Second Five-Year Review Report
Sidney Landfill Superfund Site
Delaware County
Sidney Center, New York

Prepared by:

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

June 2009

Table of Contents

FIGURE

TABLES

EXECUTIVE SUMMARY

This is the second five-year review for the Sidney Landfill Superfund site, located in the Town of Sidney, Delaware County, New York. The assessment of this five-year review is that while the remedy is currently protecting human health and the environment, should there be new construction on the property the vapor intrusion pathway should be evaluated.

Five-Year Review Summary Form

Site Name *(from WasteLAN)*: Sidney Landfill

EPA ID *(from WasteLAN)*: NYD980507677

Region: 2 | **State:** NY | **City/County:** Sidney Center/Delaware County

SITE STATUS

NPL Status: ■ Final ☐ Deleted ☐ Other (specify)

Remediation Status (choose all that apply): ☐ Under Construction ☐ Operating ■ Complete

Multiple OUs? ☐ YES ■ NO | **Construction completion date:** 9/24/2004

Are portions of the site in use or suitable for reuse? ■ YES ☐ NO ☐ N/A

REVIEW STATUS

Lead agency: ■ EPA ☐ State ☐ Tribe ☐ Other Federal Agency

Author name: Young S. Chang

Author title: Remedial Project Manager | **Author affiliation:** EPA

Review period:** 6/2004 to 5/2009

Date(s) of site inspection: 4/09/09

Type of review:

☐ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only
☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead
☐ Regional Discretion ☐ Policy ■ Statutory

Review number: ☐ 1 (first) ■2 (second) ☐ 3 (third) ☐ Other (specify)

Triggering action:

☐ Actual RA Onsite Construction at OU# ☐ Actual RA Start at OU#___
☐ Construction Completion ■ Previous Five-Year Review Report
☐ Other (specify)

Triggering action date *(from WasteLAN)*: 6/16/2004

Due date *(five years after triggering action date)*: 6/16/2009

Does the report include recommendation(s) and follow-up action(s)? ☐ yes ■ no
Is human exposure under control? ■ yes ☐ no
Is migration of contaminated groundwater stabilized? ■ yes ☐ no ☐ not yet determined
Is the remedy protective of the environment? ■ yes ☐ no ☐ not yet determined
Acres in use or available for use: **restricted:** 50 acres **unrestricted:** ___
These 50 acres are on site but outside of the landfill caps.

Five-Year Review Summary Form (continued)

Other Comments on Operation, Maintenance, Monitoring, and Institutional Controls

The selected remedy has been fully implemented. This site has ongoing maintenance and monitoring activities as part of the selected remedy. As anticipated by the decision documents, these activities are subject to routine modification and adjustment.

Although the vapor intrusion pathway was evaluated at two properties located adjacent to the site and was determined not to be a concern, in the unlikely event that there is new construction on the site, the vapor intrusion pathway should be evaluated.

Protectiveness Statement

The implemented remedial actions protect human health and the environment. Currently, there are no exposure pathways that could result in unacceptable risks and none are expected, as long as the site use does not change and the implemented engineering and institutional controls are properly maintained. The disposal areas have been capped and fenced, removing direct contact (*i.e.*, ingestion or dermal contact of soil) exposures to the public. The potential impacts to the groundwater are being addressed through the caps that reduce or prevent percolation through the disposal areas. The groundwater plume is being addressed through extraction and treatment to reduce the levels of contamination to appropriate federal standards. A nearby residence that has been affected by groundwater contamination has been provided with a water treatment system; institutional controls are in place to further prevent potential exposures to the public.

I. Introduction

This five-year review was conducted by Environmental Protection Agency (EPA) Remedial Project Manager (RPM) 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 a five-year review is to assure that implemented remedies protect public health and the environment and that they function as intended by the decision documents. This report will become part of the site file.

This is the second five-year review for the Sidney Landfill site. The trigger for this five-year review is the signature date of the first five-year review report, which was June 16, 2004. The first five-year review was triggered by the initiation of the first remedial action that left hazardous substances, pollutants, or contaminants on-site above levels that allow for unlimited use and unrestricted exposure. The five-year review was conducted from October 2008 through May 2009.

II. Site Chronology

Table 1 summarizes the dates of site-related major events from discovery to the first five-year review report.

III. Background

Physical Characteristics

The 74-acre Sidney Landfill site is situated in hilly terrain within the Susquehanna River basin, in the Town of Sidney, Delaware County, New York, approximately 2.5 miles southeast of Sidney Center and 3.5 miles northeast of Trout Creek. The landfill is situated on the western slope of Richardson Hill, which is on the east side of Richardson Hill Road. The elevation in the area ranges from 1,800 feet above mean sea level at the base of the landfill to 2,120 feet above mean sea level at the top of the hill; the distance between the two points being approximately 1,700 feet. The site is situated on a drainage divide. West of the Sidney Landfill site, adjacent to Richardson Hill Road, is North Pond; to the southwest is South Pond. Both North Pond and South Pond are located on the Richardson Hill Road Landfill Superfund site. To the north, wetlands which receive runoff from the vicinity of the site drain into an unnamed tributary to Carrs Creek, which flows through Sidney Center on its way to the Susquehanna River. Wetlands to the south receive runoff from the vicinity of the site and drain into Herrick Hollow Creek then to Trout Creek, which flows into the Cannonsville Reservoir. The Cannonsville Reservoir is on the west branch of the Delaware River and part of the Delaware watershed system, supplying drinking water to the New York City metropolitan area. There are numerous springs around the site, some of which eventually discharge into the wetlands.

