 2003
Second Five-Year Review Report signed by EPA	September 2003
Site Deleted from the National Priorities List	December 2005
Semi-Annual Monitoring Report submitted by PWGC	February 2006 to present
Monitoring Well Abandonments & Replacement at the Site	December 2006 to January 2007
Implementation of Passive Venting System	June 2007

Table 2 : Documents Reviewed

Author	Date	Title/Description
H2M Group	July 1989	Public Health Evaluation for the North Sea Landfill
EPA	September 1989 and September	Record of Decision for Operable Unit 1 and 2, North Sea Landfill
EPA	February 2001	Consent Decree for OU 1
Dvirka and Bartilucci Consulting Engineers	September 1995	Operation and Maintenance Manual for the Post Closure Care of the North Sea Landfill, Cell No.1 Cap
EPA	September 1998	Five-Year Review Report for the North Sea Landfill
EPA	September 2003	Second Five-Year Review Report for the North Sea Landfill
P.W Grosser Consulting, Inc	December 2003	Quarterly Monitoring Report, Third Quarter 2003, North Sea Landfill, Southampton, NY
P.W Grosser Consulting, Inc	January 2004	Quarterly Monitoring report, Forth Quarter 2003, North Sea Landfill, Southampton, NY
P.W Grosser Consulting, Inc	April 2004	Quarterly Monitoring Report, First Quarter 2004, North Sea Landfill, Southampton, NY
P.W Grosser Consulting, Inc	July 2004	Quarterly Monitoring Report, Second Quarter 2004, North Sea Landfill, Southampton, NY
P.W Grosser Consulting, Inc	November 2004	Quarterly Monitoring Report, Third Quarter 2004, North Sea Landfill, Southampton, NY
P.W Grosser Consulting, Inc	February 2006	Second Half of Post-Closure Monitoring Report, Year 2005, North Sea Landfill, Southampton, NY
P.W Grosser Consulting, Inc	September 2006	First Half of Post-Closure Monitoring Report, Year 2006 North Sea Landfill, Southampton, NY

P.W Grosser Consulting, Inc	May 2007	Second Half of Post-Closure Monitoring Report, Year 2006, North Sea Landfill, Southampton, NY
P.W Grosser Consulting, Inc	January 2008	First Semi-Annual Post Closure Monitoring & Maintenance Operation Report, 2007, North Sea Landfill, Southampton, NY
EPA	July 2005	Superfund Final Close-Out Report for the North Sea Landfill, Southampton, NY
P.W Grosser Consulting, Inc	November 2004	Fish Cove Benthic Survey Report Addendum, Southampton, NY
Cosper Environmental Services, Inc.	February 2005	Fish Cove Benthic Survey Report Addendum, Southampton, NY- Addendum to the Final

Table 3 - Acronyms Used in this Document	
ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
EPA	United States Environmental Protection Agency
CIC	Community Involvement Coordinator
MCL	Maximum Contaminant Level
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Protection
PRGs	Preliminary Remediation Goals
RA	Remedial Action
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
VOCs	Volatile Organic Compounds

INORGANIC GROUNDWATER MONITORING RESULTS
TABLE 4A
North Sea Landfill Superfund Site
Town of Southampton
Suffolk County, New York
EPA ID: NYD980762520

