

Five-Year Review Report

**Islip Municipal Landfill Superfund Site
Islip
Suffolk County, New York**

Prepared by:

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

July 2008



Table of Contents

Executive Summary	i
Five-Year Review Summary Form	ii
I. Introduction	1
II. Site Chronology	1
III. Background	1
Geology/Hydrogeology	
Site Description	
Land and Resource Use	
History of Contamination	
Basis for Taking Action	
History of Remediation	
IV. Remedial Objectives	3
V. Remedial Actions	5
Remedy Selection and Implementation	
System Operations, Maintenance, and Monitoring Programs	
VI. Progress Since the Last Five-Year Review	7
VII. Five-Year Review Process	7
Administrative Components	
Community Involvement	
Document Review	
Data Review	
Site Inspection and Interviews	
VIII. Technical Assessment	11
Question A: Is the remedy functioning as intended by the decision documents?	
Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy still valid?	
Question C: Has any other information come to light that could call into question the protectiveness of the remedy?	
Technical Assessment Summary	
IX. Recommendations and Follow-up Actions	13
X. Protectiveness Statement(s)	13
XI. Next Review	13
Tables	
Table 1 - Chronology of Site Events	14
Table 2 - Documents Reviewed	15
Table 3 - Groundwater Monitoring Data	16
Table 4 - List of Acronyms Used In This Document	17
Table 5 - Recommendations and Follow-up Actions	18
Figure	
Figure 1 - Site Location Map	19
Figure 2 - Site Illustration	20

Executive Summary

The remedy for the Islip Municipal Landfill Site in Islip, New York includes the capping of contaminated soils on site, methane recovery and gas migration control, installation and operation of a groundwater treatment system for treatment of contaminated groundwater, monitoring activities, and recommended institutional controls. The site achieved construction completion with the signing of the Preliminary Close-Out Report on April 8, 1998. The trigger for this five-year review was the date of the previous Five-Year Review, which was on September 30, 2003.

The assessment of this five-year review found that the remedy was constructed in accordance with the requirements of the Record of Decision (ROD). The remedy is functioning as intended by the decision documents. The immediate threats have been addressed, the implemented remedy is protective in the short-term, and the groundwater cleanup goals are expected to be achieved through continued treatment of contaminated groundwater and naturally-occurring attenuation processes.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (from WasteLAN): Islip Municipal Landfill (Blydenburgh Road Landfill)		
EPA ID (from WasteLAN): NYD980531727		
Region: 2	State: NY	City/County: Islip, Suffolk County
SITE STATUS		
NPL status: <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify)		
Remediation status (choose all that apply): <input type="checkbox"/> Under Construction <input checked="" type="checkbox"/> Operating <input checked="" type="checkbox"/> Complete		
Multiple OUs? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	Construction completion date: 4/8/1998	
Has site been put into reuse? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> N/A (site involves groundwater plume and not real property)		
REVIEW STATUS		
Lead agency: <input checked="" type="checkbox"/> EPA <input checked="" type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency		
Author name: Mark Dannenberg		
Author title: Remedial Project Manager	Author affiliation: EPA	
Review period: 08/25/2003 to 04/24/2008		
Date(s) of site inspection: February 26, 2008		
Type of review: <input type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL-Removal only <input type="checkbox"/> Non-NPL Remedial Action Site <input type="checkbox"/> NPL State/Tribe-lead <input checked="" type="checkbox"/> Statutory <input type="checkbox"/> Regional Discretion		
Review number: <input type="checkbox"/> 1 (first) <input type="checkbox"/> 2 (second) <input checked="" type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify)		
Triggering action: <input type="checkbox"/> Actual RA Onsite Construction at OU #_ <input type="checkbox"/> Actual RA Start at OU#____ <input type="checkbox"/> Construction Completion <input checked="" type="checkbox"/> Previous Five-Year Review Report <input type="checkbox"/> 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)? <input checked="" type="checkbox"/> yes <input type="checkbox"/> no Is human exposure under control? <input checked="" type="checkbox"/> yes <input type="checkbox"/> no Is contaminated groundwater under control? <input checked="" type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> not yet determined Is the remedy protective of the environment? <input checked="" type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> not yet determined		

Five-Year Review Summary Form (continued)

Issues, Recommendations, and Follow-Up Actions

Issues and Recommendations are found in Table 5. The management of the site includes ongoing operations, maintenance and monitoring activities. As expected by the decision documents, these activities are subject to routine modification and adjustment.

Ongoing operations, maintenance and monitoring activities include continuous optimization of the groundwater extraction network, as well as the operation and monitoring of the cap and groundwater systems. In addition, the IRRA will continue to collect groundwater data. Also, the IRRA has expanded its network of groundwater monitoring wells to better ascertain contamination at varying depths. The findings of all field activities have been, and will continue to be, reviewed by the IRRA, EPA and NYSDEC.

Protectiveness Statement

The remedy currently protects human health and the environment because the cap prevents direct exposure to soil contaminants, surrounding residences are on public water and institutional controls address public supply wells in the impacted areas. The groundwater contamination and the potential for gas migration at the Islip Municipal Landfill are under control and there is no exposure to human receptors from site-related contaminants. The remedy at the site is protective in the short-term. In order for the remedy to be protective in the long-term, institutional controls to prevent cap disturbance should be implemented (see Table 5).

I. Introduction

This is the third five-year review for the Islip Municipal Landfill site, located in the Town of Islip, Suffolk County, New York. This review was conducted by United States Environmental Protection Agency (EPA) Remedial Project Manager (RPM), Mark Dannenberg. 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 assure that implemented remedies are protective of public health and the environment and that they function as intended by the decision document(s). This report will become part of the site file.

This five-year review is being conducted as a statutory requirement. After completion of the landfill capping portion of the remedial action, contaminants still remain on the site, triggering the requirement for a Five-Year Review. In accordance with 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 signature date of the previous Five-Year Review Report for the Islip Landfill Site was September 30, 2003.

