# Five-Year Review Report
# DuPont Necco Park Landfill Superfund Site
# City of Niagara Falls
# Niagara County, New York


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

## July 2009

**First Five-Year Review Report**
**DuPont Necco Park Landfill Superfund Site**

## Table of Contents

**Tables**

## Executive Summary

This is the first Five-Year Review for the DuPont Necco Park Landfill Superfund Site located in the City of Niagara Falls, Niagara County, New York.

Based upon reviews of the 1998 Record of Decision, the 2007 Remedial Action Report, 2006, 2007 and 2008 Quarterly Groundwater Sampling Results, 2006, 2007 and 2008 Annual Operation & Maintenance Reports, Site Inspection Reports and a Site inspection by EPA in June 2009, it has been concluded that the remedies as defined in the decision documents for the Site continue to protect human health and the environment.

## Five-Year Review Summary Form

| SITE IDENTIFICATION | | |
|---|---|---|
| **Site Name *(from WasteLAN)*:** DuPont Necco Park Landfill Superfund Site | | |
| **EPA ID *(from WasteLAN)*:** | | |
| **Region:** 2 | **State:** NY | **City/County:** Niagara Falls/Niagara |
| **SITE STATUS** | | |
| **NPL Status:** ☐Final ☐ Deleted ■ Other (specify) non NPL site | | |
| **Remediation Status** (choose all that apply): ☐ Under Construction ☐ Operating ■ Complete | | |
| **Multiple OUs?** ☐ YES ■ NO | | **Construction completion date:** 11/06 |
| **Has site been put into reuse?** ☐YES ■ NO ☐ N/A | | |
| **REVIEW STATUS** | | |
| **Lead agency:** ■ EPA ☐ State ☐ Tribe ☐ Other Federal Agency | | |
| **Author name:** Gloria M. Sosa | | |
| **Author title:** RPM | | **Author affiliation:** EPA |
| **Review period:**** 09/28/2004 to 07/22/2009 | | |
| **Date(s) of site inspection:** 06/10/2009 | | |
| **Type of review:**<br>☐ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only<br>☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead<br>☐ Regional Discretion ■ Statutory | | |
| **Review number:** ■ 1 (first) ☐ 2 (second) ☐3 (third) ☐ Other (specify) | | |
| **Triggering action:**<br>■ Actual RA On-Site Construction ☐ Actual RA<br>☐ Construction Completion ☐ Previous Five-Year Review Report<br>☐ Other (specify) | | |
| **Triggering action date *(from WasteLAN)*:** 08/18/2004 | | |
| **Due date *(five years after triggering action date)*:** 08/18/2009 | | |
| **Does the report include recommendation(s) and follow-up action(s)?** ■yes ☐ no<br>**Acres in use or available for use:** **restricted:** 24 **unrestricted:** | | |

**Five-Year Review Summary Form (continued)**

***Issues, Recommendations, and Follow-Up Actions***

The source-control remedy has been implemented and is functioning well, as intended by the Site decision documents. There are no additional source-control remedial actions required. The ongoing monitoring program is part of the selected remedy. The review did not identify any significant issues that warrant attention with respect to the implemented source-control remedy. The review, however, recommended that further investigations be performed in the far-field area outside of the source-control area to determine whether natural attenuation has been effective in addressing the far-field (outside the source area) contamination. The review also recommends that a more thorough vapor intrusion evaluation be performed off-property.

***Protectiveness Statement***

Based on the current and reasonable anticipated use of the Site, the Environmental Protection Agency has determined that the remedy protects human health and the environment in the short term. There are no current risks present at the Site in either groundwater or soils and none are expected as long as the engineered and access controls are properly operated and maintained. However, in order for the remedy to be protective in the long term, a vapor intrusion study should be conducted off-property and the potential for monitored natural attenuation to occur in the far-field area should be determined.

## I. Introduction

This first Five-Year Review of the DuPont Necco Park Landfill Superfund Site (Site) 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.* (CERCLA) 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). This statutory review is triggered by the implementation of remedial action at the Site.

The purpose of a Five-Year Review is to ensure that implemented remedies continue to be protective of human health and the environment and continue to function as intended by the decision documents for the Site. This document, prepared by the DuPont Necco Park Landfill Superfund Site Remedial Project Manager, Gloria M. Sosa, will become part of the Site file.

