# REDUCTION OF TOXICS LOADINGS TO THE NIAGARA RIVER FROM HAZARDOUS WASTE SITES IN THE UNITED STATES: JUNE 2002

*A Report by the United States Environmental Protection Agency and the New York State Department of Environmental Conservation*

*JUNE 2002*

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## EXECUTIVE SUMMARY

Since 1987, the Niagara River has been the focus of attention for four environmental agencies in the United States and Canada (AThe Four Parties@). In a Declaration of Intent, the Four Parties committed to reducing toxic chemical inputs to the Niagara River. Hazardous waste sites were considered the most significant non-point source of toxics to the river. Therefore, the U.S. Environmental Protection Agency (EPA) and New York State Department of Environmental Conservation (DEC) identified 26 U.S. sites responsible for over 99% of the estimated input from all such sites on the U.S. side of the basin, and put them on ambitious remediation schedules. Remediation of the sites is intended to virtually eliminate the migration of toxic pollutants from the sites.

All remedial construction has been completed at 16 of the sites. The remedial technology will be operated and monitored for effectiveness for years to come at those sites. Remedial Actions (RAs) are underway at 7 sites. Four of these are interim remedies, including 3 sites under interim remediation while final remedies are being designed or investigated, and one site where an interim RA was completed and an effort to identify potentially responsible parties is underway. At 5 of the 7 sites where RAs are underway, significant remedial controls are already operating. For many of these sites, the load reductions are substantial. The remaining sites are under design or study.

16 SITES ARE COMPLETED:
- CECOS (Niagara Falls)
- Bell Aerospace Textron (Niagara Falls)
- Occidental Chem. Durez (Niagara Falls)
- Stauffer Chemical (Lewiston)
- DuPont Buffalo Ave (Niagara Falls)
- Frontier Chemical (Pendleton)
- Occidental Chem. Durez (North Tonawanda)
- Olin Corporation (Niagara Falls)
- Buffalo Color Area D (Buffalo)
- Occidental Chem. Buffalo Ave (Niagara Falls)
- 102nd Street (Niagara Falls)
- River Road (Tonawanda)
- Niagara Mohawk Cherry Farm (Tonawanda)
- Niagara County Refuse Disposal (Wheatfield)
- Iroquois Gas-Westwood Pharmac. (Buffalo)
- Gratwick Riverside Park (North Tonawanda)

7 SITES WHERE REMEDIATION IS UNDERWAY:
- DuPont Necco Park (Niagara Falls)
- Occidental Chem. Hyde Park (Niagara Falls)
- Mobil Oil (Buffalo)
- Occidental Chem. S-Area (Niagara Falls)
- Frontier Chemical Royal Ave (Niagara Falls)
- Vanadium Corporation (Niagara)
- Solvent Chemical (Niagara Falls)

Based on various simplifying assumptions, EPA estimates that remediations to date have reduced the potential inputs into the river by approximately 90% This estimate is based primarily on the sites where the final RA is completed. It does not include the load reductions at all the sites where remedial controls are operating, though the reductions may be substantial. Therefore, the actual reductions to date may exceed 90%. Through 2003, completion of RAs is expected at four more sites, summarized below.

Recent accomplishments in remediation of the priority waste sites include the following:

**Gratwick Riverside Park** - Remedial construction started in June 1999, and was substantially completed in November 2001.

**Iroquois Gas-Westwood Pharmaceutical** - All remedial construction at the plant site was completed September 1997, including sheet piling barrier wall, groundwater extraction wells, groundwater and non-aqueous phase liquid (NAPL) treatment, and a clay cap. Remediation of Scajaquada Creek sediments commenced in July 1998 and was completed in March 1999. The second extraction system was completed in August 2000 and commenced operation for NAPL extraction in December 2000.

Through 2003, completion of final RAs are expected at the following sites:

**Solvent Chemical** - Construction of the groundwater extraction and treatment systems were completed in 2001. The groundwater extraction/treatment system will be operational in 2002. A performance monitoring program will begin in 2002.

**Occidental Chemical Corporation (OCC), S-Area** - The construction of the final OCC S-area Landfill cap commenced in August 2000 and should be completed by the end of the spring or summer of 2002. Construction activities for the year 2003 include the remaining bedrock monitoring programs as well as the design, installation and evaluation of the Phase III (final) Bedrock System at both the OCC S-Area and former Niagara Falls Drinking Water Treatment Plant (DWTP) property.

**Occidental Chemical Corporation, Hyde Park** - A report examining the need for further remedial measures was submitted in draft form by OCC to EPA and DEC in February 2002. Data indicated groundwater capture of 88% in the upper bedrock, and 100% in the middle and lower layers. Two of the wells OCC installed in 2001 were drilled deeper in order to better intercept groundwater flow zones. This spring, OCC will retrofit monitoring wells with 3 one-inch PVC pipes in the four-inch wells to better delineate the groundwater capture. Completion of all remedial systems is expected by September 2002, with RAs expected to be complete by September 2003.

**Booth Oil -** After lengthy negotiations between the DEC and the Booth Oil Site Administrative Group (BOSAG), a group of potentially responsible parties, a final agreement for site remediation is near. The agreement will include remedial design, which is expected to be completed by August 2002, followed by remedy implementation. Should the proposed amendment be deemed acceptable, construction is expected to commence in the Fall of 2002 and be completed by June 2003.

Other significant updates since the October 2000 report include:

**Vanadium** - DEC and Airco negotiated an Interim Remedial Measure (IRM) to cap the landfill on their portion of the site. Closure of the Airco portion of the site (Operable Unit No. 2) was completed by December 2000.

**Buffalo Color Corporation (BCC)** - The Corrective Measures Study (CMS) was approved in July 2000. The remedy selection was expected to be public noticed in February 2002 and finalized in May 2002, with Corrective Measures Implementation (CMI) start-up expected in March 2003. However, the implementation of the final remedy will be delayed indefinitely due to the financial status of the company. If BCC declares bankruptcy, the responsibility for implementing the remedy may be transferred to another State or Federal program.

**DuPont, Necco Park -** RA completion is expected by November 2005. Because of the fractured bedrock beneath the site, future complications may arise in achieving effective hydraulic containment. The target date is intended to allow sufficient time to ensure the completion of any additional remedial work required to achieve effective containment, as well as system testing and optimization. It is also important to note that remedial actions already implemented on-Site have resulted in an estimated load reduction from the Site of approximately 27-55%.

Estimates of the cost of remediation are available for most of the 26 priority hazardous waste sites. Based on these estimates, the costs incurred to date are at least $ 382,000,000. Additional costs expected in the future are estimated at $ 249,200,000.

## INTRODUCTION

Since 1987, the Niagara River has been the focus of attention for four environmental agencies in the U.S. and Canada, called "The Four Parties". The Four Parties signed a Niagara River Declaration of Intent, pledging cooperation to achieve significant reductions of toxic chemical pollutants in the Niagara River. The Declaration of Intent and a work plan form the Niagara River Toxics Management Plan (NRTMP).

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)
ENVIRONMENT CANADA (EC)
NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (DEC)
ONTARIO MINISTRY OF ENVIRONMENT (MOE)

Under the NRTMP, the Four Parties identified 18 persistent toxic chemicals as "priority toxics". Actions to reduce the inputs of these priority toxics to the Niagara River have been aimed at point sources and non-point sources. Significant point sources on both sides of the Niagara River have been identified and are being addressed in U.S. and Canadian point source plans. The Four Parties summarize progress in controlling point sources in an annual report, last issued in June 2000 (Niagara River Secretariat, 2000).

| | |
|---|---|
| Benz(a)anthracene | Mirex |
| Benzo(a)pyrene | |
| Octachlorostyrene | |
| Benzo(b)fluoranthene | PCBs |
| Benzo(k)fluoranthene | DDTs |
| Chlordane | Dioxins |
| Chrysene | Tetrachloroethylene |
| Dieldrin | Arsenic |
| Hexachlorobenzene | Lead |
| Mercury | Toxaphene |

Non-point sources of toxic chemicals to the Niagara River (e.g., leachate from hazardous waste sites, storm water runoff, atmospheric deposition) are more difficult to quantify and control. Given the limited information available about non-point sources, the U.S. has proceeded with its actions based on the assumption that hazardous waste sites are the most significant non-point sources of toxic chemicals to the Niagara River.

In 1988, an EPA study estimated potential toxic pollutant loadings to the Niagara River from U.S. hazardous waste sites (Gradient Corp/Geotrans Inc 1988). All known U.S. waste sites in the Niagara River area were considered. To help EPA/DEC focus actions on the sites that have the most significant potential for polluting the Niagara River, the report produced a list of 70 most-significant U.S. sites. The agencies treated the 70 sites as 33 site clusters, largely based on the manner in which data have historically been collected. Figure 1 shows the locations of these 33 clusters, and several additional hazardous waste sites.

The study showed that an estimated 694 lbs/day (315 kg/day) of toxic chemicals have the potential of migrating from hazardous waste sites to the Niagara River. Because collection of site-specific transport data is ongoing, estimates were made based on certain assumptions, e.g., that groundwater flow is horizontal, and that pollutants behave in a conservative manner. These assumptions yielded conservative estimates (i.e., estimates of toxic loadings that are expected to be higher than the actual loadings).

**Figure 1: LOCATION OF SIGNIFICANT NIAGARA RIVER HAZARDOUS WASTE SITES**

**Figure 1: LEGEND**

| USGS SITE NUMBERS | SITE NAME |
|---|---|
| 41b-49 | Occidental Chemical Corp. (OCC), Buffalo Ave. |
| 81 | Niagara County Refuse Disposal |
| 14 | DuPont Necco Park |
| 78a,b | CECOS International/Niagara Recycling |
| 39 | OCC, Hyde Park |
| 40.56.85.94* | 102nd Street |
| 5 | Bell Aerospace Textron |
| 66 | OCC, Durez, Niagara Falls (formerly BTL) |
| 41a | OCC, S-Area |
| 255 | Stauffer Plant (PASNY) |
| 251 | Solvent Chemical |
| 1 | Vanadium Corp. (formerly SKW Alloys) |
| 58.59.248 | Olin, Buffalo Avenue |
| 15-19.250 | DuPont, Buffalo Avenue Plant |
| 254 | Buffalo Harbor Containment |
| 120-122 | Buffalo Color Corporation, including Area D |
| 118 | Bethlehem Steel Corporation |
| 136 | River Road (INS Equipment) |
| 67 | Frontier Chemical, Pendleton |
| 24-37 | OCC, Durez, North Tonawanda |
| 253 | Small Boat Harbor Containment |
| 68 | Gratwick Riverside Park |
| 141 | Mobil Oil |
| 162 | Alltift Realty |
| 242 | Charles Gibson |
| 22 | Great Lakes Carbon |
| 182 | Niagara Mohawk Cherry Farm |
| 241 | Times Beach Containment |
| 108 | Tonawanda Coke |
| 107 | Allied Chemical |
| 207 | Tonawanda Landfill |
| 125-127 | Dunlop Tire and Rubber |
| 123 | Columbus-McKinnon |

* Occidental 102nd Street site (#40), Olin 102nd Street site (#56), Griffon Park (#85), and Niagara River Belden site (#94)

| | |
|---|---|
| 38 | Love Canal |
| 9-15-141 | Iroquois Gas/Westwood Pharmaceutical |

In November 1989, EPA and DEC issued a report prioritizing the 33 hazardous waste clusters in order of their potential for polluting the Niagara River (EPA/DEC 1989). Table 1 presents the 33 clusters divided into three categories, based on Gradient/Geotrans estimates of their potential toxic loads to the Niagara River. These categories are as follows:

Category I: Sites with loading greater than 50 lb/day
Category II: Sites with loadings from 1 to 50 lb/day
Category III: Sites with loadings less than 1 lb/day

Sites from Category I and II collectively represented 99.9% of the total estimated loadings.

In keeping with the strategy to reduce inputs from the sites with the potential for contributing the largest amounts of pollutants to the Niagara River, the EPA/DEC report presented ambitious remediation schedules for Category I and II sites. The report=s best estimates indicated that if remediation schedules were met, potential inputs of all toxic chemicals from these sites to the Niagara River would be reduced by 99% by 1996. However, the 1989 schedules were estimates based on limited knowledge of site conditions and average negotiation periods with Potentially Responsible Parties (PRPs). Lengthy legal proceedings with PRPs or unanticipated complex site conditions have since resulted in delays. Consequently, many of the sites have exceeded their original 1996 targeted completion date. The circumstances surrounding these delays are summarized below and described in more detail in the site-specific reports contained in the Appendix.

Since 1989, EPA and DEC have also reevaluated the hazardous waste sites to identify those that new information shows are significant sources of toxic chemicals to the Niagara River. Two sites have been removed as insignificant sources of toxics, and four sites have been added as significant sources. This update reports on remediation progress at the resulting 26 significant hazardous waste sites.

The EPA estimates that site remediations have to date achieved a reduction of approximately 90% in potential toxic chemical inputs from all sites to the Niagara River. The estimate is based on the percentage of RAs in place at some of the 23 sites with completed or on-going remediation (Table 2). A 100% reduction was assumed for 13 of the 16 sites with all RAs in place. For one site, it was estimated that up to 1.5% of the site=s toxic chemical load may be continuing after remediation; this limitation is included in the overall load reduction estimate. A percentage reduction was estimated for two other sites with partial implementation of RAs. Since estimates could not be made for most of the sites with on-going remediation, actual reductions to date may be greater than the estimated 90%. Remedial systems, e.g., groundwater pump-and-treat systems, are functioning at 6 of the 7 sites where remediation is underway and are expected to have already reduced off-site loadings. Table 2 identifies the sites where remediation is not yet completed, but which have operational remedial systems that are expected to have reduced contaminant loads to the Niagara River.

Completion of final RAs are expected at several additional sites through 2003. Based on the expected implementation of these RAs, EPA=s best estimates are that, by the end of 2003, the estimated toxic chemical inputs from all sites will be reduced by almost 95% from the 1989 inputs. Current schedules call for all sites to be remediated by 2005.

Estimates have recently been made of the potential loadings of the NRTMP priority chemicals to the Niagara River from priority waste sites. The estimates are based on information that was not available when the Gradient/Geotrans estimates were developed, such as information on chemical concentrations in groundwater and groundwater flow. For example, a report by several site PRPs addressing groundwater loadings for ten of the NRTMP priority waste sites estimated priority chemical loadings from ten sites at 5.6 lbs/day (2.5 kg/day) pior to RA, and 0.0048 lbs/day (0.002 kg/day) after RA completion, a reduction of over 99% (CRA 1998). Since these estimates only consider the NRTMP priority chemicals, they are not comparable to the Gradient/Geotrans estimates of total toxic chemical loading. In addition, the report also used some assumptions (i.e. non-conservative assumptions) that would tend to reduce load estimates. Therefore, although actual loadings are probably greater than the estimates, the estimates do corroborate the reduction in toxic chemical loadings to the Niagara River achieved through remedial programs.

In addition to remediation efforts at the waste sites themselves, it is also important to recognize the role of the Niagara Falls Waste Water Treatment Plant (WWTP) in reducing toxic inputs from a number of waste sites to the Niagara River. Based on information available in 1987, the U.S. identified the Falls Street Tunnel, a major unlined industrial sewer cut into the bedrock under the City of Niagara Falls, as the largest source of toxic pollutants from any of its point sources. By the mid-1980s, the Tunnel was only receiving overflows of wastewater from the sewers of a Niagara Falls industrial area, in addition to contaminated groundwater infiltrating from major waste sites via cracks in the Tunnel=s bedrock walls. In contrast to flows from other point sources, effluent from the Falls Street Tunnel entered the Niagara River untreated. In 1993, EPA and DEC required the City of Niagara Falls to treat the Falls Street Tunnel discharges during dry weather at the Niagara Falls WWTP. Data gathered by the U.S. indicate that WWTP treatment of the Tunnel=s dry weather discharge has reduced mercury loadings by 70% relative to 1980 loads, tetrachloroethylene loadings by 85%, and the loadings of four other priority toxic chemicals by almost 100% .

Since the Falls Street Tunnel captures portions of the upper Lockport bedrock groundwater flow from seven hazardous waste sites, the actions taken to control discharge from the Tunnel reduce loadings from the following sites:

DuPont, Buffalo Avenue
OCC, Buffalo Avenue
Solvent Chemical
CECOS International

Frontier Chemical, Royal Avenue DuPont Necco Park
OCC, Durez, Niagara Falls

For this report, estimates of site loading reductions do not include those obtained through treatment of the Falls Street Tunnel dry weather flow.

**TABLE 1**
**Gradient/Geotrans Prioritization of Waste Sites According to Potential Toxic Loadings to Niagara River in 1988**

**Category I: greater than 50 lb/day**

Occidental Chemical Corporation, Buffalo Ave.
Niagara County Refuse Disposal
DuPont Necco Park
CECOS International
Occidental Chemical Corporation, Hyde Park

**Category II: between 1 - 50 lb/day**

Occidental Chemical Corporation, 102nd Street
Bell Aerospace Textron
Occidental Chemical Corporation, Durez, Niagara Falls (formerly known as BTL Specialty Resins)
Occidental Chemical Corporation, S-Area
Stauffer Plant (PASNY)
Solvent Chemical
Vanadium Corp. (formerly SKW Alloys)
Olin, Buffalo Avenue Plant
DuPont, Buffalo Avenue Plant
Buffalo Harbor Containment
Buffalo Color Corporation, including Area D
Bethlehem Steel Corporation
River Road (INS Equipment)
Frontier Chemical, Pendleton
Occidental Chemical Corporation, Durez, North Tonawanda
Small Boat Harbor Containment
Gratwick Riverside Park
Mobil Oil

**Category III: less than 1 lb/day**

Alltift Realty
Charles Gibson
Great Lakes Carbon
Niagara Mohawk, Cherry Farm
Dunlop Tire and Rubber
Columbus-McKinnon
Love Canal

Times Beach Containment
Tonawanda Coke
Allied Chemical
Tonawanda Landfill

## SUMMARY OF REMEDIATION PROGRESS

### OVERVIEW OF REMEDIATION STATUS

Table 2 and Figure 2 give overviews of remediation status at the 26 waste sites. In summary:

$ All remediation is in place at 16 of the sites. The remedial technology installed at the 16 sites will be operated and monitored for effectiveness for years to come.

$ RAs are underway at 7 sites.
- 4 of these are interim remedies, including 3 sites under interim remediation while final remedies are being investigated or designed, and one site where an interim RA was completed and PRP search efforts are underway.
- Construction of the final remedy is underway at 3 sites.

$ RAs are under design or investigation at 6 sites (including 3 of the sites under interim RA).

Remedial systems are functioning at 5 of the 7 sites where remediation is underway, and these systems are expected to have already reduced the off-site loadings.

### HIGHLIGHTS OF RECENT ACTIONS

For each site, a detailed description of progress is provided in the Appendix. Highlights of progress made, in particular since the October 2000 progress report, are summarized below.

<u>Niagara County Refuse Disposal</u>

$ Remedial construction began in November 1998. The remedy includes a perimeter clay barrier wall, leachate collection with off-site treatment and disposal, removal of field tile drains to the west of the landfill, a final landfill cap, and other actions.

$ Installation of the leachate collection system and its tie-in to the City of North Tonawanda sanitary sewer has been completed. The leachate collection has been operational since the summer of 1999, thus eliminating any potential pathway for leachate to migrate off-site.

$ The final Remedial Action Report was approved in December 2000 and operation and maintenance activities commenced. Groundwater monitoring supports that the remedy is effective and operating as designed.

**TABLE 2**
**STATUS OF SITE REMEDIATIONS**

**INVESTIGATION AND DESIGN:**

Potentially Responsible Party (PRP) Search

none

Site Investigation Underway

**Bethlehem Steel Corporation**
**Frontier Chemical, Royal Avenue**[1]
**VANADIUM CORPORATION**[2]

Remedial Design (RD) Underway

Booth Oil[3]
Buffalo Color Corporation
**DUPONT NECCO PARK**

**REMEDIATION:**

Remediation Underway:

Interim Remedy In Place or Under Construction:

**MOBIL OIL**
**Frontier Chemical, Royal Avenue**[1]
**VANADIUM CORPORATION**[2]
**DUPONT NECCO PARK**

Construction of Final Remedy Underway

**OCC, S-AREA**
**OCC, HYDE PARK**
**SOLVENT CHEMICAL**

Remediation Completed (O&M Underway)

Stauffer Chemical
Frontier Chemical, Pendleton
Bell Aerospace Textron
CECOS International
OCC, Durez, Niagara Falls
OCC, Durez, North Tonawanda
DuPont Buffalo Avenue
Olin Plant Site
Buffalo Color, Area D
OCC, Buffalo Avenue
102 Street (Olin /OCC)
River Road
Niagara Mohawk, Cherry Farm
**Niagara County Refuse Disposal**
**Iroquois Gas-Westwood Pharmac.**
**Gratwick Riverside Park**

*The sites in interim remediation are also under investigation or design, and therefore are listed twice.*

**<bold>** Sites in bold have achieved progress since the October 2000 report.

<CAPS> These sites, though not completed, have operational remedial systems that are expected to have reduced contaminant loadings to the Niagara River.

[1] A major Superfund Response Action was completed in 1995. A PRP search is underway, to be followed by negotiation of an Remedial Investigation/Feasibility Study (RI/FS) order. Notice letters were issued to PRPs in December 1999.

[2] Preliminary investigations were completed. An Interim Remedial Measure (IRM) was completed by one PRP; an IRM by another PRP is under construction.

[3] RI/FS completed. Negotiations on a legal agreement for performance of the RD/RA are continuing.

**Figure 2: STATUS OF SITE REMEDIATIONS**

DuPont, Necco Park

$ Remedial Design (RD) is underway, including the installation of additional groundwater wells, which began in September 2000. The wells will serve as component parts of the hydraulic containment portion of the Final Remedy.

$ Construction of the Final Remedy began November 2001. The following are among the measures included in the Final Remedy:
  - Upgrading the existing cap;
  - Containment of the overburden source area using hydraulic measures or a physical barrier;
  - Containment of the bedrock source area using hydraulic measures;
  - Treatment of the extracted groundwater on-site or off-site;
  - Collection and off-site disposal of DNAPL;
  - Comprehensive monitoring and additional site characterization.