Well ID	Date	Fe mg/L	Mn mg/L	Nitrate mg/L	Ammonia mg/L	TOC mg/L	Alkalinity mg/L	Hardness mg/L	SO4 mg/L	Cl- mg/L	Ca mg/L	Al mg/L	Pb mg/L	Mg mg/L	As mg/L	Hg mg/L	Phenols mg/L	TVS mg/L	BOD5 mg/L
NYSDEC GWQS		0.3	0.3	10	2	-	-	-	250	250	-	-	0.025	35*	0.025	0.0007	0.001	-	-
MW-1A	Apr-03	0.57	0.034	NM	0.19	3.9	230	220	23	13	54	0.11	<0.005	NM	<0.005	<0.001	<0.001	100	60
	Jul-03	3.6	0.97	NM	<0.05	30	230	220	24	10	56	0.69	0.007	19	<0.005	<0.001	0.006	87	9.2
	Oct-03	1.1	0.36	NM	0.13	1.8	160	130	22	11	33	0.15	<0.005	12	0.011	<0.001	<0.001	62	<2
	Apr-04	0.34	0.2	NM	<0.05	8	150	130	21	11	30	0.06	<0.005	NM	<0.005	<0.001	<0.001	64	<2
	Jul-04	0.36	0.19	NM	<0.02	8.3	210	210	26	17	52	0.06	<0.005	19	<0.005	<0.001	0.008	45	<2
	Oct-04	2.9	3	NM	<0.05	14	140	160	21	19	39	0.48	0.008	15	<0.005	<0.001	0.002	55	<2
	Apr-05	2.4	2	1.6	<0.05	10	190	230	38	47	57	0.78	0.006	NM	0.006	<0.00025	<0.001	340	10
	Oct-05	0.47	0.28	NM	<0.05	6.5	140	170	24	24	42	0.18	<0.005	16	<0.005	<0.00025	<0.001	72	2.1
	Apr-06	1.2	0.9	1.9	<0.05	10	240	250	34	26	61	0.35	<0.005	NM	<0.005	<0.00025	<0.001	50	<2
	Oct-06	0.54	0.15	NM	<0.05	9.5	270	290	26	21	72	0.13	<0.005	27	<0.005	<0.00025	<0.001	79	<2
	Apr-07	2.4	0.15	2.5	<0.05	7.6	220	230	27	24	56	0.51	0.007	NM	<0.005	<0.00025	<0.001	58	<2
	Oct-07	0.333	0.053	5.93	<0.10	5.9	150	160	10.5	27.7	39.7	NM	0.0021	16.2	NM	NM	<0.005	NM	<2
	Apr-08	0.12	0.0365	3.91	<0.1	4.7	73.8	128	33.4	28.3	27.3	0.027B	<0.005	13.3	<0.0029	<0.0001	<0.005	NM	11
MW-1B	Apr-03	0.52	0.01	NM	0.13	<1	20	19	7	10	13	0.09	0.01	NM	<0.005	<0.001	<0.001	44	7.6
	Jul-03	0.48	0.01	NM	<0.05	5	26	38	6	8	12	0.08	0.013	1.8	<0.005	<0.001	0.008	74	4.03
	Oct-03	0.39	0.02	NM	<0.05	3.7	20	20	5	7	5.1	0.07	0.01	1.8	0.01	<0.001	0.001	<10	<2
	Apr-04	0.21	<0.01	NM	<0.05	0	12	80	9	9	2.5	0.04	0.006	NM	<0.005	<0.001	<0.001	<10	<2
	Jul-04	0.24	<0.01	NM	<0.02	3	20	17	9	9	4.7	0.07	0.013	1.3	<0.005	<0.001	0.015	<10	3.4
	Oct-04	0.21	<0.01	NM	<0.05	1.7	12	12	8	11	3.5	0.04	0.005	1.5	0.01	<0.001	0.016	<10	<2
	Apr-05	0.42	0.01	<0.5	<0.05	2.5	14	16	9	10	4.3	0.08	0.012	NM	<0.005	<0.00025	<0.001	55	3.4
	Oct-05	0.71	0.02	NM	<0.05	0	18	19	8	13	5.1	0.14	0.021	1.5	<0.005	<0.00025	0.002	35	2.1
	Apr-06	0.35	0.02	<0.5	<0.05	3.3	18	15	8	6	3.6	0.06	0.008	NM	<0.005	<0.00025	0.02	<10	<2
	Oct-06	0.42	0.01	NM	<0.05	2.7	34	18	8	7	4.9	0.07	0.012	1.4	<0.005	<0.00025	0.001	120	4.1
	Apr-07	0.36	0.02	<0.5	<0.05	1.2	16	19	<5	8	5.4	0.07	0.01	NM	0.007	<0.00025	<0.001	40	<2
	Oct-07	0.189	0.0054B	<0.1	<0.10	<1.0	7.6	10	8	9.9	3.14	NM	0.0022	1.74B	NM	NM	<0.005	NM	<2
