

RECORD OF DECISION

**Operable Unit 2 of the
Geddes Brook/Ninemile Creek Site
Operable Unit of the Onondaga Lake Bottom Subsite
Onondaga Lake Superfund Site**

Onondaga County, New York



OCTOBER 2009

**NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ALBANY, NEW YORK**

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
NEW YORK, NEW YORK**

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DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Operable Unit 2 of the Geddes Brook/Ninemile Creek Site¹
Operable Unit of the Onondaga Lake Bottom Subsite/Onondaga Lake Superfund Site
Onondaga County, New York

Superfund Site Identification Number: NYD986913580
Operable Unit 24

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) documents the New York State Department of Environmental Conservation (NYSDEC) and U.S. Environmental Protection Agency's (EPA's) selection of a remedy for Operable Unit 2 (OU2) of the Geddes Brook/Ninemile Creek Site (Site), an operable unit of the Onondaga Lake Bottom subsite of the Onondaga Lake Superfund site. The selected remedy is chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 US Code (USC) §9601, *et seq.*, and the National Oil and Hazardous Substances Pollution Contingency Plan, 40 Code of Federal Regulations Part 300. This decision document explains the factual and legal basis for selecting the remedy for this Site. The attached index (see Appendix III) identifies the items that comprise the Administrative Record upon which the selection of the remedy is based.

The New York State Department of Health was consulted on the proposed remedy in accordance with CERCLA Section 121(f), 42 USC §9621(f), and it concurs with the selected remedy.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The selected remedy consists of the dredging/excavation and removal of an estimated 58,000 cubic yards (cy) (44,000 cubic meters [m³]) of contaminated channel sediments and floodplain soils/sediments over approximately 15.5 acres (6.3 hectares) in Reach AB of lower Ninemile Creek².

¹ This is also being tracked in EPA's CERCLIS data base as Operable Unit #24 of the Onondaga Lake National Priorities List (NPL) Site.

² The stretch of Ninemile Creek downstream of the area just above the confluence with Geddes Brook has been designated as "lower Ninemile Creek." Lower Ninemile Creek has been further subdivided into three reaches (AB, BC, and CD).

As part of the selected remedy, clean materials will be placed in the dredged/excavated areas throughout the Site. Depending on their location, these materials will consist of backfill (if needed) and a habitat layer. The habitat layer will consist of clean material designed to provide the proper conditions for animal and plant communities to grow. This layer will be a minimum of 2 feet (ft)(60 centimeters [cm]) thick, unless otherwise noted, and may consist of clean gravel in the stream bed and clean topsoil in wetland/floodplain areas. Backfill will consist of soils used to bring the sediment or ground surface to an appropriate elevation below the habitat layer.

The areal “footprint” of the Site remedy is bounded by steep banks within the floodplain which limited the extent of sediment/soil contamination. The selected remedy will address all of the remediation goals (RGs)³ with a combination of removal, backfilling, and habitat layer placement technologies.

In the Reach AB channel of Ninemile Creek, the selected remedy includes the removal of approximately 16,000 cy (12,000 m³) of contaminated sediments overlying the native marl layer (where present) or to a depth of approximately 2.5 ft (75 cm) to allow for the installation of a habitat layer (2 ft [60 cm]) and a sand base layer (0.5 ft [15 cm]). This depth of removal is expected to eliminate the need for an isolation cap⁴ below the habitat layer and would allow for the passage of flood flows under existing upstream infrastructure and protection of floodplain areas in accordance with applicable requirements, and provide sufficient water depth for fish passage and canoe access during low flows. The sand base layer will be installed below the habitat layer to provide support for it and to prevent clay or silt particles from migrating into it. The base layer will also provide the added benefit of attenuating any residual contamination that may remain after dredging. The removal of channel sediments is expected to reduce mercury concentrations to approximately 0.3 milligrams per kilogram (mg/kg) or less.

In the Reach AB floodplain portion of Ninemile Creek, the selected remedy includes the removal of approximately 42,000 cy (32,000 m³) of floodplain soils/sediments to depths ranging from approximately 1 to 4 ft (0.3 to 1.2 m) (depending on the level of contamination and the presence of structural stone/gravel at depth) and the placement of 1 to 3 ft (30 to 90 cm) of backfill (where needed) and habitat layer material. The removal of floodplain soils/sediments is expected to reduce concentrations of mercury to 0.5 mg/kg or less following removal.

The selected remedy for the Site will result in the removal of about 640 pounds (290 kilograms [kg]) of mercury in the channel and floodplain of Reach AB (92 percent of the total mass of mercury found in this reach) and the residual that will remain (generally less than about 0.5 mg/kg of mercury) would typically be significantly lower than the maximum concentration currently found within Reach AB (77 mg/kg).

Contaminated sediments and soils removed from the creek and floodplains will be disposed of at Honeywell's Linden Chemicals and Plastics (LCP) Bridge Street subsite containment system, which was constructed (and is being monitored) pursuant to the requirements of a September 2000 ROD or the Sediment Consolidation Area (SCA) that will be constructed at Wastebed 13 as part of the

³ Preliminary Remediation Goals identified in the Proposed Plan are referred to as “Remediation Goals” (RGs) in this document except in the selected remedy section where quantitative RGs for soil, sediment and surface water are referred to as “cleanup levels”.

⁴ Based on available data related to lithology and the concentrations of contaminants at the Site, removal of sediments to a depth of 2.5 ft (75 cm) or into the marl could be conducted in one dredging pass and would result in sediment concentrations that are generally less than 0.3 mg/kg of mercury.

Onondaga Lake Bottom subsite remedy pursuant to the requirements of a July 2005 ROD. A decision as to the specific disposal location(s) will be made during the design phase. This decision will consider various factors including the design and construction schedules for Site remedy as well as the SCA so that remediation of Ninemile Creek is not delayed.

Treatment of water generated by dredging and excavating sediments and soils and corresponding sediment/soil dewatering will be conducted at a location in the vicinity of the Site. The actual location of the treatment plant, discharge requirements, and point of discharge will be determined as part of the remedial design.

It is estimated that the dredging/excavating, backfilling, and habitat layer placement components of the selected remedy, along with dewatering, water treatment, and transport/disposal of sediments and soils at the LCP Bridge Street subsite and/or the SCA, will take one year.

Following sediment and soil removal, restoration of the stream bed and banks, floodplains, wetlands (including forested areas), and habitats will include placement of a sand base layer and backfill, where needed, and placement of a habitat layer with appropriate substrate types and thicknesses as well as planting of appropriate species of wetland and upland vegetation. Habitat restoration is an integral part of the remediation and the details of habitat restoration will be included in a habitat restoration plan that will be developed during remedial design. The goals of the habitat restoration plan will include, but will not be limited to, providing connectivity of the stream with the surrounding floodplain/wetland, the establishment of diverse habitats and native vegetation (e.g., vernal pools, forested floodplains), and no net loss of wetland areas following remediation. Natural stream restoration techniques will be used in designing both the channel remedy and the habitat layer with the goal of creating a diversity of stream and near-stream habitats and minimizing hardening of the channel and banks, to the extent feasible. Additionally, the specific thickness(es), type(s) of substrate material, and specifications for vegetation to be used for the habitat layer will be developed in the restoration plan.

The environmental benefits of the selected remedy may be enhanced by consideration, during remedial design, of technologies and practices that are sustainable in accordance with EPA Region 2's Clean and Green policy⁵. This will include consideration of green remediation technologies and practices.

The selected remedy for this Site, combined with the remedy selected for OU1 of the Geddes Brook/Ninemile Creek site in an April 2009 ROD (NYSDEC and EPA, 2009), will result in a long-term reduction in the toxicity, mobility, and volume of the contaminants of concern in Geddes Brook and Ninemile Creek, namely, mercury, arsenic, lead, hexachlorobenzene, phenol, polycyclic aromatic hydrocarbons, polychlorinated biphenyls, and polychlorinated dibenzo-*p*-dioxins/polychlorinated dibenzofurans.

The selected remedy will address all areas of this Site such that the top 2 ft (60 cm) of sediments and soils will be replaced with clean material. The goal for the concentrations of this clean material for mercury, other chemical parameters of interest, and other constituents will be NYSDEC's sediment criteria (including the lowest effects level of 0.15 mg/kg for mercury) in sediments and 6 NYCRR Part 375 unrestricted use soil cleanup objectives (including the objective of 0.18 mg/kg for mercury) in soils. Clean soil will include imported fill materials from off-Site sources. The selected remedy will also attain a 0.8 mg/kg site-specific bioaccumulation-based sediment quality value (BSQV) for mercury in sediments for protection of wildlife consumption of fish and 0.6 mg/kg

⁵

See http://epa.gov/region2/superfund/green_remediation.

site-specific BSQV for mercury in floodplain soils for protection of wildlife consumption of terrestrial invertebrates. The selected remedy is also intended to achieve fish tissue mercury concentrations ranging from 0.1 mg/kg wet weight (ww), which is for protection of ecological receptors, to 0.3 mg/kg ww, which is based on EPA's methylmercury National Recommended Water Quality criterion for the protection of human health from elevated risks due to consumption of organisms.

DECLARATION OF STATUTORY DETERMINATIONS

The selected remedy meets the requirements for remedial actions set forth in CERCLA Section 121, 42 USC §9621, because it: 1) is protective of human health and the environment; 2) meets a level or standard of control of the hazardous substances, pollutants, and contaminants, which attains the legally applicable or relevant and appropriate requirements under federal and state laws; 3) is cost effective; 4) utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable; and 5) satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as their principal element.

Because this remedy will result in contaminants remaining on-Site above levels that would allow for unlimited use and unrestricted exposure to Site media, CERCLA requires that the Site be reviewed at least once every five years. If justified by the review, additional remedial actions may be selected and implemented to remove, treat, or contain the contaminated sediments and soils.

ROD DATA CERTIFICATION CHECKLIST

This ROD contains the remedy selection information noted below. More details may be found in the Administrative Record file for this Site.

- Contaminants of concern and their respective concentrations (see ROD, pages 18 to 27).
- Baseline risk represented by the contaminants of concern (see ROD, pages 28 to 34).
- Cleanup levels established for contaminants of concern and the basis for these levels (see ROD text boxes "Toxicity-Based Sediment Effect Concentrations Selected as RGs for Mercury and Other Inorganics" [page 38] and "Toxicity-Based Sediment Effect Concentrations Selected as RGs for Organic Contaminants" [page 39]).
- Manner of addressing source materials constituting principal threats (see ROD, page 77).
- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of surface water used in the baseline risk assessment and ROD (see ROD, page 27).
- Potential land and surface water use that will be available at the Site as a result of the selected remedy (see ROD, page 27).
- Estimated capital, annual operation and maintenance, and present-worth costs; discount rate; and the number of years over which the remedy cost estimates are projected (see ROD, pages 76 and 88).

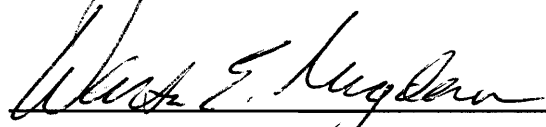
- Key factors used in selecting the remedy (e.g., how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) (see ROD, pages 77 to 79).

AUTHORIZING SIGNATURES



Dale A. Desnoyers, Director
Division of Environmental Remediation
NYSDEC

10/1/09
Date



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

Oct. 1, 2009
Date

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**RECORD OF DECISION FACT SHEET
EPA REGION 2**

Site

Site name: Operable Unit 2 of the Geddes Brook/Ninemile Creek Site, an operable unit of the Onondaga Lake Bottom subsite, Onondaga Lake Superfund Site

Site location: Onondaga County, New York

HRS score: 50

Listed on the NPL: December 16, 1994

Record of Decision

Date signed: October 1, 2009

Selected remedy: Dredging/excavation and disposal of contaminated channel sediments and floodplain soils/sediments followed by backfilling the dredged/excavated area.

Capital cost: \$15,100,000

Operation and maintenance cost: \$110,000 per year

Present-worth cost: \$16,500,000

Lead

NYSDEC

Primary Contact: Timothy Larson, P.E., Project Manager, NYSDEC, (518) 402-9676

Secondary Contact: Donald Hesler, Section Chief, NYSDEC, (518) 402-9676

Main PRP

Honeywell International, Inc.

Waste

Waste type: Mercury and other metals (e.g., lead, arsenic); semi-volatile organic compounds; dioxins/furans; polychlorinated biphenyls; dieldrin

Waste origin: Discharges from the LCP Bridge Street subsite to the streams and floodplain

Contaminated media: Sediment, floodplain soil/sediment, surface water, and biota

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DECISION SUMMARY

**Operable Unit 2 of the
Geddes Brook/Ninemile Creek Site
Operable Unit of the Onondaga Lake Bottom Subsite
Onondaga Lake Superfund Site**

Onondaga County, New York

October 2009

**New York State Department of Environmental Conservation
Albany, New York**

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

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LIST OF ACRONYMS AND ABBREVIATIONS USED IN ROD AND RESPONSIVENESS SUMMARY

AMSL	Above Mean Sea Level
ARAR	Applicable or Relevant and Appropriate Requirement
BALCT	Benthic Aquatic Life Chronic Toxicity criteria
BERA	Baseline Ecological Risk Assessment
BSAF	Biota-Sediment Accumulation Factor
BSQV	Bioaccumulation-based Sediment Quality Value
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CFR	Code of Federal Regulations
cfs	cubic feet per second
cm	centimeter
COC	Chemical (or Contaminant) of Concern
CPOI	Chemical Parameter of Interest
CSF	Carcinogenic Slope Factor
CT	Central Tendency
CWA	Clean Water Act
cy	cubic yard
DO	Dissolved Oxygen
ECL	Environmental Conservation Law
EE/CA	Engineering Evaluation/Cost Analysis
EPA	U.S. Environmental Protection Agency
ER-L	Effects Range-Low
ER-M	Effects Range-Median
FS	Feasibility Study
ft	feet/foot
GAC	Granular Activated Carbon
gal/min	gallons per minute
GM	General Motors
HEC-RAS	Hydrologic Engineering Centers River Analysis System
HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
IFG	Inland Fisher Guide (GM Subsite)
IRM	Interim Remedial Measure
kg	kilogram
km	kilometer

LCP	Linden Chemicals and Plastics
LEL	Lowest Effect Level
LOAEL	Lowest Observed Adverse Effect Level
m	meter
Metro	Metropolitan Syracuse Sewage Treatment Plant
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mi	mile
MNR	Monitored Natural Recovery
NAPL	Non-Aqueous-Phase Liquid
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
ng/L	nanograms per liter
NOAEL	No Observed Adverse Effect Level
NPL	National Priorities List
NYCRR	New York Code of Rules and Regulations
NYNHP	New York Natural Heritage Program
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
O&M	Operation and Maintenance
OU1/OU2	Operable Unit 1/Operable Unit 2
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PCDD/PCDF	Polychlorinated Dibenzo-p-Dioxin/Polychlorinated Dibenzofuran
PDI	Pre-Design Investigation
PRP	Potentially Responsible Party
PSA	Preliminary Site Assessment
RAO	Remedial Action Objective
RfD	Reference Dose
RG	Remediation Goal
RI	Remedial Investigation
RME	Reasonable Maximum Exposure
ROD	Record of Decision
SCA	Sediment Consolidation Area
SCO	Soil Cleanup Objective
SEC	Sediment Effect Concentration
SEL	Severe Effect Level
SQS	Sediment Quality Standard
SOC	Stressor of Concern
SSLC	Species Screening Level Concentration
SVOC	Semi-volatile Organic Compound
SWAC	Surface-Weighted Average Concentration
SYW	Syracuse West (from U.S. Geological Survey quadrant sheet; used to identify New York State wetlands)

TBC	to-be-considered
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
TSS	Total Suspended Solids
µg/kg	micrograms per kilogram
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	Volatile Organic Compound
ww	wet weight
YOY	Young-of-Year

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SITE NAME, LOCATION, AND DESCRIPTION

On June 23, 1989, the Onondaga Lake site was added to the New York State Registry of Inactive Hazardous Waste disposal sites. On December 16, 1994, Onondaga Lake and its tributaries and the upland hazardous waste sites which have contributed or are contributing contamination to the lake (sub-sites) were added to EPA's NPL. This NPL listing means that the lake system is among the nation's highest priorities for remedial evaluation and response under the federal Superfund law for sites where there have been a release of hazardous substances, pollutants, or contaminants.

Geddes Brook and Ninemile Creek are located southwest of Onondaga Lake (Figure 1). Ninemile Creek, a Class C stream below the former Honeywell water intake and a class C and trout stream upstream, originates at Otisco Lake and flows approximately 16 mi (26 km) northeast to its mouth at Onondaga Lake. Ninemile Creek receives surface inflow from Beaver Meadow Brook and Geddes Brook at approximately 2.8 mi (4.5 km) and 1.3 mi (2.1 km), respectively, upstream from Onondaga Lake (Figure 2). Between Amboy Dam and Onondaga Lake, Ninemile Creek flows adjacent to Solvay Wastebeds 1 through 8, 9 through 11, and 12 through 15. During the time that Honeywell utilized the Solvay process for the production of soda ash (1881 to 1986), wastes from this process were disposed of in numerous wastebeds along the lake and Ninemile Creek. Wastebeds 1 through 8 were used until 1944 and Wastebeds 9 through 15 were used from 1944 until 1986. Upstream of the dam, Ninemile Creek flows through woodlands, farmlands, and some light industrial/commercial areas. Ground surface elevations range from approximately 400 ft (122 m) above mean sea level (AMSL) at the most upstream section of Ninemile Creek addressed in this study, to approximately 363 ft (111 m) AMSL where the stream enters Onondaga Lake.

The Geddes Brook/Ninemile Creek site is defined as the channel sediments, floodplain soils/sediments, and surface water of Geddes Brook and Ninemile Creek that have been impacted or have the potential to be impacted by the disposal of hazardous and industrial wastes by Honeywell. This definition was based on the understanding at the time of the remedial investigation and feasibility study (RI/FS) work plan (1998) that contaminants from Honeywell sites (*e.g.*, LCP Bridge Street, Solvay Wastebeds) were discharged (directly or indirectly) to Geddes Brook and Ninemile Creek, where they settled into the stream beds, banks, and floodplains.

This ROD focuses only on the Operable Unit (OU) 2 portion of the Geddes Brook/Ninemile Creek site (lower Ninemile Creek channel sediments, surface water, and floodplain soils and sediments).

The stretch of Ninemile Creek downstream of the area just above the confluence with Geddes Brook has been designated as "lower Ninemile Creek," which has been further subdivided into three reaches (AB, BC, and CD). Major physical features within and near the Site, the approximate limits of the respective operable units, and the approximate limits of lower Ninemile Creek Reaches AB, BC, and CD are shown in the aerial photograph presented in Figure 2 and in Figure 3.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

Honeywell Facilities and Disposal Areas Near Geddes Brook/Ninemile Creek

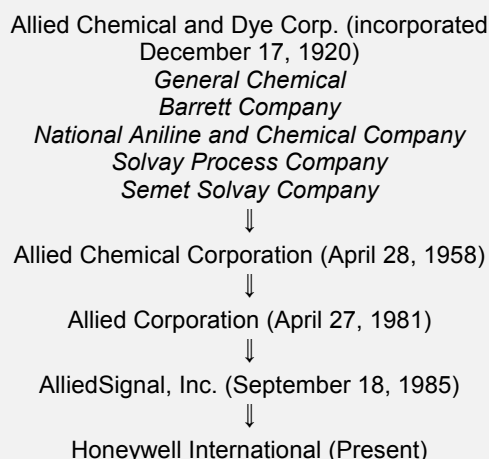
This section summarizes the industrial pollution of Geddes Brook/Ninemile Creek and key historical information regarding Honeywell International and its predecessor companies' manufacturing

operations (e.g., Allied Chemical Corporation), and is based on the RI/FS reports. For clarity, and as stated in the text box entitled "What is a Potentially Responsible Party" (page 2), "Honeywell" is used throughout this ROD to refer to Honeywell International, Inc. and its predecessor companies. Honeywell has been named a PRP as a major contributor of contamination to this Site and Onondaga Lake. Honeywell consented to investigate this Site and the lake pursuant to the terms of a Consent Decree 89-CV-815 (U.S. District Court, Northern District of New York) ("Consent Decree").

The availability of natural deposits of salt and limestone in greater Onondaga County was the primary reason for locating the Solvay Process Company in Solvay, New York. Founded in 1881, the company initially used brine collected locally, but, in 1889, it started utilizing the salt formations in the Tully Valley about 20 mi (33 km) away. The Solvay Process Company used the ammonia soda process (subsequently known as the Solvay Process) to produce soda ash, a product used to manufacture neutralizing agents, detergent, industrial chemicals, and glass. Honeywell subsequently expanded its operation to three locations – the Main Plant, the Willis Avenue plant, and the Bridge Street plant – which were collectively known as the Syracuse Works. The locations of these and other sites discussed in the RI report are shown in Figure 5. These processes resulted in releases of mercury as well as organic contamination and Solvay Waste (see the text boxes entitled "What is Mercury?"

What is a "Potentially Responsible Party?"

A potentially responsible party (PRP) is an entity that is potentially responsible for the contamination, and therefore the cleanup, of a contaminated site. In the case of the Geddes Brook/Ninemile Creek site, Honeywell International has been named as a (PRP) as a major contributor of contamination to the lake. Honeywell agreed to investigate contamination at this Site pursuant to the terms of a Consent Decree. Honeywell International, Inc., and its predecessor companies, operated manufacturing facilities in Solvay, New York, from 1881 until 1986. When Honeywell merged (December 1, 1999) with its predecessor companies (shown below), it became liable for the contamination those companies introduced into the environment. "Honeywell" represents Honeywell International, as well as its predecessor companies which include:



[page 3] and "What are Organic Contaminants in the Geddes Brook/Ninemile Creek Site?" [page 5]).

The Main Plant at the Syracuse Works manufactured soda ash and related products from 1884 to 1986 and benzene, toluene, xylenes, and naphthalene from 1917 to 1970. The Willis Avenue plant manufactured chlorinated benzenes and chlor-alkali products from 1918 to 1977. Chlor-alkali production by the diaphragm cell process was in operation at the Willis Avenue plant from 1918 until 1977. The mercury cell process was used at the Willis Avenue plant for chlor-alkali production

What is Mercury?

One of the main contaminants at the Geddes Brook/Ninemile Creek site is mercury. Honeywell used mercury in the production of chlorine and caustic soda at the mercury-cell chlor-alkali plants.

Most of the mercury in water, sediments, plants, and animals is in the form of inorganic mercury salts and organic forms of mercury (e.g., methylmercury). Methylation of mercury is a key step in the entrance of mercury into food chains. The biotransformation of inorganic mercury to methylated organic forms in water bodies can occur in the sediments and the water column.

Mercury accumulates in the food chain up to the top of the aquatic food web. Nearly all of the mercury that accumulates in fish tissue is methylmercury. Inorganic mercury, which is less efficiently absorbed and more readily eliminated from the body than methylmercury, does not tend to bioaccumulate. Accordingly, mercury exposure and accumulation is of particular concern for animals at the highest trophic levels in aquatic food webs and for animals and humans that feed on these organisms.

Mercury is a known human and ecological toxicant. Methylmercury-induced neurotoxicity is the effect of greatest concern when exposure occurs to the developing fetus. Dietary methylmercury is almost completely absorbed into the blood and distributed to all tissues including the brain; it also readily passes through the placenta to the fetus and fetal brain. Neurotoxic effects include subtle decrements in motor skills and sensory ability at comparatively low doses to tremors, inability to walk, convulsions, and death at extremely high exposures. Other adverse effects of mercury include reduced reproductive success, impaired growth and development, and behavioral abnormalities.

Mercury is known to adversely affect aquatic organisms through inhibition of reproduction, reduction in growth rate, increased frequency of tissue histopathology, impairment in ability to capture prey and olfactory receptor function, alterations in blood chemistry and enzyme activities, disruption of thyroid function, chloride secretion, and other metabolic and biochemical functions. In general, the accumulation of mercury by aquatic biota is rapid and depuration is slow. It is emphasized that organomercury compounds, especially methylmercury, are significantly more effective than inorganic mercury compounds in producing adverse effects and accumulation.

from approximately 1947 (or possibly earlier) until 1977. Starting in 1953, the Bridge Street plant produced chlor-alkali products, as well as hydrogen peroxide, using the mercury cell electrolytic process. Diaphragm cells were added to the Bridge Street operation in 1968. The plant was sold to LCP of New York in 1979 and operated until 1988.

Pursuant to the 1992 Consent Decree noted above, Honeywell commenced an RI/FS associated with the Geddes Brook/Ninemile Creek site. This culminated in the completion of an RI report by NYSDEC in July 2003 (TAMS/Earth Tech, 2003a,b,c). After the completion of a draft FS report (Parsons, 2005), it was determined that additional investigation was necessary. Additional investigative work was conducted by Honeywell in 2007 and 2008 and a Supplemental FS report for OU1 (Parsons, 2008a) was completed in November 2008 and a Supplemental FS report for OU2 (Parsons, 2009) was completed in May 2009.

LCP Bridge Street Subsite

The LCP Bridge Street subsite, which includes the West Flume, was a source of mercury and other contaminants to Geddes Brook. Geddes Brook receives discharges from the West Flume, a drainage ditch that passes through the LCP Bridge Street facility. The remediation of the LCP Bridge Street subsite included the removal of contaminated sediments from the West Flume.

The LCP Bridge Street subsite consists of 20 acres (8 hectare) of land used for various industrial activities (including a chlor-alkali production facility that operated from 1953 to 1988). The wastes from the LCP Bridge Street plant were discharged into the West Flume. A ROD was issued in September 2000 to address the LCP Bridge Street subsite. The buildings at the subsite were demolished as part of two IRMs. The LCP Bridge Street subsite remediation was substantially completed in 2007 (described below in the section entitled "Scope and Role of Response Action"). This effort included the construction of a temporary cap which will be replaced with a final cap following the placement of material from the remediation of Geddes Brook and possibly Ninemile Creek.

What are Organic Contaminants in the Geddes Brook/Ninemile Creek Site?

Honeywell released the major organic contaminants found at the Geddes Brook/Ninemile Creek site from its Syracuse facilities. Releases of hexachlorobenzene, phenol, and polycyclic aromatic hydrocarbons (PAHs) began at least as early as 1918, and polychlorinated biphenyls (PCBs) and mercury were used in the 1940s and possibly even the late 1930s. (Mercury is an inorganic contaminant and is discussed in the text box entitled "What is Mercury?") Although the Willis Avenue and Main Plant sites are not located in the Geddes Brook/Ninemile Creek watershed, wastes from these facilities were disposed of in the wastebeds within the Geddes Brook/Ninemile Creek watershed. Wastewater from the Main Plant was discharged to the West Flume, which runs through the LCP Bridge Street subsite and discharges to Geddes Brook.

Hexachlorobenzene: Hexachlorobenzene is a hazardous substance that is part of the chlorinated benzenes group. Chlorinated benzenes were produced by Honeywell's Willis Avenue Plant, which was in operation from 1918 until 1977. Hexachlorobenzene was widely used as a pesticide and fungicide for onions and wheat and other grains until 1965, and it was also used in the manufacture of fireworks, ammunition, electrodes, dye, and synthetic rubber, and as a wood preservative. Hexachlorobenzene is resistant to chemical and biological degradation and tends to accumulate in the fat-containing tissues of animals and humans. Studies in animals show that chronic ingestion of hexachlorobenzene can damage the liver, thyroid, nervous system, bones, kidneys, blood, and immune and endocrine systems. Chlorinated benzenes such as hexachlorobenzene can bioaccumulate in humans and cause adverse health effects, and maternal chronic exposure has led to teratogenic effects including cleft palate, changes in rib development, and kidney malformation.

Phenol: Phenol is a manufactured substance found in a number of consumer products. A side product of the BTEX process at Honeywell, phenol was also produced as a saleable product during the 1940s. Phenol is generally not persistent in the environment, but large or repeated releases can remain in the air, water, and soil for long periods of time. Phenol is highly toxic to fish, frogs, and other aquatic organisms. With respect to animals, effects reported in short-term studies include neurotoxicity, liver and kidney damage, respiratory effects, and growth retardation. Human exposure to high levels of phenol has resulted in liver damage, diarrhea, dark urine, and hemolytic anemia.

Polycyclic Aromatic Hydrocarbons: PAHs is the general term applied to a group of compounds, including naphthalene, comprised of several hundred organic substances with two or more benzene rings. They are released to the environment mainly as a result of incomplete combustion of organic matter and are major constituents of petroleum and its derivatives. Naphthalene and other PAHs were produced by Honeywell in conjunction with the benzene, toluene, and xylenes product line and other industrial activities. PAHs, in particular naphthalene, were also part of Honeywell's waste streams, were released to the environment by Honeywell, and are hazardous substances. Exposure to PAHs may result in a wide range of effects on biological organisms. While some PAHs are known to be carcinogenic, others display little or no carcinogenic, mutagenic, or teratogenic activity. Several PAHs exhibit low levels of toxicity to terrestrial life forms, yet are highly toxic to aquatic organisms.

Polychlorinated Biphenyls: PCBs are mixtures of up to 209 different compounds (referred to as "congeners") that include a biphenyl and from one to 10 chlorine atoms. They have been used commercially since 1930 as dielectric and heat-exchange fluids and in a variety of other applications. PCBs have been used at and released to the environment from the Honeywell facilities. They are persistent and accumulate in food webs. PCBs bioaccumulate in the fatty tissues of humans and other animals. PCBs are considered probable human carcinogens and are linked to other adverse health effects such as developmental effects, reduced birth weights, and reduced ability to fight infection.

Polychlorinated dibenzo-*p*-dioxins/polychlorinated dibenzofurans: PCDD/PCDFs are composed of a triple-ring structure consisting of two benzene rings connected to each other by either two (dioxins) or one (furans) oxygen atoms. Dioxins and furans are byproducts of chemical manufacturing or the result of incomplete combustion of materials containing chlorine atoms and organic compounds. Based on evidence collected by Honeywell from their sites, PCDD/PCDFs were apparently generated as the result of a fire in the chlorination building at the Willis Avenue Plant in the 1930s and as trace contaminants during the various manufacturing operations and thus were released into the environment. PCDD/PCDFs tend to be very insoluble in water; adsorb strongly onto soils, sediments, and airborne particulates; and bioaccumulate in biological tissues. These substances have been associated with a wide variety of toxic effects in animals, including acute toxicity, enzyme activation, tissue damage, developmental abnormalities, and cancer.

Solvay Wastebeds

The primary method of waste disposal at the Syracuse Works was to pump wastes to wastebeds located along the lake shore and along Ninemile Creek. The wastes, which were primarily made up of Solvay waste from the manufacturing of soda ash, were pumped in a slurry of about 5 percent solids. These solids settled out in the beds, and the remaining wastewater overflowed into the lake or Ninemile Creek. Wastebeds 1 through 15 are located along Ninemile Creek (see Figure 5) and were utilized as follows:

- From the 1920s to 1944, Wastebeds 1 through 8 were used to dispose of Honeywell's wastes. The mouth of Ninemile Creek was re-routed to allow for the construction of these wastebeds. The ownership of Wastebeds 1 through 8 was subsequently transferred by Allied to New York State and Onondaga County. Groundwater from Wastebeds 1 through 8 discharges predominantly into Onondaga Lake.
- From 1944 to 1986, wastes were disposed of in Wastebeds 9 through 11 and 12 through 15. Ninemile Creek was re-routed to allow for the construction of these wastebeds. Groundwater, leachate seeps, and surface water from Wastebeds 9 through 15 discharge to Ninemile Creek and serves as a migration pathway for wastebed constituents.
- Other uses were as landfills for slag and wastewater treatment sludges from the Crucible Materials Corporation (a portion of Wastebed 5); for Metropolitan Syracuse Sewage Treatment Plant (Metro) sewage sludge disposal (portions of Wastebeds 5 and 12 through 15); and as sites for construction of parking lots for the New York State Fairgrounds (portions of Wastebeds 5, 7, and 8). In addition, I-690 and Route 695 were constructed over portions of Wastebeds 7 and 8.

Honeywell is currently performing an RI/FS for Wastebeds 1 through 8 under the direction of NYSDEC. Closure of Wastebeds 9 through 15 is currently being evaluated by NYSDEC's Solid Waste Program. The sources and potential sources of contaminants influencing the Site, including these wastebeds, are discussed in more detail below in the section entitled "Results of the Remedial Investigation."

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI, FS and OU2 Supplemental FS reports describe the nature and extent of the contamination at and emanating from the Site and evaluate remedial alternatives to address this contamination. The May 2009 Proposed Plan identified NYSDEC's and EPA's preferred remedy and the basis for that preference. These documents were made available to the public in both the Administrative Record and information repositories maintained at the NYSDEC Region 7 Office, 615 Erie Boulevard West, Syracuse, New York; NYSDEC Central Office, 625 Broadway, Albany, New York; Onondaga County Public Library Syracuse Branch at the Galleries, 447 South Salina Street, Syracuse, New York; and Atlantic States Legal Foundation, 658 West Onondaga Street, Syracuse, New York.

A notice of the commencement of the public comment period related to the preferred remedy, the public meeting date, contact information, and the availability of the above-referenced documents was published in the *Syracuse Post-Standard* on May 19, 2009. The public comment period

opened on May 19, 2009. NYSDEC held a formal public meeting on June 11, 2009 at the Martha Eddy Room in the Art and Home Center of the New York State Fairgrounds to present the findings of the RI, FS, and OU2 Supplemental FS reports and Proposed Plan and to answer questions from the public about the Site and the remedial alternatives under consideration. Approximately 40 people, including residents, environmental groups, and local business people attended the public meeting. The public comment period was closed on July 3, 2009.

The Proposed Plan called for the disposal of the contaminated sediments and soils removed from the creek and floodplains at the LCP Bridge Street subsite containment system, which was constructed (and is being monitored) pursuant to the requirements of a September 2000 ROD or the Sediment Consolidation Area (SCA) that will be constructed at Wastebed 13 as part of the Onondaga Lake Bottom subsite remedy pursuant to the requirements of a July 2005 ROD. A decision as to the specific disposal location will be made during the design phase. This decision will consider various factors, including the design and construction schedules for the Ninemile Creek OU2 remedy, as well as the design and construction schedules for the SCA, so that the remediation of Ninemile Creek is not delayed.

Responses to the written comments received during the public comment period and to comments received at the public meeting are included in the Responsiveness Summary portion of this ROD (see Appendix V).

The draft Proposed Plan was provided to the Onondaga Nation for comment with an offer to meet in order to discuss such comments. The Onondaga Nation provided written comments during the public comment period, responses to which are included in the attached Responsiveness Summary.

SCOPE AND ROLE OF OPERABLE UNITS

Operable Units within the Geddes Brook/Ninemile Creek Site

Since many Superfund sites are complex and have multiple contamination problems and/or areas, they are often divided into several operable units for the purpose of managing the Site-wide response actions. Section 300.5 of the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300 (NCP) defines an operable unit as “a discrete action that comprises an incremental step toward comprehensively addressing site problems. This discrete portion of a remedial response manages migration, or eliminates or mitigates a release, threat of a release, or pathway of exposure. The cleanup of a site can be divided into a number of operable units, depending on the complexity of the problems associated with the Site. Operable units may address geographical portions of a site, specific site problems, or initial phases of an action, or may consist of any set of actions performed over time or any actions that are concurrent but located in different parts of a site.”

NYSDEC and EPA have, to date, organized the work for the Onondaga Lake NPL site into eight subsites. These subsites are also considered by EPA to be OUs of the NPL site. The Geddes Brook/Ninemile Creek site is an OU of the Onondaga Lake Bottom subsite.

The stretch of Ninemile Creek downstream of the area just above the confluence with Geddes Brook has been designated as “lower Ninemile Creek,” which has been subdivided into three reaches (AB, BC, and CD). Major physical features within and near the Geddes Brook/Ninemile Creek site, the approximate limits of the respective operable units, and the approximate limits of

lower Ninemile Creek Reaches AB, BC, and CD are shown in the aerial photograph presented as Figure 2 and in Figure 3, respectively.

OU1 of the Geddes Brook/Ninemile Creek site includes the channel sediments, surface water, and floodplain soils/sediments of lower Geddes Brook downstream from the discharge point of the West Flume, which is part of Honeywell's LCP Bridge Street subsite, and lower Ninemile Creek from approximately 600 ft (180 m) upstream of the discharge point of Geddes Brook to just downstream of the I-690 overpass near the Wastebeds 1 through 8 site. A ROD for OU1 was issued on April 29, 2009. The remedy for OU1 will result in clean sediment/soil existing at the surface in Reaches BC and CD of lower Ninemile Creek (including both channel sediment and floodplain soil/sediment). Specifically, the remedy consists of the dredging/excavation and removal of an estimated 59,000 cy (45,000 m³) of contaminated channel sediments and floodplain soils/sediments over approximately 15 acres (6 hectares). For the remainder of OU1, approximately 67,000 cy (51,000 m³) of contaminated sediments and floodplain soils/sediments will be removed over approximately 16 acres (6.5 hectares) from lower Geddes Brook under an Interim Remedial Measure (IRM) ⁶. A Response Action Document was issued by NYSDEC and EPA on April 29, 2009. That document selected the LCP Bridge Street subsite containment system as the disposal location for contaminated channel sediment and floodplain soil/sediment that will be removed under the IRM.

When the OU1 remedy's removal of approximately 535 pounds (242 kg) of mercury mass from the channel and floodplain of Ninemile Creek Reaches BC and CD is combined with the IRM's removal of approximately 1,000 pounds (450 kg) of mercury mass from lower Geddes Brook channel and floodplain, it is estimated that greater than 90 percent of the total mercury mass within OU1 will be removed. Residual mercury contamination will be isolated beneath a clean habitat layer underlain by an engineered cap in the Ninemile Creek Reach BC channel and, if needed, Reach CD channel and beneath a clean habitat layer in the floodplain of these reaches.

OU2 includes the channel sediments, surface water, and floodplain soils/sediments of the section of lower Ninemile Creek from the downstream end of OU1 to Onondaga Lake. This section of lower Ninemile Creek (Reach AB) flows adjacent to the western edge of the Wastebeds 1 through 8 site (see Figures 2 and 3). A source of groundwater contamination containing elevated levels of benzene, toluene, ethylbenzene, and xylenes has been located on the Wastebeds 1 through 8 site below (beneath) the Solvay waste. Based on these conditions and the ongoing RI/FS for the Wastebeds 1 through 8 site, the remediation of groundwater and surficial soils/waste will be evaluated for the Wastebeds 1 through 8 site in a separate remedial decision.

Pursuant to an RI/FS work plan for Wastebeds 1 through 8 (O'Brien & Gere, 2006), and based on an ongoing RI, Honeywell has initiated a focused FS study to evaluate remedial alternatives for Wastebeds 1 through 8. The Geddes Brook/Ninemile Creek OU2 Supplemental FS (Parsons, 2009), Geddes Brook/Ninemile Creek OU2 Proposed Plan and this ROD have been prepared with the understanding that any remedial measures, if required for Wastebeds 1 through 8, would not require significant modification to the Ninemile Creek OU2 site channel or floodplain, and, therefore, would not significantly impact remedy selection for Ninemile Creek OU2. However, any active remedial measures along the western edge of the Wastebeds 1 through 8 site, which may

⁶ An IRM is a discrete set of planned actions for both emergency and non-emergency situations that provide a quick solution to a defined problem, and is designed to be a permanent part of the final remedy.

be needed to address contamination from and/or erosion of the Wastebeds 1 through 8 site, would be coordinated with the remediation of Reach AB of lower Ninemile Creek.