$ RA completion is expected by November 2005. This date has been extended from October 2003 due to the time needed to resolve issues which arose with DuPont regarding the interpretation of New York State=s landfill regulations on how to design the landfill cap upgrade. Because of the fractured bedrock beneath the site, future complications may arise in achieving effective hydraulic containment. The target date is intended to allow sufficient time to ensure that any additional remedial work to achieve effective containment can be completed, and that the system is tested and optimized.

Occidental Chemical Corporation, Hyde Park

$ Though the RA is not completed, the remedial systems are already containing most of the contaminated groundwater on site, thus greatly reducing the potential contaminant loading to the Niagara River. All of the overburden groundwater is being contained and in the three bedrock groundwater zones, approximately 96% of the contaminated groundwater is being contained. Remedial work to achieve full containment is continuing.

$ In 1997, Phase III of the bedrock groundwater extraction system was installed (pumping and monitoring wells, and force mains connecting the wells to the on-site treatment plant). However, complex site conditions and difficulties in pumping NAPL resulted in the need to install additional wells. Three pumping wells and associated monitoring wells and force mains were installed in 1998. Three additional pumping wells and associated monitoring wells and force mains were installed in 1999; one additional pumping well and five monitoring wells were installed in 2000.

$ OCC still did not achieve all required inward hydraulic gradients when the additional wells were installed in 2000. Therefore, OCC created a groundwater model to better understand groundwater flow in the site vicinity. Model output was utilized to place four additional

wells in 2001. Also, a NAPL recovery well was converted to an extraction well. OCC will use the model to determine if the operation of these five additional wells, in conjunction with existing remedial system, will capture 100% of the contaminated groundwater, or if further remedial measures will be necessary. In February 2002, OCC submitted a draft data report to EPA and DEC. The report indicated groundwater capture of 88% in the upper bedrock and 100% of the middle and lower bedrock layers. OCC drilled 2 of the wells they installed in 2001 deeper, to better intercept groundwater flow zones.

$ Hydrogeologic studies conducted in 2000 and 2001 have shown that the three-bedrock- layer system is oversimplified and that there are eleven discrete flow zones in the bedrock. To improve the monitoring system, OCC is currently retrofitting existing 4-inch monitoring wells by installing three one-inch PVC pipes in each well. The one-inch wells will be screened to monitor the individual flow zones to better delineate the groundwater capture. Completion of all remedial systems is expected by September 2002, and RA completion is expected by September 2003.

$ Sampling of fenced groundwater seeps in the Niagara River Gorge Face was conducted in 1997, 1998 and 1999. Results continue to indicate no need for additional control or remediation of the seep areas.

Bell Aerospace Textron

$ Corrective Measurement Implementation (CMI) started in 1995. The on-site system has since been enhanced by the installation and operation of an additional groundwater extraction well in 1998, including the use of a higher capacity pump in August 1999, and the change of pump heads in two extraction wells in April 2000. These enhancements have produced a consistent capture zone, and the system has been achieving its design goals. No significant operational change was reported during the first quarter of 2002.

Occidental Chemical Corporation, S-Area

$ The drain collection system and cap for the old Niagara DWTP property were completed in 1999.

$ Operation of the drain collection system for the landfill portion of the site began in 1996; however, a portion of the system was improperly installed and did not function as designed. The system was subsequently replaced in 1999-2000, delaying completion of the RA.

$ Construction of the final landfill cap began in August 2000.

$ Securement of the raw water intake structure from the old DWTP began in August 2000.

$ Construction of the final S-area Landfill cap commenced in August 2000 and should be completed by the end of the spring or summer of 2002.

$ Construction activities for the year 2003 include the remaining bedrock monitoring programs as well as the design, installation and evaluation of the Phase III (final) Bedrock System at both the OCC S-Area and former Niagara Falls DWTP.

Solvent Chemical

$ Construction of the groundwater extraction and treatment systems were completed in 2001.
$ The groundwater extraction/treatment system will be operational in 2002.
$ A performance monitoring program will begin in 2002.

Vanadium Corporation

$ In November 1998, one of the site PRPs (SKW Alloys) completed an IRM to cover portions of their parcel and control site stormwater runoff.
$ DEC and Airco negotiated an IRM to cap the landfill on their portion of the site. Closure of the Airco portion of the site (OU No. 2) was completed by December 2000.
$ Negotiations with the PRPs have not resulted in an Order of Consent requiring that a site-wide Remedial Action/Feasibility Study (RA/FS) be undertaken. DEC will open negotiations with Niagara Mohawk Power Corporation and the New York Power Authority to address their portion of the site.

Buffalo Color Corporation

$ The Corrective Measures Study (CMS) was approved in July 2000. The remedy selection was expected to be public noticed in February 2002 and finalized in May 2002, with CMI start-up expected in March 2003. However, the implementation of the final remedy will be delayed indefinitely due to the financial status of the company. Should BCC declare bankruptcy, the responsibility for implementing the remedy may be transferred to another State or Federal program.

Bethlehem Steel Corporation (BSC)

$ BSC has completed the field work for the site investigation, and is preparing Resource Conservation and Recovery Act Facility Investigation (RFI) and human health risk assessment reports. These have been delayed due to negotiations over the scope and the need to collect additional data. Submittal of these reports is anticipated by July 2002.
$ BSC completed limited remedial technology studies for two areas that appear to be the primary sources of groundwater contamination at the facility (the Acid Tar Pits and Coke

Oven Areas). The EPA and DEC found the studies to be technically flawed and of limited value. BSC continues to study various potential remedial technologies.

$ BSC has submitted a Pre-design Investigation Report for the remediation of the Benzol Plant Area (i.e., Coke Oven Area). However, a dispute over waste characterization has delayed implementation.

$ BSC submitted an application for the construction of a Corrective Action Management Unit (CAMU) at its facility in November of 2000. The application was approved as substantially complete and BSC submitted a 30% design document.

$ A portion of the BSC site was selected as a RCRA brownfield pilot project in March of 2000. The focus of the project is to make approximately 102 acres of the facility available for potential redevelopment. The 102 acres has been released from the RCRA RFI Order to allow the property to be addressed under alternative programs.

$ BSC declared Chapter 11 bankruptcy in October 2001.

$ BSC closed the coking plant and ceased coke production at the Lackawanna facility in the Fall of 2001

$ Any future CMS or CMI activities will require a new order, permit or other agreement.

Frontier Chemical, Royal Avenue

$ The company that owned the facility went bankrupt in 1992, and failed to implement a DEC Order for waste removal. The site was referred to Federal Superfund for a Response Action that including the removal of thousands of drums, removal of wastes from 45 tanks on the site, and other actions. The action was completed in 1995.

$ EPA ruled not to include the site on the National Priorities List.

$ DEC initiated PRP search efforts in 1998. The efforts are to be followed by negotiations of an RI/FS Order to address soil and groundwater contamination.

$ DEC finalized the list of PRPs and issued notice letters to the PRPs in December 1999.

$ In January 2001 the site was referred for RI/FS action under the NY State Superfund program. The Focused Remedial Investigation was begun in 2001. The RI/FS is expected to be completed in 2002, with a final Record of Decision (ROD) expected in early 2003.

Gratwick Riverside Park

$ Remedial Design started in early 1996. The design includes shoreline protection, a hydraulic (slurry wall) barrier between the site and Niagara River, a cap over the site to allow it to be used as a park, and collection of contaminated groundwater.

$ During design, some site-related contamination was found in Niagara River sediments. It was also determined that steps should be taken to improve the habitat value of the shoreline area.

$ Design changes to address these issues were addressed as a ROD amendment issued in January 1999.
$ Remedial construction started in June 1999, and was substantially completed in November 2001.

Mobil Oil

$ Following site investigations in the 1980s, DEC re-classified a 3-acre area of concern on the site as Class 3 (does not present significant threat to public health or the environment; action may be deferred).
$ In 1994, the entire Mobil facility was selected for DEC=s Multi-Media Pollution Prevention ($M^2P^2$) program.
$ A multi-media inspection was conducted, leading to the signing of a Consent Order in May 1997 to undertake further site investigation and remediation. The results of the site investigation were submitted in November 1998.
$ Three areas of the site were identified as requiring additional investigation to determine the extent of contamination. The results of this site facility investigation were submitted in December 1999.
$ The results of completion of the investigation of the remaining areas of the site were submitted in March 2002.
$ Remedial systems are operating at the Mobil Oil facility. A well point system was installed in the early 1970s to prevent petroleum seepage to the Buffalo River. In 1993, six dual-pump recovery wells were activated to recover petroleum product and groundwater. Five of the six recovery wells are presently being operated in conjunction with the well point system.

Iroquois Gas-Westwood Pharmaceutical

$ All remedial construction at the plant site was completed in September 1997, including sheet piling barrier wall, groundwater extraction wells, groundwater and NAPL treatment, and a clay cap.
$ Remediation of Scajaquada Creek sediments commenced in July 1998 and was completed in March 1999.
$ Negotiations to purchase property to locate the second well at the upstream portion of the site caused some delay in its installation. The second extraction system was completed in August 2000 and commenced operation for NAPL extraction in December 2000.

Booth Oil

- $ A PRP proposal for an alternate remedy was accepted in June 1998. In 2001, the DEC proposed amending the earlier RODs. Negotiations on a legal agreement for performance of the RD/RA are continuing.
- $ The RD is expected to be complete by August 2002. Should the proposed amendment be deemed acceptable, construction is expected to commence in the Fall of 2002 and be completed by June 2003.

**ESTIMATED REMEDIATION COSTS**

Where available, estimated remediation costs incurred to date and expected in the future are provided in each site description (Appendix). Federal, State, and PRP contributions were estimated, where possible. Remediation costs were unavailable for Federal/State RCRA sites, because reporting cost information is not a requirement of the RCRA corrective action program, and facilities have generally been reluctant to provide it. The remediation costs that are provided are estimates that may change as remediation progress is made at each site. The estimates will be updated as new information becomes available.

Based on available estimates for 19 sites, following is the total amount incurred to date (costs for the remaining 7 sites are unavailable):

| | |
|---|---|
| Federal | $ 38.75 million |
| State | $ 6.80 million |
| PRPs | $ 336.45 million |
| Total | $ 382.00 million |

Based on available estimates for 17 sites, the total additional costs expected in the future are as follows (costs for the remaining 9 sites are unavailable):

| | |
|---|---|
| Federal | $ 0.85 million |
| State | $ 0.8 million |
| PRPs | $ 247.55 million |
| Total | $ 249.20 million |

The estimated costs to date cannot be compared to the estimated costs expected in the future, because different sites are included in the estimates. It is also difficult to compare the relative contributions of federal, state, and PRP expenditures, because cost information for some sites was incomplete (e.g., some sites may have been able to provide federal or state costs but not PRP costs, and so on). However, the cost information does provide a sense of the magnitude of U.S. expenditures for hazardous waste site remediation in the Niagara River basin.

## ACRONYMS

| | |
|---|---|
| **APL** | Aqueous phase liquids |
| **BCC** | Buffalo Chemical Corporation |
| **BSC** | Bethlehem Steel Corporation |
| **CERCLA** | Comprehensive Environmental Response, Compensation, and Liability Act of 1980 |
| **CMI** | Corrective Measure Implementation |
| **CMS** | Corrective Measure Study |
| **DDT** | primarily 1,1'-(2,2,2-trichloroethylidene)-bis/4 chlorobenzene |
| **DEC** | New York State Department of Environmental Conservation |
| **DNAPL** | Dense non-aqueous phase liquids |
| **DWTP** | Drinking Water Treatment Plant |
| **EC** | Environment Canada |
| **EPA** | U.S. Environmental Protection Agency |
| **HSWA** | Hazardous and Solid Waste Amendments |
| **ICM** | Interim Corrective Measure |
| **IIWA** | Immediately Implementable Work Assignment |
| **IRM** | Interim Remedial Measure |
| **MOE** | Ontario Ministry of the Environment |
| **NAPL** | Non-aqueous phase liquids |
| **NRTMP** | Niagara River Toxics Management Plan |
| **OCC** | Occidental Chemical Corporation |
| **PCBs** | Polychlorinated biphenyls |
| **PRP** | Potentially Responsible Party |
| **PSA** | Preliminary Site Assessment |
| **PVC** | Polyvinyl chloride |
| **RA** | Remedial Action |
| **RCRA** | Resource Conservation and Recovery Act |
| **RFA** | RCRA Facility Assessment |
| **RFI** | RCRA Facility Investigation |
| **RI/FS** | Remedial Investigation/Feasibility Study |
| **ROD** | Record of Decision |
| **RRT** | Requisite Remedial Technology |
| **SPDES** | New York State Pollutant Discharge Elimination System |
| **TCDD** | Tetrachlorodibenzo-p-dioxin |

| | |
|---|---|
| **TCP** | Trichlorophenol |
| **VOC** | Volatile organic compounds |

## GLOSSARY

### A

**Ambient**
A surrounding medium, such as water or air. Used in contrast to a specific source.

**Aquatic**
Growing in, living in, or dependent upon water.

**Atmospheric deposition**
Pollution from the atmosphere associated with dry deposition in the form of dust, wet deposition in the form of rain and snow, or as a result of vapor exchanges.

### B

**Barrier wall**
A wall constructed underground in a hazardous waste site or landfill to stop the flow of contaminated groundwater.

**Basin**
The land that drains into a waterbody.

**Bedrock groundwater**
Water flowing through a rock layer underground, under a top layer of mixed soil and loose rock called the overburden.

**Benzo(a)pyrene [B(a)P]**
A PAH that is formed by the incomplete combustion of fossil fuels, wood, and tobacco; the incineration of garbage; and in steel production.

**Bioaccumulation**
The process by which chemical substances accumulate in the tissues of an organism that drinks contaminated water or eats contaminated food.

### C

**Cap**
A cover over hazardous waste sites, usually made of clean soils or clay, that prevents rainwater from seeping through soil and causing the contaminants in the soil to flow into the groundwater.

**Capture Zone**
Area in which groundwater is flowing towards a pumping well; used as remediation technique for hazardous waste sites, to Acapture@ contaminated groundwater and treat it.

**Chlordane**
A persistent toxic chemical that was used to control ants, grasshoppers, and other insects on certain crops.

**Collection drain**
System of pipes around a hazardous waste site or landfill that collects surface or groundwater and directs it toward a treatment plant.

**Combined sewer overflow (CSO)**
Water discharged into a waterbody from a sewer system that carries both sanitary sewage and stormwater runoff. During dry

weather the combined sewer system=s flow is normally treated at a wastewater treatment plant, but during rain events, the plant=s capacity may be exceeded and the flow may be bypassed to discharge, untreated, directly into a waterbody.

**Contaminant**
A substance that is not naturally present in the environment or is present in amounts that can adversely affect the environment.

**D**

**DDT**
Dichloro-diphynyl-trichloroethane. A persistent toxic chemical that was used as a pesticide, particularly for mosquito control. DDT is banned in U.S. and Canada. DDE and DDD are metabolites of DDT.

**Dieldrin**
A persistent toxic chemical that was used mainly as a soil insecticide.

**Dioxins/furans**
Dioxin: A family of persistent toxic chemicals known as dibenzo-p-dioxins. Dioxins can enter the environment as the by-products of industrial processes or as a result of combustion processes in incinerators and motor vehicles using leaded fuel. The compound called A2,3,7,8-TCDD@ is the most toxic member of the dioxin family.
Furans are a class of chemicals similar to dioxins, which are created at high temperatures, such as incineration of PCBs and other organic wastes containing chlorine.

**Consent decree**
A legal document, approved by a judge, which puts into effect a remedy (i.e., actions to correct an environmental problem).

**DNAPL (Dense Non-Aqueous Phase Liquid)**
An oily, sludge-like mixture of chemicals that is denser than water. DNAPL flows with gravity or along geological formations, not always in the same direction as groundwater.

**Downstream**
In the direction with the flow of a stream or river; down river. For Niagara River, downstream is towards Niagara-on-the-Lake and Lake Ontario.

**Dredging**
Removal of sediment from the bottom of a waterbody.

**E**

**Embayment**
A bay. A part of a waterbody (such as a river or lake) that makes an indentation into the adjacent land.

**F**

**Force main**
A pipe that carries contaminated groundwater drawn out of hazardous waste sites by pumping wells to a treatment plant.

**Four Parties**
The four agencies who implement the Niagara River Toxics Management Plan:

U.S. Environmental Protection Agency, Environment Canada, New York State Department of Environmental Protection, and Ontario Ministry of Environment and Energy.

**G**

**Groundwater**
The fresh or saline waters found beneath the Earth=s surface that often supply wells and springs. Contrast to ASurface water@.
Any substance that is a by-product of society and is classified under U.S. or Canadian law as potentially harmful to human health or the environment. Hazardous wastes are subject to special handling, shipping, storage, and disposal requirements under the law.

**Hazardous waste site**
Land disposal site for hazardous wastes.

**Heavy metals**
Metallic elements with high atomic weights that tend to be toxic and bioaccumulate. Examples are mercury, arsenic, lead, etc.

**Hexachlorobenzene (HCB)**
A persistent toxic chemical that was originally manufactured as a fungicide for cereal crops. It is also generated as a by-product in the manufacture of pesticides and can be formed during the combustion of substances containing chlorine.

**I**

**Infiltration**

**H**

**Habitat**
Place where a particular type of plant or animal lives. An organism=s habitat must provide all of the basic requirements for its life.

**Hazardous waste**

Passing through or filtering through, as in rain water that filters through soil to join groundwater.

**Inorganic substance**
A chemical compound that does not contain carbon. Inorganic substances are often derived from minerals.

**Insecticide**
A chemical used to kill or control the growth of insects.

**L**

**Landfill**
Land disposal site for hazardous (or non-hazardous) wastes.

**Leachate**
Liquid derived from rain or snow melt that percolates through a hazardous waste site.

**Load or Loading**
The amount of a material entering a system over a given time interval.

**M**

**Medium (plural: Media)**
A surrounding substance in the environment: water, air, or sediment.

**Metabolite**
A substance that is the product of biological changes to a chemical.

**Mirex**
A persistent toxic substance that was used as an insecticide and a fire retardant.

**Multi-media**
Involving multiple media, such as water and air, or air and sediment, or all three.

**N**

**National Priorities List (NPL)**
An EPA list of the most serious uncontrolled or abandoned U.S. hazardous waste sites identified for long-term remedial action under Superfund.

**Non-point source**
Diffuse pollution sources (i.e., without a single point of origin or not introduced into a waterbody from a specific outlet). Generally carried off the land by stormwater. Common sources can be associated with a variety of land-uses (e.g., agriculture, forestry, and urban) and activities (e.g., construction, mining, and land disposal).Contrast to APoint source@.

**O**

**Octachlorostyrene (OCS)**

**Organic substance**
A chemical compound that contains carbon.

**Overburden groundwater**
Water flowing through a layer of mixed soil and loose rock that lies over the rock layer called bedrock.

**P**

**PAHs**
Polycyclic or polynuclear aromatic hydrocarbons. A class of persistent toxic compounds that are formed from the combustion of organic material, such as forest fires or gasoline in cars.

**PCBs**
Polychlorinated biphenyls. A group of persistent toxic chemicals used in electrical and hydraulic equipment for insulating or lubricating purposes.

**Persistent toxic chemical**
Any toxic chemical that is difficult to destroy or that breaks down slowly in the environment (i.e., with a half-life in water greater than eight weeks).

**Pesticide**
A chemical used for preventing, destroying, or repelling any pest.

**Point source**
Any discernible confined and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, container, landfill, leachate collection system, vessel or other floating craft from which pollutants are or may be discharged from.

**Pollution prevention**
Any action that reduces or eliminates pollutants before they enter the environment.

**Potentially Responsible Party (PRP)**
Any individual or company potentially responsible for, or contributing to, the contamination problems at U.S. hazardous waste sites.

**Pretreatment**
Processes used to reduce, eliminate, or alter pollutants from industrial sources before they are discharged into publicly-owned sewage treatment systems.

**Priority toxic chemicals**
Under the NRTMP, 18 toxic chemicals that exceeded water quality or fish tissue

**Requisite Remedial Technology (RRT)**
An RRT is the equivalent of an FS (see **RI/FS** above) for a pre-CERCLA agreement.

**Runoff**
Water that flows over the land surface into a waterbody.

**S**

**Slurry wall**
Barrier made of a thin, watery mixture of fine, insoluble material (e.g., clay, cement, soil).

**Solid Waste Management Units (SWMUs)**
Areas within a hazardous waste site where hazardous materials are stored or managed. SWMUs are generally storage areas, treatment systems, disposal areas, spill areas, or containment cells.

**Superfund**
A U.S. program to remediate active hazardous waste sites. Sites are remediated by potentially responsible parties whenever this can be arranged.

**Record of Decision (ROD)**
A public document that explains what actions will be taken to remediate a U.S. hazardous waste site.

**Remedial Investigation/Feasibility Study (RI/FS)**
The RI defines the areal and vertical extent of the hazardous waste problem at a Superfund site through numerous sampling wells, an extended environmental sampling program and a full geophysical survey. Based on the RI, the FS develops and evaluates alternative solutions to the problem.

**R**

**RCRA**
Resource Conservation and Recovery Act.

standards in the Niagara River or Lake Ontario.

A U.S. program to remediate inactive or abandoned hazardous waste sites in an emergency or for the long-term. Sites are remediated by potentially responsible parties whenever this can be arranged.

**Surface water**
All water open to the atmosphere (e.g., rivers, lakes, reservoirs, seas, etc.).Contrast to AGroundwater@.

**T**

**Toxaphene**
A persistent toxic chemical that was used as an insecticide.

**Toxic substance**
Any substance that adversely affects the health or well-being of a living organism, e.g., causing death, disease, birth defects, behavioral abnormalities, cancer, genetic mutations, physiological/reproductive malfunctions, or physical deformities.

**U**

**Upstream**
In the direction against the flow of a stream or river; upriver. For Niagara River, upstream is towards Fort Erie and Lake Erie.

**V**

**Volatile substance**
A substance that evaporates readily.

**W**

**Wetland**
An area that is saturated with water or has a water level at or near the surface. A wetland has organic soils and plant/animal species that are adapted to a wet environment.

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# APPENDIX

## PRIORITY NIAGARA RIVER HAZARDOUS WASTE SITES:

### SITE DESCRIPTIONS & REMEDIATION SCHEDULES

**OCCIDENTAL CHEMICAL -- BUFFALO AVENUE**
Site #41b - 49

**Site Program: RCRA (State and Federal)**
**Summary Prepared by: EPA and DEC**

Site Description

Occidental Chemical Corporation's (OCC) Buffalo Avenue Plant is a major manufacturing facility in central Niagara Falls adjacent to the Robert Moses Parkway, along the Niagara River.