Although the area in which waste was deposited is not well documented, several discrete areas in different parts of the site were filled. The following disposal areas show the presence of hazardous constituents: the North Disposal Area (10.8 acres); the Southeast Disposal Area (6.4 acres); the Southwest Disposal Area (1.9 acres); the Alleged Liquid Waste Disposal Area (3,125 ft^2); the White Goods Disposal Area (8,516 ft^2); and the Can and Bottle Dump Area (19,032 ft^2).

Site Geology/Hydrogeology

The Sidney Landfill site is in the Sonyea Group, as part of the lower Walton Formation. The geology of the bedrock beneath the site is predominately nonmarine, massive, gray sandstones interbedded with siltstone and varying-colored shales. The base of the Sonyea Group dips from north to south and is fairly regular, with occasional mounds, depressions, and undulations. The bedrock at the site consists of alternating sequences of sandstone and siltstone/shale which have a shallow dip of approximately 2 to 3 degrees to the east. The dominant fracture orientation within the exposed bedrock strikes approximately northeast to southwest. A secondary fracture set strikes approximately east to west.

The unconsolidated deposits of the site, glacial till, are generally unsaturated across the site. Saturation of the glacial till deposits only occurs at the base of Richardson Hill, along the valley floor. Typically a downward vertical hydraulic gradient exists between the unconsolidated deposits and the underlying bedrock. The majority of the groundwater flow at the site is within the fractured bedrock underlying the unsaturated unconsolidated deposits. The groundwater flow within the bedrock occurs primarily along bedding planes and fractures, with minimal flow within the primary porosity of the bedrock.

Land and Resource Use

The Sidney Landfill site consists of a mixture of disturbed land, shrub land, and upland forest. Land use is mixed in the vicinity of the site and zoned residential-agricultural. Approximately 50 property owners reside (part-time or permanently) within a one-mile radius of the site. All residences within the immediate vicinity of the site get their water from private wells or springs.

History of Contamination

The land on which the Sidney Landfill is located was purchased in 1967 for the purpose of operating a refuse disposal area. While running the Sidney Landfill, the owner also operated a disposal area on the west side of Richardson Hill Road referred to as the Richardson Hill Road Landfill (RHRL). The Sidney and Richardson Hill Road Landfills were used for the disposal of municipal waste from the Town of Sidney and commercial wastes from Bendix Corporation. The New York State Department of Environmental Conservation (NYSDEC) and New York State Department of Health (NYSDOH) files indicate that the Sidney Landfill was poorly operated, with improper compaction of waste, poor daily covering, no supervision, and uncontrolled access to the site.

Operations at the Sidney Landfill ceased in 1972, and the Town of Sidney began sending its waste to a landfill in Chenango County.

Initial Response

NYSDEC performed a Phase II investigation of the site from 1985 to 1987. In September 1985 and October 1986, NYSDOH collected groundwater samples from residential wells near the site and identified the presence of site contaminants. These efforts lead to the proposed listing of the site on the Superfund National Priorities List (NPL) on June 24, 1988.

Basis for Taking Action

The site was listed on the NPL on March 31, 1989. EPA conducted a remedial investigation and feasibility study (RI/FS) from 1991 to 1995. Bedrock groundwater samples collected during the RI indicated the presence of chlorinated and nonchlorinated volatile organic compounds (VOCs). Three private water supplies sampled during the RI also contained contaminants found in site groundwater; two were found to be above drinking water standards Surface soils at the site were found to contain elevated concentrations of pesticides, polychlorinated biphenyls (PCBs), and inorganic compounds. Leachate samples identified the presence of chlorinated VOCs and PCBs.

IV. Remedial Actions

Remedy Selection

The Record of Decision (ROD) for the Sidney Landfill site was signed on September 28, 1995. Remedial Action Objectives (RAOs) are specific goals to protect human health and the environment. These objectives are based on available information and standards such as applicable or relevant and appropriate requirements and risk-based levels established in the risk assessment. The following RAOs were established for the site:

- minimize infiltration and the resulting contaminant leaching to groundwater;
- control surface water runoff and erosion;
- mitigate the off-site migration of contaminated groundwater;
- restore groundwater quality to levels which do not exceed state or federal drinking-water standards;
- control generation and prevent migration of subsurface landfill gas; and
- prevent contact with contaminants in the groundwater.

The selected remedy in the ROD includes the following:

- Excavating and relocating waste from the Can and Bottle Dump Area to the adjacent North Disposal Area;

- Construction of four independent closure caps in accordance with the New York State 6 NYCRR Part 360 requirements over the North Disposal Area, the White Goods Disposal and Alleged Liquid Disposal Areas (capped together), the Southeast Disposal Area, and the Southwest Disposal Area, and the construction of four individual chain-link fences;

- Extracting contaminated groundwater from a "hotspot" in the bedrock aquifer in the vicinity of monitoring well MW-2S (located just east of the North Disposal Area, where floating product was detected) via a blasted bedrock trench, followed by air-stripping or other appropriate treatment, and discharge to surface water;

- Securing institutional controls (the placement of restrictions on the installation and use of groundwater wells at the site and restrictions on the future use of the site in order to protect the integrity of the caps); and,

- Long-term monitoring of groundwater, surface water, and sediments.

The ROD also stated that after the construction of the caps and the extraction and treatment of the contaminated groundwater in the vicinity of monitoring well MW-2S for five years, the results of semiannual bedrock groundwater monitoring would be evaluated using trend analysis and possibly modeling of the bedrock aquifer to determine whether it appeared that the groundwater quality in the bedrock aquifer would be restored to acceptable levels through natural attenuation cost-effectively and within a reasonable time frame. Should the trend analysis and/or modeling show that groundwater quality in the bedrock aquifer would likely not be restored within a reasonable time frame by natural attenuation alone, then site-wide bedrock groundwater extraction and treatment would be implemented.