In order to evaluate various alternatives and deal first with the most contaminated areas, the Site was subdivided into two areas of concern:

- The Source Area: An area associated with Necco Park that is acting as a continuing source of constituent migration to the downgradient aqueous environment was identified. The primary criterion for defining the source area was the aerial extent of free-phase or residual dense non-aqueous phase liquid (DNAPL). To be conservative, areas where aqueous constituent levels indicated the potential presence of DNAPLs (based upon solubility criteria) were also included. The source area, therefore, includes: the 24-acre Necco Park landfill itself, areas where DNAPLs have been observed to be present, and areas where the concentrations of aqueous phase contaminants in the groundwater indicate that DNAPL may be present .

- Far-Field Area: The far-field is the large area outside the source area where chemical constituents attributable to the Necco Park Site have been found to have contaminated the groundwater. The far-field aqueous plume is defined as the plume of dissolved contaminants downgradient of the source area. Transport modeling of dissolved constituents was conducted to supplement available monitoring well data to estimate the horizontal extent of far-field contamination.

The 1998 Record of Decision (ROD) addressed the source area. Further characterization of the groundwater in the far-field area will be performed to determine the effectiveness of the source control remedy in eliminating further contribution to the far-field area and to determine the ability of monitored natural attenuation to achieve the groundwater standards in the far-field.

## II. Site Chronology

Table 1 summarizes the site-related events beginning with the discovery of hazardous wastes on the Site through the present.

| TABLE 1: DuPONT NECCO PARK LANDFILL CHRONOLOGY OF EVENTS | |
|---|---|
| **EVENT** | **DATE** |
| Waste Disposal | 1930-1977 |
| Landfill Closed | 1977 |
| Groundwater Investigations Initiated | 1977 |
| Clay Cap Placed on Landfill | 1979 |
| Operation of Two Groundwater Extraction Wells Initiated | 1983 |
| Consent Decree Entered | 01/88 |
| Administrative Order on Consent Executed | 10/89 |
| Grout Curtain Installed in Bedrock | 1989 |
| Supplemental Groundwater Investigations Conducted | 1992 |
| Third Groundwater Extraction Well Operating | 1992 |
| Necco Park Investigation Report Approved by EPA | 1996 |
| Analysis of Alternatives Issued | 06/96 |
| Proposed Plan Issued | 07/96 |
| Public Meeting Held | 08/96 |
| Revised Proposed Plan Issued | 02/98 |
| Second Public Meeting Held | 03/98 |
| Record of Decision Signed | 09/98 |
| Cap Remedial Design Approved | 09/03 |
| Hydraulic Control System Remedial Design Approved | 04/04 |
| Remedial Action On-Site Construction Begins | 08/04 |
| Groundwater Treatment Facility Operational | 04/05 |
| Construction Completed | 09/05 |
| Remedial Action Completed | 09/07 |
| First Five-Year Review | 07/09 |

## III. Background

*Physical Characteristics*

The 24-acre Necco Park landfill is an inactive hazardous and industrial waste landfill located approximately 1.5 miles north of the Niagara River in the City of Niagara Falls and the Town of Niagara, Niagara County, New York. The landfill, located off Pine Avenue near 56th Street in Niagara Falls, was sold to DuPont in 1930.

Necco Park is located in a heavily industrialized section of Niagara Falls and is bounded on three sides by commercial disposal facilities. Immediately adjacent to the north and east boundaries of the landfill lies the Newco solid waste landfill, an active nonhazardous waste facility formerly owned by Browning-Ferris Industries and currently owned by Allied Waste Services (Allied Waste facility). Immediately adjacent to the southern boundary are three inactive secure hazardous waste landfill cells and a wastewater treatment facility owned by CECOS International, Inc. (CECOS facility). An access road

and a Conrail (Niagara Junction Railway Company) right-of-way bound the landfill to the west. The nearest residential neighborhoods are located approximately 2,000 feet to the south and 2,500 feet to the west of the landfill, respectively.

The Necco Park landfill was used for the disposal of industrial and process wastes generated at the DuPont Niagara Plant from the mid-1930's until 1977. Wastes from the Necco Park landfill have migrated in the overburden and bedrock underneath the landfill and now extend underneath the CECOS facility and a portion of the Allied Waste facility.

*Geology/Hydrogeology*

The Lockport Dolomite is characterized by horizontal and vertical fractures through which groundwater flows generally toward the Niagara Gorge and the lower Niagara River. The aquifers underlying the Site have been classified as class GA fresh groundwaters, a source of potable water supply. The A zone refers to saturated overburden and the B, C, CD, D, E, F and G zones refer to identified Lockport Formation bedding-plane fracture zones which act as separate water-bearing units.