Starting with seven acres in 1911, the facility has grown to approximately 130 acres, with hundreds of buildings. During its history, the facility has manufactured over 250 different chemical products, including halogenated benzenes, toluenes, phenols, and aliphatics. Chemical raw materials, products and wastes have been buried or spilled at numerous locations on the plant site. Estimates of the amount of waste disposed in the various production areas include: 4,200 tons in D-Area, 1,500 tons in F-Area, 11,300 tons in N-Area, and unknown amounts in U-Area.

Five aquifers exist at this site: one overburden and four bedrock. A clay/till layer serves as an aquitard (a barrier) between the overburden and the bedrock, except where man-made influences such as utilities and building foundations have penetrated the layer. The four bedrock flow zones occur within the Lockport Group (a rock formation) with the three upper units accounting for nearly 100% of bedrock groundwater at the site.

In the overburden, groundwater flow was historically toward the Niagara River from the southeast portion of the site. However, an overburden barrier wall constructed in 1994 restricts the direct discharge of this groundwater to the Niagara River. The barrier wall re-directs the groundwater to the southwest. In the southwest portion of the site, the overburden groundwater discharges to the New York Power Authority (NYPA) conduit drain system and then probably discharges from the NYPA drain system to the Falls Street Tunnel. At other plant areas, the direction of overburden groundwater flow is locally influenced by man-made structures, particularly the sanitary and outfall sewers as well as existing groundwater collection systems.

In the bedrock aquifers, groundwater moves northwest, north, and northeast, is recharged by the river, and is influenced by the NYPA conduits and the Falls Street Tunnel. Most bedrock groundwater flow leaving the site will enter the NYPA conduit drainage system or

the Falls Street Tunnel. All of the dry weather flow through the Falls Street Tunnel now is treated by the Niagara Falls Wastewater Treatment Plant before discharge to the River.

Interim Corrective Measures

OCC completed certain interim corrective measures required under the Resource Conservation and Recovery Act (RCRA):

- Removal and capping of contaminated soils
- Installation of a barrier wall
- Collection of DNAPL from bedrock wells
- Installation of fences
- Removal of spills from secondary containment areas
- Removal of fly ash accumulated on the ground.

DEC and EPA issued OCC a state Part 373 permit and an EPA Hazardous and Solid Waste Amendments permit under RCRA in June 1988, permitting the storage/treatment and incineration of hazardous wastes.

Site Investigation

Pursuant to the permits, OCC completed the on-site and off-site components of a RCRA Facility Investigation (RFI). Due to the complexity of site conditions, the remedial program activities for the facility were subdivided into several components:

- bedrock groundwater
- overburden groundwater
- overburden soils
- off-site groundwater contamination.

In accordance with an August 1993 DEC Part 373 permit modification, the remedial measures are being implemented as stabilization measures, followed by the final remedy selection after the adequacy of the stabilization measures are assessed. Stabilization measures for the individual components are being addressed on a priority basis. OCC has prepared a comprehensive, site-wide CMS, addressing all site components including the adequacy of the stabilization measures described below. This was submitted in November 1998.

Stabilization Measures (Additional Interim Corrective Measures)

**Bedrock Groundwater**. All of the bedrock groundwater extraction wells and monitoring wells have been installed. A new treatment plant designed to treat the contaminated

bedrock groundwater has been constructed. The pump-and-treat system has been started up. From April 1996 through September 1996, as part of the testing and optimization of the remedial system, over 700 gallons per minute of contaminated groundwater were pumped from the upper three bedrock aquifers and treated at the new treatment plant. Three bedrock wells have collected, through May 1997, approximately 5,840 gallons of DNAPL from the site. The DNAPL is incinerated in OCC's hazardous waste incinerator. The pump-and-treat system was tested and optimized through March 1997. The pumping rates of each of the 19 bedrock groundwater extraction wells were optimized to achieve a hydraulic barrier along the northern and western plant boundaries to contain the contaminated groundwater.

Based on performance monitoring data, OCC determined that additional measures were necessary to achieve the remedial design objectives. The treatment plant has been enhanced by adding additional treatment measures (air stripping to address break-through of vinyl chloride), and expanding the plant=s capacity from 800 gpm to 1200 gpm. OCC subsequently increased the extraction rate of the bedrock groundwater recovery system to 1000 gpm. On average more than 50 pounds per day of organic chemicals are captured by the bedrock groundwater collection system.

**Overburden Groundwater**. Construction of a collection system to capture overburden groundwater along the southern boundary of the site is complete. In the southwestern portion of the site, an 1,800 foot-long abandoned sewer line has been converted into a groundwater collection system. Conversion of the line began in February 1996. A 1,400 foot-long section of the line began operation in June 1997. During the sewer line conversion, a 400 foot-long section of the line was found to be unsuited for capturing the groundwater. As a result, OCC installed a new groundwater collection drain (trench) adjacent to this 400 foot-long section of pipe, and extending an additional 400 feet to the west beyond the original sewer line length. This increased the capture zone to a total of 2,200 feet. This system began operation in December 1997. However, performance monitoring data indicated that these measures were insufficient to produce the necessary groundwater capture, so the system was augmented by installation of a tile drain. This was completed in December 1998. The new collection system extends along the alignment of the converted sewer to the vicinity of the OCC S-Area site. On average more than 50 pounds per day of organic chemicals are captured by the overburden groundwater collection system.

The overburden groundwater collection system is now fully operational. The collected groundwater is being treated on-site at an existing wastewater treatment plant, which was upgraded to handle the additional flow.

At one time, groundwater infiltration into the on-site industrial waste sewer system was a significant source of contamination to the river. However, OCC has had an ongoing program for replacing and repairing pipes since the early 1980s. OCC completed the investigation of groundwater infiltration into the Plant=s Outfall Sewer System in June 1996 and implemented measures to eliminate infiltration points from Fall 1996 through Spring 1997.

OCC installed a barrier wall in 1994 along the Niagara River to prevent migration of overburden groundwater contamination into the Niagara River.

**Overburden Soils and Off-site Groundwater**. As interim corrective measures, OCC identified and removed 36 tons of liquid mercury from contaminated soils on-site in U-Area, and capped dioxin-contaminated soils in X-Area.

OCC submitted a draft CMS for the overburden soils in 1996. In a Fall 1997 comment letter on the draft CMS, DEC advised OCC not to prepare a separate off-site CMS, but instead to submit a comprehensive, site-wide, final CMS that addresses remedial measures for all site components (bedrock, overburden and off-site). That CMS was submitted in November 1998.

Final Corrective Measures

Future off-site loadings from the Buffalo Avenue site will be effectively eliminated by the bedrock groundwater stabilization program (completed), and the overburden groundwater stabilization program (completed).

A draft permit that specifies the Final Corrective Measures for the facility was public noticed in September 1999. The draft permit proposed to incorporate the Interim Corrective Measures currently in place as part of the Final Corrective Measures for the site. After a public comment period, the final permit became effective February 10, 2000.

The Final Corrective Measures in the final permit include:

- $ Extraction of bedrock groundwater on-site; and treatment in accordance with the applicable SPDES permit at an on-site plant.
- $ Monitoring bedrock groundwater extraction wells for NAPL; and collection of detected NAPL with on-site or off-site treatment.
- $ Extraction of overburden groundwater on-site; and treatment in accordance with the applicable SPDES permit at an on-site plant.
- $ Compliance with the limits specified in the applicable Significant Industrial User Wastewater Discharge Permit for overburden groundwater infiltration into the City of Niagara Falls sanitary sewers.
- $ Compliance with the provisions of the applicable SPDES permit to restrict discharge of overburden groundwater from the outfall sewer system.
- $ Monitoring overburden groundwater extraction wells for NAPL; and collection of detected NAPL with on-site or off-site treatment.
- $ Monitoring the performance of the remedial systems on-site and off-site.

The schedule for implementation of a corrective action program at the plant, including

Corrective Measure Study (CMS) and Corrective Measure Implementation (CMI), is shown below.

Remediation Costs

Following are estimated amounts that have been spent to date on remediating this site:

| | |
|---|---|
| Federal | $ (Not available) |
| State | $ (Not available) |
| PRP | $ (Not available) |

The following estimated amounts will be spent from now to the completion of remediation:

| | |
|---|---|
| Federal | $ (Not available) |
| State | $ (Not available) |
| PRP | $ (Not available) |

**OCCIDENTAL CHEMICAL -- BUFFALO AVENUE**

| Output | | Responsible Party | Previous Target Date | Current Schedule |
|---|---|---|---|---|
| RFI Work Plan Approval | | DEC/EPA | Jun 1991 | **COMPLETED** |
| RFI Completion | | Permittee | Dec 1992 | **COMPLETED** |
| CMS Work Plan Approval | | DEC/EPA | Jun 1993 | **COMPLETED** |
| CMS Completion: | Bedrock Groundwater | Permittee | Aug 1993 | **COMPLETED** |
| | Overburden Groundwater | Permittee | Dec 1994 | **COMPLETED** |
| | Overburden Soil[1] | Permittee | Aug 1996 | **COMPLETED** |
| | Off-Site (Groundwater)[1] | Permittee | Feb 1997 | N/A |
| | Site-wide CMS[1] | Permittee | N/A | **COMPLETED** |
| Stabilization Selection: | Bedrock Groundwater | DEC/EPA | Dec 1994 | **COMPLETED** |
| | Overburden Groundwater | DEC/EPA | Feb 1995 | **COMPLETED** |
| | Overburden Soil[1] | DEC/EPA | Oct 1997 | N/A |
| | Off-Site (Groundwater)[1] | DEC/EPA | Apr 1998 | N/A |
| Stabilization Work Plan Approval: | Bedrock Groundwater | DEC/EPA | Nov 1994 | **COMPLETED** |
| | Overburden Groundwater | DEC/EPA | Jun 1995 | **COMPLETED** |
| | Overburden Soil[1] | DEC/EPA | Apr 1998 | N/A |
| | Off-Site (Groundwater)[1] | DEC/EPA | Jul 1998 | N/A |
| Start-up: Stabilization[2] | Bedrock Groundwater | Permittee | Oct 1995 | **COMPLETED** |
| | Overburden Groundwater | Permittee | Dec 1997 | **COMPLETED** |
| | Overburden Soil[1] | Permittee | Oct 1998 | N/A |
| | Off-Site (Groundwater)[1] | Permittee | Dec 1998 | N/A |
| Start-up of CMI | | Permittee | Dec 1997 | **COMPLETED** |

[1] The overburden soil remedial measures were delayed so that contaminated soils generated during both bedrock and overburden groundwater remediation could be addressed at once. Off-site remedial measures were delayed, pending evaluation of the effectiveness of on-site remedial measures. None of these remedial measures impact the potential for off-site loadings, which was eliminated in Dec. 1998, with full operation of the overburden groundwater remedial

system. OCC submitted a comprehensive, site-wide, final CMS in November 1998, addressing all on-site and off-site components. The NYSDEC issued a draft 373 permit that specifies final corrective measures for the facility in September 1999. After a public comment period, the final permit became effective February 10, 2000.

[2] Implementation of the Bedrock and Overburden Stabilization Programs will effectively eliminate future off-site loadings from the Main Plant Site.

**NIAGARA COUNTY REFUSE DISPOSAL**
Site # 81

**Site Program: Federal Superfund**
**Summary Prepared by: EPA**

Site Description

The Niagara County Refuse site occupies approximately 65 acres, about 1000 feet north of the Niagara River in the Town of Wheatfield, New York.

During its operation period (1968-1976), the Niagara County Refuse Disposal District (NCRDD) accepted household, yard, agricultural, institutional, commercial, and industrial waste; demolition and construction debris; sewage treatment plant sludge; street sweepings; and used tires. More than 100 waste generators or transporters are thought to have used the site. Disposed materials included heat-treatment salts, plating-tank sludge, tetrachloroethylene, PVC skins and emulsion, thiazole polymer blends, polyvinyl alcohol, phenolic resins, and brine sludge containing mercury. The site was capped with 20 inches of dirt and clay at the time that it was closed by the NCRDD in 1976. Illegal dumping of rubbish and hard fill, as well as the erosion of the clay cap, have been concerns at the site since its closure.

Three overburden zones and one bedrock zone are present under this site. The bedrock zone and one of the overburden zones are the primary water-bearing formations (aquifers). The groundwater in these two aquifers generally flows in a south/southwest-erly direction towards the Niagara River beneath the southern half of the site and in a north/northwesterly direction towards Black Creek beneath the northern half of the site.

Site Investigation

Niagara County Refuse is an EPA-lead site on the National Priorities List of Superfund sites. Pursuant to a March 1989 consent order, a group of fourteen Potentially Responsible Parties (PRPs) performed a Remedial Investigation/Feasibility Study (RI/FS) for the site. It was completed in September 1993, when EPA signed a Record of Decision (ROD) for the site.

Among other things, the RI report indicated that the water-bearing zones beneath the site showed either a negligible impact from volatile and semi-volatile organic compounds and

pesticides, or no impact at all. Maximum contaminant levels were generally exceeded in the site groundwater for chromium, iron, manganese, and sodium (although iron and sodium levels in regional groundwater typically exceed maximum contaminant levels). Based on these findings, EPA considers the original loadings estimate for this site to be too high.

Upon completion of the RI/FS, EPA issued a Proposed Plan for remediation of the site. After consideration of public comment on the Proposed Plan, EPA executed a ROD on September 24, 1993, selecting the following remedy:

$ a full NYCRR part 360 cap with a complete perimeter clay barrier wall
$ leachate collection and offsite treatment and disposal
$ gas venting
$ an ecological assessment of the adjacent wetlands
$ removal of the field tile drains located to the west of the landfill
$ long-term operation and maintenance.

The Final Design Report for the remedial action was approved by EPA in September 1997. Due to the Site being a municipal landfill, the municipalities are eligible for State funding assistance for their respective share of remedial action costs. As such, the specific state requirements for funding eligibility were completed by May 1998. A call for bids was issued and the bid was awarded for remedial construction in June 1998. Construction began in fall 1998.

Construction Progress

On-site construction at the site commenced in November 1998. The site was cleared and grubbed and a security fence erected. Installation of the leachate collection system and its tie-in to the City of North Tonawanda sanitary sewer by force main was completed over the winter months. Early spring was devoted to grading the site and filling the central swales with clean fill. Placement of the first layer of the cap, gas-vent stone, began in May 1999. Construction progressed with the placement of a geotextile drainage layer, a geocomposite barrier layer, a soil barrier protection layer, and a topsoil layer, respectively. Placement of each layer proceeded in a north-to-south direction over the entire site. At the end of the 1999 construction season, construction was 95% complete. Work resumed in the spring of 2000 and the construction was completed in June. A final inspection was conducted in September 2000. The final Remedial Action Report was

approved in December 2000 and operation and maintenance activities commenced. Groundwater monitoring supports that the remedy is effective and operating as designed.

The leachate collection system has been operational since summer 1999, thus eliminating any potential pathway for leachate to migrate off-site.

Schedule for Completion

An updated schedule for remediation of the site is shown in the following table.

Remediation Costs

Following are estimated amounts that have been spent to date in response to this site:

| | |
|---|---|
| Federal | $ 1,300,000 |
| PRP | $ 11,500,000 |

**NIAGARA COUNTY REFUSE DISPOSAL**

| Output | Responsible Party | Previous Target Date | Current Schedule |
|---|---|---|---|
| RI/FS | 14 PRPs | Mar 1993 | **COMPLETED** |
| Record of Decision | EPA | Sept 1993 | **COMPLETED** |
| Remedial Design Start | 13 PRPs | Jul 1994 | **COMPLETED** |
| Remedial Action Start | 13 PRPs | Jan 1997 | **COMPLETED** |
| Remedial Action Completion | 13 PRPs | Dec 1999 | **COMPLETED** |

**DUPONT NECCO PARK**
Site # 14

**Site Program: Federal Superfund**
**Summary Prepared By: EPA**

Site Description

The Necco Park Site, owned by DuPont, is an inactive industrial waste landfill on approximately 24 acres in Niagara Falls. It is surrounded on three sides by the BFI Sanitary Landfill and the CECOS site, approximately 1.5 miles from the Niagara River.

DuPont acquired the Site in the 1930s and used it as a landfill to dispose of approximately 93,000 tons of industrial wastes until its closure in 1977. The following chemicals are known, from disposal records, to have been disposed at the Site: carbon tetrachloride, chloroform, hexachlorobenzene, hexachlorobutadiene, hexachloroethane, methylene chloride, tetrachloroethylene and trichloroethylene.

Eight aquifer zones have been identified under the Site. In the overburden, groundwater flow is minimal, but is influenced by two water table depressions along the southern property boundary, which are caused by two recovery wells in the upper bedrock. Groundwater in the upper bedrock zones is partially captured by the recovery well system. Otherwise, Site groundwater in the upper bedrock water-bearing zones discharges down-gradient to the south. A portion of it is presumed to eventually reach the Falls Street Tunnel (FST). Groundwater in the middle bedrock zones flows generally to the west and is partially captured by a third recovery well. Groundwater in the middle and lower bedrock zones flows west toward the New York Power Authority (NYPA) conduits.

Interim Remedial Measures

Necco Park is not on the National Priorities List. However, DuPont conducted groundwater investigations pursuant to a RCRA 3013 consent decree and a CERCLA Administrative Order on Consent (AOC) with EPA.

The Site was capped in 1978. Since 1982, two recovery wells near the center of the property, when operational, have recovered contaminated groundwater and established a partial hydraulic barrier in the upper bedrock and overburden along the southern edge of

the landfill. However, some upper bedrock groundwater continued to flow south toward the Niagara River. In order to improve containment and collection of contaminated groundwater, an up-gradient grout curtain was installed in the bedrock in August 1989. A third recovery well, which penetrates the middle bedrock zones at the southern boundary of Necco Park, went into limited operation in 1992. These on-site remedial actions have resulted in an estimated load reduction from the site of approximately 27-55%, based on information collected pursuant to the AOC. DuPont estimates that approximately 163 million gallons of groundwater have been pumped since 1983. Since 1989, 7100 gallons of DNAPL have been recovered, containing approximately 94,600 pounds of organic compounds.

A portion of the groundwater not recovered by the on-Site pumping wells is probably captured (1) by the New York Power Authority conduit drain system (water in the drain system may drain to the Falls Street Tunnel or flow north to the Forebay Canal) or (2) by the Falls Street Tunnel directly. All the dry-weather flow through the Falls Street Tunnel is treated by the Niagara Falls Wastewater Treatment Plant before discharge to the River.

Final Remedial Action

The remedial investigation began May 1991 and the Investigation Report was approved in May 1994. The feasibility study (FS) (entitled "Analysis of Alternatives Report") was approved by EPA and DEC in July 1996.

On September 18, 1998, EPA issued a Record of Decision (ROD) for the site, which set forth the following remedy:

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 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;
$ Using hydraulic measures in the bedrock 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-site, to achieve the appropriate discharge requirements.

3. Collection, and off-site disposal, of DNAPL in the Source Area by:

$ Utilizing the existing monitoring wells network;
$ Utilizing any groundwater recovery wells placed in the Source Area;
$ The installation of additional dedicated DNAPL recovery well(s).

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

Schedule for Completion

The Proposed Plan was released to the public in July 1996, upon approval of the FS. A public meeting to discuss the Proposed Plan was held in August 1996, shortly after its release. Because of extensive public comments received on the Proposed Plan, EPA revised the Proposed Plan in response to the comments and provided a second public comment period. A Record of Decision (ROD) was issued in September 1998. Design studies started in October 1998. The remedial design is underway. In September 2000, DuPont commenced installation of additional groundwater wells that will serve as component parts of the hydraulic containment portion of the final remedy. RA completion is expected by November 2005. Because of the fractured bedrock beneath the site, future complications may arise in achieving effective hydraulic containment. The target date is intended to allow sufficient time to ensure that any additional remedial work to achieve effective containment can be completed, and that the system is tested and optimized. It is also important to note that, as mentioned above under Interim Remedial Actions, remedial actions already implemented on-Site have resulted in an estimated load reduction from the Site of approximately 27-55%.

Remediation Costs

Following are estimated amounts that have been spent to date on remediating this Site:

| | | |
|---|---|---|
| Federal | $ 2,030,000 | (Does not include EPA=s indirect costs) |
| State | $ 141,000 | (Does not include travel costs) |
| PRP | $ 42,500,000 | (Unverified DuPont estimate) |

It is estimated that the following amounts will be spent from now to the completion of remediation:

| | | |
|---|---|---|
| Federal | $ 320,000 | |
| State | $ 100,000 | |
| PRP | $ 65,102,000 | (includes O&M) |

**DUPONT NECCO PARK**

| Output | | Responsible Party | Previous Target Date | Current Schedule |
|---|---|---|---|---|
| RI | | PRP | May 1994 | **COMPLETED** |
| FS | | PRP | Sept 1994 | **COMPLETED** |
| Record of Decision | | EPA | Sept 1996 | **COMPLETED** |
| Remedial Design Start | | PRP | Feb 1997 | **COMPLETED** |
| Final Remedial Action Start | | PRP | Nov 2001 | **COMPLETED** |
| Remedial Action Completion | Grout Curtain | PRP | --- | **COMPLETED** |
| | 3 Pumping Wells | PRP | --- | **COMPLETED** |
| | Final Action | PRP | Oct 2003 | November 2005 |

**CECOS INTERNATIONAL**
Site # 78

**Site Program: RCRA (State and Federal)**
**Summary Prepared by: EPA and NYSDEC**

Site Description

CECOS International, Inc. operates a 385-acre commercial solid/industrial waste management facility in the Town of Niagara and the City of Niagara Falls. The facility is situated in an industrial and commercial area, bordering residential and recreational areas, and is about 1.5 miles north of the Niagara River.

The site has been used for waste disposal for over 80 years. The facility managed hazardous wastes from all Resource Conservation and Recovery Act (RCRA) categories identified in Part 261 -- characteristic wastes, specific and non-specific industrial wastes and commercial chemical product waste. Current hazardous waste management activities include a wastewater treatment system and container storage.

The CECOS facility is underlain by an overburden and two bedrock aquifers. A less permeable layer of native clays and glacial till serves as an aquitard (or barrier) between the overburden and the bedrock aquifers.

