ANNUAL STATUS UPDATE FOR: REDUCTION OF TOXICS LOADINGS TO THE NIAGARA RIVER FROM HAZARDOUS WASTE SITES IN THE UNITED STATES

Report for the Year Ending 2015

Prepared by the United States Environmental Protection Agency-Region 2 in conjunction with the New York State Department of Environmental Conservation-Region 9

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Executive Summary

For over three decades, the water quality of the Niagara River has been the focus of attention between four environmental agencies in the United States and Canada ("the Four Parties"): U.S. Environmental Protection Agency, New York State Department of Environmental Conservation (DEC), Environment and Climate Change Canada (ECCC) and Ontario Ministry of the Environment and Climate Change (MOECC). The Four Parties signed, on February 4, 1987, a Niagara River Declaration of Intent (DOI) pledging cooperation to achieve significant reductions of toxic chemical pollutants in the Niagara River. The DOI outlined the principles and activities to be followed which, combined with a detailed annual work plan, forms the Niagara River Toxics Management Plan (NRTMP).

The Four Parties agreed upon a specific list of 18 'priority toxics' targeted for reduction through the NRTMP. A key sub-objective and milestone of the NRTMP DOI was to achieve a 50% reduction of ten specific priority toxics believed to be from significant Niagara River sources by 1996. Actions to reduce the inputs of these priority toxics to the Niagara River have been aimed at point sources and non-point sources. Overall, the NRTMP has met its 50% reduction goal for the ten targeted priority toxics, and some by more than 75% through actions addressing point and non-point sources of toxic contamination.

In December 1996, the Four Parties formally re-affirmed, by Letter of Support, their commitment to continue reductions of priority toxic loadings to the Niagara River. In November 2010, ECCC completed a concentrations, loads, and trends report of toxic contaminants covering a 20-year period (1986/87 – 2004/05) based on data collected as part of their Upstream/Downstream (U/D) monitoring program, which includes 72 analytes (including the 18 priority toxics) at monitoring locations at Fort Erie (FE) and Niagara-on-the-Lake (NOTL). This program has been the primary mechanism by which the NRTMP evaluates water quality in the river.

Based on the most recent data available (U/D Program, 2004/05), 6 of the 18 priority toxics (mercury, arsenic, lead, chlordane, octachlorostyrene, and benzo(a)anthracene) are below the strictest water quality criteria at both FE and NOTL. The downward trends of most compounds at NOTL suggest sources from the Niagara River watershed are being reduced or eliminated and existing management actions under the NRTMP are working. The data does show that further study and evaluation is needed to identify, characterize, and eliminate certain sources of PAH class compounds, specifically benzo(a)pyrene and benzo(b/k)fluoranthene. Scientists from ECCC are currently evaluating the U/D monitoring data and contaminant trends for years subsequent to 2004/05.

The purpose of this report is to affirm EPA and DEC commitment to the NRTMP by reporting on the progress achieved to date in remediating hazardous waste sites (HWS) on the U.S side of the Niagara River which have negatively impacted, or have had the potential to negatively impact, the river, as a result of offsite chemical contaminant migration.

In 1988, an EPA study estimated potential toxic pollutant loadings to the Niagara River from 70 known hazardous waste sites on the U.S. side of the Niagara River, grouped into 33 cluster site areas. The study indicated that a total estimated 694 lbs/day (315 kg/day) of chemical contaminants had the potential of

migrating from these 33 cluster sites to the Niagara River. In 1989, these sites were prioritized in a report by EPA and DEC into three categories: Category I (sites with loadings greater than 50 lbs/day), Category II (sites with loadings between 1 and 50 lbs/day), and Category III (sites with loadings less than 1 lb/day). It was determined that the 22 Category I and II sites were responsible for about 99.9% of the potential 694 lbs/day contaminant loading to the river. Subsequent to the 1989 report, and based on more current information that became available at that time, EPA and DEC removed some of the sites from consideration as potential significant sources of contaminants to the Niagara River, but also identified other new sites as potential sources that were not included among the original sites. At the completion of this process, 26 sites were identified as those that should be targeted for priority remedial actions. Since that time, 11 additional sites have been added to this list of priorities and included in this Annual Status Update report. To date, key remedial actions have been completed at 24 of the original 26 priority hazardous waste sites, and seven of the 11 additional sites. The remaining sites are in various stages of remediation or investigation.

DEC is currently conducting the first comprehensive contaminant loading reassessment within the Niagara River Area of Concern since the efforts in the late 1980's. It includes an assessment of contaminant loads from permitted point sources, non-point sources (i.e., groundwater at hazardous waste sites), and select major tributaries to the river. In addition to providing more current loading estimates, the loading estimates from the current assessment are anticipated to be much more accurate than those from previous efforts since, unlike the 1980's estimates, it includes the actual collection of samples, a more uniform list of chemical contaminants for all collected samples/locations, and improved, site-specific (where possible) groundwater flow estimates. Finalization of the report is awaiting evaluation by the full NRTMP Secretariat.

It is also important to note other efforts that have reduced contaminant loadings to the Niagara River. The principal sources for two of the priority toxics (tetrachloroethylene and toxaphene) have essentially been eliminated. Tetrachloroethylene contaminated water previously discharged from the Falls Street Tunnel to the Niagara River has been redirected for treatment to the Niagara Falls Wastewater Treatment Plant (WWTP), and Toxaphene use as a pesticide was discontinued in 1982 before EPA banned all general uses of the compound in the U.S. and its territories in 1990.

The federal Great Lakes Legacy Act has, in recent years, provided significant funding that has resulted in the characterization and removal of large amounts of contaminated sediments in AOCs throughout the Great Lakes region. From 2012-2015, approximately 450,000 cubic yards of contaminated sediments were removed from the Buffalo River, which drains into Lake Erie at the headwaters of the Niagara River. This is in addition to approximately 550,000 cubic yards of river sediment removed in 2011-2012 as part of the United States Army Corps of Engineers maintenance dredging of the federal navigation channel within the river.

The commitment to reduce toxic loadings through the NRTMP continues. The Four Parties are in the process of evaluating past achievements, current initiatives and future opportunities that exist to coordinate with other related program initiatives occurring within the basin utilizing available expertise and resources.

Acronyms

AOC	Area of concern
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
BSC	Bethlehem Steel Corporation
BTEX	Benzene, toluene, ethylbenzene, xylene
BUI	Beneficial Use Impairment
CAA	Clean Air Act
CMS	Corrective Measure Study
CWA	Clean Water Act
DDT	Dichlorodiphenyltrichloroethane
DEC	New York State Department of Environmental Conservation
DNAPL	Dense non-aqueous phase liquid
DOI	Declaration of Intent
EC	Environment Canada
E&E	Ecology and Environment Engineering, P.C.
EPA	U.S. Environmental Protection Agency
FE	Fort Erie
FS	Feasibility Study
GLLA	Great Lakes Legacy Act
GLRI	Great Lakes Restoration Initiative
HSWA	Hazardous and Solid Waste Amendments
HWS	Hazardous Waste Site
IRM	Interim Remedial Measure
MGP	Manufactured gas plant
MOECC	Ontario Ministry of the Environment and Climate Change
NAPL	Non-aqueous phase liquid
NOTL	Niagara-on-the-Lake
NRTMP	Niagara River Toxics Management Plan
OCC	Occidental Chemical Corporation
OCS	Octachlorostyrene
OM&M	Operation, Maintenance & Monitoring