The Niagara River downstream of Niagara Falls receives discharge from the bedrock groundwater flow system. The Niagara River upstream of Niagara Falls acts as a groundwater recharge area. However, studies demonstrate that the New York Power Authority (NYPA) conduits and several sewers/tunnels act as regional groundwater sinks. Groundwater entering the conduit drainage system near the Necco Park Site may flow either to the south where a portion infiltrates the Falls Street tunnel where these structures intersect, or to the north where the water may eventually discharge to the Forebay Canal through bedrock fractures. The dry weather flow of the Falls Street tunnel discharges to the Niagara Falls Publicly Owned Treatment Works (POTW), where the effluent is treated.

Groundwater in the B and C zones generally flows to the south in areas beyond the radius of influence of the operational recovery well system. Although the Falls Street tunnel is located southwest of the Site and flow in the study area is to the south, the hydraulic influence of the Falls Street tunnel may extend some distance east of the Falls Street tunnel/John Street sewer intersection. Therefore, although insufficient information is available to determine the exact flow path, a portion of B and C zone groundwater ultimately discharges to the Falls Street tunnel.

Groundwater in the D, E and F zones generally flows in a westerly direction toward the NYPA power conduits. This groundwater is intercepted by the conduit drain system.

The piezometric map for the G zone generally indicates that hydraulic gradients are low. The primary flow direction appears to be west/northwest toward the groundwater discharge boundary at the NYPA conduits.

*Land and Resource Use*

The Site is located in an area zoned for industrial use.

The population of the City of Niagara Falls is approximately 62,000. The population of Niagara County is approximately 221,000 and the population of the Town of Niagara is approximately 10,000.

A municipal water system serves the City of Niagara Falls. General land use and drinking water sources in the vicinity of the Site have not changed since the 1998 Record of Decision.

*Enforcement History*

DuPont and EPA entered into a Consent Decree as a settlement of a civil action filed by DuPont in federal district court seeking judicial review of an Administrative Order issued by EPA under Section 3013 of the Resource Conservation and Recovery Act (RCRA) in January 1988 which specified that DuPont perform additional investigations pertaining to the Necco Park Site. The results of these investigations are presented in the Necco Park Interpretive Report (Woodward-Clyde (WCC) 1991) which was approved by EPA in July 1992.

In October 1989, an Administrative Order on Consent pursuant to CERCLA was signed by EPA and DuPont. This Order required DuPont to conduct additional investigations beyond those performed pursuant to the 1988 Consent Decree and to analyze remedial alternatives to address the contamination at the Site. This work began in May 1991 and was completed in September 1992. The results of these investigations are presented in the Necco Park Investigation Report (IR, WCC 1993) which was approved by EPA in May 1994.

*Response Actions Previous to 1998 ROD*

Several response actions were implemented to mitigate the impact and spread of contamination at the Necco Park landfill prior to the 1998 ROD.

During 1978 and 1979, a clay cap was constructed over the 24-acre Site. The final compacted cover consisted of a minimum of 18 inches of clay. Data collected from soil borings at the Site indicate that the average cap thickness is approximately 24 inches. The cap is overlain by a 6-inch cover of topsoil and grass.

In 1982, two existing monitoring wells (D 12 and 52) were converted to recovery wells (RW 1 and RW 2) to control off-property migration of contaminated groundwater in the upper bedrock fracture zones (B and C zones). Extracted groundwater was pumped to a CECOS commercial wastewater treatment facility located adjacent to Necco Park where it was treated and discharged to the Niagara Falls POTW. Wells RW 1 and RW 2 have been used as recovery wells from 1982 to the present.

Initial evaluations of the recovery well network's effectiveness indicated that under continuous operation, the wells created a hydraulic barrier across the entire southern perimeter of the Necco Park property in the first two bedrock water-bearing zones (B and C zones). However, after additional monitoring wells were installed during subsequent investigations, a reevaluation of the recovery well system's effectiveness revealed that some off-property flow from these two zones was occurring, particularly along the eastern property boundary in the C zone. The primary influence of well RW 2 was observed in the B zone and the primary influence of well RW 1 was observed in the C zone.