All but a minor percentage of the CECOS site groundwater flows off site to the south and southeast and is drawn into the Falls Street Tunnel and New York Power Authority (NYPA) conduit sink on its way to the Niagara River. The potential loading to the Niagara River from the site overburden aquifer compared to that from the bedrock aquifers is minor. By the time it reaches the tunnel/conduit system, the groundwater from the overburden aquifer has found its way into the upper bedrock through discontinuities and excavations in the native sediments. All of the dry weather flow through the Falls Street Tunnel is treated by the Niagara Falls Waste Water Treatment Plant.

Site Investigation

The site encompasses approximately 50 Solid Waste Management Units, including landfills, waste piles and surface impoundments. An EPA HSWA permit and state Part 373 permit were issued in September 1988, requiring investigation/remediation of all waste management units.

Pursuant to the requirements of the RCRA permit, in September 1991, CECOS completed the required investigations at the facility. Groundwater contaminants were mainly detected in the central area of the site, in the three groundwater transmissive zones monitored by CECOS. The volatile organic compounds (VOC) detected include acetone, 2-butanone, benzene, chloroform, toluene, chlorobenzene, methylene chloride, and tetrachlorethane.

Interim Corrective Measures (ICM)

An interim groundwater recovery system has been pumping contaminated groundwater from all three zones since 1990. The recovery system was started with four recovery wells and currently consists of 20 recovery wells. The pumped groundwater is treated on-site and discharged to the City of Niagara Falls wastewater treatment plant. From July 1991 through August 1998, over 60 million gallons of groundwater have been treated, and over 2,500 pounds of organic compounds were removed.

In addition, several interim measures consisting of the removal of contaminated soils and wastes have been completed at the following units: surface impoundments, phenolic resin area, and sewage sludge area. Post-closure permit/HSWA modification for the closed hazardous waste landfills was issued in September 1991.

A final remedy for the Scrap Yard Area was incorporated into the DEC/EPA permit modification of September 1991. The remedy, implemented in 1992, consisted of:

- $ Removal and off-site disposal of approximately 24,000 cubic yards of soil contaminated with PCBs, organic compounds, and metals
- $ Construction of a low permeability cover
- $ Long-term inspection and maintenance of the cover, and monitoring of the groundwater.

All of the interim remedial actions that have come due at this site have been accomplished.

Corrective Measures Study

A RCRA Facility Investigation (RFI) and a Corrective Measures Study have been completed. The final, site-wide corrective measures for the CECOS site were selected through the DEC Part 373 permit renewal process. The permit was renewed in February 1995. The final corrective measures consist of:

- $ Groundwater extraction and on-site treatment (prior to discharge to the City of Niagara Falls Wastewater Treatment Plant);
- $ Maintenance of existing caps and pavement over areas of residual contamination;
- $ Restrictions on future land development; and
- $ Restrictions on public access to the facility.

The interim groundwater pump-and-treat program has been successful in containing and remediating the groundwater contamination at the facility. However, as part of the final remedy, this interim remedial system will be enhanced to expand the groundwater capture zone and facilitate a more rapid clean-up of the site.

CECOS submitted a Corrective Measure Implementation (CMI) design in August 1995 and prepared an addendum to the design plan that included an aquifer pumping test program. A short-term pumping test was conducted in October-November 1995 to evaluate the potential use of existing wells as both pumping wells and monitoring wells for the CMI. An extended trial CMI pumping test was conducted in February-May 1996 to test additional wells and to optimize pumping rates over a longer duration (to determine the extent of long-term capture zones to control contaminant migration). Several existing recovery wells, an existing collection drain, and a new recovery well are being operated for the CMI. CECOS submitted a new CMI design in November 1996. The CMI was started up in December 1996. The remedial system continues to be operated.

Remediation Costs

Following are estimated amounts that have been spent to date on remediating this site:

| | |
|---|---|
| Federal | $ (Not available) |
| State | $ (Not available) |
| PRP | $ (Not available) |

It is estimated that the following amounts will be spent from now to the completion of remediation:

| | |
|---|---|
| Federal | $ (Not available) |
| State | $ (Not available) |
| PRP | $ (Not available) |

**CECOS INTERNATIONAL**

| Output | Responsible Party | Previous Target Date | Current Schedule |
|---|---|---|---|
| RFI Work Plan Approval | DEC/EPA | Sep 1989 | **COMPLETED** |
| RFI Completion | Permittee | Sep 1991 | **COMPLETED** |
| Stabilization Start-up (Groundwater) | Permittee | | **COMPLETED** |
| Start-up of CMI (Scrap Yard) | Permittee | | **COMPLETED** |
| CMS Work Plan Approval | DEC/EPA | Apr 1992 | **COMPLETED** |
| CMS Completion | Permittee | Apr 1993 | **COMPLETED** |
| Remedy Selection (site-wide) | DEC/EPA | Dec 1994 | **COMPLETED** |
| CMI Work Plan Approval (site-wide) | DEC/EPA | Apr 1995 | **COMPLETED** |
| Start-up of CMI (site-wide) | Permittee | Apr 1996 | **COMPLETED** |

**OCCIDENTAL CHEMICAL -- HYDE PARK**
Site # 39

**Site Program: Federal/State Co-lead: Superfund**
**Summary Prepared by: EPA**

Site Description

Occidental Chemical Corporation's (OCC) Hyde Park site is a 15-acre landfill in northwest Niagara Falls, less than one-half mile from the Niagara River.

From 1953 to 1975, the company (then Hooker Chemicals and Plastics) deposited approximately 80,000 tons of chemical wastes at the site. The hazardous materials disposed on site included 3,300 tons of 2,4,5-trichlorophenol (TCP) wastes, which are known to contain significant amounts of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD); approximately 0.7 - 1.6 tons of dioxin are believed to be associated with the TCP. Chlorinated organic wastes, including hexachloropentadiene derivatives, chlorendic acid, chlorinated toluenes, benzenes and phenols, predominate at the site. The former drainage stream of the landfill, Bloody Run, which flows into the Niagara River, was historically contaminated with organic chemicals, including dioxin. A clay cap and a shallow leachate collection system were installed at the site in 1979.

There is an overburden and a bedrock aquifer present under this site. Groundwater flows both downward and horizontally through the fractures and layers of the bedrock. The aquifers flow generally northwest, toward the Niagara River Gorge. Contaminants have migrated from the site in both aqueous and non-aqueous phases in the overburden and bedrock. Dioxin from the site has previously been found in contaminated groundwater seeping to the River from the Gorge face, located 1,600 feet west-northwest of the site.

Although, as summarized below, remedial action has not been completed at the site, the remedial action taken at the site to date has substantially reduced off-site migration. Since installation of an overburden remediation system in 1991, groundwater in the overburden is no longer migrating horizontally past the remediation system around the site. Therefore, no loading of hazardous substances from the site to the Niagara River via groundwater in the overburden is currently taking place.

Substantial containment of bedrock groundwater has also been achieved across the NAPL plume boundary. The bedrock is separated into three groundwater zones (upper, middle

and lower). OCC completed a groundwater model of the site in February 2001 and concluded that full containment has not been achieved in the upper zone. Additional control must be achieved in the northwest corner of the site. OCC also concluded that the major portion of the groundwater in the middle zone and almost the entire lower zone are being captured with the existing extraction wells. Remedial work to achieve full containment is continuing, as described below.

APL purge wells at the gorge face have substantially reduced the contaminants reaching the Niagara River. Sampling at the gorge face seeps, conducted annually since 1997, has not detected dioxin, which was found in previous gorge face surveys.

Requisite Remedial Technology Agreement

The site is a joint EPA/DEC-lead Superfund site on the National Priorities List and is governed by a pre-CERCLA settlement agreement. EPA sued to require OCC to remediate the site in 1979. In January 1981, EPA, DEC, and OCC filed a Stipulation and Judgment Approving Settlement Agreement. Since 1982, OCC has been implementing the settlement agreement. Agreement on a Requisite Remedial Technology (RRT) was approved by the court in 1986. The RRT included:

- Source Control (prototype landfill extraction wells);
- Containment and collection of contaminants in the overburden (overburden barrier collection system) and the Lockport bedrock (purge and recirculation wells);
- An Intermediate and Deep Formations Study (monitoring wells);
- A Community Monitoring Program (monitoring wells) for early detection of plumes;
- An Industrial Protection Program for neighboring industries;
- Treatment and monitoring of collected leachates:
  - Aqueous-phase liquids to be treated on-site;
  - Non-aqueous phase liquids to be destroyed by incineration;
- Site Capping;
- Gorge Face Seep Remediation to isolate seeps from the public;
- A TCDD bioaccumulation study in Lake Ontario; and
- Bloody Run Creek excavation and monitoring; and
- Long-term monitoring.

Major Remedial Activities

| Action | Start | Complete |
|---|---|---|
| Intermediate Formation Wells | 10/88 | 12/89 |
| Leachate Storage Facility | -- | 05/89 |
| Leachate Treatment Facility | -- | 04/91 |
| Upgrade APL Treatment System | 01/98 | 03/98 |
| Lagoon Closure | 07/90 | 01/92 |
| Phase I Source Control Extraction Wells Installed | 04/90 | 06/90 |
| Phase II Source Control Extraction Wells Installed | 04/94 | 07/94 |
| Overburden Barrier Collection System | -- | 11/90 |
| APL/NAPL Plume Redefinition | 04/90 | 07/90 |
| Recirculation Wells | 01/91 | 03/91 |
| Cluster Monitoring Wells | 06/90 | 09/90 |
| Landfill Cap | 08/94 | 12/94 |
| Phase I Prototype Purge Wells Installed | 04/90 | 07/90 |
| Phase II Prototype Purge Wells | 03/93 | 12/93 |
| Phase III Purge Wells | 05/96 | 05/97 |
| 3 Bedrock Purge Wells and Force Mains Installed | 03/98 | 12/98 |
| 3 Additional Bedrock Purge Wells and Force Mains | 03/99 | 12/99 |
| Groundwater model | 4/00 | 2/01 |
| Conceptual Evaluation of NAPL Plume Containment | 12/00 | 3/01 |
| Upgrade of Leachate Treatment Facility to 400 gpm | 4/01 | 6/01 |
| 4 Additional wells installed in NW corner of site | 6/01 | 12/01 |
| Site Characterization (Geophysics, Hydraulic Evaluation) | 6/01 | 12/01 |
| Re-evaluation of NAPL Plume Containment | 12/01 | 2/02 |
| | | |

| | | |
|---|---|---|
| Additional wells or other remedial measures, if needed | 4/02 | 12/02 |

The status of activities included in the schedule follows.

Community Monitoring Wells provide early detection of chemical migration. They are sampled and analyzed quarterly to ensure the safety of the community. The well data confirm that the hydraulic gradient near the community is downward, thereby ensuring that chemical migration toward the community is not an issue.

Under the Industrial Protection Program, sumps in neighboring industries have been sealed, as have some manholes.

Fences were used to prevent access to the Gorge Face seeps; seep water has been diverted into culverts and pipes to prevent humans from being exposed to the potentially contaminated water; and contaminated sediments were scraped away. Monitoring of the fenced seeps has been conducted annually since 1989. Results continue to indicate no need for additional control or remediation of the seep areas. Annual inspections are performed at all recorded seep locations, and the fences around the seeps are not required anymore.

The on-site Leachate Storage and Handling Facility was completed in April 1990. 155,000 gallons of NAPL which had been stored on-site in the lagoons and four railroad tank cars were pumped into the leachate storage facility and the lagoons were closed in January 1992.

The Treatment Facility was brought on-line in April 1991. The contaminants collected through the remedial systems are treated on-site. Aqueous-phase liquids pass through an inclined plane settler, filters, and sacrificial carbon pre-treatment to remove dioxins and PCBs. This is followed by activated carbon treatment. All vapors in the closed system are treated. In March 1998, the APL treatment system was upgraded to handle a higher flow of 100-150 gallons per minute. In the spring of 2001, OCC completed upgrading the capacity of the treatment system to 400 gallons per minute in June 2001 so it can adequately handle excess water in wet weather.

NAPL is trucked to Laidlaw Environmental Services in Deer Park, Texas, for incineration. To date, 299,166 gallons of NAPL have been destroyed.

Prior to the trucking, NAPL was destroyed at OCC=s Niagara Plant Incinerator. The plant=s permit was modified by EPA and DEC in November 1990 to allow destruction of NAPL from Hyde Park (and other Occidental sites). This was the first commercially-owned incinerator in the U.S. specifically permitted to destroy dioxin wastes.

The Overburden Barrier Collection System (OBCS), a drain system around the entire landfill, was installed in 1990. Occidental continuously operates its pumps, preventing the migration of contaminants through the overburden.

Installation of two 36-inch diameter Source Control extraction wells within the landfill itself was completed in June 1990. Phased pump tests were conducted and evaluated throughout 1991 and 1992. Based on the results of these pump tests, four additional source control wells of smaller diameter were installed in the landfill in 1994. With the completion of the new cap on the landfill and completion of the OBCS, the need for source control wells has diminished. Of the original six source control wells, only three remain in service. These are manually operated on a weekly basis due to very low recovery rates. Collected liquids are taken to the Leachate Storage Facility.

The Lake Ontario TCDD bioaccumulation study was completed in May 1990. Fish and sediment samples from Lake Ontario were analyzed for TCDD, and a laboratory study of the uptake of TCDD by lake trout was conducted.

In 1990, the extent of the aqueous-phase liquid/non-aqueous phase liquid plumes in the overburden and bedrock were redefined. This information was considered in the implementation of the remedy for the site.
The objective of the bedrock NAPL plume containment system is to create a "zone of capture" around purge wells down gradient of the landfill so that contaminated ground water can be collected in these purge wells and pumped to the Leachate Treatment Facility. The bedrock purge well system was installed in a phased approach:

$ Phase I of the system was installed in the NAPL plume area and pump tests were performed on individual and multiple wells. Based on these tests, additional purge wells (Phase II) were installed in late 1993.
$ Pump tests were performed on the Phase II wells in early 1994 to determine if there was an adequate zone of capture surrounding these wells. Phase II wells did not meet the performance criteria and more wells were needed.

- $ OCC installed Phase III wells in 1997, along with the associated monitoring wells. The force mains to connect these wells to the Hyde Park Leachate Treatment Plant were completed in May 1997.
- $ Phase III monitoring indicated that the bedrock NAPL collection system in this area still did not meet performance criteria. Three pumping wells were installed and connected by force mains to the on-site treatment facility in 1998. Three additional wells were installed and connected to force mains in 1999; one additional well and five monitoring wells were installed in 2000.
- $ Subsequent to the completion of Phase II, additional wells were necessary to assure an inward hydraulic gradient on all vectors within the bedrock. OCC produced a groundwater model which indicated that there was not complete capture in the upper bedrock in the northwest corner of the site. Four additional wells were installed in 2002 and a NAPL recovery well was converted to an extraction well. The model predicts that the operation of these five additional wells will achieve complete groundwater capture, however the reports containing the data that will document the effectiveness of these additional wells will not be ready in draft form until August 2002. Hydrogeologic studies conducted in 2000 and 2001 have shown that the three-bedrock- layer system is oversimplified and that there are eleven discrete flow zones in the bedrock. To improve the monitoring system, OCC is currently retrofitting existing 4-inch monitoring wells by installing three one-inch PVC pipes in each well. The one-inch wells will be screened to monitor the individual flow zones to better delineate the groundwater capture. If OCC demonstrates that full capture is being achieved, the EPA and DEC will issue a Construction Completion report September 2002 which documents the completion of all remedial systems. However, if it is determined that full containment has not been achieved, additional remedial measures will be installed by OCC.

Excavation of Bloody Run Creek began in October 1992 and was completed in March 1993. Occidental removed 29,200 cubic yards of contaminated sediment and lined the creek bed with rocks. Samples taken at the bottom and sides of the excavation confirmed the effectiveness of this remedy.

The sewer under University Drive adjacent to Niagara University was sealed and a new sewer was installed in 1993. A sewer was relocated at Tams Ceramics, a neighboring industrial plant in 1989, and the College Heights sewer was remediated in 1990.

The perimeter cap of the landfill was completed in 1991. A low permeability cap was placed over the entire landfill in 1994.

Complex site conditions and difficulties in pumping NAPL have resulted in the installation of additional wells, thus delaying completion of remediation. However, the landfill has been capped, a leachate collection system surrounds the landfill, NAPL is being extracted and destroyed, and Bloody Run creek has been excavated. Also, additional wells have been installed to ensure sufficient bedrock NAPL containment. It is expected that the operation of the additional wells installed in 2002 will achieve full capture of the contaminated groundwater associated with the site. However, the documents which will evaluate the effectiveness of the additional pumping wells are not yet available. These reports were submitted to EPA and DEC in draft form in February 2002. The report indicated that 88% of the groundwater in the upper bedrock was being captured, and 100% of the middle and lower bedrock groundwater was being captured. OCC drilled 2 of the wells they installed in 2001 deeper, to better intercept groundwater flow zones. This spring, OCC will retrofit monitoring wells with 3 one-inch PVC pipes in the four-inch wells to better delineate the groundwater capture. This report will be followed by a re-evaluation of the containment of the NAPL plume. If these documents indicate that no additional remedial measures are needed to fully contain the site, activities to install these remedial measures will be completed by September 2002.

Remediation Costs

Following are estimated amounts that have been spent to date on remediating this site:

| | |
|---|---|
| Federal | $ 11,550,000 |
| PRP | $ 62,000,000 |

It is estimated that $ 2,000,000/year will be spent on the Operation and Maintenance of the site for approximately the next 30 years.

**OCCIDENTAL CHEMICAL -- HYDE PARK**

| Output | Responsible Party | Target Date | Current Schedule |
|---|---|---|---|
| Remedial Action Completed for Bloody Run Creek | PRP | Jan 1993 | **COMPLETED** |
| Remedial Systems Construction Completed (See above table for detailed list of remedial actions) | PRP | March 1996 | September 2002 |
| Remedial Action Completion* | PRP | March 1997 | September 2003 |

* Remedial systems are considered Aoperational@ when they are operating as designed and are meeting their performance criteria. Once the remedial systems are declared operational, the Remedial Action is completed. Then, the Operation and Maintenance period follows.

**102nd STREET**
Sites # 40, 56, 85, and 94

**Site Program: Federal Superfund**
**Summary Prepared By: EPA**

Site Description

The 102nd Street site is located at the eastern edge of the City of Niagara Falls, on the banks of the Niagara River. The site encompasses 22.1 acres, owned by two Potentially Responsible Parties (PRPs): 15.6 acres owned by Occidental Chemical Corporation (formerly Hooker Chemical and Plastics Corporation) and 6.5 acres are owned by Olin Chemical Corporation.

This landfill was used from 1943 to 1971 for the disposal of an estimated 159,000 tons of wastes, including organic and inorganic phosphates (1,300 tons), hexachlorocyclohexanes (>1,500 tons), chemical and demolition wastes, and fly ash.

There are overburden and bedrock aquifers present under this site. A clay and till layer acts as an aquitard (or barrier) between the overburden and the bedrock. Although water flows in several directions in each aquifer, the average flow direction and ultimate discharge point is south to the Niagara River. A small portion of the groundwater from the upper two aquifers along the eastern site boundary flows east into an adjacent storm sewer, which ultimately discharges into the Niagara River upstream of the site.

Site Investigation

This National Priorities List site has been the subject of state and federal litigation, and is a joint EPA/DEC-lead Superfund site. EPA and the State of New York sued Occidental Chemical Corporation and the Olin Corporation in December 1979.

Interim remedial efforts taken at this site include bulkheading along the shoreline to minimize erosion into the river and the installation of a clay cap in the 1970s.

A Remedial Investigation (RI) was performed to determine the nature and extent of contamination in the soils and ground water. The RI, Feasibility Study (FS) and the Record of Decision (ROD) were completed in 1990.

The target dates for remedial action were delayed by approximately one year of negotiations, during which the PRPs disagreed with the terms of a proposed Consent Decree. Instead of continuing negotiations, EPA issued an Administrative Order in September 1991, requiring the companies to perform the remedial design and remedial action. An "Intent-to-Comply" letter was signed by the PRPs in October 1991, at which time the Remedial Design started.

Remedial Design

The remedial design of this site was delayed when the natural resource trustees (federal and state) expressed concerns about 5 acres of the embayment that was proposed in the design to be enclosed within a slurry wall and covered by the final landfill cap. Design modifications were explored to reduce the embayment loss to approximately 2 to 3 acres by constructing the slurry wall closer to the shoreline. The 1990 ROD, however, required that hot spots of contaminated sediments that would be outside the slurry wall be excavated and incinerated. The proposed design change would have left known hot spots of contaminated sediment outside the slurry wall, substantially changing the scope and cost of the remedy from that initially contemplated. A Record of Decision Amendment, signed by EPA in June 1995, eliminated the contingency requiring the incineration of any hot spots of sediments that would be left outside the slurry wall. The amended ROD required these sediments to be excavated and placed behind the wall within the encapsulated landfill.

Remedial Activities

Construction of remedial activities began in March 1996. A cofferdam was built around the embayment. After a fish survey was completed, game fish were removed from the embayment. Contaminated sediments were removed from the embayment. Perimeter soils were excavated and placed on site. The redesign discussed above enabled over 2 acres of embayment water resources to be saved. A slurry wall was built around the site to prevent contaminants from leaking into the River. The final landfill cap was completed in 1998, to prevent rainwater from infiltrating the waste and carrying contamination off-site.

An additional change in the remedial design is taking advantage of excess capacity at the Love Canal Treatment Plant. Instead of on-site leachate treatment, a force main was constructed to pump leachate from the 102nd Street Site to the Love Canal Treatment Plant. This change did not delay the completion and optimization of the final remedial

action.

The leachate pumping system was completed in December 1998, at which time the potential for contaminants to run to the River from this site was eliminated. Landscaping and optimization of the pump-and-treat system was completed in March 1999, and the long-term operation and maintenance of the site was started.

Remediation Costs

Following are estimated amounts that have been spent to date on remediating this site:

| | |
|---|---|
| Federal | $ 9,900,000 (Indirect costs not included.) |
| State | $ (State costs are included with EPA costs) |
| PRP | $ 26,000,000 |

Costs for Operation and Maintenance expected to be incurred in the future are approximately $100,000 per year, and will be paid by the PRPs.

**102ND STREET**

| Output | Responsible Party | Current Schedule |
|---|---|---|
| Final RI/FS Report | PRPs (Olin and Occidental) | **COMPLETED** |
| Record of Decision | EPA/DEC | **COMPLETED** |
| Record of Decision Amendment | EPA/DEC | **COMPLETED** |
| Remedial Design Start | PRPs | **COMPLETED** |
| Remedial Action Start | PRPs | **COMPLETED** |
| Remedial Action Completion | PRPs | **COMPLETED*** |

* The potential for contaminants to flow to Niagara River from this site was eliminated in December 1998, when the leachate pumping system was completed. Landscaping and optimization of the pump-and-treat system was completed in March 1999.