Remedy Implementation

On July 9, 1996, EPA issued a Unilateral Administrative Order, EPA Index No. II-CERCLA-96-0204 to the potentially responsible parties (PRPs) to conduct the remedial design/remedial action (RD/RA). The RD was initiated in 1997.

Landfill Caps

The contractor mobilized on June 16, 1999 to implement the landfill caps remedy. During the construction period, 1,200 cubic yards (cy) of waste was excavated from the Can and Bottle Dump Area and consolidated onto the North Disposal Area and Part 360 caps were installed over the North Disposal Area, Southeast Disposal Area, Southwest Disposal Area, Alleged Liquid Waste Disposal Area, and White Goods Disposal Area[1]. The caps consisted of a 12-inch gas venting layer, a textured 60-mil high density polyethylene geomembrane liner, a 24-inch barrier

[1] The ROD called for four individual caps because the Alleged Liquid Waste Disposal Area and White Goods Disposal Area were going to be combined under one cap. However, during the design phase a determination was made that the best location for an access road would go between the two disposal areas. Therefore, these two areas were capped and fenced independently. This was documented in the design field changes of the RA Report.

protection layer, and a 6-inch topsoil layer. Each cap was enclosed by a chain-link fence. The cap construction work was completed in November 1999.

Groundwater

The ROD specified that VOCs in groundwater were to be reduced to cleanup standards by extraction and treatment of groundwater from a "hotspot" near monitoring well MW-2S and by natural attenuation in downgradient areas. As part of a 1998 pre-design investigation, a blasted-bedrock trench was pilot-tested for the purpose of developing design criteria for a trench to be used for groundwater extraction in the "hotspot" area. The blasting created hydraulic interconnectivity between shallow and deep bedrock zones that resulted in dewatering the aquifer zone near monitoring well MW-2S. Consequently, groundwater extraction adjacent to monitoring well MW-2S was no longer possible. In addition, while groundwater contamination in wells downgradient of the former "hotspot" area is still present, aquifer testing results indicate that a hydraulic connection exists between the contaminated downgradient Sidney Landfill site monitoring wells and recovery wells located in the "North Area" portion of the adjacent RHRL site (see Figure 1) and the RHRL site extraction system is capturing the contaminants from the Sidney Landfill site. Therefore, it was concluded that the downgradient groundwater contamination at the Sidney Landfill site will be addressed utilizing the RHRL site's recovery wells. The above-noted findings and conclusions were documented in an Explanation of Significant Differences (ESD) approved on September 24, 2004.

Institutional Controls

The ROD required the implementation of institutional controls to restrict the use of on-site groundwater and to protect the integrity of the caps.

Environmental Restriction Easements and Declaration of Restrictive Covenants that run with the land were entered into between the property owners adjacent to the site and the PRPs. These were recorded in the Delaware County Clerk's Office on January 22, 2002. These easements provide for restrictions on groundwater consumption at the two properties where water treatment systems were installed pursuant to RHRL site Administrative Order on Consent to address groundwater contamination related to the RHRL site. One of these properties was determined to be structurally unstable and the owners had the building demolished in 2008. The water treatment system at the other residence still exists but it is not being used while the owner makes electrical upgrades.

The land on which the landfill caps are located is owned by the estate of Louis Mangone. The Mangones declined to enter into an Environmental Restrictive Easement and Declaration of Restrictive Covenants with either the PRPs or EPA. As a result, EPA directed that the PRPs file a Notice to Successors in Title containing information similar to an Environmental Restrictive Easement. The Notice was recorded in the Delaware County Clerks Office on September 20, 2007. The notice, together with other Site control measures, such as signage and fencing, should provide adequate site use restrictions.

System Operations/Operation and Maintenance

An Operation and Maintenance Manual, covering inspection and maintenance procedures for the site, was submitted and approved by EPA in December 1999. During the first year following the landfill caps construction, the site was inspected quarterly and following heavy storm events. For the subsequent years, the site has been inspected on a quarterly basis as follows:

- Each of the five landfill areas is inspected for debris, litter and/or waste.
- The landfill caps are inspected for vegetation loss due to erosion or poor grass growth. Annual ground inspections at the beginning of each summer also note the status of woody plant species on the landfill surface and side slopes.
- The landfill caps are inspected for settlement, ponding, and animal borrows.
- The gas venting pipes are inspected for damage.
- The access roads are inspected for rutting, tree blockage, and settlement.
- The site access gate and the five landfill area security fences are inspected for operational locks and vandalism.
- The culverts, drainage ditches, and level spreaders are inspected for sediment buildup or erosion.
- The groundwater monitoring wells are inspected for operational locks, damage, and vandalism.

Following the construction of the landfill caps, samples were collected and analyzed for VOCs on a quarterly basis from two springs (springs 6 and 7) and one surface water body (North Pond). This sampling was discontinued in mid-2003 since the results from eight consecutive quarterly sampling events showed no detections.

The monitoring wells are sampled and vapor emanating from the gas vents are measured on a quarterly basis. Routine maintenance involves addressing any of the items requiring repairs and grass mowing.

The inspections, maintenance, sampling, monitoring, data evaluation and reporting costs are approximately $120,000 on an annual basis; these costs are broken down in Table 2.

V. Progress Since Last Five-Year Review

The first five-year review was conducted in June 2004. The 2004 review concluded that the portion of the remedy that had been implemented at the time (the excavation of contaminated

soils and the capping of the landfill areas) was done so in accordance with the remedy selected in the ROD and that it was fully protective of human health and the environment. The five-year review also concluded that although a final groundwater remedy had not been implemented at that time, there were no exposure to human receptors from site-related contaminants and no exposures were anticipated over the next five years. For the interim, the site was determined to be protective of human health and the environment.