II. Site Chronology

See Table 1 for site chronology.

III. Background

The Islip Municipal Sanitary Landfill Site (also known as Blydenburgh Road Landfill Site) property is approximately 52 acres in size and is located in the Town of Islip, Suffolk County, New York. The site is part of a larger complex owned by the Town of Islip. The Islip Resource Recovery Agency (IRRA) is responsible for the operation of the landfill closure project.

Geology/Hydrogeology

The topography in the area of the site itself is hilly due to the presence of the Ronkonkoma Terminal Moraine. The top of the landfill is approximately 250 feet above mean sea level which is the highest elevation in the area. The uppermost hydrogeologic formations, i.e., the Upper Glacial and Magothy aquifers, are of primary interest as they are hydraulically interconnected, and are sole source (NYSDEC - Class IIa) aquifers, used as a source of drinking water, in this region of Long Island. The site is located in the deep-flow recharge zone of the Long Island aquifer system, and vertical hydraulic gradients in the study area are primarily downward. The prevailing horizontal groundwater flow direction is to the south-southeast. The depth to the water table is typically greater than 100 feet below ground surface (bgs) in the immediate vicinity of the landfill. Five public supply well fields, currently owned and maintained by the Suffolk County Water Authority, are located within a 2-mile radius of the site.

The hydrogeology in the vicinity of the landfill is complex for a number of reasons. Specifically, hydrogeologic factors that can complicate the groundwater flow at or near the site include: possible past mounding in the water table below the landfill; localized groundwater mounding in the vicinity of the site; effects from the recharge of groundwater via the injection wells associated with the site; the subterranean Smithtown Clay unit; and the site's near proximity to the groundwater divide (i.e., north of the divide, groundwater generally flows northward and discharges into Long Island Sound; south of the divide, groundwater generally flows southward and discharges into the Atlantic Ocean). Additionally, there is the possible presence of other sources of groundwater contamination, unrelated to the site, which may mingle with the contaminant plume associated with the site.

Site Description

The landfill complex consists of four contiguous, solid waste management areas: (1) an approximately 52-acre, closed and capped municipal solid waste (MSW) landfill with both lined and unlined components; (2) an approximately 2-acre closed and capped ash monofill; (3) a 13-acre operational clean fill landfill which accepts construction and demolition debris; and (4) a 17.5-acre sandy borrow pit which is to be converted into an extension to the clean fill landfill. The remainder of the acreage is committed to buffer zones, leachate storage, surface water management, a groundwater treatment system, office and maintenance buildings, on-site roadways, and landfill gas recovery energy utilization. The MSW landfill is the only portion of the landfill complex which, together with the groundwater contaminant plume, represents the Islip Municipal Landfill Superfund site, which is on the National Priorities List (NPL). In other words, this Superfund site relates to the 52-acre municipal solid waste landfill, which is closed and capped, and the associated groundwater contamination.

Land and Resource Use

Residential communities are located to the north and to the west of the landfill. A pre-school, the Whipporwill School, is also located to the north of the landfill. A hotel (which operates its own wastewater treatment facility) and golf course are located to the east of the landfill. New residential homes have been built around portions of the golf course since the last Five-Year Review. The landfill is bordered on the south by Motor Parkway, which is predominantly a commercial area. The Andrew Morrow School is located approximately one-half mile southeast of the southern boundary of the landfill complex. Five public water supply wellfields, currently owned and maintained by the Suffolk County Water Authority, are located within a 2-mile radius of the site. There are no permanent surface water bodies, other than the recharge basins on the site, within one mile of the site.

The landfill complex is fenced and mostly vacant. It is still an active site and a portion of the landfill complex is used as a clean fill disposal site. The Town of Islip does not have any future plans for alternative uses of the site. The site must be maintained as a Superfund containment facility, so the re-use opportunities are limited. Presently, activities at the site include ongoing maintenance of the landfill cover/cap, and the operation of the groundwater treatment facilities, the gas control system, and the leachate collection system.

History of Contamination

Most of the landfilling activities in the unlined portion of the landfill were carried out from the late 1960's through the early 1980's. In December 1990, the site stopped receiving municipal

solid waste pursuant to New York State's landfill closure law, Part 360 of Title 6 of the New York Codes of Rules and Regulations (6 NYCRR Part 360), and the Long Island Landfill Law. In the late 1970's and early 1980's, it became apparent that contaminants (in particular, methane gas) were migrating from the landfill and were causing problems for the neighboring residential properties. In 1979, two houses adjacent to the landfill were purchased by the Town of Islip in order to protect the residents after high concentrations of methane gas (which is a flammable and explosive gas) were detected in their basements. The source of this methane was thought to be the landfill. In 1983, an active gas collection system was installed to control migration of flammable or explosive gases (e.g., methane) beyond the site boundary. Furthermore, groundwater investigations were conducted in 1980 in the vicinity of the landfill which indicated that private wells adjacent to the landfill were contaminated with volatile organic compounds (VOCs), namely, vinyl chloride and tetrachloroethene. In 1981, the Town of Islip connected these residents to a permanent public water supply to prevent exposure to contaminated groundwater in the private wells.

Basis for Taking Remedial Action(s)

The basis for taking remedial actions at the site included: the migration of gas(es) from the landfill, the potential for human exposure to contaminated soils on-site, and the potential for human exposure to contaminated groundwater downgradient of the site. The main human health risk currently associated with the site is for potential exposure to contaminated groundwater (i.e., from drinking or ingestion contaminated groundwater). This risk is mitigated because all residences in the vicinity of the site are hooked-up to the public drinking water supply. The Town of Islip uses public drinking water supply wells within a 2-mile radius of the landfill; these wells are potentially threatened by the contaminants. The primary contaminants detected in the groundwater are volatile organic compounds, iron, and manganese.