**BELL AEROSPACE TEXTRON**
Site # 5

**Site Program: RCRA (State and Federal)**
**Summary Prepared by: EPA and DEC**

Site Description

The Bell Aerospace Textron plant is located approximately 2.5 miles north of the Niagara River, adjacent to the Niagara Falls International Airport.

Between 1950 and 1980, the company used an unlined 60' X 100' surface impoundment to collect wash water from rocket engine test firings, storm run-off, and solvent drippings from cleaning, degreasing, and anodizing operations. Hazardous waste and constituents of concern include trichloroethylene and dichloroethylene. The wastes were discharged to a sanitary sewer after pH adjustment.

Beneath the site lies one overburden and two bedrock aquifers. Groundwater flow through the overburden aquifer is primarily to the south-southeast. There is a potential vertical flow between the overburden and the upper bedrock aquifer, and at least some of the groundwater from the overburden discharges to Bergholtz Creek. The upper bedrock aquifer flows primarily in a southeasterly direction and in the lower bedrock aquifer groundwater flow is generally to the south. The down-gradient extent of groundwater contamination in each of the three aquifers has been well defined, and, currently, no contaminated groundwater appears to be discharging directly to the Niagara River.

Remedial Actions

Bell Aerospace Textron is an RCRA site with a closed surface impoundment. The company excavated 1225 tons of contaminated soil and capped the area in 1987.

All of the remedial actions that were required here have been accomplished on schedule.

Since the initial 1989 hazardous waste site report, an RCRA Facility Investigation (RFI) has determined the extent of contaminant migration and a Corrective Measures Study (CMS) has addressed on- and off-site groundwater contamination. A State Part 373 post-closure permit was issued to Bell Aerospace in September 1992, which will expire in September 2003. The permit required final Corrective Measures Implementation (CMI),

consisting of groundwater pump-and-treat programs for on- and off-site contamination. In addition, in October 2001 the facility has installed (on a voluntary basis) monitoring wells through the cap of the Neutralization Pond as part of an ongoing investigation of the natural degradation of groundwater contamination at the facility.

The overall remedial program is designed to intercept the bedrock groundwater that is migrating off-site toward the Niagara River. It consists of the installation of 11 groundwater extraction wells.

The off-site remedial system was started up in April 1993. It is achieving its designed objective. The capture zone associated with the system covers the area of groundwater contamination, and the areal extent of the contamination is diminishing. Five extraction wells have been installed to contain the off-site groundwater. However, as the off-site plume has become smaller, four extraction wells were determined to be optimal for pumping. The extracted groundwater contamination is discharged into the publicly owned treatment works (POTW) of the Town of Wheatfield. The off-site system is designed to recover two pounds of volatile compounds daily. The performance of the off-site remedial system is considered acceptable.

The on-site remedial system began the start-up operating period in April 1995. Several technical problems prevented the on-site system from attaining all of its design objectives. The remedial system was redesigned to address these problems, and the following two modifications were made:

$ The installation of a 900 foot-long pipeline to divert the cooling water discharge from a rocket testing facility operating at the site to the storm drainage system; and
$ The installation of a slurry wall barrier along the main sewer line on Walmore Road to prevent the water migration from the sewer line to the on-site system.

However, even after these modifications, the on-site system was still not attaining satisfactory hydraulic containment. To address this, an additional extraction well was installed along the southern boundary of the site. This well was installed in July 1998, and is currently in operation. The operation of this well has increased the groundwater capture zone along the southern edge of the facility, but the capture zone was not consistently continuous from two of the five extraction wells. A higher capacity pump has been in operation on the new well since August 20, 1999, thus increasing the groundwater pumping rate.

With the above modifications, the on-site system is achieving its design goals. The on-site system has been effective in creating a groundwater capture zone, therefore, all contaminated groundwater is being intercepted and treated on-site, so that no loading is migrating from the site. Six extraction wells are currently operating in the on-site system. The operation of the higher capacity pump has maintained a continuous capture zone. Monitoring data of 2001 and the first quarter of 2002 indicates a complete capture zone has been obtained along the southern boundary. The on-site system is designed to recover four pounds of volatile compounds daily.

Remediation Costs

Following are estimated amounts that have been spent through March 2002 on remediating this site:

| | |
|---|---|
| Federal | $ (Oversight costs not available) |
| State | $ (Oversight costs not available) |
| PRP | $ 1,762,500 (Capital/Operation/Maintenance) |

It is estimated that the following amounts will be spent from April 2002 over the next ten years for operation and maintenance.

| | |
|---|---|
| Federal | $ (Not available) |
| State | $ (Not available) |
| PRP | $ 487,500 |

**BELL AEROSPACE TEXTRON**

| Output | Responsible Party | Previous Target Date | Current Schedule |
|---|---|---|---|
| RFI Work Plan Approval | DEC/EPA | May 1990 | **COMPLETED** |
| RFI Work Plan Approval for Phase II | DEC/EPA | None | **COMPLETED** |
| RFI Completion | Permittee | Jul 1991 | **COMPLETED** |
| CMS Work Plan Approval | DEC/EPA | Dec 1991 | **COMPLETED** |
| CMS Completion | Permittee | May 1992 | **COMPLETED** |
| Remedy Selection | DEC/EPA | Oct 1992 | **COMPLETED** |
| CMI Work Plan Approval (off-site) | DEC/EPA | Apr 1993 | **COMPLETED** |
| CMI Work Plan Approval (on-site) | DEC/EPA | Sep 1993 | **COMPLETED** |
| Start-up of CMI (off-site) | Permittee | Apr 1996 | **COMPLETED** |
| | | | |

| | | | |
|---|---|---|---|
| Start-up of CMI (on-site) | Permittee | Nov 1994 | **COMPLETED** |

**OCCIDENTAL CHEMICAL -- DUREZ DIVISION, NIAGARA FALLS**
**(Formerly BTL Specialty Resins)**
Site # 66

**Site Program: RCRA (State and Federal)**
**Summary Prepared by: EPA and DEC**

Site Description

Occidental Chemical Corporation (OCC) operates a phenol-formaldehyde resin manufacturing plant at 5000 Packard Road, Niagara Falls, known until June 1986 as the Varcum Chemical Division of Reichhold Chemicals, Inc. and until October 1989 as BTL Specialty Resins. The 5-acre site is approximately 3 miles north of the Niagara River.

The hazardous wastes generated at this site are ignitable and/or toxic solvent washings from reactor vessels, spilled raw materials and small amounts of laboratory samples. These wastes are accumulated, stored, treated, and incinerated on site.

Under this site lie one overburden aquifer and four bedrock aquifers. Bedrock groundwater flow is along both horizontal and vertical fractures. In general, the groundwater flow direction before remedial activities took place at the site was south to southwest, with the upper most bedrock aquifer flowing southeast.

Interim Remedial Measures

Three recovery wells began pumping in February 1989 to capture and remediate the groundwater under the site. These recovery wells affected groundwater flow in the overburden and the upper bedrock aquifers. Most of the contaminated groundwater from the uppermost bedrock aquifer and from the aquifer below it is captured by the recovery wells.

In May 1990, DEC issued OCC a state Part 373 Permit for the storage, treatment, and incineration of hazardous waste on-site. An EPA Hazardous and Solid Waste Amendments (HSWA) permit was issued in March 1991. Both permits required corrective action. As required by the permits:

$ Four carbon-steel tanks were installed to replace a 30,000 gallon hazardous waste storage tank;

$ The incinerator was modified with a larger burner, an expanded combustion chamber, a new double-layered refractory, a new control system, automatic alarm, and waste feed cut-off systems, and new instrumentation and piping. Prior to operation, a trial burn was conducted;

$ Approximately 3,000 tons of phenolic-contaminated soil were removed from the tank farm area in 1990. Additional areas with contaminated soils were capped.

Site Investigation and Additional Interim Remedial Measures

The RCRA Facility Investigation (RFI) Work plan was approved in May 1990, and the RFI was completed in November 1992. The main area of chemical presence is beneath the tank farm area on the east side of the facility. The predominant overburden and bedrock groundwater contaminants are total recoverable phenolics, ethylbenzene, total xylenes, 1,2-dichlorobenzene, and 1,4-dichlorobenzene. The vertical extent of groundwater contamination is limited to the overburden and the first three bedrock aquifer zones. With the exception of the tank farm area, chemical concentrations in the soils were less than action levels for soil ingestion. The soils are not a significant source of groundwater contamination; nevertheless, all open spaces on the site have been paved over.

As an interim corrective measure, beginning in February 1989, OCC has pumped bedrock ground water contaminated with phenols and other organics (primarily non-chlorinated solvents) to its biological treatment facility, prior to discharge to the Niagara Falls Wastewater Treatment Plant. EPA and DEC required OCC to submit interim reports to assess whether groundwater was being remediated adequately, and to assess the need for modifications, such as increasing pumping rates or installing additional wells. The groundwater pumping rate was doubled in 1990 with the addition of new treatment capacity at OCC's treatment facility which was constructed that year. Also, as an interim corrective measure to address the overburden groundwater contamination at the tank farm area, an overburden drain tile collection system began operating in 1993. The purged water is pretreated in the on-site wastewater treatment facility, prior to discharge to the Niagara Falls Wastewater Treatment Plant.

From April 1994 through August 1998, 22,624,389 gallons of bedrock groundwater were pumped and treated. Since the start-up of the drain tile system in January 1993 through August 1998, 189,620 gallons of overburden groundwater have been removed and treated. Approximately 25,442 pounds of contaminants have been removed.

Remedial Actions

The Corrective Measures study report has been approved. EPA and DEC have determined that the existing groundwater recovery systems which have been operating as interim corrective measures are capable of serving as the final groundwater remedy for the facility. The DEC Part 373 permit was modified in September 1995 to specify the final corrective measures. In addition to operation of the groundwater recovery systems, the final corrective measures include maintaining existing caps and pavement over areas of contaminated soil, restricting site access, and restricting future site development. Pursuant to the DEC Part 373 permit, OCC prepares monthly reports on the operating status of the groundwater recovery systems and is required to prepare comprehensive annual reports on performance monitoring of the recovery systems. The performance monitoring includes hydraulic monitoring, to establish the extent of plume capture, and chemical monitoring, to evaluate changes in groundwater quality.

The remedial actions that have come due at this site have been accomplished ahead of schedule, and Corrective Measure Implementation is underway.

Remediation Costs

Following are estimated amounts that have been spent to date on remediating this site:

| | |
|---|---|
| Federal | $ (Not available) |
| State | $ (Not available) |
| PRP | $ (Not available) |

It is estimated that the following amounts will be spent from now to the completion of remediation:

| | |
|---|---|
| Federal | $ (Not available) |
| State | $ (Not available) |
| PRP | $ (Not available) |

**OCC -- DUREZ, NIAGARA FALLS**

| Output | Responsible Party | Previous Target Date | Current Schedule |
|---|---|---|---|
| RFI Work plan Approval | DEC/EPA | Jul 1990 | **COMPLETED** |

| | | | |
|---|---|---|---|
| RFI Completion | Permittee | Sep 1992 | **COMPLETED** |
| Stabilization Start-up | Permittee | | **COMPLETED** |
| CMS Work plan Approval | DEC/EPA | Jun 1993 | **COMPLETED** |
| CMS Completion | Permittee | Dec 1993 | **COMPLETED** |
| Remedy Selection* | EPA/DEC | Dec 1994 | **COMPLETED** |
| CMI Work plan Approval | EPA/DEC | Feb 1995 | **COMPLETED** |
| Start-up of CMI | Permittee | Dec 1996 | **COMPLETED** |

* EPA and DEC have determined that the existing interim corrective measures groundwater pump-and-treat program is capable of serving as the final groundwater remedy for the site. The DEC Part 373 permit was modified in September 1995 to formally select the final remedy.

**OCCIDENTAL CHEMICAL S-AREA**
Site # 41A

**Site Program: Federal/State Co-lead: Superfund**
**Summary Prepared by: EPA**

Site Description

The S-Area site is an eight-acre landfill on Occidental Chemical Corporation's (OCC) Buffalo Avenue Plant in Niagara Falls. The site is located approximately 200 yards north of the Niagara River and immediately to the west of the former location of the old City of Niagara Falls drinking water treatment plant.

The site was used primarily from 1947 to 1961 for the disposal of approximately 63,000 tons of organic and inorganic chemicals. Chemicals deposited at the site included chlorobenzenes, organic phosphates, acid chlorides, phenol tars, thionyl chloride, chlorendic acid, trichlorophenol, benzoyl chloride, liquid and chlorotoluene-based disulfides, metal chlorides, thiodan, and miscellaneous chlorinated hydrocarbons.

One overburden and four bedrock aquifers exist under this site. While the bedrock aquifers flow generally north-northwest onto the main OCC - Buffalo Avenue Site, only the overburden aquifer flows south to the Niagara River.

Requisite Remedial Technology Agreement

This National Priorities List site is a joint EPA/DEC-lead responsibility, governed by a non-CERCLA settlement agreement, effective June 1985. The agreement provided for a source control remedy, monitoring programs, and a remedial plan for the Niagara Falls Drinking Water Treatment Plant (DWTP). The DWTP main bedrock intake tunnel was shut down due to the presence of non-aqueous phase liquid (NAPL) contamination. In the interim, the City's backup, emergency intake pipe was used to draw water from the Niagara River. The S-Area site was surveyed by OCC from December 1986 to April 1988 to determine the extent of chemical migration from the landfill. This survey was the basis for a Requisite Remedial Technology (RRT) report to EPA in November 1988.

As a result of the RRT Report and subsequent RRT negotiations among EPA/DEC, OCC and the City of Niagara Falls, an amendment (RRT stipulation) to the 1985 settlement agreement was submitted to the court in September 1990 and approved in April 1991.

The RRT stipulation included construction of a new DWTP for the City of Niagara Falls at a new location, to be funded by the City and OCC.

Remedial Actions

Most of the collection and containment remedial systems were installed at the landfill from 1990 to 1995. Initial testing and operational start-up began on November 1, 1995. The remedial systems are designed to eliminate the contaminant loadings from the site to the Niagara River by containment and collection of contaminated ground water and NAPL. Contaminated ground water and NAPL are currently being collected and treated on-site. Assessment of the remedial systems performance began in early 1997, and is being done on a semi-annual basis.

One of the components of the landfill remedy (drain collection system) did not function as designed during its initial operation. An investigation in late 1997 revealed that the system was improperly installed. OCC=s efforts to enhance the performance of the drain collection system in 1998 were unsuccessful and the EPA/DEC directed OCC to replace the system in 1999. The new drain collection system was completed in early 2000 and its performance is presently being evaluated.

The work on the new drain collection system delayed the construction of the final landfill cap. The construction of the final landfill cap began in August 2000 and is on-going.

The new DWTP was completed and fully operational by March 1997. The remedial activities for the old DWTP and property, including the decommission and demolition of the plant, had to wait until the new DWTP was built and on-line. The demolition of the old DWTP was performed in 1997 and early 1998. The eastern barrier wall, which adjoins the other three sides of the S-Area barrier wall, was completed in May 1998. The overburden drain collection system for the former DWTP was completed in 1999. Construction of the DWTP cap was completed in 1999.

Securement of the raw water intake structures from the old DWTP was scheduled for completion in 2000. The grouting of the 5,000-foot long DWTP bedrock intake tunnel commenced in August 2000. However, due to problems encountered in the field, the remediation of this tunnel was not properly completed. A confirmatory boring sampling program was conducted in the summer of 2001, whereby a major void was discovered in the tunnel grouting along a portion of the tunnel under Buckhorn Island and the Niagara River. It has been agreed by all regulatory parties and OCC that this ungrouted section of tunnel poses no discernable environmental threat and will be used to monitor the groundwater beneath the Niagara River at this location. A monitoring well will be installed to sample the water in the tunnel during Summer 2002. This well will be sampled as part of the overburden sampling program.

The full remedial program for this site consists of:

- $ A slurry barrier wall in the overburden to contain the NAPL plume;
- $ Installation of a drain system and collection wells (i.e., pumping wells) in the overburden, within the barrier wall, to: 1) collect contaminated ground water and NAPL, and 2) create an inward hydraulic gradient across the barrier walls and an upward hydraulic gradient from the underlying bedrock to the overburden within the barrier wall;
- $ Installation of wells in the bedrock to contain NAPL by creating an inward hydraulic gradient across the bedrock NAPL plume boundary, and to collect NAPL from the bedrock, to the maximum extent practicable;
- $ Capping of the site to reduce infiltration;
- $ Overburden and bedrock monitoring to determine the effectiveness of remedial systems;
- $ Incineration of non-aqueous-phase liquids; and
- $ Treatment of contaminated groundwater by carbon adsorption and discharge to a permitted outfall.

The remedial systems will continue to operate for at least 30 years.

The following progress has been made:

- $ The northern, western, and southern portions of the barrier wall were built in late 1994/early 1995.
- $ The drain collection system, collection wells, and the force mains for the drain and collection wells were completed in 1995 for the landfill. Additional wells were installed in 1997 to improve the performance of the system in collecting NAPL. The drain collection system for the former DWTP property was completed in 1999.
- $ Operation of the landfill drain collection system and collection wells began in 1996. As noted above, the drain collection system did not function as designed due to damage of the collection pipe and non-functioning stone backfill. The system was replaced in 1999-2000.
- $ A leachate storage facility and carbon adsorption treatment facility have been constructed on site and currently receive contaminated groundwater and NAPL from the overburden and bedrock collection wells.

- $ A perimeter landfill cap was installed between March and August 1996 to reduce infiltration. It included a 2-foot clay layer and flexible membrane liner near the Robert Moses Parkway, and asphalt paving west and north of the landfill.
- $ The construction of the final landfill cap commenced in August 2000, and is nearly completed. Reseeding of the cover material will be necessary in spring 2002.
- $ The new DWTP was completed in March 1997, and now supplies the City of Niagara Falls with its drinking water.
- $ The demolition of the old DWTP was completed in early 1998.
- $ The eastern barrier wall at the DWTP property was completed in May 1998.
- $ The DWTP drain collection system was completed in 1999.
- $ The construction of the DWTP cap was completed in 1999.
- $ The securement of the DWTP intake structure commenced in August 2000 and is on-going.

An updated schedule for completing the remaining remedial construction activities at the site follows. EPA anticipates that all of the components of the remedy (including the final S-Area and DWTP Bedrock RRT remedial system and related monitoring programs) will be installed and should be fully operational by the end of 2003.

Remediation Costs

Following are estimated amounts that have been spent to date on remediating this site:

| | |
|---|---|
| Federal | $ 10,500,000 |
| State | $ (State costs were covered under EPA costs through grants) |
| PRP | $ 45,000,000 |

It is estimated that the following amounts will be spent from now to the completion of remediation:

| | |
|---|---|
| Federal | $ 1,000,000 (oversight) |
| State | $ (Not available) |
| PRP | $ 5,000,000 (Capital costs) |
| | $ 2 to 3,000,000 per year for 30 years (Operation & Maintenance) |

**OCC S-AREA**

| Output | | Responsible Party | Previous Target Date | Current Schedule |
|---|---|---|---|---|
| RRT Survey work (RI) Completion | | PRP | --- | **COMPLETED** |
| RRT Study (FS) approved | | PRP | --- | **COMPLETED** |
| Record of Decision (RRT Stipulation) | | EPA/DEC | Mar 1990 | **COMPLETED** |
| Remedial Design (RD) Start | | PRP | --- | **COMPLETED** |
| Remedial Actions (RA) | Start | PRP | Jun 1991 | **COMPLETED** |
| | Construction of new DWTP | PRP | Apr 1997 | **COMPLETED** |
| | Demolish old DWTP | PRP | Sep 1997 | **COMPLETED** |
| | DWTP cap & drain collection system | PRP | 1998 | **COMPLETED** |
| | Securement of raw water intake structures from the old DWTP | PRP | 1999 | 2002[1] |
| | Perimeter landfill cap & drain collection system | PRP | N/A | **COMPLETED** |
| | Final landfill cap | PRP | 1999 | 2002[2] |
| | Construct Eastern barrier wall | PRP | Jul 1998 | **COMPLETED** |
| RA Completion | | PRP | 2000 | 2003[3] |

[1] The securement of the DWTP intake structures, including the grouting of the 5,000-foot long bedrock intake tunnel, commenced in summer 2000. Completion is tentatively scheduled in the summer of 2002.

[2] The construction of the final S-area Landfill cap commenced in August 2000 and should be completed by the end of the spring or summer of 2002.

[3] Construction activities for the year 2003 include the remaining bedrock monitoring programs as well as the design, installation and evaluation of the Phase III Bedrock System (final system) at both the S-Area and former DWTP property.

**STAUFFER CHEMICAL**
Site # 255

**Site Program: N.Y. Division of Hazardous Waste Remediation**
**Summary Prepared by: DEC**

Site Description

The Stauffer Chemical Plant site occupies about 23 acres, located about 1/4 mile east of the Niagara River in the Town of Lewiston.

Used for manufacturing from 1900 to 1976, the site was occupied by Stauffer Chemical from 1930 to 1976. Carbon tetrachloride and various metallic chlorides were produced on site, and methylene chloride and tetrachloroethylene were repackaged from bulk shipments. Plant operations terminated in 1976, and the site was razed in 1980. Disposal occurred on the plant site, as well as in two small landfills on the PASNY property to the east.

There are four significant, and one less significant, bedrock aquifers under the site. The flow direction for all water-bearing layers is southwest, towards the Power Authority of New York Forebay and the Niagara River.

Site Investigation

The Stauffer Chemical Plant site is a DEC-lead site. Pursuant to a Consent Order, Stauffer Chemical completed a Remedial Investigation/Feasibility (RI/FS) study of the site. The Record of Decision (ROD) was signed July 1992, and consent order for the remedial design/remedial action was executed in July 1993. The main components of the remedial plan included bedrock groundwater pumping and treatment, and soil vapor extraction, both on and off site. The plan also included re-grading of the site.

Delays in the original schedule were due to the need for additional remedial investigative studies to adequately define the nature and extent of contamination.

Remedial Activities

The remedial design was completed in July 1995. Extensive design work was necessary for proper de-watering, including pump tests, soil vacuum extraction pilot test, DNAPL treatment, and so on. Construction of the remedy has been completed.