While there were no recommendations or follow-up actions associated with the previous review, the first five-year review noted that, although the concentrations of contaminants in the groundwater had decreased over time, the vapor intrusion pathway should be evaluated in the near-term using the new guidance to ensure that this exposure pathway is not contributing to unacceptable risks or hazards at the site or nearby residences. To that end, in January 2008, EPA sampled both the soil gas in the sub-slab and the indoor air at two properties located adjacent to the site. The sample results identified no vapor intrusion pathway issues at one property. At the other, sample results indicated that the risks were within the upper bounds of the risk range, with the primary contaminant identified being 1,2-dibromomethane. This chemical is not site-related and is believed to be from an indoor source.

The previous five-year review also noted that negotiations with the family of the late Louis Mangone were underway to enter into an environmental easement which would ensure continued access to the site, restrict the use of groundwater at the site, and prohibit activities which may affect the caps. Since the Mangones ultimately declined to enter into an Environmental Restrictive Easement and Declaration of Restrictive Covenants, the PRPs filed a Notice to Successors in Title containing information similar to an Environmental Restrictive Easement. The Notice was recorded in the Delaware County Clerks Office on September 20, 2007.

In addition, since the last five-year review, EPA determined that construction activities at the Sidney Landfill site have been completed in accordance with the Close Out Procedures for National Priorities List Sites (OSWER Directive 9320.2-09), as documented in the September 2004 Preliminary Close Out Report. EPA also concluded that the extraction and treatment of contaminated groundwater in the former "hotspot" area was no longer necessary and that the downgradient groundwater contamination at the site would be addressed utilizing the RHRL site's groundwater extraction and treatment system.

VI. Five-Year Review Process

Administrative Components

The five-year review team consisted of Young Chang (RPM), Ed Modica (Hydrogeologist), Marian Olsen (Risk Assessor), and Mindy Pensak (Biological Technical Assistance Group).

Community Involvement

The EPA Community Involvement Coordinator (CIC) for the Sidney Landfill site, Cecilia Echols, published a notice in the *Tri-Town News,* a local newspaper, on February 5, 2009,

notifying the community of the initiation of the second five-year review process. The notice indicated that EPA would be conducting a five-year review to ensure that the remedies implemented at the site remain protective of public health and are functioning as designed. It also indicated that once the five-year review is completed, the results will be made available in the 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 or the Sidney Landfill site. No comments were received.

Document Review

The documents, data, and information which were reviewed in completing the five-year review are summarized in Table 3 (attached).

Data Review

As part of an assessment of site-wide monitored natural attenuation (MNA), quarterly groundwater sampling was initiated in November 2001 along with site-wide VOC data collection. Table 4 summarizes the site-wide VOC results, in particular trichloroethene (TCE), 1,2-dichloroethene (1,2-DCE), and vinyl chloride (VC) for this review period. The following summarizes these sample results:

- Since the last five year review, the former "hotspot" area groundwater data shows TCE ranging from not detected to 250 micrograms per liter (μg/l); 1,2-DCE ranging from not detected to 19 μg/l; and VC ranging from not detected to less than 10 μg/l. No LNAPL was recovered. VOC concentrations in the former "hotspot" area continue to be equal to or less than concentrations found in the remainder of the site.

- Outside of the former "hotspot" area, the greatest concentrations of contaminants of concern (TCE, 1,2-DCE, and VC respectively) are present in monitoring wells MW-6S (190 μg/l, 150 μg/l, and 53 μg/l) and MW-6D (670 μg/l , 750 μg/l, and 7.4 μg/l). As part of the remedy for RHRL site, since August 2003, a bedrock groundwater recovery system has been in operation in the "North Area" portion of the RHRL site. The "North Area" portion of the RHRL site is in close proximity to the Sidney Landfill site (see Figure 1). Based on the results of an aquifer pumping test, it has been concluded that a hydraulic connection exists between Sidney Landfill monitoring well clusters and RHRL North Area recovery wells. Pumping of the recovery system creates a potential for groundwater flow from the Sidney Landfill's western site boundary wells to the RHRL North Area.

Site Inspection

On April 9, 2009, a five-year review-related site inspection was conducted by Young Chang, Ed Modica, and Marian Olsen. Also present at the site inspection were Rich Galloway, Honeywell (PRP), James Mickam, JTM Associates (PRPs' contractor), and Gerald Pratt, New York State Department of Environmental Conservation project manager.

Interviews

No interviews were conducted for this review.

Institutional Controls Verification

The Environmental Easements on the adjacent properties and the Notice to Successors in Title recorded for the land on which the landfill caps are located have been verified as being in place.

Other Comments on Operation, Maintenance, Monitoring, and Institutional Controls

Table 5 summarizes several observations and offers suggestions to resolve these issues.

VII. Technical Assessment

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

Based upon a review of the data collected during the review period and the April 9, 2009 inspection, it has been concluded that the remedy at the site is functioning as intended by the decision documents.

The soil component of the selected remedy calls for the excavation and consolidation of waste from the Can & Bottle Dump Area on the adjacent North Disposal Area and the construction of four independent caps and chain link fences at the disposal areas. Twelve hundred cy of waste material was excavated and relocated from Can & Bottle Dump Area to the adjacent North Disposal Area and caps were constructed on the disposal areas in accord with the New York State 6 NYCRR Part 360 design standard. Institutional Controls were imposed to restrict future use of the site in order to protect the integrity of the caps.