	Apr-08	0.15	0.0037B	<0.1	<0.1	<1.0	26	<0.1	9.14	9.8	3.33B	0.0571B	<0.0023	1.86B	<0.0029	<0.0001	<0.005	NM	13
MW-1C	Apr-03	0.51	0.07	NM	0.06	<1	24	19	5	7	12	0.05	<0.005	NM	<0.005	<0.001	<0.001	35	5.5
	Jul-03	0.61	0.02	NM	<0.05	3.5	20	25	6	6	7.2	0.08	0.017	1.7	<0.005	<0.001	0.004	10	<2
	Oct-03	0.16	0.01	NM	<0.05	<1	16	19	6	7	4.4	0.01	<0.005	1.9	0.005	<0.001	0.005	33	<2
	Apr-04	0.31	0.02	NM	<0.05	1.5	18	17	8	9	4.2	0.03	0.008	NM	<0.005	<0.001	<0.001	11	<2
	Jul-04	0.5	0.02	NM	<0.02	2.7	52	18	9	0.015	4.5	0.09	0.015	1.7	<0.005	<0.001	0.058	20	3.9
	Oct-04	0.41	0.02	NM	<0.05	1.5	30	26	9	9	7.2	0.05	0.005	2	<0.005	<0.001	0.012	<10	<2
	Apr-05	0.68	0.05	<0.5	<0.05	4.3	24	28	9	13	8	0.05	0.007	NM	<0.005	<0.00025	0.062	74	4.3
	Oct-05	0.57	2	NM	<0.05	3.6	24	19	5	8	5.3	0.11	0.007	1.5	<0.005	<0.00025	0.004	41	6
	Apr-06	0.23	0.02	<0.5	<0.05	1.4	18	17	5	6	4	0.03	<0.005	NM	<0.005	<0.00025	0.048	<10	<2
	Oct-06	0.36	0.01	NM	<0.05	2.1	30	19	<5.0	7	5.1	0.04	<0.005	1.5	<0.005	<0.00025	0.001	110	3.2
	Apr-07	0.26	0.26	<0.5	<0.05	1.2	20	20	5	10	5.1	0.03	<0.005	NM	<0.005	<0.00025	0.002	34	4.1
	Oct-07	<0.024	0.0012B	0.1	<0.1	<1.0	13	17	7.6	10.2	4.39B	NM	<0.0014	2.13B	NM	NM	<0.005	NM	<2
	Apr-08	2.69	0.31	0.11	<0.1	<1.0	13.4	26	8.78	9.7	4.45B	0.51	0.0042	2.64B	<0.0029	<0.001	<0.005	NM	14
MW-3A	Apr-03	2.5	0.16	NM	<0.05	<1	26	68	12	230	20	0.18	<0.005	NM	<0.005	<0.00025	<0.001	80	38
	Jul-03	1.9	0.11	NM	<0.05	3	32	20	11	30	6.1	0.13	<0.005	1.2	<0.005	<0.00025	0.004	29	<4
	Oct-03	2.2	0.2	NM	<0.05	3.7	4.2	36	9	16	11	0.22	<0.005	2.2	<0.005	<0.001	0.002	<10	<2
	Apr-04	4.4	0.16	NM	<0.05	0	30	92	19	370	28	0.14	<0.005	NM	<0.005	<0.002	0.002	80	<2
	Jul-04	4	0.06	NM	<0.02	1.8	46	27	11	49	7.3	0.1	<0.005	2.1	<0.005	<0.001	0.006	31	<2
	Oct-04	10	0.25	NM	0.6	4.8	42	24	12	30	6.8	0.17	<0.005	1.8	<0.005	<0.001	0.002	0	<2
	Apr-05	7.5	0.31	0.6	<0.05	0	30	64	19	140	19	0.69	<0.005	1.8	<0.005	<0.00025	<0.001	43	<2
	Oct-05	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	Apr-06	11	0.35	0.5	<0.05	1.3	50	51	10	41	14	0.64	<0.005	NM	<0.005	<0.00025	<0.001	25	<2
	Oct-06	1.4	0.04	NM	<0.05	1.8	50	35	6	18	11	0.11	<0.005	2.1	<0.005	<0.00025	<0.001	<10	<2
	Apr-07	6.5	6.5	0.8	<0.05	7	32	120	7	320	37	0.72	0.006	NM	<0.005	<0.00025	<0.001	230	<2
	Oct-07	7.67	1.97	0.52	0.85	2.3	65	66	13.9	28.8	18.1	NM	<0.0014	4.81B	NM	NM	<0.005	NM	<2
	Apr-08	31.9	2.33	0.32	1.2	2.9	60.8	100	9.5	45.4	15.5	0.5	<0.0023	3.79B	0.0029B	<0.001	<0.005	NM	14

INORGANIC GROUNDWATER MONITORING RESULTS
TABLE 4A
North Sea Landfill Superfund Site
Town of Southampton
Suffolk County, New York
EPA ID: NYD980762520