Remedial actions completed include the following:

$ Installation of a bedrock pump-and-treat system that will operate for the next 30 years.
$ Installation of a soil vapor extraction and dewatering system that draws contaminants out of the soil.

Operational difficulties were encountered with the groundwater treatment system. This was corrected in 1997. The groundwater treatment system has been modified. Groundwater now flows through granular activated carbon prior to discharge to the NYPA Forebay.

Remediation Costs

Following are estimated amounts that have been spent to date on remediating this site:

| | |
|---|---|
| State | $ 180,000 |
| PRP | $ 5,100,000 |

It is estimated that the following amounts will be spent from now on Operation and Maintenance of the remedial system:

| | |
|---|---|
| State | $ 10,000 |
| PRP | $ 1,300,000 |

**STAUFFER CHEMICAL**

| Output | Responsible Party | Previous Target Date | Current Schedule |
|---|---|---|---|
| RI/FS | PRP | Sept. 1990 | **COMPLETED** |
| Record of Decision | DEC | Jan. 1991 | **COMPLETED** |
| Remedial Design | PRP | April 1993 | **COMPLETED** |
| Remedial Action Completion | PRP | April 1994 | **COMPLETED** |

# SOLVENT CHEMICAL
Site # 251

**Site Program: N.Y. Division of Hazardous Waste Remediation**
**Summary Prepared by: DEC**

Site Description

The Solvent Chemical site occupies approximately 6 acres in the City of Niagara Falls. The site is located about 1/4 mile north of the Niagara River.

The Solvent Chemical plant site has been used for manufacturing operations at various times from 1941 to 1978 by DuPont, Hooker Chemical and Solvent Chemical. DuPont and Hooker produced impregnite; Solvent Chemical manufactured chlorinated hydrocarbons, zinc chloride and zinc ammonium chloride. Chemicals disposed on site include zinc, benzene and chlorinated benzenes.

Five water-bearing layers have been significantly impacted by site contaminants: the saturated overburden layer and four bedrock zones. The groundwater in the overburden flows to the north. The bedrock aquifers generally flow to the northeast. Groundwater in the site area is influenced by the Falls Street Tunnel (due north of the site), and the New York Power Authority (NYPA) conduits (about 1,500 feet east of the site), which drain bedrock groundwater in the area. The majority of the site ground water flows into the Falls Street Tunnel, either directly or via the NYPA conduits. All of the dry weather flow through the Falls Street Tunnel now is treated by the Niagara Falls Wastewater Treatment Plant before discharge to the River.

Site Investigation

The Solvent Chemical site is a DEC/Department of Law-lead site. An initial Remedial Investigation [RI] (funded by the Potentially Responsible Party [PRP]) was completed in June 1991. Despite lengthy negotiations, the PRPs did not agree to undertake the Feasibility Study [FS]. The site was referred to State Superfund for completion of the RI/FS, while the Attorney General's office litigated the matter. Field work for supplemental investigations needed to support the FS was completed in November 1994. The RI/FS report was approved in August 1996. The proposed Remedial Action Plan was submitted for public comment in September 1996. The resulting Record of Decision (ROD) was signed in December 1996. The Remedial Action Plan includes the following components:

- Existing buildings on site to be demolished.
- Storm sewer from the site to Gill Creek is to be removed.
- Site is to be capped.
- Contaminated groundwater is to be hydraulically controlled through pump-and-treat systems (including an off-site hot spot to the west).
- Pre-treatment system for contaminated groundwater.

DEC and site PRPs completed legal agreements that require ROD implementation. The settlement was approved by the U.S. District Court in October 1997. Construction was started in early 1998, but was delayed by lack of access agreements with adjacent property owners. Building demolition was completed in 1998. Installation of the extraction system in the off-site hot spot has been completed. Removal of the off-site storm sewer began in July 2000.

Construction of the groundwater extraction and treatment systems were completed in 2001. Treatment system modifications are required in early 2002. The remedial system is expected to be fully operational after the modifications. A performance monitoring program will begin in 2002 when the remedial system comes on-line.

Remediation Costs

Following are estimated amounts that have been spent to date on remediating this site:

| | |
|---|---|
| State | $ 1,170,000 |
| PRP | $ 2,950,000 |

It is estimated that the following amounts will be spent from now to the completion of remediation:

| | |
|---|---|
| State | $ 0[1] |
| PRP | $ 11,250,000 |

**SOLVENT CHEMICAL**

| Solvent Chemical | Responsible Party | Previous Target | Current |
|---|---|---|---|

[1] PRP will reimburse future state costs.

| | | Date | Schedule |
|---|---|---|---|
| RI | PRPs | Dec 1990 | **COMPLETED** |
| RI/FS | DEC | Sep 1994 | **COMPLETED** |
| Record of Decision | DEC | Dec 1994 | **COMPLETED** |
| Remedial Design Start | PRPs | Dec 1995 | **COMPLETED** |
| Remedial Action Start | PRPs | Dec 1996 | **COMPLETED** |
| Remedial Action Completion | PRPs | May 2001 | Dec 2002 |

**VANADIUM CORPORATION OF AMERICA**
**(Formerly SKW Alloys)**
Site # 1

**Site Program: N.Y. Division of Hazardous Waste Remediation**
**Summary Prepared by: DEC**

Site Description

The Vanadium site is located approximately 1 2 miles east of the Niagara River in the Town of Niagara.

The Vanadium Corporation of America owned and operated a facility at the site from 1920 to 1964 when approximately 594,000 tons of slag and other refuse were disposed at the site. In 1964, the site was purchased by the Pittsburgh Metallurgical Company, which subsequently changed its name to Airco Properties, Inc. Airco disposed wastes similar to the wastes disposed by Vanadium. In 1979, SKW Alloys, Inc. bought 37 acres of the 62 acre parcel owned by Airco, while Airco retained ownership of the eastern 25 acres. The Vanadium site consists of both properties as well as property owned by the Niagara Mohawk Power Corporation and the New York Power Authority (NYPA) to the east and north which also contains waste piles deposited by Vanadium. Chromium is a major contaminant of concern at the site, as well as a caustic waste which is affecting the pH of the ground and surface water.

The site contains 11 to 24 feet of overburden, consisting of clay, stratified drift and till, underlain by Lockport Dolomite. Groundwater flow in the area is influenced by the NYPA conduits causing a groundwater flow divide which bisects the site. Groundwater under the SKW site and most of the Airco site flows to the southwest. Groundwater under the Niagara Mohawk site, the NYPA site, and the remainder of the Airco site flows east into the conduit drain system.

Site Investigation and Interim Remedial Measures

The Vanadium site is a DEC-lead site. A Phase I investigation was completed in December 1989. A Preliminary Site Assessment (Phase II investigation) is complete. Wells were sampled in November 1992 and a report with results and recommendations for site reclassification was completed in September 1993.

As a result of the Preliminary Site Assessment, the site was reclassified to a class 2 (significant threat to the public health or the environment, action required) on April 3, 1995. In 1997, DEC completed a study (IIWA) to further define the nature and extent of contamination at the Niagara Mohawk and NYPA properties. For remediation purposes, the site has been divided into three operable units: OU#1 (SKW), OU#2 (Airco), and OU#3 (Niagara Mohawk and NYPA).

Under Consent Order, SKW completed an Interim Remedial Measure to cover portions of their parcel and control site storm water runoff. This remedial measure was completed in November 1998. DEC and Airco negotiated an Interim Remedial Measure (IRM) to cap the landfill on their portion of the site. Closure of the Airco portion of the site (OU No. 2) was completed by December 2000.

Schedule for Completion

A schedule for completion is presented below. The site PRPs have not agreed to act as a group. This has contributed to delays in the schedule due to the need to negotiate individually with the PRPs. Niagara Mohawk and the NYPA have agreed to conduct a Remedial Investigation of OU No. 3. A scope of work has been approved, and field work is expected to commence in the summer of 2002.

Remediation Costs

Following are estimated amounts for the Interim Remedial Measures:

OU #1:

| | |
|---|---|
| State | $ 30,000 |
| PRP | $ 750,000 |

OU #2:

| | |
|---|---|
| State: | $ 75,000 |
| PRP | $ 4,500,000 |

It is estimated that the following amounts will be spent from now to the completion of remediation:

| | |
|---|---|
| State | $ (Not available; site has yet |

PRP $ to proceed to final remediation)

**VANADIUM CORPORATION OF AMERICA**

| Output | Responsible Party | Previous Target Date | Current Schedule |
|---|---|---|---|
| Phase I Investigation | DEC | Dec 1989 | **COMPLETED** |
| Phase II Investigation | DEC | Dec 1991 | **COMPLETED** |
| IIWA Investigation | DEC | Aug 1997 | **COMPLETED** |
| Interim Remedial Measure | SKW Alloys, Inc. | Dec 98 | **COMPLETED** |
| Interim Remedial Measure | Airco | Dec 2000 | **COMPLETED** |
| RI/FS (Operable Unit #3) | Niagara Mohawk And NYPA | Mar 2001 | July 2003 |
| Record of Decision (site wide) | DEC | July 2001 | Schedule dependent on results of OU No. 3 Remedial Investigation. |
| Remedial Design | PRP or DEC | July 2002 | |
| Remedial Action | PRP or DEC | July 2003 | |

**OLIN CORPORATION**
Site #58, 59

**Site Program: RCRA (State and Federal)**
**Summary Prepared by: EPA and DEC**

Site Description

The Olin Corporation site, 25 acres located on Buffalo Avenue in Niagara Falls, is actually two plants on separate but contiguous sites, partially separated by the property of the E.I. DuPont Company. Gill Creek flows through the eastern part of the facility. The site is about 1/4 mile North of the Niagara River.

Olin Corporation has used this site for inorganic chemical production since 1897. Several organic chemicals, including benzene, chlorobenzene, trichlorobenzene, and trichlorophenol were used or manufactured between 1950 and 1956. Wastes handled at this facility include: ignitable, corrosive, reactive, and EPA toxic characteristic wastes and Resource Conservation and Recovery Act (RCRA)-listed wastes (brine purification muds and wastewater treatment sludge from mercury-cell chlorine production). Brine sludge, containing mercury and possibly polychlorinated bi-phenyl, was used as fill material in various locations throughout the site.

The site consists of soil and gravel at 0-3.5 feet, sandy clay at 3.5-5 feet. The bedrock surface lies at 5.5-8 feet. Proximity to the Niagara River and Gill Creek indicates a major potential for contaminant migration. Ground water on the site exists in shallow unconsolidated deposits and in a bedrock aquifer composed of 3 monitored zones. Shallow groundwater infiltrates to Gill Creek, which discharges to the Niagara River.

In 1984, EPA issued Olin Corporation a RCRA permit to operate the hazardous waste storage and treatment facilities on this site, but since it was issued before the Hazardous and Solid Waste Amendments to RCRA were enacted, it did not incorporate corrective actions. EPA issued an order in September 1989, requiring investigation of releases throughout the site, and particularly from the brine mud storage area, where releases have occurred. Permitted units were closed in 1990, according to a DEC-approved closure plan.

Interim Remedial Measures

Under a joint venture with DuPont, Olin conducted the off-site remediation of Gill Creek from Buffalo Avenue to the Niagara River, which was completed in December 1992. Contaminated sediment was removed, and the creek has been restored.

An EPA/DEC-approved DNAPL interim corrective measure (ICM) was implemented by Olin during May and June 1994. The program was intended to identify and characterize any DNAPL presence in five Olin monitoring wells and to remove any DNAPL encountered. DNAPL was only detected in one well and a total volume of less than two gallons was removed.

Former Olin production wells are currently being used to pump and treat groundwater from the site through an agreement with the adjacent DuPont facility. The Olin wells serve as part of DuPont's bedrock groundwater remediation program and exert a large radius of influence over the Olin site, which effectively reduces the total toxic load migrating from the Olin site. The radius of influence of the Olin wells extends approximately halfway (east-west) across Olin=s Plant 2 in the B zone, and approximately to Gill Creek in the lower aquifer zones and CD zones). The remedy approved in the CMS is designed to capture all groundwater contamination not captured by the Olin production wells. The wells extract groundwater at a rate of approximately 600 gallons per minute continuously.

Site Investigation and Remedy Selection

Olin has conducted soil and hydrological studies, and submitted several supplemental RFI reports to the EPA/DEC. Olin has completed the final phase of the RFI, and the final RFI report was approved by EPA and DEC in February 1995. Mercury was detected in the soils in concentrations up to 1,210 parts per million. Volatile and semi-volatile organic constituents and pesticides were also identified in the soils. Sampling of twenty-four overburden and bedrock wells identified volatile and semi-volatile constituents, pesticides, and mercury at levels exceeding federal and state groundwater standards.

Work plans for both Phase I of the CMS (soil & overburden groundwater) and for Phase II of the CMS (bedrock groundwater) were previously approved by EPA/DEC. In March 1995 Olin submitted a full CMS Report (incorporating both Phases I and II), which was approved by EPA/DEC in September 1995. In July 1996, the proposed remedy for this site was public noticed. Following public review, a remedy was selected and the CMI Work plan approved. The remedy includes the following components:

$ Drilling and installing 5 groundwater recovery wells at Olin=s plant 2 site. The recovered groundwater will be pumped to a new on-site treatment plant before being discharged into the City of Niagara Falls sewer system.

$ Paving all unpaved surfaces in order to minimize the volume of contaminated groundwater recharge.

DEC issued a Consent Order to implement the selected remedy. The remedial system was constructed and began operation in October 1997.

Operation & Maintenance is now underway. The remedial system is close to meeting its performance objectives. Olin is addressing problems due to incrustation associated with high pH (>10) groundwater. For example, two pumps have been replaced and a system to inhibit scaling of the pumps and pipes has been installed. Recent performance reports indicate that system performance has improved, but more actions may be necessary.

An updated schedule for implementation of a corrective action program, including Corrective Measure Implementation (CMI), follows. The scheduled project milestones relate to complete on- and off-site investigation and remediation.

Remediation Costs

Following are estimated amounts that have been spent to date on remediating this site:

| | |
|---|---|
| Federal | $ (Not available) |
| State | $ (Not available) |
| PRP | $ (Not available) |

It is estimated that the following amounts will be spent from now to the completion of remediation:

| | |
|---|---|
| Federal | $ (Not available) |
| State | $ (Not available) |
| PRP | $ (Not available) |

**OLIN CORPORATION**

| Output | | Responsible Party | Previous Target Date | Current Schedule |
|---|---|---|---|---|
| RFI Work Plan Approval | | DEC/EPA | Apr 1990 | **COMPLETED** |
| RFI Completion | Phase I | Permittee | | **COMPLETED** |
| | Phase II | Permittee | Dec 1994 | **COMPLETED** |
| Stabilization Start-up (Groundwater) | | | | **COMPLETED** |
| CMS Work Plan Approval | Phase I | Permittee | | **COMPLETED** |
| | Phase II | DEC/EPA | Sep 1993 | **COMPLETED** |
| CMS Completion (including approval) | | Permittee | Mar 1995 | **COMPLETED** |
| Remedy Selection | | DEC/EPA | Mar 1996 | **COMPLETED** |
| CMI Work Plan Approval | | DEC/EPA | Mar 1996 | **COMPLETED** |
| Start-up of CMI Initiation/Stabilization | | Permittee | Dec 1996 | **COMPLETED** |

Note: Phase I - Overburden soil and groundwater
Phase II - Bedrock groundwater

**DUPONT -- BUFFALO AVENUE**
Site # 15-19

**Site Program: N.Y. Division of Hazardous Waste Remediation**
**Summary Prepared by: DEC**

Site Description

The DuPont Buffalo Avenue Plant site occupies over 50 acres in the City of Niagara Falls. The plant is separated from the Niagara River by the Robert Moses Parkway.

Manufacturing operations have been conducted at the site since 1898. Chemicals disposed on the site included: carbon tetrachloride, chloroform, dichloroethylene, methylene chloride, trichloroethylene, tetrachloroethylene, vinyl chloride, PCBs, barium and other organic and inorganic compounds.

One overburden and five bedrock aquifers exist under this site, each consisting of two or three zones with different flow directions. Groundwater flowing south discharges into the Niagara River and Gill Creek. Groundwater flowing north discharges into the unlined Falls Street Tunnel, and groundwater flowing east, into the New York Power Authority (NYPA) conduit drain system.

Remedial Actions

As of January 1992, all remedial systems at this site were completed and operating. More than 60 studies of subsurface contamination were completed by DuPont on the plant site, and a Consent Order was negotiated for the implementation of a groundwater remediation program. In January 1992, an on-site groundwater pump-and-treat system went into operation. A portion of the flow from the western half of the DuPont site is under the influence of the Olin production wells. This water is remediated by the Olin Treatment Plant before discharge to the river.

Additionally, DuPont is a Potentially Responsible Party for the remediation of Gill Creek, which was completed in December 1992. A total of 8,020 cubic yards of contaminated sediment was removed, and the creek has been restored. Five-years of post-remediation monitoring of Gill Creek sediments was completed in 1998. Monitoring reports do not indicate PCB re-contamination in the sediment of the Gill Creek remediation area.

Remediation Costs

Following are estimated amounts that have been spent to date on remediating this site:

| | |
|---|---|
| State | $ 50,000 |
| PRP | $ 43,600,000 (includes Gill Creek remediation) |

It is estimated that $ 1,600,000 will be spent annually by the PRP on the Operation and Maintenance of this site.

**DUPONT BUFFALO AVENUE**

| Output | Responsible Party | Status |
|---|---|---|
| Record of Decision | DEC | **COMPLETED** |
| Remedial Design | PRP | **COMPLETED** |
| Remedial Action | PRP | **COMPLETED** |

**BUFFALO COLOR CORPORATION**
Site # 120, 122

**Site Program: RCRA (State and Federal)**
**Summary Prepared by: EPA and DEC**

Site Description

Buffalo Color Corporation, located on 61 acres adjacent to the Buffalo River within the city of Buffalo, is a major manufacturer of indigo dye.

This plant, which was originally built in 1879 by the Schoelkopf Aniline and Dye Company, merged with two other companies to form the National Aniline and Dye Company in 1916, one of five companies forming Allied Chemical Corporation in 1920. Buffalo Color Corporation purchased and began operating the dye plant in 1977.

Dyestuffs and/or organic chemicals have been continuously produced at the facility for more than 110 years. The dye manufacturing operations generate approximately 450,000 gallons per day of process waste water. The waste water is a Resource Conservation and Recovery Act (RCRA) hazardous waste due to its corrosivity (pH >12.5). RCRA hazardous constituents in this waste stream include: aniline, N-methylaniline, N,N-dimethylaniline, N,N-diethylaniline, cyanide, methanol, nickel, and chromium. Prior to 1971, these wastes were discharged directly to the Buffalo River. In 1971, Allied Chemical diverted the waste streams to three surface impoundments for neutralization prior to release to the Buffalo Sewer Authority, and beginning in March 1989, Buffalo Color installed a new neutralization tank to treat wastewater before discharge to sewers.

The stratigraphy at the site from the upper to lowermost units is: 2-11 feet of fill, 6-13 feet of silt and fine sand (upper aquifer), 25-37 feet of silty clay, 5-7 feet of sand and gravel (lower aquifer), and bedrock of Onondaga Limestone. Groundwater flow in the upper aquifer is towards the Buffalo River. Groundwater near the surface impoundments is contaminated with aniline, dimethylaniline, N-ethylaniline, and cyanide, all of which most likely derive from the surface impoundments.

Site Investigation

A RCRA Facility Assessment (RFA) Preliminary Review and Visual Site Inspection were completed during 1986 and 1988, respectively. Eight (8) Solid Waste Management units (SWMUs) have been identified at the site. Overburden ground water monitoring

wells at the impoundments show concentrations of chlorobenzene, dichlorobenzenes, toluene, anilines and phenol above DEC-promulgated ground water standards. An RFA soil sampling program for a container storage area was completed in January 1991. EPA and DEC identified a need to investigate potential releases from both the extensive sewer system and from two inactive buildings at the site.

A DEC Part 373 post-closure permit was public noticed in 1992 to address releases. The facility objected to several conditions of the draft permit and requested an administrative hearing. All outstanding issues were resolved and the Part 373 permit became effective on February 10, 1995. Remediation will be implemented under the Part 373 permit.

The RFI Work plan has been approved. The RFI includes a subsurface (soil and groundwater) investigation program for all areas of the plant except for Area D, which is being remediated under the New York State Inactive Hazardous waste program (see Area D summary for details).

$ Field work for Phase I of the RFI began in April 1996 and consisted of 18 monitoring wells around the perimeter of the site to evaluate groundwater quantity and potential migration of hazardous constituents off site.
$ Phase II of the RFI, completed in September 1996, involved the advancement of 24 soil probes within the site to collect near and sub-surface soil samples.

Hazardous contaminants were detected at the perimeter monitoring wells during the Phase I and II investigations for the RFI. In November 1996, BCC proposed supplemental investigations (involving 10 additional wells) to determine the off-site extent of contamination. DEC approved the proposal in December 1996. In January 1997, BCC proposed the collection of 6 additional surficial samples to provide further support of a corrective measures study. DEC approved the proposal in March 1997. BCC submitted the RFI report in November 1997. In response to DEC comments on the RFI, BCC submitted a second supplemental investigation plan involving 8 new wells, 5 piezometers, and 10 soil samples. This proposal was approved in July 1998 and implemented during the summer of 1998. A revised RFI report was submitted in December 1998 and approved in April 1999. A Corrective Measures Work Plan was submitted in May 1999 and approved in July 1999. In July 2000, the Corrective Measures Study Report was approved. However the approval does not constitute approval of the Risk Assessment provided in the report. The Risk Assessment is based in part, on USEPA Industrial/Commercial Risk-Based Levels, that are not completely accepted by the NYS Department of Health. In addition, there were cases in which the method detection limits for soils were not sufficiently low to evaluate comparison with the risk levels.

During July 1999, a pump test was performed to aid in the design of Corrective Measures for Plant Area A, to prevent the discharge of contaminated groundwater into the Buffalo River. The pump test indicated that conventional pumping wells should be effective in controlling the migration of contaminated groundwater in Plant Area A, and that migration control should be achievable with a total system pumping rate on the order of 25-30 gpm. Such a system has been proposed as part of the final corrective measures, within the CMS report.

The supplemental investigations delayed completion of the RFI. All target dates in the table below account for these delays. Remedy selection and CMI implementation have been delayed due to the financial viability of the company. Completion of the milestones is dependent, in part, on field conditions encountered, which may delay the overall schedule for corrective action.