The ROD called for the VOCs in groundwater in the "hotspot" near monitoring well MW-2S to be reduced to cleanup standards by extraction and treatment and by natural attenuation in downgradient areas. Since groundwater data indicate that the elevated concentrations of contaminants are no longer present in the "hotspot" area, extraction and treatment of contaminated groundwater in this area is no longer necessary. In addition, aquifer testing results indicate that a hydraulic connection exists between the contaminated downgradient Sidney Landfill monitoring wells and recovery wells located at the adjacent RHRL site and the RHRL site system is capturing the contaminants from the Sidney Landfill site, obviating the need for a separate extraction and treatment system on the Sidney Landfill property. The above-noted findings and conclusions were documented in a September 2004 ESD and Preliminary Close-Out Report of September 2004.

An evaluation of extraction well performance from the four recovery wells in the North Area of the RHRL site indicated that the wells generate a cone of depression sufficient to maintain

hydraulic control. Water quality trends in monitoring wells indicate that contaminated groundwater is contained by North Area extraction wells. The operational assessment of the treatment facility indicates that the intake rates were well within design capacity of 100 gallons per minute. The treatment system is successfully treating contaminants to NYSDEC surface water discharge limits.

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

The implementation of the landfill caps portion of the remedy has significantly reduced the exposure risk to potential receptors and has reduced the sources of groundwater contamination.

Soil uses have not changed during the past five years and are not expected to change during the next five years. The land use considerations and potential exposure pathways considered in the baseline human health risk assessment (*i.e.*, residential, trespassing, and utility worker exposures) are still valid. The remedial action to address the soil contamination included the excavation and consolidation of one source area and the installation of five New York State 6 NYCRR Part 360 caps. The maintained caps provide a barrier to exposure to site contaminants.

The quarterly inspection reports over the past five years indicate that the fences are vandalized (cut) on regular basis, coinciding with hunting season. As a result, the fences are repaired on regular basis. The third quarter report for 2008, however, indicates "it appears that the individuals (suspected hunters) who have breached the fence are closing their access holes and re-securing the fence when they leave the site." Based on this history, continued monitoring and repair of fences will be ongoing.

Groundwater use has not changed during the past five years and is not expected to change during the next five years. The land-use considerations (residential) and potential exposure pathways considered in the baseline human health risk assessment are still valid. At the time of the ROD, the Applicable or Relevant and Appropriate Requirements selected were the Maximum Contaminant Levels (MCLs) established under the Safe Drinking Water Act. The values selected are consistent with the current MCLs and remain protective. Since the ROD was signed, several toxicity values are under review or have been updated through the Integrated Risk Information System, EPA's database of toxicity values, and other programs. Based upon a comparison of the maximum concentrations found in the sampled groundwater wells with the Regional Screening Level residential concentrations established at a risk level of 10^{-6} and a noncancer Hazard Quotient equal to 1, it has been concluded that the MCLs remain protective and are still valid.

Since the Environmental Easements and the Notice to Successors in Title provide for restrictions on groundwater consumption, the remedy is protective for this exposure pathway.

During the first five-year review, vapor intrusion into indoor air was identified as a potentially important route of exposure at the site. This exposure pathway is based on the conservative (health protective) assumption that buildings are located above the maximum detected concentration of the contaminants of concern in the groundwater and accumulating vapors that

are migrating up through the vadose zone. It is evaluated using the health-based screening criteria provided in EPA's *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils* (EPA, 2002). In January 2008, a vapor intrusion study was conducted at two residences located adjacent to the site. Sub-slab soil gas results indicated no vapor intrusion pathway issues at one property. At the other property, sample results indicated that the risks were within the upper bounds of the risk range, with the primary contaminant identified being 1,2-dibromomethane. This chemical is not site-related and is believed to be from an indoor source.

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

There is no information that calls into question the protectiveness of the remedy.

Technical Assessment Summary

Based upon the results of the five-year review, it has been concluded that:

- The five Part 360 caps and vegetative covers are intact and in good condition, with no settling;
- The fences around the individual caps within the site are intact and in good repair;
- The groundwater monitoring wells are functional and are in good condition;
- The culverts and drainage ditches are clear of sediment buildup;
- There continues to be some evidence of vandalism to the fencing coinciding with hunting season, which were repaired upon discovery; and
- There are no drinking water wells within the groundwater plume and none are expected to be drilled because of the existing easements.

VIII. Recommendations and Follow-Up Actions

There are no recommendations or follow-up actions associated with this review.

IX. Protectiveness Statement

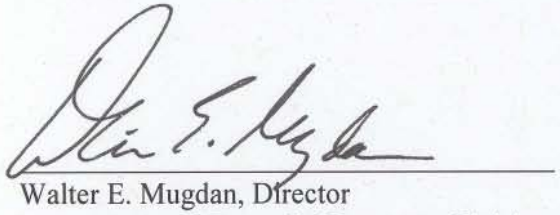
The implemented remedial actions protect human health and the environment. Currently, there are no exposure pathways that could result in unacceptable risks and none are expected, as long as the site use does not change and the implemented engineering and institutional controls are properly maintained. The disposal areas have been capped and fenced, removing direct contact

(*i.e.*, ingestion or dermal contact of soil) exposures to the public. The potential impacts to the groundwater are being addressed through the caps that reduce or prevent percolation through the disposal areas. The groundwater plume is being addressed through extraction and treatment to reduce the levels of contamination to appropriate federal standards. A nearby residence that has been affected by groundwater contamination has been provided with a water treatment system and institutional controls are in place to further prevent potential exposures to the public.

X. Next Review

Since hazardous substances, pollutants or contaminants remain at the Sidney Landfill site which do not allow for unlimited use or unrestricted exposure, in accordance with 40 CFR 300.430 (f) (4) (ii), the RA for the site shall be reviewed no less often than every five years. EPA will conduct another five-year review on or before June 2014.