Well ID	Date	Fe mg/L	Mn mg/L	Nitrate mg/L	Ammonia mg/L	TOC mg/L	Alkalinity mg/L	Hardness mg/L	SO4 mg/L	Cl- mg/L	Ca mg/L	Al mg/L	Pb mg/L	Mg mg/L	As mg/L	Hg mg/L	Phenols mg/L	TVS mg/L	BOD5 mg/L
NYSDEC GWQS		0.3	0.3	10	2	-	-	-	250	250	-	-	0.025	35*	0.025	0.0007	0.001	-	-
MW-3B	Apr-03	13	2.6	NM	2.8	3.1	72	47	11	16	10	0.03	<0.005	NM	0.017	<0.00025	<0.001	27	4.5
	Jul-03	15	2.4	NM	2.6	4	52	46	15	20	11	0.03	<0.005	4.3	0.018	<0.00025	0.005	<10	<4
	Oct-03	8.1	1.9	NM	1.8	1.2	44	39	14	21	9.7	0	<0.005	3.6	0.01	<0.001	<0.001	<10	3.8
	Apr-04	5.2	0.41	NM	0.1	5.3	42	36	11	22	9	0.6	<0.005	NM	<0.005	<0.002	0.001	17	2.2
	Jul-04	14	2.3	NM	0.8	4.3	64	47	95	22	12	0.06	<0.005	4.2	0.018	<0.001	0.004	40	7.8
	Oct-04	18	2.6	NM	2.2	3	76	62	13	19	16	0.04	<0.005	5.6	<0.005	<0.001	0.004	23	<2
	Apr-05	13	1.5	<0.5	2.4	<1	42	40	40	10	9.8	0.03	<0.005	NM	0.025	<0.00025	<0.001	15	<2
	Oct-05	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	Apr-06	21	3.5	<0.5	1.8	2.4	60	51	12	5	12	0.06	<0.005	NM	0.023	<0.00025	0.002	27	6
	Oct-06	20	3.1	NM	2.1	3.6	100	60	7	20	15	0.04	<0.005	5.3	0.019	<0.00025	<0.001	30	<2
	Apr-07	21	3.3	<0.5	5	1.7	110	62	7	23	16	0.02	<0.005	NM	0.024	<0.00025	0.002	120	<2
	Oct-07	13.1	1	<0.10	6.67	2.6	60.2	54	11.1	17.1	11.5	NM	<0.0014	3.99B	NM	NM	<0.005	NM	<2
	Apr-08	14.8	2.13	<1.0	3.52	2.6	60.8	60	11.9	18.5	10.7	0.0219B	<0.0023	4.04B	0.0116	<0.0001	<0.005	NM	12
MW-3C	Apr-03	0.21	0.01	NM	0.65	<1	40	29	7	9	6.9	0.04	<0.005	NM	<0.005	<0.00025	<0.001	22	4.6
	Jul-03	0.33	0.02	NM	<0.05	3	38	34	<5	9	8.2	0.06	<0.005	3.2	<0.005	<0.00025	0.006	17	<4
	Oct-03	0.3	0.01	NM	0.05	3.1	38	35	<5	10	8.4	0.05	<0.005	3.4	<0.005	<0.001	<0.001	<10	3.4
	Apr-04	0.32	0.04	NM	<0.05	3.6	48	39	5	14	9.8	0.05	<0.005	NM	<0.005	<0.002	0.001	14	2
	Jul-04	0.24	0.04	NM	<0.02	3	58	45	<5	15	11	0.05	<0.005	4.2	<0.005	<0.001	0.044	31	4.6
	Oct-04	0.18	0.02	NM	0.2	4.5	54	48	<5	16	11	0.05	<0.005	4.8	<0.005	<0.001	0.006	0	<2
	Apr-05	0.16	0.03	<0.5	<0.05	<1	46	45	<5	16	10	0.04	<0.005	NM	<0.004	<0.00025	0.002	11	<2
	Oct-05	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	Apr-06	0.16	0.06	<0.5	<0.05	<1	70	70	<5	26	17	0.05	<0.005	NM	<0.005	<0.00025	0.002	22	<2
	Oct-06	0.16	0.07	NM	<0.05	1.5	88	77	<5	23	18	0.06	<0.005	7.8	<0.005	<0.00025	<0.001	11	<2
	Apr-07	0.29	0.06	<0.5	<0.05	<1	82	76	<5	26	76	0.03	<0.005	NM	<0.005	<0.00025	<0.001	120	<2
	Oct-07	0.823	0.181	<0.10	<0.10	1.4	97.6	91	<5.0	27.7	22.2	NM	<0.0014	10.6	NM	NM	<0.005	NM	<2
	Apr-08	0.354	0.99	<1.0	<0.10	1.1	87.2	86	0	23.7	18.9	0.0211B	<0.0023	9.56	<0.0029	<0.0001	<0.005	NM	13
MW-4A	Apr-03	1.4	0.13	NM	0.08	<1	14	28	6	42	5.9	0.72	<0.005	NM	<0.005	<0.00025	<0.001	65	17
	Jul-03	1.5	0.09	NM	<0.05	5	6	25	17	17	5.8	0.62	0.006	2.5	<0.005	<0.001	0.003	12	<4
	Oct-03	1.5	0.11	NM	<0.05	<1	4	28	15	12	6.5	0.7	<0.005	2.9	<0.005	<0.001	0.001	<10	<2
	Apr-04	0.81	0.06	NM	1.2	<1	4	22	12	22	4.8	0.32	<0.005	NM	<0.005	<0.002	<0.001	33	<2
	Jul-04	0.28	0.04	NM	<0.02	<1	8	21	13	11	4.2	0.16	<0.005	2.6	<0.005	<0.001	0.01	22	<2
	Oct-04	0.62	0.05	NM	<0.05	<1	12	28	11	18	5	0.29	<0.005	3.7	<0.005	<0.001	<0.001	33	<2
	Apr-05	1.7	0.19	2.3	<0.05	<1	6	26	10	19	4.6	1	<0.005	NM	<0.005	<0.00025	0.004	0	<2
	Oct-05	1.1	0.08	NM	<0.05	1.4	20	35	11	33	6.4	0.52	<0.005	4.7	<0.005	<0.00025	<0.001	38	2.4
	Apr-06	2.1	0.15	4.9	<0.05	<1	4	31	30	16	6	1.3	<0.005	NM	<0.005	<0.00025	<0.001	28	<2
	Oct-06	0.29	0.04	NM	<0.05	<1	18	32	10	25	6.3	0.2	<0.005	4	<0.005	<0.00025	<0.001	31	<2
	Apr-07	1.1	<0.01	7.4	<0.05	<1	8	39	11	19	8.3	0.47	<0.005	NM	0.006	<0.00025	<0.001	44	<2
	Oct-07	0.107	0.0254	2.65	<0.10	<1	4.4	29	13.1	19.2	5.88	NM	<0.0014	3.28B	NM	NM	<0.005	NM	<2
	Apr-08	0.176	0.0137B	1.5	<0.10	<1	13.4	26	14	13.9	4.18B	0.082B	<0.0023	2.75B	<0.0029	<0.0001	<0.005	NM	12
MW-4B	Apr-03	1.6	0.28	NM	1	6.3	190	170	39	51	37	0.03	<0.005	NM	<0.005	<0.00025	<0.001	70	46
	Jul-03	0.97	0.9	NM	2	28	190	160	<5	52	35	0.03	<0.005	19	<0.005	<0.001	0.005	70	<4
	Oct-03	1	1.2	NM	2	4.2	190	180	6	51	38	0.05	<0.005	20	<0.005	<0.001	0.001	64	<2
	Apr-04	2.5	0.36	NM	1.4	10	170	150	7	48	33	0.02	<0.005	NM	<0.005	<0.002	<0.001	96	4
	Jul-04	0.49	0.37	NM	0.6	2.6	160	160	7	45	33	0.02	<0.005	18	<0.005	<0.001	0.01	64	9
	Oct-04	0.59	0.26	NM	2.8	7.5	170	160	9	49	34	0.01	<0.005	18	<0.005	<0.001	<0.001	73	7.4
	Apr-05	2.1	0.67	0.5	3	4	160	150	9	42	31	0.03	<0.005	NM	0.007	<0.00025	0.002	32	7.6
	Oct-05	1.6	1	NM	3.2	3.3	160	140	7	39	31	0.04	<0.005	16	<0.004	<0.00025	<0.001	40	13
	Apr-06	1.7	0.31	1.3	2	3.9	150	140	9	37	29	0.03	<0.005	NM	0.007	<0.00025	0.007	52	4.2
	Oct-06	0.53	0.24	NM	0.98	3.3	150	130	6	36	27	0.02	0.015	15	<0.005	<0.00025	<0.001	35	2.5
	Apr-07	2.4	0.49	<0.5	0.62	2.7	140	130	5	39	28	0.03	<0.005	NM	0.007	<0.00025	<0.002	59	2.2
	Oct-07	2.17	0.689	<0.10	1.88	3.4	135	125	9.2	32	27.3	NM	<0.0014	14.2	NM	NM	<0.005	NM	<2
	Apr-08	3.74	0.84	<0.10	1.64	3	134	118	11.1	28.6	26	0.061B	<0.0023	14.3	0.0032B	<0.0001	<0.005	NM	13