OU	Operable Unit
PAH	Polycyclic Aromatic Hydrocarbon
PCBs	Polychlorinated Biphenyls
PRAP	Proposed Remedial Action Plan
PRP	Potentially Responsible Party
RA	Remedial Action
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI	Remedial Investigation
ROD	Record of Decision
SSF	State Superfund
SPDES	New York State Pollutant Discharge Elimination System
SVOC	Semivolatile organic compound
TCDD	Tetrachlorodibenzo-p-dioxin
TCP	Trichlorophenol
U/D	Upstream/Downstream
VHB	Vertical Hydraulic Barrier
VOC	Volatile Organic Compound
WWTP	Wastewater Treatment Plant

Introduction

For over three decades, the water quality of the Niagara River has been the focus of attention between four environmental agencies in the United States and Canada ("the Four Parties"): U.S. Environmental Protection Agency, New York State Department of Environmental Conservation (DEC), Environment and Climate Change Canada (ECCC) and Ontario Ministry of the Environment and Climate Change (MOECC). As a result of increasing awareness in the 1980s of the environmental degradation occurring along the Niagara River corridor, the Four Parties signed, on February 4, 1987, a Niagara River Declaration of Intent (DOI) pledging cooperation to achieve significant reductions of toxic chemical pollutants in the Niagara River. The DOI outlined the principles and activities to be followed which, combined with a detailed annual work plan, forms the Niagara River Toxics Management Plan (NRTMP).

THE FOUR PARTIES

U.S. Environmental Protection Agency (EPA)
Environment and Climate Change Canada (ECCC)
NY State Department of Environmental Conservation (DEC)
Ontario Ministry of the Environment & Climate Change (MOECC)

Table 1. 18 NRTMP Priority Toxic Chemicals

*Benz(a)anthracene**	Mirex/PhotoMirex*
Benzo(a)pyrene*	*Octachlorostyrene*
Benzo(b)fluoranthene*	PCBs*
Benzo(k)fluoranthene*	DDTs
Chlordane	Dioxin*
Chrysene	Tetrachloroethylene*
Dieldrin	*Arsenic*
Hexachlorobenzene*	*Lead*
*Mercury**	Toxaphene

* Targeted for 50% load reduction by 1996 from point & non-point Niagara River watershed sources using 1987 as a baseline.

Compounds in italics no longer exceed strictest agency criteria at Fort Erie (FE) and Niagara-on-the-Lake (NOTL), based on 2004/05 monitoring data.

The Four Parties agreed upon a specific list of 18 'priority toxics' (Table 1) targeted for reduction through the NRTMP. A key sub-objective and milestone of the NRTMP DOI was to achieve a 50% reduction of ten specific priority toxics believed to be from significant Niagara River sources by 1996. Actions to reduce the inputs of these priority toxics to the Niagara River have been aimed at point sources and non-point sources. Former 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, which today are primarily implemented via the regulation and permitting of discharges. Contamination from hazardous waste sites continues to be addressed through remedial program efforts on both sides of the river. Overall, the NRTMP has met its 50% reduction goal for the ten targeted priority toxics, and some by more than 75% through actions addressing point and non-point sources of toxic contamination.

In December 1996, the Four Parties formally re-affirmed, by Letter of Support, their commitment to continue reductions of priority toxic loadings to the Niagara River. In November 2010, ECCC completed a concentrations, loads, and trends report of toxic contaminants covering a 20-year period

(1986/87 – 2004/05) based on data collected as part of their Upstream/Downstream (U/D) monitoring program, which includes 72 analytes (including the 18 priority toxics) at monitoring locations at Fort Erie (FE) and Niagara-on-the-Lake (NOTL). This program has been the primary mechanism by which the NRTMP evaluates water quality in the river. The report observed the following long-term loading trends:

- most of the 72 analytes have a downward trend and are not exceeding the strictest agency water quality criteria;
- certain polycyclic aromatic hydrocarbon (PAH) compounds show upward trends most recently;
- most of the compounds that still exceed the strictest agency water quality criteria show downward trends; and,
- Niagara-on-the-Lake (NOTL) appears to have a greater number of compounds with a downward trend.

Based on the most recent data available (U/D Program, 2004/05), 6 of the 18 priority toxics (mercury, arsenic, lead, chlordane, octachlorostyrene (OCS), and benzo(a)anthracene) are below the strictest criteria at both FE and NOTL. The downward trends of most compounds at NOTL suggest sources from the Niagara River watershed are being reduced or eliminated and existing management actions under the NRTMP are working. The data does show that further study and evaluation is needed to identify, characterize, and eliminate certain sources of PAH class compounds, specifically benzo(a)pyrene and benzo(b/k)fluoranthene. Scientists from ECCC are currently evaluating the U/D monitoring data and contaminant trends for years subsequent to 2004/05.

The purpose of this report is to affirm EPA and DEC commitment to the NRTMP by reporting on the progress achieved to date in remediating hazardous waste sites (HWS) on the U.S side of the Niagara River which have negatively impacted, or have had the potential to negatively impact, the river, as a result of offsite chemical contaminant migration.

Contaminant Loading Estimates

Non-point sources of toxic chemicals to the Niagara River (e.g., leachate from hazardous waste sites, storm water runoff, and atmospheric deposition) are difficult to quantify and control. Given the limited information available about non-point sources, especially stormwater and atmospheric deposition, the U.S. has proceeded with its actions over the past 30+ years based on the assumption that hazardous waste sites are the most significant non-point sources of toxic chemicals to the Niagara River.

(*Note: names and site identification numbers of the hazardous waste sites listed in subsequent sections of this report generally reflect those currently used on the publicly-accessible site registry maintained on the DEC website. Due to various circumstances such as property ownership changes and division of site property parcels, some of these names have changed since the studies undertaken in the 1980's, and may not be identical to those listed in the earlier study reports. Where applicable and necessary for proper identification, current and former designations are used within this report for clarification purposes.*)

In 1988, an EPA study estimated potential toxic pollutant loadings to the Niagara River from known hazardous waste sites on the U.S. side of the Niagara River (Gradient Corp/Geotrans Inc 1988). The study included an assessment of contaminants from 70 sites, grouped into 33 cluster site areas largely based on the manner in which data had historically been collected. The study indicated that a total estimated 694 lbs/day (315 kg/day) of chemical contaminants had the potential of migrating from these 33 cluster sites to the Niagara River. Because collection of site-specific transport data was not always available, 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 were expected to be higher than the actual loadings). The actual load estimated in the report was 478 lbs/day (217 kg/day), 82% of which were organic contaminants (approximately 394 lbs/day or 179 kg/day). It should be noted that these estimates were based on available data for all known chemical contaminants, not just the 18 priority contaminants listed in Table 1.

In 1989, EPA and DEC issued a report (EPA/DEC 1989) in which the 33 cluster site areas assessed in the Gradient/Geotrans report were categorized according to the potential contaminant loadings to the river, as summarized on Table 2.