To enhance the groundwater pumping system's effectiveness, a grout curtain, termed Subsurface Formation Repair (SFR), was constructed from July 1988 through September 1989. The SFR extends along the entire western and northern perimeter of the Necco Park property and to just over one-half of the eastern perimeter. The southern perimeter and southern portion of the eastern perimeter were left ungrouted due to the possible presence of DNAPL and to allow for recovery of contamination that had migrated beyond the Necco Park property boundary. To reduce the potential for an upgradient increase in the water-table elevation in the overburden, the upper 10 feet of bedrock were not grouted on the northern perimeter.

Post- remedial investigation data indicates that wells RW 1 and RW 2 and the SFR have reduced off-property migration of contamination in the B and C zones. In 1992, a third recovery well, RW 3, was installed and began operation at the Necco Park Site. Well RW 3 penetrates the D, E and F zones, is located at the center of the southern Necco Park property line, and is pumped at an average rate of 3.5 to 4 gallons per minute (gpm). When well RW 3 is pumped continuously, a shallow cone of depression extending throughout the central portions of the Necco Park property is observed in the D, E and F zones.

Annual groundwater sampling and analytical testing was conducted at 38 monitoring wells on or near the Necco Park property prior to the 1998 ROD. Groundwater monitoring systems are currently in place at the CECOS and Allied Waste facilities, in accordance with State and federal regulations, to assure protection of human health and the environment as a result of operation of those facilities.

*Remedial Investigation*

A number of investigations and remedial studies needed to design and implement a remedial program were conducted from 1984 to 1988. DuPont completed investigations pursuant to the 1988 Consent Decree that included: an evaluation of existing monitoring wells; monitoring well seal verification; installation of new monitoring wells; development of a geologic report; characterization of vertical fracturing (lineament study); development and refinement of a site-specific indicator parameter list for groundwater and DNAPLs; groundwater and DNAPL sampling; a man-made passageway investigation; a historic drainageway investigation; and development of a health and

safety plan. The results of these investigations are presented in the Necco Park Interpretive Report

DuPont conducted additional investigations pursuant to the 1989 Administrative Order on Consent that included: additional groundwater monitoring; sampling for 2,3,7,8-tetrachlorodibenzodioxin (2,3,7,8-TCDD); further investigation of vertical fracturing (lineament investigation); assessment of the current remedial actions; sampling of underground man-made passageways; and further assessment for the presence of DNAPLs. This work began in May 1991 and was completed in September 1992. The results of these investigations are presented in the Necco Park Investigation Report.

DuPont subsequently conducted an analysis of alternatives to identify, develop, screen, and evaluate response action alternatives to address the contamination and potential health risks identified by the Necco Park Investigation and EPA's Risk Assessment and Addendum to the Risk Assessment. This analysis of remedial alternatives is presented in the Analysis of Alternatives (AOA) Report. The AOA Report was approved by EPA in June 1996.

*Basis for Taking Action*

The information collected during this investigation and from previous investigations revealed that hazardous substances were present in the groundwater attributable to releases from the DuPont Necco Park Site that could present an imminent and substantial endangerment to public health, welfare or the environment.

The 1998 ROD addressed the source area in order to eliminate or reduce the contribution of DNAPLs, contaminated soil and bedrock, and contaminated groundwater in the source area to the degradation of the groundwater quality in the far-field. Further characterization of the groundwater in the far-field area will be performed to determine the effectiveness of the source control remedy in eliminating further contribution to the far-field area and to determine the ability of natural attenuation to achieve the groundwater standards in the far-field.

## IV. Remedial Actions

*Remedy Selection*

The remedy described in the September 1998 ROD addressed landfill soils and dense non-aqueous phase liquid in the soils and bedrock which represent continuing sources of contamination to the groundwater. The remedy requires long-term management to maintain the groundwater pump and treat systems and groundwater monitoring to determine the effectiveness of the containment measures in reducing contaminant concentrations in the far-field aquifer.

The goal of the remedial action is to establish hydraulic control of contaminated groundwater within the source area and to prevent off-property migration. Remediation

of DNAPL, contaminated soils, bedrock, and groundwater within the source area of Site was considered technically impracticable. Consequently, the ROD waived federal and state drinking water standards for groundwater in the source area.