As discussed below in the “Summary of Site Risks” section of this ROD, the human health risk assessment (HHRA) and baseline ecological risk assessment (BERA) for the Site indicated unacceptable risks associated with the Site for human and ecological receptors. Although both risk assessments were conducted for the Geddes Brook/Ninemile Creek site as a whole, the exposure assessments utilized varying subareas of the Geddes Brook/Ninemile Creek site, depending on the route of exposure and the receptor being assessed. The HHRA and BERA are applicable to both Geddes Brook/Ninemile Creek OUs 1 and 2 because the separation of the Geddes Brook/Ninemile Creek site into operable units, which was done after the completion of the Geddes Brook/Ninemile Creek RI and risk assessments, are based on similar cleanup strategies and criteria for the protection of human health and the environment.

Status of Other Onondaga Lake NPL Site Operable Units

The primary objective of this response action is to address the risks to human health and the environment due to mercury and other chemical parameters of interest (CPOIs) in the contaminated channel sediments, surface water, and floodplain soils/sediments within Reach AB of lower Ninemile Creek.

NYSDEC and EPA have to date identified eight subsites, as shown in Figure 9, which comprise the Onondaga Lake NPL site. These subsites are also considered to be operable units of the NPL site by EPA and actions at these subsites have and will need to meet all CERCLA requirements. The Site is an operable unit of the Onondaga Lake Bottom subsite. The status of the subsites is discussed below.

Onondaga Lake Bottom Subsite

In July 2005, NYSDEC and EPA issued a ROD for the Onondaga Lake Bottom subsite of the Onondaga Lake NPL site. The selected remedy includes dredging an estimated 2.65 million cubic yards (2 million cubic meters) of contaminated sediments and isolation capping of an estimated 425 acres (172 hectares) in the littoral zone (water depths ranging from 0 to 30 ft [0 to 9 m]), thin-layer capping of an estimated 154 acres (62 hectares) in the profundal zone (water depths exceeding 30 ft [9 m]), an oxygenation pilot study (of the water near the lake bottom) which will be followed by full-scale oxygenation if supported by the pilot study, and monitored natural recovery (MNR) in the profundal zone. It is anticipated that the most highly contaminated materials would be treated and/or disposed of off-site. The balance of the dredged sediment would be placed in the SCA at Wastebed 13. Wastewater generated by the dredging/sediment handling processes as a result of dewatering of the sediments at the SCA would be treated prior to being discharged back to the lake. An Explanation of Significant Differences which describes a change to a portion of the remedy required by the Lake Bottom Subsite ROD in the southwest portion of the lake was issued by NYSDEC and EPA in December 2006. The change was necessary to ensure the stability of the adjacent causeway and the adjacent area which includes a portion of I-690, and was supported by recent, more extensive sampling of the area which indicates that the pure chemical contamination is significantly less extensive in this area than estimated in the Lake Bottom Subsite ROD. In January 2007, Honeywell entered into a consent decree with the State of New York whereby Honeywell committed to implement the remedy at the Onondaga Lake Bottom subsite. Extensive pre-design investigations (PDI) commenced in September 2005 and are ongoing, along with remedial design activities (Parsons, 2008c). Dredging in the lake is scheduled to begin in May 2012.

LCP Bridge Street Subsite

In September 2000, NYSDEC issued a ROD for the LCP Bridge Street Subsite of the Onondaga Lake NPL site. In March 2002, Honeywell entered into an administrative consent order (Order on Consent by Honeywell International, Inc., D7-0001-00-12 [State of New York: Department of Environmental Conservation]) whereby Honeywell committed to implement the remedy at the LCP Bridge Street subsite. The remediation of the LCP Bridge Street subsite was substantially completed in 2007. Remedial construction included removal of contaminated sediments from the West Flume, on-Site ditches, and wetlands; restoration of wetlands; installation of a low-permeability cutoff wall around the Site; installation of an interim low-permeability cap⁷; and capture of contaminated groundwater inside the cutoff wall. Remediation of the LCP Bridge Street subsite has controlled discharges of mercury and other CPOIs to the West Flume, some of which ultimately migrated to Onondaga Lake through Geddes Brook and Ninemile Creek. Maintenance and monitoring activities are ongoing.

Other Subsites

The Ley Creek PCB Dredgings Subsite ROD was issued in 1997 and remedial construction activities were completed in 2001.

The Semet Residue Ponds Subsite ROD was issued in 2002. Construction activities associated with a portion (lakeshore barrier wall/collection system for the shallow and intermediate zones) of the groundwater remedy component were completed in 2007. Design of the remaining portion (groundwater collection system adjacent to Tributary 5A) is underway. NYSDEC and EPA are evaluating a potential modification to the portion of the remedy that addresses the pond residues.

The Town of Salina Landfill Subsite ROD was issued in 2007 and the design is currently underway. It is anticipated that the design will be completed in 2010.

RI/FSSs are underway for the General Motors Former Inland Fisher Guide, Wastebed B/Harbor Brook, and Willis Avenue subsites. Construction activities associated with the Willis Avenue lakeshore barrier wall/collection system are underway.

SUMMARY OF SITE CHARACTERISTICS

Description of Historic Channel Modifications

Prior to 1926, most of the Geddes Brook and Ninemile Creek watershed was primarily rural and bordered by farms. Since that time, the stream channels have been impacted and modified by commercial and industrial development. These impacts and modifications included discharges from Honeywell (formerly Allied Chemical/AlliedSignal) operations (e.g., the LCP Bridge Street facility) and re-routing of the streams. A brief history of the streams and their modifications is presented by reach below. The original streambed is shown in Figure 4 along with the current channel locations and designation of the reaches used in this ROD.

⁷

A temporary cap was installed. It will be replaced with a final cap following the placement of material from the remediation of Geddes Brook and possibly Ninemile Creek.

Lower Ninemile Creek

For the purpose of the RI/FS for the Geddes Brook/Ninemile Creek site and this ROD, the stretch of Ninemile Creek downstream of the area just above the confluence with Geddes Brook has been designated as “lower Ninemile Creek,” which has been further subdivided into three reaches.

Reach AB

In 1926, the lowest reach of Ninemile Creek (*i.e.*, Reach AB) was re-routed to accommodate Wastebeds 1 through 8. At this time, the outlet to Onondaga Lake was moved to its current location, as shown in Figure 4, about 1,600 ft (500 m) west of its original location.

In the late 1960s, sediments in Onondaga Lake near the mouth of Ninemile Creek were dredged to remove a portion of a delta that had built up over the years. Based on sediment probing in Ninemile Creek adjacent to Wastebeds 1 through 8, it is likely that the dredging continued up Ninemile Creek as far as just downstream of the second major bend in the stream (*i.e.*, nearly the entire length of Reach AB). The dredging at the delta of Ninemile Creek was part of a larger project along the northwest shore of the lake to fill the marshland to establish parkland and to ease the flow of water from Ninemile Creek to Onondaga Lake. These dredge spoil areas, located west of Wetland SYW-10 and the Reach AB portion of the Site, underwent a preliminary investigation in 2000 during the Onondaga Lake RI (TAMS/Earth Tech, 2002) and a preliminary Site assessment (PSA) was conducted by Honeywell under a consent order with NYSDEC.

Reach BC

Between approximately 1940 and 1951, Reach BC, south of State Fair Boulevard, appears to have been straightened or re-channelized. This portion of lower Ninemile Creek consisted of two channels – a western channel located very close to the foot of Wastebed 9 and an eastern channel.

The downstream section of Reach BC was slightly relocated in 1954 during the construction of I-690. The area from approximately 50 ft (15 m) north of the northbound lane to about 100 ft (30 m) south of the southbound lane of I-690 was straightened and the banks were relocated approximately 6 to 10 ft (2 to 3 m) either east or west in several locations.

In the late 1960s, Reach BC of Ninemile Creek was excavated and/or re-routed to accommodate the construction of State Highway Route 695. The new (current) channel was located approximately 100 ft (30 m) west of the former eastern channel. The western channel (*i.e.*, the channel nearest Wastebeds 9 through 11) was eliminated.

Reach CD

In contrast to Reaches AB and BC, Reach CD of lower Ninemile Creek has remained essentially unaltered since at least the 1930s (*e.g.*, two channels remain separated by islands).

Upper Ninemile Creek

Upper Ninemile Creek includes the area of the stream just upstream of its confluence with Geddes Brook to Amboy Dam. Around 1944, a portion of upper Ninemile Creek was re-routed to accommodate the construction of Wastebeds 9 through 11.

Upper and Lower Geddes Brook

The upper Geddes Brook portion of the Geddes Brook/Ninemile Creek site extends from the confluence with the West Flume to a point approximately 2,500 ft (760 m) upstream of Gerelock Road. Part of Geddes Brook experienced re-routing to accommodate the construction of Route 695 in the late 1960s. The first 200 ft (60 m) of Geddes Brook above the confluence of the West Flume was re-routed approximately 200 ft (60 m) east to its current location some time between 1967 and 1978 during the construction of Route 695. At some time in the past, lower Geddes Brook (reach downstream of the West Flume) was likely artificially modified, given the straight and deeply-cut channel. Although no record of this original channelization is available, it is believed that this stretch was dredged between 1959 and 1966, resulting in the mounds of dredge spoils alongside the lower portion of the brook.

Site Geology/Hydrogeology

Most of the Onondaga Lake drainage basin, including Geddes Brook and Ninemile Creek, is located in the Limestone Belt of central New York State. Exposed surfaces in some areas of the Limestone Belt consist of glacial till and lacustrine deposits, and in other areas they consist of outcrops of limestone (particularly Onondaga Limestone) and alkaline shales. Because of this geologic influence, concentrations of calcium, magnesium, bicarbonate, and alkalinity are higher in streams and lakes influenced by the Limestone Belt than in those influenced by the Northern Allegheny Plateau to the south and the Ontario-Oneida-Champlain Lake Plain to the north.

The bedrock geology beneath the Site consists of 500 to 600 ft (150 to 180 m) of sedimentary rocks of the Vernon Shale formation. The Vernon Shale consists of soft and erodible mudstones with some localized, discontinuous gypsum seams. In the upper reaches of Geddes Brook, the Upper Silurian Syracuse Formation overlays the older Vernon Formation. The Syracuse formation is approximately 600 ft (180 m) thick and consists of shales, dolostones, and salt.

The sedimentary geology at the Site is primarily a result of glaciation that deposited a thin layer of glacial till over the bedrock surface. The glacial till consists of a poorly sorted mixture of clays, silts, sands, and boulders. The glacial till is generally 10 to 15 ft (3 to 5 m) thick and is overlain by glaciolacustrine deposits. The glaciolacustrine deposits were formed in lake waters which were formed from glacial meltwater several thousand years ago, and consist of marl, clays, silts, and sands with gravels present at increasing depth.

Regional groundwater flow in the area is from south to north. In the vicinity of the Site, groundwater flow occurs both in the bedrock and unconsolidated Ninemile Creek valley fill deposits, with movement between the two strata. The unconsolidated valley fill deposits are generally heterogeneous, with a relatively less permeable layer close to the ground surface. As described in detail below, groundwater recharge to the subsurface occurs primarily along the Ninemile Creek valley walls. However, in the lower reaches of the valley near Onondaga Lake, the deeper bedrock flow system discharges into the overlying material in the center of the valley. Discharge from the bedrock flow system is limited to areas with little overlying glacial till.

Bedrock underlying the Ninemile Creek area consists of Vernon Shale, which underlies most of the valley fill in the study area. The formation produces water fairly consistently, with yields ranging from one to 450 gallons per minute (gal/min) with a median of 12 gal/min. Water flow in this formation is largely through voids and channels created by groundwater that has dissolved various salts commonly found in this formation.

Groundwater flow tends to follow the elevation of the ground surface in the Ninemile Creek valley fill deposits. Two distinct groundwater flow systems in the valley fill deposits (*i.e.*, shallow and deep) have been identified. Groundwater migration in the shallow flow system is generally towards the stream, however, in the vicinity of the wastebeds, the groundwater is mounded (higher in elevation). The mounding is attributed to the height and the relatively low permeability of the wastebed materials, and causes groundwater to flow away from the wastebeds in all directions. Groundwater migration in the deeper flow system heads northeast, which is more consistent with the orientation of the valley.

Concentrations of total dissolved solids (TDS) in Ninemile Creek above Amboy Dam (*i.e.*, above the area of influence of the wastebeds and former Honeywell operations) range from 720 to 809 milligrams per liter (mg/L), and exceed the state surface water quality standard of 500 mg/L for a Class C water body. As discussed in the RI report, discharge from Wastebeds 9 through 11 is evident in Ninemile Creek by the increase of ionic loading downstream of the wastebeds. Between Station NM3 (located near the upstream limit of Wastebed 11) and Station NM4 (located near Wastebeds 9 and 10), TDS increased from 1,430 to 2,810 mg/L, total chloride increased from 288 to 674 mg/L, and calcium increased from 216 to 354 mg/L in samples from July 1998. Wastebeds 1 through 8 are located along Onondaga Lake southeast of the mouth of Ninemile Creek, with only Wastebed 5 directly bordering Ninemile Creek. Compared to Wastebeds 9 through 15, Wastebeds 1 through 8 are considered a minor source of groundwater to Ninemile Creek, based on relatively small increases in TDS in this section of the stream from upstream to downstream.

Groundwater in the vicinity of the Site is designated as Class GA groundwater under 6 NYCRR Part 701.15. However, groundwater is not and has not been used for potable water supply purposes. High concentrations of chloride and TDS in the surface aquifer preclude its use as potable water.

Surface Water Hydrology

Geddes Brook and Ninemile Creek are the major surface water features at the Geddes Brook/Ninemile Creek site and also serve as major drainage features in the region. Ninemile Creek empties into Onondaga Lake north of the New York State Fairgrounds. Geddes Brook is the largest tributary to Ninemile Creek. Beaver Meadow Brook is a minor tributary that joins Ninemile Creek across from Wastebed 13. The West Flume which flows through the LCP Bridge Street subsite, and an unnamed tributary which carries drainage from Wastebeds 12 through 15, are minor contributors of flow to Geddes Brook. These three minor tributaries (Beaver Meadow Brook, West Flume, and the unnamed tributary) are not part of the Site.

The State of New York has classified the lower reaches of Geddes Brook, Beaver Meadow Brook, and Ninemile Creek from Otisco Lake (where it originates) to Onondaga Lake as Class C water. According to 6 NYCRR Part 701.8, the best usage of Class C waters is "fishing. These waters shall be suitable for fish propagation and survival. The water quality shall be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes."

The designation of C(T) standards apply to Geddes Brook, upstream of the Old Erie Canal, and Ninemile Creek, upstream of the former Honeywell water intake location (0.6 mi [1 km] upstream of Airport Road). This designation indicates that, in addition to Class C uses, these waters are trout waters and that the dissolved oxygen (DO) specification for trout waters apply (6 NYCRR Part 895). Streams and small water bodies located in the course of a stream that have the classification or standard designation of C(T) or higher (*i.e.*, C[TS], B, or A) are collectively referred to as "protected streams," and are subject to the disturbance of protected streams provisions of the Protection of Waters regulations (6 NYCRR Part 608.2).

Flow rates in Ninemile Creek range from 50 cubic feet per second (cfs) to over 1,000 cfs, with an annual mean stream flow of 154 cfs for the years 1980 to 2000. Flow rates increase dramatically during storm events. The U.S. Geological Survey (USGS) gauges that collect daily flow data are located on Ninemile Creek upstream of the Site in the town of Camillus and within the Reach BC portion of the Site at Lakeland, approximately 2,500 ft (760 m) upstream of the mouth of the stream. Honeywell collects quarterly flow data from lower Geddes Brook.

Annual mean stream flow in Ninemile Creek dropped from 264 cfs in the 1970s to 154 cfs from 1980 to 2000. This drop in flow coincided with the diversion of former Honeywell discharges to other receiving waters, and then closure of their facilities. The total suspended solids (TSS) load has also decreased by approximately 30 percent since the closure of former Honeywell operations. These reductions in flow and sediment load have contributed to changes in the hydraulic regime and may have affected patterns of deposition and erosion.

The maximum areal extent of surface water at the Site was estimated in the FS by the use of the U.S. Army Corps of Engineers (USACE) Hydrologic Engineering Centers River Analysis System (HEC-RAS) flood model Version 3.1 and updated in the OU1 and OU2 Supplemental FS reports (see text box entitled “Flood Flow Model” on page 53).

The modeled floodplain footprints for flood events of various sizes as well as the approximate boundaries of OU1 and OU2 are shown in Figure 3. The footprint of the 50-year floodplain (*i.e.*, from a storm event which has a 2 percent chance of occurring in any given year), determined through the modeling effort, is comparable to the extent of the historical high water mark from 1972. As discussed in the RI report, the 1972 flood caused by Hurricane Agnes was the largest historically recorded flood event in central New York. The limits of that estimated flood event at the Site are generally well constrained by rapid changes in elevation of the land surrounding the stream (breaks in grade), which generally coincide with the limits of areas warranting remediation.

The floodplain portion of OU2 contains wetland SYW-10, which is directly connected to the lower reach of Ninemile Creek (see Figure 2). Wetland SYW-10 is a 27.2-acre (11-hectare) Class I wetland⁸. This wetland is divided by I-690. On the lake side of I-690, the wetland is dominated by emergent vegetation and floodplain forest. This portion of the wetland, which is part of the OU2 portion of the Site, has been recently delineated using both federal and NY State wetland delineation methodologies. The extent of the field-delineated wetland within the limits of OU2 is shown in Figure 10. The wetland section on the western side of I-690 was historically a salt marsh; however, the saline inputs appear to be gone and the wetland is now dominated by typical emergent vegetation.

Sediment Transport and Characteristics

For the ROD, the stream channel is defined as those areas below the mean high-water level, while the floodplain is defined as those areas above the mean water level to the highest extent of flooding during the period of Honeywell operations, which is constrained by steep banks present along the Site (see discussion above in the “Site Name, Location, and Description” section). Sediment transport is dependent on flow conditions, with the water velocities controlling the

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NYSDEC classifies and regulates wetlands in New York State pursuant to 6 NYCRR Parts 663 and 664. Four classes of wetlands have been established and are ranked according to their ability to perform wetland functions and provide wetland benefits. Class I wetlands provide the most critical functions and benefits, while Class IV wetlands provide fewer functions and benefits.

erosional or depositional character of Ninemile Creek and Geddes Brook. At low (base) flow with low water velocities, the suspended sediment load is limited to small, easily transported particles. At high (flood) flow with high water velocities, additional sediment from the stream bed can be resuspended and transported downstream. Inputs of sediment during high flow, however, come from erosion of the channel bank. When water flows over the stream banks and onto the floodplain, water velocities over the floodplain are slowed by the topography and by the vegetation. This results in depositional floodplain areas that accumulate sediment.

In natural systems, these types of erosion variations cause streams to curve or meander; the meanders are the bends in the river. Meanders are common features of rivers caused by the erosion and deposition of bank materials. The current in a river flows most quickly near the outer edge of a meander and most slowly near the inner edge. Since erosion increases as current speed increases, and deposition increases as current speed drops, rivers erode material on the outside of meanders and deposit sediment on the inside. Typically, over time, the meanders gradually migrate downstream.

However, the lower reaches of Geddes Brook and Ninemile Creek have not been naturally meandering, as they have been artificially and permanently restricted to a large degree by large immobile constructed features. In Reach AB, I-690 restricts movement to the west for most of the reach, and Solvay Wastebeds 1 through 8 restrict movement to the east. There is some opportunity for the stream to meander near its mouth, although even in this section, it would be limited by the deeply entrenched channel and the heavily wooded bank on the west.

Based on observations made during the RI, Reach AB of Ninemile Creek is currently depositional during low-flow conditions; modeling performed as part of the FS indicates that it would be erosional at high flows. The current distribution of sediments in Reach AB is the result of historical depositional and erosional patterns, historical anthropomorphic modifications to the stream, and the current depositional and erosional regime. Overall, the historical discharges by Honeywell have resulted in two effects:

- The large amounts of solids discharged into the streams, along with the potential for the dissolved solids to precipitate out, caused much more of lower Geddes Brook and lower Ninemile Creek to be depositional during Honeywell's operations than is currently the case.
- Deposition rates during Honeywell's operations were much greater than those currently experienced, as evidenced by the accumulation of several feet of Solvay waste.

The re-routing of the streams produced different hydrologic conditions with respect to width, depth, and gradient. In addition, the alteration of the stream bed by various activities impacted the contaminant deposition patterns that would be typically seen in stream systems. Typically, the highest concentrations of a contaminant are seen in the sediments and floodplain near the source and then gradually decline farther from the source. At this Site, the source of mercury contamination was determined to be the Honeywell LCP Bridge Street plant which started using mercury in 1953, discharging it through the West Flume into Geddes Brook. Downstream of the culverts in lower Geddes Brook, the highest mercury concentrations within the Geddes Brook/Ninemile Creek site are found in the Ninemile Creek Reach CD channel and floodplain south of the large island. The mercury concentrations in the stream channel of Geddes Brook, while elevated, are lower than in Ninemile Creek Reach CD and lower than in the Geddes Brook floodplain. This is likely because the lower Geddes Brook channel was dredged in, or just prior to,

1966 (four years before pollution controls were installed at Honeywell's LCP Bridge Street plant in 1970) and the spoils were placed in the floodplain (now seen as mounds along the channel).

The mercury levels in the Reach BC channel, while elevated, are lower than both Reach CD, as expected, and Reach AB, which being downstream of Reach BC would be expected to have lower concentrations. However, Reach BC of Ninemile Creek was relocated to the east in the late 1960s. The former channel was located approximately where the ramp for Route 695 is now. Therefore, both the channel and floodplain of Reach BC contain mercury concentrations somewhat lower than might be expected, although still elevated. In Reach AB, the mercury concentrations in the floodplain tend to be much higher than the concentrations in the channel. This is because much, although not all, of the contaminated sediments in the Reach AB channel were dredged in 1968 and the spoils placed in the nearby dredge spoils area site and/or along the channel bank. The contaminated floodplain of Reach AB still contains high concentrations of mercury, but the channel sediments in this reach are lower than in the floodplain. Thus, although the pattern of the mercury distribution is not typical, an understanding of the history of the Site ensures that the source of mercury contamination was properly identified and addressed in this and other remedial programs. Although these modifications to the streams impacted the historic distribution of mercury and other contaminants, levels remain throughout the Site that warrant remediation, as discussed later in the ROD, and remedial alternatives are based on the current distribution of mercury and other CPOIs.

Additional information on sediment transport and stream channel characteristics can be found in the RI report and in the "Summary of Site Characteristics" section of this ROD.

Soil Characteristics

The soils of the Onondaga Lake watershed include soils formed during glacial times, and soils of more recent origin. Deposits of glacial origin, include till, outwash, alluvial, and glaciolacustrine sediments. The soils tend to be medium-textured, well drained, and high in lime.

The soils overlying bedrock and glacial material in the study area include alluvial deposits along Geddes Brook and Ninemile Creek, organic-rich sediments and peat deposited in post-glacial marshes and swamps, and lacustrine deposits in the Onondaga Lake basin. The lacustrine deposits are composed primarily of marl with varying amounts of silts and fine sand. Fill deposits composed of cinders, ash, and Solvay waste are located above the native soils in many upland areas near the Site.

Within the Ninemile Creek valley, large amounts of Solvay Process wastes were placed in Wastebeds 1 through 15, both north (Wastebeds 1 through 8 and 9 through 11) and south (Wastebeds 12 through 15) of adjacent reaches of Ninemile Creek. The Wastebeds 1 through 8 site occupies approximately 315 acres (127 hectares) and ranges in thickness from approximately 20 to 67 ft (6 to 20 m). Wastebeds 9 through 15 occupy approximately 662 acres (268 hectares) and range in thickness from approximately 3 to 69 ft (1 to 21 m). As noted above, Ninemile Creek was historically diverted to accommodate accumulations of these wastes. Wastebeds 9 and 10 are separated from Wastebed 11 by a low interbed area that is the original ground surface prior to construction of the wastebeds. Remnants of the original Ninemile Creek channel are present within this interbed area.

Biota

Aquatic Species

The major aquatic communities sampled during the RI at the Geddes Brook/Ninemile Creek site include benthic macroinvertebrates (the insects, worms, and other animals which inhabit the stream bottom) and fishes. Benthic macroinvertebrate communities were sampled in these water bodies by Honeywell at 24 stations in 1990 and at eight stations in 1998. More than 80 taxa (types of organisms) were identified in the samples. Soft-substrate macroinvertebrates included amphipods, chironomids, and non-tubificid and tubificid oligochaetes. Hard-substrate macroinvertebrates included amphipods, chironomids, caddisflies, mayflies, and non-tubificid oligochaetes. Nocturnally drifting invertebrates included amphipods, chironomids, caddisflies, mayflies, and non-tubificid oligochaetes.

The fish communities in Geddes Brook and Ninemile Creek were evaluated in 1973 by independent researchers, and in 1990 and 1998 by Honeywell. Over 25 fish species from 11 families were found during surveys at the Geddes Brook/Ninemile Creek site in 1973, 1990, and 1998. The most numerous species included longnose dace (*Rhinichthys cataractae*), creek chub (*Semotilus atromaculatus*), alewife (*Alosa pseudoharengus*), tessellated darter (*Etheostoma olmstedii*), white sucker (*Catostomus commersoni*), pumpkinseed (*Lepomis gibbosus*), and bluegill (*Lepomis macrochirus*). In 2002, TAMS/Earth Tech (for NYSDEC) sampled young-of-year (YOY) fish at three stations in lower Ninemile Creek downstream of Geddes Brook. The following species were collected: bluegill, killifish (*Fundulus diaphanous*), largemouth bass (*Micropterus salmoides*), tessellated darter, blacknose dace (*Rhinichthys atratulus*), and white sucker.

Historic studies conducted during Honeywell's period of operation showed heavily impacted communities throughout the Geddes Brook/Ninemile Creek site. As noted in a 1974 NYSDEC report (Cooper et al., 1974), based on a field study conducted in 1973, "the water [of Ninemile Creek] was turbid and light brown in color. The odor of chlorine was very noticeable. Only one specimen of a fly maggot (*Diptera*) was found in the Surber sample. No other organisms were found while making fairly intensive dip-net sampling. The stream bottom for all practical purposes was sterile. No fish life was observed and probably did not exist. Station 9 was grossly polluted by toxic wastes."

Terrestrial Species

Over 60 bird species have been observed near Onondaga Lake and the Geddes Brook/Ninemile Creek site, including double-crested cormorants (*Phalacrocorax*), herons (e.g., great blue heron [*Ardea herodias*]), ducks (e.g., mallard [*Anas platyrhynchos*]), swallows (e.g., tree swallow [*Tachycineta bicolor*]), blue jays (*Cyanocitta cristata*), American crows (*Corvus brachyrhynchos*), American robins (*Turdus migratorius*), and sparrows (e.g., song sparrow [*Melospiza melodia*]). Vegetation along Ninemile Creek provide nesting areas and foraging habitat for waterfowl, ring-necked pheasants (*Phasianus colchicus*), owls (e.g., barred owl [*Strix varia*]), and hawks (e.g., red-tailed hawk [*Buteo jamaicensis*]).

Over 25 mammalian species have been observed near Onondaga Lake and the Geddes Brook/Ninemile Creek site, including opossums (*Didelphis virginiana*), Northern short-tailed shrews (*Blarina brevicauda*), Eastern cottontails (*Sylvilagus floridanus*), Eastern chipmunks (*Tamias striatus*), woodchucks (*Marmota monax*), squirrels (e.g., gray squirrel [*Sciurus carolinensis*]), mice (e.g., deer mouse [*Peromyscus maniculatus*]), meadow voles (*Microtus pennsylvanicus*), muskrats (*Ondatra zibethicus*), raccoons (*Procyon lotor*), striped skunks (*Mephitis mephitis*), moles (e.g.,

starnosed mole [*Condviura cristata*], foxes (e.g., red fox [*Vulpes fulva*]), and white-tailed deer (*Odocoileus virginianus*). Periodic sightings of river otter (*Lutra canadensis*) have been made in the Ninemile Creek area.

Rare, Threatened, and Endangered Species

According to the databases maintained by the New York Natural Heritage Program (NYNHP) and the U.S. Fish and Wildlife Service (USFWS), and based also on field observations made during the RI field effort, 12 state-listed rare, threatened, or endangered species have been observed near Geddes Brook and Ninemile Creek, including three plant species, eight bird species, and one mammal. The plants include three species known only from historical records: Sartwell's sedge (*Carex sartewellii*), little-leaf tick-trefoil (*Desmodium ciliare*), and red pigweed (*Chenopodium rubrum*). Eight state-listed bird species, including the common loon (*Gavia immer*), common nighthawk (*Chordeiles minor*), sharp-shinned hawk (*Accipiter striatus*), osprey (*Pandion haliaetus*), horned lark (*Eremophila alpestris*), red-headed woodpecker (*Melanerpes erythrocephalus*), common tern (*Sterna hirundo*), and bald eagle (*Haliaeetus leucocephalus*) have been recorded near Geddes Brook and Ninemile Creek. The federal and state-listed endangered Indiana bat (*Myotis sodalis*) is the only listed mammalian species that has been observed in the area.

Areas of Archaeological or Historical Significance

The Onondaga Nation has asserted that Onondaga Lake lies within its aboriginal territory and that Onondaga villages were located on the shores of the lake. The Nation has indicated that it relied heavily on the lake and its tributaries in the past for fishing, gathering of plants for medicinal and nutritional needs, and for recreation. In the late 1800s and early 1900s, Onondaga Lake supported a thriving resort industry based upon the recreational utilization of the lake, including swimming and recreational fishing. The lake also had a plentiful cold-water fishery, which supported a commercial fishing industry until the late 1800s. However, from the late 1800s to the present, Onondaga Lake has been a receptacle for both industrial and municipal wastes.

A Phase 1A Cultural Resource Assessment for various areas, including the Geddes Brook/Ninemile Creek site, was completed by Honeywell in 2003. Based on the results of the Phase 1A assessment, Phase 1B cultural resources work would be conducted in appropriate areas of Geddes Brook and Ninemile Creek prior to remediation.

Results of the Remedial Investigation

The Geddes Brook/Ninemile Creek site was the subject of multiple investigations conducted by Honeywell from 1992 to 2002, with additional investigation of YOY fish by NYSDEC in 2002. The investigations conducted by Honeywell in 1992 and 1995 were part of the Onondaga Lake Bottom subsite's RI and focused on quantifying loads of contaminants (especially mercury) from the Geddes Brook/Ninemile Creek site to the lake. Geddes Brook/Ninemile Creek site-specific RI field work was conducted by Honeywell in 1998 (Geddes Brook/Ninemile Creek RI/FS Phase 1 sampling), 2001 (Geddes Brook/Ninemile Creek supplemental RI/IRM sampling), and 2002 (Ninemile Creek supplemental RI floodplain sampling and Geddes Brook IRM pre-design sediment and floodplain soil sampling). Results of these three investigations were presented in the Geddes Brook/Ninemile Creek RI report (TAMS/Earth Tech, 2003c). Additional floodplain and channel data were collected by Honeywell in 2007 and 2008, respectively. These data are presented in the OU1 Supplemental FS report (Parsons, 2008a) and the OU2 Supplemental FS report (Parsons, 2009), respectively. The HHRA report (TAMS/Earth Tech, 2003a) and BERA report (TAMS/Earth Tech, 2003b) were completed by NYSDEC as part of the RI process. These risk assessments are

discussed in the “Summary of Site Risks” section of this ROD. The RI, HHRA, and BERA were issued by NYSDEC in July 2003.

As a result of the RI studies and risk assessments, numerous contaminants were identified as CPOIs (see Tables 1 and 2 and the text box entitled “What are Chemical Parameters of Interest?” [page 20]), including:

- Mercury and other metals.
- Volatile organic compounds (VOCs).
- Semivolatile organic compounds (SVOCs).
- Pesticides.
- PCBs.
- PCDD/PCDFs.
- Ionic waste constituents.

Both total mercury and methylmercury were analyzed during the RI. In this ROD, total mercury is generally referred to as “mercury.” Total mercury encompasses all mercury species present in a sample, including inorganic species such as ionic mercury and organic species such as methylmercury. Methylmercury is the most toxic and most bioaccumulative form of mercury, with over 95 percent of total mercury in fish tissue present as methylmercury.

Data summaries for Geddes Brook and Ninemile Creek channel sediments, floodplain soils/sediments, surface water, and fish are presented in Tables 3 through 6 in this ROD. These tables present data from the RI, unless otherwise noted. Maps showing the extent of mercury contamination within the Site at depths up to 3 ft (90 cm) in channel sediments and floodplain soils/sediments of Reach AB are presented in this ROD as Figures 6a through 6c. These figures also show mercury floodplain data collected in 2007 and channel sediment data collected in 2008. Additional maps for mercury and other CPOIs can be found in Chapter 5 of the Geddes Brook/Ninemile Creek site RI report (TAMS/Earth Tech, 2003c) and Chapter 2 and Appendix C of the FS report (Parsons, 2005). The floodplain data collected in 2007 are presented in Appendix B of the Geddes Brook/Ninemile Creek site OU1 Supplemental FS report (Parsons, 2008a). The channel sediment data collected from the lower portion of Reach AB in 2008 (including data below 3 ft) are presented in Appendix B of the OU2 Supplemental FS report (Parsons, 2009).

Channel Sediments

Mercury

Mercury concentrations in stream channel sediments based on data collected through 2002 generally reflected the input and transport of mercury from the West Flume to Geddes Brook and from Geddes Brook to Ninemile Creek. Sediment concentrations were also affected by the stream channel geomorphology and historical changes to the stream channel. Mercury concentrations were highest in Geddes Brook downstream of the West Flume, and in Ninemile Creek downstream of the Geddes Brook confluence. The ranges of total mercury concentrations in surface sediments (0 to 15 cm) in the upper and lower Ninemile Creek portions of the Geddes Brook/Ninemile Creek site were 0.06 to 0.15 mg/kg⁹ and 0.01 to 21.1 mg/kg, respectively. Within lower Ninemile Creek,

⁹ This range of concentrations in the upper Ninemile Creek portion of the Geddes Brook/Ninemile Creek site from Amboy Dam to just upstream of Geddes Brook is based on two surface sediment samples collected in 1998 as part of the RI. An additional eight surface sediment samples were collected in 1998 and 2001 as part of the RI in Ninemile Creek upstream of Amboy Dam with mercury

What are Chemical Parameters of Interest?

The **chemical parameters of interest**, or **CPOIs**, for the Geddes Brook/Ninemile Creek RI/FS are defined as those elements or compounds that were selected as **contaminants of potential concern (COPCs)**, **chemicals of concern (COCs)**, or **stressors of concern (SOCs)**. The major classes of CPOIs at the Site include mercury and other metals, SVOCs (including PAHs, hexachlorobenzene, and phenol), PCBs, PCDD/PCDFs, and calcite.

COPCs: COPCs are used in human health risk assessments (HHRAs) to determine contaminants that may be harmful to humans. An HHRA for the Geddes Brook/Ninemile Creek site was performed as part of the RI. COPCs were developed using available contaminant concentration data for fish (fillets only; limited to species likely to be consumed by humans), channel sediments, floodplain soils/sediments, and surface water. A total of about 40 individual COPCs in one or more Geddes Brook/Ninemile Creek site media were identified in the HHRA that fall into the classes identified above plus other SVOCs and pesticides. (See attached Table 1 entitled "Contaminants of Potential Concern for the Geddes Brook/Ninemile Creek HHRA.")

COCs: COCs are used in baseline ecological risk assessments (BERAs) to determine chemicals that may be harmful to the environment. A BERA for the Geddes Brook/Ninemile Creek site was performed as part of the RI. COCs were developed using toxicity values to establish conservative thresholds for adverse effects to ecology (surface water, channel surface sediments, floodplain surface soils/sediments, plants, fish, and wildlife). As presented in the BERA, numerous toxic chemicals were detected at elevated concentrations in various Geddes Brook/Ninemile Creek site media. A total of 28 COCs in one or more Geddes Brook/Ninemile Creek site media were identified in the BERA that fall into the classes identified above plus select VOCs, other SVOCs, and pesticides. (See attached Table 2 entitled "Contaminants and Stressors of Concern Selected for Geddes Brook/Ninemile Creek Site Media in the BERA.")

SOCs: SOCs are used in BERAs to determine those chemical contaminants which may not be addressed as hazardous wastes or hazardous substances, but which may cause effects or conditions that are harmful to the environment. The SOCs identified in the BERA include calcite in channel sediments, and chloride, sodium, and total dissolved solids in surface water. (See attached Table 2 entitled "Contaminants and Stressors of Concern Selected for Geddes Brook/Ninemile Creek Site Media in the BERA.")

the highest concentrations were found in Reach CD and in Reach AB near the mouth of the stream where it enters Onondaga Lake.

Sediments in Reach AB of Ninemile Creek were generally characterized by elevated surficial mercury concentrations that declined with depth. This could have been a result of the previous dredging of the channel. This reach is currently depositional and contains relatively deep sediments (*i.e.*, 5 to 10 ft [1.5 to 3 m]) based on available sediment probing results. In the downstream portion of the Reach AB channel, a marl layer is generally present at depths of less than 1 ft (30 cm) to about 2 ft (60 cm) below the stream bottom (sediment-water interface).

Patterns of methylmercury (a highly toxic and bioaccumulative form) were similar to those of mercury, with higher concentrations in the lower reaches of the streams than in the upper reaches. For Ninemile Creek site sediment locations and depths where both total mercury and

concentrations ranging from 0.08 to 1.4 mg/kg. In addition, four surface sediment samples were collected by NYSDEC in upper Ninemile Creek with mercury concentrations ranging from less than 0.05 to 0.18 mg/kg. The average mercury concentration of all 14 samples in upper Ninemile Creek, upstream of Reach CD, was 0.33 mg/kg (if the highest value is removed, this average would be 0.25 mg/kg).

methylmercury have been measured, concentrations of methylmercury are generally less than 1 percent of total mercury (average of about 0.3 percent).

Other CPOIs

Other CPOIs detected in stream sediments included metals (e.g., arsenic and lead) other than mercury and organic compounds. Other inorganic CPOIs (e.g., arsenic, lead, and sodium) were detected throughout Ninemile Creek sediments.

Patterns of contaminant distribution showed a significant increase in sodium from upper Ninemile Creek to lower Ninemile Creek. Higher concentrations of lead and arsenic (i.e., greater than the NYSDEC severe effects levels [SELS] for arsenic [33 mg/kg] and lead [110 mg/kg]) were found only in lower Ninemile Creek, and not in the upper reaches of the stream. These higher concentrations of arsenic and lead were found in the same areas as elevated concentrations of mercury.

Organic CPOIs detected in sediments of lower Ninemile Creek which exceeded NYSDEC's sediment screening criteria included hexachlorobenzene, various individual PAHs, phenol, PCBs, and PCDD/PCDFs.

Calcite (i.e., calcium carbonate) was identified as a SOC in the BERA. Calcium concentrations were higher in sediments in the lower reaches of Ninemile Creek than in the upper reaches.

Floodplain Soils/Sediments

Mercury

The patterns of mercury concentrations in floodplain soils/sediments (including the islands and wetland portions of the floodplains) were similar to those found in channel sediments. In Reach AB, the highest mercury concentrations were found near the mouth of Ninemile Creek and generally decrease with depth. However, there are some locations adjacent to the stream in this reach where mercury concentrations remain elevated at a depth of 3 ft (90 cm), which is the maximum depth of the RI floodplain data.