Table 2. Categorization of the 33 Cluster Site Areas from 1988 Gradient/Geotrans Report

Category I: > than 50 lbs/day	Category II: 1 - 50 lbs/day	Category III: < than 1 lb/day
Occidental/Former Hooker Main Plant (Buffalo Avenue)	102nd Street Landfill (Olin/Occidental) Combined with Griffon Park and Niagara River Belden Site	Alltift Landfill
Niagara County Refuse Disposal - Wheatfield	Bell Aerospace - Textron	Charles Gibson
DuPont Necco Park combined with CECOS International	Occidental Durez Engineered Materials Packard Road (Formerly BTL Specialty/Reichold-Varcum)	Great Lakes Carbon
Occidental/Hooker-Hyde Park Landfill	Occidental/Hooker S-Area	Niagara Mohawk - Cherry Farm
	Stauffer Chemical-PASNY	Times Beach Containment/Disposal
	Solvent Chemical	Tonawanda Coke
	Vanadium Corporation (formerly SKW Alloys)	PVS Chemicals (former Allied Chemical)
	Olin Corporation Plant (Buffalo Avenue)	Dunlop Tire and Rubber
	DuPont Plant (Buffalo Avenue)	Columbus-McKinnon
	Buffalo Harbor Containment	Love Canal
	Buffalo Color Corporation (including Area D)	Tonawanda City Landfill

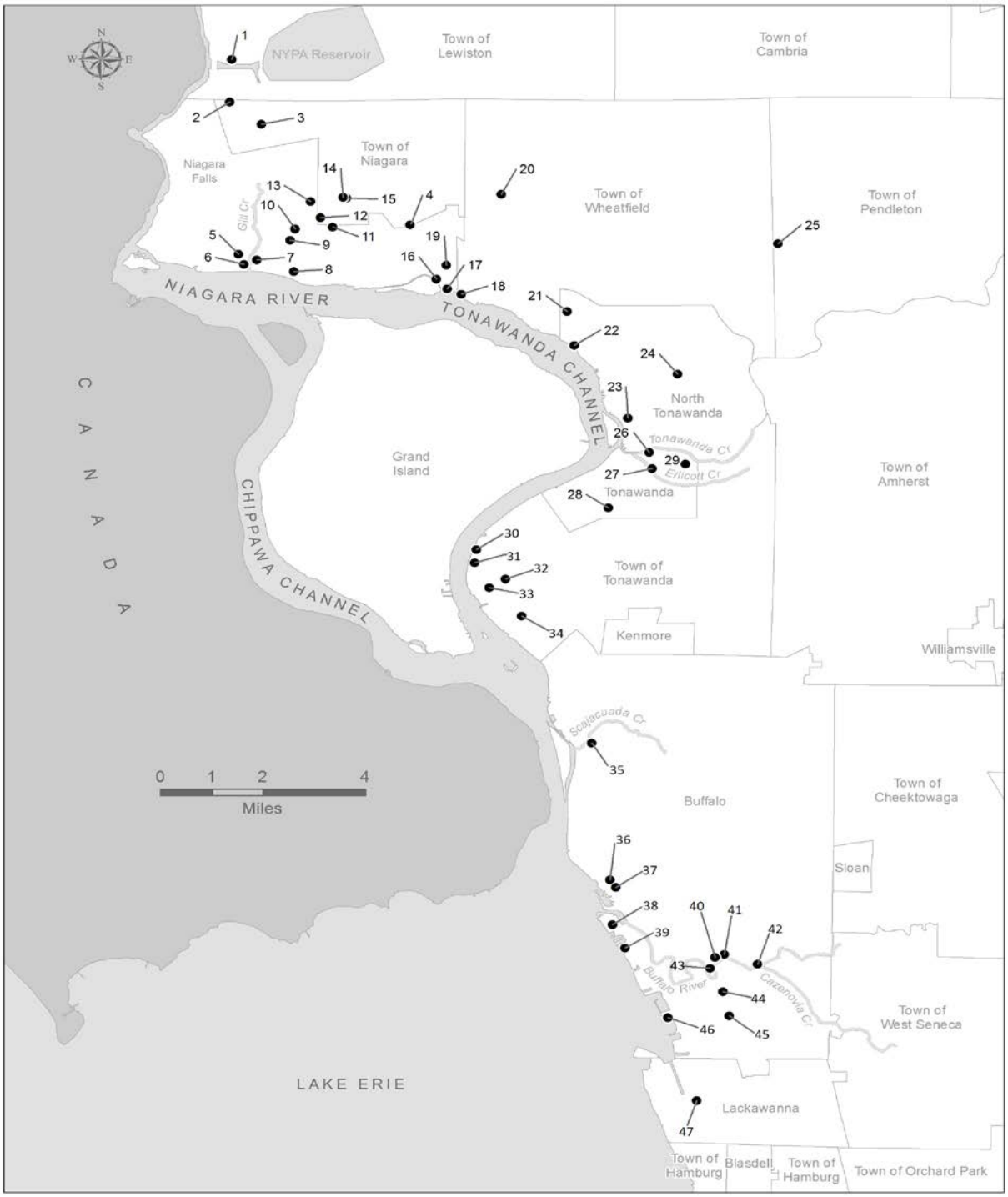
Category I: > than 50 lbs/day	Category II: 1 - 50 lbs/day	Category III: < than 1 lb/day
	Former Bethlehem Steel Property	
	River Road (INS Equipment)	
	Frontier Chemical - Pendleton	
	Occidental – Durez Division (North Tonawanda)	
	Small Boat Harbor Containment	
	Gratwick - Riverside Park	
	Mobil Oil	

The EPA/DEC report indicated that the 22 Category I and II sites were responsible for about 99.9% of the potential 694 lbs/day contaminant loading to the river, and should be the primary focus of remediation efforts. Subsequent to this 1989 report, and based on more current information that became available at that time, the Buffalo Harbor and Small Boat Harbor Containment sites were removed from the list of 22 priority sites, and four additional sites were added: Frontier Chemical – Royal Avenue, Booth Oil, Niagara Mohawk – Cherry Farm, and NFG/Iroquois Gas/Westwood Pharmaceutical (Note: the Niagara Mohawk – Cherry Farm site was previously listed as one of the Category III sites, as indicated on Table 2). In addition, two cluster site areas were each further separated as follows: DuPont Necco Park/CECOS International were split into separate sites, and Area D of the Buffalo Color Corporation was separated from Areas A, B, C and E. The resulting 26 sites/site areas then became the focus of remedial efforts and the subject of reporting in this annual report.

Since that time, an 11 additional sites have been added as potential significant sources of contaminant loadings to the Niagara River, and included in this annual report. These include eight new sites: Niacet Corporation, Niagara Recycling (Allied/BFI Landfill), National Fuel Gastown MGP – Tonawanda, Spaulding Fibre, Citizen's Gas Works/NFG Fourth Street MGP Site, Former Buffalo Service Station, Allied Chemical-Special Chemical Division, and Steelfields (aka Riverbend, LLC); and, three of the Category III sites from the 1989 EPA/DEC report for which new information had become available: Tonawanda Coke, PVS Chemicals (formerly Allied Chemical), and Alltift Landfill.

Figure 1 shows the locations of all sites that have been identified in this report, and includes information (in the figure legend) about the categorization of each as previously described.

Figure 1: Location of Hazardous Waste Sites



Legend for Figure 1:

Map #	NYS ID #	NYS Site ID	Map #	NYS ID #	NYS Site ID
1	***932053***	***Stauffer Chemical-PASNY***	26	915171	National Fuel Gastown MGP - Tonawanda
2	***932021***	***Occidental/Hooker-Hyde Park Landfill***	27	915016	Columbus-McKinnon
3	***932001/B/C***	***Vanadium Corporation (formerly SKW Alloys)***	28	915050	Spaulding Fibre
4	932063	Charles Gibson	29	915079	Tonawanda City Landfill
5	***932051A/B***	***Olin Corporation Plant (Buffalo Avenue)***	30	**915063**	**Niagara Mohawk - Cherry Farm**
6	***932013***	***DuPont Plant (Buffalo Avenue)***	31	***915031***	***River Road (INS Equipment)***
7	***932096***	***Solvent Chemical***	32	915055	Tonawanda Coke
8	***932019***	***Occidental/Former Hooker Main Plant (Buffalo Avenue)***	33	915003A/B/C	Allied Chemical - Special Chemical Division
	932019A	***Occidental/Hooker "S" Area***	34	915018	Dunlop Tire and Rubber
9	**932110**	**Frontier Chemical - Royal Avenue**	35	**915141A/B**	**INFG/Iroquois Gas/Westwood Pharmaceutical**
10	V00373	Niacet Corporation	36	915167	Citizen's Gas Works/NFG Fourth Street MGP Site
11	932016	Great Lakes Carbon	37	C915194	Former Buffalo Service Station
12	***932047***	***DuPont Necco Park***	38	915080	Times Beach Containment/Disposal
13	***932040***	***Occidental Durez Engineered Materials Packard Road (formerly BTL Specialty/Reichold-Varcum)***	39	*N/A*	*Buffalo Harbor Containment*
14	***932046***	***CECOS International***	40	***C915230***	***Buffalo Color Corporation Areas A & B***
15	932042	Niagara Recycling (Allied/BFI Landfill)		***C915230A***	***Buffalo Color Corporation Areas A & B - Off-Site***
16	***932081***	***Griffon Park***		***C915231***	***Buffalo Color Corporation Area C***
17	***932031***	***102nd Street Landfill (Olin/Occidental)***		***C915232***	***Buffalo Color Corporation Area E***
18	***932055***	***Niagara River Belden Site***	41	915004	PVS Chemicals (formerly Allied Chemical)
19	932020	Love Canal	42	***915040***	***Mobil Oil Corporation***
20	***932052***	***Bell Aerospace - Textron***		***C915201***	***ExxonMobil Oil Former Buffalo Terminal***
21	***932026***	***Niagara County Refuse Disposal - Wheatfield***	43	***915012***	***Buffalo Color Corporation Area D***
22	***932060***	***Gratwick - Riverside Park***	44	V00619/C915204	Steelfields (aka Riverbend, LLC)
23	**932100**	**Booth Oil**	45	915054	Alltift Landfill
24	***932018***	***Occidental - Durez Division (North Tonawanda)***	46	*915127*	*Small Boat Harbor Containment*
25	***932043***	***Frontier Chemical - Pendleton***	47	***Multiple***	***Former Bethlehem Steel Property***

Note: Site IDs/names above generally reflect current NYS designations, but contain historical names where needed for clarification.

- Shaded sites are those included in the 33 cluster site areas listed in the 1988 Gradient/Geotrans report (the 33 areas include 41 individual sites above).

- Italicized sites are those identified as the 22 Category I or II cluster site areas in the 1989 EPA/DEC report, taken from the list of 33 site areas identified in the 1988 Gradient/Geotrans report (the 22 areas include 30 individual sites above).

- Bold sites are those identified subsequent to the 1989 EPA/DEC report as representing the 26 priority site areas (32 individual sites above) that posed the most significant contaminant loading threat to the Niagara River. (Note: Griffon Park, 102nd Street Landfill, and Niagara River Belden Sites are considered one site area; Buffalo Color Corporation Areas A, B, C and E are considered one site area; and, Mobil Oil Corporation and ExxonMobil Oil Former Buffalo Terminal are considered one site area.)

- The eight sites in plain text (no shading, italics, or bold) represent additional sites that have been added to the list of priorities since the original 26 designated in 1989. In addition to these, three of the Category III sites identified in the 1989 EPA/DEC report were reconsidered as potential significant sources: Tonawanda Coke, PVS Chemicals (formerly Allied Chemical), and Alltift Landfill.

Subsequent to the loading estimates in the 1988 Geotrans/Gradient report, and after completion of remedial actions (RAs) at 21 of the 26 original priority hazardous waste sites, EPA had estimated that potential contaminant loadings from these sites had been reduced from 694 lbs/day to less than 50 lbs/day, an approximate 94% reduction from the 1988 contaminant loading estimate. This EPA estimate was based primarily on assuming 100% reduction at sites where the final RA had been completed. It did not include the load reductions at other sites where interim remedial measures (IRMs) had been in place and were expected to have already reduced off-site loadings. As of this 2015 report, RAs have been completed at 24 of these 26 sites. The remaining two sites, Former Bethlehem Steel Property and Mobil Oil Corporation, have interim remedial measures in various stages of progress.

The current status of RAs at the original 26 priority sites, and the 11 additional sites added since 1989, is summarized in Table 3. A summary of recent actions at the sites for which remediation has not been completed, or where remediation has recently been completed, is provided later in this report. More comprehensive summaries for all sites are available on the DEC website, direct links for each site are provided in Appendix A (original 26 sites) and Appendix B (additional 11 sites).

Table 3. Remediation Status of Priority Hazardous Waste Sites (The 11 sites added since 1989 are shown in bold text. Some sites are listed more than once due to varying phases of remedial actions.)

Investigation and Design Status	Remedial Action Status
Potentially Responsible Party (PRP) Search	Interim Remedy in Place, Final Pending or Under Construction
No sites in this phase	Former Bethlehem Steel Property
Site Investigation Underway	Mobil Oil Corporation OUs 2,3 and 5
PVS Chemicals (formerly Allied Chemical) - investigation currently on hold	**Niacet Corporation**
Feasibility Study Underway	**National Fuel Gastown MGP - Tonawanda**
Tonawanda Coke OU3	**Tonawanda Coke OU1 and OU2**
Remedial Design Underway	Remediation Completed (Operation, Maintenance and Monitoring [OM&M] Ongoing)
	Stauffer Chemical-PASNY
No sites in this phase	Frontier Chemical - Pendleton
	Frontier Chemical - Royal Avenue
	Bell Aerospace - Textron
	CECOS International
	Dupont Necco Park
	Occidental Durez Engineered Materials Packard Road (formerly BTL Specialty/Reichold-Varcum)
	Occidental – Durez Division (North Tonawanda)
	DuPont Plant (Buffalo Avenue)
	Olin Corporation Plant (Buffalo Avenue)
	Buffalo Color Corporation Areas A, B, C and E

Investigation and Design Status	Remedial Action Status
	Buffalo Color Corporation Area D
	Mobil Oil Corporation OUs 1 and 4
	Occidental/Former Hooker Main Plant (Buffalo Avenue)
	102nd Street Landfill (Olin/Occidental)
	River Road (INS Equipment)
	Niagara Mohawk - Cherry Farm
	Niagara County Refuse Disposal - Wheatfield
	NFG/Iroquois Gas/Westwood Pharmaceutical*
	Gratwick - Riverside Park
	Occidental/Hooker "S" Area
	Solvent Chemical
	Booth Oil
	Occidental/Hooker-Hyde Park Landfill
	Vanadium Corporation (formerly SKW Alloys) OU3
	Former Buffalo Service Station
	Citizen's Gas Works/NFG Fourth Street MGP Site
	Alltift Landfill
	Steelfields (aka Riverbend, LLC)
	Spaulding Fibre
	Niagara Recycling (Allied/BFI Landfill)
	Allied Chemical – Special Chemical Division

*It has recently been determined that additional action at this site is necessary, as described elsewhere in this report.

In addition to the 1988 and 1989 contaminant loading estimates discussed earlier in this report, other estimates of potential loadings of the NRTMP priority chemicals from groundwater to the Niagara River from priority waste sites have been made. These estimates are based on information that was not available when the 1988 and 1989 estimates were developed. For example, a report by several site potentially responsible parties (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) prior 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 considered the NRTMP priority chemicals, they are not directly comparable to the 1988 and 1989 estimates of total toxic chemical loading. In addition, the CRA report also used some non-conservative assumptions that would tend to reduce load estimates. Therefore, although actual loadings may have been greater than the estimates, the estimates do corroborate the reduction in toxic chemical loadings to the Niagara River achieved through remedial programs.