History of Remediation

The site was proposed for listing on the NPL in January 1987 and was added to the NPL on March 31, 1989. In August 1987, the Town of Islip and New York State Department of Environmental Conservation (NYSDEC) entered into an Order on Consent to conduct a remedial investigation and a remedial program at the site. The Remedial Investigation (RI) for the site began in September 1988 and was completed in May 1991. The Feasibility Study for the site was completed in June 1992 and a Record of Decision (ROD) was issued on September 30, 1992 stating the components of the selected remedy. Construction of an impermeable cap over the 52-acre site was completed in November 1993. The construction of the groundwater treatment system was completed in mid-1995 and it has been fully operational since September 1996.

IV. Remedial Objectives

EPA issued a comprehensive ROD for the site on September 30, 1992. The three major components of the selected remedy were (1) capping and closure of the municipal solid waste landfill in accordance with 6 NYCRR Part 360, Solid Waste Management Facilities; (2) installation and operation of a groundwater extraction and treatment system; and (3) institutional controls. These components are described in greater detail below.

- (1) The capping and closure components of the ROD included the following:

- the installation of a modified, geosynthetic membrane cap on the landfill, in compliance with 6NYCRR Part 360. The aerial extent of the cap is approximately 52 acres. The synthetic membrane cap includes layers of fill material, drainage layers, an impermeable membrane and a gas-venting system that utilizes Rolite-treated incinerator ash. Construction of the cap was completed in November 1993. The total volume of waste capped, and, thereby removed from human exposure, is estimated to be 4 million cubic yards.
 - the construction of a storm water system, which would control and direct storm water runoff from the site to on-site recharge basins.
 - the collection of ambient air samples to determine the need for modifications to the landfill gas control system and development of an air-monitoring system to ensure compliance with ambient air standards.
- (2) The groundwater extraction and treatment portion of the ROD includes the following components:
- the development and implementation of an on-site groundwater extraction and treatment system. Extraction of groundwater contaminated with VOCs, treatment via aeration, carbon adsorption (if necessary), chemical precipitation (if necessary), and discharge to groundwater recharge wells or an on-site recharge basin. Construction of the groundwater extraction and treatment system was completed in 1995 and the system has been fully operational since September 1996.
 - the attainment of drinking water standards through groundwater treatment and/or natural attenuation.
 - the completion and evaluation of the supplemental groundwater investigation to determine whether groundwater contamination detected at Monitoring Well 7M-1 is site-related.¹
 - the implementation of a groundwater monitoring system, namely, a network of monitoring wells to monitor the groundwater contamination plume and to evaluate the effectiveness of the groundwater treatment system. Natural attenuation processes can also be evaluated for contributing to the reduction of pollutant levels in the groundwater.
- (3) The ROD also recommended implementation of institutional controls including deed restrictions for the site and restrictions on the use or installation of wells within the groundwater contaminant plume to eliminate potential human exposure to wastes and contaminated groundwater.

¹Note: One of six groundwater extraction wells (EW-5) was installed to capture contamination present in the vicinity of cluster 7.

V. Remedial Actions

Remedy Implementation

A complete closure program of the entire landfill area including capping, methane recovery, and landfill gas monitoring activities has been implemented, as required by a December 18, 1990 NYSDEC Consent Order. On December 18, 1990, the Town of Islip ceased landfilling of municipal solid wastes at the site. The construction contract for the closure plan and landfill cap design was issued on September 24, 1992, the on-site mobilization began on January 27, 1993, and all work required under the contract was completed on November 30, 1993.

The final cover section of the municipal solid waste landfill and ash monofill consists of multiple natural and geosynthetic layers. The physical components comprising the final cap are, starting at the bottom: gas venting, impermeable barrier, drainage, and erosion control. Surface water runoff as well as infiltration into the final cover is collected and conveyed through a system of open channels and several runs of pipe to two recharge basins. Leachate is collected from the municipal solid waste landfill at three locations and is also collected off of the liners of the ash monofill at a sump pump station in its northwestern corner. The collected leachate is pumped or gravity fed from the landfill to four 220,000 gallon leachate storage tanks on the northeast corner of the site. Leachate from the storage tanks is transferred to tanker trucks for off-site treatment at the Suffolk County Wastewater Treatment Plant at Bergen Point, which is a permitted treatment/disposal facility. The quantity of leachate produced/collected has decreased significantly over time. The gas management system for the landfill has been upgraded, based on site-specific monitoring, and consists of an interior and a perimeter control system. A groundwater monitoring program is ongoing that will ascertain and monitor changes in water quality immediately upgradient, beneath and immediately downgradient of both closed portions of the site.

The original outline for the development and implementation of an on-site groundwater monitoring program was part of the December 18, 1990 NYSDEC Consent Order. The Record of Decision subsequently required the development and implementation of the groundwater remediation program involving extraction of groundwater, construction of a groundwater treatment system to remove contaminants, including organic compounds and metal contaminants, and the subsequent recharge of the treated groundwater into the aquifer. The groundwater remediation program has been constructed under five separate construction contract agreements between the Islip Resource Recovery Agency and the respective prime contractors.