Methylmercury was only analyzed for a subset of the 1998 surface (0 to 15-cm-deep) soil/sediment samples. Higher concentrations were found in lower Geddes Brook and in Reach CD than in other reaches. Methylmercury concentrations in the floodplain soils/sediments in all reaches ranged from 0.11 to 27.5 µg/kg. With the exception of Station NM9 at the upstream end of Reach AB (with methylmercury concentrations up to 1.2 µg/kg), methylmercury data were not collected in the floodplain/wetlands of Reach AB during the RI. For Ninemile Creek floodplain locations and depths where both total mercury and methylmercury have been measured, concentrations of methylmercury are generally less than 1 percent of total mercury (average of about 0.6 percent).

Other CPOIs

Various metals (e.g., arsenic and lead) were identified as CPOIs for floodplain soils and wetland sediments in the risk assessments. For these metal CPOIs, there was generally little difference in average concentrations between the upper and lower reaches of Ninemile Creek.

Organic CPOIs identified in the initial screening of the risk assessments based on exceedances of the screening criteria included hexachlorobenzene, PAHs, phenol, PCBs, and PCDD/PCDFs. Concentrations of hexachlorobenzene, total PAHs, PCB Aroclor 1254, PCB Aroclor 1268, and

PCDD/PCDFs were generally higher in floodplain soils/sediments along Ninemile Creek Reach CD than in Reach AB, and were co-located with elevated mercury concentrations.

As with channel sediments, calcium concentrations in floodplain soils/sediments were higher in the lower reaches of Ninemile Creek than in the upper reaches.

Surface Water

Mercury

In the surface water, total mercury concentrations reflected the input of mercury from the West Flume to Geddes Brook and from Geddes Brook to Ninemile Creek. In 1998, the average detected unfiltered total mercury concentrations were 2.1 and 22.3 nanograms per liter (ng/L) in upper and lower Geddes Brook, respectively. In upper and lower Ninemile Creek, the average detected unfiltered total mercury concentrations were 1.8 and 9.2 ng/L, respectively, in 1998. Samples collected at the mouth of the West Flume had the highest concentrations of unfiltered total mercury (815 and 1,090 ng/L in July and September of 1998, respectively). Dissolved total mercury was detected only in the West Flume (56.8 ng/L in July and 41.4 ng/L in September) and Geddes Brook below the West Flume (1.33 ng/L and 1.41 ng/L in a duplicate sample in July). These concentrations of dissolved mercury exceeded the lowest New York State surface water standard for dissolved mercury (0.7 ng/L). See also discussion below under “RG 4.”

The average detected dissolved methylmercury concentrations from July and September 1998 were 0.029 and 0.037 ng/L in upper and lower Geddes Brook, respectively, and 0.041 and 0.021 ng/L in upper and lower Ninemile Creek, respectively. Samples collected at the mouth of the West Flume had the highest concentrations of dissolved methylmercury (1.14 ng/L in July and 1.26 ng/L in September of 1998). There was little change in dissolved methylmercury concentrations along the length of Ninemile Creek.

The concentration of total mercury on suspended sediments (*i.e.*, total mercury concentration on particles carried in the water) was calculated from the 1998 data under base-flow (*i.e.*, low water) conditions. Suspended sediments from the West Flume had the highest concentrations of mercury (30 and 58 mg/kg in July and September), followed by lower Geddes Brook samples (6.8 and 2.7 mg/kg) and the September sample from the most downstream Ninemile Creek station (2.0 mg/kg). All other suspended sediment samples contained less than 1 mg/kg total mercury. Most of the mercury amounts (*i.e.*, 75 to 99 percent) in surface water samples were associated with particles.

Comparison of the 1998 RI data to previous investigations in 1990 and 1992 indicated that mercury concentrations in surface water from the West Flume, lower Geddes Brook, and lower Ninemile Creek, sampled at low flow, were between 77 and 90 percent lower in 1998 than in 1990 and 1992. The most recent high flow sampling conducted in 1995 found considerably higher mercury concentrations than at low flow, indicating that different sources and transport processes may be important during high flow. During high-flow events in 1995, total mercury concentrations were 1.34 to 11.1 ng/L in upper Ninemile Creek (just above the Geddes Brook confluence), 27.6 to 455 ng/L in lower Ninemile Creek (at State Fair Boulevard), and 169 to 615 ng/L in lower Geddes Brook.

Other CPOIs

Select metals other than mercury (*e.g.*, lead) and one group of organic compounds (PCDD/PCDFs) were retained in the HHRA as human health CPOIs in surface water. Select metals other than

mercury (e.g., barium, lead, and manganese) and one organic compound (chlorobenzene) were retained in the BERA as ecological CPOIs in surface water.

Organic CPOIs were only detected sporadically in the surface water of Geddes Brook and Ninemile Creek. PCDD/PCDFs and chlorobenzene were detected in the 1998 sampling.

Four conventional parameters (total chloride, calcium, sodium, and TDS) were identified as SOCs in the BERA. The highest concentrations of these parameters in Geddes Brook were found at stations located downstream of the unnamed tributary which carries drainage from Wastebeds 12 through 15. Concentrations of these parameters in Ninemile Creek roughly doubled as the stream flowed past Wastebeds 9 through 11. In Ninemile Creek, concentrations of sodium were higher in lower reaches than in upper reaches by approximately 1.2 to 3 times. See the "Site Geology/Hydrogeology" section of this Propose Plan for discussion of chloride, calcium, and TDS results.

Fish

Adult fish were collected for chemical analysis in Ninemile Creek in 1990, 1998, and 2000, and YOY fish were collected in 1990, 1998, 2000, and 2002. Because adult fish move between the streams and lake, the source of mercury in these fish (*i.e.*, stream, lake, or both) is unclear. For these reasons, YOY fish were also collected since they tend to reside within a small area, and provide a clearer understanding of where these fish acquire mercury in their tissue.

Fish sampled in 1990 had mercury concentrations ranging from 0.13 to 2.5 mg/kg ww in fillets collected from the Geddes Brook/Ninemile Creek site, which exceeded EPA's methylmercury in fish criterion of 0.3 mg/kg for protection of human health. See also discussion below under "RG 3."

Mercury concentrations in adult fish collected in 1998 ranged from 0.07 to 1.5 mg/kg ww in fillets, which exceeded EPA's methylmercury in fish criterion of 0.3 mg/kg for protection of human health, and from 0.01 to 1.0 mg/kg ww in remainder tissues (the rest of the fish after the fillets are removed). The lowest concentrations were found in samples from the most upstream (above Amboy Dam) locations in Ninemile Creek. The highest concentrations were found in Ninemile Creek just downstream of the Geddes Brook confluence (Reach CD). In 2000, fish were only collected at the mouth of Ninemile Creek, and mercury in those adult fish ranged from 0.5 to 0.9 mg/kg ww in fillets, which exceeded EPA's methylmercury in fish criterion of 0.3 mg/kg for protection of human health, and 0.4 to 0.7 mg/kg ww in remainder tissue.

In YOY fish, mercury concentrations were higher in samples collected below the Geddes Brook confluence (Reach CD) and at the mouth of Ninemile Creek than in samples collected in upper Ninemile Creek. Mercury was detected in YOY fish at concentrations ranging from 0.02 to 0.05 mg/kg ww in 1998 in upper Ninemile Creek (Honeywell was unable to collect YOY fish samples in lower Ninemile Creek in 1998) and 0.14 to 0.22 mg/kg ww in 2000 at the mouth of Ninemile Creek. In 2002, mercury was detected in YOY fish at concentrations ranging from 0.18 to 0.85 mg/kg ww at Ninemile Creek stations downstream of Geddes Brook.

In addition to mercury, other CPOIs were detected in both adult and YOY fish. The BERA retained arsenic, selenium, zinc, DDT and metabolites, total PCBs, and PCDD/PCDFs as chemicals of concern for fish. Hexachlorobenzene, dieldrin, DDT and metabolites, heptachlor epoxide, PCBs, and PCDD/PCDFs exceeded human health screening criteria for fish consumption in the HHRA.

Impacts to Fish and Wildlife Resources

The contamination in the media described above has contributed to negative effects on the fish and wildlife resources at the Geddes Brook/Ninemile Creek site in a number of ways, including:

- Chloride loadings to Geddes Brook and Ninemile Creek from Solvay waste.
- Decreased value of habitat due to calcite crust formation and excessive turbidity.
- Expected acute and chronic toxic impacts to biota within the streams, wetlands, and floodplains.
- Increased dominance of benthic macroinvertebrate communities by pollution-tolerant taxa.
- Impoverished fish communities in Ninemile Creek.
- Bioaccumulation of mercury and other contaminants in fish and likely bioaccumulation in other biota.

Historical studies documented that waste discharges into Ninemile Creek during plant operations adversely affected the fish community to the extent that Ninemile Creek was considered unsuitable to support fish (New York State Conservation Department, 1946, 1947). A study conducted by CDR Environmental Specialists in 1990 for Honeywell found that the fish fauna in the slow, deep channels of Ninemile Creek, which constitute about 70 percent of the stream length, were generally impoverished in comparison to fish fauna at other habitats in the study area (CDR, 1991).

Additional information on impacts to fish and wildlife resources can be found in the BERA report and in the “Summary of Site Risks” section of this ROD.

A detailed evaluation of the nature and extent of contamination, including contaminant distribution maps, can be found in Chapter 5 of the Geddes Brook/Ninemile Creek RI report.

Groundwater

Groundwater at the Geddes Brook/Ninemile Creek site is not considered to be a medium requiring remediation, since both Geddes Brook and Ninemile Creek below Amboy Dam are gaining streams (*i.e.*, groundwater flows upward, discharging into these water bodies). Any groundwater contamination beneath or near the Site would be from upland sites, which are and/or will be investigated separately, as appropriate.

Transport and Fate of Contaminants

Transport and fate refers to the movement of CPOIs in the environment, their transformation, and their ultimate destination. The movement is largely a function of deposition, suspension, and redeposition of CPOIs that are bound to the sediments. These processes are critical to understanding the relative importance of contaminant sources and the outcome of proposed remedial actions. Transport and fate processes, therefore, need to be characterized at a level sufficient to support evaluation of remedial alternatives.

The analysis of transport and fate of CPOIs in the Site is complicated by two factors. First, flow conditions and discharges to the Site have changed significantly over time. Flows in Ninemile Creek dropped significantly from the 1970s to the 1980s as former Honeywell discharges were diverted from the West Flume and the wastebeds. Similarly, concentrations of TSS, TDS, and mercury in Ninemile Creek have been declining over the years since former Honeywell operations

and active discharges ceased. Second, high flow events are expected to play a dominant role in mobilizing CPOIs from sediments and floodplain soils, yet data collection during such events has been limited. The peak flow rates were generally recorded during the snowmelt or spring runoff period; however, no chemical concentration data were available from this period. The load analysis presented in the RI report for conditions during high flow is based on samples taken during one high-flow event in October 1995.

Mercury

The transport and fate of mercury are strongly influenced by the tendency of mercury to associate with sediment/soil particles and, therefore, the tendency of particles to be resuspended or eroded and transported during high flow events. During base flow when transport of particles is low, the primary source of mercury to the Site has been the LCP Bridge Street subsite, which contributed mercury to the Site via the West Flume. Total unfiltered mercury concentrations in surface water increased in Geddes Brook downstream of the West Flume and in Ninemile Creek downstream of Geddes Brook. Methylmercury concentrations increased in Geddes Brook downstream of the West Flume but did not increase in Ninemile Creek downstream of Geddes Brook (possibly because methylmercury is rapidly oxidized in surface water).

Analysis of the mercury load carried in the Ninemile Creek water column during base flow (based on four sampling events in 1990 and 1998) suggests that Geddes Brook supplied 15 to 43 percent (mean of 33 percent) and upper Ninemile Creek supplied approximately 20 percent of the mercury load carried in lower Ninemile Creek (Figures 7 and 8). The remainder of the mercury load (mean of 47 percent of total load) carried in lower Ninemile Creek is presumed to come from internal sources (e.g., from the sediments in the stream) within lower Ninemile Creek.

For Geddes Brook, load analysis at base flow (based on four sampling events in 1990 and 1998) suggested that the West Flume supplied 50 to 70 percent of the total mercury load in lower Geddes Brook. The remainder of the mercury load in lower Geddes Brook is presumed to come from internal sources (e.g., sediment) within lower Geddes Brook. However, on at least one occasion, lower Geddes Brook appeared to have been a sink for mercury (*i.e.*, more mercury entered the brook from the West Flume than was carried to the lower reaches).

Estimation of loads during high flow was based on a single event with a flow of 500 cfs, during which the load of mercury increased by a factor of ten over the load at base flow. As discussed in the RI report, during the one high-flow event for which data are available (October 21 and 22, 1995), Geddes Brook contributed 14 percent of the total mercury load carried in lower Ninemile Creek (compared to 33 percent at base flow). The majority of the total mercury load in lower Ninemile Creek (82 percent) during this high-flow event was, therefore, attributed to erosion and transport of streambed sediments and bank sediment/floodplain soils within lower Ninemile Creek. There was considerable uncertainty associated with the load estimates for this event and with the implication of these estimates on annual loads to the lake. Nevertheless, the analysis strongly suggested that internal sources within lower Ninemile Creek likely contribute to the mercury load carried to Onondaga Lake.

The main source of internal loads in lower Ninemile Creek is likely streambed sediments and stream bank sediments/floodplain soils in Reach CD. Reach CD contains the highest concentrations of mercury and other CPOIs in Ninemile Creek. The high concentrations of mercury in this reach reflects historical patterns of transport and deposition and the fact that this reach has remained unaltered since the 1930s, while other reaches have been re-routed and/or dredged.

Sediments can be resuspended and transported downstream. Based on general hydrologic principals and quantitative modeling, the largest inputs of sediment during high flow, however, come from erosion of the channel bank. During even higher flows, when water flows over the channel banks and onto the floodplain, bank erosion is still the major source of particles. (See further discussion below under “RG 1.”)

In addition to the transport and fate of mercury on particles from the Geddes Brook/Ninemile Creek channel and floodplain, the production of methylmercury (*i.e.*, methylation of inorganic mercury) is an important process because of methylmercury's potential toxicity and tendency to bioaccumulate. Methylmercury is formed naturally by bacteria in the environment in the absence of oxygen, such as in anoxic sediment. In aquatic environments, methylmercury formed in sediment enters the food web through both benthic (*i.e.*, sediment-associated) and water column-associated pathways. Organisms at the top of the food chain (*e.g.*, wildlife that consume fish) receive the highest methylmercury exposure.

In terrestrial environments, anoxic conditions are more limited and methylmercury production is therefore limited. Methylmercury in terrestrial environments is potentially available to receptors such as the shrew that consume terrestrial invertebrates (*e.g.*, earthworms [*Lubricus terrestris*]) that are exposed to methylmercury in soil.

Other Metal CPOIs

Filtered and unfiltered surface water sampling results indicated that the concentration of metals (other than mercury) associated with particles did not vary significantly within the Site. Sediment sampling results were similar. Metals were generally found at higher concentrations in floodplain soils/sediments than in channel sediments, suggesting preferential settling of fine-grained material in floodplain soils/sediments or dilution in the streambed.

The ultimate fate of soluble and sediment-associated metal CPOIs is eventual transport to Onondaga Lake.

Organic CPOIs

Most of the organic CPOIs are highly persistent and remain associated with sediments. Like mercury, the organic CPOIs (*e.g.*, hexachlorobenzene, PCBs, PAHs, and PCDD/PCDFs) appear to be primarily associated with depositional zones downstream of the LCP Bridge Street subsite and the West Flume. As such, the organic CPOIs tend to be co-located with elevated mercury concentrations in Reach CD of Ninemile Creek, where the stream has remained unaltered since at least the 1930s. As with mercury and other metals, sediments containing organic CPOIs can be transported downstream if resuspended. Based on data from Onondaga Lake sediments near the mouth of Ninemile Creek, the Site is a possible source of some organic CPOIs to the lake. These organic CPOIs include hexachlorobenzene, PCBs, PAHs, and PCDD/PCDFs.

Ionic Waste Constituents

Ionic waste constituents, including calcium, sodium, chloride, and carbonates, can enter into and impact the streams in either dissolved or solid forms.

With regard to dissolved ionic waste constituents, the concentration of TDS, which includes ionic waste constituents, exceeds the New York State surface water quality standard (500 mg/L) under base-flow conditions (*i.e.*, when groundwater contributions to the system are most obvious) in

Ninemile Creek above the wastebeds (four samples at two locations in the 1998 sampling range from 720 to 809 mg/L), and further increases as the stream flows past Wastebeds 9 through 15 (concentration ranges from 1,430 to 2,810 mg/L). The ionic waste constituents in this segment enter the stream from groundwater and surface runoff associated with Wastebeds 9 through 15 and are predominantly in the form of dissolved calcium chloride and sodium chloride.

In regards to solid ionic waste constituents, calcite deposits (*i.e.*, solid calcium carbonate) are found adjacent to the wastebeds in upper Ninemile Creek and in various locations in lower Ninemile Creek (particularly in Reach CD). Under high-flow conditions, erosion of the calcite deposits results in transport of particulate calcite downstream, eventually to Onondaga Lake. TSS loads, which are assumed to be approximately 50 percent calcite based on sediment analysis in Onondaga Lake, increase significantly during storm-related high-flow events, due primarily to stream bank erosion. Analysis of TSS loads during the one high-flow event for which data are available shows that lower Ninemile Creek is a major source of TSS to the load carried by the stream. The New York State standard for TSS, which is “none from sewage, industrial wastes or other wastes that will cause deposition or impair the waters for their best usages,” would be considered exceeded during high-flow conditions.

CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

The State of New York, Onondaga County, and the City of Syracuse have jointly sponsored the preparation of a land-use master plan to guide future development of the Onondaga Lake area (Syracuse-Onondaga County Planning Agency, 1998). The primary objective of land-use planning efforts is to enhance the quality of the Onondaga Lake area for recreational and commercial uses. Anticipated recreational uses of the lake and Geddes Brook/Ninemile Creek area include fishing without consumption restrictions and swimming.

Land Use

In general, the northwest upland of the lake, which includes the Site area, is primarily residential, with interspersed urban structures and several undeveloped areas. Solvay wastebeds cover much of the western lakeshore and areas of the Site. Land around much of the lake is recreational, providing hiking and biking trails, picnicking, sports, and other recreational activities.

Surface Water Use

Approximately the northern two-thirds of Onondaga Lake is classified by the State of New York as Class B water (best usages defined as “primary and secondary contact recreation and fishing. These waters shall be suitable for fish propagation and survival” [6 NYCRR Part 701.7]). The southern third of Onondaga Lake and the area at the mouth of Ninemile Creek are classified as Class C water (best usage defined as “fishing. These waters shall be suitable for fish propagation and survival. The water quality shall be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes” [6 NYCRR Part 701. 8]). Ninemile Creek is a Class C stream below the former Honeywell water intake and C(T) upstream. Geddes Brook is a Class C stream below the Old Erie Canal and C(T) upstream. No permitted swimming beaches or sanctioned swimming areas exist at the Site (NYSDOH, 1995).

Fishing occurs, but the NYSDOH has a specific, restrictive consumption advisory for Onondaga Lake including its tributaries which warns against eating walleye (*Stizostedion vitreum*), largemouth bass (*Micropterus salmoides*), and smallmouth bass (*Micropterus dolomieu*) larger than 15 inches, with consumption of all other species limited to no more than once per month (NYSDOH, 2008).

The specific advisory also stipulates that infants, children under 15, and women of childbearing age should eat no fish from the lake and its tributaries. The more general, statewide advisory for the state's fresh waters advises that consumption be limited to no more than one meal per week. Onondaga Lake and the associated tributaries do not serve as potable-water sources (Syracuse Department of Water, 2000).

SUMMARY OF SITE RISKS

As part of the RI process, baseline risk assessments were conducted for the Site to estimate the risks to human health and the environment. The baseline risk assessments, consisting of an HHRA, which evaluated risks to people, and a BERA, which evaluated risks to the environment, analyzed the potential for adverse effects both under current conditions and if no actions are taken to control or reduce exposure to hazardous substances at the Site. As indicated below, based upon the results of the RI and the risk assessments, NYSDEC and EPA have determined that active remediation is necessary to protect public health or welfare and the environment from actual and threatened releases of hazardous substances into the environment. In addition, the control of contamination migrating from Geddes Brook and Ninemile Creek into Onondaga Lake is an integral part of the overall remediation of Onondaga Lake.

Human Health Risk Assessment

A Site-specific HHRA was performed to quantitatively evaluate both cancer risks and noncancer health hazards associated with potential current and/or future exposures to chemicals present in Geddes Brook and Ninemile Creek surface water, floodplain soils/sediments, channel sediments, and fish in the absence of any action to control or mitigate those chemicals. The HHRA is used to determine whether the risks associated with the Site justify remedial action; however, the HHRA does not identify specific remedial goals. The HHRA was prepared to evaluate potential risks associated with exposure to elevated concentrations of mercury, lead, PCDD/PCDFs, and other COPCs in surface water; mercury, lead, arsenic, hexachlorobenzene, PAHs, PCBs, PCDD/PCDFs, and other COPCs in channel sediments; mercury, lead, arsenic, hexachlorobenzene, PAHs, PCBs, PCDD/PCDFs, and other COPCs in floodplain soils/sediments; and mercury, arsenic, hexachlorobenzene, PCBs, PCDD/PCDFs, and other COPCs in fish.

Hazard Identification

In addition to mercury (including methylmercury), approximately 40 other chemicals were identified as COPCs in one or more Site media using a screening process that compared measured concentrations to risk-based target concentrations. Risks were calculated for these COPCs in the HHRA.

Exposure Assessment

Geddes Brook and Ninemile Creek are surrounded by lands used for industrial, commercial, and recreational purposes. No residential property directly abuts the Geddes Brook/Ninemile Creek site. People who consume fish from Geddes Brook and Ninemile Creek and recreational visitors exposed to Geddes Brook and Ninemile Creek sediments, surface water, and floodplain and wetland soils/sediments are the receptors or individuals with the greatest potential for exposure to COPCs. Cancer risks and noncancer health hazards were evaluated for young children (less than 6 years old), older children (6 to less than 18 years old), and adults (18 and over) who consume fish from Geddes Brook and Ninemile Creek. Cancer risks and noncancer health hazards were also evaluated for older children and adults who are exposed to sediments, surface water, and

floodplain and wetland soils/sediments within the Geddes Brook/Ninemile Creek site during recreational activities. Under current conditions, potential exposures for recreational visitors to the Geddes Brook/Ninemile Creek site are limited by the lack of public swimming areas. The exposure point concentrations for the COCs, along with the detection frequencies for these contaminants, are presented in Table 7.

The NYSDOH has also issued specific, restrictive fish consumption advisories for Onondaga Lake and its tributaries, including Geddes Brook and Ninemile Creek, which currently advises that women of childbearing age, infants, and children under the age of 15 should not eat any fish from Onondaga Lake and its tributaries, and all others should eat no more than one meal per month of any species, with no walleye and bass larger than 15 inches to be eaten at all. However, because the HHRA addresses future conditions, it was assumed that the public would consume fish caught in Geddes Brook and Ninemile Creek, and that recreational visitors would be exposed to sediments, surface water, and floodplain and wetland soils/sediments of the Geddes Brook/Ninemile Creek site.

The HHRA assesses risk under both current and future use scenarios. Potential future uses are evaluated under the assumption that there are no restrictions, advisories, or limitations in place, although it was assumed that there would continue to be no residential exposure to sediments and soils since the Site consists of open channel and floodplain/wetland areas that are unlikely to be developed in the future. Thus, since no occupied structures currently exist on-Site and none are likely to be built on-Site in the future, a residential scenario was not evaluated in the HHRA. Exposure pathways evaluated quantitatively include consumption of fish from Geddes Brook and Ninemile Creek, incidental ingestion of and dermal contact with surface and subsurface channel sediments, incidental ingestion of and dermal contact with surface and subsurface floodplain soils/sediments, and incidental ingestion of and dermal contact with surface water.

In addition to exposures attributable to fish consumption and direct exposures to contaminated media by recreational visitors, the HHRA also evaluated potential exposures to construction workers who may contact contaminated media (*i.e.*, channel sediments, floodplain soils/sediments, and surface water) during work on the Site.

Because risk assessments are designed to be conservative so that risk management strategies can be protective of human health, as well as consistent with EPA requirements, two types of exposure scenarios were analyzed in the HHRA to assess a range of potential risk: the reasonable maximum exposure (RME), which portrays the highest level of human exposure that could reasonably be expected to occur, and the central tendency (CT, or “typical”) scenarios. Cancer risks and non-cancer health hazards were assessed for exposures attributable to fish consumption and direct exposures to contaminated media by recreational visitors and construction workers at the Site under both these scenarios.

Toxicity Assessment

Risk estimates for all COPCs were based on use of toxicity values, using carcinogenic slope factors (CSFs) to assess potential carcinogenic effects and reference doses (RfDs) to assess potential noncancer effects. These measures were primarily derived and published by EPA. The three COPCs (or COPC groups) responsible for a majority of estimated Site risks are methylmercury, PCBs, and PCDD/PCDFs, as described below.

- Methylmercury is a toxic chemical with which a number of adverse health effects have been associated in both human and animal studies (see the

text box entitled “What is Mercury?” [page 3]). With respect to the adverse effects of methylmercury, the largest amount of data exists on neurotoxicity, particularly in developing organisms.

- PCBs cause cancer in animals and probably cause cancer in humans, based on evidence in laboratory animals (see the text box entitled “What are Organic Contaminants in the Geddes Brook/Ninemile Creek Site?” [page 5]). In addition, serious noncancer health effects have been observed in animals exposed to PCBs. Studies of Rhesus monkeys exposed to PCBs indicate a reduced ability to fight infection and reduced birth weight in offspring exposed in utero.
- PCDD/PCDFs probably cause cancer in humans, based on evidence in laboratory animals (see the text box entitled “What are Organic Contaminants in the Geddes Brook/Ninemile Creek Site?” [page 5]). They have also been associated with a wide variety of toxic effects in animals, including acute toxicity, enzyme activation, tissue damage, and developmental abnormalities.

A summary of the toxicity information for both noncancer health effects as well as cancer endpoints is presented in Tables 8 and 9, respectively.

Risk Characterization

Contamination at the Site presents risks to human health that are above applicable EPA guidelines, particularly as a result of fish consumption. The primary sources of cancer risks and noncancer health hazards are mercury, PCBs, and PCDD/PCDFs.

- **Cancer risks (fish consumption and recreational scenarios):** The calculated RME cancer risks (ranging from 2.9×10^{-5} for young children to 9.3×10^{-5} for adults) associated with fish consumption exceeded the low end of the target cancer risk range (1×10^{-6}) by more than an order of magnitude, but were less than the high end of the target risk range (1×10^{-4}).¹⁰ The calculated CT cancer risks for fish consumption were slightly greater than 1×10^{-6} , ranging from 1.2×10^{-6} to 1.3×10^{-6} . PCBs and PCDD/PCDFs contributed the bulk of the cancer risk associated with fish consumption.

RME cancer risk estimates associated with several other exposure pathways related to channel sediments, floodplain soils/sediments, and

¹⁰ In an HHRA, exposures are evaluated based on the potential risk of developing cancer and the potential for non-cancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10^{-4} cancer risk means a “one-in-ten-thousand excess cancer risk,” or one additional cancer may be seen in a population of 10,000 people as a result of exposure to Site contaminants under the conditions explained in the Exposure Assessment of the HHRA. Current federal Superfund guidelines for acceptable exposures are “generally concentration levels that represent an excess upper bound cancer to an individual of between 10^{-4} to 10^{-6} ” (40 CFR § 300.430[e][2][A][2]) (corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk). The 10^{-6} risk is used as the point of departure for determining remediation goals.

surface water in recreational scenarios were greater than 1×10^{-6} but lower than 1×10^{-4} . CT risk estimates for only two of these pathways (exposure to surface sediments and surface water in upper Geddes Brook) slightly exceeded the low end of the target risk range (1×10^{-6}). However, for these routes of exposure there was no increase in calculated risks from the upper to the lower reaches, and the chemicals presenting the highest risks are typical of urban runoff. The cancer risk estimates for the COCs for the RME scenario are presented in Table 10.

- **Noncancer health hazards (fish consumption and recreational scenarios):** The RME noncancer hazard indices (HIs) for the recreational angler fish consumption pathway (ranging from 4.1 to 6.4) exceeded the target hazard index of 1.0.¹¹ The CT HIs (ranging from about 0.3 to 0.5) were below 1.0. The elevated HIs for the fish consumption pathways were primarily related to PCBs (highly chlorinated Aroclors, assessed as Aroclor 1254), methylmercury, and, to a lesser extent, dieldrin. RME and CT HIs for all pathways other than fish ingestion were less than 1.0. The non-cancer hazard quotients and indices for the COCs for the RME scenario are presented in Table 11.
- **Cancer risks (construction worker scenario):** RME cancer risks (1.2×10^{-6}) for exposure to upper Geddes Brook sediments for future construction workers slightly exceeded the low end of the target risk range of 1×10^{-6} . All other RME and CT risks for future construction workers were less than the target range.
- **Noncancer health hazards (construction worker scenario):** None of the calculated noncancer hazards (for both RME and CT scenarios) for future construction workers and recreational visitors associated with pathways other than fish consumption exceeded the target threshold of 1.0, indicating that exposure to COCs from all pathways except fish consumption are not predicted to result in adverse noncancer effects.

In addition, the potential risks and hazards to subsistence fishers were evaluated in the uncertainty section of the HHRA. Although the RME and CT exposures were used to quantify risks and hazards from the Geddes Brook/Ninemile Creek site, the uncertainty section examines additional factors which could influence risk characterization, such as the higher consumption rates from a subsistence life style. As discussed in the Geddes Brook/Ninemile Creek HHRA report (see Section 7.3.3 thereof), the potential risks and hazards to a subsistence fisherman, which would be greater than the risks and hazards calculated for the adult recreational angler by a factor of seven for the RME and nine for CT scenarios, are also above applicable EPA guidelines.

¹¹ For non-cancer health effects, a “hazard quotient” (HQ) is calculated for each contaminant. An HQ represents the ratio of the estimated exposure to the corresponding reference doses (RfDs). The sum of the HQs is termed the “hazard index” (HI). The key concept for a non-cancer HI is that a “threshold level” (measured as an HQ or HI of 1) exists, below which non-cancer health effects are not expected to occur.

Baseline Ecological Risk Assessment

The BERA evaluated the likelihood that adverse ecological effects are occurring or may occur as a result of exposure to one or more chemicals or stressors. The BERA was prepared to evaluate potential risks associated with exposure to elevated concentrations of mercury, lead, and other contaminants of concern (COCs) and stressors in surface water; mercury, arsenic, lead, hexachlorobenzene, phenol, PAHs, PCBs, and other COCs and stressors in channel sediments; mercury, arsenic, lead, hexachlorobenzene, phenol, PAHs, PCBs, PCDD/PCDFs, and other COCs and stressors in floodplain soils/sediments; and mercury, arsenic, PCBs, PCDD/PCDFs, and other COCs in fish. The framework used for assessing Site-related ecological risks is similar to that used for HHRA and consists of problem formulation, ecological exposure assessment, ecological effects assessment, and risk characterization.

Problem Formulation

Problem formulation identifies the major factors to be considered in a BERA, including COC and SOC (e.g., ionic waste) characteristics, ecosystems and/or species potentially at risk, and ecological effects to be evaluated. It establishes the goals, breadth, and focus of the assessment, develops a conceptual model, and selects assessment endpoints, which are explicit expressions of the environmental value that is to be protected. In an HHRA, only one species (humans) is evaluated and the cancer and noncancer effects are typically the assessment endpoints. In contrast, a BERA involves multiple species that are likely to be exposed to differing degrees and respond differently to the same contaminant. Assessment endpoints focus the risk assessment on particular components of the ecosystem that could be adversely affected by contaminants from the Site.

Assessment endpoints selected for the Geddes Brook/Ninemile Creek BERA are based on the sustainability of plant and animal communities and populations. "Sustainability" relates to survival, growth, and reproduction. The assessment endpoints include:

- Sustainability of a terrestrial plant community that can serve as a shelter and food source for local invertebrates and wildlife.
- Sustainability of a benthic invertebrate community that can serve as a food source for local fish and wildlife.
- Sustainability of local fish populations.
- Sustainability of local amphibian and reptile populations.
- Sustainability of local insectivorous, piscivorous (fish-eating), and carnivorous bird populations.
- Sustainability of local insectivorous and piscivorous mammal populations.

Detailed quantitative assessments of the sustainability of selected fish and wildlife populations were conducted by selecting individual species representative of various feeding preferences, predatory levels, and habitats. Receptors selected to represent the Geddes Brook/Ninemile Creek ecological community for the BERA included benthic macroinvertebrates, four species of fish (bluegill, brook trout [*Salvelinus fontinalis*], smallmouth bass [*Micropterus dolomieu*], and white sucker), four species of birds (tree swallow, belted kingfisher [*Ceryle alcyon*], great blue heron, and red-tailed

hawk), and four species of mammals (little brown bat [*Myotis lucifugus*], short-tailed shrew, mink, and river otter). The remaining receptors (*i.e.*, terrestrial plants, amphibians, reptiles) were evaluated qualitatively.

Ecological Exposure Assessment

The assumptions and models used to predict the potential exposure of plants and animals to COCs associated with the Site are addressed in this component. Exposure parameters (*e.g.*, body weight, prey ingestion rate, home range) of wildlife species selected as representative receptors and Site-specific fish, channel sediments, floodplain soils/sediments, and water COC concentrations, were used to calculate the exposure concentrations or dietary doses using food-web models.

Ecological Effects Assessment

Mercury and numerous other potentially toxic chemicals, including metals, PCBs, PAHs, hexachlorobenzene, and PCDD/PCDFs, were detected at concentrations above ecological screening levels in various Site media.

Measures of toxicological effects were selected based on lowest-observed-adverse-effect levels (LOAELs) and no-observed-adverse-effect levels (NOAELs) from studies reported in the scientific literature. Reproductive effects (*e.g.*, egg maturation, egg hatchability, and survival of juveniles) were generally the most sensitive endpoints.

Risk Characterization

Multiple lines of evidence, based on various measurement endpoints (measures of effect), were used to evaluate major components of the Geddes Brook/Ninemile Creek ecosystem to determine if contamination has adversely affected plants and animals at the Site. Almost all lines of evidence indicate that inputs of chemicals to Geddes Brook and Ninemile Creek and their associated floodplains/wetlands in the lower reaches have produced adverse ecological effects at all trophic levels (levels of the food chain) examined. Ionic wastes have also impacted the Site, reducing habitat value for aquatic macrophytes, benthic invertebrates, and fish that use the stream for feeding or spawning.

As discussed in the BERA, mercury and possibly other chemicals have bioaccumulated in most organisms serving as a food source for biota in the Site, resulting in risks to fish and wildlife above acceptable levels. Comparisons of measured tissue concentrations and modeled doses of chemicals to measures of toxicological effects show exceedances of hazard quotients for chemicals at the Site. Many of the chemicals at the Site are persistent (*i.e.*, they remain in the same chemical state without breaking down); therefore, the risks associated with these chemicals are unlikely to decrease significantly unless remediation is performed.

Exceedances of toxicity-based sediment effects concentrations from the literature suggest that adverse effects to invertebrates due to contact with surface channel sediments and floodplain soils/sediments will frequently occur in lower Geddes Brook and lower Ninemile Creek. This is confirmed by sediment toxicity testing that was conducted in Geddes Brook and Ninemile Creek. These tests indicate that sediment toxicity appears to occur in both streams in those areas downstream of and directly influenced by the discharges of the West Flume from the LCP Bridge Street subsite.

Summary of Human Health and Ecological Risks

Key results of the HHRA include the finding that contamination at the Site presents risks to human health that are above EPA guidelines, particularly as a result of fish consumption. The primary sources of these cancer risks and noncancer health hazards are methylmercury, PCBs, and PCDD/PCDFs.

Key results of the BERA indicate that comparisons of measured tissue concentrations and modeled doses of chemicals to toxicity reference values show exceedances of hazard quotients for Site-related chemicals. Many of the contaminants at the Site are persistent and, therefore, the risks associated with these contaminants are unlikely to decrease significantly in the absence of remediation. On the basis of these comparisons, it has been determined through the BERA that all receptors of concern are at risk. Contaminants and stressors at the Site have either impacted or potentially impacted every trophic level examined in the BERA.

Based upon the results of the RI and the risk assessments, NYSDEC and EPA have determined that active remediation is necessary to protect public health or welfare and the environment from actual and threatened releases of hazardous substances into the environment.

Basis for Action

Actual or threatened releases of hazardous substances from the Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

The documents that form the basis of NYSDEC and EPA's selection of a remedy are included in the Administrative Record Index (see Appendix III) and include the final Geddes Brook/Ninemile Creek RI report, BERA, and HHRA (all dated July 2003), the draft final Geddes Brook/Ninemile Creek FS report (dated May 2005), the Ninemile Creek OU2 Supplemental FS report (dated May 2009), the Geddes Brook/Ninemile Creek OU1 ROD (dated April 29, 2009), the OU2 Proposed Plan (dated May 18, 2009), the comments on the above documents and the Geddes Brook/Ninemile Creek OU2 Proposed Plan received from the public during the comment period, and this ROD (which includes the Responsiveness Summary).

REMEDIAL ACTION OBJECTIVES AND REMEDIATION GOALS

Remedial action objectives (RAOs) are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), to-be-considered guidance (TBCs), and risk-based levels. There are no federal or New York State sediment cleanup standards for mercury or the other CPOIs found in Geddes Brook and Ninemile Creek channel and wetland sediments. However, as discussed below, NYSDEC's (1999) sediment screening criteria have been used as TBC criteria to develop remedial alternatives for the channel and floodplain.

Since completion of the Geddes Brook/Ninemile Creek FS Report (Parsons, 2005) in May 2005, NYSDEC issued soil cleanup objectives (SCOs) for inactive hazardous waste sites (6 NYCRR Part 375.6). Because the majority of the floodplain portion of the Site is a regulated wetland with soils more characteristic of sediments than upland soils, the Part 375 SCOs were not considered in this ROD to determine areas warranting remediation. However, as discussed below in the "Description

of Alternatives” section, the unrestricted use SCOs (6 NYCRR 375-6.8[a]) are goals that will be used to determine clean soil acceptable for use as suitable habitat layer material.

Although the channel sediments and floodplain soils/sediments are the primary focus of the remediation, the degrees of attainment of New York State’s surface water standards and guidance values and Site-specific fish target concentrations were also evaluated in this ROD.

The RAOs for this Site are based on Site-specific information including the nature and extent of CPOIs, the transport and fate of mercury and other CPOIs, and the baseline human health and ecological risk assessments. The RAOs were developed as goals for controlling CPOIs within the Site and protecting human health and the environment. The RAOs for this Site are:

- **RAO 1:** To eliminate or reduce, to the extent practicable, further transport of sediments and soils, containing mercury and other CPOIs, from the channel and floodplain of lower Geddes Brook and lower Ninemile Creek to Geddes Brook, Ninemile Creek, and, ultimately, Onondaga Lake.
- **RAO 2:** To eliminate or reduce, to the extent practicable, existing and potential future adverse ecological effects on fish and wildlife resources, as well as potential risks to humans.
- **RAO 3:** To eliminate or reduce, to the extent practicable, levels of mercury and other CPOIs in surface water in order to meet surface water quality standards.