In 2010, EPA, in collaboration with 15 other federal agencies, launched the Great Lakes Restoration Initiative (GLRI), and released a 5-year (2010-2014) Action Plan that articulated the most significant ecosystem problems facing the Great Lakes and the efforts needed to address them. In September 2014, GLRI Action Plan II was released, defining the program priorities for 2015-2019. The significance of GLRI, within the context of this report, is that it provided the funding that is allowing DEC to conduct the first comprehensive contaminant loading reassessment within the Niagara River Area of Concern (AOC) since the efforts back in the late 1980s. This loading reassessment includes an assessment of contaminant loads from permitted point sources, non-point sources (i.e., groundwater at hazardous waste sites), and select major tributaries to the river. In addition to providing more current loading estimates, the loading estimates from the current assessment are anticipated to be much more accurate than those from previous efforts since, unlike the 1980's estimates, it includes the actual collection of samples, a more uniform list of chemical contaminants for all collected samples/locations, and improved, site-specific (where possible) groundwater flow estimates. Finalization of the report is awaiting evaluation by the full NRTMP Secretariat.

Status of Remediation Progress

Overview

As of the release of this 2015 NRTMP report, final RAs have been completed at 24 of the original 26 priority sites, which includes all Category I sites as previously identified in this report (those with estimated contaminant loads of >50 lbs/day to the river). In addition, final RAs have been completed at seven of the 11 additional sites identified since 1989 that were thought to be potential significant contributors of contaminants to the Niagara River. A brief summary of actions taken in 2015 at sites for which final RAs have not been completed (or that were recently completed) are provided below. Information is provided for all operable units (OU) within a site where work was performed in 2015. (Note: Operable unit is a term used for each of a number of separate activities undertaken as part of a site cleanup.) Additional information for all sites can be found on the DEC website, direct links for each waste site are provided in Appendix A (original 26 sites) and Appendix B (additional 11 sites).

2015 Site Highlights

- **Vanadium Corporation OU 3**: The final RA began in late summer of 2013 and was completed in 2014. Final reports are currently being developed. It is expected that the post-remedial Operation, Maintenance and Monitoring (OM&M) plan could be in effect for up to 30 years or longer.

- **Mobil Oil Corporation OU 4**: Site is operating IRMs while progressing toward completion of the final RA. The RA at OU 1 had been completed in prior years, and the RA at OU 4 was substantially completed in 2014. Remedial investigations at OU 2 and OU 3 were completed in 2015, and those sites are currently in the Feasibility Study (FS) or Remedial Design (RD) stage. OU 5, which includes the sediment along the north shore of the Buffalo River adjacent to the main site, will require additional investigation following completion of upland RAs in OU 2 and OU 3.

- **Former Bethlehem Steel Property**: Site is operating IRMs while progressing toward

completion of their final RAs. Completed IRMs included groundwater collection and treatment, waste consolidation, and hot spot removals. DEC is evaluating results of a Corrective Measures Study (CMS) required by a Consent Order with Tecumseh Redevelopment (current owner of the BSC site) to complete remediation of the remaining areas of concern at the site. Several areas of the site are tracking for Certificates of Completion once the final site cover is completed.

- **Frontier Chemical – Royal Avenue**: Records of decision (RODs) for OU 1 (overburden soil and groundwater) and OU 2 (bedrock groundwater) were issued in March 2006 and March 2011, respectively. The OU 2 ROD called for the control and collection of site groundwater utilizing the City's Falls Street Tunnel, and the development of a long-term plan to monitor the natural attenuation process. This work began in March 2013 by the PRP group, and work was completed in December of that year. Reports documenting the results of the remedial work were reviewed and approved in 2014 with a Certificate of Completion issued August 2014, which requires compliance with the Site Management Plan and restrictions for industrial use only. Long term monitoring is currently on-going.

- **PVS Chemicals (Formerly Allied Chemical)**: The site has been used for chemical manufacturing since the early 1900s. On-site groundwater contamination has been identified during past investigations, and Buffalo River sediments adjacent to the site exhibit the same contaminants as on-site groundwater. Additional investigation is needed to fully evaluate the nature and extent of contamination at the site.

- **Niacet Corporation**: Implementation of the IRM to remove the visible mercury was initiated in January 2013 and temporarily suspended in June 2013 due to inability to control mercury vapors at the excavation site or at the disposal site. Work resumed in February 2014 and again was suspended in November 2014. IRM excavation work is anticipated to resume in 2016.

- **Tonawanda Coke**: A proposed remedial action plan (PRAP) was drafted in 2013 but was on hold because of legal proceedings against the company. A revised FS report is required from the responsible party to complete the PRAP to address all the comments received during the review of the 2013 PRAP. To facilitate the completion of this FS, the company is completing additional investigation work surrounding above-ground storage tanks that are located adjacent to the Niagara River. Once this information has been collected the FS can be revised and the PRAP completed and submitted for public comment.

- **National Fuel Gastown MGP - Tonawanda**: Remedial design was completed in 2014, and implementation of the remedy commenced in 2015. This included the off-site disposal or in-situ solidification (ISS) of coal tar contaminated soils from the site, as well as dredging of contaminated sediments from the impacted area of Tonawanda Creek. Remedial work is expected to be completed in 2016.

- **NFG/Iroquois Gas/Westwood Pharmaceutical**: While initial remedial work at the main

facility site was completed in the 1990's, NYSDEC has determined through ongoing site monitoring that, during wet weather events, the groundwater extraction system that was part of the original remedy is not intercepting all contaminated groundwater as it moves toward Scajaquada Creek. To mitigate this, an interceptor trench is currently being designed that will replace the existing groundwater collection well system.

Other Efforts

In addition to remediation efforts at the waste sites themselves under the NRTMP, 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. Subsequent data gathered by the U.S. indicated that WWTP treatment of the Tunnel's dry weather discharge had 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%.

A significant portion of wet weather flows within the Falls Street Tunnel is also effectively captured, stored, and then pumped to the WWTP for treatment. The storage capacity depends on wet weather flow intensity, and pumping capacity of the Gorge pumping station. In addition, there have been periodic improvements and/or modification to the tunnel to reduce the flow of bedrock groundwater infiltration.

Other program actions outside the NRTMP have eliminated principal sources of priority toxic compounds, such as toxaphene, primarily used in pesticides in the Great Lakes Region during the 1970s. Toxaphene, although not being measured as part of the U/D Program, was discontinued for use as a pesticide in 1982 before EPA banned all general uses of the compound in the United States and its territories in 1990. Although toxaphene is considered a very persistent chemical, it is reasonable to conclude that there are unlikely to be harmful releases from sources to the Niagara River due to site remedial actions, natural attenuation and its discontinued use.

The federal Great Lakes Legacy Act (GLLA) has, in recent years, provided significant funding that has resulted in the characterization and removal of large amounts of contaminated sediments in AOCs throughout the Great Lakes region. From 2012-2015, approximately 450,000 cubic yards of contaminated sediments were removed from the Buffalo River, which drains into Lake Erie at the headwaters of the Niagara River. Though additional monitoring of sediment chemistry will be performed to determine if the project's remedial goals have been achieved, the 2015 dredging efforts have completed the GLLA scope of work, as they relate to dredge activities, within the Buffalo River. This is in addition to approximately 550,000 cubic yards of river sediment removed in 2011-2012 as part of the United States Army Corps of Engineers maintenance dredging of the federal

navigation channel within the river. Since sediments (and thus contaminants) from within the Buffalo River can be transported to the Niagara River, this GLLA project has removed a potential long-term source of contamination to the Niagara River.