Approved:



Walter E. Mugdan, Director
Emergency and Remedial Response Division

June 15, 2009
Date

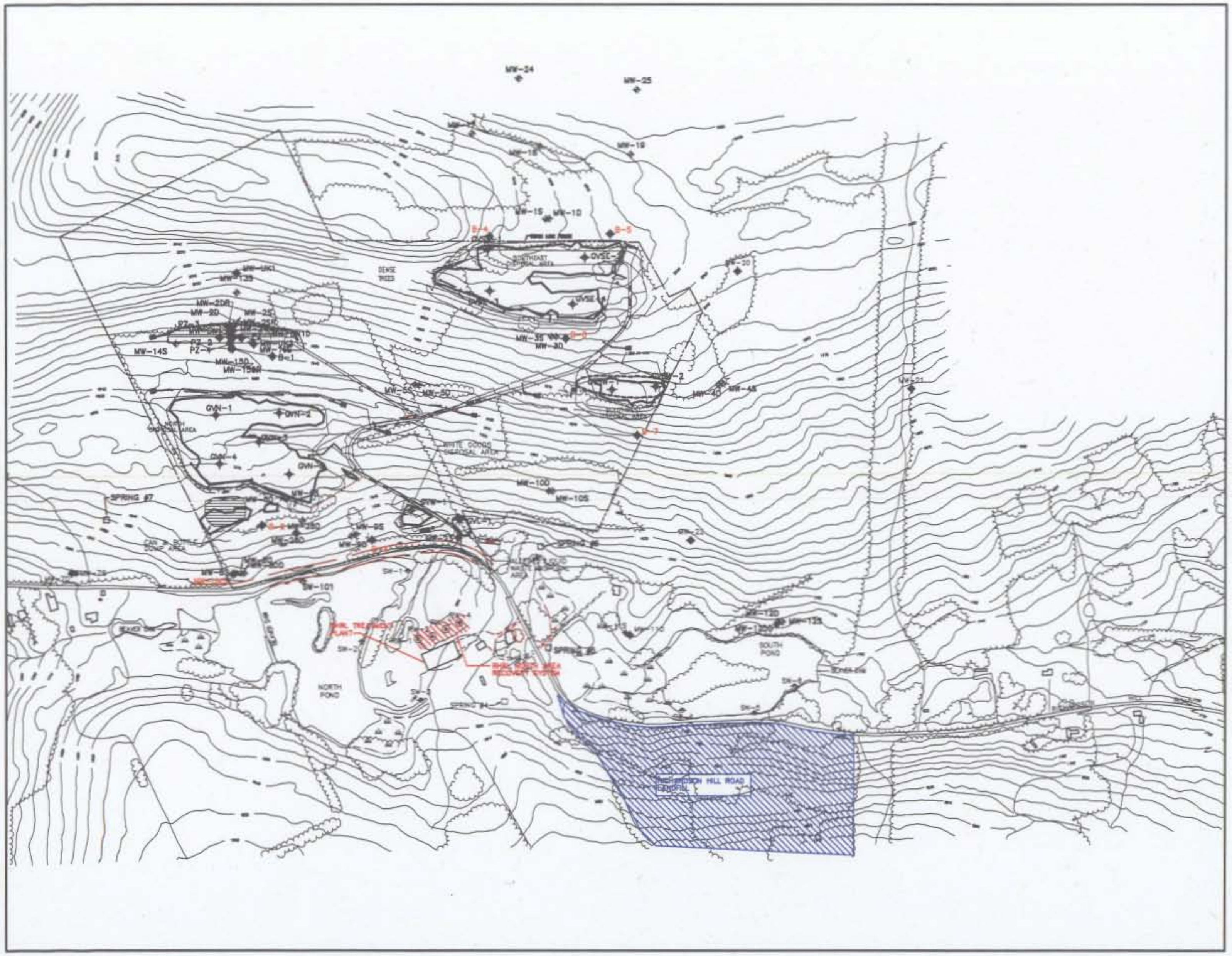


FIGURE 1

SIDNEY LANDFILL ENVIRONMENTAL MONITORING PROGRAM

SITE MAP

LEGEND

- BEDROCK MONITORING WELL
- GLACIAL TILL MONITORING WELL
- GAS VENT LOCATION
- SURFACE WATER SAMPLE LOCATION
- RECOVERY WELL
- SPRING
- TREE LINE
- SIDNEY LANDFILL PROPERTY BOUNDARY
- WASTE LIMITS

NOTES:

1. ADAPTED FROM MAPS AND ILLUSTRATIONS PREPARED BY HARDING ESE.
2. TOPOGRAPHIC SURVEY FROM MALCOLM PIRNIE; JANUARY 1995.

200 0 200 400

JTM ASSOCIATES, LLC
environmental consulting

PLOT DATE: 8/24/06

Table 1: Chronology of Site Events	
Event	**Date(s)**
Commencement of operation of the landfill	1967
NYSDEC Phase II investigations detect contamination	1985-1987
Site placed on National Priorities List	1989
EPA conducts RI/FS	1991-1995
Record of Decision is signed	1995
Unilateral Administrative Order issued to the Respondents	1996
Site-wide Remedial Design started	1996
Remedial Design investigation for "hotspot" groundwater in MW-2S Area conducted	1997-2003
Remedial Design completed for earthwork (excavation/consolidation and caps)	1998
Remedial Action for earthwork started and completed	1999
Remedial Action Report for earthwork approved	2000
Initiate landfill cap maintenance and inspections	2000
Environmental Monitoring Data Review Report draft submitted	2004
Explanation of the Significant Differences issued	2004
Conduct First Five-Year Review	2004
Initiate routine groundwater monitoring and quarterly inspections	2004
Preliminary Site Close-Out Report issued	2004
Final Interim Remedial Action Report for Remedial Work Element II-Groundwater Collection and Treatment and Operation and Maintenance Manual for Richardson Hill Road Landfill Site submitted by Parsons and approved.	2007
Interim Remedial Action Report for Groundwater approved	2007
Select number of wells not in the monitoring plan decommissioned	2008