In order to achieve these RAOs, remediation goals (RGs) were established to provide additional information with which remedial alternatives can be developed and selected. The Site contains four primary media that have been impacted by CPOIs: channel sediments, floodplain soils/sediments, biological tissue, and surface water. The following four RGs have been developed to address each of the affected media:

- **RG 1:** Reduce, contain, or control, to the extent practicable, mercury and other CPOI concentrations in erodible channel sediments and in erodible floodplain soils/sediments within the Site.
- **RG 2:** Achieve CPOI concentrations, to the extent practicable, in channel sediments and floodplain soils/sediments that are protective of human health and fish and wildlife resources. This RG covers a range of risk levels for mercury and other CPOIs.
- **RG 3:** Achieve CPOI concentrations, to the extent practicable, in fish tissue that are protective of humans and wildlife that consume fish.
- **RG 4:** Achieve, to the extent practicable, aqueous CPOI concentrations to meet surface water quality standards.

RG 1 – Erodible Channel Sediments and Erodible Floodplain Soils/Sediments

RG 1: Reduce, contain, or control, to the extent practicable, mercury and other CPOI concentrations in erodible channel sediments and in erodible floodplain soils/sediments within the Site.

Since the spread of mercury and most other key CPOIs (arsenic, lead, hexachlorobenzene, PCBs, PCDD/PCDFs, and PAHs) is primarily associated with the transport of soils and sediment particles, minimization of transport of sediments and soils from the streambed and floodplains of lower Geddes Brook and lower Ninemile Creek also would minimize the transport of these contaminants. This can be best addressed by targeting those CPOI-containing sediments and floodplain soils/sediments that are prone to erosion, resuspension, and transport through surface water. Therefore, RG 1 focuses on the erodible sediments and floodplain soils/sediments along lower Geddes Brook and lower Ninemile Creek to achieve reduction of transport of streambed sediments and floodplain soils/sediments.

As part of the RI report (see its Appendix H), a qualitative and quantitative assessment was conducted to determine which sections of the Geddes Brook and Ninemile Creek stream channels are erosional or depositional at low flows. This issue was further investigated in the FS report (see FS Figures 1-17 to 1-24, and its Appendix A) and in the Geddes Brook/Ninemile Creek OU1 Supplemental FS report (see its Appendix D). Using a quantitative model (*i.e.*, USACE's Hydrologic Engineering Centers River Analysis System [HEC-RAS] model), the erosion potential of the lower Geddes Brook and lower Ninemile Creek channels and floodplains was determined for a range of flows, up to and including the 500-year flood event. Results from these evaluations indicate that the streams and the banks within the floodplain are erosive at almost all locations during major storm events, while the floodplain overbank areas are depositional under all storm conditions. Thus, to address this RG, those areas subject to stream erosion (*i.e.*, all channel deposits and stream banks) are included in the remedial alternatives.

Applicability to RAOs

RG 1 addresses RAOs 1 through 3 to varying degrees, as follows:

- RAO 1: The reduction, containment, or control of mercury and other CPOI concentrations in erodible channel sediments and in erodible floodplain soils/sediments would directly address further transport of mercury and other CPOIs from channel sediments and from floodplain soils/sediments.
- RAO 2: Reducing the concentrations of mercury and other CPOIs on erodible channel sediments and floodplain soils/sediments would reduce the further transport of contaminants from the streambeds and floodplains, thus reducing adverse ecological effects to the benthic and terrestrial community. In addition, reductions of CPOI concentrations would reduce adverse effects associated with direct exposure of humans, fish, and wildlife to sediments and soils, as well as adverse effects associated with bioaccumulation of CPOIs.
- RAO 3: Reducing the transport of CPOIs from erosion of the streambeds and floodplains into the water column would help to address RAO 3 by reducing the levels of mercury and other CPOIs in surface water in order to meet surface water quality standards.

RG 2 – Channel Sediments and Floodplain Soils/Sediments

RG 2: Achieve CPOI concentrations, to the extent practicable, in channel sediments and floodplain soils/sediments that are protective of human health and fish and wildlife resources. This RG covers a range of risk levels for mercury and other CPOIs.

Toxicity

Target sediment concentrations that address direct contact toxicity to benthic organisms are considered “not-to-exceed” levels at individual locations. As directed by the NYSDEC (1999) Technical Guidance for Screening Contaminated Sediments, Site-specific sediment toxicity testing was conducted which confirmed sediment toxicity at the Site. However, this work did not produce sufficient data for the derivation of Site-specific toxicity-based sediment effect concentrations. Therefore, literature-based values were used in the BERA and in development of remedial alternatives which is common practice. The target concentrations considered for this Site include criteria/guidelines for sediment toxicity to benthic macroinvertebrates from New York State, as well as the Province of Ontario and Washington State. These literature values are based on studies of a wide variety of freshwater and marine aquatic systems. Each literature-based value is defined with a differing level of expected effects at each concentration. (See text boxes called “Toxicity-Based Sediment Effect Concentrations Selected as RGs for Mercury and Other Inorganics” [page 38] and “Toxicity-Based Sediment Effect Concentrations Selected as RGs for Organic Contaminants” [page 39].)

Toxicity-Based Sediment Effect Concentrations Selected as Remediation Goals for Mercury and Other Inorganics

To evaluate sediment quality at the Site, channel sediment and floodplain sediment/soil concentrations were compared to statewide criteria for sediment toxicity to benthic macroinvertebrates. These criteria are literature values that are based on studies of a wide variety of aquatic systems. The literature values used in developing this ROD were based on the following methods.

Effects Range-Low (ER-L) – The concentration that represents the lowest 10th percentile of the concentrations at which toxic effects were observed. At concentrations below the ER-L, toxic effects are rarely expected (Long and Morgan, 1990).

Effects Range-Median (ER-M) – The concentration that represents the 50th percentile (median) at which toxic effects were observed. At concentrations above the ER-M, toxic effects are likely to occur (Long and Morgan, 1990).

Lowest Effect Level (LEL) – The level of sediment contamination that can be tolerated by the majority (95 percent) of benthic organisms but still causes toxicity to a few (5 percent) species. It is derived in a two-step process in which the 90th percentile of the concentrations tolerated by a single species is determined (species screening level or SSLC). The 5th percentile concentration of the SSLCs considered represents the LEL (Persaud et al., 1993).

Severe Effect Level (SEL) – The level of sediment contamination that can causes toxicity to the majority (95 percent) of benthic organisms. It is derived in a two-step process in which the 90th percentile of the concentrations tolerated by a single species is determined (species screening level or SSLC). The 95th percentile concentration of the SSLCs considered represents the SEL (Persaud et al., 1993).

Sediment Quality Standard (SQS) – This concentration was derived for the Washington State Department of Ecology (Avocet and Science Applications International Corporation, 2002 and Avocet, 2003) by first assessing the strength of the relationship between individual contaminants and toxicity. For those contaminants which have a relationship with toxicity, an iterative statistical process is employed which provides the concentrations which are the most reliable predictors of toxic effects. The SQS for mercury cited in this ROD represents a concentration that is discernable from control samples with a change in mortality of 10 percent from the controls. Above this concentration, minor adverse effects may occur.

NYSDEC developed two levels of risk for metals contamination in sediment (NYSDEC, 1999). These are:

NYSDEC LEL – NYSDEC defines the LEL as the lowest of either the Persaud et al. (1993) LEL or the Long and Morgan (1990) ER-L.

NYSDEC SEL – NYSDEC defines the SEL as the lowest of either the Persaud et al. (1993) SEL or the Long and Morgan (1990) ER-M.

For **mercury**, which is the primary contaminant of concern at this Site, the following sediment RGs were used to develop and/or evaluate remedial alternatives: 0.15 mg/kg, which is the NYSDEC (1999) LEL; 0.5 mg/kg, which is the SQS from Washington State (Avocet, 2003); 1.3 mg/kg, which is the NYSDEC (1999) SEL; and 2.0 mg/kg, which is the Persaud et al. (1993) SEL.

Lead and arsenic are the other two inorganics that were determined to be potential risk drivers. For **lead**, the NYSDEC (1999) SEL of 110 mg/kg was used in developing the remedial alternatives while the LEL of 31 mg/kg was used for the comparative analysis. For **arsenic**, the NYSDEC (1999) SEL of 33 mg/kg was used in developing the remedial alternatives while the LEL of 6 mg/kg was used for the comparative analysis.

Toxicity-Based Sediment Effect Concentrations Selected as Remediation Goals for Organic Contaminants

For the organic contaminants that presented a potential impact to benthic toxicity, including hexachlorobenzene, PCBs, and phenol, NYSDEC's **Benthic Aquatic Life Chronic Toxicity (BALCT)** criteria, which are on an organic-carbon-normalized basis, were used to develop and/or evaluate each remedial alternative (NYSDEC, 1999). For purposes of the FS and this ROD, the Site-wide average for total organic carbon (TOC) in sediment of 2.1 percent was used to convert the BALCT criteria to a dry-weight basis for determining exceedances of the RGs. During the remedial design, additional TOC data would be obtained along with the chemical data for determining final areas of remediation.

For PCBs, the NYSDEC BALCT criterion of 19.3 µg/g organic carbon was used ($19.3 \mu\text{g/g organic carbon} \times 2.1\% / 100$) to derive a sediment RG of 0.405 mg/kg.

For hexachlorobenzene, the NYSDEC BALCT criterion of 5,570 µg/g organic carbon was used ($5,570 \mu\text{g/g organic carbon} \times 2.1\% / 100$) to derive a sediment RG of 117 mg/kg.

For phenol, 50 times the NYSDEC BALCT criterion of 0.5 µg/g organic carbon was used ($50 \times 0.5 \mu\text{g/g organic carbon} \times 2.1\% / 100$) to derive a sediment RG of 0.53 mg/kg. The factor of 50 was applied to phenol because, as stated in the NYSDEC Technical Guidance for Screening Contaminated Sediments (NYSDEC, 1999) "for non-polar organic contaminants, exceedance of sediment criteria based on aquatic life chronic toxicity by a factor of 50 in a significantly large area indicates that biota are probably impaired and to achieve restoration of the ecosystem will require remediation of organic contaminants present."

For total PAHs, the ER-M of 35 mg/kg was used in the development of each remedial alternative while the ER-L of 4 mg/kg was used for the comparative analysis.

In addition to channel sediments, the toxicity RGs are also considered to be relevant for floodplain sediments since a majority of the floodplain consists of sediments associated with delineated federal and state wetlands. The physical and chemical characteristics of the channel sediments and the wetland sediments that predominantly comprise the floodplain are very similar. Thus, the same set of toxicity RGs are used for both floodplain sediments and channel sediments.

Bioaccumulation

Target sediment and soil concentrations that address bioaccumulation are designed to protect humans, fish, and wildlife resources from bioaccumulation and are derived from the human health and ecological risk assessments for the Site. Site-specific target fish tissue concentrations to protect human health and wildlife (e.g., river otter, mink) against bioaccumulation were back-calculated from the HHRA risk models and BERA food web models. (See the text boxes on RGs in fish tissue to protect human health and ecological receptors [pages 41 and 42].) Then, target sediment concentrations for bioaccumulation of CPOIs from sediments to fish tissue were developed through the application of a biota-sediment accumulation factor (BSAF). Also, a target soil concentration was calculated for the protection of wildlife (e.g., short-tailed shrew) that consume terrestrial invertebrates. (See the text boxes on sediment quality values for channel sediments and floodplain soils/sediments to protect against bioaccumulation and direct contact [pages 44 and 45].) The Site-specific bioaccumulation-based sediment/soil quality values (BSQVs) calculated for mercury are 0.8 mg/kg for channel sediments and 0.6 mg/kg for soils.

Concentrations of PCBs and PCDD/PCDFs in fish tissue and hexachlorobenzene in invertebrates (modeled) were also determined to be risk drivers for human health and wildlife. PCBs, hexachlorobenzene, and PCDD/PCDFs are not widespread in Geddes Brook and Ninemile Creek and are found primarily in a few specific areas of the streams. The NYSDEC sediment screening

criteria for protection of wildlife and humans from bioaccumulation were used as the comparison values for these three CPOIs. Therefore, Site-specific BSQVs were not developed for these CPOIs. The areas where these CPOIs are elevated are generally co-located with areas that would be addressed under the remedial alternatives evaluated in this ROD.

Target sediment and soil concentrations that address bioaccumulation are considered on a surface area-weighted average basis, since fish and wildlife integrate soils/sediments exposure over a larger area than benthic invertebrates. Therefore, residual (*i.e.*, post-remediation) CPOI concentrations in channel sediments and floodplain soils/sediments on a surface area-weighted average basis reflect the concentrations at which bioaccumulating receptors are exposed. Additional information on how the remedial alternatives address these CPOIs can be found in the Geddes Brook/Ninemile Creek site OU2 Supplemental FS report (*e.g.*, Tables 3-3 and 3-4; Parsons, 2009).

Applicability to RAOs

RG 2 addresses RAOs 1 and 2 to varying degrees, as follows:

- **RAO 1:** Reducing the concentration of CPOIs in the channel sediments and floodplain soils/sediments would limit the amount of contaminants available for further transport.
- **RAO 2:** Reducing channel sediment and floodplain soil/sediment concentrations would directly reduce adverse ecological effects to the benthic community. In addition, reductions of CPOI concentrations would reduce adverse effects associated with direct exposure of humans, fish, and wildlife to sediments and soils, as well as adverse effects associated with bioaccumulation of CPOIs.

RG 3 – Fish Tissue

RG 3: Achieve CPOI concentrations, to the extent practicable, in fish tissue that are protective of humans and wildlife that consume fish.

RG 3 directly addresses RAO 2 by eliminating or reducing existing and potential future adverse ecological effects on fish and wildlife resources, as well as potential risks to humans. Quantitative fish tissue target concentrations were developed to protect wildlife and human health. It is expected that the achievement of these fish target concentrations will allow for individuals to consume fish at a higher rate than what is currently recommended under NYSDOH's fish consumption advisory for Onondaga Lake and its tributaries. (See text boxes on RGs in fish tissue to protect human health and ecological receptors [pages 41 and 42].) Site-specific BSQVs or NYSDEC sediment screening criteria to protect wildlife and humans from bioaccumulation were used as estimates of the concentrations in surface sediments and floodplain soils/sediments needed to reach acceptable target concentrations in fish tissue. (See text boxes on sediment quality values for channel sediments and floodplain soils/sediments to protect against bioaccumulation and direct contact [pages 44 and 45].)

Remediation Goals in Fish Tissue to Protect Ecological Receptors

Methylmercury was calculated to pose potential risks (*i.e.*, hazard quotients above 1) to piscivorous birds and mammals consuming fish from Geddes Brook and Ninemile Creek. RGs for mercury (as methylmercury) in fish tissue were developed for Geddes Brook and Ninemile Creek using risk-based methods, as there are no federal or New York State cleanup standards for mercury in fish to protect fish or wildlife.

The concentrations of methylmercury for the RGs for fish were calculated based on a hazard quotient of 1 for ecological receptors. The hazard quotients for ecological receptors were based on both the no-observed-adverse-effect level (NOAEL), representing the highest CPOI concentration at which no adverse effects are seen, and the lowest-observed-adverse-effect level (LOAEL), representing the lowest CPOI concentration shown to produce adverse effects. The RGs were calculated using the same exposure assumptions and toxicity values as the BERA.

Mercury fish tissue RGs range from 0.009 to 0.35 mg/kg ww, depending on the receptor species and whether the NOAEL or LOAEL is used to set the target hazard quotient. If only the LOAELs are used, the fish tissue RGs range from approximately 0.1 to 0.3 mg/kg ww.

The calculations for these values are presented in Section I.2 of Appendix I of the FS report.

Remediation Goals in Fish Tissue to Protect Human Health

Methylmercury and PCBs are bioaccumulative contaminants calculated to pose potential risks (*i.e.*, hazard quotients above 1) to humans consuming fish from Geddes Brook and Ninemile Creek. RGs for mercury (as methylmercury) and PCBs in fish tissue were developed for Geddes Brook and Ninemile Creek using risk-based methods. There are no federal or New York State human health cleanup standards for mercury or PCBs in fish.

The concentrations of methylmercury for the human health RGs for fish were calculated based on a hazard quotient of 1 for noncancer risk for humans (see the "Summary of Site Risks" section of this ROD). The human health hazard quotient of 1 for individual CPOIs indicates the "threshold level" below which noncancer effects are not expected to occur. The RGs were calculated using the same exposure assumptions and toxicity values as the HHRA.

Human health mercury target fish tissue concentrations range from 0.6 to 0.9 mg/kg ww for the reasonable maximum exposure (RME) scenario with the lower end of the range based on young children and the upper end of the range based on adults.

PCB target fish tissue concentrations based on cancer risk targets of 1×10^{-5} and 1×10^{-4} range from 0.11 to 1.1 mg/kg ww, respectively, for the RME scenario for adults. The target range for children (0.35 to 3.5 mg/kg ww) is slightly higher. The fish tissue target concentrations corresponding to a risk of 1×10^{-6} (0.011 mg/kg ww for adults to 0.035 mg/kg ww for children) may not be achievable since they are much lower than the mean background fish concentration (0.04 mg/kg) in U.S. waters. The target tissue concentrations for the RME scenario based on noncancer effects of PCBs (0.12 mg/kg ww for children to 0.19 mg/kg ww for adults) are within the range based on a cancer risk target of 1×10^{-5} (0.11 to 0.35 mg/kg ww).

Concentrations of PCDD/PCDFs for human health RGs for fish were also calculated based on cancer risks. RGs for noncancer effects could not be developed (see HHRA). PCDD/PCDF target fish tissue concentrations based on cancer risk targets of 1×10^{-5} and 1×10^{-4} range from 1×10^{-6} to 1×10^{-5} mg/kg ww, respectively, for the RME scenario for adults. The target range for children (5×10^{-6} to 5×10^{-5} mg/kg ww) is slightly higher. The fish tissue target concentrations corresponding to a risk of 1×10^{-6} (1×10^{-7} mg/kg ww for adults to 5×10^{-7} mg/kg ww for children) may not be achievable since they are much lower than the mean background fish concentration (8×10^{-7} mg/kg) in U.S. waters.

These concentrations assume that only a fraction of the fish consumed by an individual comes from Geddes Brook or Ninemile Creek due to the limited carrying capacity of these water bodies. The calculations for these values are presented in Section I.3 of Appendix I of the Geddes Brook/Ninemile Creek FS report (Parsons, 2005) and in Attachment A-2 of Appendix A of the OU1 Supplemental FS report (Parsons, 2008a).

It should be noted that EPA's National Recommended Water Quality Criterion for methylmercury, as measured in fish tissue, is 0.3 mg/kg. When both wildlife and human health fish tissue RGs for Geddes Brook/Ninemile Creek are considered, the overall range of Site-specific fish tissue RGs for mercury (*i.e.*, about 0.1 to 0.6 mg/kg using the LOAEL for wildlife and the RME for human health) encompasses the EPA criterion¹². Fish tissue target concentrations for PCBs and PCDD/PCDFs are presented in the RGs in fish tissue to protect human health text box on page 42.

¹² The target fish tissue concentrations for mercury (0.1 and 0.3 mg/kg) are similar to the mean background concentration of mercury in fish of U.S. lakes and reservoirs (approximately 0.2 mg/kg; see Appendix G, page G-6 and Table G.1 of the Onondaga Lake FS [Parsons, 2004] and supplemental data through 2003 [EPA, 2005]). Target fish tissue concentrations based on the subsistence fisher consumption rate evaluated in the uncertainty section of the HHRA are not included since these concentrations would not likely be achievable without a reduction in background sources of mercury and would not be a representative measure of the effectiveness of Site remedial actions.

RG 4 – Surface Water

RG 4: Achieve, to the extent practicable, aqueous CPOI concentrations to meet surface water quality standards.

RG 4 directly addresses RAO 3 by eliminating or reducing levels of mercury and other CPOIs in surface water to meet surface water quality standards. Geddes Brook and Ninemile Creek currently meet most New York State surface water quality standards and guidelines (6 NYCRR Part 703). Numeric state surface water quality standards that are consistently not met in Geddes Brook and/or Ninemile Creek are those for aluminum, iron, mercury, and dissolved solids. The two lowest numeric state water quality standards for mercury are also periodically exceeded. The lowest standard, 0.7 ng/L as dissolved mercury for protection of human health via fish consumption, was exceeded in four of 29 surface water samples collected for the RI in 1998. These exceedances occurred in samples from two locations, one in lower Geddes Brook and one in the West Flume near the confluence with Geddes Brook. The samples collected from lower Geddes Brook (a sample and a field duplicate) had dissolved mercury concentrations of 1.3 and 1.4 ng/L. The two samples collected from the mouth of the West Flume had concentrations of 41.4 and 56.8 ng/L. The water quality standard to protect wildlife from exposure to mercury, 2.6 ng/L as dissolved mercury, was exceeded in only the two samples collected from the West Flume. It should be noted that the West Flume, which was sampled during the Geddes Brook/Ninemile Creek RI, has been remediated by Honeywell as part of the cleanup of the LCP Bridge Street subsite.

Narrative water quality standards for turbidity and suspended solids are periodically exceeded in both streams, and sporadic exceedances have been observed for several other CPOIs including thallium and chlorobenzene. For these constituents and other CPOIs, the reduction of CPOIs in Site-related contributions from contaminated sediments and soils is expected to result in the achievement of the New York State water quality standards. In addition, closure of the wastebeds would help to achieve narrative water quality standards, including the prohibitions for turbidity and for suspended, colloidal, or settleable solids.

Summary

The goals of the selected remedy are to achieve the RAOs and RGs as defined in this ROD. Per the NCP, the success or failure of the Geddes Brook/Ninemile Creek remedial program, as assessed every five years, will be based on the attainment of all RGs and cleanup levels.

Because of the importance of the Geddes Brook/Ninemile Creek ecosystem as a natural resource, the protection of habitat through remediation and corresponding restoration has been an important consideration in the development of the various dredging/excavation and capping alternatives. The goal of restoring productive aquatic and terrestrial (wetland) habitats in the Site has been considered throughout the analysis of the various alternatives, along with the need to provide an effective remedy. A Site-wide habitat restoration plan will be prepared during the remedial design.

Sediment Quality Values for Channel Sediments to Protect from Bioaccumulation and Direct Contact

Since a variety of dynamic factors affect contaminant levels in fish, bioaccumulation-based sediment quality values (BSQVs) were developed for Geddes Brook and Ninemile Creek to estimate the mercury concentrations in sediments associated with the fish tissue RGs. These BSQVs were derived to be protective of human health and the environment by reducing the potential for bioaccumulation from the sediments into fish. The first step entailed calculating site-specific biota-sediment accumulation factors (BSAFs) for fish filets consumed by people and for whole fish consumed by wildlife using Geddes Brook and Ninemile Creek fish and surface sediment data. BSAFs for mercury were calculated by dividing the average contaminant concentration in fish tissue by the average contaminant concentration in sediments of lower Ninemile Creek.

The mercury RGs for fish based on human and wildlife fish consumption were divided by the BSAF to calculate the target concentration of mercury in sediments. The human health sediment target concentrations of mercury were calculated to be between 2.1 and 3.2 mg/kg for the RME scenario, depending on the receptor used (*i.e.*, adult, older child, young child).

Mercury wildlife sediment RGs range from 0.08 to 2.0 mg/kg, depending on the receptor species and whether the NOAEL or LOAEL is used. Avian mercury target levels range from 0.1 to 2.0 mg/kg and mammalian target levels range from 0.08 to 0.8 mg/kg. The most sensitive ecological receptors, the mink and river otter, were used to calculate a LOAEL-based sediment target of 0.8 mg/kg. As this ecological-based target level was less than the low end of the human health target concentration range of 2.1 to 3.2 mg/kg (*i.e.*, also protective of human health), 0.8 mg/kg was selected as the target BSQV for mercury to compare to post-remediation surface-weighted average sediment concentrations (SWACs). The bioaccumulation-based targets are applied on an area-weighted basis (*i.e.*, by reach rather than point-to-point) since animals, such as fish, that bioaccumulate mercury and other bioaccumulative contaminants are not limited to a specific location of the Site.

A Site-specific BSQV was not calculated for PCBs, as discussed in Appendix A of the Supplemental FS (Parsons, 2008a). As discussed in the text of the ROD, NYSDEC's bioaccumulation-based sediment screening criteria (NYSDEC, 1999) were used for evaluation purposes. The NYSDEC wildlife bioaccumulation screening value for PCBs is 0.03 mg/kg based on 2.1% total organic carbon (TOC). The NYSDEC screening value for human health bioaccumulation for PCBs is below the detection limit at the Site and was therefore not used for evaluation purposes.

A Site-specific BSQV was also not developed for hexachlorobenzene since the NYSDEC sediment screening criterion (NYSDEC, 1999) to protect wildlife from bioaccumulation was used as the comparison value for hexachlorobenzene. This value is 0.25 mg/kg based on 2.1% TOC. PCDD/PCDFs exceeded NYSDEC bioaccumulation screening criteria at only three of the 194 locations sampled. These locations would be remediated based on concentrations of other contaminants (*e.g.*, mercury) detected. Therefore, RGs for PCDD/PCDFs in sediments were not developed.

Target concentrations for dermal exposure pathways were derived by adjusting concentrations of the CPOIs identified to result in a cumulative risk estimate of 1×10^{-5} (specifically, 1.49×10^{-5}) for all CPOIs. In these calculations for human health-based sediment concentrations for direct contact, a cumulative risk target of 1×10^{-5} (which is the midpoint of the risk range considered in CERCLA HHRAs) was applied. The remaining CPOIs were conservatively assumed to remain unchanged, although remedial methods to address any given CPOI would likely reduce concentrations of all chemicals present. Within the project area, benzo(a)pyrene had the largest contribution to the risk estimates. Remedial methods that address benzo(a)pyrene would also be expected to be effective with additional co-located PAHs. The RG to protect from direct exposure to sediments/soils is 1.3 mg/kg of benzo(a)pyrene.

The calculations for these values are presented in Sections I.4 and I.5 of Appendix I of the FS report and in Attachment A-2 of Appendix A of the OU1 Supplemental FS report (Parsons, 2008a).

***Sediment Quality Values for Floodplain Soils/Sediments to Protect from
Bioaccumulation and Direct Contact***

BSQVs that are protective of human health and the environment were also developed for mercury, benzo(a)pyrene (representing PAHs), and hexachlorobenzene in Geddes Brook/Ninemile Creek floodplain soils/sediments.

To protect wildlife that consume terrestrial invertebrates, the first step of BSQV development entailed modeling rates of mercury accumulation in terrestrial invertebrates based on a transfer factor derived from the literature. The target concentration was then calculated using receptor-specific data and toxicity values. The LOAEL-based mercury RG to protect the most sensitive ecological receptor, the short-tailed shrew, was calculated to be 0.6 mg/kg.

A target concentration of 0.25 mg/kg was established for hexachlorobenzene to be protective of wildlife based on NYSDEC's bioaccumulation-based sediment screening criterion. See text box above entitled "Sediment Quality Values for Channel Sediments to Protect from Bioaccumulation and Direct Contact."

To protect recreational visitors that may contact sediments, the benzo(a)pyrene direct contact-based value of 1.3 mg/kg calculated for channel sediments was also selected for floodplain soils/sediments, as the exposure assumptions were the same for both media.

The calculations for these values are presented in Sections I.4 and I.5 of Appendix I of the FS report and in Attachment A-2 of Appendix A of the OU1 Supplemental FS report (Parsons, 2008a).

DESCRIPTION OF REMEDIAL ALTERNATIVES

General

CERCLA §121(b)(1), 42 U.S.C. §9621(b)(1), mandates that remedial actions must be protective of human health and the environment, comply with ARARs, be cost-effective, and utilize permanent solutions, alternative treatment technologies, and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants at a site. CERCLA §121(d), 42 U.S.C. §9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA §121(d)(4), 42 U.S.C. §9621(d)(4) (see the nine evaluation criteria listed below in the "Comparative Analysis of Disposal Options and Remedial Alternatives" section of this ROD).

The media of concern for remediation at the Site are channel sediments and surface water, and floodplain soils/sediments. Alternatives that specifically address these media were developed in the Geddes Brook/Ninemile Creek FS report (Parsons, 2005) and Geddes Brook/Ninemile Creek OU2 Supplemental FS report (Parsons, 2009). Specific areas of the Site which exhibit different characteristics that are important to the development of remedial alternatives are presented in Figure 10. This figure also shows the station markers for lower Ninemile Creek. The channel sediments between Stations 0+00 and 3+00 (lower 300 ft [90 m]), which are downstream of Reach AB, are being addressed under the Onondaga Lake remedy.

The Geddes Brook/Ninemile Creek FS report evaluated a variety of remedial alternatives for both channel sediments and floodplain soils/sediments, using combinations of removal to various depths, isolation capping, backfilling, and habitat layer placement, to meet a range of PRGs. Permutations of the channel and floodplain alternatives were then further combined to assemble Site-wide alternatives. As described in the Geddes Brook/Ninemile Creek OU1 and OU2 Supplemental FS reports, a number of Site investigations and assessments have been conducted since the submittal of the FS report, which have resulted in a better understanding of Site features and physical and ecological conditions. In consideration of the recent investigations and assessments, and to facilitate a more focused evaluation of alternatives, the OU2 Supplemental FS report and this ROD evaluate four alternatives: three representative alternatives from the FS report (updated to reflect the recent Site information) and a new alternative (based on the recent Site information). Also, while the FS report presented and evaluated alternatives separately for channel and floodplain areas, the alternatives in the OU2 Supplemental FS report and this ROD reflect coordinated activities for channel and floodplain areas to facilitate a focused evaluation.

With the exception of the “no action” alternative, all of the alternatives included in this ROD involve some combination of the following remedial technologies, which are described on the following pages:

- Dredging/excavation to remove contaminated channel sediments.
- Excavation to remove contaminated floodplain soils/sediments.
- Consolidation and disposal in the containment area at Honeywell’s LCP Bridge Street subsite and/or the SCA that will be constructed at Wastedbed 13 as part of the remediation of the Onondaga Lake Bottom subsite. The FS report and OU2 Supplemental FS report also evaluated disposal at a New York State commercial landfill which is not in the vicinity of Onondaga Lake (see discussion below).
- Water treatment.
- Isolation capping of channel sediments.
- Backfilling.
- Installation of habitat layer.

Each of the action alternatives also includes wetland and stream restoration. Any wetland habitat that is disturbed as a result of remedial action would be restored. In instances where restoration is not feasible, actions such as wetland mitigation would be required. The design and construction of restoration elements must be consistent with the substantive requirements for permits associated with disturbance to state- and federal-regulated wetlands (*e.g.*, 6 NYCRR Part 663, Freshwater Wetlands Permit Requirements) and navigable waters (*e.g.*, 6 NYCRR Part 608, Use and Protection of Waters). The details would be developed during the remedial design, as part of a habitat restoration plan for the Site.

The alternatives proposed for the Site are based on a variety of and, in some cases, a combination of technologies. Therefore, the section on technologies (below) is presented before the “Description of Geddes Brook/Ninemile Creek Operable Unit 2 Remedial Alternatives” section so that the alternatives may be clearly understood.

Technologies

Removal of Contaminated Channel Sediments (Dredging/Excavation) and Floodplain Soils/Sediments (Excavation)

Channel Sediments (Dredging/Excavation)

Removal of channel sediments can be accomplished in a submerged aqueous environment using hydraulic and/or mechanical dredging equipment or in a “dry” environment using more conventional upland construction equipment to excavate sediments after water has been drained and diverted.

Dredging and/or excavation at the Site would involve removal of contaminated channel sediments from lower Ninemile Creek to a depth that achieves a specified residual contaminant concentration (less than RGs) or enables installation of a cap and habitat layer. It should be noted that lower Geddes Brook sediments will be excavated down to the underlying clay layer as part of the Geddes Brook IRM (for a detailed discussion of the Geddes Brook IRM, see the “Honeywell Facilities and Disposal Areas near Geddes Brook/Ninemile Creek” section of the OU1 ROD).

Sediments can be dredged hydraulically, mechanically, or by a combination of the two. Mechanical dredging was selected as the representative process for detailed evaluation in the FS report for estimating costs; however, the actual dredging and excavation methods would be determined during design. The type of dredging/excavation to be performed would likely depend on the Site-specific area and stream reach conditions. Any requisite stream bank removal (for cap construction or contaminant excavation) would be performed using on-shore mechanical excavation.

The remedial design will need to evaluate appropriate roadway and bridge structural stability and safety-related considerations. These considerations may impose limitations on the depths and footprints of removal in the vicinity of transportation structures.

Floodplain Soils/Sediments (Excavation)

Excavation at the Site would involve removal of floodplain soils/sediments from along lower Ninemile Creek to various depths. As discussed below, after removal, backfilling and placement of a habitat layer would occur to appropriate ground elevations to provide terrestrial or wetland habitat, as part of a habitat restoration plan for the Site. It was assumed for the FS report and this ROD that floodplain soils/sediments would be removed using standard construction techniques such as backhoes and excavators.

Disposal

Sediment dredging and soil excavation projects require land areas for operations support and materials management (which includes dewatering, water treatment, solids staging and loading, and final disposal) of the dredged/excavated sediment and soil. Typically, the dredged/excavated material from a remediation project is either consolidated in an on-site disposal location (with treatment, if required) if sufficient land area is available or is transported off-site for treatment or disposal.

The assessment of various land disposal options included consolidating excavated materials within the containment system at Honeywell’s nearby LCP Bridge Street subsite and/or the SCA that will be constructed at Wastebed 13 as part of the remediation of the Onondaga Lake Bottom subsite,

and disposing of excavated materials at an existing permitted landfill in the Rochester, New York, area. The estimated costs for these disposal options are included in the descriptions of alternatives below.

Water Treatment

Dredging/excavating, dewatering, and sediments handling can generate significant volumes of water. Transport and off-Site treatment of this water was evaluated for each of the remedial alternatives in the FS report. However, the OU2 Supplemental FS report demonstrated that on-Site treatment, at a location in the vicinity of the Site, and discharge of water would be more cost-effective and efficient. The actual location of treatment would be determined as part of the remedial design. On-Site treatment and discharge of waters generated by the excavation of contaminated sediments and soils is assumed, for the purpose of the OU2 Supplemental FS report, to be similar to the temporary treatment system used at the LCP Bridge Street subsite, which consisted of pH adjustment equipment, a clarifier tank, bag filters, sand filters, and a granular activated carbon (GAC) and/or sulfur-impregnated GAC filtration system. Estimated equipment and operating costs for the temporary system are based on the system used at LCP. The treated water may be released back to the Geddes Brook/Ninemile Creek watershed in accordance with discharge requirements to be determined by NYSDEC, or managed in another way determined to be acceptable to NYSDEC.

Placement of Clean Materials (Channel and Floodplain)

The placement of clean material is included in all of the action alternatives developed for the Site. There are several purposes for placing clean materials over the Site, including to restore the natural elevations in the floodplain, to prevent potential adverse exposure to residual contaminated channel sediments and floodplain soils/sediments by human and ecological receptors, to provide habitat for wetland and upland species (e.g., through vegetative cover), and to provide stable slopes and stream banks.

Depending on location, as described further in this ROD, these clean materials would consist of one or more of the following layers, from the surface down:

- **Habitat Layer:** Clean material designed to provide the proper conditions for animal and plant communities to grow. This layer is assumed in this ROD to be a minimum of 2-ft (60-cm) thick, unless otherwise noted. The type of substrate would be determined during design and might include a variety of materials in the stream and floodplain.
- **Backfill:** Soils used to bring the sediment or ground surface to an appropriate elevation below the habitat layer but not necessarily proper material for habitat (e.g., inappropriate grain size, or organic content).
- **Isolation Cap:** Clean sand or other suitable clean material designed to isolate the habitat layer from underlying residual contamination in areas where contaminant transport via sediment porewater is a concern (i.e., the stream channel or wetlands).
- **Sand Base Layer:** Where an isolation cap is not needed, a sand base layer (called a mixing layer if under an isolation cap), which is a relatively thin layer of sand, would be placed on top of the underlying sediments (or backfill) prior to placement of the habitat layer. A sand layer would prevent clay or silt particles from migrating into the habitat layer above it, and

would provide the added benefit of attenuating residual contamination that may remain after dredging.

Where dredging/excavating results in removal of all significant contamination in the stream or floodplain, the area would be backfilled to bring the sediment or ground surface up to the designed elevation, if needed, and a habitat layer would be placed.

In floodplain areas, the area would be backfilled to bring the ground surface up to the designed elevation, if needed, and a habitat layer would be placed on top of the backfill. Unlike the channel areas where residual contamination could migrate upward due to diffusion and advection of porewater, a separate isolation cap may not be needed to isolate residual contamination at depth if residual contamination remains below the depth of removal within the floodplain.

In the development of the floodplain alternatives, the potential for CPOI upwelling in the floodplain was determined not to be significant since groundwater is typically at a depth of 6 inches (15 cm) or more below the ground surface in the SYW-10 wetland. In addition, portions of this wetland area are inundated at times from high lake and stream levels. However, due to limited available data, additional data would be obtained during the remedial design to assist with determining if upwelling is a significant concern in the floodplains. If it is determined during design that there is upwelling in certain areas of the wetlands or floodplains, then deeper removal of contaminated soils/sediments (beyond that required in the alternative selected) and/or placement of an isolation cap may be needed prior to placement of the habitat layer to prevent unacceptable migration of contamination by groundwater.

The use of clean materials for the purposes of isolation capping, habitat restoration, and backfilling is discussed further below.

Isolation Capping of Channel Sediments

Isolation capping involves placement of an engineered cap on top of post-excavation, residual contaminated sediments to meet the following objectives:

- Provide physical isolation of the contaminated sediments from benthic organisms and other animals and human contact.
- Physically stabilize the sediments to prevent resuspension, contaminant mobilization, and sediment transport.
- Provide chemical isolation of contaminated sediments from advective or diffusive flux into the overlying surface waters.

Specific factors that would be evaluated as part of the design of the engineered cap include erosion, groundwater upwelling, bioturbation, chemical isolation, habitat protection, settlement, static and seismic stability, and placement techniques. The Geddes Brook/Ninemile Creek FS and Geddes Brook/Ninemile Creek OU1 and OU2 Supplemental FS reports included preliminary evaluations of many of these factors.

The isolation cap, if included as a component of the selected remedy, would be constructed following removal of contaminated sediments and would consist of as many as three layers, each of which would serve a specific purpose; a mixing layer, a chemical isolation layer, and an armor

(erosion) layer. A habitat layer would be placed above the isolation cap as well as in areas dredged/excavated where an isolation cap would not be needed.

Mixing Layer

The first layer of the engineered cap on top of residual contaminated sediments that remain following removal is referred to as the mixing layer, which accounts for mixing of the cap material with the underlying sediments and uneven application during cap placement. A layer of substrate would be placed as a mixing layer where required. The actual thickness of the mixing layer, if an isolation cap is necessary, would be determined during design.

Chemical Isolation Layer

Above the mixing layer is the chemical isolation layer which “isolates” contaminants in the sediments below the cap. The chemical isolation layer would be a minimum of 1-foot (30-cm) thick. The thickness of the chemical isolation layer is determined based on computer modeling, such that concentrations of contaminants within the sediments beneath the cap do not result in unacceptable levels of exposure to aquatic life at the surface of the cap (which assumes that the cap thickness does not decrease over time [*i.e.*, does not erode]). During the design phase (if isolation capping is part of the selected remedy), the isolation capping model would be rerun as needed based on additional field data to be collected and cap thicknesses and/or removal depths would be revised as appropriate. However, based on practical considerations of constructing an engineered cap in a stream environment and for long-term effectiveness, the thickness of the isolation layer would be designed to be no less than 1 ft (30 cm).