In 2014, EPA conducted an initial GLLA characterization of sediment within portions of the Niagara River AOC, focusing on the southernmost area of the AOC in the vicinity of the Buffalo Harbor and within the Black Rock Channel. EPA and DEC are currently evaluating the need to expand this characterization to better assess the potential threat that these sediments may have on water quality and biota within the Niagara River.

Remedial action plans (RAPs) and associated initiatives within the two AOCs that impact the Niagara River will continue to be a top priority for the Four Parties over the next several years. The beneficial use impairments (BUIs) listed by both the binational Niagara River AOC and Buffalo River AOC are believed to be based in large part on impacts of toxics chemicals which have been closely linked to the hazardous waste site inputs to the rivers. Currently, removal/redesignation of BUIs within both AOCs (Table 4) is a top priority for the Four Parties and all are investing substantial resources to achieve these goals.

Table 4. Beneficial Use Impairments for Niagara River and Buffalo River AOCs.

Niagara River AOC BUIs	Buffalo River AOC BUIs
Restrictions on fish and wildlife consumption	Restrictions on fish and wildlife consumption
Fish tumors or other deformities	Fish tumors or other deformities
Degradation of benthos	Degradation of aesthetics
Restriction on dredging activities	Degradation of benthos
Loss of fish and wildlife habitat	Restriction on dredging activities
Degradation of fish and wildlife populations	Loss of fish and wildlife habitat
Bird or animal deformities or reproductive problems	Tainting of fish and wildlife flavor
	Degradation of fish and wildlife populations
	Bird or animal deformities or reproductive problems

Glossary

A

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

Area of Concern (AOC)
An area that has experienced environmental degradation.

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.

Attenuation
A gradual diminishing in the strength of something.

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.

Beneficial Use Impairment (BUI)
A change in the chemical, physical, or biological integrity of the Great Lakes system sufficient to cause any of the 14 use impairments identified in the Great Lakes Water Quality Agreement.

Benzo(a)pyrene/Benz(a)anthracene/Benzo (b/k)fluoranthene
PAHs that are 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 ‘capture’ contaminated groundwater and treat it.

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

Chrysene
A PAH that is formed by the incomplete combustion of fossil fuels, wood, and tobacco; the incineration of garbage; and in steel production.

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.

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

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

D

Declaration of Intent (DOI)
The NRTMP initiative to achieve significant reductions of toxic chemical pollutants in the Niagara River, signed by the Four Parties.

Dredging
Removal of sediment from the bottom of a waterbody.

DDT
Dichloro-diphenyl-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 '2,3,7,8-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.

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.

E

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

F

Feasibility Study (FS)
The mechanism for the development, screening, and detailed evaluation of alternative remedial actions.

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 Climate Change.

G

Great Lakes Legacy Act (GLLA)
Under the first priority of the GLRI, the Great Lakes Legacy Act provides federal funding to accelerate the pace of contaminated sediment remediation in AOCs.

Great Lakes Restoration Initiative (GLRI)
The federal (U.S.) initiative launched in 2010 to accelerate efforts to protect and restore the Great Lakes - to provide additional resources to make progress toward the most critical long-term goals for this important ecosystem.

Great Lakes Water Quality Agreement (GLWQA)
The Great Lakes Water Quality Agreement addresses critical environmental health issues in the Great Lakes region and is a model of binational (U.S. and Canada) cooperation to protect water quality. The Agreement was initially signed in 1972 and was updated in 1987 and 2012.

Groundwater
The fresh or saline waters found beneath the Earth's surface that often supply wells and springs. Contrast to "Surface water".

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 Site
Land disposal site for hazardous wastes.

Hazardous Waste Substance
Any substance that is a by-product of society classified under U.S. or Canadian law as potentially harmful to human health or the environment and are subject to special handling, shipping, storage, and disposal requirements under the law.

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
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.

Interim remedial measure (IRM)
An IRM is a discrete set of planned actions for both emergency and non-emergency situations that can be conducted without the extensive investigation and evaluation of a RI/FS, but that is designed to be a permanent part of the final remedy.

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 or landfill.

Load or Loading
The mass 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)

O

Octachlorostyrene (OCS)
A persistent toxic chemical that was released as a by-product when chlorine was manufactured using certain processes that are no longer used.

Operable unit (OU)
Term for each of a number of separate activities undertaken as part of a site cleanup.

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 standards in the Niagara River or Lake Ontario.

R

RCRA
Resource Conservation and Recovery Act. 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 Action Plan (RAP)
Under the GLWQA, an ecosystem based, multi-media approach for assessing and remediating impaired uses at Great Lakes AOCs.

Remedial Investigation (RI)
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.

Remediation
The action of remedying something, in particular of reversing or stopping environmental damage.

Requisite Remedial Technology (RRT)
An RRT is the equivalent of an FS (see **RI/FS** above) for a pre- Comprehensive Environmental Response, Compensation, and Liability Act of 1980 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.

Stormwater
Stormwater is generated when precipitation from rain and snowmelt events flows over land or impervious surfaces and does not percolate into the ground. As the runoff flows over the land or impervious surfaces (paved streets, parking lots, and building rooftops), it accumulates debris, chemicals, sediment or other pollutants that could adversely affect water quality if the runoff is discharged untreated.

Superfund
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 "Groundwater".

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.

W

Watershed
A watershed is the area of land where all of the water that is under it or drains off of it goes into the same place.

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 A

26 ORIGINAL PRIORITY NIAGARA RIVER HAZARDOUS WASTE SITES:

REMEDIATION STATUS SUMMARIES

Site Name: DEC Site #: Program:	Contents / Pollutants of Concern	Remedial Actions Completed	Formal Remedial Compliance and/or Enforcement Actions	2015 Post-Remedial Action O&M Status	Additional Information Available at:
Occidental/Former Hooker Main Plant (Buffalo Avenue) #932019 RCRA (State & Federal)	Chlororganics, cell brine sludges, phosphorus sludges	1998	NYS Part 373 and EPA RCRA permits issued	Bedrock & overburden groundwater monitoring, collection & treatment.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=932019
Niagara County Refuse Disposal - Wheatfield #932026 Federal Superfund	Phenolic resins, plating tank sludges, brine sludge	1999	EPA Consent Order and ROD issued	Routine site inspection and certification. Groundwater monitoring program. Maintenance of landfill cap; site access restrictions.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=932026
Dupont Necco Park #932047 Federal Superfund	Brine sludge, barium salts, chlorinated organic chemicals	2007	EPA Consent Orders and ROD issued	Routine site inspection and certification. Groundwater monitoring, collection & treatment.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=932047
CECOS International #932046 RCRA (State & Federal)	Acetone, 2-butanone, benzene, chloroform, toluene, chlorobenzene, methylene chloride, tetrachlorethane	1995	EPA RCRA Hazardous and Solid Waste Amendments (HSWA) and NYS Part 373 permits issued	Groundwater extraction & treatment; landfill cap maintenance; site access restrictions.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3

Site Name: DEC Site #: Program:	Contents / Pollutants of Concern	Remedial Actions Completed	Formal Remedial Compliance and/or Enforcement Actions	2015 Post-Remedial Action O&M Status	Additional Information Available at:
Occidental/Hooker-Hyde Park Landfill #932021 Federal/State Superfund Co-lead	Brine sludge, organic phosphates, dechlorane, chlorotoluenes, trichlorophenol (TCP), benzoyl chloride, chlorobenzenes, acid chlorides	2003	EPA/DEC/OCC Stipulation and Judgment Approving Settlement Agreement	Routine site inspection and certification. Overburden groundwater monitoring, collection & treatment. Maintenance of landfill cap; Site access restrictions.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=932021
102nd Street Landfill (Olin/Occidental) #932031 Federal Superfund	Benzenes, chlorobenzenes, chlorophenols, hexa-chlorocyclohexanes, mercury	1998	EPA ROD completed 1990 & Administrative Order issued September 1991	Routine site inspection and certification. Groundwater/Leachate pump and treat. Maintenance of landfill cap; Site access restrictions.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=932031
Bell Aerospace - Textron #932052 RCRA (State and Federal)	Chlorinated solvents, rocket fuel, misc. chemicals	1987	NYS Part 373 and EPA RCRA permits issued	Hydraulic groundwater containment pump and treat system.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=932052