The major components of the selected remedy include the following:

1. Containment of the Source Area by:
    - upgrading the existing cap to meet New York State Part 360, or equivalent standards;
    - using hydraulic measures in the overburden (A zone) to maintain an inward gradient within the Source Area or installing a physical barrier (e.g., slurry wall, sheet pile) on the southern and portions of the eastern and western Necco Park property boundaries; and, using hydraulic measures in the bedrock (B-F zones) to maintain an inward gradient within the Source Area and prevent the movement of contaminated groundwater beyond the Source Area boundary.

2. Treatment of the extracted groundwater from the Source Area, either on-site or off-property, to achieve the appropriate discharge requirements.

3. Collection of DNAPL in the Source Area by:

    - utilizing the existing monitoring wells network;
    - utilizing any groundwater recovery wells placed in the Source Area; and
    - the installation of additional dedicated DNAPL recovery well(s). Collected DNAPL would be disposed of off-property at an appropriate facility.

4. Operation and maintenance (O&M) of the existing systems and the systems constructed under this selected remedy.

5. Comprehensive monitoring to verify hydraulic control, identify DNAPL occurrence, demonstrate the effectiveness of the remedial measures and assess the impact of such measures on far-field groundwater quality.

6. Additional characterization of the Site to assess whether natural attenuation will be effective in addressing far-field contamination.

7. Development and implementation of institutional controls to restrict Site access, the use of groundwater at the Site, and control land use such that it is consistent with Site conditions.

*Remedy Implementation*

Source Remediation

*Cap*

DuPont upgraded the existing cap. The cap installation was completed in November 2005 in accordance with 6NYCRR Part 360 requirements and included the following components:

- 40-mil linear-low density polyethylene geomembrane
- geosynthetic drainage composite on slopes greater than 12 percent
- cushioned geotextile fabric over the geomembrane
- one-foot thick layer of barrier protection soil
- drainage stone layer
- six-inch thick vegetative layer

*Hydraulic Containment*

The Hydraulic Control System (HCS), a series of extraction wells and associated plumbing, was also upgraded. Groundwater extraction pumps were installed in the B/C zone wells RW-4, RW-5 and RW-10. Pumps were also installed in D/E/F-zone wells RW-8 and RW-9. The HCS system is operated to create an inward hydraulic gradient to ensure that contaminated groundwater is captured in the source area. The remedial design indicated that no additional wells were needed to control the A zone.

A groundwater treatment facility (GWTF) was built on-site to treat water extracted by the HCS. The effluent from the GWTF is discharged to the Niagara Falls Wastewater Treatment Plant. GWTF influent samples are collected and analyzed to ensure that discharge parameters are met.

*Institutional Controls Implementation*

The entire property is zoned industrial by the City of Niagara Falls and the Town of Niagara. The Site is completely bounded by the Allied Waste facility. The Site is fenced and access is through the Allied Waste facility gate which is staffed 24 hours a day. There are no activities that could interfere with the integrity of the cap. DuPont filed a deed restriction which runs with the land with Niagara County. In addition, the Site is listed on the Registry of Inactive Hazardous Waste Disposal Sites in New York State.

There are no drinking-water wells within the area impacted by the Site. All residents are connected to the public water supply. No new drinking-water wells are expected as a Niagara County ordinance prohibits the installation of drinking-water wells without a permit.

There are no additional institutional controls required as actions under CERCLA.

Systems Operation/Operation and Maintenance (O&M)

The HCS is operated in accordance with the EPA approved Operations and Maintenance Plan. Hydraulic head measurements are performed quarterly to ensure that the inward gradient is maintained. Quarterly groundwater chemistry monitoring is performed to monitor the effectiveness of the HCS in reducing chemical concentrations within the source area and to monitor the presence of DNAPL. Groundwater sampling indicates a decrease in total volatile organic compounds at the Site. In addition, the far-field groundwater chemistry is monitored to determine if the HCS is controlling off-property migration of contaminants and]that natural attenuation is occurring. Monitoring data are consistent with lines of evidence required for monitored natural attenuation of chlorinated contaminants. Contaminants in the groundwater decrease along flowpaths from the source area to the down-gradient zone. Bacteria have been identified which assist in the dechlorination and geochemical conditions are indicative of the low redox conditions required for reductive dechlorination .

The HCS has been operating successfully at the Site; the system is online better than 92% of the time each year since it became operational. The GWTF has also been operating successfully. DuPont has minimized its downtime by continuously monitoring its operating conditions and accordingly making adjustments to the process or operating systems. The GWTF is also online better than 92% of the time. DuPont extracted approximately 12.3 million gallons of groundwater in 2008 which were treated at the GWTF. Approximately 512 gallons of DNAPL were extracted in 2008.