Remediation Costs

Following are estimated amounts that have been spent to date on remediating this site:

| | |
|---|---|
| Federal | $ 0 |
| State | $ 0 |
| PRP | $ (Not available) |

It is estimated that the following amounts will be spent from now to the completion of remediation:

| | |
|---|---|
| Federal | $ (Not available) |
| State | $ (Not available) |
| PRP | $ (Not available) |

**BUFFALO COLOR CORPORATION**

| Output | Responsible Party | Previous Target Date | Current Schedule |
|---|---|---|---|
| RFA Work Plan Approval | EPA/DEC | Mar 1990 | **COMPLETED** |
| RFA Completion | Permittee | May 1990 | **COMPLETED** |
| RFI Work Plan Approval | EPA/DEC | Mar 1995 | **COMPLETED** |

| | | | |
|---|---|---|---|
| RFI Completion | Permittee | July 1997 | **COMPLETED** |
| Stabilization Start-up | Permittee | Jan 1998 | N/A* |
| CMS Work Plan Approval | EPA/DEC | Jan 1998 | **COMPLETED** |
| CMS Completion | Permittee | Jul 1998 | **COMPLETED** |
| Remedy Selection | EPA/DEC | Nov 1998 | May 2002 |
| CMI Work Plan Approval | EPA/DEC | Apr 1999 | September 2002 |
| Start-up of CMI | Permittee | Oct 1999 | March 2003 |

* Results of a 1999 pump test indicated that conventional pumping wells should be effective in controlling the migration of contaminated groundwater in Plant Area A, and that migration control should be achievable with a total system pumping rate on the order of 25-30 gpm. Such a system has been proposed as part of the final corrective measures, within the CMS report.

**BUFFALO COLOR -- AREA D**
Site # 120-122

**Site Program: N.Y. Division of Hazardous Waste Remediation**
**Summary Prepared by: DEC**

Site Description

Area D of the Buffalo Color Plant site occupies about 19 acres adjacent to the Buffalo River in the City of Buffalo. The site is about 4 miles upstream of the confluence of the Buffalo and Niagara Rivers.

Area "D" is an inactive hazardous waste site. It was used from 1905 to 1974 as a chemical manufacturing, handling and disposal site. From 1905 to 1920, acids, chemicals and dye intermediates were produced by Contact Process Company and by National Aniline Chemical Company, which merged into Allied Chemical and Dye Corporation in 1920. Allied Chemical and Dye Corporation manufactured petroleum-based detergents, dye intermediates, picric acid, and other chemicals at Area "D" from 1920 to 1974. During that time, a number of structures, railroad tracks and tank parks were built at the site. All chemical manufacturing operations ceased in 1974, and chemical waste handling ceased in 1976 at Area "D". In 1977, the property was sold to Buffalo Color Corporation and remained idle. All structures on the site were demolished to grade by Buffalo Color Corporation in 1984.

The site overburden consists of fill, alluvium, glaciolacustrine deposits and glacial till, and is underlain by the Onondaga Limestone. The shallow overburden water-bearing zone on the site is in direct hydraulic connection with the Buffalo River. The major pathways of contaminant migration from the site to the Buffalo River was shallow ground water and erosion of the shoreline.

Site Investigation and Remedy Selection

The Buffalo Color Area D site is a DEC-lead site. Pursuant to a Consent Order, the PRPs (Buffalo Color and Allied Chemical) conducted a Remedial Investigation (RI), which was first submitted in April 1989 and approved in September 1990. The RI indicated elevated levels of Polynuclear Aromatic Hydrocarbons (PAHs), chlorinated benzenes and heavy metals in the site fill layer. The site groundwater was found to be

contaminated by volatile organics, chlorinated benzenes, iron and other heavy metals and non-aqueous phase liquid (NAPL).

A Feasibility Study (FS) was submitted in December 1990, with final revisions submitted and approved in July 1991. The FS evaluated 13 alternatives for the remediation of the site and identified a preferred alternative; all were discussed at a public meeting in October 1991. A Record of Decision (ROD) was signed in November 1991, setting forth a selected remedial plan.

An Order on Consent was signed by Allied Signal and NYSDEC in June 1993 for the remediation of the site. Construction of the selected remedy began in June 1996. The Remedial Action was completed in September 1998.

The following are the elements of the remedy completed in September 1998:

$ A slurry wall was constructed around the entire site;
$ River sediments adjacent to the site were dredged and deposited on-site. The shoreline was armored with rip rap;
$ A high-density polyethylene liner was placed over the entire site and properly capped;
$ Groundwater is being pumped and treated at an on-site treatment facility.

Remediation Costs

Following are estimated amounts that have been spent to date on remediating this site:

| | |
|---|---|
| State | $ 200,000 |
| PRP | $ 14,000,000 |

**BUFFALO COLOR -- AREA D**

| Output | Responsible Party | Current Schedule |
|---|---|---|
| RI/FS | PRPs | **COMPLETED** |
| Record of Decision | DEC | **COMPLETED** |
| Remedial Design | PRPs | **COMPLETED** |
| Begin Remedial Construction | PRPs | **COMPLETED** |

| | | |
|---|---|---|
| Remedial Action Completion | PRPs | **COMPLETED** |

**BETHLEHEM STEEL CORPORATION**
Site # 118

**Site Program: RCRA (State and Federal)**
**Summary Prepared by: EPA**

Site Description

The Bethlehem Steel Corporation (BSC) facility encompasses approximately 2.5 square miles, located on Hamburg Turnpike, Lackawanna. Buffalo Harbor marks the northern boundary of the site, and Lake Erie marks its western boundary.

BSC is a former major manufacturing plant that produced structural steel, coke, coke byproducts and specialty steel products. Processing occurred primarily on the eastern section of the site. The western section of the site was created by landfilling 440 acres of Lake Erie with slag from processing. Since 1983 the facility has significantly reduced manufacturing operations. Most of the former production areas have been closed and demolished. Until the fall of 2001, the galvanizing and coke production processes were the only areas in operation. The coke ovens were closed in the fall of 2001 and coke production ceased. Over 100 Solid Waste Management Units have been identified at the site. Six surface water bodies on site have been identified as having received hazardous waste or hazardous constituents from BSC.

Within the Buffalo-Lackawanna area, all surface and ground waters ultimately drain into Lake Erie. Preliminary information concerning site-wide hydrogeology indicates that contaminated groundwater flows east to west into Lake Erie. Groundwater also appears to enter both Smokes Creek and the Ship (or Lackawanna) Canal. In the area immediately surrounding the two regulated surface impoundments, groundwater flows west towards Lake Erie. Also, transecting the site are trenches, which drain from the process area into Smoke and Blasdell Creeks. The Ship Canal drains northward into Buffalo Harbor.

Site Investigation

EPA issued a consent order in August 1990 requiring an on-site RCRA Facility Investigation (RFI). The RFI investigation is being conducted in a multi-phase approach. Initial phases of the investigation (Phase I and Phase IIA) were conducted between 1990 and 1993.

BSC submitted the Phase II-B RFI Report in November 1994. These investigations have identified benzene, naphthalene, phenolic compounds, and metals in groundwater samples collected from monitoring wells at the facility. Due to the complexity of site conditions that have been encountered at the facility in previous investigations, EPA and DEC required BSC to conduct a Phase III RFI investigation to fill in data gaps. Field work for this investigation was completed in September 1995. Negotiations over the scope of the human health risk assessment, which is required as part of the RFI report, have delayed the submittal of the RFI and human health risk assessment. In July 1996, EPA approved the Ecological Risk Assessment Work Plan, and BSC completed a draft of this assessment, which is also a component of the RFI. A review of the draft Ecological Risk Assessment revealed that additional data collection was necessary to complete the assessment. As such, BSC submitted an Ecological Sampling Work Plan and a Supplemental Solid Waste Management Unit Work Plan in May 2000 to address collection of the additional data. This data was collected in 2001 and will be incorporated into the RFI Report.

EPA and DEC have identified two areas (Acid Tar Pits and Coke Oven Areas) where BSC should consider implementing stabilization or interim corrective measures to control and reduce the further spread and off-site migration of contaminated groundwater from the facility. These two areas appear to be the primary sources of groundwater contamination at this facility. BSC has not implemented any interim corrective action or stabilization activities to address the contamination in these areas to date. However, BSC has submitted a Pre-design Investigation Report for the remediation of the Benzol Plant Area (i.e., Coke Oven Area). The implementation of the remedial work in the Benzol Plant Area has been delayed due to a dispute over the characterization of the wastes in that area. BSC also previously proposed and performed two remedial technology studies for the acid tar pit area. These studies were found by the EPA and NYSDEC to be technically flawed and of limited value. Any future CMS or CMI activities will require a new order, permit or other agreement.

Following approval of the RFI report, a site-wide CMS Work Plan, with a schedule, will be required of BSC. The scope of this Work Plan will be partly determined by the results of the Human Health and Ecological Risk Assessments.

BSC also submitted an application for two Corrective Action Management Units (CAMUs) to NYSDEC and EPA. The Agencies have determined that BSC=s application is considered Asubstantially complete.@ BSC subsequently submitted a 30% design for the CAMU and continues to meet with NYSDEC on the CAMU issue. This will allow the potential for CAMUs to be utilized as part of a future remedy at the facility.

While RFI activities are being completed, EPA has removed approximately 102 acres of the facility from the RFI Order to facilitate brownfields type redevelopment. This acreage is not believed to be significantly contaminated and may be suitable for redevelopment. BSC and NYSDEC are negotiating a Work Plan and Order for investigation of the parcel. The negotiations for the Work Plan and Order are currently stalled due to disagreement between BSC and NYSDEC.

BSC filed for Chapter 11 bankruptcy in October of 2001. This has cause delays in the implementation of various site activities.

A current schedule for implementation of a corrective action program at the facility, including CMI, follows. Due to delays caused by several problems outlined above, the proposed schedule was extended. All subsequent target dates were extended accordingly. Completion of the outputs is dependent on 1) the nature and extent of contamination found on- and off-site (and thus the complexity of remedial measures required); and 2) the timeliness in which the planning and implementation of work plans and reports are submitted by the facility and approved by EPA and DEC. The scheduled project milestones relate to complete on- and off-site investigation and remediation.

Remediation Costs

Following are estimated amounts that have been spent to date on remediating this site:

| | |
|---|---|
| Federal | $ (Not available) |
| State | $ (Not available) |
| PRP | $ (Not available) |

It is estimated that the following amounts will be spent from now to the completion of remediation:

| | |
|---|---|
| Federal | $ (Not available) |
| State | $ (Not available) |
| PRP | $ (Not available) |

**BETHLEHEM STEEL CORPORATION**

| Output | Responsible Party | Previous Target Date | Current Schedule |
|---|---|---|---|
| | | | |

| | | | |
|---|---|---|---|
| RFI Work Plan Approval | EPA/DEC | Jan 1990 | **COMPLETED** |
| RFI Completion | Permittee | Mar 2000 | Apr 2001 |
| RFI Report Approved[1] | EPA/DEC | Apr 2001 | July 2002 |
| CMS/CMI | | | |
| Issue CMS/CMI Order | DEC/EPA | July 2000 | July 2002 |
| CMS Work Plan Approval[2] | DEC/EPA | Oct 2000 | Oct 2002 |
| CMS Completion[2] | Permittee | June 2001 | June 2003 |
| Remedy Selection | DEC/EPA | Oct 2001 | Oct 2003 |
| CMI Work Plan Approval[2] | DEC/EPA | Aug 2002 | Aug 2004 |
| Start-up of CMI[2] | Permittee | Dec 2002 | Dec 2004 |

[1] RFI to include human health and ecological risk assessments.

[2] These outputs will require a new order, permit or other agreement. Target dates dependent upon facility owner/operator agreement to complete these stages of site corrective action program.

**RIVER ROAD (INS EQUIPMENT)**
Site # 136

**Site Program: N.Y. Division of Hazardous Waste Remediation**
**Summary Prepared by: DEC**

Site Description

The River Road site occupies approximately 23 acres in the Town of Tonawanda. The site is adjacent to the Niagara River.

The River Road site was utilized for waste disposal from the early 1920s through the late 1970s. Disposed on site were steel and coke industry wastes, consisting of foundry sand, coke sludges, oils, solvents and slags.

The overburden at this site consists of 15 to 20 feet of fill over glaciolacustrine deposits and till. The overburden is underlain by Onondaga Limestone. The two overburden aquifers on site flow west towards the Niagara River.

Site Investigation

The River Road site is a DEC-lead site. Negotiations with the six Potentially Responsible Parties (PRPs) for an RI/FS were not successful, causing a delay in targeted remedial action dates. The PRPs did not agree to conduct an RI/FS; therefore, the State undertook the task under State Superfund. The RI/FS was completed in January 1994 and the record of decision (ROD) was signed in March 1994. The River Road site was combined with the adjacent Niagara Mohawk-Cherry Farm site for joint remediation (see following site description). Some PRPs agreed to remediate the site and signed an order of consent in September 1994. The remedial design was completed in February 1996, that consisted of:

- Capping the site with clean soil;
- Pulling back, grading, and stabilizing the shore line;
- Removing some river sediments; and
- Installing groundwater collection trench and recovery wells.

Remedial Actions have been completed, including sediment removal. Sediment removal began in July 1998 and was completed November 1998. Final capping of the sediment

disposal area was completed July 1999. The Construction Certification Report and Operation, Maintenance and Monitoring Plan were approved in January 2000.

Diver inspection of the dredged areas shows good revegetation and recolonization by fish.

Groundwater is collected, treated at an on-site treatment facility, and discharged to the local POTW.

Remediation Costs

Following are estimated amounts that have been spent to date on remediating this site:

| | |
|---|---|
| State | $ 546,000 |
| PRP | $ 15,000,000* |

**RIVER ROAD (INS EQUIPMENT)**

| Output | Responsible Party | Current Schedule |
|---|---|---|
| RI/FS | DEC | **COMPLETED** |
| Record of Decision | DEC | **COMPLETED** |
| Remedial Design | PRPs | **COMPLETED** |
| Remedial Action Completion | PRPs | **COMPLETED** |

* Costs include Niagara Mohawk Cherry Farm site.

## NIAGARA MOHAWK -- CHERRY FARM

**Site Program: N.Y.S. Division of Hazardous Waste Remediation**
**Summary Prepared by: DEC**

Site Description

The Cherry Farm Site is an inactive landfill located between River Road and the Niagara River in the Town of Tonawanda, New York. The site encompasses approximately 56 acres, 80% of which is covered by various fill materials. The fill material consists primarily of foundry sand, slag, and cinders. The surface of the fill is between 10 to 20 feet above the original surrounding land surface. The present topography of the filled area is essentially flat.

The fill area is surrounded by intermittent surface water. A wetland designated as BW-6 by DEC is present on the eastern portion of the Site. This wetland drains into the drainage ditches which flow along the southern and northern boundaries of the property and ultimately discharge to the Niagara River, which forms the western side of the Site.

Site Investigation/Remedial Design

A Record of Decision (ROD) for the site was signed by DEC in February 1991. The selected remedy included covering the site with an impermeable cap, along with ground water containment, collection, treatment, and disposal. After additional field investigations and discussions with the PRPs, the ROD was amended on October 7, 1993. The differences between the remedies include l) the cover design will include a permeable soil cover; 2) collected ground water will not be discharged into the Niagara River, but will be pretreated and discharged to a local water treatment plant; and 3) fencing will not be installed around the site as part of the remedy. The revised remedy will allow for development of the site as a park after remedial construction is completed. In addition, the remedial action includes fish and wildlife habitat enhancements through the construction of shoreline wetland embayments along the Niagara River.

A consent order between DEC and the PRPs to complete the design and construction of the remedy was signed in September 1994. The Niagara Mohawk-Cherry Farm site was combined with the adjacent River Road site for joint remediation. Please see the previous site description (River Road) for details on the remedial action. The remedial work is complete.

Remediation Costs

Following are estimated amounts that have been spent to date on remediating this site:

| | |
|---|---|
| State | $ * |
| PRP | $ * |

**NIAGARA MOHAWK - CHERRY FARM**

| Output | Responsible Party | Current Schedule |
|---|---|---|
| RI/FS | PRPs | **COMPLETED** |
| Record of Decision | DEC | **COMPLETED** |
| Remedial Design | PRPs | **COMPLETED** |
| Remedial Action | PRPs | **COMPLETED** |

* Remediation of the Cherry Farm site was completed as part of the River Road RI/FS. Costs are reported in the River Road site description.

**FRONTIER CHEMICAL, PENDLETON**
Site # 67

**Site Program: N.Y. Division of Hazardous Waste Remediation**
**Summary Prepared by: DEC**

Site Description

The Frontier Chemical site in the Town of Pendleton occupies about 21 acres adjacent to Bull Creek, approximately 4 1/4 miles inland from the Niagara River.

Approximately 7.5 acres of the site were used for treatment and disposal of hazardous wastes. From about 1958 to 1974, Frontier Chemical used the site for processing, storage and burial of industrial and hazardous wastes. Unknown volumes of solvents, oils, acids, dyes, paint wastes, heavy metal sludges, and other wastes were handled on the site. An on-site lake was used for disposal of metal salt sludges from the neutralization of plating wastes and pickling liquors.

The site consists of various amounts of fill underlain by glaciolacustrine silty clay to a depth 20 to 30 feet. The silty clay is underlain by glacial till and then bedrock, which is believed to be Lockport Dolomite. Shallow groundwater on the site flows radially from the site, very slowly, with some discharge to the on-site lake.

Site Investigation

DEC completed a remedial investigation/feasibility study (RI/FS) of the site using State Hazardous Waste Remediation Program funds. The Record of Decision (ROD) was finalized in March 1992. The remedial design completed in May 1995 calls for the following: dredging and stabilization of contaminated lake sediments; consolidation of lake sediments and contaminated soils on the process/fill area; collection, treatment, and disposal of contaminated groundwater; capping of the site; physical controls for run-on, run-off and flow from the lake; long term monitoring. A Consent Order requiring a group of Potentially Responsible Parties (PRPs) to implement the selected remedy was executed.

Remedial Actions

Remedial construction began in June 1995. Quarry Lake was de-watered and contaminated sediments were removed, stabilized, and consolidated into the onsite landfill. Construction of the landfill cap and leachate collection system is complete. The final completion report certification and Operation & Maintenance (O&M) manual were finalized in March 1997.

Long-term O&M includes pump-and-treat of the leachate from the site. The O&M is scheduled to continue for a period of 30 years from 1997. Thorough review of the project will be done every five years during this period to verify that remediation goals are being achieved.

Remediation Costs

Following are estimated amounts that have been spent to date on remediating this site:

| | |
|---|---|
| State | $ 1,430,000 (of which $1,326,000 has been repaid by PRPs) |
| PRP | $ 14,120,000 |

It is estimated that the following amounts will be spent for the O&M from now through completion:

| | |
|---|---|
| State | $ 50,000 |
| PRP | $ 1,680,000 |

**FRONTIER CHEMICAL, PENDLETON**

| Output | Responsible Party | Current Schedule |
|---|---|---|
| RI/FS | DEC | **COMPLETED** |
| Record of Decision | DEC | **COMPLETED** |
| Remedial Design | PRPs | **COMPLETED** |
| Remedial Action | PRPs | **COMPLETED** |

# FRONTIER CHEMICAL, ROYAL AVENUE

**Site Program: Superfund**
**Summary Prepared by: EPA and DEC**

Site Description

Frontier Chemical Waste Process, Inc. occupies approximately 9 acres, bordered by Royal Avenue on the south and 47th Street on the east, in Niagara Falls, New York. The Niagara River lies within 1 mile south of this site.

The facility treated chemical wastes from 1974 to December 1992 when the facility closed. The Solid Waste Management Units (SWMUs) at the facility include:

- A treatment and pretreatment system for aqueous waste;
- Synthetic fuel-blending system for waste solvents/oils;
- A solvent recovery system;
- Bulk and drummed material handling, storage, and transfer facilities; and
- A hydrolysis process, tanks, old surface impoundments, an old waste pile, and site trucks.

When operating, the active waste management units treated or stored approximately 25,140 tons of chemical wastes each year. The waste, which came from businesses located in the eastern United States and southeastern Canada, can be classified as RCRA-listed wastes, as well as RCRA-characteristic wastes.

There are two fractured bedrock aquifers present under this site. Groundwater from both aquifers flows generally in a southeasterly direction. Although the flow is toward the Niagara River, it is intersected by the Falls Street Tunnel, south of the site, where the groundwater infiltrates into the tunnel. All of the dry-weather flow from the Tunnel is diverted to the City of Niagara Falls wastewater treatment plant and treated before discharge to the River.

The EPA and DEC added Frontier Chemical, Royal Avenue to the list of sites that contribute a significant amount of contaminants to the Niagara River after extensive groundwater investigation revealed the following chemicals at the site: monochlorotoluene, methylene chloride, chloroform, dichlorobenzene, tetrachloroethylene and other organic contaminants. Dense Non-Aqueous Phase Liquid (DNAPL) is present at the southern edge of the facility.

In 1999, most of the site buildings were demolished with the rubble remaining on site.

Interim Remedial Actions

This facility was formerly regulated under RCRA and 6 NYCRR Part 373. The company that operated the facility went bankrupt in 1992. As a result, New York State issued an Order in December 1992, requiring the owner to begin cleanup of the site by removing all stored waste from the facility. When the company failed to meet the required deadline for waste removal, the State requested that EPA secure the site and begin a Superfund Response Action to remove the wastes.

Two phases were implemented at the site. Initially, an EPA contractor provided maintenance to the drums and tanks at the facility. Phase I dealt with enforcement actions leading to the removal of over 4,000 drums and 6,700 pounds of laboratory chemicals from the site. Phase II dealt with enforcement actions for the removal of all wastes from the 45 tanks on site.

Phase I began in October 1993, after approximately 5 months of negotiations with 430 potentially responsible parties (PRPs). The PRPs hired a cleanup contractor to remove all laboratory chemicals and drums from the site and to send them to multiple disposal facilities. This field work was completed in May 1994, and all wastes were subsequently destroyed at off-site disposal facilities.

Phase II began in July 1994, after approximately 3 months of negotiations with over 400 PRPs. A consultant hired by the PRPs sampled the tanks and prepared a removal action plan that was approved by EPA. Removal of the tank wastes was completed in March 1995.