INORGANIC GROUNDWATER MONITORING RESULTS
TABLE 4A
North Sea Landfill Superfund Site
Town of Southampton
Suffolk County, New York
EPA ID: NYD980762520

Well ID	Date	Fe mg/L	Mn mg/L	Nitrate mg/L	Ammonia mg/L	TOC mg/L	Alkalinity mg/L	Hardness mg/L	SO4 mg/L	Cl- mg/L	Ca mg/L	Al mg/L	Pb mg/L	Mg mg/L	As mg/L	Hg mg/L	Phenols mg/L	TVS mg/L	BOD5 mg/L
NYSDEC GWQS		**0.3**	**0.3**	**10**	**2**	-	-	-	**250**	**250**	-	-	**0.025**	**35***	**0.025**	**0.0007**	**0.001**	-	-
MW-4C	Apr-03	0.23	<0.01	NM	0.13	<1	34	32	<5	16	6.9	0.02	<0.005	NM	<0.005	<0.00025	<0.001	15	5.2
	Jul-03	0.21	<0.01	NM	<0.05	4	30	41	<5	17	10	0.04	<0.005	3.9	<0.005	<0.001	0.005	<10	<4
	Oct-03	0.36	0.01	NM	0.05	<1	32	36	<5	16	8	0.04	<0.005	3.8	<0.005	<0.001	<0.001	<10	<2
	Apr-04	0.5	0.01	NM	<0.05	<1	28	33	<5	19	7.5	0.04	<0.005	NM	<0.005	<0.002	0.001	14	<2
	Jul-04	0.08	<0.01	NM	<0.02	1.5	32	38	<5	20	8.5	0.01	<0.005	4.2	<0.005	<0.001	0.012	<10	<2
	Oct-04	0.13	<0.01	NM	<0.05	<1	36	45	<5	23	10	0.02	<0.005	4.9	<0.005	<0.001	0.002	27	<2
	Apr-05	0.28	0.02	<0.5	<0.05	3.2	34	53	<5	30	12	0.02	<0.005	NM	<0.004	<0.00025	0.001	26	<2
	Oct-05	0.29	0.03	NM	<0.05	<1	42	53	5	32	12	0.03	<0.005	5.7	<0.004	<0.00025	<0.001	24	2.8
	Apr-06	0.33	0.02	<0.5	<0.05	<1	40	68	<5	39	15	0.02	<0.005	NM	0.006	<0.00025	0.003	26	<2
	Oct-06	0.16	0.04	NM	<0.05	<1	50	64	<5	44	14	0.01	<0.005	6.9	<0.005	<0.00025	<0.001	42	<2
	Apr-07	0.65	0.02	<0.5	<0.05	<1	40	65	<5	53	15	0.03	<0.005	NM	<0.005	<0.00025	<0.001	67	<2
	Oct-07	0.587	0.0296	<0.10	<0.10	<1	33.4	78	<5	55.8	17.1	NM	<0.0014	7.95	NM	NM	<0.005	NM	<2
	Apr-08	0.245	0.0191	<0.10	<0.10	<1	36	78	<5	54.6	14	0.0209B	<0.0023	8.44	<0.0029	<0.0001	<0.005	NM	11
MW-8	Apr-03	1.5	1.3	NM	0.21	8.1	50	60	15	10	16	0.2	<0.005	NM	<0.005	<0.00025	<0.001	56	5.9
	Jul-03	21	1.7	NM	<0.05	4.5	52	59	20	11	15	0.51	<0.005	4.7	<0.005	<0.001	0.006	59	4.5
	Oct-03	18	1.4	NM	1	1.6	70	51	18	11	13	0.35	0.007	4.3	0.024	<0.001	<0.001	26	<2
	Apr-04	15	1.2	NM	0.28	8.2	58	48	12	12	13	0.86	0.006	NM	0.014	<0.001	0.001	48	<6
	Jul-04	29	0.68	NM	<0.02	5.5	34	32	11	10	8.3	0.61	0.006	2.9	0.011	<0.001	0.012	34	8.5
	Oct-04	18	1.3	NM	0.6	<1	6	53	10	11	13	0.18	<0.005	5.1	0.012	<0.001	0.002	27	3
	Apr-05	11	0.76	1	0.07	3	38	41	13	10	10	1.1	<0.005	NM	0.017	<0.00025	<0.001	50	2.9
	Oct-05	10	0.63	NM	0.07	1.9	46	37	12	8	8.9	0.63	<0.005	3.6	<0.005	<0.00025	0.001	46	5.5
	Apr-06	8.1	1.4	3.2	0	<1	52	73	15	13	17	0.76	0.007	NM	0.0078	<0.00025	0.003	62	<2
	Oct-06	41	1.2	NM	0.3	8.9	140	74	5	6	20	0.27	0.006	5.6	<0.005	<0.00025	<0.001	140	6.5
	Apr-07	17	0.41	<0.5	0.11	1.2	36	34	6	8	8.7	0.16	<0.005	NM	<0.005	<0.00025	<0.001	33	<2
	Oct-07	NM	NM	0.7	<0.1	<1	31.4	NM	NM	9.3	NM	NM	<0.0014	NM	NM	NM	<0.005	NM	<2
	Apr-08	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.0023	NM	NM	NM	NM	NM	NM
MW-9	Apr-03	16	3.9	NM	0.07	1.9	44	40	11	13	9.6	0.61	<0.005	NM	<0.005	<0.001	<0.001	26	4.9
	Jul-03	13	2	NM	<0.05	2.5	52	73	17	12	16	0.42	<0.005	8	<0.005	<0.001	<0.001	83	12
	Oct-03	3.4	3.1	NM	0.4	6	100	140	21	11	33	0.17	<0.005	14	<0.005	<0.001	<0.001	75	3.3
	Apr-04	8	4.1	NM	0.28	5.5	98	79	22	10	20	0.31	<0.005	NM	<0.005	<0.001	<0.001	69	<2
	Jul-04	6.4	2.5	NM	<0.02	7.2	88	120	25	12	27	0.23	<0.005	12	<0.005	<0.001	0.02	80	12
	Oct-04	8.2	2.2	NM	0.09	7.8	60	71	13	11	18	0.06	<0.005	6.7	<0.005	<0.001	0.004	16	<2
	Apr-05	7.1	3	7.1	<0.05	2.8	78	94	20	13	18	0.74	<0.005	NM	0.005	<0.00025	<0.001	73	<2
	Oct-05	3.3	0.59	NM	<0.05	<1	40	29	8	13	7	0.12	<0.005	2.7	<0.005	<0.00025	<0.001	32	2.4
	Apr-06	18	1	0.7	<0.05	2.5	36	61	13	13	17	1.8	0.009	NM	0.014	<0.00025	0.001	42	<2
	Oct-06	10	1.2	NM	<0.1	2.7	110	95	12	10	22	0.83	<0.005	9.6	<0.005	<0.00025	<0.001	180	3.7
	Apr-07	9	1.1	1.5	0.09	1.1	98	91	10	11	21	1.3	<0.005	NM	<0.005	<0.00025	<0.001	51	<2
	Oct-07	2.47	0.452	0.46	<0.1	<1	42.3	53	9.4	10.3	14.2	NM	<0.0014	5.37	NM	NM	<0.005	NM	<2
	Apr-08	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-11A	Apr-03	11	15	NM	2.4	34	320	300	15	15	86	0.35	0.009	NM	0.11	<0.001	<0.001	300	43
	Jul-03	170	12	NM	2.4	75	280	260	24	22	72	1.4	0.012	19	0.049	<0.001	<0.001	300	28
	Oct-03	66	9.8	NM	1.4	5	180	150	24	17	41	0.74	0.008	12	0.02	<0.001	0.002	140	6.7
	Apr-04	240	8.9	NM	1.2	44	250	260	10	16	75	0.03	0.008	NM	<0.005	<0.001	0.012	470	52
	Jul-04	200	11	NM	1.6	21	490	210	95	17	58	0.18	0.006	15	0.043	<0.001	<0.001	150	28
	Oct-04	210	8.4	NM	1.2	17	220	200	19	17	57	0.13	<0.005	14	0.01	<0.001	0.001	650	10
	Apr-05	480	14	1.8	1.4	19	310	290	19	16	79	1	<0.005	NM	0.084	<0.00025	0.03	210	13
	Oct-05	400	13	NM	0.9	9.6	220	170	17	15	44	0.24	0.027	16	0.024	<0.00025	<0.002	320	20
	Apr-06	440	16	1.6	1.2	16	260	190	31	16	50	2.1	0.033	NM	0.047	<0.00025	<0.001	260	14
	Oct-06	200	7.9	NM	2.6	8.1	260	200	12	20	50	0.58	0.027	17	0.021	<0.00025	<0.002	160	5
	Apr-07	290	20	<0.5	0.88	8.2	230	240	9	12	63	0.98	0.32	NM	0.033	<0.00025	<0.001	210	<2
	Oct-07	66.9	3.74	<0.1	0.18	1.9	77.6	200	16.5	11	17	0.15B	0.0054	9.29	0.0182	<0.001	<0.005	NM	<2
	Apr-08	253	5.17	0.18	0	4.4	133	150	14	13.6	37.3	0.0552B	<0.0023	12.3	0.0372	<0.001	<0.005	NM	12

INORGANIC GROUNDWATER MONITORING RESULTS
TABLE 4A
North Sea Landfill Superfund Site
Town of Southampton
Suffolk County, New York
EPA ID: NYD980762520