DuPont inspects the Site routinely. No activities are occurring which may impact the integrity of the cap. Cap maintenance activities are performed when necessary.

O&M Costs

The inspections, sampling, monitoring, data evaluation and reporting costs are approximately $700,000 per year.

## V. Progress Since the Last Five-Year Review

This is the first five-year review for the Site.

## VI. Five-Year Review Process

*Administrative Components*

The five-year review team consisted of: Gloria M. Sosa (Remedial Project Manager), Ed Modica (Hydrogeologist), Chloe Metz (Human Health Risk Assessor) and Mindy Pensak (Ecological Risk Assessor).

*Community Involvement*

The EPA Community Involvement Coordinator for the Site, Michael J. Basile, published a notice in the *Niagara Gazette,* a local newspaper, on March, 15, 2009, notifying the community of the initiation of the five-year review process. The notice indicated that EPA would be conducting a five-year review of the remedy for the Site to ensure that the implemented remedy remains protective of human health and the environment and is functioning as designed. It also indicated that once the five-year review is completed, the results will be made available in the local Site repository. The notice, including the RPM's mailing address, e-mail address and telephone number, solicits public comments or questions related to the five-year review process or to the Site.

*Document Review*

The documents, data and information which were reviewed in completing this five-year review are summarized in Table 2.

| **TABLE 2: LIST OF DOCUMENTS REVIEWED DuPONT NECCO PARK LANDFILL FIRST FIVE-YEAR REVIEW** |
|---|
| 1998 Record of Decision |
| 2007 Remedial Action Report |
| 2005 Remedial Action Post-Construction Monitoring Report |
| 2006 Remedial Action Post-Construction Monitoring Report |
| 2007 Remedial Action Post-Construction Monitoring Report |
| 2008 Remedial Action Post-Construction Monitoring Report |
| Quarterly Monitoring Reports |

*Monitoring and Data Review*

During 2007, more than 11 million gallons of groundwater were extracted and treated at the GWTF and approximately 205 gallons of DNAPL were removed. During 2008, more than 12 million gallons of groundwater were extracted and treated at the GWTF and approximately 512 gallons of DNAPL were removed The HCS is removing contaminants from the on-property plume. The concentrations of contaminants in RW-1 have generally declined; however, the concentrations of contaminants in RW-2 have remained generally unchanged.

A monitoring program was established to verify hydraulic control, identify DNAPL occurrence, demonstrate effectiveness of recovery, and evaluate groundwater quality in the far-field (area outside of the source area). Overall, water levels compared to baseline levels and drawdown data indicate that the source groundwater is contained. The A zone in the overburden appears to show significant dewatering and rapid response to extraction. Hydraulic depression is also maintained in the B zone of the shallow bedrock.

Well RW-10 was replaced with RW-11 in July 2008 to correct for yield loses that were occurring at well RW-10. A Blast Fractured Bedrock Trench was also installed in 2008 to improve performance. Water-level data in wells screened through bedrock fracture zones D, E and F also indicate that containment performance is favorable in these zones.

An assessment of data from groundwater chemical monitoring for the past several years indicate an overall decrease in total volatile organic compounds (VOCs) for all flow zones both in the source and far-field areas. No significant off-site migration of contaminants was detected in the overburden. Some decreases in total VOCs were observed in the B and C zones at wells 171B and 172B. Decreasing or stable trends were observed in the D, E and F zones in the source area with larger decreases in far-field wells 147F and156F. There appear to be no changes observed in the source area limits in the A, B and C zones compared to the limits described in the Source Area Report (SAR) of April 2001. There do appear to be some reductions in source area limits in the D, E, and F zones compared to those defined in the SAR.

*Site Inspection*

The Site was inspected by EPA's Remedial Project Manager, Gloria M. Sosa, and NYSDEC's Region 9 project manager, Michael Hinton, on June 10, 2009. DuPont's Project Manager, Paul Mazierski, was also in attendance.

The current condition of the cap is excellent. The GWTF is being well maintained. The RPM did not observe any problems or deviations from the ongoing O&M activities being implemented at the Site.

*Interviews*

No interviews were conducted for this review.

## VII. Technical Assessment

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

Based on an evaluation of data collected since 2005, the remedy at the Dupont Necco Park Site is functioning as intended by the decision documents.