Table 2: Annual Monitoring Costs	
Estimated Costs for Contract Performance	**Cost per Year**
Sampling and analysis (quarterly)	$20,000
Site inspection/maintenance/data evaluation and reporting	$100,000
Total estimated cost	*$120,000*

Table 3: Documents, Data, and Information Reviewed in Completing the Five-Year Review	
Document Title, Author	Submittal or Signed Date
Record of Decision, EPA	September 1995
First Five-Year Review Report, EPA	June 2004
Explanation of the Significant Differences, EPA	September 2004
Preliminary Site Close-Out Report, EPA	September 2004
Inspection and Monitoring Reports from First Quarter 2004 through Third Quarter 2008, JTM Associates	February 2004 – August 2008
2004 Annual Inspection and Monitoring Report, JTM Associates	August 2005
2005 Annual Inspection and Monitoring Report, JTM Associates	August 2006
2006 Annual Inspection and Monitoring Report, JTM Associates	August 2007
2007 Annual Inspection and Monitoring Report, JTM Associates	September 2008
Preliminary Groundwater data for 1st and 2nd quarterly monitoring event for 2008	October 2008
EPA guidance for conducting five-year reviews and other guidance and regulations to determine if any new Applicable or Relevant and Appropriate Requirements relating to the protectiveness of the remedy have been developed since EPA issued the ROD.	

Table 4: Site-Wide TCE, 1,2-DCE, and VC Concentrations Detected from 2004 to 2008 at the Sidney Landfill Site

TCE (ug/l)

	2004				2005				2006				2007				2008			
Well No.	Feb	May	Aug	Nov	Feb	May	Aug	Nov	Feb	May	Aug	Nov	Mar	May	Aug	Nov	Mar	May	Aug	Nov
MW-1S	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*
MW-1D	52	52	39	23	36	57	NS*	59	53	38	23	32	8.6	11	23	37	13	21	22	NS*
MW-2S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NS*	11
MW-2D	ND	NS*	ND	ND	7.2J	5.2J	NS*	ND	6.1J	NS*	NS*	7.2J	ND	ND	ND	ND	6.4J	ND	ND	ND
MW-3S	26	40	24	28	26	26	16	18	28	20	30	29	ND	17	14	29	24	18	16	17
MW-3D	6.7J	ND	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	ND	NS*	NS*
MW-6S	120J	130J	130	120	88	160	72	46	90	170	180	78	62	130	96J	81	160	190	140	72
MW-6D	660	170	160	180	110	310	460	150	73	520	410	130	330	94	120	300	670	250	530	560
MW-8S	10	ND	6.2J	5.9J	8.4J	9.8J	9.7J	10	6.6J	9.2J	12	8.4J	11	12	13	13	9J	12	11	8.7
MW-8D	6.2	7.9J	6.1J	7J	6.5J	9.2J	12	8.5J	10	10	12	10	9.8	8.4J	11	12	9.6J	11	11	11
MW-9S	23	15	24	22	17	27	29	23	18	23	27	22	17	17	22	26	17	20	23	20
MW-14S	10	ND	6.8J	ND	ND	12	7.1J	ND	ND	10	5.3J	ND	5.1	6.6J	5.6J	10	ND	5.3	5.4	8.3
MW-15SR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	250	160
MW-15D	ND	ND	5.9J	ND	7.6J	5J	ND	ND	ND	ND	ND	5.2J	ND	ND	ND	ND	ND	ND	4.5	9.8
MW-16S	37	ND	23	12	9.6J	12	24	13	11	8.7J	24	11	ND	8.5J	29	14	8J	12	22	13
MW-17	ND	ND	ND	ND	ND	5.7J	NS*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS*	NS*
MW-18	ND	ND	ND	ND	ND	ND	NS*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2	ND
NW-19	5.5J	7J	6.6J	5.1J	6.3J	6.7J	12	6.6J	7.1J	7.8J	6.9J	5.3J	6	5.1J	10	6.3J	5.2	ND	10	10
MW-23	9.2J	ND	8.6J	5.6J	5.5J	7.4J	11J	7.2J	5.3J	7J	7.4J	ND	5.4	ND	9.8J	6.5J	ND	5.2	9.7	10
MW-26D	ND	ND	ND	ND	ND	ND	NS*	NS*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS*	ND

highest concentration detected during the review period
ND = non detect, but it also can be less than detection limit (5 ug/l).
NS* = not sampled due to insufficient volume
"-" = not sampled
J = estimated

Sidney table 4- 2nd 5yr review 032609.xls

(continued pg 2 of 3)

Table 4: Site-Wide TCE, 1,2-DCE, and VC Concentrations Detected from 2004 to 2008 at the Sidney Landfill Site

1,2-DCE (ug/l)