Modeling for chemical isolation performed during the FS and OU2 Supplemental FS was used to calculate the maximum allowable CPOI sediment concentrations that can remain beneath the isolation layer of the cap without resulting in unacceptable levels at the base of the habitat (surface) layer of the cap at 1,000 years or steady state¹³ (whichever happens first), from chemical upwelling, diffusion, or other transport processes (see the text box entitled “Isolation Capping Model” on page 51). The point of compliance being at the base of the habitat layer is intended to ensure that the isolation portion of the cap is effective in preventing unacceptable concentrations of contaminants (*i.e.*, concentrations greater than the lowest RG for mercury of 0.15 mg/kg and RGs for other CPOIs) from entering the habitat restoration layer.

¹³

Steady state is the point at which the chemical concentrations within the isolation layer would reach their maximum predicted values. The period of time to achieve steady state could be less than or greater than 1,000 years.

Isolation Capping Model

A model was developed to assess the effectiveness of in-situ isolation capping of the channel sediments of Ninemile Creek OU2 and to estimate the maximum CPOI concentrations that can remain in the sediments beneath the cap without resulting in an exceedance of the RG concentrations at the top of the cap due to chemical upwelling, diffusion, or other transport processes. In-situ capping involves placement of an engineered cap over contaminated sediment to prevent or limit the movement of contaminated porewater from the sediment into the water column and minimize exposure of benthic organisms to the contaminated sediments. The placement of an isolation cap, if needed, would include the following:

1. A mixing layer, designed to address the mixing of underlying sediments with the cap material during placement, as well as uneven placement.
2. An isolation layer, designed to prevent or limit vertical chemical migration.
3. An armor layer, designed to protect the isolation layer from erosional processes such as channel flow and ice scour.
4. A habitat layer, designed to provide habitat for fish and benthic macroinvertebrates and allow for bioturbation processes without exposure to contaminated sediment or disruption of the isolation layer material.

This model assumes that the cap is armored, so that erosion of the cap is minimal and does not provide the primary means of contaminant migration.

During the FS, a steady-state cap model was run using an iterative approach to estimate maximum allowable sediment concentrations for key CPOIs for a range of isolation layer thicknesses up to 2 ft (60 cm). These sediment concentrations were then used in each alternative to identify deeper remediation areas necessary for cap effectiveness. The model is discussed in detail in Appendix H of the Geddes Brook/Ninemile Creek FS report.

During the OU2 Supplemental FS, a transient cap model was run at 1,000 years to estimate an appropriate isolation layer thickness assuming varying sediment concentrations for mercury, PCBs, hexachlorobenzene, benzo(a)pyrene, and phenol. As discussed in the OU2 Supplemental FS, an upwelling velocity of 100 cm/yr was assumed for Reach AB. Detailed modeling results are provided in Appendix E of the OU2 Supplemental FS report, and the results are summarized below.

- Within Reach AB, an isolation layer thickness of 1.25 ft (38 cm) would result in attainment of the RGs for mercury, PCBs, hexachlorobenzene, benzo(a)pyrene, and phenol.

A preliminary estimate of the groundwater upwelling velocity in Reach AB (*i.e.*, 100 cm/year) was used in the isolation capping model. Preliminary modeling indicates that the isolation cap, if required in Reach AB, would need to be 1.25 ft (38 cm) thick. If isolation capping is part of the selected remedy, during the design phase, additional field data would be collected to verify the estimated groundwater upwelling velocity, and the isolation capping model would be rerun as needed (should isolation capping be a component of the selected remedy) and cap thicknesses and/or removal depths would be revised as appropriate.

As discussed in the OU2 Supplemental FS report, a final determination of model applications and input assumptions would be made during the design based on available data and the selected remedial approach for the Site. In general, chemical isolation layer designs should be based on an appropriate level of conservatism in the selection of design parameters to address uncertainties. A buffer (or safety) layer is also an approach that can be used to address uncertainties surrounding selection of design parameters. The need for a buffer layer would be determined during design based on the selected remedial approach and on an assessment of the design investigation data.

Armor (Erosion) Layer

An armor or erosion control layer (e.g., gravel) would be included in the cap design/construction above the chemical isolation layer. Erosion mechanisms can be classified into two distinct categories based on sediment bed properties, cohesive sediments (fine-grained with clay particles which tend to bind the sediment particles together) and non-cohesive (larger particles such as sand or gravel which do not interact with each other). Cohesive sediments (e.g., the silts and Solvay wastes in the stream) tend to resist erosion better than would be predicted from their size alone because of their binding action, but once the channel flow reaches the critical water velocity, deposits of cohesive sediments tend to erode out quickly and completely. The particles of sand in non-cohesive sediments (e.g., the sand that would be used in the isolation layer of the cap) would be eroded out of the stream bed as individual particles at their critical water velocities, with the water removing the smaller particles first and leaving larger particles behind. Each deposit of non-cohesive sediments would erode until a layer of larger stone is either encountered or is produced by the current removing smaller grains until only particles larger than the critical size remain. Such a layer would then effectively guard (armor) the sediments below it from any further erosion.

In order to assess the potential for erosion, the USACE's HEC-RAS flood velocity model was run by Honeywell for lower Ninemile Creek, with results indicating that much of the channel is erosional under high-flow conditions and that an armor layer would be required to prevent erosion of the underlying chemical isolation layer under base flow and flood events (see text box entitled "Flood Flow Model" on page 53). An armor layer would be placed beneath the habitat layer, where necessary, to further protect the underlying chemical isolation layer of the cap against erosion from high flows and ice scour. Specific details of the cap configuration, including the thicknesses of each layer, would be determined during the remedial design. It was assumed for the FS report (Parsons, 2005) that the sediment cap would include a 0.5-ft (15-cm) thick erosion protection layer. For the OU2 Supplemental FS report (Parsons, 2009), the combined thickness of the armor layer and habitat layer (see below) was assumed to be 2 ft (60 cm). A determination of the final thickness of the armor layer and whether a portion of the armor layer could be incorporated into the habitat layer would be made during design.

Habitat Layer

A habitat layer would be placed throughout the remediated area whether or not an isolation cap is present.

Where an isolation cap is required, the habitat layer would be placed above the chemical isolation and armor layers. In the aquatic areas (streams and wetlands), the overlying habitat layer would be designed to be compatible with local benthic and other aquatic life forms and would provide suitable substrate to establish aquatic vegetation, where appropriate. In the floodplain areas, the habitat layer would be of sufficient thickness to protect burrowing animals from being exposed to contaminated soils/sediments at depth.

A minimum of 2 ft (60 cm) of clean soil or other suitable material, as determined during design, would be used as the habitat layer in channel and floodplain areas of lower Ninemile Creek where CPOIs exceeding the RGs remain in the residual soils/sediments. The goal for the concentrations of this clean material for mercury, other CPOIs, and other constituents would be NYSDEC's sediment criteria (including the LEL of 0.15 mg/kg for mercury) in sediments and 6 NYCRR Part 375 unrestricted use soil cleanup objectives (including the objective of 0.18 mg/kg for mercury) in soil. Clean soil would include imported fill materials from off-Site sources.

Flood Flow Model

The HEC-RAS flood model Version 3.1 was used to evaluate hydraulic effects of the remedial alternatives. Model simulations were conducted to provide data on the extent of flooding within the Geddes Brook and Ninemile Creek channels and floodplains and flow velocities, depths, and shear stresses associated with various storm events. These data were then used to evaluate the stability of various substrates (with different thicknesses and sediment type) and channel alignments.

The term "erosion" refers to the ability of the channel sediment to be eroded or moved by flowing water. Sediments will erode when the stream velocity exceeds the critical velocity for moving or eroding sediment particles. The size of the material used as the armoring layer (if required above the isolation layer) must be able to withstand erosive forces associated with the 100-year storm event. In addition, the habitat layer should be able to withstand certain storm conditions, although some of this layer may erode and become re-deposited, which is natural in streams.

The model included lower Ninemile Creek from Onondaga Lake to the confluence with Geddes Brook, and lower Geddes Brook from the confluence with Ninemile Creek to the confluence with the West Flume. Based on results, the material used for the armoring layer could be comprised of either graded gravel or riprap. The modeling effort is discussed in detail in Appendix D of the OU1 and OU2 Supplemental FS reports.

The HEC-RAS model would be updated during design based on detailed bathymetric and topographic surveys to be conducted throughout the Site. This updated model would be used during remedial design to ensure that the remedy is protective and stable and meets requirements for protection of existing infrastructure and floodplain areas (*i.e.*, no adverse increase in water elevations or extent of flooding as compared to existing conditions).

The actual make up of the habitat layer would be determined during the design. The intention of the habitat layer is to provide the substrate necessary for the restoration of a diversity of habitats throughout the stream corridor. The habitat layer will consist of clean materials, the contents of which will depend on the final habitat goals for the section of the Site. The substrate organic content, grain size and distribution, thickness, and placement may vary depending on the location within the Site. The expected forces of any erosional events on the habitat layer will have to be considered during design. The habitat layer may also be influenced by the species of biota that will be expected in the area after remediation. The placement of large habitat or stream structures, such as boulders, woody debris, or flow diversions, would be considered in the design of the habitat layer.

Overall, natural stream restoration techniques would be used in designing both the channel remedy and the habitat layer with the goal of creating a diversity of stream and near-stream habitats and minimizing hardening of the channel and banks, to the extent feasible. To the greatest extent possible and if applicable, the existing pool and riffle habitats would be restored within the stream. The details of the habitat layer would have to meet the substantive requirements of 6 NYCRR Part 608.

A habitat restoration plan would be developed as part of the remedial design, and would include a determination of the final thickness and substrate of the habitat layer as well as planting plans and specifications, including the species composition of any plantings or seed mixes (*e.g.*, species native to floodplain forests of the northeast).

Backfilling in Removal Areas

There are several potential reasons for backfilling in the remedial area without the need for a fully engineered isolation cap, including restoration of surface topography after removal, stabilizing

slopes, and creating desirable habitat features. Backfilling would include the use of soils to bring the sediment or ground surface to an appropriate elevation below the habitat layer, but these soils would not necessarily consist of appropriate material for habitat (e.g., inappropriate grain size, or organic content).

GEDDES BROOK/NINEMILE CREEK OPERABLE UNIT 2 REMEDIAL ALTERNATIVES

For the action alternatives, the cleanup criteria are based on the RGs developed for the Site (see the “Remedial Action Objectives and Remediation Goals” section of this ROD). As discussed therein, screening of CPOIs identified in the RI report, which included COCs and COPCs from the BERA and HHRA, was conducted in the FS, and based on those results, quantitative PRGs were developed for the following CPOIs: mercury, arsenic, lead, total PAHs, benzo(a)pyrene, PCBs, hexachlorobenzene, and phenol. These PRGs address both direct toxicity and bioaccumulation impacts on human health and the environment, including fish tissue and surface water exposure pathways. For mercury, the sediment toxicity RG concentrations ranged from 0.15 to 2 mg/kg. For this ROD, these PRGs are selected as the RGs. RG concentrations for mercury and the other CPOIs are presented in the text boxes in the “Remedial Action Objectives and Remediation Goals” section of this ROD. Calcite was also determined to be a stressor of concern in the BERA. Alternatives in the OU2 Supplemental FS report and this ROD do not explicitly include the removal of visible calcite (ionic waste), but all of the action alternatives would improve the benthic substrate as a by-product of removal (based on CPOIs) and/or placement of a clean habitat layer above sediments/soils within the remedial areas.

The OU2 Supplemental FS report and this ROD evaluate four alternatives for Reach AB of Ninemile Creek. One of these alternatives (Alternative 1) calls for no action and the other three alternatives call for varying amounts of excavation, backfilling, and placement of a clean habitat layer within the stream channel and floodplains. Table 12 presents a summary of the four alternatives. Detailed descriptions of each of the four alternatives follow:

Alternative 1 – “No Action”

The Superfund program requires that the “no action” alternative be considered as a baseline for comparison with the other alternatives. The “no action” remedial alternative for channel sediments and floodplain soils/sediments does not include any physical remedial measures that address the contamination at the Site.

Because this alternative would result in contaminants remaining on-Site above levels that allow for unlimited use and unrestricted exposure to Site media, CERCLA requires that the Site be reviewed at least once every five years. If justified by the review, remedial actions may be implemented to remove, treat, or contain the contaminated sediments and floodplain soils/sediments.

Alternative 1 (Ninemile Creek Reach AB)

Dredged/Excavated Volume (cy):	0
Mercury Mass Removed (pounds):	0
Capital Cost:	\$0
Average Operation and Maintenance (O&M) Annual Costs:	\$0
Present-Worth O&M Costs:	\$0
Present-Worth Cost:	\$0
Construction Time:	0 years

Alternative 2 – Removal of contaminated Ninemile Creek channel sediments in Reach AB to a depth to meet criteria (1.3 mg/kg mercury and RGs for other CPOIs) in the channel and removal of contaminated floodplain soils/sediments where concentrations exceed 1.3 mg/kg mercury (and RGs for other CPOIs) to a depth of 2 ft (60 cm) in the floodplain, followed by placement of backfill and a habitat layer in the channel and floodplain

The specific components of this alternative, as shown in Figure 11, include:

- Ninemile Creek Channel:** Remove channel sediments with mercury concentrations exceeding 1.3 mg/kg and other non-mercury CPOIs exceeding RGs. It is anticipated that the removal, where needed, would average 2 ft (60 cm), with a maximum depth of about 3 ft (90 cm). Backfill areas of removal and place a 2-ft (60 cm) habitat layer. A 0.5-ft (15 cm) sand base layer would be installed below the habitat layer to provide support for it and to prevent clay or silt particles from migrating into it. The base layer would also provide the added benefit of attenuating residuals that may remain after dredging. Removal of channel sediments and restoration of the stream would allow for passage of flood flows under existing upstream infrastructure (e.g., bridges) and ensure no adverse increases in water elevations, extent of flooding, and erosion potential in accordance with applicable requirements, and would provide sufficient water depth for fish passage and canoe access. Based on available data, it is not anticipated that a chemical isolation layer would be needed following this removal since mercury concentrations are less than 1.3 mg/kg at depths below 3 ft in the Reach AB channel. If additional data are collected during design that are not consistent with this current understanding of the Site, a chemical isolation layer may be required following this removal.
- Ninemile Creek Floodplain:** Remove up to 2 ft (60 cm) of floodplain soil/sediment with mercury concentrations exceeding 1.3 mg/kg and other non-mercury CPOIs exceeding RGs. Place up to 2 ft (60 cm) of vegetated habitat layer in areas where soil/sediment had been removed and restore delineated wetlands and other habitats. For the portion of the floodplain adjacent to I-690, restore the area with trees and shrubs as feasible, based on the presence of the structural stone, to create a riparian buffer and to screen recreational users of the stream from I-690. In the portion of the floodplain adjacent to the Wastebeds 1 through 8 site, restore the area with trees and shrubs as feasible to create a riparian buffer.

This alternative includes the removal of an estimated 23,000 cy (18,000 m³) of contaminated sediment and soil over an area of approximately 10.8 acres (4.4 hectares) within and along Reach AB. It is estimated that this dredging and excavation would result in the removal of about 430 pounds (195 kg) of mercury from Ninemile Creek (or about 63 percent of the estimated total mercury mass in Reach AB).

Removal areas for Alternative 2 are shown in Figure 14 for channel areas and Figure 15 for floodplain areas.

The contaminated sediments and soils that are removed from the stream and floodplains would be disposed of in the containment area at the LCP Bridge Street Subsite containment system and/or the SCA (Option A) or an existing permitted landfill in the Rochester, New York, area (Option B).

It is estimated that the dredging/excavating, backfilling, and habitat layer placement components of this alternative, along with dewatering, water treatment, and transport/disposal of sediments and soils would take one year.

If residual contamination remains beneath the habitat layer in any areas following the implementation of this alternative at levels above that which would allow for unlimited use or unrestricted exposure, an institutional control, such as an environmental easement or some other appropriate mechanism which would include restrictions on dredging/excavating in these areas, would be needed.

Under this alternative, it would be certified on an annual basis that O&M is being performed. If an institutional control is implemented under this alternative, it would be certified on an annual basis that the institutional control is in place.

Because this alternative would result in contaminants remaining on-Site above levels that would permit unlimited use and unrestricted exposure to Site media, CERCLA requires that the Site be reviewed at least once every five years. If justified by the review, additional remedial actions may be implemented to remove, treat, or contain the contaminated sediments and floodplain soils/sediments.

Alternative 2 (Ninemile Creek Reach AB)

Dredged/Excavated Volume for Disposal (cy):	23,000
Mercury Mass Removed (pounds):	430
Capital Cost:	\$8,600,000
Average O&M and Periodic Annual Costs:	\$105,000
Present-Worth O&M and Periodic Costs:	\$1,300,000
Present-Worth Cost:	\$9,900,000
Construction Time:	1 year

Note: For cost estimating purposes, the costs above are based on disposal in the containment area at the LCP Bridge Street subsite (Option A). The costs for disposal at the SCA are likely to be similar. For disposal at a facility not in the vicinity of Onondaga Lake (Option B), the costs are based upon utilizing a facility in the Rochester, New York area. The estimated cost for this disposal is \$12.6 million.

Alternative 3 – Removal of Ninemile Creek channel sediments and floodplain soils/sediments in Reach AB to various depths and placement of backfill and habitat layer

This alternative provides for more removal of contaminated channel sediments and floodplain soils/sediments at generally a greater depth, and a greater footprint than Alternative 2, based on limits defined by physical features (e.g., horizontally to breaks in grade or wetland boundaries; vertically to stone where present on the banks or marl where present in the channel). Within the remedy footprint, this alternative would address the RAOs and RGs for mercury and other CPOIs.

Specific components of this alternative, as shown in Figure 12, are summarized below. Because Alternative 3 tailors the remedial approach to specific areas of the Site, the summary below includes separate discussions corresponding to specific areas of the Ninemile Creek channel and floodplain.

Channel Areas

- **Ninemile Creek Reach AB Channel Lower 1,600 ft (500 m)** (*i.e.*, station 3+00 to station 19+00 [see Figure 10 for the location of these stations]): In this portion of Reach AB, a natural formation of uncontaminated marl (with mercury concentrations typically less than 0.15 mg/kg) is present. For the full area of the channel in this portion of Reach AB (*i.e.*, bank-to-bank), remove sediment overlying the native marl layer and a portion of the marl, as necessary, to eliminate the need for an isolation cap and to allow for restoration of the stream, including the installation of a sand base layer (0.5 ft [15 cm]) and habitat layer (2 ft [60cm]).
- **Ninemile Creek Reach AB Channel Upper 1,100 ft (340 m)** (*i.e.*, station 19+00 to station 30+00 [see Figure 10 for the location of these stations]): For the full area of the channel in this portion of Reach AB (*i.e.*, bank-to-bank), remove approximately 2.5 ft (75 cm) of sediment to eliminate the need for an isolation cap and to allow for restoration of the

stream, including the installation of a sand base layer (0.5 ft [15 cm]) and habitat layer (2 ft [60 cm]).

For both sections of the Reach AB channel, removal of channel sediments and restoration of the stream would allow for passage of flood flows under existing upstream infrastructure (e.g., bridges) and ensure no adverse increases in water elevations, extent of flooding, and erosion potential in accordance with applicable requirements, and would provide sufficient water depth for fish passage and canoe access.

The sand base layer noted above would be installed below the habitat layer to provide support for it and to prevent clay or silt particles from migrating into it. The base layer would also provide the added benefit of attenuating residuals that may remain after dredging. Based on available data related to lithology and the concentrations of contaminants at the Site, removal of sediments to a depth of 2.5 ft (75 cm) or into marl could be conducted in one dredging pass and would result in concentrations of residuals (generally less than 0.3 mg/kg of mercury; see Appendix C of the OU2 Supplemental FS) that would not require a chemical isolation layer¹⁴.

The final channel restoration plan and profile would be determined during design, and would include microtopography and other features to the extent feasible, to restore in-stream habitat under varying flow conditions.

Floodplain Areas

- **Ninemile Creek Floodplain Adjacent to I-690:** Remove all floodplain soil/sediment (1 ft [30 cm] typical) overlying structural stone between the Ninemile Creek waterline and the break in grade at the top of the bank. Restore removal areas with approximately 1 ft (30 cm) of vegetated habitat layer from the waterline to the break in grade and restore the vegetation in the area including trees and shrubs, as feasible, based on the presence of structural stone, to create a riparian buffer.
- **Ninemile Creek Floodplain Adjacent to Wastebeds 1 through 8:** Remove floodplain soil/sediment to approximately 2 ft (60 cm) below existing grade between the Ninemile Creek waterline and the break in grade associated with the toe of the wastebeds, which

¹⁴ One of the design goals for this portion of Ninemile Creek will be to minimize, via sediment removal, the areal extent of stream channel where an isolation layer will be required. Based on the available data, it appears that the vertical distribution of mercury (that would warrant an isolation cap) in Reach AB is generally limited to the top 2 to 3 ft of stream sediments. A Pre-Design Investigation (PDI) will be performed to gather additional channel sediment data from Reach AB. The data will be reviewed during design to determine the appropriate depth of sediment removal. This will include an evaluation of the vertical and areal distribution of mercury, potential post-removal residual concentrations, the potential thickness and type of backfill materials that will be placed over remaining sediments and forming the base for the habitat layer, potential sheeting and dewatering requirements associated with differing removal depths, and potential stability concerns during construction. The evaluation will determine whether or not an isolation layer will be needed beneath the habitat layer in any portion or portions of this reach in lieu of additional sediment removal. It would not be considered feasible to substitute additional sediment removal depth for an isolation layer in a specific area if the additional removal would require or cause: disproportionate additional equipment use or infrastructure (e.g., sheeting, water management equipment, materials); or a major extension to the overall construction schedule. It also would not be considered feasible if the required depth of removal would exceed 2 ft (60 cm) beyond that needed to otherwise remove sediments for the purpose of: placing the isolation layer, erosion protection layer, and habitat layer, and to reconstruct/reconstructing the stream channel with the appropriate depths and slopes for maintaining stream flows and appropriate habitats.

generally corresponds to the 370-ft contour. Place approximately 2 ft (60 cm) of vegetated habitat layer along the portion of the floodplain adjacent to Wastebeds 1 through 8 from the waterline to the break in grade. Restore vegetation in the area including trees and shrubs as feasible to create a riparian buffer.

- **Ninemile Creek Floodplain in Wetland SYW-10 Area:** The remedial approach for Alternative 3 in this portion of the Site is divided into different areas based on existing physical features and degrees of mercury contamination¹⁵. The removal (to various depths specified below) are expected to reduce concentrations of mercury to 0.5 mg/kg or less following removal. However, the engineering feasibility as noted above for channel sediments would also be considered during design to determine the final depths of removal. These areas are described below and are shown in Figure 12:
 - *Wetland SYW-10 Spit Areas*¹⁶: Remove floodplain soil/sediment to approximately 3 ft (90 cm) below existing grade at the western spit and approximately 4 ft (1.2 m) below grade at the eastern spit, backfill with clean substrate, install habitat layer, and restore wetland conditions. The actual depth of removal and backfill thickness would be determined during design based on the results of a pre-design investigation and the thickness of the habitat layer would be as specified in the habitat restoration plan being developed for the Onondaga Lake Bottom subsite.
 - *Upland Adjacent to Eastern SYW-10 Spit Area*: Remove 2 ft (60 cm) of soil/sediment from the edge of the SYW-10 spit area to the break in grade associated with the toe of the wastebeds, which generally corresponds to the 370 ft contour. Place approximately 2 ft (60 cm) of vegetated habitat layer.
 - *Wetland SYW-10 Forested Wetland*: Remove approximately 2 ft (60 cm) of soil/sediment within the wetland. Place a minimum of 2 ft (60 cm) of suitable habitat layer with the intent to restore the forested wetland and current topography. The actual extent and depth of removal would be confirmed during design based on the results of a pre-design investigation.
 - *Area Adjacent to I-690*: Remove approximately 2 ft (60 cm) of floodplain soil in the area adjacent to I-690. Place approximately 2 ft (60 cm) of vegetated habitat layer on the floodplain in removal areas. The actual depth of removal would be confirmed during design based on the results of a pre-design investigation. The remedial work would be coordinated with the bike trail that is currently being planned for the area.
 - *Upland Between SYW-10 Forested Wetland and Ninemile Creek*: Remove

¹⁵ As discussed in the RI report, the CPOIs other than mercury have the same general distribution as mercury, although the degree to which they are elevated over upstream conditions, and the extent to which they are found are less than for mercury. Therefore, mercury represents the best measure of the extent of contamination attributable to the LCP Bridge Street subsite. In addition, only mercury presents areas of contiguous sample locations which contain concentrations much (*i.e.*, a factor of ten or more) greater than the concentrations in the surrounding area (*i.e.*, hot spots which are present in the wetlands in this area). Sampling during the pre-design investigation would include the other CPOIs (as well as mercury) to ensure that the remedy is protective for all CPOIs.

¹⁶ The spit areas referred to in this ROD are small peninsulas extending out on both sides of the mouth of Ninemile Creek into Onondaga Lake. These areas are also part of Wetland SYW-10. See Figure 10.

floodplain soil/sediment to approximately 3 ft (90 cm) below existing grade. Provide approximately 2 ft (60 cm) of habitat layer in areas where soil/sediment had been removed, resulting in a lower overall elevation, with the intent to establish a forested wetland. The actual depth of removal would be determined during design based on the results of a pre-design investigation.

This alternative includes the removal of an estimated 58,000 cy (44,000 m³) of contaminated sediment and soil over an area of approximately 15.5 acres (6.3 hectares) within and along Reach AB. It is estimated that this dredging and excavation would result in the removal of about 640 pounds (290 kg) of mercury from the Ninemile Creek channel and floodplain (or about 92 percent of the estimated total mercury mass in the Reach AB channel and floodplain).

Removal areas for Alternative 3 are shown in Figure 16 for channel areas and Figure 17 for floodplain areas.

As is discussed above, remedial limits for Alternative 3 are based on physical features which would have confined the possible extent of contamination carried by Ninemile Creek. As shown in Figures 12 and 17, the northwest remedial limit for Alternative 3 is the northwest edge of the delineated SYW-10 forested wetland, which is separated from the forested floodplain (non-wetland) by a rise in ground surface elevation. Since the forested portion of SYW-10 is a valuable Class I wetland that is limited along the shores of Onondaga Lake, a portion of SYW-10 may be identified during the remedial design for exclusion from remediation so that area can continue to provide valuable forested wetland functions. During design a focused study will take place to evaluate criteria such as contaminant concentrations, habitat value, size, location within SYW-10, and engineering considerations would be used to determine what portion of SYW-10 would be remediated. In areas of the wetland requiring remediation, remedial activity would be phased to allow portions of the forested wetland to remain intact while the remediated portion is disturbed and restored. However, for the purposes of this ROD, the remedial areas, masses, volumes, and costs for this alternative are based on the full extent of the delineated SYW-10 wetland within Reach AB and are therefore upper-end estimates.

The contaminated sediments and soils that would be removed from the stream and floodplains would be disposed of at the LCP Bridge Street subsite containment system and/or the SCA that will be constructed at Wastebed 13 as part of the remediation of the Onondaga Lake Bottom subsite (Option A) or at an existing permitted landfill in the Rochester, New York, area (Option B).

It is estimated that the dredging/excavating, backfilling, and habitat layer placement components of this alternative, along with dewatering, water treatment, and transport/disposal of sediments and soils in the containment area at the LCP Bridge Street subsite or the SCA, would take one year.

If residual contamination remains beneath the habitat layer in any areas following the implementation of this alternative at levels above that which would allow for unlimited use or unrestricted exposure, an institutional control, such as an environmental easement or some other appropriate mechanism which would include restrictions on dredging/excavating in these areas, would be needed.

Under this alternative, it would be certified on an annual basis that O&M is being performed. If an institutional control is implemented under this alternative, it would be certified on an annual basis that the institutional control is in place.

Because this alternative would result in contaminants remaining on-Site above levels that allow for

unlimited use and unrestricted exposure to Site media, CERCLA requires that the Site be reviewed at least once every five years. If justified by the review, additional remedial actions may be implemented to remove, treat, or contain the contaminated sediments and floodplain soils/sediments.

Alternative 3 (Ninemile Creek Reach AB)

Dredged/Excavated Volume for Disposal (cy):	58,000
Mercury Mass Removed (pounds):	640
Capital Cost:	\$15,100,000
Average O&M and Periodic Annual Costs:	\$110,000
Present-Worth O&M and Periodic Costs:	\$1,400,000
Present-Worth Cost:	\$16,500,000
Construction Time:	1 year

Note: For cost estimating purposes, the costs above are based on disposal in the containment area at the LCP Bridge Street subsite (Option A). The costs for disposal at the SCA are likely to be similar. For disposal at a facility not in the vicinity of Onondaga Lake (Option B), the costs are based upon utilizing a facility in the Rochester, New York area. The estimated cost for this disposal is \$23.9 million.

Alternative 4 – Full removal of Ninemile Creek channel sediments and floodplain soils/sediments in Reach AB to a depth to meet criteria (0.15 mg/kg mercury and RGs for other CPOIs) and placement of backfill and habitat layer

The specific components of this alternative, as shown in Figure 13, include:

- **Ninemile Creek Channel:** Remove sediment with mercury concentrations exceeding 0.15 mg/kg and other non-mercury CPOIs exceeding RGs. It is anticipated that the removal would average 3 ft (90 cm), with a maximum of 8 ft (2.4 m). Backfill areas of removal and place a habitat layer with clean soil at the surface.
- **Ninemile Creek Floodplain:** Remove floodplain soil/sediment with mercury concentrations exceeding 0.15 mg/kg and other non-mercury CPOIs exceeding RGs. It is anticipated that the removal would range in depths from approximately 1 to 4 ft (0.3 to 1.2 m) and average 3 ft (0.9 m). Backfill the removal areas and place a habitat layer with clean soil to previous ground surface or a shallower depth to provide terrestrial or wetland habitat. As discussed above for Alternatives 2 and 3, removal in the floodplain along I-690 would be limited to soils above the structural armor stone.

This alternative includes the removal of an estimated 70,000 cy (54,000 m³) of contaminated sediment and soil, over an area of approximately 16.4 acres (6.6 hectares) within and along Reach AB. It is estimated that this dredging and excavation would result in the removal of about 690 pounds (313 kg) of mercury from Ninemile Creek (or 100 percent of the estimated total mercury mass in Reach AB based on the lowest RG for mercury).

Removal areas for Alternative 4 are shown in Figure 18 for channel areas and Figure 19 for floodplain areas.

Alternative 4 includes a remedial footprint area that is 1 acre larger than Alternative 3. This additional area is a forested floodplain (non-wetland) located west of the western boundary of the delineated SYW-10 (see Figures 12 and 13). This area is included under this alternative because two of the four locations sampled in this additional area exhibit mercury concentrations of 0.2 mg/kg, which is slightly above the lowest mercury RG of 0.15 mg/kg.

The contaminated sediments and soils that are removed from the stream and floodplains would be disposed of in the containment area at the LCP Bridge Street subsite containment system and/or the SCA that will be constructed at Wastebed 13 as part of the remediation of the Onondaga Lake Bottom subsite (Option A) or at an existing permitted landfill in the Rochester, New York, area (Option B).

It is estimated that the dredging/excavating, backfilling, and habitat layer placement components of this alternative, along with dewatering, water treatment, and transport/disposal of sediments and soils in the containment area at the LCP Bridge Street subsite or the SCA, would take two years.

Institutional controls are not envisioned being necessary for Alternative 4.

Alternative 4 (Ninemile Creek Reach AB)

Dredged/Excavated Volume for Disposal (cy):	70,000
Mercury Mass Removed (pounds):	690
Capital Cost:	\$20,000,000
Average O&M and Periodic Annual Costs:	\$90,000
Present-Worth O&M and Periodic Costs:	\$1,100,000
Present-Worth Cost:	\$21,100,000
Construction Time:	2 years

Note: For cost estimating purposes, the costs above are based on disposal in the containment area at the LCP Bridge Street subsite (Option A). The costs for disposal at the SCA are likely to be similar. For disposal not in the vicinity of Onondaga Lake (Option B), the costs are based upon utilizing a facility in the Rochester, New York area. The estimated cost for disposal is \$29.3 million.

COMPARATIVE ANALYSIS OF DISPOSAL OPTIONS AND REMEDIAL ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative is assessed against nine evaluation criteria: overall protection of human health and the environment; compliance with ARARs or TBCs; long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; cost; support agency acceptance; and community acceptance. The evaluation criteria are described below. A comparative analysis of the disposal options and remedial alternatives was performed, based on these nine criteria, and

is presented in this section of the ROD.

The following “**threshold criteria**” are the most important and must be satisfied by any alternative in order to be eligible for selection:

1. **Overall protection of human health and the environment** addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.
2. **Compliance with ARARs** addresses whether or not a remedy would meet all of the applicable or relevant and appropriate requirements of federal and state environmental statutes and regulations or provide grounds for invoking a waiver. Other federal or state advisories, criteria or guidance are TBCs. TBCs are not required by the NCP, but may be very useful in determining what is protective of a site or how to carry out certain actions or requirements.

The following “**primary balancing criteria**” are used to make comparisons and to identify the major tradeoffs among alternatives:

3. **Long-term effectiveness and permanence** refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.
4. **Reduction of toxicity, mobility, or volume through treatment** is the anticipated performance of the treatment technologies a remedy may employ, with respect to these parameters.
5. **Short-term effectiveness** addresses the period of time needed to achieve protection from any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.
6. **Implementability** is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.
7. **Cost** includes estimated capital, operation and maintenance (O&M), and present-worth costs. Present-worth cost is the total cost of an alternative over time in terms of today’s dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

The following “**modifying criteria**” are used in the final evaluation of the remedial alternatives after the formal comment period, and may prompt modification of the preferred remedy that was presented in the Proposed Plan:

8. **Support agency acceptance** indicates whether, based on its review of the RI/FS reports, Proposed Plan, and ROD, NYSDOH concurs with, opposes, or has no comments on the selected remedy.
9. **Community acceptance** refers to the public’s general response to the alternatives

described in the RI/FS reports and Proposed Plan.

A comparative analysis of the disposal options and the alternatives based upon the evaluation criteria noted above follows.

DISPOSAL OPTIONS

Disposal options for the excavated contaminated channel sediments and floodplain soils/sediments include consolidation within the containment system at Honeywell's nearby LCP Bridge Street subsite (Option A)¹⁷ and disposing of contaminated channel sediments and floodplain soils/sediments at a permitted landfill which is not in the vicinity of Onondaga Lake such as in the Rochester, New York, area (Option B).

Criterion 1: Overall Protection of Human Health and the Environment

Both disposal options would provide similar and adequate overall protection of human health and the environment by containing contaminated sediments and soils under a low-permeability cap and reducing or eliminating risks associated with direct contact with contaminated material.

Criterion 2: Compliance with ARARs

Both disposal options would be equally compliant with location-specific and action-specific ARARs.

Criterion 3: Long-Term Effectiveness and Permanence

Both disposal options would provide similar levels of acceptable long-term effectiveness and permanence. Consolidation of the removed material at the LCP Bridge Street subsite containment system, at the SCA, or at an approved commercial facility would result in the permanent containment of contaminated channel sediments and floodplain soils/sediments. For the disposal option at the LCP Bridge Street subsite, the contaminated channel sediments and floodplain soils/sediments would provide needed fill material for site closure.

Criterion 4: Reduction of Toxicity, Mobility, or Volume through Treatment

Consolidation within the containment system at the LCP Bridge Street subsite, at the SCA, or removal to a commercial facility would reduce the mobility of mercury and other CPOIs, although not through treatment. The reduction in mobility would be the same for consolidation at the LCP Bridge Street subsite, at the SCA, and removal to an approved commercial facility. Containment at either of the facilities would not reduce the toxicity or volume of mercury or other CPOIs in the removed channel sediments and floodplain soils/sediments.

Criterion 5: Short-Term Effectiveness

Consolidation and containment at the LCP Bridge Street subsite or the SCA would provide the highest level of short-term effectiveness. The dominant short-term impact of disposal of excavated sediments and soils from Ninemile Creek at a facility which is not in the vicinity of Onondaga Lake is truck traffic, which presents potential issues for noise, dust/exhaust, traffic congestion, and safety

¹⁷ For cost estimating purposes, the costs are based on disposal in the containment area at the LCP Bridge Street subsite. The costs for disposal at the SCA are likely to be similar.

concerns for the local community. For consolidation and containment locally, truck traffic would be routed approximately one to two miles from the location of the dredging/excavation activities at the Site (depending on the reach where the soils/sediments are being removed) via easily accessible non-residential roads suitable for truck traffic. Therefore, this disposal option would have limited direct impact on the local community since the haul route is short and no residential roads would be used.

For disposal at a landfill which is not in the vicinity of Onondaga Lake (assumed to be in the Rochester area, approximately 75 miles [120 km] away), the heavy truck traffic would have to use public roadways to transport the excavated sediments and soils. The remedial alternatives for Reach AB of Ninemile Creek would involve the disposal of 23,000 cy (18,000 m³) of sediments and soils for Alternative 2, 58,000 cy (44,000 m³) for Alternative 3, and 70,000 cy (54,000 m³) for Alternative 4. Assuming 15 cy (11 m³) per truckload, and the need for two trips (loaded and empty), the three action alternatives would require approximately 3,000 (Alternative 2), 7,700 (Alternative 3), and 9,300 (Alternative 4) truck trips through the community.

Criterion 6: Implementability

Both options are readily implementable technically and administratively. However, due to the shorter travel distances involved, consolidation at the containment system at the LCP Bridge Street subsite or the SCA is slightly more implementable than consolidation at a commercial facility in the Rochester area, such as the High Acres Landfill or the Ontario County Landfill.

Criterion 7: Cost

As shown in the tables in the “Geddes Brook/Ninemile Creek Operable Unit 2 Remedial Alternatives” section above, the total present-worth costs for the disposal option for a facility which is not in the vicinity of Onondaga Lake for all of the action alternatives evaluated in this ROD are approximately 27 to 45 percent greater than the costs for disposal within the containment system at the LCP Bridge Street subsite containment system (*i.e.*, \$12.6 million versus \$9.9 million for Alternative 2, \$23.9 million versus \$16.5 million for Alternative 3, and \$29.3 million versus \$21.1 million for Alternative 4)¹⁸. As presented in Appendix F of the OU2 Supplemental FS report, the unit cost (*i.e.*, price per cubic yard) for disposal at a landfill which is not in the vicinity of Onondaga Lake (\$146/cy) is approximately four times higher than for consolidation and disposal at the LCP Bridge Street subsite (\$36/cy).

Criterion 8: Support Agency Acceptance

NYSDOH concurs with the selected disposal option.

Criterion 9: Community Acceptance

Comments received during the public comment period indicate that the public generally supports the selected disposal option. The public’s comments are summarized and addressed in the Responsiveness Summary, which is attached as Appendix V to this document.

¹⁸

For cost estimating purposes, the costs are based on disposal in the containment area at the LCP Bridge Street subsite. The costs for disposal at the SCA are likely to be similar. For disposal at a location not in the vicinity of Onondaga Lake, the costs are based upon utilizing a facility in the Rochester, New York area.