The September 1995 ROD calls for implementation of a hydraulic containment system in overburden and bedrock flow zones, a discharge treatment system (GWTF) and disposal at a publicly owned treatment works, DNAPL collection in the source area, an upgrade to the landfill cap, and a monitoring program for wells in source area and far-field areas. The goal of the remedial action is to establish hydraulic control of contaminated groundwater within the source area and to prevent off-property migration. Remediation of DNAPL, contaminated soils, bedrock, and groundwater within the source area of Site was considered technically impracticable. Consequently, the ROD waived federal and state drinking water standards for groundwater in the source area.

The hydraulic containment system effectively controls groundwater flow in the overburden and in fracture zones of the bedrock. The system consists of a barrier wall, five pumping wells, and a treatment facility that operates in accordance with the established Operation & Maintenance Plan. A barrier wall was also put in place in the north, east, and west sections of the landfill. The system functions to maintain an inward flow gradient in the source area in flow zones within bedrock, and to prevent movement of contaminated groundwater beyond source area boundary. The containment system started operations in 2005. The treated extracted water is discharged under a Significant Industrial User (SIU) permit with the Niagara Falls Waste-Water Treatment Plant. Necco GWTF discharge is sampled quarterly to verify compliance with the SIU permit. DNAPL is collected in select wells in the source area using existing monitoring wells or dedicated DNAPL recovery wells.

The landfill cap was upgraded to comply with the New York State 6 NYCRR Part 360 design standard. All cap landfill construction activities were completed in August 2006. The cap is maintained and is in good repair. The cap area has been over seeded and permanent vegetation has been established over the entire Site. Institutional controls have been imposed to restrict Site access and use of groundwater, and to control land use.

A monitoring program was established to verify hydraulic control, identify DNAPL occurrence, demonstrate effectiveness of recovery, and evaluate groundwater quality in the far-field (area outside of the source area). Overall, water levels compared to baseline levels and drawdown data indicate that the source groundwater is contained. The A zone in the overburden appears to show significant dewatering and rapid response to extraction. Hydraulic depression is also maintained in the B zone of the shallow bedrock. Well RW-10 was replaced with RW-11 in July 2008 to correct for yield losses that were occurring at well RW-10. A Blast Fractured Bedrock Trench was also installed in 2008 to improve performance. Water-level data in wells screened through bedrock fracture zones D, E and F also indicate that containment performance is favorable in these zones.

An assessment of data from groundwater chemical monitoring for the past several years indicates an overall decrease in total VOCs for all flow zones both in the source and far-field areas. No significant off-property migration of contaminants was detected in the overburden. Some decreases in total VOCs were observed in the B and C zones at wells 171B and 172B. Decreasing or stable trends were observed in the D, E, and F zones in the source area with larger decreases in far-field wells 147F and156F. There appear to be no changes observed in the source area limits in the A, B, and C zones compared to the limits described in the Source Area Report (SAR) of April 2001. There do appear to be some reductions in source area limits in the D, E and F zones compared to those defined in the SAR.

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

There are no changes in the physical conditions of the Site or uses that would affect the protectiveness of the selected remedy. The landfill cap is intact and contaminated material is not available for contact. Groundwater is not available for drinking since the area is served by a public supply. During the RI, it was noted that contaminated groundwater was migrating via man-made channels associated with the Robert Moses Power Project and impacting the Niagara River. Due to on-property containment, significant contributions to the off-property groundwater and the river are not expected.

The exposure assumptions and the toxicity values that were used to estimate the potential risk and hazards to human health followed the general risk assessment practice at the time the risk assessment was performed 1993. Although the risk assessment process has been updated since 1993 and specific parameters and toxicity values may have changed, the risk assessment process that was used is still consistent with current practice and the need to implement a remedial action remains valid.

The remedial action objective (RAO) for the source area groundwater was to reduce risks associated with potential exposure. This has been accomplished by preventing off-property migration. The applicable or relevant and appropriate requirements (ARARs) from the September 1998 ROD are still valid. However, analysis of the data from far-field wells shows that concentrations in some wells currently exceed standards. With continued operation of the groundwater containment system, levels are likely to decrease. Continued monitoring and a re-evaluation of the groundwater data are necessary to determine if natural attenuation will achieve RAOs in the far-field area.