A total of six groundwater extraction wells have been constructed to intercept the plume, extract the contaminated groundwater, and pump groundwater to the Treatment Facility. The six wells range in capacity from 40 to 90 gallons per minute (gpm) with a combined capacity of 350 gpm. The groundwater treatment system operates continuously, 24 hours per day, 7 days per week, pumping approximately 350 gpm or 500,000 gallons per day. The water treatment process consists of aeration, chemical addition, coagulation, flocculation, sedimentation, and iron and manganese pressure filtration. The treatment process reduces the water contaminant levels in the effluent to below federal and state drinking water standards. Treated water is discharged to the groundwater system by means of three disposal options: Disposal Option No. 1 involves discharge of treated effluent directly to the groundwater system by means of six recharge wells constructed as part of this program; Disposal Option No. 2 involves discharge of treated effluent

to the groundwater system by means of an existing recharge basin (Recharge Basin No. 1) located in the southwest corner of the landfill property; Disposal Option No. 3 involves discharge of treated effluent to the groundwater system by means of an existing recharge basin (Recharge Basin No. 3) located in the northeast corner of the landfill property. The groundwater extraction system commenced operation on September 4, 1996. Currently the discharge is primarily in accordance with Disposal Option No. 1, where the treated groundwater is discharged back into the groundwater via the recharge (or injection) wells.

The ROD recommended implementation of institutional controls including deed restrictions for the site and restrictions on the use or installation of wells within the groundwater contaminant plume to eliminate potential human exposure to wastes and contaminated groundwater. The well restriction recommendation for impacted areas is addressed by the Suffolk County Department of Health Services, Private Water Systems Standards. These standards require that any homeowner water system should be hooked up to the community water system, if available. If a community water system is not available, then the individual private water system must be tested for chemical constituents, which include volatile organic compounds, pesticides and inorganic compounds. This list of constituents has been compiled by the Suffolk County Department of Health Services. In addition, NYSDEC's Part 602, Applications for Long Island wells, states that all new private wells with total property capacity over 45 gpm are required to obtain a well permit. Residences surrounding the Islip 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.

System Operations, Maintenance, and Monitoring Programs

All remedial activities at the site, including the capping and closure of the landfill and the implementation of a groundwater extraction and treatment system, were generally consistent with the ROD, the NYSDEC December 18, 1990 Consent Order, and the final design documents. The capping and closure of the landfill were completed in November 1993 using multiple geosynthetic and natural layers. Furthermore, a vegetative cover has been established on the cap. The cap is routinely inspected and is properly maintained. The groundwater remediation system began operating on September 4, 1996, pumping approximately 500,000 gallons per day from the six extraction (or recovery) wells into the groundwater treatment system. The treatment plant design and the initial operating conditions are based on continuous 24 hours per day, seven day per week operation. The water treatment process reduces the water contaminant levels in the effluent to drinking water standards. The total annual cost for operating the groundwater treatment facility, including conduct of the associated groundwater monitoring activities, is currently \$256,000.

The IRRA implements a groundwater sampling and monitoring program, which consists of collecting water-level measurements and groundwater quality sampling at 36 monitoring wells to evaluate changes in groundwater quality over time. Groundwater samples were originally collected on a quarterly basis and are currently collected semi-annually. The groundwater samples are analyzed for VOCs, iron and manganese. In addition, monthly monitoring of the groundwater treatment plant effluent is conducted to monitor levels of VOCs, iron, and manganese, and to verify compliance with State Pollution Discharge Elimination System (SPDES) permit limits.

The Town of Islip constructed a cap on the landfill which includes an active gas collection/control system in order to reduce the potential migration of soil gas. The IRRA routinely collects soil gas samples from the monitoring wells placed along the perimeter of the landfill which demonstrates the effectiveness of the methane gas collection system and demonstrates that gas is not migrating beyond the landfill boundary.

VI. Progress Since The Last Five-Year Review

The capping of the landfill effectively minimizes infiltration of precipitation into the 52-acre landfill, which substantially reduces the potential for contaminants to leach, thereby preventing or minimizing negative impacts to groundwater quality in the underlying aquifers. The cap also acts as an effective barrier, preventing other forms of direct exposure to contaminated soil from inhalation, ingestion and dermal contact. The cap is routinely inspected and adequately maintained.

The objective of the selected remedy is to restore the groundwater to drinking water quality. As reflected by a review of the monitoring data, VOC concentrations in most areas have significantly decreased since implementation of the remedy. Active groundwater treatment and/or naturally-occurring attenuation processes are expected to ultimately achieve drinking water standards in groundwater. In addition, EPA worked with the IRRA to revise the long-term groundwater monitoring program, which, among other things, added monitoring wells to the program and changed the frequency of groundwater monitoring activities. The additional data collected from the expanded groundwater monitoring well network has been reviewed by the IRRA and EPA, and is evaluated in this Five-Year Review.

The IRRA shut down extraction wells EW-2 and EW-6 in order to test the effects this would have on contamination (and/or the spread of contamination) in the groundwater. As VOC concentrations were very low in EW-2 and EW-6, a shutdown (or temporary shutdown) of these extractions wells was considered to have little, if any, detrimental effect on the environment. A thorough analysis of the data collected from this test will assist EPA in determining whether to permanently shut down any extraction wells (e.g., EW-1, EW-2, EW-5 and EW-6) in the future. Finally, as part of this Five-Year Review process, the potential for vapor intrusion was assessed based on EPA's Soil Vapor Intrusion Guidance screening process.

VII. Five-Year Review Process

Administrative Components

The current five-year review team consists of Mark Dannenberg (EPA RPM), Michael Scorca (EPA Hydrogeologist), Marian Olsen (EPA Risk Assessor), Charles Nace (EPA Risk Assessor) and Cecilia Echols (EPA Community Involvement Coordinator).

Community Involvement and Notification

The EPA Community Involvement Coordinator (CIC) for the Islip Municipal Landfill Site, Cecilia Echols, had a notice published in the Islip Bulletin on June 26, 2008, notifying the community of the initiation of the five-year review process. The notice indicated that EPA is

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 also indicated that the results of the five-year review 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 as contacts for questions related to the five-year review process for the site. A similar notice will be sent when the review is completed. To date, no comments were received from the public or from stakeholders during this review.