Selected Disposal Option

Based upon the above analysis, Option A, consolidation and containment at the LCP Bridge Street subsite and/or at the SCA is the selected sediment management option. This decision is based on consideration of the primary and balancing criteria and the cost disparity between consolidation locally and consolidation at a Rochester area commercial facility. Management at the existing LCP Bridge Street subsite containment system or the SCA would be a proven and reliable technology for sediment and waste management.

If the consolidated sediments and soils are contained at the LCP Bridge Street subsite, it would be beneath a 6 NYCRR Part 360 equivalent low-permeability cap covering approximately 18 acres (7 hectares). The area is surrounded by a subsurface barrier (slurry) wall to contain contaminated groundwater that would be collected and treated. Additional information on the cap and containment/collection system can be found in the ROD and the remedial design documents for the LCP Bridge Street subsite.

As discussed in the Onondaga Lake remedial design work plan (Parsons, 2008c), the SCA will be designed, constructed, operated, and maintained in accordance with the substantive requirements of NYSDEC Part 360, Section 2.14(a) (industrial monofills) and will include an impermeable liner, leachate collection system, and cover. The decision of whether the sediments and soils would be consolidated at the SCA will consider various factors, including the design and construction schedules for the Ninemile Creek OU2 remedy as well as the SCA so that remediation of Ninemile Creek is not unnecessarily delayed.

If the excavated soils and sediments are disposed of at the LCP Bridge Street subsite containment system, they would not negatively impact the property's future development potential. The LCP Bridge Street subsite cap area would be maintained and monitored in the same manner whether or not it contains contaminated materials from the Site. As discussed above, management of the dredged/excavated channel sediments and floodplain soils/sediments in a containment system at the LCP Bridge Street subsite and/or at the SCA would also be more cost-effective than disposal at a facility for the removal volumes needed and would involve fewer impacts on the community (e.g., less truck traffic, lower potential for risks of an accident or spill during transport).

Based upon the evaluation of the disposal options above, the following comparison of the remedial alternatives against the evaluation criteria assumes that the dredged/excavated channel sediments and floodplain soils/sediments would be disposed of at the LCP Bridge Street subsite containment system or the SCA.

REMEDIAL ALTERNATIVES

Criterion 1: Overall Protection of Human Health and the Environment

Alternative 1, the "no action" alternative, would not actively address risks to human health and the environment posed by contaminated sediments, soils, water, and biota in Ninemile Creek because it would not reduce or control risk to receptors or the further transport of CPOIs at the Site. The RAOs and RGs would not be met under this alternative.

All of the alternatives, with the exception of Alternative 1, would achieve the RAOs established for the Site. However, Alternative 2 would not achieve all of the RGs. The three action alternatives (Alternatives 2 through 4) would be protective of human health and the environment because they would reduce or eliminate existing and potential future adverse ecological effects on fish and

wildlife resources and potential risks to humans (RAO 2); achieve, to varying degrees, CPOI concentrations in fish tissue that are protective of humans and wildlife that consume fish (RG 3); achieve, to varying degrees, CPOI concentrations in channel sediments that are protective of human health and fish and wildlife resources (RG 2); and reduce, contain, or control CPOI concentrations in erodible channel sediments (RAO 1 and RG 1). The remediation of sediments and soils under these alternatives is expected to achieve surface water quality standards for CPOIs (RAO 3 and RG 4).

All three action alternatives would meet all SWAC-based sediment targets for protection of bioaccumulation and direct contact (by humans). Alternatives 2, 3, and 4 are all also expected to result in reduced mercury concentrations in fish and, consequently, reduced risk to humans and ecological receptors from fish consumption.

Alternatives 2 through 4 would be protective of human health potentially impacted by consumption of fish containing PCBs and PCDD/PCDFs. PCBs and PCDD/PCDFs are not widespread in Ninemile Creek sediments and the areas where these CPOIs are elevated are generally located within the areas addressed under these alternatives. The reduction in PCB and PCDD/PCDF concentrations in sediment as a result of these alternatives is expected to result in reduced fish tissue concentrations over time, to the extent that Geddes Brook/Ninemile Creek sediments contribute to the body burden of these contaminants in fish tissue.

In the Reach AB portion of the Ninemile Creek channel, Alternative 2 provides protectiveness by removal of material with concentrations that exceed 1.3 mg/kg mercury and targets for all other CPOIs and replacement with a habitat layer. This alternative would also address 56 percent of the Ninemile Creek channel surface that exceeds both 0.5 and 0.15 mg/kg mercury (resulting from exceedances of RGs for other CPOIs).

Alternative 3 through a combination of removal, backfilling, and/or habitat layer placement addresses all of the sediment targets for mercury in the stream channel. Alternative 4 also addresses all of the sediment target values for mercury in the channel via removal of all sediment to achieve a residual of less than 0.15 mg/kg mercury (*i.e.*, essentially to concentrations near or below background).

In the Reach AB portion of the Ninemile Creek floodplain, Alternative 2 provides a degree of protectiveness by removal of up to 2 ft (60 cm) of material with concentrations that exceed 1.3 mg/kg mercury and/or targets for other CPOIs and replacement with up to 2 ft (60 cm) of clean soil. This alternative would also address 77 percent and 57 percent of the floodplain that exceeds 0.5 and 0.15 mg/kg mercury, respectively (resulting from exceedances of RGs for other CPOIs).

Following removal and placement of a clean habitat layer, Alternative 3, compared to Alternative 4, addresses 100 percent and 93 percent of the floodplain that exceeds the two lowest mercury RGs of 0.5 and 0.15 mg/kg mercury, respectively. Alternative 4 addresses all of the surficial floodplain exceeding each of the sediment targets. Note that the difference between Alternatives 3 and 4 is due to the additional 1 acre area to be remediated under Alternative 4.

Although not targets, NYSDEC's LEL sediment screening criteria for arsenic (6 mg/kg), lead (31 mg/kg) and total PAHs (4 mg/kg) were considered during this comparative evaluation. For the top 2 ft (60 cm) of soil/sediment, Alternative 2 is not as effective as Alternatives 3 and 4 in addressing these screening criteria. Alternative 2 would address 100 percent, 100 percent, and 95 percent of the Ninemile Creek channel and 82, 97, and 90 percent of the floodplain exceeding these three criteria, respectively. Alternative 3 would address 100 percent of the area exceeding each of these

criteria in the Ninemile Creek channel and 90 percent, 100 percent, and 95 percent of the area exceeding these three criteria in the floodplain. Alternative 4 would address 100 percent of the area exceeding these three criteria in the Ninemile Creek channel and floodplain. Note that this difference between Alternatives 3 and 4 (similar to mercury) is due to the additional remedial area under Alternative 4 that is just west of the western border of the delineated wetland SYW-10. As discussed in Appendix A of the OU1 Supplemental FS report, concentrations as low as these screening criteria may not be achievable in the long-term because they are influenced by sources other than just the Site.

Certain institutional controls may be needed for Alternative 2 and possibly Alternative 3 to ensure that any future construction or other activities do not remove or disrupt any residual contamination beneath the habitat layers in the channels and floodplain. Institutional controls would likely not be needed for Alternative 4.

As stated above, Alternatives 2 and 3 would achieve the RAOs established for the Site; however, Alternative 2 would not meet all of the RGs for mercury. Alternative 3 would be protective of benthic macroinvertebrates, because for the top 2 ft (60 cm) of channel sediment and floodplain soil/sediment, it would meet all sediment toxicity targets for mercury in all channel and wetland areas of Reach AB. As previously discussed, the goal is that the concentrations of the clean material used for the habitat layer within the top 2 ft (60 cm) would meet the lowest RG for mercury in channel sediment areas (0.15 mg/kg) and the Part 375 unrestricted use soil cleanup objectives for floodplain areas. This alternative would also meet the sediment toxicity targets for arsenic, lead, total PAHs, PCBs, hexachlorobenzene, and phenol within the habitat layer.

Alternative 4 would achieve the RAOs established for the Site. Implementation of Alternative 4 would be expected to remove all of the contamination from the Site, to the extent feasible. Following the removal, channel and floodplain areas would be backfilled and a habitat layer with clean soil placed. Similar to Alternative 3, Alternative 4 would be protective of benthic macroinvertebrates because for the top 2 ft (60 cm) of soil/sediment, the goal is to meet all four sediment toxicity targets for mercury and meet sediment toxicity targets for arsenic, lead, total PAHs, PCBs, hexachlorobenzene, and phenol.

Criterion 2: Compliance with ARARs

As there are currently no federal or state promulgated standards for contaminant levels in sediments, the sediment RGs would be used as TBC criteria. For soils, New York State has issued soil cleanup objectives for remedial programs (6 NYCRR Part 375.6). The unrestricted use soil cleanup objectives represent the concentration of a contaminant in soil which, when achieved at a site, would require no use restrictions on the site for the protection of public health, groundwater and ecological resources due to the presence of contaminants in the soil. For surface water, New York State has promulgated standards which are enforceable standards for various surface water contaminants.

In general, Alternatives 2 to 4 would be expected to comply with the designated chemical-specific ARARs to the extent practicable, while Alternative 1 (no action) would not, since there would be no active remediation associated with the sediments or soils.

As discussed above, narrative water quality standards for turbidity and suspended solids are periodically exceeded in both streams, and sporadic exceedances have been observed for several other CPOIs including thallium and chlorobenzene. For these constituents and other CPOIs, the reduction of CPOIs in Site-related contributions from contaminated sediments and soils is expected

to result in the achievement of the New York State water quality standards. In addition, closure of the wastebeds would help to achieve narrative water quality standards, including the prohibitions for turbidity and for suspended, colloidal, or settleable solids. It is also expected that closure of the wastebeds would significantly reduce TDS concentrations in Ninemile Creek. As noted in the “Site Geology/Hydrogeology” and “Results of the Remedial Investigation” sections above, TDS has been detected in Ninemile Creek at concentrations exceeding the State surface water quality standard of 500 mg/L for a Class C water body. The presence of TDS at these concentrations has been determined to be primarily from upgradient sources of ionic substances (e.g., Wastebeds 9 through 11), which are unrelated to the conditions to be addressed by the OU2 portion of this Site. For this reason, attainment of the surface water quality standard of 500 mg/L in Ninemile Creek is not a performance standard for the action alternatives considered in this ROD, and it is anticipated that the conditions causing or contributing to these exceedances would be addressed in a subsequent action or actions to address the upgradient sources.

As discussed in the RI/FS, for surface water, two of the four New York State water quality standards for mercury (based on dissolved total mercury) for Class B/C waters were exceeded in lower Geddes Brook and the West Flume, but not in Ninemile Creek. The New York State surface water quality standards for mercury for protection of wildlife is 2.6 ng/L dissolved mercury and the standard for protection of human health (via fish consumption) is 0.7 ng/L dissolved mercury. As discussed previously, dissolved total mercury was not detected in lower Ninemile Creek and was detected at 1.4 ng/L in lower Geddes Brook and up to 57 ng/L in the West Flume during low-flow conditions in 1998. In conjunction with the selected remedy for Geddes Brook/Ninemile Creek OU1, implementation of Alternatives 2, 3, or 4 would be expected to enable Ninemile Creek Reach AB to comply with the applicable water quality standards for mercury.

During implementation of Alternatives 2, 3, or 4, any short-term exceedances of surface water ARARs in Ninemile Creek due to dredging/excavation or capping would be expected to be limited to the area in the vicinity of the work zone. Sufficient engineering controls would be utilized during dredging/excavation and capping to prevent or minimize exceedances of surface water ARARs outside of the work zone. Furthermore, compliance with the discharge limits (to be established by NYSDEC if needed) should ensure that there are no exceedances of surface water ARARs caused by the discharge from on-Site water treatment.

The primary location-specific ARARs applicable to the remediation are ECL Article 24 Freshwater Wetlands, ECL Article 15 Use and Protection of Waters, and Clean Water Act (CWA) Section 404. For freshwater wetlands, 6 NYCRR Part 663 regulates activities conducted in or adjacent to regulated wetlands. Article 15 is implemented by 6 NYCRR Part 608 which regulates alterations to beds and banks of streams such as dredging and filling.

CWA Section 404 includes requirements related to the discharge of dredged or fill material into navigable waters of the U.S. and prohibits activities which adversely affect an aquatic ecosystem, including wetlands. In addition, Superfund actions must meet EPA’s 1985 Policy on Floodplains and Wetland Assessments for CERCLA Actions, and EPA’s Protection of Wetlands Executive Order 11990. The policy memorandum discusses situations that require preparation of a floodplains or wetlands assessment, and the factors that should be considered in preparing an assessment, for response actions taken pursuant to Section 104 or 106 of CERCLA. Executive Order 11990 addresses long- and short-term adverse impacts associated with the destruction or modification of wetlands and seeks to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative.

Since all of the alternatives except the “no action” alternative include dredging/excavation and/or

backfilling, and habitat layer placement within the stream, the final design of the remedy must meet the substantive requirements of the applicable regulations. Alternatives that restore appropriate habitat and function, do not result in unacceptable changes in water depth or the loss of stream surface area, and do not diminish natural resource values throughout the stream would more readily meet the requirements. All of the alternatives except the “no action” alternative are expected to comply with all of the designated location-specific and action-specific ARARs, to varying degrees. Compliance with Articles 15 and 24 would be achieved under Alternatives, 2, 3, or 4 via development and implementation of a habitat restoration plan. The habitat restoration plan would address bathymetry and other related habitat aspects for each impacted stream reach.

Although there are no chemical-specific ARARs for sediment, the two lowest RGs for mercury in sediments (0.15 and 0.5 mg/kg) would not be met in portions of the Site under Alternative 2. Since the entire area of the Site within the well-defined steep banks and within the delineated wetlands would be remediated under Alternatives 3 and 4, with use of clean soils in both channel and floodplain areas at the surface (excluding the non-wetland floodplain forest west of the forested wetlands), the goal of concentrations within the top 2 ft (60 cm) would be less than the lowest mercury RG of 0.15 mg/kg within the entire remedial area of each of the Alternatives 3 and 4.

The NYSDEC Part 375 unrestricted use soil cleanup objective of 0.18 mg/kg for mercury would apply to clean surface soil being placed in those areas of the floodplain not expected to be wetland (*i.e.*, upland). Alternative 1 (“no action”) would not comply with the Part 375 unrestricted use soil cleanup objective in the floodplain soils, since there would be no active remediation. Under Alternative 2, the NYSDEC Part 375 unrestricted use soil cleanup objective of 0.18 mg/kg for mercury would not be met in areas not being remediated (*i.e.*, areas having mercury concentrations between 0.18 and 1.3 mg/kg at the floodplain surface). For Alternatives 3 and 4, it would be expected that all ARARs and RGs (TBCs) for CPOIs, would be met.

Sediment removal, handling, dewatering, and consolidation, as well as the installation of the channel and floodplain habitat layer, are expected to meet action-specific and location-specific ARARs. Appropriate regulatory approvals or permits would be obtained prior to initiating the alternatives.

Criterion 3: Long-Term Effectiveness and Permanence

Alternative 1 would be neither effective in the long-term nor permanent because the potential for further transport of mercury and other CPOIs, and the associated risks to human health and ecological receptors, would not be controlled or eliminated. Some amount of natural recovery would be anticipated due to the planned remediation of upstream and external sources; however, it is unlikely that the RAOs and RGs would be met within the foreseeable future.

Alternatives 2, 3, and 4 all provide long-term effectiveness and permanence. The sand base layer (or residual cap, if needed) used in Alternatives 2 and 3 would be designed to attenuate any residuals that may remain after dredging and excavating. Adequate engineering controls are readily available and can be used during the removal of sediment and during placement/installation of the habitat layer to provide for the long-term effectiveness of the remedy. Proven techniques are available to provide for the adequacy and reliability of the remedy through its design and construction, and implementation of a long-term operation and maintenance program.

A discussion of additional factors related to this evaluation criterion is provided below.

Permanence and Adequacy and Reliability of Controls

Alternative 4 provides the greatest reliability by removing more of the sediments and soils that exceed toxicity-based cleanup criteria than the other alternatives. Alternatives 2 and 3 incorporate removal of contaminated sediments and soils prior to covering with clean material. Alternative 3 would remove more than twice as much contaminated sediment and soil as Alternative 2, and approximately 20 percent less than Alternative 4. Alternative 3 would remove about 50 percent more mercury than Alternative 2, and about 8 percent less mercury than Alternative 4. Alternative 3 includes removal of contaminated floodplain and wetland soils to depths up to 4 ft (1.2 m) whereas Alternative 2 is limited to 2 ft (60 cm) removal in the floodplain and wetlands.

As the volume of removal decreases relative to Alternatives 4, 3, and 2, the relative degree of reliability of the given alternative also decreases. Therefore, Alternative 4, which would attempt to remove the maximum amount of contaminated sediments and soils is regarded as the most reliable. However, insofar as the extent of mercury residuals beneath the habitat layers under Alternative 3 may be very limited (*i.e.*, residual concentrations of mercury less than 0.5 mg/kg based on available data), there is no significant difference in degree of reliability between Alternatives 3 and 4. Alternative 2, which addresses a much smaller portion of the Site based on one of the higher RGs for mercury (1.3 mg/kg), is clearly less reliable than Alternatives 3 and 4.

For any contaminated sediments and soils that would be left at the Site under Alternatives 2 and 3, the sand base layer (or residual cap, if needed) would attenuate any residuals that may remain after dredging and excavating. There would be development and implementation of a monitoring and maintenance program to ensure that the integrity and effectiveness of the habitat layer and cap, if needed, are maintained. Therefore, although complete removal of contaminated sediments, to the extent practicable, would be most permanent, covering any low-level residual contaminated sediments with a habitat layer and sand base layer (or residual cap, as needed), would still achieve a high degree of permanence.

Reduction of Residual Risk

Residual risk in Ninemile Creek can be evaluated on the basis of direct toxicity, bioaccumulation, and potential for recontamination. Since Alternative 1 would involve no active remedial measures, it would not effectively reduce residual risk.

At the point of exposure (top 2 ft [60 cm]), Alternative 2 would remediate all areas which exceed the mercury RG of 1.3 mg/kg, leaving some areas below 1.3 mg/kg unremediated. At the point of exposure (top 2 ft [60 cm]), Alternatives 3 and 4 would address all areas exceeding the lowest mercury RG of 0.15 mg/kg within all channel areas and within the well-defined steep banks of the floodplain or delineated wetlands. Alternative 4 would also address a 1-acre area with mercury concentrations marginally above the mercury RG of 0.15 mg/kg in a non-wetland floodplain area. Reduction of residual risk is greatest for Alternative 4 since this alternative removes the greatest volume of contaminated soils/sediments. Alternative 3 provides for a greater reduction of residual risk than Alternative 2 since Alternative 3 removes a greater volume and addresses a larger area than Alternative 2.

The cleanup criteria address sediment toxicity to benthic macroinvertebrates. For those areas that are remediated, concentrations of CPOIs in the clean habitat layer overlying any residual contamination are expected to remain low enough to reduce toxicity. Based on this criterion of direct toxicity, all three action alternatives would be protective. However, Alternatives 3 and 4 are similar in that they would provide a greater degree of confidence in the protectiveness of the

alternative, as compared to Alternative 2.

Alternatives 2, 3 and 4 would meet the bioaccumulation-based RGs for mercury and other CPOIs. Mercury concentration goals in sediments of 0.8 mg/kg and in soil of 0.6 mg/kg were developed for the Site to address bioaccumulation concerns (see the text boxes entitled “Sediment Quality Values for Channel Sediments and Floodplain Soils/Sediments to Protect from Bioaccumulation and Direct Contact” [pages 44 and 45]). To determine whether the alternatives (which were developed based on direct toxicity goals) meet the bioaccumulation goals for mercury, the estimated post-remediation SWAC for each alternative was compared to the 0.8 mg/kg or 0.6 mg/kg goals. This was done on an area-weighted basis (*i.e.*, by reach rather than point-to-point) since animals that bioaccumulate mercury, such as fish, are not limited to a specific location of the Site. For Alternative 2 (which is the only action alternative that does not include remediation of the full Site or delineated wetland), the predicted post-remediation SWACs (0.4 mg/kg mercury in the channel and 0.2 mg/kg mercury in the floodplain) would meet these goals in both the channel and floodplain portions of Reach AB. The post-remediation SWACs for Alternatives 3 and 4 would also meet these criteria since only new clean material (0.15 mg/kg mercury) would be at the surface of the entire remedial area. Bioaccumulation-based RGs, based on NYSDEC sediment screening criteria, were also evaluated for PCBs (0.03 mg/kg) and hexachlorobenzene (0.25 mg/kg) in channel sediments. A direct contact-based RG for benzo(a)pyrene (1.3 mg/kg) was also evaluated. The predicted post-remediation SWACs for these non-mercury CPOIs would also be less than the bioaccumulation-based RGs for Alternatives 2, 3 and 4.

Criterion 4: Reduction of Toxicity, Mobility, or Volume through Treatment

No treatment would be performed under Alternative 1; therefore, there would be no reduction of toxicity, mobility, or volume through treatment.

As discussed in the “Description of Alternatives” section, there would be on-Site treatment of water generated from excavated sediment and soil using a temporary treatment system for the action alternatives. However, this treatment is not expected to reduce the concentrations of mercury and other CPOIs within the sediments and soils.

Implementation of Alternative 2 would result in the removal of approximately 23,000 cy (18,000 m³) of contaminated sediments and soils and approximately 430 pounds (195 kg) of mercury from Reach AB of Ninemile Creek (approximately 63 percent of the total mercury mass in Reach AB channel and floodplains), significantly reducing the toxicity, mobility, and volume of contaminated sediments and soils. The habitat layer and sand base layer (residual cap, if needed), installed following the removal, would reduce the mobility of residual concentrations in sediments and soils, although the reduction of toxicity, mobility, and volume at the point of exposure is achieved through removal and containment rather than treatment.

Implementation of Alternative 3 would result in the removal of approximately 58,000 cy (44,000 m³) of contaminated sediments and soils and approximately 640 pounds (290 kg) of mercury from Reach AB of Ninemile Creek (approximately 92 percent of the total mercury mass in Reach AB channel and floodplains), significantly reducing the toxicity, mobility, and volume of contaminated sediments and soils.

For Alternative 3, the residuals that would remain following removal in Reach AB (expected to be less than about 0.5 mg/kg) would typically be about two orders-of-magnitude lower than the maximum concentrations currently found at the Site (77 mg/kg). The habitat layer, installed following the removal, would comprehensively cover the Site (with the exception of a small non-

wetland floodplain forested area with mercury concentrations at or below 0.2 mg/kg) and reduce the mobility of residual concentrations in sediments and soils, although the reduction of toxicity, mobility, and volume at the point of exposure is achieved through removal and containment rather than treatment.

Implementation of Alternative 4 would result in the removal of approximately 70,000 cy (54,000 m³) of contaminated sediments and soils and approximately 690 pounds (313 kg) of mercury from Reach AB of Ninemile Creek (100 percent of the mercury mass in Reach AB channel and floodplains above the lowest RG), significantly reducing the toxicity, mobility, and volume of contaminated sediments and soils, although the reduction of toxicity, mobility, and volume at the point of exposure is achieved through removal and containment rather than treatment.

Alternative 3 would remove more than twice as much contaminated sediment and soil as Alternative 2, and approximately 20 percent less than Alternative 4 (58,000 cy [44,000 m³] compared to 70,000 cy [54,000 m³]). Alternative 3 would remove about 50 percent more mercury than Alternative 2, and about 8 percent less mercury than Alternative 4. Thus, on the basis of the amount of contaminated sediment and soil removed and placed in a secure facility, Alternative 2 would result in much less reduction in mobility and toxicity than Alternatives 3 and 4, while Alternative 3 would result in a slightly lower reduction in mobility and toxicity than Alternative 4.

EPA's Preference for Treatment

The NCP states that EPA expects to use treatment to address the principal threats posed by a site wherever practicable (NCP Section 300.430 [a][1][iii][A]). The “principal threat” concept is applied to the characterization of “source materials” at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for the migration of contamination to groundwater, surface water, or air, or acts as a source for direct exposure. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur.

As noted above, the contaminated sediments and soils within the Site contain hazardous substances, pollutants, or contaminants that have migrated from the LCP Bridge Street subsite. Although contaminated sediments/soils are present at the Site, the concentrations are generally lower than the levels found on the LCP Bridge Street subsite. Thus, these contaminated sediments and soils would not be considered “source materials” or “principal threat wastes.”

Criterion 5: Short-Term Effectiveness

Environmental Impacts

Alternative 1 (“no action”) does not include any active remediation and, therefore, would not present any potential adverse impacts to on-Site workers, the environment, or the community as a result of its implementation. However, as previously noted, unacceptable risks to human health and the environment posed by contaminated sediments and soils, water, and fish in the stream would continue to occur.

In general, short-term effectiveness risks are proportional to the volume of materials excavated and the duration of work. Thus, these impacts are least for Alternative 2 and greatest for Alternative 4. The estimated volumes of materials to be excavated from the Reach AB portion of Ninemile Creek for Alternatives 2, 3, and 4 are approximately 23,000 cy (18,000 m³), 58,000 cy (44,000 m³), and

70,000 cy (54,000 m³), respectively. The estimated remedial construction durations for Alternatives 2, 3, and 4 are approximately one, one, and two years, respectively.

For all of the action alternatives, potential short-term risks associated with sediment dredging and related activities in the channel include resuspension of channel sediment, related potential impacts to water quality, and temporary loss of aquatic and upland habitats within and near work areas. For Alternatives 2, 3, and 4, the durations of sediment dredging and associated installation and removal of sheet piling, where needed, for Ninemile Creek Reaches AB are estimated to be approximately 26 weeks, 41 weeks (one construction season), and 82 weeks (two construction seasons), respectively. Additional information on construction scheduling for these alternatives can be found in Appendix F of the OU2 Supplemental FS report.

As a result of its deeper removal (up to a depth of 8 ft [2.5 m] into the sediments), Alternative 4 would require installation and removal of significantly (greater than ten times) more sheet pile than Alternatives 2 and 3, which contributes added short-term risks of potential adverse water quality impacts relative to Alternatives 2 and 3. Under each action alternative, the short-term risks of water quality impacts would be mitigated through the use of best management dredge practices (*e.g.*, the use of environmental buckets where feasible), silt curtains placed downstream from the dredge site, and potentially other resuspension controls.

Other short-term risks associated with sediment dredging, floodplain soil/sediment excavation, and installation of a habitat layer, include those associated with erosion of floodplain soil/sediment, air emissions from stockpiles and equipment, noise and light from construction equipment, and truck traffic to the upland sediment/soil consolidation area. These types of risks, however, are common to many remedial and heavy construction projects and would be mitigated to the extent feasible.

The sediment and soil removals under the action alternatives would also temporarily impact the existing benthic macroinvertebrate and terrestrial species in the area, and indirect effects may be experienced by fish that forage in the affected area due to temporary disruption of the benthic food web. However, the negative ecological effects would be temporary and offset by the positive long-term effects of significantly less contaminated benthic habitat via remediation.

Alternatives 3 and 4 would involve remediation (*i.e.*, removal of soils to various depths) of the entire 4.1-acre forested wetland of SYW-10 within the Reach AB portion of the Site, and Alternative 4 would, in addition, also remediate the 1-acre forested floodplain (non-wetland) to the west of this area. While the alternatives would include restoring SYW-10 as a forested wetland/floodplain, even with the planting of large trees, it would be decades before the mature forested wetland would be restored. Thus, the potential long-term environmental impact would be greater for Alternative 4 than Alternative 3, since Alternative 4 would remove approximately a 1-acre larger area of mature trees in a non-wetland area with relatively low concentrations of mercury (*i.e.*, about 0.2 mg/kg or less). In addition, as discussed in the “Description of Alternatives” section, a stated objective of Alternative 3 is to preserve a portion of the existing forested wetland of SYW-10 during the initial phase of the remediation, thereby presenting less environmental impact than Alternative 4 in this area.

Community and On-Site Worker Impacts

Alternatives 2, 3, and 4 could present some limited adverse impacts to on-Site workers through dermal contact and inhalation related to dredging activities. Noise from the dredging/excavation work processes could present some limited adverse impacts to on-Site workers and nearby residents, although the nearest residents are over half-a-mile away and would likely not be

affected. In addition, post-dredging sampling activities may pose some risk to on-Site workers. Another potential adverse impact associated with dredging would be odors associated with the dredged sediments. The risks to on-Site workers and nearby residents under all of the alternatives could be mitigated by following appropriate health and safety protocols, exercising sound engineering practices, and utilizing proper protective equipment.

Alternatives 2, 3, and 4 would require the transport of increasing amounts of material, including backfill, which may involve use of local roadways and would cause increased traffic. For transport of dredged/excavated sediments from Reach AB of Ninemile Creek to the LCP Bridge Street subsite containment system or the SCA, it is anticipated that only non-residential roads suitable for truck traffic would be used. During remedial design, various means would be evaluated to minimize potential adverse impacts (e.g., traffic, odors associated with dredged sediments) on the community.

The public would be excluded from the work areas of Ninemile Creek during remediation, with the duration of this impact estimated as one year for Alternatives 2 and 3, and two years for Alternative 4.

Criterion 6: Implementability

No remedial actions would be implemented in Ninemile Creek under Alternative 1.

Sediment dredging, floodplain soil excavation, and placing clean materials on floodplains and through surface water have been implemented at other sites. Construction of temporary haul roads, removal of floodplain soil/sediment, construction and operation of sediment dewatering piles, construction and operation of a temporary water treatment system, and upland confinement of contaminated sediment is routine work for environmental remediation contractors. Removal of contaminated sediment in Ninemile Creek would be done by dredging with the use of shore-based excavators or cranes. A portion of the removal along the lakeshore may need to be performed using barge-mounted dredges since the soils in and along the wetlands spits are not expected to support heavy equipment. The dredging would be moderately difficult to implement due to the challenges of accurate removal and mitigating re-suspension of sediment and potential impacts to water quality. However, accurate dredge cuts can be made using modern dredging/excavation equipment. In addition, resuspension of sediment and potential impacts to water quality would be mitigated by use of best-management dredge practices (e.g., the use of environmental buckets where feasible), silt curtains downstream from the dredge site, and potentially other resuspension controls, including temporary stream diversions.

For Alternative 2, it is not anticipated that sheet pile would be required to remove sediment and install the habitat layer except for a short (*i.e.*, 300 ft [90 m]) section at the upper end of Reach AB, which would include removal generally less than 4 ft (1.2 m). The implementability of Alternative 3 would be similar to Alternative 2.

For Alternative 4, removal of contaminated sediment from Ninemile Creek to reach the RGs would require removal to depths averaging 3 ft (0.9 m), and up to 8 ft (2.5 m). Removal to such depths would likely require structural support to prevent failure of the stream banks. A total of about 3,500 ft (1.1 km) of 40-ft (12 m) deep sheet pile would be required under this alternative. Thus, Alternative 4 would be more difficult to implement than Alternatives 2 and 3.

Criterion 7: Cost

The cost estimates for both channel sediments and floodplain soils/sediments presented in this ROD are based upon capital (construction) costs and the present-worth of the annual O&M costs calculated using a discount rate of 7 percent and a 30-year time interval. The actual costs would vary depending on the specifications contained in the detailed remedial design. Further, the actual costs would also vary because the cost estimates provided are developed conservatively and have an accuracy of +50 percent to -30 percent, to comply with the 1988 EPA guidance document, "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA."

In general, the cost of each alternative increases with increases in the footprint of the remediated area and with the volumes and depths of sediments and soils removed, as follows:

- There is no cost associated with Alternative 1, the "no action" alternative.
- The estimated present-worth cost for Ninemile Creek Reach AB for Alternative 2, which includes partial removal of contaminated channel sediments and floodplain soils/sediments and construction of a habitat system, is \$9,900,000.
- The estimated present-worth cost for Ninemile Creek Reach AB for Alternative 3, which includes a greater volume of removal of contaminated channel sediments and floodplain soils/sediments as compared to Alternative 2 and a larger remedial footprint (but nearly the same as Alternative 4), is \$16,500,000.
- The estimated present-worth cost for Ninemile Creek Reach AB for Alternative 4, which includes full removal to meet all RGs (versus partial removal) of contaminated channel sediments and floodplain soils/sediments, is \$21,100,000.

Costs for Alternatives – Ninemile Creek Reach AB

Alternative	Capital Cost	Average O&M and Periodic Annual Cost	Present-Worth O&M and Periodic Cost	Present-Worth Cost
1	\$0	\$0	\$0	\$0
2	\$8,600,000	\$105,000	\$1,300,000	\$9,900,000
3	\$15,100,000	\$110,000	\$1,400,000	\$16,500,000
4	\$20,000,000	\$90,000	\$1,100,000	\$21,100,000

Criterion 8: Support Agency Acceptance

NYSDOH concurs with the selected remedy.

Criterion 9: Community Acceptance

Comments received during the public comment period indicate that the public generally supports the selected remedy. The public's comments are summarized and addressed in the Responsiveness Summary, which is attached as Appendix V to this document.

PRINCIPAL THREAT WASTE

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (NCP Section 300.430 (a)(1)(iii)(A)). The “principal threat” concept is applied to the characterization of “source materials” at a Superfund Site. A source material is material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for the migration of contamination to groundwater, surface water, or air, or acts as a source for direct exposure. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur. The decision to treat principal threat wastes is made as provided in the Principal Threat Waste Guidance, OSWER Directive No. 9380.3-06FS, ‘A Guide to Principal Threat and Low Level Threat Wastes’ and additionally pursuant to Site-specific concerns. As noted above, the contaminated sediments and soils within the Site contain hazardous substances, pollutants, or contaminants that have migrated from the LCP Bridge Street subsite. Thus, these contaminated sediments and soils would not be considered “source materials” or “principal threat wastes.”

SELECTED REMEDY

Summary of the Rationale for the Selected Remedy

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives, and public comments, NYSDEC and EPA have determined that Alternative 3, removal of Ninemile Creek channel sediments and floodplain soils/sediments in Reach AB and placement of backfill and a habitat layer, best satisfies the requirements of CERCLA Section 121, 42 USC §9621, and provides the best balance of tradeoffs among the remedial alternatives with respect to the NCP's nine evaluation criteria, 40 CFR Section 300.430(e)(9).

Alternative 3 addresses the RAOs, RGs and cleanup levels for mercury and other CPOIs and will result in a long-term reduction in the toxicity, mobility, and volume of the key contaminants, namely, mercury, arsenic, lead, hexachlorobenzene, phenol, PAHs, PCBs, and dioxins/furans. Alternative 3 is preferred over Alternative 4 because it provides the same overall protection of human health and the environment and compliance with ARARs as Alternative 4, but at significantly less cost (\$16.5 million versus \$21.1 million), presents less short-term impact, and is more implementable than Alternative 4.

Alternative 3 will be protective of benthic macroinvertebrates, because, with the exception of a small non-wetland floodplain forested area with mercury concentrations at or below 0.2 mg/kg, the top 2 ft (60 cm) of channel sediment and floodplain soil/sediment would meet all of the sediment toxicity targets for mercury. This alternative would also meet the sediment toxicity targets for arsenic, lead, total PAHs, PCBs, hexachlorobenzene, and phenol.

Alternatives 3 and 4 would address all ARARs, RGs, and cleanup levels. Alternative 2 would not address NYSDEC's Part 375 unrestricted use soil cleanup objective of 0.18 mg/kg for mercury in

portions of the floodplain with concentrations between 0.18 and 1.3 mg/kg.

Alternatives 2 through 4 address the RGs and cleanup levels for mercury and other contaminants through removal, to various extents. Alternative 3 is more protective than Alternative 2, since it addresses potentially contaminated surface soils/sediments throughout the entire remedial area (15.5 acres [6.3 hectares]) since this alternative is based on physical limitations to the extent of potential contamination and limits of delineated wetlands. Alternative 2, which is based on one of the less stringent mercury cleanup levels (1.3 mg/kg) to define the areal extent of remediation, addresses a smaller portion of the remedial area (10.8 acres [4.4 hectares]). Alternative 4, which is based on the lowest of the mercury cleanup levels (0.15 mg/kg), addresses a slightly larger (16.4 acres [6.6 hectares]) remedial area than Alternative 3.

Alternative 3 would be more protective than Alternative 2. Alternative 3 addresses all of the potential mercury cleanup levels at the point of exposure in the surface (top 2 ft [60 cm]) soils/sediments (with the exception of a small non-wetland floodplain forested area with mercury concentrations at or below 0.2 mg/kg), while Alternative 2 does not fully address the two most stringent mercury cleanup levels (0.15 and 0.5 mg/kg). Alternative 4, which is based on the most stringent of the mercury cleanup levels, also addresses the same cleanup levels as Alternative 3 at the point of exposure.

As discussed in the “Toxicity-Based Sediment Effect Concentrations Selected as Remediation Goals for Mercury and Other Inorganics” text box (page 38), the mercury cleanup levels of 0.15 mg/kg and 1.3 mg/kg are based on the LEL and SEL, respectively, of the NYSDEC sediment screening values (NYSDEC, 1999), which are in turn based on Long and Morgan’s (1990) ER-L and ER-M values. The ER-L (0.15 mg/kg) represents a concentration below which toxic effects are rarely expected, and the ER-M (1.3 mg/kg) represents a concentration above which toxic effects are likely to occur. By meeting the LEL under Alternative 3, an added measure of protectiveness for the benthic community (*i.e.*, the base of the food chain) over the SEL (used for Alternative 2) is provided.

Alternatives 2, 3, and 4 would meet all SWAC-based sediment targets for protection of bioaccumulation and direct contact (by humans) in Reach AB.

All three alternatives remove a majority of the mercury mass in Reach AB. Alternative 3 removes about 640 pounds [290 kg] of mercury (92 percent of the total found in this reach), which is significantly more than Alternative 2 (430 pounds [195 kg], or 63 percent of the total), but less than Alternative 4 (690 pounds [313 kg] or 100 percent of the total above the lowest RG). For Alternative 3, the residuals that would remain following removal (generally less than 0.5 mg/kg of mercury) would typically be about two orders-of-magnitude lower than the maximum concentrations currently found at the Site (77 mg/kg). Furthermore, under Alternative 3, all residuals would be covered. The residuals for Alternative 2 would remain at higher concentrations than for Alternative 3.

Alternative 3 would remove more than twice as much soil/sediment (58,000 cy [44,000 m³]) as Alternative 2 (23,000 cy [18,000 m³]), and about 20 percent less than Alternative 4 (70,000 cy [54,000 m³]). All of these alternatives include disposal of these soils and sediments at Honeywell’s LCP Bridge Street subsite under the landfill cap or at the SCA. Disposal at the LCP Bridge Street site and/or the SCA would eliminate the need for large volumes of heavy truck traffic to pass through nearby communities on public roads.

Both Alternatives 2 and 3 utilize a sand base layer under the habitat layer to attenuate any residual contamination left after removal. These layers can be designed to be reliable and protective of the

low concentrations of contamination left as residuals. Alternative 4 would be slightly more reliable than Alternative 3, since about 20 percent more material (8 percent more mercury) would be sent to the secure containment system at the LCP Bridge Street subsite or the SCA.

Alternatives 2, 3, and 4 would disrupt the benthic community of Ninemile Creek, as well as prevent access by the public during remedial construction. Alternative 2 would cause disruption for less than one year, Alternative 3 for one year, and Alternative 4 for two years. There is a potential risk of resuspension of contaminated sediments being washed downstream into Onondaga Lake during dredging/excavation. While it is expected that releases of this type would be controlled, this potential risk is most pronounced for Alternative 4 due to the larger amount of sheet piling that would be required in a portion of the channel for the deeper removal to reach the RG of 0.15 mg/kg mercury at depth. For this reason, Alternative 4 would be more difficult to implement than Alternatives 2 and 3.