	2004				2005				2006				2007				2008			
Well No.	Feb	May	Aug	Nov	Feb	May	Aug	Nov	Feb	May	Aug	Nov	Mar	May	Aug	Nov	Mar	May	Aug	Nov
MW-1S	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*
MW-1D	67	62	47	34	52	55	NS*	72	68	50	26	51	7.4	14	29	65	28	26	27	NS*
MW-2S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NS*	8
MW-2D	ND	NS*	ND	ND	ND	ND	NS*	ND	ND	NS*	NS*	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-3S	20	22	13	16	14	13	13	8.5J	15	12	19	18	ND	11	9.1J	16	21	11	14	12
MW-3D	16	19	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	6.1	NS*	NS*
MW-6S	150J	73	65	69	61	86	57	61	76	93	100	87	100	72	84	100	130	73	100	66
MW-6D	410	80	80	89	67	144	340	84	39	410	300	70	130	37	40	200	750	160	440	450
MW-8S	35	29	22	20	30	30	26	27	19	31	34	30	32	35	33	41	37	31	32	28
MW-8D	19	26	17	20	27	23	27	25	33	28	35	31	24	24	29	33	40	27	28	25
MW-9S	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	17	17	22	26	ND	ND	ND	ND
MW-14S	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-15SR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19	8.1
MW-15D	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-16S	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-17	ND	7.9J	6.7J	5J	5.2J	6.3J	NS*	ND	5.3J	6.6J	6.2J	ND	ND	ND	ND	ND	6.7J	ND	NS*	NS*
MW-18	ND	5J	5.5J	5.1J	6.8J	5J	NS*	5.1J	6.1J	ND	5.4J	6.8J	6.8	ND	ND	ND	5.1J	ND	ND	ND
NW-19	10	12	9.4J	8.6J	9.7J	8.4J	17	11	11	11	9.7J	9.8J	ND	7J	16	9.6J	11	ND	16	18
MW-23	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.4	ND	9.8J	6.5J	ND	ND	ND	ND
MW-26D	19J	19	13	12	15	13	NS*	NS*	ND	21	13	14	14	12	ND	12	18	13	NS*	ND

highest concentration detected during the review period
ND = non detect, but it also can be less than detection limit (5 ug/l).
NS* = not sampled due to insufficient volume
"-" = not sampled
J = estimated

(continued pg 3 of 3)

Table 4: Site-Wide TCE, 1,2-DCE, and VC Concentrations Detected from 2004 to 2008 at the Sidney Landfill Site

VC (ug/l)

	2004				2005				2006				2007				2008			
Well No.	Feb	May	Aug	Nov	Feb	May	Aug	Nov	Feb	May	Aug	Nov	Mar	May	Aug	Nov	Mar	May	Aug	Nov
MW-1S	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*
MW-1D	11	<10	<10	8J	<10	13	<10	13	17	<10	<10	<10	<10	<10	<10	<10	<10	ND	ND	NS*
MW-2S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NS*	ND
MW-2D	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ND	ND	ND
MW-3S	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ND	ND	ND
MW-3D	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	NS*	<10	<10	<10	<10	NS*	ND	NS*	NS*
MW-6S	18J	<10	39	41J	36	30	49	35	19	32	26J	22	30	34J	53	43	33	32	42	30
MW-6D	7J	<10	<10	4J	<10	4J	<10	3J	<10	<10	<10	<10	<10	<10	<10	<10	ND	4.4	7.4	8.4
MW-8S	5J	<10	<10	6J	<10	8J	10J	3J	<10	<10	<10	<10	6NJ	17J	12	13	<10	9	7	5.2
MW-8D	2J	<10	<10	10J	17	8J	16	10	<10	<10	<10	<10	<10	14J	14	17	11	12	11	8.4
MW-9S	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ND	ND	ND
MW-14S	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ND	ND	ND
MW-15SR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND	ND
MW-15D	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ND	ND	ND
MW-16S	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ND	ND	ND
MW-17	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ND	NS*	NS*
MW-18	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ND	ND	ND
NW-19	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ND	ND	ND
MW-23	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ND	ND	ND
MW-26D	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ND	NS*	ND

highest concentration detected during the review period
ND = non detect, but it also can be less than detection limit (2 ug/l).
NS* = not sampled due to insufficient volume
"-" = not sampled
J = estimated

VC cleanup level is 2 ug/l. However, many of the detection limit was higher

Table 5: Other Comments on Operation, Maintenance, Monitoring, and Institutional Controls	
Comment	**Suggestion**
There continues to be vandalism to the fencing coinciding with hunting season, which were repaired upon discovery. (Note: Even though the fences were cut in places, the integrity of the landfill caps were still good, thereby maintaining one of the remedial action objectives, minimize infiltration and the resulting contaminant leaching to groundwater).	As part of site maintenance, the access gate and the five landfill area security fences will continue to be inspected for operational locks and vandalism; repairs will be made when necessary.
The vapor intrusion pathway was evaluated at two properties located adjacent to the site and was determined not to be a concern. Since groundwater contaminant concentrations on-site are significantly greater than the concentrations found at the two properties located adjacent to the site, vapor intrusion could be a potential concern in the unlikely event that the site is developed.	Should there be new construction on the site; the vapor intrusion pathway should be evaluated.
New York State now requires annual certifications that institutional controls that are required by RODs are in place and that remedy-related operation and maintenance is being performed.	On an annual basis, the site will be inspected to determine whether any intrusive activities have been performed. The annual report should include a summary of the findings of the above-noted activities, along with a certification that the institutional controls are in place and that remedy-related maintenance is being performed.

Table 6: Acronyms Used in this Document	
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIC	Community Involvement Coordinator
CY	Cubic Yards
1,2-DCE	1,2-Dichloroethene
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
μg/l	Micrograms per liter
MCLs	Maximum Contaminant Levels
MNA	Monitored Natural Attenuation
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Protection
NYSDOH	New York State Department of Health
PCBs	Polychlorinated Biphenyls
PRPs	Potentially Responsible Parties
RA	Remedial Action
RD	Remedial Design
RHRL	Richardson Hill Road Landfill
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
TCE	Trichloroethene
VC	Vinyl Chloride
VOCs	Volatile Organic Compounds