Document Review

This five-year review was conducted to determine whether the selected remedy is protective of human health and the environment. The site was characterized in order to evaluate if it poses an existing hazard or a potential hazard to neighboring populations. This involved performing a review and evaluation of: reports, groundwater monitoring data (from monitoring wells both on and off-site), Discharge Monitoring Reports, and of the physical conditions of the contaminant source(s) or physical hazard(s) at or near the site. Relevant documents and data have been reviewed to obtain information to assess the performance of the response action(s). The documents and information reviewed in the process of this five-year review are listed in Table 2.

Data Review

The capping of the landfill has been an effective means of reducing the mobility of contaminants through the layers of waste in the landfill. Specifically, the cap effectively restricts the infiltration of precipitation, which, in turn, reduces the percolation of contaminants downward, and, thereby, reduces the transport of contaminants in the subsurface to groundwater beneath the landfill. In addition, surface water runoff is routed off of the cover to retention basins at the base of the landfill. A review of the groundwater monitoring data indicates that contaminant levels have significantly decreased in most monitoring wells located in the upper glacial aquifer immediately downgradient of the capped landfill. This finding supports the conclusion that contaminants are not significantly leaching downward into the groundwater because of the restrictions on infiltration of precipitation into the landfill. This correlates with the extremely low quantities of leachate currently produced from the landfill.

The groundwater recovery system was designed to capture and treat the most contaminated portion of the groundwater contamination plume associated with the site. From 1996 to 2004, groundwater monitoring was conducted on a quarterly basis. Since then, groundwater monitoring has been performed semi-annually. Groundwater samples are analyzed for VOCs, iron, and manganese. The VOC data is evaluated and compared to previous monitoring results, as well as applicable groundwater standards.

A review of the historical groundwater monitoring data indicates a trend of overall reduction in VOC levels in most of the wells. The primary VOCs found in the groundwater impacted by the site are: dichloroethane; dichloroethene; trichloroethene; 1,1,1-trichloroethane; tetrachloroethene; chlorobenzene; dichlorobenzene; and vinyl chloride. There are currently thirty-six groundwater monitoring wells associated with the site that are sampled as part of the monitoring program. Data from most monitoring and recovery wells indicate a reduction in total VOC levels over time. Recent sampling data at several of the monitoring wells reflect very low (frequently nondetectable) levels of VOCs. Specifically, twenty-four of the thirty-six groundwater monitoring wells consistently reflect total VOC concentrations below 10 parts per

billion (ppb); over half of these monitoring wells consistently show non-detectable levels of total VOCs. The twelve remaining groundwater monitoring wells do exhibit total VOC concentrations above 10 ppb. Sampling data from the twelve groundwater monitoring wells with total VOC concentrations still above 10 ppb are shown in Table 3. The highest concentration of total VOCs detected in the 2nd half of 2007 is 53 ppb, in Monitoring Well 12M-1, which had an historical high of 715 ppb. This trend of decreasing VOC contamination in Monitoring Well 12M-1 corresponds with decreasing VOC concentrations at other monitoring wells, indicating that, in general, groundwater quality associated with the landfill has significantly improved in response to the groundwater remediation program. As seen in Table 3, the data (from most of the monitoring wells exhibiting total VOC concentrations above 10 ppb) reflects relatively stable concentrations of total VOCs near or below 50 ppb. Furthermore, the previous Five-Year Review reflected that total VOC concentrations were increasing in Monitoring Wells MW-7 and MW-22. These two wells are located near a recharge basin in the northeast corner of the landfill complex. The ROD recognizes that the VOC contamination in the northeast corner of the site may be from an upgradient source. As no other sources were known, an extraction well (EW-5) was installed in this area, in part, to capture contamination in the vicinity of monitoring wells MW-7 and MW-22. This extraction well (EW-5) continues to operate and continues to capture contamination present in the vicinity of these monitoring wells. Over the last five years of data collection, VOC concentrations in MW-7 have remained relatively consistent and VOC concentrations in MW-22 have significantly decreased to near or below detection levels.

Groundwater extraction wells EW-2 and EW-6 were shut off recently in order to test the effects this would have on contamination in the groundwater. A review of the data indicates little change in VOC concentrations as a result of the shutdown of these extraction wells. Furthermore, the groundwater treatment system has not been, thus far, adversely affected by the shutdown of these extraction wells. As such, these two wells will remain shut off. Monitoring data will continue to be assessed to help make decisions pertaining to permanently shutting down any additional extraction wells.

The ROD notes that the groundwater contaminants associated with the site are VOCs, primarily chlorinated solvents such as tetrachloroethene, trichloroethene, dichloroethene, trichloroethane, and vinyl chloride. Although the toxicity values have changed for some of these compounds since the issuance of the ROD, the Maximum Contaminant Levels (MCLs) have not changed. Furthermore, the effluent from the groundwater treatment system is monitored and does not exceed these MCL values, and these values remain protective of public health.

In summary, the results of the groundwater monitoring efforts indicate that the groundwater treatment system is operating according to design and that groundwater quality is continuing to improve in response to the ongoing remediation. In addition, cleanup activities at the site (including the capping and closure of the landfill, and the implementation of a groundwater extraction and treatment system) were generally consistent with the ROD and with the Consent Order with NYSDEC, signed on December 18, 1990. Given the complexity of the hydrogeology of the area (as discussed earlier, in Section III, "Background - Geology/Hydrogeology"), the near proximity of the site to the groundwater divide, and the possible presence of other contaminant plume(s), additional field activities have been performed to improve the understanding of contaminant transport in the area. Furthermore, additional groundwater monitoring wells have been added to the monitoring well network. These additional wells have been sampled since

2006 to complement EPA's understanding of the groundwater contamination in the vicinity of the site.

The ROD also required that the groundwater treatment system would be evaluated to determine whether an air pollution control device will be necessary to comply with air emission requirements. The IRRA has monitored air emissions from the groundwater treatment system and reported that no further air pollution control device(s) are deemed necessary. Furthermore, the IRRA has indicated that air monitoring from the groundwater treatment system reflected compliance with the NYSDEC Air Guide No. 1 limits, which became effective in July 2000.