Vapor intrusion was qualitatively evaluated in the 1993 risk assessment: "Available data indicate that given the shallow water table and the levels of volatiles detected in downgradient wells, volatilization of contaminants and infiltration to in [sic] building spaces cannot be ruled out. The magnitude of risk cannot be determined at present." This information coupled with the concentrations in some of the far-field wells suggests that the potential for vapor intrusion exists and a more thorough investigation of this pathway should occur. It is recommended that re-sampling of the wells in the residential area south of the Site (last sampled in 1992), as well as far-field wells (focusing on the A zone) take place before the next Five-Year Review. Groundwater concentrations from these wells should be compared to screening values in Table 2C of EPA's 2002 Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (EPA530-F-02-052) to determine whether further investigation of this pathway is necessary.

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

No human health or ecological risks have been identified, and no weather-related events have affected the protectiveness of the remedy. No other information has come to light

that could call into question the protectiveness of the remedy.

Technical Assessment Summary

Based upon the results of five-year review process, including a review of the Site data and the Site inspection, it has been concluded that the remedy is functioning as intended by the decision documents for the Site. A re-evaluation of the vapor intrusion pathway is necessary to ensure that buildings above the contamination do not have indoor air issues. Further far-field groundwater evaluations are needed to determine if natural attenuation will achieve RAOs in the far-field area.

## VIII. Issues, Recommendations and Follow-up Actions

The remedy for the Site addresses the source area. These remedial actions have been fully successful in containing the contaminants in the source area. Recommendations and follow-up actions are summarized in Table 3.

**TABLE 3 – Recommendations and Follow-Up Actions**

| Issue | Recommendations & Follow-Up Actions | Party Responsible | Oversight Agency | Date | Affects Protectiveness (Y/N) | |
|---|---|---|---|---|---|---|
| | | | | | Current | Future |
| Determine the potential for vapor intrusion in the far-field Area. | A more thorough vapor intrusion evaluation should be performed in the far-field area | EPA | EPA | 2010 | N | Y |
| Determine if natural attenuation has been effective in addressing the far-field contamination | Further investigation should be performed in the far-field area (outside the source-control area) to determine whether natural attenuation has been effective in reducing contaminant levels | PRP | EPA | 2010 | N | Y |

## IX. Protectiveness Statement

Based on the current and reasonable anticipated use of the Site, the Environmental Protection Agency has determined that the remedy protects human health and the environment. There are no current risks present at the Site in either groundwater or soils and none are expected, as long as the engineered and access controls are properly operated and maintained. However, in order for the remedy to be protective in the long term, a vapor intrusion study should be conducted off-property and the natural attenuation potential should be determined in far-field area.

## X. Next Five-Year Review

The next Five-Year Review for the Site will be completed by July 2014, five years from the date of this review.

**Approved:** _____ Date: 7/23/2009

Walter E. Mugdan, Director
Emergency and Remedial Response Division
EPA – Region 2

| **TABLE 4: List of Acronyms** | |
|---|---|
| ARAR | Applicable or Relevant and Appropriate Requirement |
| CIC | Community Involvement Coordinator |
| EPA | United States Environmental Protection Agency |
| NPL | National Priorities List |
| NYS | New York State |
| NYSDEC | New York State Department of Environmental Conservation |
| NYSDOH | New York State Department of Health |
| MCL | Maximum Contaminant Level |
| MNA | Monitored Natural Attenuation |
| PRP | Potentially Responsible Party |
| RI | Remedial Investigation |
| RA | Remedial Action |
| RD | Remedial Design |
| RI/FS | Remedial Investigation/Feasibility Study |
| ROD | Record of Decision |
| RPM | Remedial Project Manager |
| O&M | Operation and Maintenance |

| **Table 5: Contaminants of Concern** |
|---|
| Carbon Tetrachloride |
| Chloroform |
| 1,2-Dichloroethane |
| 1,1-Dichloroethene |
| Cis- 1,2-Dichloroethene |
| Trans-1,2-Dichloroethene |
| Hexachlorobenzene |
| Hexachloroethane |
| 1,1,2,2-Tetrachloroethene |
| Tetrachloroethene |
| 1,1,2-Trichloroethene |
| Trichloroethene |
| Vinyl Chloride |
| Hexachlorobutadiene |
| 4-Methylphenol |
| Pentachlorophenol |
| Phenol |
| 2,4,5-Trichlorophenol |
| 2,4,6-Trichlorophenol |
| Barium |
| Cyanide |
| Carbon Tetrachloride |
| Chloroform |