Site Name: DEC Site #: Program:	Contents / Pollutants of Concern	Remedial Actions Completed	Formal Remedial Compliance and/or Enforcement Actions	2015 Post-Remedial Action O&M Status	Additional Information Available at:
Occidental Durez Engineered Materials Packard Road (formerly BTL Specialty/ Reichold-Varcum) #932040 RCRA (State and Federal)	Phenolic wastes	1995	NYS Part 373 and EPA RCRA permits issued	Routine site inspection and certification. Groundwater pump and treat program; maintenance of landfill cap; site access restrictions.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=932040
Occidental/Hooker "S" Area #932019A Federal/State Superfund Co-lead	CaF2 sludge, organic phosphates, chlororganics, sulfides	2003	EPA/DEC lead responsibility under 1985 judicial settlement agreement	Routine site inspection and certification. Operation and maintenance of landfill cap; groundwater collection and treatment.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=932019A
Stauffer Chemical-PASNY #932053 DEC Superfund	Carbon tetrachloride, various metallic chlorides, methylene chloride, tetrachloroethylene	1995/2001	DEC Consent Order	Bedrock groundwater pump and treat system; soil vapor extraction system (inactive), and institutional controls.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=932053

Site Name: DEC Site #: Program:	Contents / Pollutants of Concern	Remedial Actions Completed	Formal Remedial Compliance and/or Enforcement Actions	2015 Post-Remedial Action O&M Status	Additional Information Available at:
Solvent Chemical #932096 DEC Superfund	Chlorobenzenes, zinc	2003	ROD issued December 1994; U.S. District Court Judgment issued October 1997.	Routine site inspection and certification. Maintenance of cover; Site access restrictions. Bedrock groundwater pump and treat system.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=932096
Vanadium Corp. #932001 DEC Superfund	Chromium, VOCs, phenol, caustic waste	2014	ROD issued March 2006: OU#1 - No Further Action OU#2 - No Further Action OU#3 - Consolidation and capping	OU#1 -Waste consolidation and storm water control, groundwater monitoring; OU#2- landfill cap, groundwater collection and treat system; OU#3 – Containment and storm water control; landfill cap, Routine site inspection and certification.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=932001 http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=932001B http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=932001C

Site Name: DEC Site #: Program:	Contents / Pollutants of Concern	Remedial Actions Completed	Formal Remedial Compliance and/or Enforcement Actions	2015 Post-Remedial Action O&M Status	Additional Information Available at:
Olin Corporation Plant (Buffalo Avenue) #932051A/B State and Federal RCRA	Mercury brine sludges, chlororganics, fly ash	1997	DEC Consent Order	Routine site inspection and certification. Groundwater pump and treat system.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=932051A http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=932051B
DuPont Plant (Buffalo Avenue) #932013 DEC Superfund	Carbon tetrachloride, chloroform, dichloroethylene, methylene chloride, trichloroethylene, tetrachloroethylene, vinyl chloride, PCBs, barium, and other organic and inorganic compounds	1992/2004	DEC Consent Order ROD issued January 1990	Groundwater pump and treat system.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=932013
Buffalo Color Corporation Areas A, B, C, and E #C915230/A, C915231, C915232 State and Federal RCRA State Brownfield Program	Aniline, N-methylaniline, N-dimethylaniline, N-diethylaniline, cyanide, methanol, nickel, chromium, arsenic, lead, mercury, VOCs, SVOCs	2013	NYS Part 373 and EPA RCRA permits issued; DEC Consent Orders issued 3/12/2005 and 6/30/2006.	Slurry wall, soil cover, groundwater pump and treat system, and institutional controls.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=C915230 http://www.dec.ny.gov/cfmx/extapps/derexternal/index.cfm?pageid=3&progno=C915230A http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=C915231 http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=C915232

Site Name: DEC Site #: Program:	Contents / Pollutants of Concern	Remedial Actions Completed	Formal Remedial Compliance and/or Enforcement Actions	2015 Post-Remedial Action O&M Status	Additional Information Available at:
Buffalo Color Corporation Area D #915012 DEC Superfund	Iron oxide sludges containing organics	1998	DEC Consent Order	Routine site inspection and certification. Slurry wall, landfill cap; groundwater pump & treat system.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=915012

Site Name: DEC Site #: Program:	Contents / Pollutants of Concern	Remedial Actions Completed	Formal Remedial Compliance and/or Enforcement Actions	2015 Post-Remedial Action O&M Status	Additional Information Available at:
Former Bethlehem Steel Property #915009, C915197, C915198, C915199, C915205, C915216, C915217, & C915218 State and Federal RCRA State Brownfield Program	Tar decanter sludge, ammonia still lime, sludge, pickling liquor, metals, VOCs, SVOCs/PAHs	C915197 Projected October 2008 C915205 - completed 2006 Other sites ongoing as part of Corrective Measures Study	DEC Consent Order C915197 - Brownfield Clean-up Agreement (BCA) C915198 -BCA C915199 -BCA C915205 - BCA C915216 - Denied entry into BCP C915217 - BCA C915218 - Eligibility Pending	Groundwater collection and treatment for brownfields redevelopment. C915205 - Protective cover, passive groundwater treatment, Easement.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=915009 http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=C915197 http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=C915198 http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=C915199 http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=C915205 http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=C915216 http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=C915217 http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=C915218

Site Name: DEC Site #: Program:	Contents / Pollutants of Concern	Remedial Actions Completed	Formal Remedial Compliance and/or Enforcement Actions	2015 Post-Remedial Action O&M Status	Additional Information Available at:
River Road (INS Equipment) #915031 DEC Superfund	Foundry sand, cutting oils, industrial sludges, PCBs, PAHs, metals	January 2000	DEC Consent Order. ROD issued March 1994	Routine site inspection and certification. Landfill cap and leachate collection and treatment.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=915031
Niagara Mohawk – Cherry Farm #915063 DEC Superfund	Foundry sand, cutting oils, industrial sludges, PCBs, PAHs, metals	See Site 915031 above.	ROD issued Feb 1991 Amended ROD Oct 1993	Routine site inspection and certification. Landfill cap and leachate collection and treatment.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=915063
Frontier Chemical - Pendleton #932043 DEC Superfund	Solvents, oils, acids, dyes, paint wastes, heavy metal sludges, metal salt sludges, pickling liquors	1997	DEC ROD issued March 1992; DEC Consent Order	Routine site inspection and certification. Landfill cap and leachate collection and treatment.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=932043
Frontier Chemical - Royal Avenue #932110 EPA and DEC Superfund	Monochlorotoluene, methylene chloride, chloroform, dichlorobenzene, tetrachloroethylene and other organic contaminants	2014	DEC ROD - OU#1 issued March 2006; OU#2 issued March 2011	Natural attenuation, long-term monitoring, site use restrictions. Site groundwater is collected passively by sewers and treated at the Niagara Falls WWTP.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=932110