This current Five-Year Review also evaluates soil vapor intrusion using the *U.S. EPA Soil Vapor Intrusion Guidance*. As referenced in the "Background Section" of this report, it became apparent (in the late 1970's and early 1980's) that contaminants were migrating from the landfill. In 1979, two houses adjacent to the landfill were purchased by the Town of Islip after high concentrations of methane suspected to have originated from the landfill were detected in their basements. In 1983, an active gas collection system was installed to control migration of explosive gases beyond the site boundary. Monitoring reports have demonstrated the effectiveness of the methane gas collection system for controlling gas migration beyond the boundary of the landfill. The *U.S. EPA Vapor Intrusion Guidance* employs certain processes and screening tools which "screen-out" or eliminate certain scenarios from consideration. For instance, contamination found in groundwater wells at depths greater than 100 feet below ground surface can be "screened-out" from consideration because these contaminated regions are considered to be at depths great enough to pose little or no risk from vapor intrusion. This Five-Year Review specifically evaluated wells within 100 feet of the ground surface. For these wells, screening maximum contaminant concentration levels versus the soil vapor intrusion guidance values indicate that the screening levels were not exceeded. Therefore, no further evaluation of vapor intrusion is deemed necessary at this time.

Finally, the ROD recommended implementation of institutional controls including deed restrictions for the site and restrictions on the use or installation of wells within the groundwater contaminant plume to eliminate potential human exposure to wastes and contaminated groundwater. The well restriction recommendation for impacted areas is being addressed by the Suffolk County Department of Health Services, Private Water Systems Standards. Deed restrictions are not currently in place. However, the property continues to be owned and controlled by the Town of Islip and no changes in use are anticipated. In addition, the site is still active and a portion of the landfill complex is used for the disposal of construction and demolition wastes. Before the site is deleted from the National Priorities List, appropriate institutional controls should be in place. It is anticipated that they will be in place before the next five-year review, see Table 5.

Site Inspection and Interviews

A site inspection was conducted on February 26, 2008. The following parties were in attendance: Mark Dannenberg (EPA Region 2 RPM), Michael Scorca (EPA Region 2 Hydrogeologist), Marian Olsen (EPA Region 2 Human Health Risk Assessor), Charles Nace (EPA Region 2 Ecological Risk Assessor), Angela Carpenter (EPA Region 2 Section Chief), Anthony Varrichio (IRRA Chief Engineer), and Alan Sanchez (IRRA Vice President of Operations). 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 Chief Engineer and the Vice President of Operations, as well as other site personnel.

VIII. Technical Assessment

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

Yes, the remedy is functioning as intended by the ROD signed on September 30, 1992.

The remedy involved installation of a modified geosynthetic membrane cap of the landfill in compliance with 6NYCRR Part 360 that provides a barrier to exposure; construction of a storm water system to direct and control runoff from the site to on-site recharge basins; collection of ambient air samples to evaluate the methane gas control system; development of an air monitoring system to ensure compliance with ambient air standards; development and implementation of an on-site groundwater extraction and treatment system; attainment of drinking water standards through groundwater treatment and/or natural attenuation; completion and evaluation of the supplemental groundwater investigation to determine whether groundwater contamination detected at Monitoring Well 7M-1 is site-related; implementation of a groundwater monitoring system to monitor the groundwater contamination plume and to evaluate effectiveness of the groundwater treatment system; and implementation of institutional controls and deed restrictions on the use or installation of wells within the groundwater contaminant plume to eliminate potential human exposure to wastes and contaminated groundwater.

These actions have interrupted the direct exposure pathways of direct contact with the contaminated groundwater and soils. The capping of the landfill has minimized infiltration of precipitation into the landfill, thereby minimizing the potential for contaminants to leach from the landfill and any subsequent negative impact(s) on groundwater quality. In addition, the cap acts as an effective barrier, which prevents other forms of direct exposure to contaminated soil from inhalation, ingestion and dermal contact. Furthermore, treated groundwater discharged from the groundwater treatment system complies with MCLs. Based upon the review of the documents summarized in Table 2 and the results of the routine evaluations of the groundwater treatment system and groundwater monitoring data, it has been concluded that the remedy is functioning as intended by the ROD. Total VOC contamination continues to be detected (ranging from non-detect to 60 ppb) in several monitoring wells downgradient of the landfill. This situation will continue to be assessed and further optimization efforts may be necessary in the future. Finally, annual reports have demonstrated the effectiveness of the methane gas collection system for controlling gas migration beyond the boundary of the landfill. The remedies are functioning as intended.

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

- Are the exposure assumptions and toxicity data used at the time of the remedy selection still valid?

a. Soil The exposure assumptions and toxicity values that were used to estimate the potential cancer risks and non-cancer hazards in the risk assessment supporting the 1992 Record of Decision for human health followed the Risk Assessment Guidance for Superfund used by the Agency in assessing risks. The process that was used in the human health risk assessment is still valid. In addition, given that the municipal landfill has been stabilized with a cap, the human exposure pathways have been interrupted. In addition, the entire site is fenced, which also interrupts the potential for human exposure.

b. Groundwater Currently, the uppermost two groundwater formations (Glacial and Magothy) are of primary interest as they are hydraulically interconnected, and are defined as a groundwater sole source (Class IIa). The site is located in the deep flow recharge zone of the Long Island aquifer system, and vertical hydraulic gradients in the study area are primarily downward. Residences surrounding the Islip Landfill Site are supplied with public water and there are no known private water supplies near the site which are currently being used for drinking. In addition, the Suffolk County Department of Health prevents the installation of drinking water wells in impacted areas such as this.

c. Vapor Intrusion There are currently no buildings (other than the structure housing the groundwater treatment system) located on the site. Vapor intrusion was evaluated based on EPA's Soil Vapor Intrusion Guidance screening process. One of the screening steps includes screening out from consideration contamination found in those wells that are at depths greater than 100 feet below ground surface because these contaminated regions are considered to be at depths great enough to pose little or no risk from vapor intrusion. In addition, this Five-Year Review specifically evaluated wells within 100 feet of the ground surface. From these wells, screening maximum contaminant concentration levels versus the vapor intrusion guidance groundwater values indicate that the screening levels were not exceeded. Therefore, no further evaluation of vapor intrusion is deemed necessary at this time.