Schedule for Completion

On April 6, 1994 the State of New York issued an Order which formally revoked the operating Permit for the facility and revoked all authority to operate a hazardous waste management facility at the Royal Avenue site. In March 1995, the site was listed on the NYS Registry of Hazardous Waste sites as Class 2 (significant threat to the public health or the environment, action required).

In March 1994, while the interim remedial actions were being implemented, the Superfund Program assigned the site to be evaluated for possible inclusion in the National Priorities

List (NPL), which identifies sites requiring remedial action under Superfund. EPA has ruled not to include this site on the NPL. The DEC initiated PRP search efforts in 1998. The search effort will be followed by negotiations of an RI/FS Order to address soil and groundwater contamination. In mid-1998, DEC contractors completed a review of facility records to identify PRPs. DEC subsequently reviewed its internal records to finalize the list of PRPs. Notice letters were issued to PRPs in December 1999.

In January 2001 the site was referred for RI/FS action under the NY State Superfund program. The Focused Remedial Investigation was begun in 2001. The RI/FS is expected to be completed in 2002, with a final Record of Decision expected in early 2003.

Remediation Costs

Following are estimated amounts that have been spent to date on remediating this site (EPA Emergency Removal Action):

| | |
|---|---|
| Federal | $ 3,690,000 |
| State | $ 50,000 |
| PRP | $ 3,600,000 |

It is estimated that the following amounts will be spent from now to the completion of remediation:

| | |
|---|---|
| Federal | $ 0 |
| State | $ (Not available) |
| PRP | $ (Not available) |

**FRONTIER CHEMICAL, ROYAL AVENUE**

| Output | Responsible Party | Target Date |
|---|---|---|
| RFI Work plan Approval (groundwater investigation) | DEC | **COMPLETED** |
| RFI Completion (groundwater investigation) | Permittee | **COMPLETED** |
| Remedial Investigation | DEC | 2002 |
| Feasibility Study | DEC | 2002 |

| | |
|---|---|
| Remedial Design | Dependent on ROD and subsequent RD/RA Order negotiations with PRP group. |
| Remedial Action | |

**OCCIDENTAL CHEMICAL -- DUREZ DIVISION, NORTH TONAWANDA**
Site # 24 - 37

**Site Program: N.Y. Division of Hazardous Waste Remediation**
**Summary Prepared by: DEC**

Site Description

The Occidental Chemical Corporation (OCC) Durez site occupies about 40 acres in the city of North Tonawanda. The site is located about 1 1/4 miles east of the Niagara River.

The Durez plant has been in operation since 1926, producing various plastic formulations. Chemicals deposited on site include: chlorinated benzenes, phenol, chlorinated phenols, chlorotoluene, and other organic compounds. During 1995, the plant ceased manufacturing operations and the site facilities were demolished. Operation of remedial systems at the site continue.

Two aquifers, one overburden and one bedrock, are present under this site. The overburden aquifer unit is the primary aquifer of concern. The bedrock aquifer, for the most part, is isolated from overlying chemical contamination by a confining clay layer. Prior to remediation, groundwater in the overburden flowed in several directions and was complicated by storm drains and sewers to the north, northwest, and southwest of the site. The regional overburden and bedrock groundwater flow is to the southwest, toward the Niagara River.

Remedial Actions

Remedial actions have been conducted under several consent orders and have addressed the following three areas:

- Plant site: An 8450-feet long groundwater interceptor trench has been constructed around the entire plant perimeter to collect contaminated groundwater for treatment at an on-site carbon treatment system.

- Off site: Off-site contaminants from some 22,000 feet of City of North Tonawanda and OCC Durez plant sewers were removed.

- Pettit Creek Cove: Remediation of the Pettit Creek Cove was completed in 1995 under consent order. This remediation included excavation and removal of contaminated soils and sediments from the cove and the

Little Niagara River, removal and treatment of dense non-aqueous phase liquid (DNAPL), and restoration of the cove as a wetland. A total of 23,500 cubic yards of soil and sediment were removed and transferred to licensed disposal facilities.

All remedial construction activities have been completed. Operation of plant groundwater systems will continue, probably for decades, until no longer needed. Approximately 25,000 cubic yards of contaminated sediments from sewers and from Pettit Cove were removed during the Remedial Action. Biomonitoring sampling by the Ontario Ministry of the Environment in 1997, and recent water quality sampling by the NYSDEC, detected the possible release of OCC Durez contaminants of concern into the post-remedial Pettit Creek Cove. The extent of the sampling was limited to a very small area at the mouth of the Pettit Creek Flume storm sewer. As a result, OCC agreed to undertake a supplemental investigation of the Pettit Creek Cove to ascertain the cove=s current condition and to demonstrate the effectiveness of the completed remedial programs. Sampling of cove sediment, completed October 1999, found that low levels of Durez contaminants were present in recently deposited sediment emanating from the Pettit Flume storm sewer. OCC believes the contamination to be residual from the sewer cleaning project of 1994. In response, OCC completed maintenance dredging of 400 cubic yards of the recently deposited sediment in May 2000.

Remediation Costs

Following are estimated amounts that have been spent for this remediation project:

| | |
|---|---|
| State | $ 510,000 |
| PRP | $ 39,000,000 |

**OCC -- DUREZ, NORTH TONAWANDA**

| Output | Responsible Party | Current Schedule |
|---|---|---|
| Remedial Construction: | | |
| Plant Site | PRP | **COMPLETED** |
| Sewer Clean-up | PRP | **COMPLETED** |
| Pettit Creek Cove: | | |
| RI/FS | PRP | **COMPLETED** |
| Record of Decision | DEC | **COMPLETED** |
| Remedial Design | PRP | **COMPLETED** |
| Remedial Action | PRP | **COMPLETED** |

**GRATWICK RIVERSIDE PARK**
Site # 68

**Site Program: N. Y. Division of Environmental Remediation**
**Summary Prepared by: DEC**

Site Description

The Gratwick Riverside Park site occupies about 53 acres in the City of North Tonawanda and borders the Niagara River.

Prior to 1960, the site was used for the disposal of metallurgical slag. During the period 1960 to 1968, the site was operated as a landfill accepting municipal and industrial wastes. It is known that phenolic wastes from Occidental Chemical - Durez were disposed at the Gratwick Park site.

The Gratwick Park site contains about 13 feet of fill underlain by a discontinuous glaciolacustrine unit above glacial till. The till layer acts as an aquitard (or barrier) to downward groundwater flow from the overburden/fill aquifer to the next significant aquifer, in the Camillus Shale bedrock. Each aquifer flows generally to the southwest, towards the Niagara River.

Site Investigation

Gratwick Riverside Park is a DEC-lead site. DEC has completed a Remedial Investigation/ Feasibility Study (RI/FS) of the site under State Superfund. A Record of Decision (ROD) selecting a remedy was completed February 1991. In May 1996, after lengthy and difficult negotiations, the PRPs agreed to design and implement the selected remedy. In February 1997, the City of North Tonawanda (one of the PRPs) entered into a Title 3 contract for state funding of its share (approximately 34%) of project design and construction costs.

Remedial Design (RD) started in early 1996. The design includes:

- Shoreline protection
- Hydraulic barrier (slurry wall) between site and river
- Cap over the site to allow it to be used as a park
- Collection of contaminated groundwater

During design, samples of river sediment along the shoreline indicated the presence of relatively low levels of site-related contamination. It was also determined that steps should be taken to improve the habitat value of the shoreline area. To address these issues and the shoreline protection component of the remedy, the design was modified to include covering portions of the river bottom with soil that could support selected vegetation to be planted, and to include features to provide erosion resistance. These changes are incorporated in an amendment to the ROD issued in January 1999.

Construction of the remediation measures began in June 1999, and was substantially completed in November 2001.

The components of the remediation of this site include the following:

- a permeable soil cap, which includes a six inch fertile layer for planting of appropriate vegetation,
- a subsurface hydraulic barrier wall along the entire shoreline of the site, approximately 5600 feet long, to separate the contaminated leachate on the site from the river waters,
- rip rap stabilization and protection of the shoreline,
- remediation of three existing storm sewer lines,
- removal of an area of soils contaminated by viscous material approximately fifty feet square, and
- a groundwater/leachate collection system.

Remediation Costs

Following are estimated amounts that have been spent to date on remediating this site:

| | |
|---|---|
| State | $ 2,550,000 |
| PRP | $ 5,000,000 |

It is estimated that the following amounts will be spent from now to the completion of remediation:

| | |
|---|---|
| State | $ 450,000 |
| PRP | $ 430,000 |

Operation and Maintenance costs are estimated at $1,140,000 for ten years.

**GRATWICK RIVERSIDE PARK**

| Output | Responsible Party | Current Schedule |
|---|---|---|
| RI/FS | DEC | **COMPLETED** |
| Record of Decision | DEC | **COMPLETED** |
| Remedial Design Completion | PRPs | **COMPLETED** |
| Remedial Action Completion | PRPs | **COMPLETED** |

**MOBIL OIL**
Site # 141

**Site Program: NY Division of Environmental Remediation**
**Summary Prepared by: EPA/DEC**

Site Description

The Mobil Oil site associated with Niagara River Toxics Management Plan (NRTMP) priority toxic chemicals is a 3-acre area in the southeast portion of an approximately 62-acre Mobil facility in the City of Buffalo. The site is located adjacent to the Buffalo River, about 5 miles upstream of the confluence of the Buffalo and Niagara Rivers.

The entire facility was used by Mobil for oil refining from 1951 to 1981. The 3-acre area of concern was used by the City of Buffalo for disposal of municipal wastes before being sold to Mobil in 1951. Mobil used it until 1976 for the disposal of unknown quantities of tetraethyl lead sludge, lubricating sludges, spent catalysts, and other wastes.

The site consists of varying amounts of fill underlain by a sand and gravel unit. Below the sand and gravel unit is a clay layer, followed by glacial till and then the Onondaga Limestone. Groundwater flow across the site is generally to the south toward the Buffalo River.

Site Investigation

From 1982 to 1983, various investigations of the 3-acre site were conducted by the U.S. Geological Survey and by DEC. In 1985, Mobil and DEC signed a Consent Order to perform a Phase II investigation. The Phase II investigation, completed in 1987, included soil sampling, groundwater monitoring, and surface water and sediment sampling from the Buffalo River. The highest concentrations of lead and volatile organic compounds were found in the soil and river sediment. The highest concentrations of semi-volatile base/neutral compounds were found in the soil and groundwater. Liquid petroleum was found in a monitoring well.

In 1988, based on the site investigations, the 3-acre Mobil site was re-classified as Class 3 (does not present a significant threat to the public health or the environment, action may be deferred). Tetraethyl lead has extremely low solubility in water and is not expected to significantly migrate off site through groundwater. However, tetraethyl lead is highly soluble in petroleum products, so that any spill of fuel oils in the area could mobilize it

and carry it to the Buffalo River.

Site Remediation

Around 1971 Mobil Oil began operation of a well point system (WPS) installed along the Buffalo River. The WPS consists of a series of interconnected wells designed to recover groundwater and petroleum product and prevent petroleum seepage to the Buffalo River. The WPS extends approximately 1600 feet along the south-facing side of the site, from the 3-acre disposal area toward Babcock Street. In February 1989, Mobil notified DEC of liquid phase petroleum encountered during the installation of geotechnical borings. This report prompted additional site investigation, and remedial measures were instituted to recover petroleum product. In 1993, six dual-pump recovery wells were activated. Each of the recovery wells is equipped with both groundwater and product recovery pumps. Five of the six recovery wells are presently being operated in conjunction with the WPS. The recovery wells are located outside the 3-acre disposal area, within the south-central portion of the Mobil facility.

In 1994, the entire 62-acre Mobil facility, including the 3-acre area of concern, was selected for inclusion in the DEC Multimedia Pollution Prevention ($M^2P^2$) program based in part on the facility=s involvement with multiple divisions within DEC (Division of Air Resources, Division of Hazardous Substance Regulation, Division of Environmental Remediation, Division of Regulatory Affairs, Division of Solid Waste, Division of Water). The goal of the $M^2P^2$ program is to provide an integrated approach to the environmental management of the facility. The $M^2P^2$ facility team conducted a multi-media inspection to better coordinate the various facility remediation activities. A Consent Order was signed on May 20, 1997 to undertake further investigation and remediation. The results of the additional site facility investigation were submitted to the DEC and EPA on November 25, 1998. Three areas of the site (the Elk Street Lot, the Former Lube Building Area & the Buffalo Terminal Disposal Area) were identified as requiring further investigation to determine the extent of contamination. The results of the further site facility investigation were submitted to the DEC and EPA on 12/15/99. The results of additional investigations of the Babcock Street Properties and the Eastern Tank Yard (Buffalo Terminal Disposal Area) were submitted on 6/11/01 and 7/5/01, respectively. The results of completion of the investigation of the remaining areas of the site were submitted in March 2002.

Remediation Costs

Following are estimated amounts that have been spent to date on remediating this site:

| | |
|---|---|
| Federal | $ (Not available) |
| State | $ (Not available) |
| PRP | $ (Not available) |

It is estimated that the following amounts will be spent from now to the completion of remediation:

| | |
|---|---|
| Federal | $ (Not available) |
| State | $ (Not available) |
| PRP | $ (Not available) |

**MOBIL OIL**

| Output | Responsible Party | Previous Target Date | Current Schedule |
|---|---|---|---|
| Phase I Investigation | DEC | Sept 1983 | **COMPLETED** |
| Phase II Investigation | PRP | Dec 1986 | **COMPLETED** |
| Re-classification to Class 3* | DEC | Dec 1988 | **COMPLETED** |
| Site Investigation | PRP | Nov 2000 | **COMPLETED** |

* Class 3 means that the site does not present a significant threat to the public health or the environment and that action may be deferred. Further remediation will be coordinated under the $M^2P^2$ program, with the schedule to be determined.

**IROQUOIS GAS -- WESTWOOD PHARMACEUTICAL**
Site Code 9-15-141

**Site Program: N.Y. Division of Hazardous Waste Remediation**
**Summary Prepared by: DEC**

Site Description

The Iroquois Gas - Westwood Pharmaceutical Hazardous Waste Site is 8.8 acres in size. The site is bounded on the: east by Dart Street, north by Buffalo Structural Steel, west by Scajaquada Creek, and south by residential properties. The site is predominately covered by asphalt or buildings, and is fenced, which precludes direct exposure to the public. The potential for site contaminants to be transported via ground water to Scajaquada Creek exists.

Iroquois Gas Company, predecessor to National Fuel Gas Distribution Corporation (NFG) used the site from the turn of the century to about 1955 to manufacture gas. After 1955, NFG stored natural gas at the site, with oil storage believed to have continued into the 1960's. In 1972 Westwood Pharmaceuticals, Inc. purchased the site and, the next year, constructed a 100,000 square foot warehouse on the southwest portion of the site.

In the fall of 1985, during building construction, buried tar separator pits and an oil storage tank foundation were encountered, along with fill and soils containing tar-like and oily residues. As a result, construction plans were modified to permit excavation, evaluation and proper disposal of the potentially contaminated soils, materials and liquids. In 1985, Westwood also began an investigation of the site. The investigation indicated the presence of both soil and ground water contamination.

Site Investigation

In 1989 DEC requested that Westwood undertake a Remedial Investigation and Feasibility Study (RI/FS) to assess the nature and extent of contamination at the site. Ultimately, Westwood agreed to undertake the RI/FS, with DEC oversight, under a Partial Consent Decree issued by the Federal Court. The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. Field work for the RI started in April 1992 and was completed in June 1993.

The results of the RI are as follows:

- ! The soil at the site is primarily contaminated with PAHs (Polynuclear Aromatic Hydrocarbons), BTEX (Benzene, Toluene, Ethylbenzene, Xylene), lead and cyanide;
- ! Ground water in the upper aquifer (fill, with maximum depth of up to 32 feet) is contaminated with PAHs and BTEX;
- ! Substrate below the fill consists of a silty clay layer to a depth of 60 feet, followed by a layer of sand and gravel, and then bedrock. No significant contamination has been found in the sand and gravel layer; the direction of ground water flow is towards Scajaquada Creek.

Based on RI data, the ground water discharge to the creek is estimated to be 7350 gallons per day; the direction of flow of NAPL (liquid, non-water soluble chemicals) is also towards the creek. The estimated amount of NAPL entering the creek is 440 lb/year; the chemicals of concern (BTEX and PAHs) in the NAPL and ground water are estimated to be migrating to the creek at a rate of 261 lb/year; the creek sediments are primarily contaminated with the same contaminants which are present in soil, ground water and NAPL.

In March 1994, the Department signed a Record of Decision which outlined a Remedial Action Plan calling for:

- Construction of a clay cap to isolate the source area contaminants;
- In Situ (in place) bio-treatment of soil and groundwater, if feasible;
- Installation of a vertical sheet piling barrier wall and extraction wells for ground water control and removal of contaminated ground water;
- Treatment of extracted ground water and NAPL before proper disposal;
- Long term Operation & Maintenance.

The Remedial Action Plan also addresses contamination in Scajaquada Creek and includes: excavation of contaminated sediments originating from the site and restoration of the creek channel to background conditions.

Note that DEC found bio-treatment to be infeasible. DEC will review this decision at five-year intervals to determine if any new technologies are feasible.

<u>Remedial Actions</u>

For remediation purposes, the site has been divided into two operable units: Operable Unit 01 (Main Plant) and Operable Unit 02 (Scajaquada Creek). Westwood is

undertaking the remediation of the Main Plant site which includes the pump-and-treat system for groundwater and NAPL and plant site capping. National Fuel Gas is responsible for remediation of Scajaquada Creek.

Remedial construction began in November 1996, with installation of the sheet pile barrier wall. The wall was completed in December 1996. All remedial work on the Main Plant site was completed in 1997. Remediation of Scajaquada Creek sediments commenced in July 1998 and was completed in March 1999. The Remedial action includes two wells to extract NAPL from beneath the creek bed. Extraction of NAPL from beneath the creek bed has begun at the downstream portion of the site. Negotiations to purchase property to locate the second well at the upstream portion of the site caused some delay in its installation. The second extraction system was completed in August 2000 and commenced operation for NAPL extraction in December 2000.

Remediation Costs

Following are estimated amounts that have been spent to date on remediating this site:

| | |
|---|---|
| State | $ 150,000 |
| PRP | $ 6,500,000 |

It is estimated that the following amounts will be spent from now to the completion of remediation, including operation and maintenance:

| | |
|---|---|
| State | $ 100,000 |
| PRP | $ 500,000 |

**IROQUOIS GAS -- WESTWOOD PHARMACEUTICAL PLANT SITE:**

| Output | Responsible Party | Current Schedule |
|---|---|---|
| Record of Decision | DEC | **COMPLETED** |
| Remedial Design | PRP | **COMPLETED** |
| Remedial Action | PRP | **COMPLETED** |

**CREEK SITE:**

| Output | Responsible Party | Current Schedule |
|---|---|---|
| Record of Decision | DEC | **COMPLETED** |
| Remedial Design | PRP | **COMPLETED** |
| Remedial Action | PRP | **COMPLETED** |

# BOOTH OIL

**Site Program: N.Y. Division of Hazardous Waste Remediation**
**Summary Prepared by: DEC**

Site Description

The Booth Oil site is located at 76 Robinson Street in the City of North Tonawanda. The site occupies approximately 2.7 acres on three parcels of land each separated by railroad tracks operated by CSX. The site is located about 500 feet from the Little Niagara River.

Waste oils were refined at the site for more than 50 years, until the phased plant closure in the early 1980's. During processing, frequent spills occurred and oil was periodically discharged to the Little Niagara River via surface water run-off through the Robinson Street storm sewer.

Site Investigation

The RI identifies oil saturated soils on site containing PCB, VOCs, Semi-VOCs, and PAHs. An investigation of the River indicated that oil/PCB waste from the Booth Oil site is limited to a small area in the vicinity of the outfall.

Two Records of Decision were issued: the first in March 1992 (Operable Unit OU1, on-site) and the second in March 1993 (Operable Unit OU2, Little Niagara River). The remedy consists of the excavation of contaminated on-site soils, sewer sediments and a limited area of sediment in the Little River with on-site treatment by separation technologies or incineration. Contaminated ground water will also be extracted and treated.

The RI/FS was performed under State Superfund. However, many Potentially Responsible Parties (PRPs) exist, including the site owners and numerous generators who shipped waste to the site.

A PRP proposal for an alternate remedy was accepted in June 1998. In 2001, the NYSDEC proposed amending the earlier RODs. The amended remedy is similar to the previously selected remedies, however, contaminated soil and sediment would be excavated and disposed of off-site, rather treating these materials on-site. The components of the amended remedy include:

- $ Contaminated soil would be excavated down to the clay layer underlying the site;
- $ Storm sewer sediment would be removed from the Robinson Street storm sewer and its catch basins;
- $ Contaminated sediments in the Little River would be excavated and disposed of with the contaminated site soils;
- $ Water produced during de-watering of excavations would be treated on site prior to discharge;
- $ All contaminated soils and sediments removed during remediation would be disposed of in a permitted disposal facility;
- $ Excavations would be backfilled and graded with clean fill;
- $ Deed restrictions and a long-term monitoring program would be established to address any residual contamination.

After lengthy negotiations between the NYSDEC and the Booth Oil Site Administrative Group (BOSAG), a group of potentially responsible parties, a final agreement for site remediation is near. The agreement will include remedial design, which is expected to be completed by August 2002, followed by remedy implementation. Should the proposed amendment be deemed acceptable, construction is expected to commence in the Fall of 2002 and be completed by June 2003.

A schedule for remediation of the site follows.

Remediation Costs

Following are estimated amounts that have been spent through 1997 on remediating this site:

| | |
|---|---|
| State | $ 1,100,000 |
| PRP | $ 0 |

It is estimated that the following amounts will be spent from now to the completion of remediation:

| | |
|---|---|
| State | $ (Not available) |
| Permittee | $ 5,000,000 |

**BOOTH OIL**

| Output | Responsible Party | Previous Target Date | Current Schedule |
|---|---|---|---|
| OU1 | | | |
| RI/FS | DEC | Feb 1992 | **COMPLETED** |
| ROD | DEC | Mar 1992 | **COMPLETED** |
| Remedial Design | PRP | Apr 2001 | August 2002 |
| Remedial Action | PRP | Apr 2002 | June 2003 |
| OU2 | | | |
| RI/FS | DEC | Feb 1993 | **COMPLETED** |
| ROD | DEC | Mar 1993 | **COMPLETED** |
| Remedial Design | PRP | Apr 2001 | August 2002 |
| Remedial Action | PRP | Apr 2002 | June 2003 |