Site Name: DEC Site #: Program:	Contents / Pollutants of Concern	Remedial Actions Completed	Formal Remedial Compliance and/or Enforcement Actions	2015 Post-Remedial Action O&M Status	Additional Information Available at:
Occidental - Durez Division (North Tonawanda) #932018 DEC Superfund	Phenol tars containing chlorobenzenes and chlorophenols	Plant site:1990 Inlet/Cove: 1992 &2000	DEC ROD OU#1/2 -Feb 1989; ROD OU#3 - March 1992.	Plant site includes cover system and groundwater control/treatment. Inlet cove & north lobe removal and containment work is being monitored.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=932018
Gratwick - Riverside Park #932060 DEC Superfund	Phenolic resins, PCBs	2005	DEC ROD- Feb. 1991; Amended ROD - Jan. 1999	Landfill cap and leachate collection and treatment.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=932060
Mobil Oil Corporation #915040 & C915201 DEC Brownfield	Tetraethyl lead and lube sludges, spent catalysts, Air floatation unit and gravity oil/water separator sludges, VOCs, SVOCs, metals	OU#1 in 2007; OU#2 partially completed in 2007, additional work is necessary; Additional work is necessary at OU#3, OU#4, and OU#5.	DEC Consent Order issued in 1985. NYS Brownfield Cleanup Agreement executed April 3, 2006	Remediation on-going.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=915040 http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=C915201

Site Name: DEC Site #: Program:	Contents / Pollutants of Concern	Remedial Actions Completed	Formal Remedial Compliance and/or Enforcement Actions	2015 Post-Remedial Action O&M Status	Additional Information Available at:
NFG/Iroquois Gas/Westwood Pharmaceutical # 915141A/B DEC Superfund	PAHs (Polynuclear Aromatic Hydrocarbons) BTEX (Benzene, Toluene, Ethyl benzene, Xylene), lead, and cyanide	Main plant site in 1997 and Scajaquada Creek sediments in March 1999. 915141A: 1997 915141B: 2001	DEC ROD issued March 1994 for both sites.	915141A: hydraulic control; groundwater pump and treat. NYSDEC has determined that remedy may not be meeting intent of ROD; corrective measures implemented while interceptor trench to replace existing collection well system is being designed. 915141B: DNAPL extraction.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=915141A http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=915141B
Booth Oil #932100 DEC Superfund	Waste oils, PCBs, VOCs, semi-VOCs, and PAHs	2004	DEC ROD issued March 1992 and March 1993, ROD amendments in August 2002	OM&M plan for site cover maintenance. Deed restrictions in place.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=932100

APPENDIX B

11 ADDITIONAL PRIORITY NIAGARA RIVER HAZARDOUS WASTE SITES:

REMEDIATION STATUS SUMMARIES

Site Name: DEC Site #: Program:	Contents /Pollutants of Concern	Remedial Actions Completed	Formal Remedial Compliance and/or Enforcement Actions	2015 Post-Remedial Action O&M Status	Additional information available at:
Citizen's Gas Works/NFG Fourth Street MGP Site 915167 NYS Superfund	benzene, toluene, xylenes, phenolic compounds, PAHs	2006	State Superfund Program	Groundwater monitoring and an environmental easement.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=915167
Former Buffalo Service Station C915194 NYS Brownfield Clean-up Program	benzene, toluene, ethylbenzene, xylenes, PAHs, total cyanides	2006	Brownfield Clean-up Agreement	Groundwater monitoring and environmental easement.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=C915194
Alltift Landfill 915054 NYS Superfund	miscellaneous organic chemicals, chrome sludge, copper sulfate, nitrobenzene, monochlorobenzene, naphthalene, automobile shredder wastes, demolition debris, fly-ash and sand wastes, metals, pesticides, PCBs, VOCs, PAHs	2005	SSF Consent Order	Routine site inspection and certification. Landfill cap, leachate collection and treatment, environmental easement.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=915054
Steelfields (aka Riverbend, LLC) V00619/C915204 NYS Voluntary Clean-up Program	waste slag and coke, significant quantities of chemically contaminated fill soils, VOCs, SVOCs, metals	2007	Voluntary Clean-up Agreement/Brownfield Cleanup Agreement	Groundwater monitoring and Declaration of Covenants and Restrictions. Area 2 Landfill cap and leachate collection and treatment.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=C915204 http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=V00619

Site Name: DEC Site #: Program:	Contents /Pollutants of Concern	Remedial Actions Completed	Formal Remedial Compliance and/or Enforcement Actions	2015 Post-Remedial Action O&M Status	Additional information available at:
Niacet Corporation V00373 NYS Voluntary Clean-up Program	mercury/ acetaldehyde, sodium acetate, paraldehyde, aldol, crotonaldehyde, aluminum sludge, 2-ethylexoate, zincacetate, acetic acid, acetate salts	Ongoing, not completed.	Voluntary Clean-up Agreement	Remedial action ongoing.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=V00373
Spaulding Fibre NA 915050/E915050 NYS Superfund/Environmental Restoration program	PCBs, Metals, phenolic compounds	2010	State Superfund Program/ State Assistance Contract	Environmental easement with use restrictions.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=915050 http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=E915050

Site Name: DEC Site #: Program:	Contents /Pollutants of Concern	Remedial Actions Completed	Formal Remedial Compliance and/or Enforcement Actions	2015 Post-Remedial Action O&M Status	Additional information available at:
Tonawanda Coke #915055 DEC/EPA CWA, Superfund, RCRA, CAA	PAHs, iron, phenols, cyanide, benzene, naphthalene, benzo(a)pyrene	OU#1 and #2 completed 2008. OU#3: Investigation still ongoing.	ROD for OU#1 and #2 signed 3/31/08. Consent order to conduct the RI at OU#3 signed 9/17/09. Formal enforcement actions taken by DEC and EPA for SPDES water quality, air quality, petroleum spill/bulk storage and RCRA violations during 2010-2014.	The groundwater contamination at the site is insignificant and the surface water discharge from the site to the river is managed under an SPDES permit. Institutional/engineering controls are ongoing at OU#1 and #2 of the site.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=915055

Site Name: DEC Site #: Program:	Contents /Pollutants of Concern	Remedial Actions Completed	Formal Remedial Compliance and/or Enforcement Actions	2015 Post-Remedial Action O&M Status	Additional information available at:
National Fuel Gastown MGP - Tonawanda #915171 DEC Superfund	BTEX, coal tar	2016	ROD signed in 2007 requiring installation of subslab depressurization systems, and sediment removal; ROD amendment in 2013 to use in-situ stabilization instead of excavation and tar collection wells instead of a trench.	Remedial action completed in April 2016. Site management plan being developed.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=915171
Niagara Recycling (Allied/BFI Landfill) 932042 DEC Superfund	Chlorinated hydrocarbons, metals	1991	On-going landfilling operation being administered through Part 360 program.	Operating under City of Niagara Falls discharge permit, ongoing groundwater monitoring.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=932042
Allied Chemical - Special Chemical Division 915003A/B/C DEC Superfund	Organics, scrap chlorinated polyethylene/polyethylene, magnesium chromate and dichromate impregnated on potassium aluminum silicate	1991	Being addressed under NY RCRA program.	Remedial action completed, no ongoing actions.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=915003A http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=915003B http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=915003C

Site Name: DEC Site #: Program:	Contents /Pollutants of Concern	Remedial Actions Completed	Formal Remedial Compliance and/or Enforcement Actions	2015 Post-Remedial Action O&M Status	Additional information available at:
PVS Chemicals 915004 DEC Superfund	Arsenic, cadmium, mercury, chlorobenzenes	Ongoing, not completed.	NYS Stipulation and Order of Settlement (2002)	Ongoing evaluation.	http://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?pageid=3&progno=915004