- Are the Cleanup Values Selected in the ROD Still Valid?

The selected remedy for the soils was designed to reduce the risk to human health and the environment due to contaminants leaching from the landfill. As such, specific ARARs were not established for the soils at the site although the landfill cap is regulated under 6NYCRR Part 360, an ARAR for the site.

Maximum Contaminant Levels and non-zero Maximum Contaminant Level Goals were identified as ARARs in the Record of Decision for remediation of the on-site groundwater in all three aquifers. The MCLs and MCLGs remain valid. Other state ARARs identified in the ROD included the 10 NYCRR Part 5, and 6 NYCRR Part 703 standards. All standards remain valid.

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

Based on the evaluation of the potential human exposures at the site, there is no new information that has been developed that could call into question the protectiveness of this remedy.

IX. Recommendations and Follow-Up Actions

Issues and Recommendations are found in Table 5. The management of the site includes ongoing operations, maintenance and monitoring activities. As expected by the decision documents, these activities are subject to routine modification and adjustment.

Ongoing operations, maintenance and monitoring activities include continuous optimization of the groundwater extraction network, as well as the operation and monitoring of the cap and groundwater systems. In addition, the IRRA will continue to collect groundwater data. Also, the IRRA has expanded its network of groundwater monitoring wells to better ascertain contamination at varying depths. The findings of all field activities have been, and will continue to be, reviewed by the IRRA, EPA and NYSDEC.

X. Protectiveness Statement

The remedy currently protects human health and the environment because the cap prevents direct exposure to soil contaminants, surrounding residences are on public water, and institutional controls address public supply wells in the impacted areas. The groundwater contamination and the potential for gas migration at the Islip Municipal Landfill are under control and there is no exposure to human receptors from site-related contaminants. The remedy at the Site is protective in the short-term. In order for the remedy to be protective in the long-term, institutional controls to prevent cap disturbance should be implemented, see Table 5.

XI. Next Review

The next five-year review for the Islip Municipal Landfill Site should be completed by June 2013, five years from the date of this review.

Approved by:

Date:

John S. Frisco

7/22/08

for George Pavlou, Acting Director
Emergency and Remedial Response Division
U.S. EPA, Region 2

Table 1: Chronology of Site Events	
Site proposed for listing on the NPL	January 1987
Town of Islip and NYSDEC enter into a Consent Order to develop and implement a Remedial Investigation and a Feasibility Study	August 8, 1987
Site added to the NPL	March 31, 1989
Site ceased receiving municipal solid waste (coinciding with the Long Island Landfill Ban)	December 1990
Town of Islip and NYSDEC enter into a Consent Order to perform remedial activities at the site	December 18, 1990
Remedial Investigation conducted	1988 to 1991
Feasibility Study prepared	1992
Issuance of the Record of Decision	September 30, 1992
Completed the capping and closure of landfill	November 30, 1993
Start-up of the groundwater extraction and treatment system	September 4, 1996
Final inspection of the groundwater treatment system and the groundwater remediation program	September 27, 1996
Preliminary Close-Out Report	April 8, 1998
The first Five-Year Review Report	April 1998
The second Five-Year Review Report	September 2003
Revision of the long-term groundwater monitoring program	2006
Experimental shut-off of two groundwater extraction wells (EW-2 and EW-6)	2006

Author	Date	Title/Description
U.S. Environmental Protection Agency	September 1992	Record of Decision, Islip Municipal Sanitary Landfill
New York State Department of Environmental Conservation	August 8, 1987	Consent Decree
New York State Department of Environmental Conservation	December 18, 1990	Consent Order
U.S. Environmental Protection Agency	April 1998	The First Five-Year Review
Islip Resource Recovery Agency	Monthly reports (2003 to 2008)	Blydenburgh Road Landfill Complex Monthly Discharge Monitoring Reports
Dvirka & Bartilucci Consulting Engineers	March 25, 2003	The Statement of Work (for the additional field activities that were conducted in 2003)
U.S. Environmental Protection Agency	September 2003	The Second Five-Year Review
Dvirka & Bartilucci Consulting Engineers	Multiple dates (from 2003 through 2006)	Post-Closure Groundwater Monitoring Results, Quarterly Reports (2003 through 2005)
Dvirka & Bartilucci Consulting Engineers	2003, 2004, 2005, 2006 and 2007	Post-Closure Groundwater Monitoring Program, Annual Reports (2003, 2004, 2005, 2006 and 2007)
Dvirka & Bartilucci Consulting Engineers	Multiple dates (2006, 2007 and 2008)	Post-Closure Groundwater Monitoring Results, Semi-Annual Sampling Reports (2006, 2007 and 2008)