Well ID	Date	Fe mg/L	Mn mg/L	Nitrate mg/L	Ammonia mg/L	TOC mg/L	Alkalinity mg/L	Hardness mg/L	SO4 mg/L	Cl- mg/L	Ca mg/L	Al mg/L	Pb mg/L	Mg mg/L	As mg/L	Hg mg/L	Phenols mg/L	TVS mg/L	BOD5 mg/L
NYSDEC GWQS		0.3	0.3	10	2	-	-	-	250	250	-	-	0.025	35*	0.025	0.0007	0.001	-	-
MW-11B	Apr-03	75	3	NM	14	22	400	260	7	21	75	0.24	<0.005	NM	0.006	<0.001	0.002	340	80
	Jul-03	76	1.7	NM	13	18	290	290	44	18	89	0.22	0.005	16	0.028	<0.001	0.002	330	82
	Oct-03	87	2.7	NM	14	20	520	290	88	31	77	0.1	<0.005	23	0.032	<0.001	0.007	200	15
	Apr-04	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	Jul-04	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	Oct-04	440	4.1	NM	8.6	45	420	330	17	24	95	2.2	0.013	22	0.068	<0.001	0.002	1600	<2
	Apr-05	140	4	<0.5	12	18	340	240	10	9	70	0.44	<0.005	NM	<0.005	<0.00025	0.01	170	18
	Oct-05	65	0.32	NM	0.43	16	110	110	120	7	36	1.1	0.014	5.7	<0.005	<0.00025	<0.001	110	12
	Apr-06	NM	NM	MN	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	Oct-06	75	6.1	NM	6.8	16	360	240	8	<2	68	0.82	0.015	17	0.008	<0.00025	<0.002	240	9.4
	Apr-07	44	1.3	4.9	0.24	7	270	250	10	13	72	0.51	0.011	NM	0.007	<0.00025	0.003	220	6.4
	Oct-07	34.7	2.7	0.25	<0.1	11	25.8	48	13.5	10.8	37.8	21.5	0.151	14.4	0.121	<0.0001	<0.005	NM	3
	Apr-08	16.1	0.442	0.52	<0.1	2.1	36.7	60	8.37	10.2	12.3	0.793	0.0051	3.48	<0.0029	<0.0001	<0.005	NM	14
MW-12A	Apr-03	23	0.89	NM	1	<1	44	70	46	16	19	0.2	<0.005	NM	<0.005	<0.001	<0.001	64	5.2
	Jul-03	33	1.1	NM	<0.05	5	78	130	69	19	34	0.51	<0.005	12	0.015	<0.001	0.004	87	6.5
	Oct-03	23	0.52	NM	0.13	1.5	72	98	62	18	26	0.1	<0.005	8	0.022	<0.001	<0.001	72	<2
	Apr-04	32	0.6	NM	0.07	4.5	44	44	31	10	12	0.18	0.005	NM	0.014	<0.001	<0.001	39	<2
	Jul-04	22	0.72	NM	0.03	1.7	110	130	55	17	35	0.16	<0.005	10	<0.005	<0.001	0.008	32	<6
	Oct-04	17	0.33	NM	0.08	1.5	88	100	38	17	27	0.09	<0.005	8.2	<0.005	<0.001	0.002	<10	2.1
	Apr-05	19	0.7	1.5	2.2	2.1	88	110	55	13	29	0.11	<0.005	NM	0.031	<0.00025	<0.001	21	2.6
	Oct-05	16	0.34	NM	0.07	1.5	44	51	27	12	14	0.09	<0.005	3.9	<0.005	<0.00025	<0.001	56	2.5
	Apr-06	29	1.2	1.6	0.19	2.5	68	85	24	11	22	0.31	<0.005	NM	0.021	<0.00025	<0.001	25	<2
	Oct-06	8.5	1.1	NM	0.14	3.4	110	120	35	16	32	0.17	<0.005	9.3	0.008	<0.00025	0.001	37	2.3
	Apr-07	19	1.7	1.6	1	2.7	130	150	32	20	42	0.21	<0.005	NM	0.013	<0.00025	<0.001	34	4.8
	Oct-07	2.96	0.194	0.86	<0.1	1.4	36	61	20	12.1	15.9	NM	<0.0014	4.93B	NM	NM	<0.005	NM	2
	Apr-08	13.8	0.125	0.6	<0.1	1.5	27	60	17.3	11	10.9	0.13B	<0.0023	3.5B	0.0082B	<0.0001	<0.005	NM	13
MW-12B	Apr-03	7.9	0.47	NM	0.2	<1	30	32	19	11	9	0.13	<0.005	NM	<0.005	<0.001	<0.001	44	7.2
	Jul-03	3.3	0.35	NM	<0.05	10	28	31	15	8	8.9	0.19	<0.005	2.2	<0.005	<0.001	0.006	11	11
	Oct-03	5.9	0.28	NM	<0.05	5	70	55	32	11	14	0.11	<0.005	5	0.009	<0.001	<0.001	70	0
	Apr-04	2.6	0.18	NM	<0.05	5.2	42	57	29	10	14	0.1	<0.005	NM	<0.005	<0.001	<0.001	20	<2
	Jul-04	13	0.36	NM	0.1	2.8	76	110	30	18	25	0.09	<0.005	11	<0.005	<0.001	0.01	40	9.7
	Oct-04	1.8	0.07	NM	0.27	13	30	27	14	8	7.2	0.07	<0.005	2.2	<0.005	<0.001	0.049	25	8
	Apr-05	4.8	0.17	<0.5	0.22	5.5	40	58	32	13	15	0.26	0.006	NM	<0.005	<0.00025	<0.001	15	4
	Oct-05	4.1	0.11	NM	<0.05	3.6	45	37	14	8	10	0.45	0.009	2.8	<0.005	<0.00025	0.002	59	7.5
	Apr-06	1	0.09	<0.5	<0.05	2.1	30	34	11	11	8.9	0.07	<0.005	NM	<0.005	<0.00025	0.006	<10	<2
	Oct-06	1.1	0.11	NM	<0.1	11	34	34	16	8	8.9	0.1	<0.005	2.8	<0.005	<0.00025	0.001	150	9.6
	Apr-07	2.3	0.07	0.5	<0.05	3.1	32	41	15	11	11	0.14	<0.005	NM	<0.005	<0.00025	<0.001	16	4.3
	Oct-07	0.235	0.0052B	0.63	<0.1	<1	25.6	39	11	10.2	8.18	NM	<0.0014	4.32	NM	NM	<0.005	NM	<2
	Apr-08	2.52	0.0263	1.02	<0.1	2	91.8	100	22	14.3	24.8	0.6	<0.0023	11.1	<0.0029	<0.0001	<0.005	NM	13

Notes:

NYSDEC GWQS: New York State Department of Environmental Conservation Groundwater Quality Standards

*: Guidance value, no GWQS exists

B: Laboratory flag; analyte was found in associated blank

Shaded cells: Compound exceeded standard.

NM: Mot monitored

GROUNDWATER QUALITY PARAMETERS
TABLE 4B
North Sea Landfill Superfund Site
Town of Southampton
Suffolk County, New York
EPA ID: NYD980762520