Alternatives 3 would involve remediation of a portion of the forested wetland of SYW-10, the extent of which would be determined during the remedial design. Alternative 4 would involve remediation (*i.e.*, removal of soils to various depths) of the entire forested wetland of SYW-10 within the Reach AB portion of the Site and remediate the forested floodplain (non-wetland) to the west of this area, which is approximately 1 acre in size. While the alternatives would include restoring SYW-10 as a forested wetland/floodplain, even with the planting of larger trees, it would be decades before the mature forested wetland would be restored. Thus, the potential long-term environmental impact is greater for Alternative 4 than Alternative 3, since Alternative 4 would remove approximately a larger area consisting of at least a 1-acre larger area of mature trees in a non-wetland area with relatively low concentrations of mercury (*i.e.*, about 0.2 mg/kg or less).

In addition to providing long-term effectiveness and permanence, the remedial action under all three action alternatives would meet requirements for protection of existing infrastructure and floodplain areas (*i.e.*, no adverse increase in water elevations or extent of flooding as compared to existing conditions).

Alternative 3 will remove more than twice as much sediment and soil as Alternative 2, and approximately 20 percent less than Alternative 4. Alternative 3 will remove about 50 percent more mercury than Alternative 2, and only about 8 percent less mercury than Alternative 4. Thus, on the basis of the amount of contaminated sediment and soil removed and placed in a secure facility, Alternative 2 would result in much less reduction in mobility and toxicity than Alternatives 3 and 4, while Alternative 3 will result in a slightly lower reduction in mobility and toxicity than Alternative 4. However, the costs and difficulty of implementation are significantly greater for Alternative 4 than Alternative 3. The cost of Alternative 4 is about 30 percent greater than Alternative 3. In addition, Alternative 3 includes measures to potentially limit the loss of mature forested areas with low levels of soil contamination.

Summary

NYSDEC and EPA selected Alternative 3 because it provides the same overall protection of human health and the environment and compliance with ARARs as Alternative 4, but at significantly less cost (\$16.5 million versus \$21.1 million). Alternative 3 also presents less short-term risk and is more implementable than Alternative 4. Under Alternative 1 none of the threats to human health and the environment would be abated. Alternative 2 would be less protective, would not comply with all ARARs and affords less reduction of toxicity, mobility, and volume than Alternative 3. In addition there are more significant short-term risk and implementation issues associated with Alternative 4.

Description of the Selected Remedy

The selected remedy for this Site is Alternative 3. This alternative addresses the RAOs and cleanup levels for mercury and other CPOIs and will result in a long-term reduction in the toxicity, mobility, and volume of the key contaminants, namely, mercury, arsenic, lead, hexachlorobenzene, phenol, PAHs, PCBs, and dioxins/furans.

The selected remedy addresses all areas of this Site, as described in this ROD, such that the top 2 ft (60 cm) of sediments and soils will be replaced with clean material. The goal for the concentrations of this clean material for mercury, other CPOIs, and other constituents will be NYSDEC's sediment criteria (including the LEL of 0.15 mg/kg for mercury) in sediments and 6 NYCRR Part 375 unrestricted use soil cleanup objectives (including the objective of 0.18 mg/kg for mercury) in soils. Clean soil will include imported fill materials from off-Site sources. The selected remedy will also attain a 0.8 mg/kg Site-specific BSQV for mercury in sediments for protection of wildlife consumption of fish and 0.6 mg/kg Site-specific BSQV for mercury in floodplain soils for protection of wildlife consumption of terrestrial invertebrates. The selected remedy is also intended to achieve fish tissue mercury concentrations ranging from 0.1 mg/kg, which is for protection of ecological receptors, to 0.3 mg/kg, which is based on EPA's methylmercury National Recommended Water Quality criterion for the protection of human health from elevated risks due to consumption of organisms.

Specific components of the selected remedy, as shown in Figure 12, are summarized below.

Channel Areas

- **Ninemile Creek Reach AB Channel Lower 1,600 ft (500 m)** (*i.e.*, station 3+00 to station 19+00 [see Figure 10 for the location of these stations]¹⁹): In this portion of Reach AB, a natural formation of uncontaminated marl (with mercury concentrations typically less than 0.15 mg/kg) is present. For the full area of the channel in this portion of Reach AB (*i.e.*, bank-to-bank), sediment overlying the native marl layer and a portion of the marl, as necessary, will be removed to eliminate the need for an isolation cap and to allow for restoration of the stream, including the installation of a sand base layer (0.5 ft [15 cm]) and habitat layer (2 ft [60cm]).
- **Ninemile Creek Reach AB Channel Upper 1,100 ft (340 m)** (*i.e.*, station 19+00 to station 30+00 [see Figure 10 for the location of these stations]): For the full area of the channel in this portion of Reach AB (*i.e.*, bank-to-bank), approximately 2.5 ft (75 cm) of sediment will be removed to eliminate the need for an isolation cap and to allow for restoration of the stream, including the installation of a sand base layer (0.5 ft [15 cm]) and habitat layer (2 ft [60 cm]).

For both sections of the Reach AB channel, removal of channel sediments and restoration of the

¹⁹ The channel sediments between Stations 0+00 and 3+00 (lower 300 ft [90 m]), which are downstream of Reach AB, are being addressed under the Onondaga Lake Bottom subsite remedy. In this lower 300-ft reach, the concentrations of mercury in the sediments and the depth to marl are significantly greater (see data for Stations NMC-SED-70 through NMC-SED-74 in Appendix B of the OU2 Supplemental FS; note that these data are not shown in Figures 6a through 6c of this ROD since they are downstream of Reach AB). The depth of removal in this lower 300 ft downstream of Reach AB is expected to be greater than 2.5 ft (75 cm) and will be developed as part of the dredge/cap designs for Sediment Management Unit (SMU) 4 of the lake.

stream will allow for passage of flood flows under existing upstream infrastructure (e.g., bridges), and this will ensure no adverse increases in water elevations, limit the extent of flooding, and reduce erosion potential in accordance with applicable requirements, and it will provide sufficient water depth for fish passage and canoe access.

The sand base layer noted above will be installed below the habitat layer to provide support for it and to prevent clay or silt particles from migrating into it. The base layer will also provide the added benefit of attenuating residuals that may remain after dredging. Based on available data related to lithology and the concentrations of contaminants at the Site, it is anticipated that removal of sediments to a depth of 2.5 ft (75 cm) or into marl could be conducted in one dredging pass and will result in concentrations of residuals (generally less than 0.3 mg/kg of mercury; see Appendix C of the OU2 Supplemental FS) that will not require a chemical isolation layer²⁰.

The final channel restoration plan and profile will be determined during design, and will include microtopography and other features to the extent feasible, to restore in-stream habitat under varying flow conditions.

Floodplain Areas

- **Ninemile Creek Floodplain Adjacent to I-690:** Remove all floodplain soil/sediment (1 ft [30 cm] typical) overlying structural stone between the Ninemile Creek waterline and the break in grade at the top of the bank. Restore removal areas with approximately 1 ft (30 cm) of vegetated habitat layer from the waterline to the break in grade and restore the vegetation in the area including trees and shrubs, as feasible, based on the presence of structural stone, to create a riparian buffer.
- **Ninemile Creek Floodplain Adjacent to Wastebeds 1 through 8:** Remove floodplain soil/sediment to approximately 2 ft (60 cm) below existing grade between the Ninemile Creek waterline and the break in grade associated with the toe of the wastebeds, which generally corresponds to the 370 ft contour. Place approximately 2 ft (60 cm) of vegetated

²⁰

One of the design goals for this portion of Ninemile Creek will be to minimize, via sediment removal, the areal extent of stream channel where an isolation layer will be required. Based on the available data, it appears that the vertical distribution of mercury (that would warrant an isolation cap) in Reach AB is generally limited to the top 2 to 3 ft of stream sediments. A Pre-Design Investigation (PDI) will be performed to gather additional channel sediment data from Reach AB. The data will be reviewed during design to determine the appropriate depth of sediment removal. This will include an evaluation of the vertical and areal distribution of mercury, potential post-removal residual concentrations, the potential thickness and type of backfill materials that will be placed over remaining sediments and forming the base for the habitat layer, potential sheeting and dewatering requirements associated with differing removal depths, and potential stability concerns during construction. The evaluation will determine whether or not an isolation layer will be needed beneath the habitat layer in any portion or portions of this reach in lieu of additional sediment removal. It will not be considered feasible to substitute additional sediment removal depth for an isolation layer in a specific area if the additional removal will require or cause: disproportionate additional equipment use or infrastructure (e.g., sheeting, water management equipment, materials); or a major extension to the overall construction schedule. It also will not be considered feasible if the required depth of removal would exceed 2 ft (60 cm) beyond that needed to otherwise remove sediments for the purpose of: placing the isolation layer, erosion protection layer, and habitat layer; and to reconstruct the stream channel with the appropriate depths and slopes for maintaining stream flows and appropriate habitats.

habitat layer along the portion of the floodplain adjacent to Wastebeds 1 through 8 from the waterline to the break in grade. Restore vegetation in the area including trees and shrubs as feasible to create a riparian buffer.

- **Ninemile Creek Floodplain in Wetland SYW-10 Area:** The remedial approach for the remedy for this portion of the Site is divided into different areas based on existing physical features and degrees of mercury contamination²¹. The removal (to various depths specified below) are expected to reduce concentrations of mercury to 0.5 mg/kg or less following removal. However, the engineering feasibility as noted above for channel sediments will also be considered during design to determine the final depths of removal. These areas are described below and are shown in Figure 12:
 - *Wetland SYW-10 Spit Areas*²²: Remove floodplain soil/sediment to approximately 3 ft (90 cm) below existing grade at the western spit and approximately 4 ft (1.2 m) below grade at the eastern spit, backfill with clean substrate, install habitat layer, and restore wetland conditions. The actual depth of removal and backfill thickness will be determined during design based on the results of a pre-design investigation and the thickness of the habitat layer will be as specified in the habitat restoration plan being developed for the Onondaga Lake Bottom subsite.
 - *Upland Adjacent to Eastern SYW-10 Spit Area*: Remove 2 ft (60 cm) of soil/sediment from the edge of the SYW-10 spit area to the break in grade associated with the toe of the wastebeds, which generally corresponds to the 370 ft contour. Place approximately 2 ft (60 cm) of vegetated habitat layer.
 - *Wetland SYW-10 Forested Wetland*: Remove approximately 2 ft (60 cm) of soil/sediment within the wetland. Place a minimum of 2 ft (60 cm) of suitable habitat layer with the intent to restore the forested wetland and current topography. The actual depth of removal will be confirmed during design based on the results of a pre-design investigation.
 - *Area Adjacent to I-690*: Remove approximately 2 ft (60 cm) of floodplain soil in the area adjacent to I-690. Place approximately 2 ft (60 cm) of vegetated habitat layer on the floodplain in removal areas. The actual depth of removal will be confirmed during design based on the results of a pre-design investigation. The remedial work will be coordinated with the bike trail that is currently being planned for the area.

²¹ As discussed in the Geddes Brook/Ninemile Creek RI report, the CPOIs other than mercury have the same general distribution as mercury, although the degree to which they are elevated over upstream conditions, and the extent to which they are found are less than for mercury. Therefore, mercury represents the best measure of the extent of contamination attributable to the LCP Bridge Street subsite. In addition, only mercury presents areas of contiguous sample locations which contain concentrations much greater (*i.e.*, a factor of ten or more) greater than the concentrations in the surrounding area (*i.e.*, hot spots which are present in the wetlands in this area). Sampling during the pre-design investigation would include the other CPOIs (as well as mercury) to ensure that the remedy is protective for all CPOIs.

²² The spit areas referred to in this ROD are small peninsulas extending out on both sides of the mouth of Ninemile Creek into Onondaga Lake. These areas are also part of Wetland SYW-10. See Figure 10.

- *Upland Between SYW-10 Forested Wetland and Ninemile Creek:* Remove floodplain soil/sediment to approximately 3 ft (90 cm) below existing grade. Provide approximately 2 ft (60 cm) of habitat layer in areas where soil/sediment had been removed, resulting in a lower overall elevation, with the intent to establish a forested wetland. The actual depth of removal will be determined during design based on the results of a pre-design investigation.

The selected remedy will encompass the removal of an estimated 58,000 cy (44,000 m³) of contaminated sediment and soil over an area of approximately 15.5 acres (6.3 hectares) within and along Reach AB. It is estimated that this dredging and excavation will result in the removal of about 640 pounds (290 kg) of mercury from the Ninemile Creek channel and floodplain (or about 92 percent of the estimated total mercury mass in the Reach AB channel and floodplains).

Removal areas for the selected remedy are shown in Figure 16 for channel areas and Figure 17 for floodplain areas.

As discussed above, the remedial limits for the selected remedy are based on physical features which would have confined the possible extent of contamination carried by Ninemile Creek. As shown in Figures 12 and 17, the northwest remedial limit is the northwest edge of the delineated SYW-10 forested wetland, which is separated from the forested floodplain (non-wetland) by a rise in ground surface elevation. The forested portion of SYW-10 is a valuable Class I wetland which is limited along the shores of Onondaga Lake. Therefore, during remedial design a focused study will take place to evaluate criteria such as contaminant concentrations, habitat value, size, location within SYW-10, and engineering considerations to determine what portions of SYW-10 would require remediation. The details of this focused study will be developed during design. Based on the outcome of this study it may be determined that a portion of SYW-10 is appropriate to be excluded from remediation so that area can continue to provide valuable forested wetland functions. In areas of the wetland requiring remediation, remedial activity will be phased to allow portions of the forested wetland to remain intact while the remediated portion is disturbed and restored. However, for the purposes of this ROD, the remedial areas, masses, volumes, and costs for the selected remedy are based on the full extent of the delineated SYW-10 wetland within Reach AB and are therefore upper-end estimates.

Contaminated sediments and soils removed from the stream and floodplain will be disposed of at the LCP Bridge Street subsite containment system, which was designed and constructed, and is being monitored pursuant to the requirements of a September 2000 ROD and/or the SCA that will be constructed at Wastebed 13 as part of the remediation of the Onondaga Lake Bottom subsite. A decision as to the specific disposal location will be made during the design phase. This decision will consider various factors including the design and construction schedules for this Site remedy as well as the SCA so that remediation of Geddes Brook/Ninemile Creek is not unnecessarily delayed.

Consolidation and disposal in this manner is a proven and reliable technology for management of contaminated sediments, soils, and wastes to protect human health and the environment. The consolidated sediments and soils will either be contained at the LCP Bridge Street subsite beneath a 6 NYCRR Part 360 equivalent low-permeability cap covering approximately 18 acres (7 hectares) or at the SCA at Wastebed 13 which will include an impermeable liner and leachate collection/treatment. The containment area at the LCP Bridge Street subsite is surrounded by a subsurface barrier (slurry) wall to contain contaminated groundwater that will be collected and treated.

Treatment of water generated by dredging and excavating sediments and soils and corresponding sediment/soil dewatering will be conducted at a location in the vicinity of the Site. The actual location of the treatment plant, discharge requirements, and point of discharge will be determined as part of the remedial design.

The design and construction of the remedy, including habitat restoration, will need to meet the substantive requirements for permits associated with the disturbance to state and federal regulated wetlands (e.g., 6 NYCRR Part 663, Freshwater Wetlands Permit Requirements) and navigable waters (e.g., 6 NYCRR Part 608, Use and Protection of Waters).

Restoration of the stream bed and banks, floodplains, wetlands (including forested areas), and habitats will be performed following sediment and soil removal and placement of a sand base layer and backfill, where needed, and placement of a habitat layer with appropriate substrate types and thicknesses as well as planting of appropriate species of wetland and upland vegetation. Habitat restoration is an integral part of the remediation and the details of habitat restoration will be included in a habitat restoration plan that will be developed during remedial design. The goals of the habitat restoration plan will include, but will not be limited to, providing connectivity of the stream with the surrounding floodplain/wetland, the establishment of diverse habitats and native vegetation (e.g., vernal pools, forested floodplains), and no net loss of wetland areas following remediation. Natural stream restoration techniques will be used in designing both the channel remedy and the habitat layer with the goal of creating a diversity of stream and near-stream habitats and minimizing hardening of the channel and banks, to the extent feasible. Additionally, the specific thickness(es), type(s) of substrate material, and specifications for vegetation to be used for the habitat layer will be developed in the restoration plan.

A comprehensive wetlands and floodplains assessment, as described under EPA's Policy on "Floodplains & Wetlands Assessments for CERCLA Actions" (1985) will be conducted during remedial design.

A long-term monitoring program will be developed during remedial design. It will be implemented to assess the remedy's achievement of the RAOs, RGs, and cleanup levels, monitor habitat restoration success, and to ensure that the remedial technologies are performing as specified in the remedial design. The monitoring program could encompass the stream, floodplains and wetlands before, during and after remedy implementation. Types of monitoring could include biological tissue sampling (e.g., fish, invertebrates), success of vegetation establishment, environmental effect measurements (e.g., community analysis), surface water and sediment sampling, and containment system monitoring (e.g., groundwater) to determine its chemical and structural integrity.

A long-term operations and maintenance program will be developed and implemented to include the inspection of the various components of the remedy, and the performance of any repairs (e.g., bank stabilization, replacement of the habitat layer) that might be necessary to ensure the effectiveness of the remediation. In addition, if an isolation cap is installed as part of the remedy for this Site, the effectiveness of the isolation cap will be monitored in accordance with a monitoring and maintenance program. The scope of the program would be determined during remedial design.

The remedial design will include the collection of additional Site data (e.g., sediment cores, soil borings) to delineate in detail the various areas in which remedial activities will be performed consistent with the requirements of the selected remedy, including the final determination of dredging/excavation areas and volumes. The specific types of dredging and excavation methods will be determined during design. Also, treatability studies (e.g., water treatment) will be performed

if necessary.

The design and construction of the remedy will also need to meet all applicable requirements and regulations regarding water flow and flooding as well as protection of federal and state-listed threatened and endangered species.

A Phase 1A Cultural Resource Assessment for various areas, including the Site, was completed by Honeywell in 2003. Based on the results of the Phase 1A assessment, Phase 1B cultural resources work will be conducted in appropriate areas of lower Ninemile Creek prior to remediation.

If residual contamination remains beneath the habitat layer in any areas following the implementation of the selected remedy at levels above that which would allow for unlimited use or unrestricted exposure, an institutional control, such as an environmental easement or some other appropriate mechanism which would include restrictions on dredging/excavating in these areas, will be needed. As part of the selected remedy, it will be certified on an annual basis that remedy-related O&M is being performed. If an institutional control is implemented under the selected remedy, it will be certified on an annual basis that the institutional control is in place. In addition, although they are voluntary, and so are not considered true institutional controls, the New York State Department of Health fish consumption advisories for Onondaga Lake and its tributaries, including Geddes Brook and Ninemile Creek, will continue.

The environmental benefits of the selected remedy may be enhanced by consideration, during remedial design, of technologies and practices that are sustainable in accordance with EPA Region 2's Clean and Green policy. This will include consideration of green remediation technologies and practices.

It is estimated that the dredging/excavating, backfilling, and habitat layer placement components of the selected remedy along with dewatering, water treatment, and transport/disposal of sediments and soils at the containment system at the LCP Bridge Street subsite or the SCA will take approximately one year.

Because this selected remedy will result in contaminants remaining on-Site above levels that allow for unlimited use and unrestricted exposure to Site media, CERCLA requires that the Site be reviewed at least once every five years. The five-year review will evaluate the results from monitoring programs established as part of this remedy to ensure that the remedy remains protective of human health and the environment. If justified by the review, additional remedial actions may be implemented to remove, treat, or contain the contaminated sediments and floodplain soils/sediments.

Summary of the Estimated Remedy Costs

The estimated cost of the selected remedy for Reach AB of lower Ninemile Creek is \$16,500,000. This total cost estimate is comprised of a capital cost of \$15,100,000²³ and annual O&M and periodic costs of \$110,000 per year (or \$1,400,000 in present-worth cost).

The cost estimates presented in this ROD are based upon capital (construction) costs and the present-worth of the annual O&M costs calculated using a discount rate of 7 percent and a 30-year

²³

For cost estimating purposes, the capital cost is based on disposal in the containment area at the LCP Bridge Street subsite.

time interval. The actual costs will vary depending on the specifications contained in the detailed remedial design. Further, the actual costs will also vary because the cost estimates provided are developed conservatively and have an accuracy of +50 percent to -30 percent, to comply with the 1988 EPA guidance document, "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA."

Table 13 provides details of the estimated cost of the selected remedy.

Expected Outcomes of the Selected Remedy

The results of the HHRA indicate that the Site, if left unremediated, presents an unacceptable noncancer hazard and an increased cancer risk to recreational users of Ninemile Creek due to consumption of contaminated fish. The results of the BERA indicate that comparisons of measured tissue concentrations and modeled doses of chemicals to toxicity reference values show exceedances of hazard quotients for Site-related chemicals throughout the range of the point estimates of risk. Site-specific sediment toxicity data indicate sediments are toxic to benthic macroinvertebrates on both an acute and chronic basis.

The State of New York, Onondaga County, and the City of Syracuse have jointly sponsored the preparation of a land-use master plan to guide future development of the Onondaga Lake area (Syracuse-Onondaga County Planning Agency, 1998). The primary objective of land-use planning efforts is to enhance the quality of the Onondaga Lake area for recreational and commercial uses. Implementation of the remedy will aid this long-term planning effort by reducing or eliminating concerns related to human exposure to contaminated sediments, soils, and surface water.

Under the selected remedy, it is estimated that concentrations of contaminants in fish will be reduced following completion of remedial activities. Potential risks to humans who consume fish and existing and potential future adverse ecological effects on fish and wildlife resources will be eliminated or reduced as contaminant levels fall. Fish tissue data from post-remedial monitoring can be used to document improvements in the streams, and to support reevaluation of the NYSDOH fish consumption advisory.

STATUTORY DETERMINATIONS

Under CERCLA Section 121 and the NCP, remedies must be selected that are protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, or contaminants at a site.

For the reasons discussed below, NYSDEC and EPA have determined that the selected remedy meets these statutory requirements.

Protection of Human Health and the Environment

The selected remedy will be protective of human health and the environment in that all RAOs, RGs, and cleanup levels will be met through the implementation of this remedy. The predicted reductions of mercury and other contaminant inventories are expected to reduce the exposures and uptake of contaminants in humans and wildlife. BSQVs were developed for Geddes Brook/Ninemile Creek to provide a conservative total mercury concentration in sediments and soils below which

bioaccumulation is expected to be low enough to result in mercury concentrations in fish and terrestrial organisms that are protective for human and wildlife consumption. BSQVs of 0.8 mg/kg and 0.6 mg/kg for mercury in sediments and soils, respectively, based on the most sensitive receptors (*i.e.*, the river otter and short-tailed shrew), are considered protective of all adult human and ecological receptors modeled in the Geddes Brook/Ninemile Creek risk assessments. Following implementation of the selected remedy, mercury concentrations in the habitat layer of the channel and floodplain will be less than the BSQVs of 0.8 mg/kg and 0.6 mg/kg, respectively.

The implementation of the selected remedy will not pose unacceptable short-term risks or cross-media impacts that cannot possibly be mitigated.

Compliance with ARARs and Other Environmental Criteria

Since there are currently no federal or state promulgated standards for contaminant levels in sediments, the literature-based sediment screening criteria were used as “To-Be-Considered” criteria. A summary of action-specific, chemical-specific, and location-specific ARARs, as well as TBCs, which will be complied with during implementation of the selected remedy, is presented below.

Action-Specific ARARs:

- National Emissions Standards for Hazardous Air Pollutants (40 CFR Parts 51, 52, and 60)
- 6 NYCRR Part 257, Air Quality Standards
- 6 NYCRR Part 200, New York State Regulations for Prevention and Control of Air Contamination and Air Pollution
- 6 NYCRR Part 375-1,-2, Environmental Remediation Programs
- 6 NYCRR Part 376, Land Disposal Restrictions
- Resource Conservation and Recovery Act (42 U.S.C. § 6901, *et seq.*)
- Clean Water Act Sections 301-304 and 307
- Clean Water Act Section 404
- Rivers and Harbors Act Section 10
- Fish and Wildlife Coordination Act, 16 USC § 662

Chemical-Specific ARARs:

- Safe Drinking Water Act (SDWA) MCLs and nonzero MCL Goals (40 CFR Part 141)
- 6 NYCRR Parts 700-705 Groundwater and Surface Water Quality Regulations
- 6 NYCRR Part 703, New York State Surface Water Quality Standards

Location-Specific ARARs:

- Fish and Wildlife Coordination Act, 16 U.S.C. 661
- New York State Environmental Conservation Law, Article 24, Freshwater Wetlands
- 6 NYCRR Part 663, Freshwater Wetlands Permit Requirements Regulations
- New York State Environmental Conservation Law, Article 15, Use and Protection of Waters
- 6 NYCRR Part 608, Use and Protection of Waters
- National Historic Preservation Act

Other Criteria, Advisories, or Guidance TBCs:

- New York Guidelines for Soil Erosion and Sediment Control
- New York State Air Cleanup Criteria, January 1990

- SDWA Proposed MCLs and nonzero MCL Goals
- NYSDEC Technical and Operational Guidance Series 1.1.1, June 1998
- NYSDEC Guidelines for the Control of Toxic Ambient Air Contaminants, DAR-1, November 12, 1997
- NYSDEC Technical Guidance for Screening Contaminated Sediments, January 1999
- EPA Region 2's Clean and Green Policy, March 2009
- EPA's 1985 Policy on Floodplains and Wetland Assessments for CERCLA Actions
- EPA's Protection of Wetlands Executive Order 11990
- EPA's Floodplain Management Executive Order 11988

A summary of the action-specific, chemical-specific, and location-specific ARARs and TBCs is presented in Tables 14 through 19.

Cost-Effectiveness

A cost-effective remedy is one whose costs are proportional to its overall effectiveness (NCP §300.430(f)(1)(ii)(D)). Overall effectiveness is based on the evaluations of: long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness. Based on the comparison of overall effectiveness (discussed above) to cost, the selected remedy meets the statutory requirement that Superfund remedies be cost-effective in that for a reasonable increase in cost, it affords a greater degree of permanence and reliability than does the lower-cost action alternatives, and it will achieve the remediation goals in a reasonable time frame.

Each of the alternatives has undergone a detailed cost analysis. In that analysis, capital and annual O&M costs have been estimated and used to develop present-worth costs. The cost estimates presented in this ROD are based upon capital (construction) costs and the present-worth of the annual O&M costs calculated using a discount rate of 7 percent and a 30-year time interval.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

NYSDEC and EPA have determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the Site. Of the alternatives that are protective of human health and the environment and comply with ARARs, NYSDEC and EPA have determined that the selected remedy provides the best balance of tradeoffs in terms of the five balancing criteria set forth in NCP §300.430(f)(1)(i)(B), while also considering the statutory preference for treatment as a principal element and the bias against off-Site disposal without treatment and further considering support agency and community acceptance.

Implementation of the selected remedy will greatly reduce the mass of mercury and other CPOIs in the sediments and soils and lower the contaminant concentrations in surface sediments and soils, which in turn will reduce contaminant levels in the water column and fish and other biota, thereby reducing the level of risk to humans and ecological receptors.

Preference for Treatment as a Principal Element

EPA's statutory preference for treatment of principal threat materials has been considered as part of this remedy.

As noted above in the “Principal Threat Waste” section, the contaminated sediments and soils within the Site contain hazardous substances, pollutants, or contaminants that have migrated from the LCP Bridge Street subsite. Although contaminated sediments/soils are present at the Site, the concentrations are generally lower than the levels found on the LCP Bridge Street subsite. Thus, these contaminated sediments and soils would not be considered “source materials” or “principal threat wastes.”

Five-Year Review Requirements

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on Site above levels that allow for unlimited use and unrestricted exposure to Site media, a statutory review will be conducted within five years after initiation of remedial action. The five-year review will evaluate the results from monitoring programs established as part of this remedy to ensure that the remedy remains protective of human health and the environment.

DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan identified Alternative 3 (removal, backfill, and placement of a habitat layer) as the preferred remedy. Based upon the review of the written and oral comments submitted during the public comment period, NYSDEC and EPA determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

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APPENDIX I

FIGURES

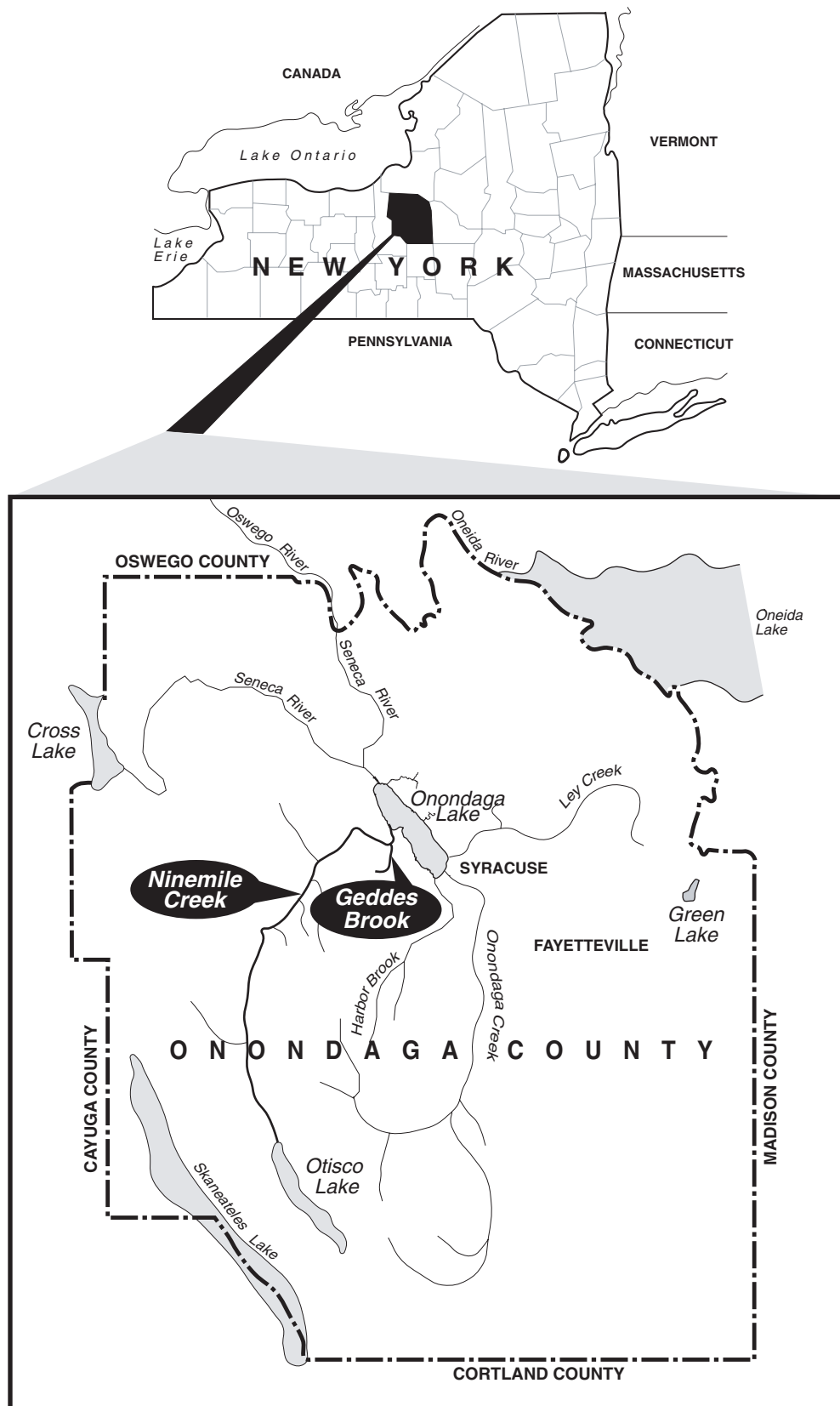


Figure 1. Location of Geddes Brook, Ninemile Creek, and Onondaga Lake

Source: FS Figure 1-1 (Parsons, 2005)

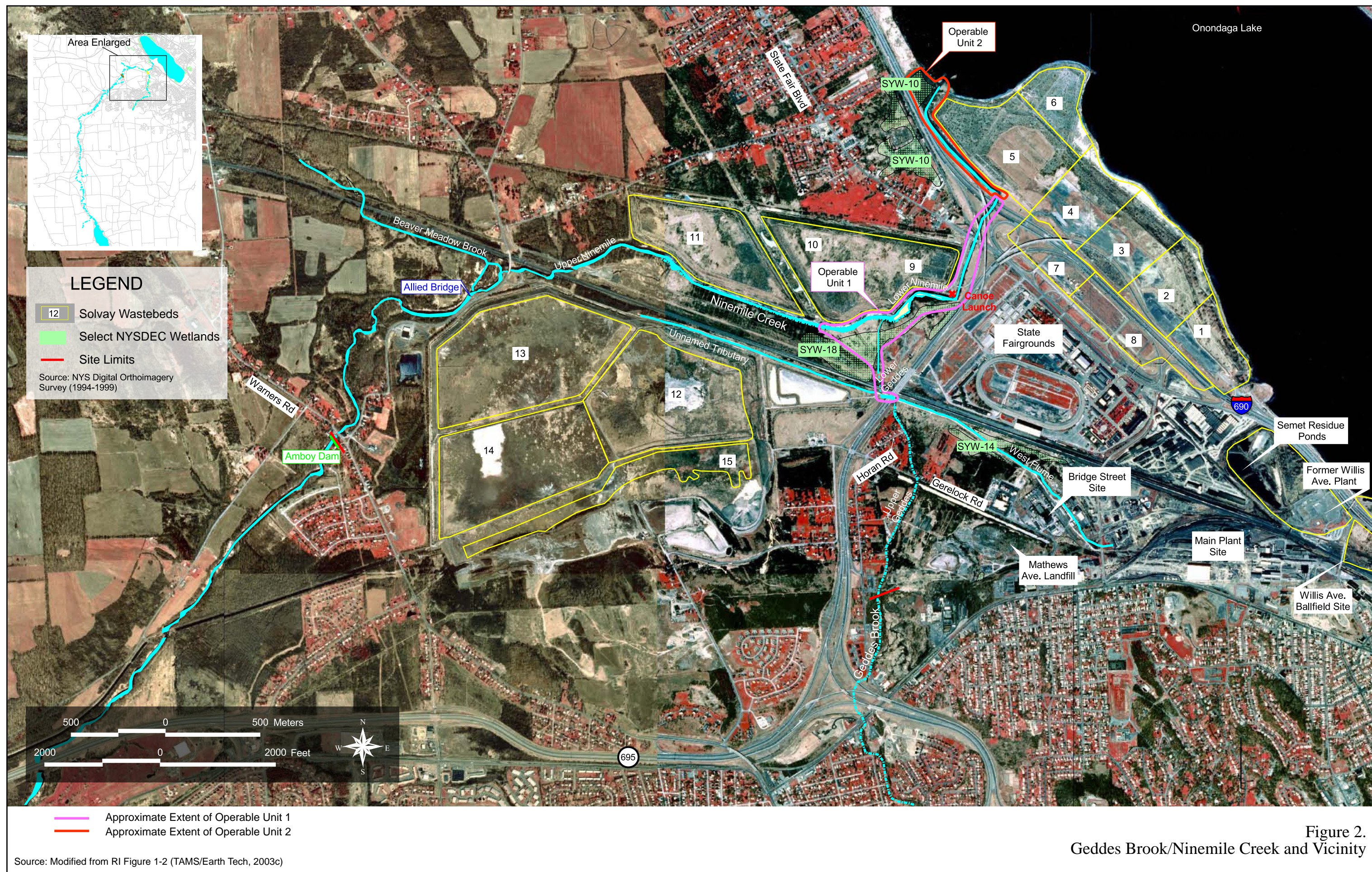
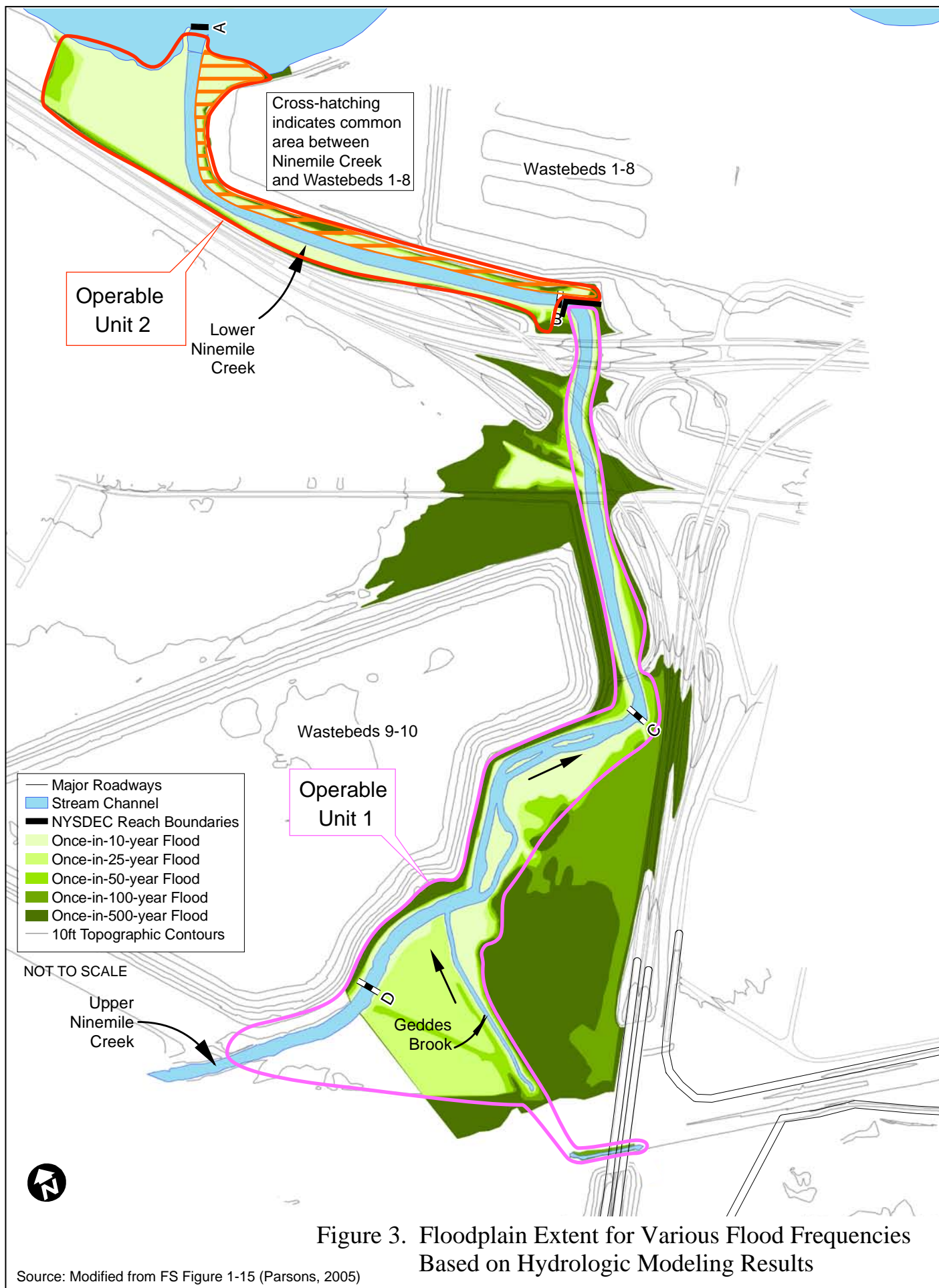
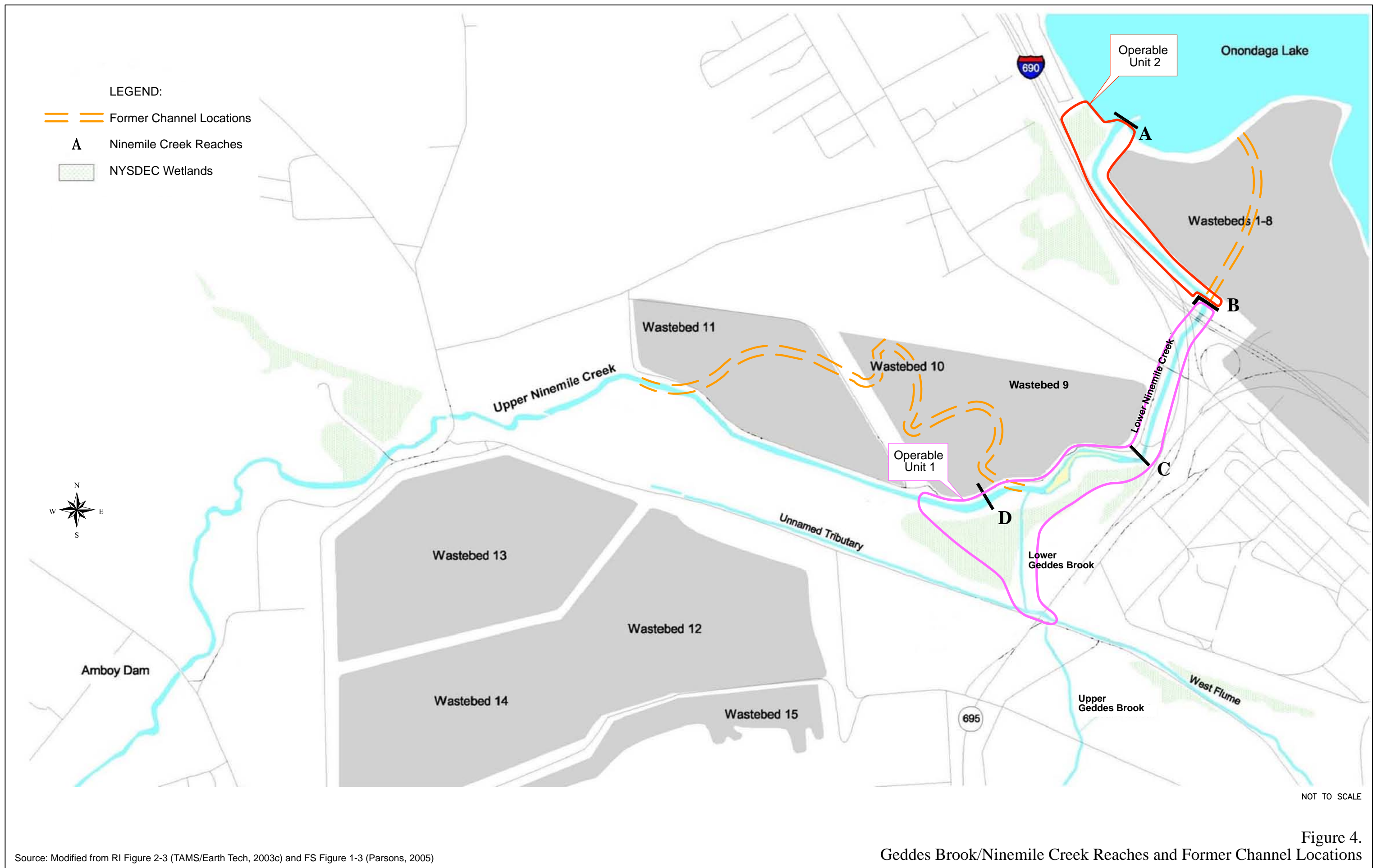