Table 3: Islip Municipal Landfill Groundwater Monitoring Data

Monitoring Well	Depth in feet (relative to msl) to bottom of screen	DATE SAMPLED											
		[Concentration of Total VOCs (ug/L)]											
		2/2004	5/2004	8/2004	2/2005	5/2005	8/2005	11/2005	2/2006	7/2006	2/2007	8/2007	2/2008
GM-1D	-247	28	25	27	26	26	22	27	26	25	53	53	53
4M-1	-159	73	58	53	39	57	58	53	50	57	56	49	48
6G-3	-138	-	-	-	-	-	-	-	4	38	27	25	27
7M-1	-152	71	40	75	48	31	70	82	93	85	79	50	31
10M-1	-167	15	20	18	19	15	16	17	13	14	29	27	21
11G-1	22	18	33	26	43	58	52	23	54	38	28	36	40
11G-2	-51	72	69	60	36	44	41	57	52	45	50	47	41
12M-1	-163	73	61	69	71	58	66	50	43	63	64	53	67
13M-1	-155	22	24	25	30	28	2	37	33	31	24	23	-
14M-1	-194	52	45	54	46	51	42	49	46	49	60	29	36
16M-1	-163	44	33	44	45	42	43	38	30	25	31	20	29
22M-1	-164	60	34	22	12	8	5	2	0	1	0	0	0
23M-1	-164	37	29	22	24	15	12	12	8	11	4	3	3

Table 4: List of Acronyms Used in this Document	
ARAR	Applicable or Relevant and Appropriate Requirement
Bgs	below ground surface
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIC	Community Involvement Coordinator
EPA	United States Environmental Protection Agency
FS	Feasibility Study
Gpm	gallons per minute
IRRA	Islip Resource Recovery Agency
MCL	Maximum Contaminant Level
MSW	Municipal Solid Waste
NPL	National Priorities List
NYCRR	New York Codes of Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
O&M	Operation and Maintenance
OSWER	Office of Solid Waste and Emergency Response
Ppb	parts per billion
RA	Remedial Action
RD	Remedial Design
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SDWA	Safe Drinking Water Act
SPDES	State Pollution Discharge Elimination System
TCE	Trichloroethene
VOCs	Volatile Organic Compounds

Table 5: Recommendations and Follow-up Actions

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
The ROD recommends institutional controls (deed restrictions) to eliminate potential human exposure to the contained wastes.	Town to implement proprietary control on the property.	Town	NYSDEC	June 2013	N	Y

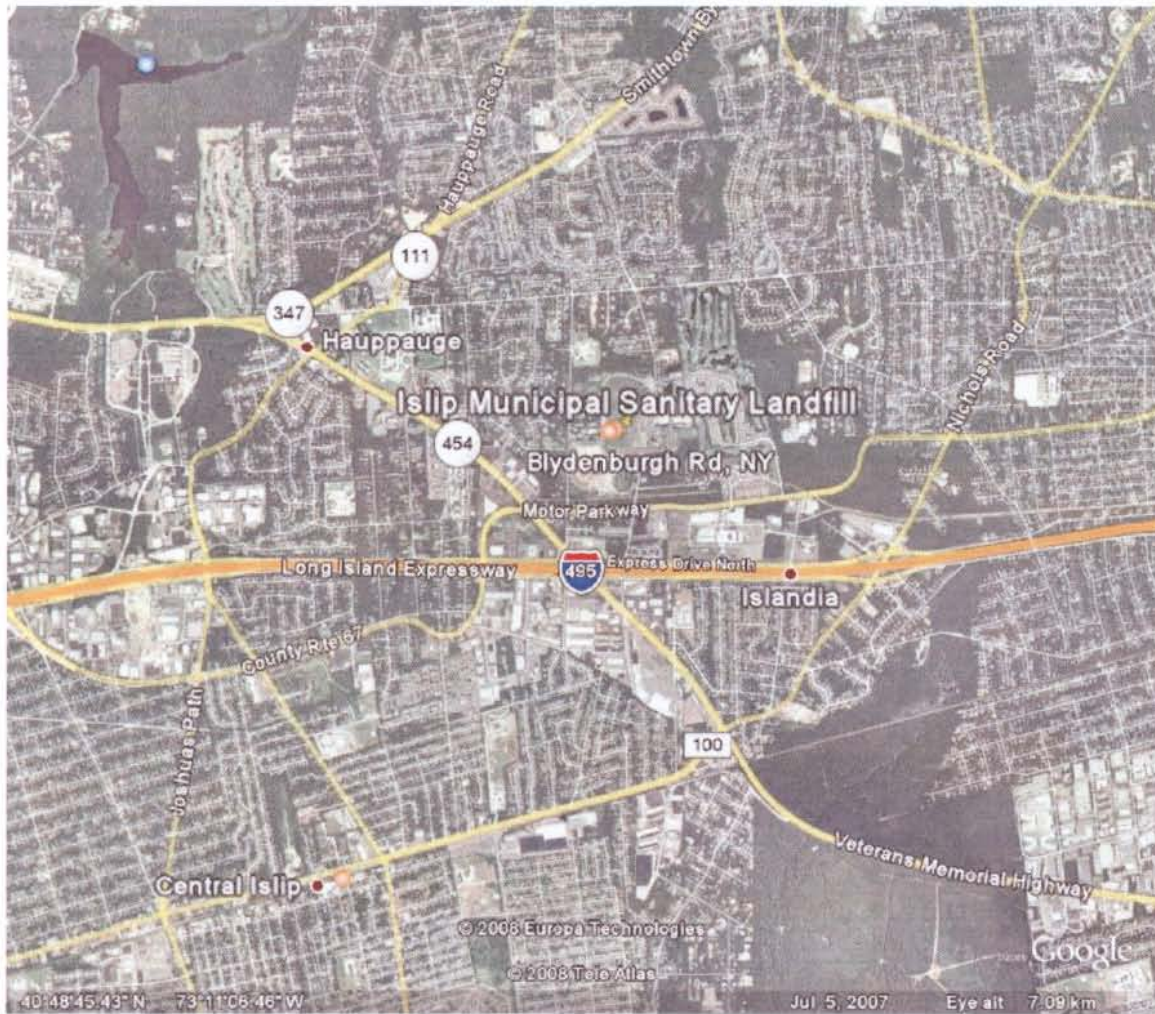


Figure 1 – Site Location Map

Figure 2 - Site Illustration