Well ID	Date	DTW	GW Elevation	pH	Turbidity NTU	Specific Conductance umho/cm	Eh mV	T deg. C
MW-1A	Apr-03	103.75	10.12	6.9	3.7	600	290	12
	Jul-03	101.88	11.99	6.5	12	540	240	15
	Oct-03	101.84	12.03	6.7	4.7	410	200	14
	Apr-04	102.65	11.22	6.3	0.62	320	260	12
	Jul-04	102.57	11.30	6.3	1.9	430	470	13
	Oct-04	103.09	10.78	6.2	0.56	340	310	13
	Apr-05	102.40	11.47	7.3	7.6	500	310	15
	Oct-05	103.22	10.65	6.4	4.1	460	210	13
	Apr-06	102.03	11.84	6.6	8.2	570	140	13
	Oct-06	101.36	12.51	6.6	2.4	620	310	13
	Apr-07	101.23	12.64	6	11	550	380	13
	Oct-07	102.55	11.32	8.53	0	NM	NM	12.8
	Apr-08	102.50	11.37	5.45	18.6	NM	NM	12.31
MW-1B	Apr-03	104.95	10.14	6.4	11	77	300	10
	Jul-03	103.11	11.98	6.1	7.5	110	230	12
	Oct-03	103.06	12.03	6.6	4.7	93	240	12
	Apr-04	103.89	11.20	6	1.9	68	280	11
	Jul-04	103.79	11.30	6.3	5.9	63	340	12
	Oct-04	104.29	10.80	6.9	2.5	66	400	12
	Apr-05	103.61	11.48	6.9	5.6	62	360	13
	Oct-05	104.43	10.66	7.2	6.2	77	210	12
	Apr-06	103.24	11.85	6	5.2	71	320	12
	Oct-06	102.58	12.51	6.1	8.4	82	310	12
	Apr-07	102.45	12.64	7.3	5.9	73	NM	11
	Oct-07	103.78	11.31	8.51	7	NM	NM	11.6
	Apr-08	103.01	12.08	5.37	27.2	NM	NS	11.63
MW-1C	Apr-03	105.43	9.56	6.5	5.9	83	290	10
	Jul-03	104.28	10.71	7.4	4.7	100	320	12
	Oct-03	104.40	10.59	7.8	1.4	93	330	12
	Apr-04	104.91	10.08	6	2.8	96	400	11
	Jul-04	105.15	9.84	6.7	6.8	79	340	12
	Oct-04	105.42	9.57	7.5	2.1	90	520	12
	Apr-05	104.57	10.42	6.3	4.3	64	490	13
	Oct-05	105.31	9.68	7.6	5	79	220	12
	Apr-06	104.49	10.50	6.1	2.7	70	440	12
	Oct-06	103.94	11.05	6.1	4.1	75	390	12
	Apr-07	103.38	11.16	6.4	2.9	77	430	11
	Oct-07	105.22	9.77	8.3	0	NM	NM	12.5
	Apr-08	104.98	10.01	5.9	34.8	NM	NM	14.44
MW-3A	Apr-03	46.93	8.37	6.2	26	660	190	13
	Jul-03	46.08	9.22	6.5	21	200	300	13
	Oct-03	46.41	8.89	7	14	160	190	13
	Apr-04	46.79	8.51	6.4	15	920	-160	15
	Jul-04	46.95	8.35	6.5	43	260	150	13
	Oct-04	47.23	8.07	6.3	2.7	190	150	12
	Apr-05	46.39	8.91	6.4	7.7	590	120	14
	Oct-05	NM	NM	NM	NM	NM	NM	NM
	Apr-06	46.22	9.08	6.3	77	270	160	14
	Oct-06	45.59	9.71	6.9	20	220	69	14
	Apr-07	45.47	9.83	6.4	15	1100	66	15
	Oct-07	47.09	8.21	8.47	21	NM	NM	11.9
	Apr-08	47.45	7.85	6.3	88.2	NM	NM	12.76

GROUNDWATER QUALITY PARAMETERS
TABLE 4B
North Sea Landfill Superfund Site
Town of Southampton
Suffolk County, New York
EPA ID: NYD980762520

Well ID	Date	DTW	GW Elevation	pH	Turbidity NTU	Specific Conductance umho/cm	Eh mV	T deg. C
MW-3B	Apr-03	43.65	8.25	6.6	91	260	36	13
	Jul-03	42.80	9.10	6.7	110	250	260	13
	Oct-03	43.16	8.74	6.9	36	260	48	11
	Apr-04	43.52	8.38	6.2	16	150	-170	13
	Jul-04	43.66	8.24	6.5	110	180	58	14
	Oct-04	43.95	7.95	6.5	20	220	10	13
	Apr-05	43.11	8.79	6.5	8.4	170	2	14
	Oct-05	NM	NM	NM	NM	NM	NM	NM
	Apr-06	42.95	8.95	6.1	150	210	55	14
	Oct-06	42.35	9.55	6.5	110	340		13
	Apr-07	42.20	9.70	6.4	92	350	64	14
	Oct-07	43.81	8.09	8.35	7	NM	NM	11.9
	Apr-08	44.45	7.45	6.39	7.3	NM	NM	12.96
MW-3C	Apr-03	43.24	8.16	6.6	2.8	120	240	13
	Jul-03	42.81	8.59	6.9	3.4	140	230	14
	Oct-03	43.13	8.27	7.1	4.3	150	280	13
	Apr-04	43.33	8.07	6.2	3.8	130	-94	13
	Jul-04	43.67	7.73	6.3	4.4	160	92	13
	Oct-04	43.69	7.71	6.5	0.75	130	190	13
	Apr-05	42.97	8.43	6.6	1.6	150	140	13
	Oct-05	NM	-	NM	NM	NM	NM	NM
	Apr-06	42.95	8.45	6.3	1.2	200	110	15
	Oct-06	42.57	8.83	6.7	2.2	320	170	13
	Apr-07	42.21	9.19	6.6	2.2	260	300	13
	Oct-07	43.88	7.52	8.58	2	NM	NM	12.5
	Apr-08	43.91	7.49	6.24	9.6	NM	NM	12.67
MW-4A	Apr-03	12.97	3.03	6.1	19	150	230	11
	Jul-03	13.14	2.86	6.2	5.6	110	240	16
	Oct-03	13.61	2.39	5.1	5.2	120	420	15
	Apr-04	13.86	2.14	5.5	<0.5	120	-160	12
	Jul-04	13.28	2.72	5.4	1.6	100	160	14
	Oct-04	13.31	2.69	5.7	<0.5	120	550	14
	Apr-05	13.21	2.79	5.5	2.2	130	240	12
	Oct-05	12.89	3.11	5.7	3.7	200	200	15
	Apr-06	13.47	2.53	5.6	15	170	430	12
	Oct-06	12.93	3.07	6.5	1	340	220	14
	Apr-07	13.11	2.89	5.8	1.3	210	320	12
	Oct-07	13.78	2.22	8.46	0	NM	NM	13.4
	Apr-08	13.66	2.34	4.9	10.9	NM	NM	12.58
MW-4B	Apr-03	13.40	2.70	6.4	7	570	120	12
	Jul-03	10.35	5.75	6.4	6.2	530	170	15
	Oct-03	13.66	2.44	6.6	5.4	550	130	14
	Apr-04	14.09	2.01	6.3	3.2	460	-200	13
	Jul-04	13.41	2.69	6.5	2.6	470	140	14
	Oct-04	13.27	2.83	6.6	1.2	380	130	14
	Apr-05	13.21	2.89	6.1	7.1	440	97	14
	Oct-05	12.37	3.73	6.7	8.4	430	39	14
	Apr-06	13.85	2.25	6.5	6.7	460	150	14
	Oct-06	13.03	3.07	6.6	2.8	440	140	14
	Apr-07	13.25	2.85	6.6	4.1	440	77	13
	Oct-07	11.06	5.04	8.52	1	NM	NM	13.5
	Apr-08	13.63	2.47	6.24	9	NM	NM	13.32

GROUNDWATER QUALITY PARAMETERS
TABLE 4B
North Sea Landfill Superfund Site
Town of Southampton
Suffolk County, New York
EPA ID: NYD980762520

Well ID	Date	DTW	GW Elevation	pH	Turbidity NTU	Specific Conductance umho/cm	Eh mV	T deg. C
MW-4C	Apr-03		7.37	7.1	0.6	130	190	12
	Jul-03	8.63	7.69	7.3	2.2	120	160	13
	Oct-03	8.31	7.42	7.2	2.7	140	280	13
	Apr-04	8.58	7.22	6.6	1.7	130	-200	13
	Jul-04	9.05	6.95	7.3	1.5	140	130	13
	Oct-04	8.97	7.03	6.8	<0.5	140	150	13
	Apr-05	8.40	7.60	6.6	1.8	180	100	13
	Oct-05	8.36	7.64	7	1.8	230	250	13
	Apr-06	8.74	7.26	6.9	1.7	250	130	13
	Oct-06	8.03	7.97	7	1.5	300	160	13
	Apr-07	8.15	7.85	6.7	2.5	260	85	12
	Oct-07	9.34	6.66	8.51	1	NM	NM	12.8
	Apr-08	9.20	6.80	6.7	9.6	NM	NM	12.69
MW-8	Apr-03	76.23	9.79	5.8	25	150	240	12
	Jul-03	74.52	11.50	5.6	14	210	210	13
	Oct-03	74.57	11.45	5.8	70	150	170	14
	Apr-04	75.28	10.74	6.3	20	120	-170	13
	Jul-04	75.25	10.77	5.6	100	99	190	15
	Oct-04	75.31	10.71	5.8	8	120	150	13
	Apr-05	74.99	11.03	6.4	6.9	100	210	15
	Oct-05	75.79	10.23	6	43	280	150	13
	Apr-06	74.75	11.27	6.1	28	160	190	12
	Oct-06	73.99	12.03	6.1	280	150	130	13
	Apr-07	73.90	12.12	7.1	74	100	270	12
	Oct-07	75.72	10.30	NM	NM	NM	NM	NM
	Apr-08	76.21	9.81	NM	NM	NM	NM	NM
MW-9	Apr-03	73.08	9.48	5.6	96	230	130	14
	Jul-03	71.57	10.99	5.9	30	25	140	17
	Oct-03	71.64	10.92	6	16	210	180	17
	Apr-04	72.35	10.21	5.9	8.6	110	170	16
	Jul-04	72.33	10.23	5.8	22	180	150	16
	Oct-04	72.76	9.80	5.9	8.3	110	150	16
	Apr-05	71.99	10.57	6.4	7.8	180	180	18
	Oct-05	72.86	9.70	6.2	6.7	130	110	15
	Apr-06	71.88	10.68	5.8	94	130	180	15
	Oct-06	71.06	11.50	6	32	170	92	15
	Apr-07	70.98	11.58	6.4	42	130	230	14
	Oct-07	72.49	10.07	8.25	44	NM	NM	13.8
	Apr-08	73.23	9.33	NM	NM	NM	NM	NM
MW-11A	Apr-03	71.36	9.42	6.8	3800	700	170	15
	Jul-03	69.92	10.86	6.6	39	690	170	18
	Oct-03	70.11	10.67	6.7	460	520	120	17
	Apr-04	70.77	10.01	6.7	140	510	120	14
	Jul-04	70.84	9.94	6.6	3400	540	120	18
	Oct-04	71.22	9.56	6.6	13	520	110	16
	Apr-05	70.56	10.22	7.3	3.5	520	11	15
	Oct-05	71.32	9.46	6.4	3500	440	36	16
	Apr-06	70.32	10.46	6.3	3200	530	7	16
	Oct-06	69.52	11.26	7.9	1500	530	51	16
	Apr-07	69.43	11.35	9	1200	510	11	14
	Oct-07	70.97	9.81	8.21	227	NM	NM	14.8
	Apr-08	71.61	9.17	5.84	>1000	NM	NM	15.93

GROUNDWATER QUALITY PARAMETERS
TABLE 4B
North Sea Landfill Superfund Site
Town of Southampton
Suffolk County, New York
EPA ID: NYD980762520

Well ID	Date	DTW	GW Elevation	pH	Turbidity NTU	Specific Conductance umho/cm	Eh mV	T deg. C
MW-11B	Apr-03	62.99	15.33	6.2	260	910	140	14
	Jul-03	64.53	13.79	6	37	960	70	17
	Oct-03	66.38	11.94	6.5	440	600	-32	17
	Apr-04	65.70	12.62	NM	NM	NM	NM	NM
	Jul-04	NM	NM	NM	NM	NM	NM	NM
	Oct-04	62.87	15.45	6.3	65	960	-30	15
	Apr-05	43.85	34.47	6.8	2.7	610	3	15
	Oct-05	59.19	19.13	6	580	230	99	15
	Apr-06	NM	NM	NM	NM	NM	NM	NM
	Oct-06	47.72	30.60	7.8	460	700	NA	15
	Apr-07	51.04	27.28	6.5	250	590	100	14
	Oct-07	63.68	14.64	8.49	300	NM	NM	14.5
	Apr-08	69.10	9.22	5.81	112	NM	NM	14.22
MW-12A	Apr-03	79.12	NA	6.4	49	270	87	14
	Jul-03	78.02	NA	6.3	39	350	100	15
	Oct-03	78.29	NA	6.6	120	220	66	15
	Apr-04	78.75	NA	6.3	64	180	110	13
	Jul-04	78.81	NA	6.3	100	320	140	15
	Oct-04	79.16	NA	6.2	17	250	50	13
	Apr-05	78.31	NA	6.6	5.2	240	52	15
	Oct-05	78.61	NA	6.5	62	150	110	14
	Apr-06	78.36	NA	6.3	140	200	280	14
	Oct-06	77.48	NA	7.6	35	270	180	14
	Apr-07	77.46	NA	6.6	22	390	210	13
	Oct-07	78.87	NA	6.82	12.8	NM	NM	12.7
	Apr-08	79.41	NA	5.82	44.2	NM	NM	13.46
MW-12B	Apr-03	79.99	NA	6.9	45	230	89	13
	Jul-03	78.88	NA	6.3	28	190	100	15
	Oct-03	79.16	NA	6.7	18	300	31	14
	Apr-04	79.62	NA	6.2	7.1	260	66	13
	Jul-04	79.70	NA	6.1	16	320	120	14
	Oct-04	80.04	NA	6.1	5.7	140	110	13
	Apr-05	79.19	NA	6.3	2.4	260	66	15
	Oct-05	79.47	NA	6.6	30	120	100	13
	Apr-06	79.23	NA	6.1	7	150	460	13
	Oct-06	78.37	NA	7.3	13	120	470	14
	Apr-07	78.35	NA	6.8	15	190	310	13
	Oct-07	79.46	NA	6.96	6.62	NM	NM	12.3
	Apr-08	80.04	NA	5.64	38.7	NM	NM	12.9

Notes:
NM: Mot monitored
NA: Not applicable; well cluster has not been surveyed