Figure 2.
Geddes Brook/Ninemile Creek and Vicinity

Source: Modified from RI Figure 1-2 (TAMS/Earth Tech, 2003c)





Source: Modified from RI Figure 2-3 (TAMS/Earth Tech, 2003c) and FS Figure 1-3 (Parsons, 2005)

Figure 4.
Geddes Brook/Ninemile Creek Reaches and Former Channel Locations

LEGEND

a Approximate Location and Extent

Wastebeds 1-15

● Approximate Location of non-Honeywell sites:
 1. State Fair Landfill
 2. Village of Solvay Landfill
 3. Pass & Seymour
 4. Frazer & Jones
 5. Stanton Foundry

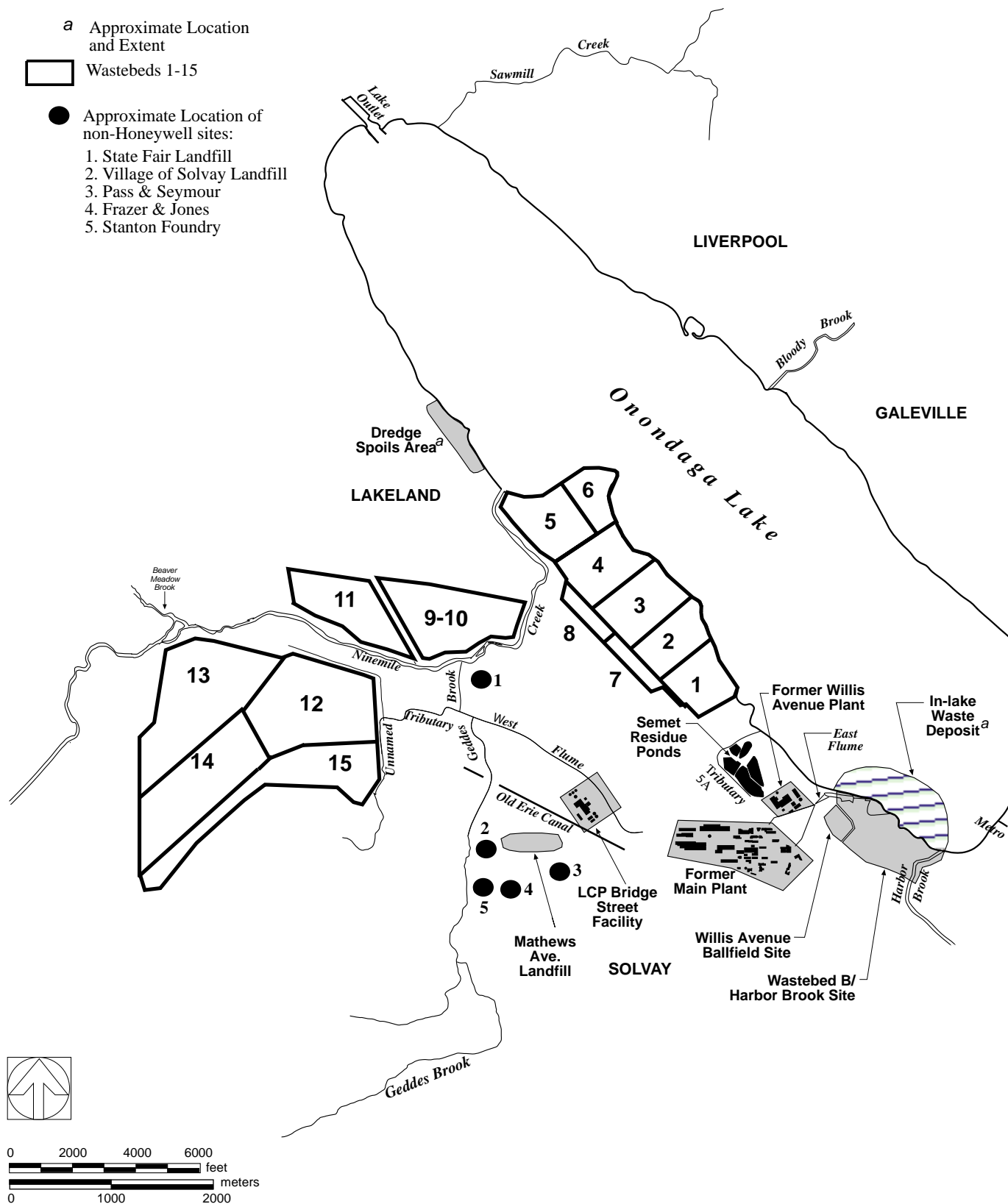


Figure 5. Location of Honeywell and Other Referenced Sites Near Geddes Brook/Ninemile Creek

Source: RI Figure 4-1 (TAMS/Earth Tech, 2003c)



Figure 6a
Source: Modified from OU2 Supplemental FS (Parsons, 2009) Mercury Concentrations in Channel and Floodplain Samples in Reach AB (0 to 1 ft)



Figure 6b

Source: Modified from OU2 Supplemental FS (Parsons, 2009) Mercury Concentrations in Channel and Floodplain Samples in Reach AB (1 to 2 ft)



Figure 6c
Source: Modified from OU2 Supplemental FS (Parsons, 2009) Mercury Concentrations in Channel and Floodplain Samples in Reach AB (2 to 3 ft)

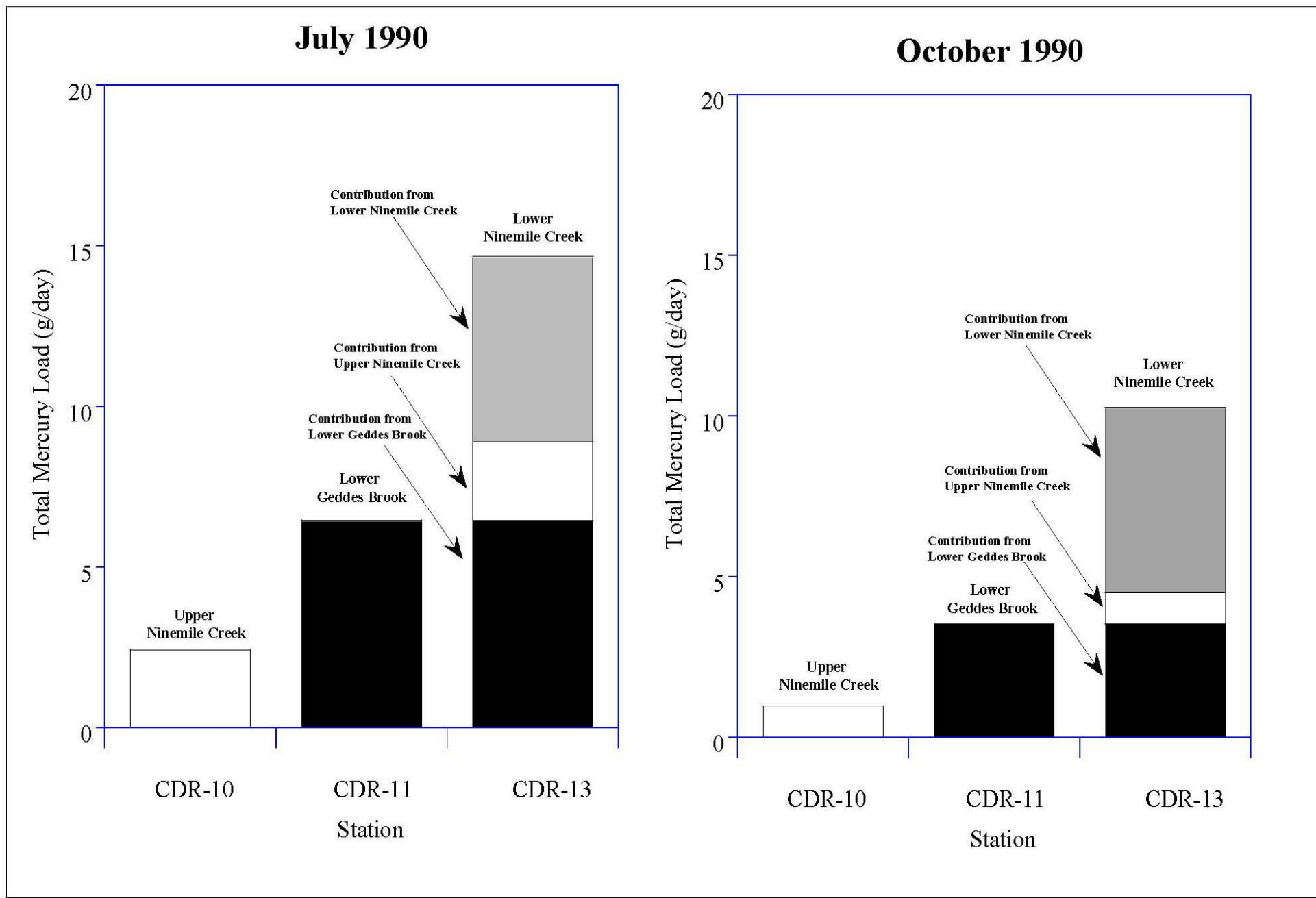


Figure 7. Comparison of Total Mercury Loads in Surface Water of Geddes Brook and Ninemile Creek in 1990

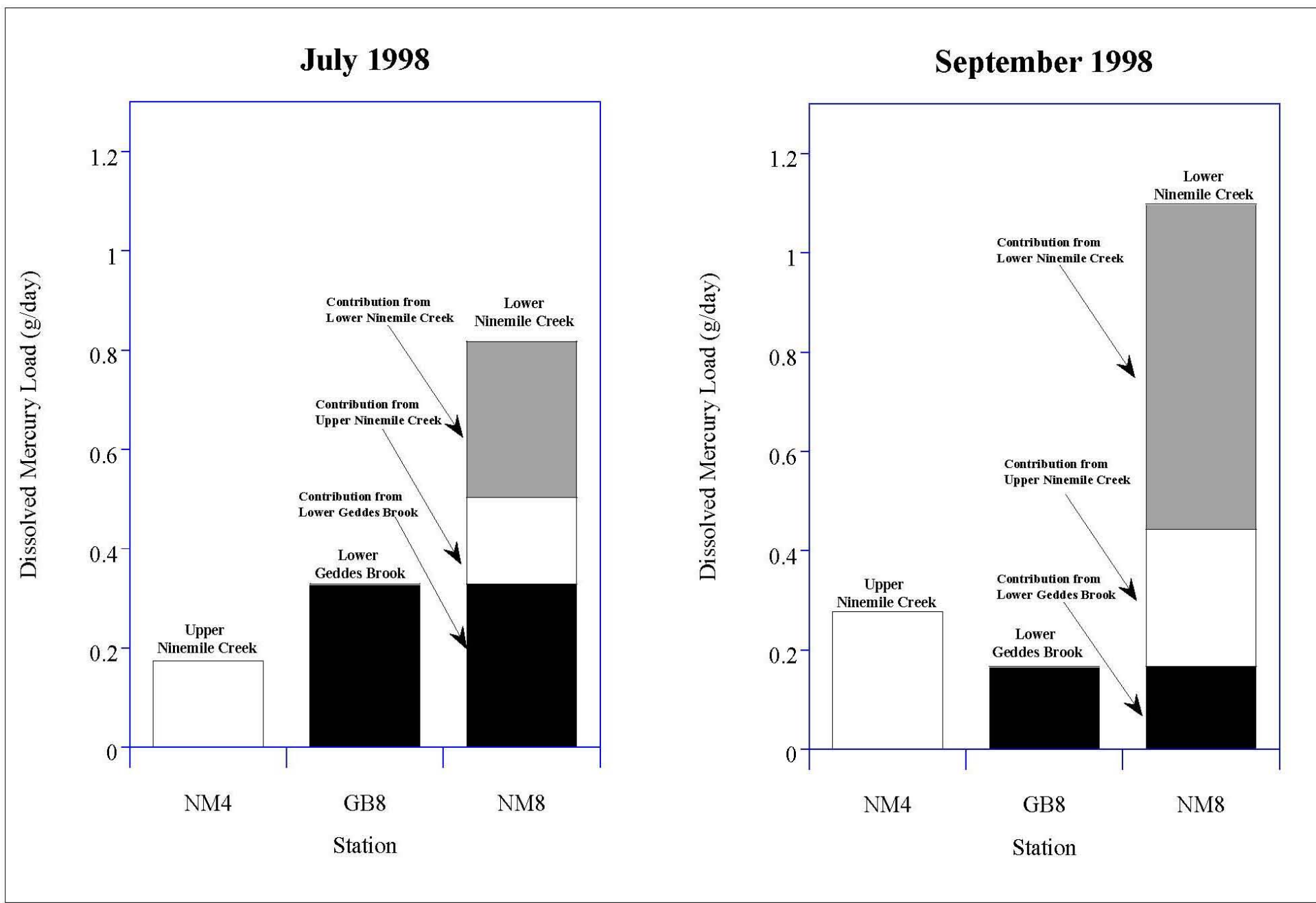
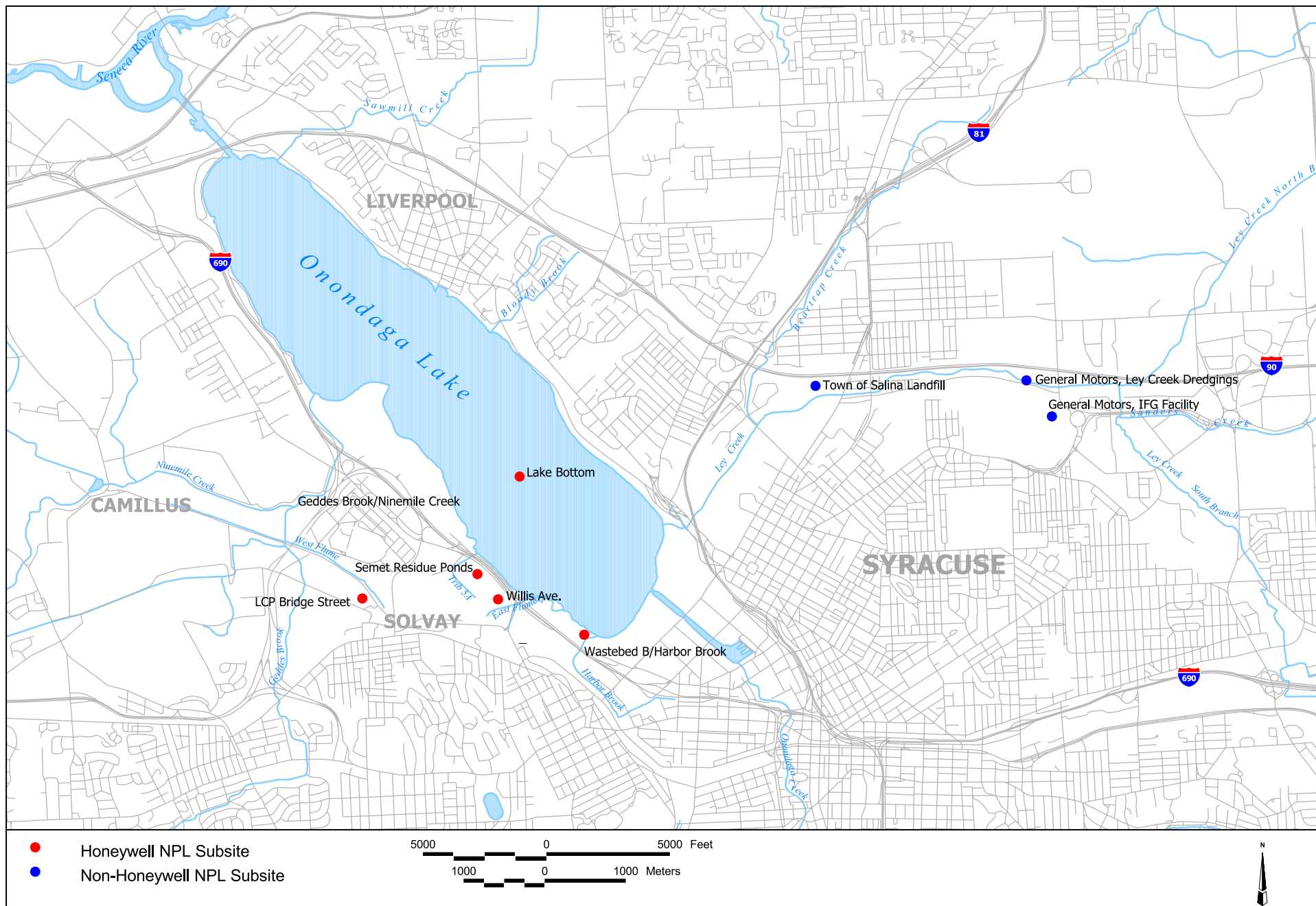


Figure 8. Comparison of Total Mercury Loads in Surface Water of Geddes Brook and Ninemile Creek in 1998



Source: Onondaga Lake ROD Figure 5 (NYSDEC/USEPA, 2005)

Figure 9. Location of Onondaga Lake NPL Subsides

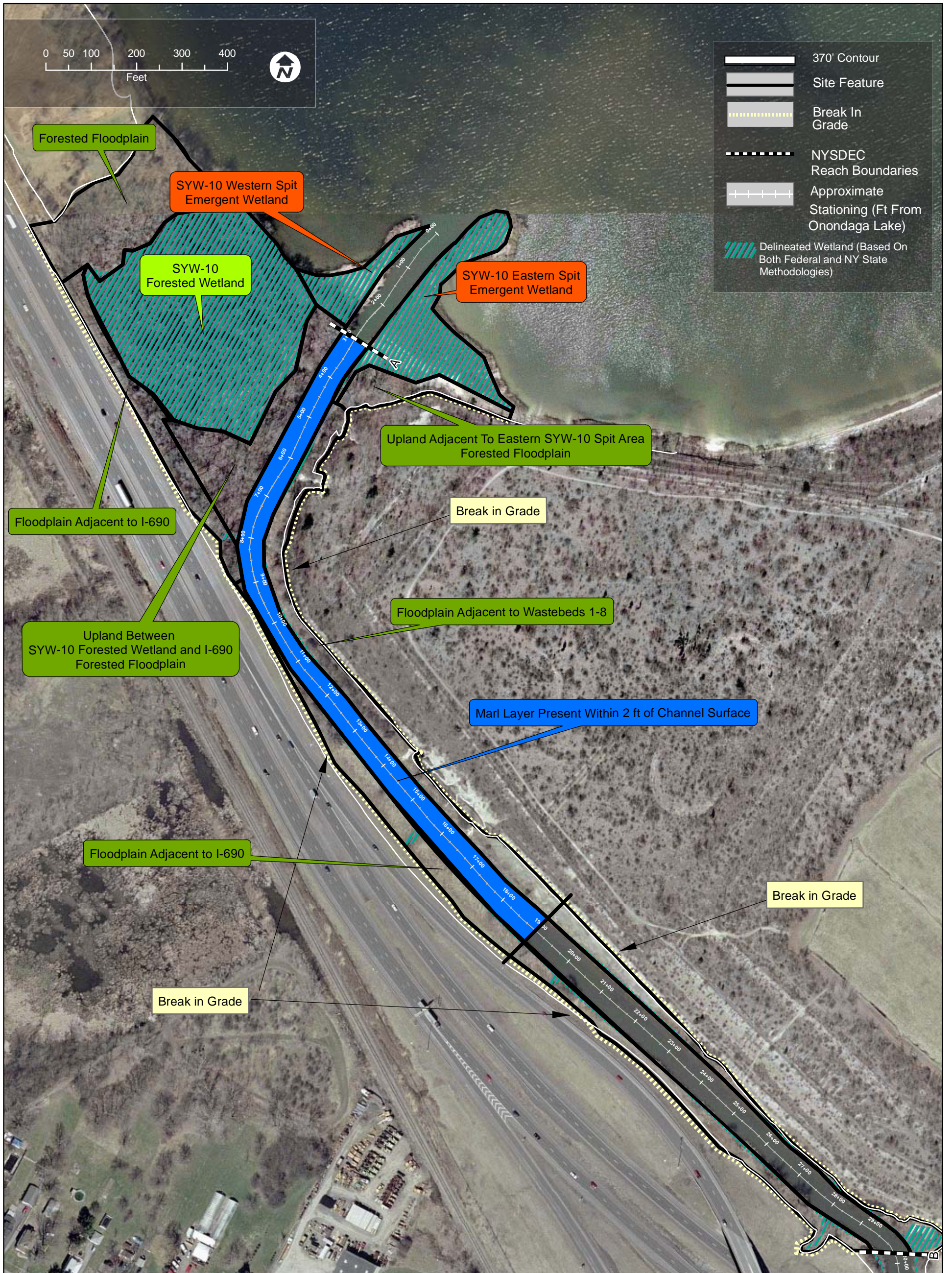


Figure 10
OU2 Site Characteristics

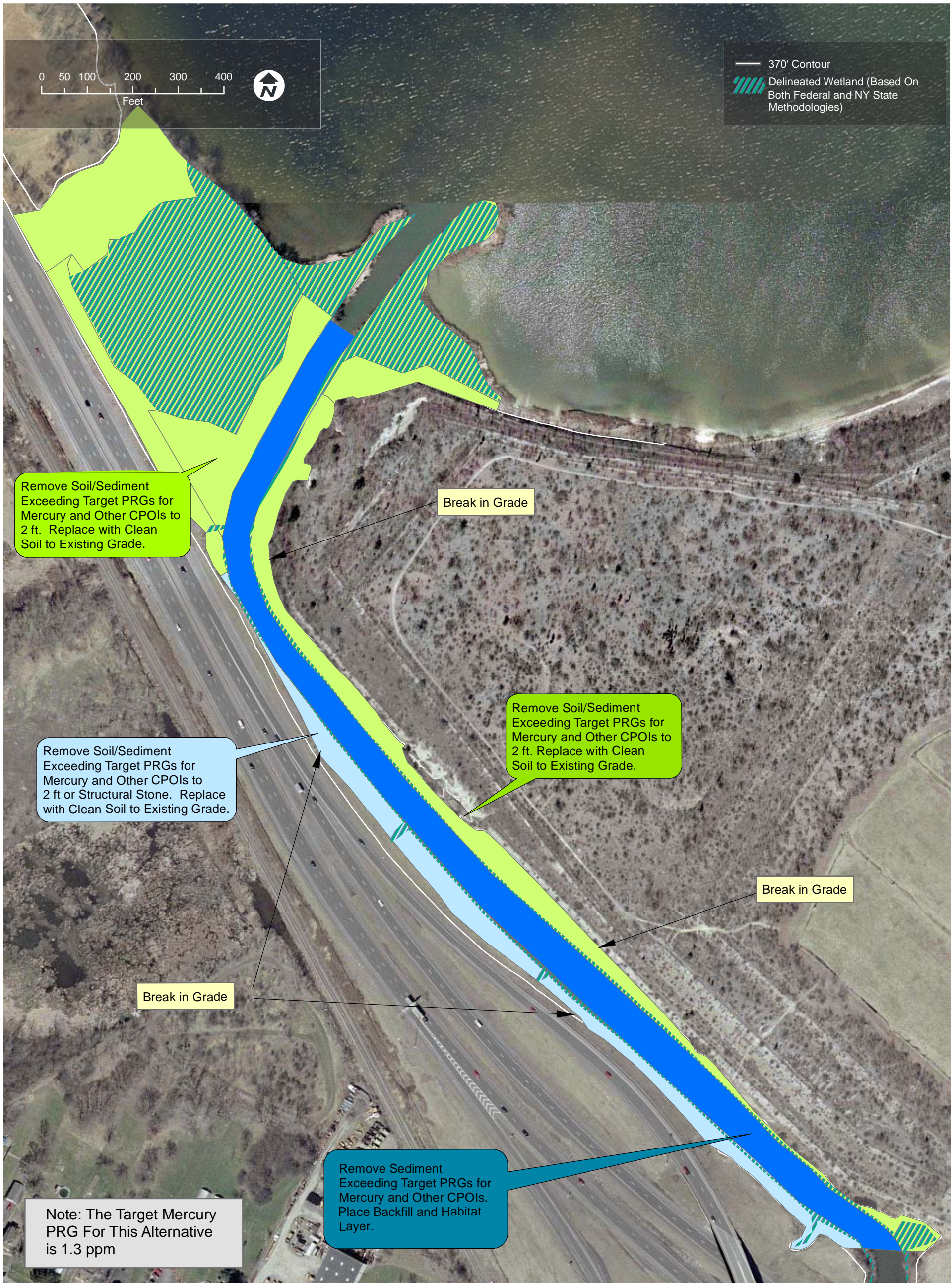
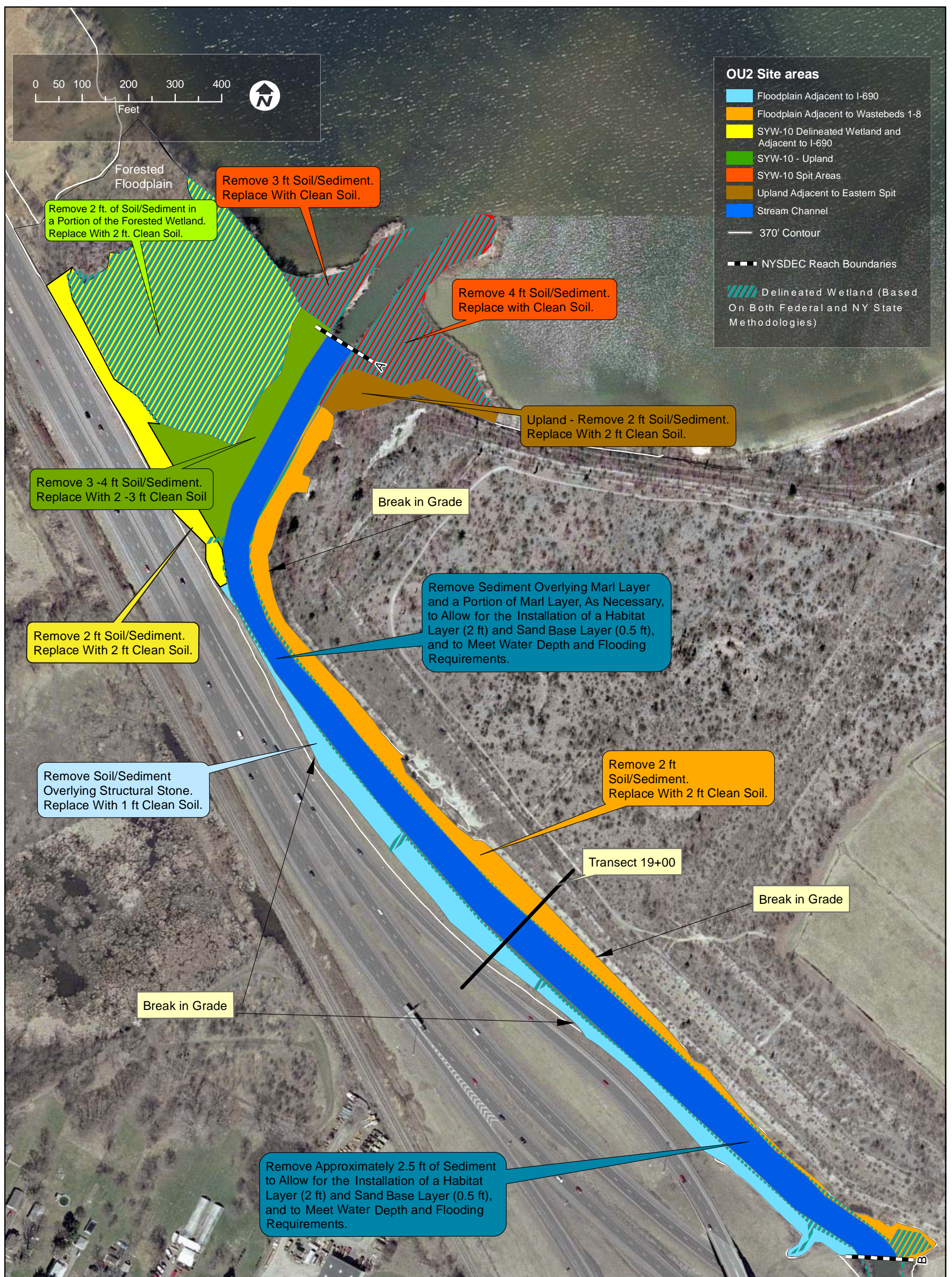


Figure 11
Alternative 2 Remedial Approach

Source: Modified from OU2 Supplemental FS (Parsons, 2009)



Note: Removal depths noted above are preliminary and would be finalized during remedial design.





Source: Modified from OU2 Supplemental FS (Parsons, 2009)

Figure 14
Alternative 2 Removal Areas, Channel



Figure 15
Alternative 2 Removal Areas, Floodplain





Figure 17
Alternative 3 (Selected Remedy) Removal Areas, Floodplain

Source: Modified from OU2 Supplemental FS (Parsons, 2009)



Figure 18
Alternative 4 Removal Areas, Channel

Source: Modified from OU2 Supplemental FS (Parsons, 2009)



Source: Modified from OU2 Supplemental FS (Parsons, 2009)

Figure 19
Alternative 4 Removal Areas, Floodplain

APPENDIX II

TABLES

Table 1. Contaminants of Potential Concern for the Geddes Brook/Ninemile Creek HHRA

Contaminant	Fish Fillets	Channel Sediments	Floodplain Soils/Sediments	Surface Water
Metals/Inorganics				
Aluminum		•	•	
Antimony		•	•	•
Arsenic (inorganic)	•	•	•	
Cadmium	•			•
Chromium		•	•	•
Copper	•			
Cyanide		•	•	
Iron	•	•	•	
Lead		•	•	•
Manganese		•	•	•
Methylmercury	•	•	•	•
Mercury (inorganic)	NA ¹	•	•	•
Nickel	•			
Selenium	•	•		
Thallium		•	•	•
Vanadium	•			
Zinc	•			
Volatile Organic Compounds				
No VOC COPCs identified in any Geddes Brook/Ninemile Creek medium				
Semivolatile Organic Compounds				
3-Nitroaniline			•	
N-nitroso-di-n-propylamine			•	
Hexachlorobenzene	•	•	•	
Polycyclic Aromatic Hydrocarbons				
Benz(a)anthracene		•	•	
Benzo(a)pyrene		•	•	
Benzo(b)fluoranthene		•	•	
Benzo(g,h,i)perylene			•	
Benzo(k)fluoranthene			•	
Dibenz(a,h)anthracene		•	•	
Indeno(1,2,3-cd)pyrene		•	•	
Phenanthrene		•	•	
Pesticides				
4,4-DDD	•			
4,4'-DDE	•			
4,4'-DDT	•			
Dieldrin	•	•		
Heptachlor Epoxide	•	•		
Polychlorinated Biphenyls				
Aroclor 1248	•		•	
Aroclor 1254	•	•	•	
Aroclor 1260	•	•	•	
Aroclor 1268		•	•	
Total PCBs (sum)	•	•	•	
Dioxins/Furans				
2,3,7,8-TCDD TEQ	•	•	•	•

Notes: • - Specified contaminant identified as a contaminant of potential concern (COPC).

NA - This analyte or parameter group not analyzed in specified exposure area.

Contaminants not listed were not identified as COPCs in any site medium.

¹ - All mercury in fish addressed as methylmercury.

Table 2. Contaminants and Stressors of Concern Selected for Geddes Brook/Ninemile Creek Media in the BERA

Contaminant	Surface Water	Channel Sediments	Floodplain Soils/Sediments	Plants	Fish
Metals/Inorganics					
Arsenic		•	•	•	•
Barium	•				
Cadmium			•		
Chromium			•	•	
Copper		•	•		
Iron			•		
Lead	•	•	•	•	
Manganese	•	•	•		
Mercury/Methylmercury	•	•	•	•	•
Nickel		•	•		
Selenium			•	•	•
Thallium			•	•	
Vanadium			•	•	
Zinc		•	•	•	•
Volatile Organic Compounds					
Dichlorobenzenes (Sum)		•			
Carbon disulfide		•			
Methylene chloride		•			
Semivolatile Organic Compounds					
Bis(2-ethylhexyl)phthalate		•			
Hexachlorobenzene		•	•		
2-Methylphenol		•			
Phenol		•	•		
Polycyclic aromatic hydrocarbons (total)		•	•		
Pesticides/Polychlorinated Biphenyls					
Chlordane isomers		•	•		
DDT and metabolites		•	•		•
Dieldrin			•		
Endrin			•		
Endosulfans (sum)		•			
Heptachlor and heptachlor epoxide		•	•		
Polychlorinated biphenyls (total)		•	•		•
Dioxins/Furans					
PCDD/PCDFs (TEQ)			•		•
Other Substances/Stressors					
Calcite		•			
Chloride	•				
Sodium	•				
Total dissolved solids	•				

Notes: • – Contaminants and stressors of concern assessed in the BERA for the specific media listed.

Table 3. Summary of Channel Sediment Data for Select Parameters from Geddes Brook and Ninemile Creek (1998,2001,2008)

	Upper Ninemile Creek		Lower Ninemile Creek		Upper Geddes Brook		Lower Geddes Brook		Lower Ninemile Creek Reach AB 2008	
Parameter	Maximum Detection	Average Detection	Maximum Detection	Average Detection	Maximum Detection	Average Detection	Maximum Detection	Average Detection	Maximum Detection	Average Detection
0 to 15 cm									0 to 30 cm	
Arsenic (mg/kg)	5.80	5.20	23.7	6.12	3.30	2.55	6.60	4.44	NA	NA
Benzo(a)pyrene (µg/kg)	180	118	1,100	328	2,100	1,550	2,900	720	NA	NA
Hexachlorobenzene (µg/kg)	ND	ND	2,450	193	3.10	3.10	795	253	NA	NA
Lead (mg/kg)	23.5	18.0	194	39.7	30.3	30.3	114	36.4	NA	NA
Mercury (mg/kg)	0.15	0.10	21.1	3.08	0.36	0.20	15.7	2.62	119	25.57
Methylmercury (µg/kg)	1.89	1.24	6.26	2.48	2.01	1.60	4.83	2.91	NA	NA
Total PAHs (µg/kg)	2,040	1,379	13,981	3,645	24,469	18,009	42,130	8,717	NA	NA
Total PCBs (µg/kg)	ND	ND	1,350	166	ND	ND	150	111	NA	NA
Phenol (µg/kg)	ND	ND	220	142	ND	ND	250	195	NA	NA
15 to 45 cm									30 to 60 cm	
Arsenic (mg/kg)	4.20	4.20	33.2	7.09	3.40	3.40	14.6	6.26	NA	NA
Benzo(a)pyrene (µg/kg)	ND	ND	2,800	460	360	360	480	283	NA	NA
Hexachlorobenzene (µg/kg)	ND	ND	7,100	807	ND	ND	5,500	925	NA	NA
Lead (mg/kg)	9.90	9.90	532	50	35.2	35.2	200	41.4	NA	NA
Mercury (mg/kg)	0.03	0.03	68.6	6.58	0.32	0.27	5.30	1.57	98.8	30.10
Methylmercury (µg/kg)	0.17	0.17	9.01	2.82	0.59	0.59	4.60	1.37	NA	NA
Total PAHs (µg/kg)	ND	ND	33,915	4,420	4,083	4,083	6,030	2,929	NA	NA
Total PCBs (µg/kg)	ND	ND	1,200	210	52.0	52.0	400	250	NA	NA
Phenol (µg/kg)	ND	ND	1,700	499	ND	ND	120	92.5	NA	NA
45 to 75 cm										
Arsenic (mg/kg)	NA	NA	101	10.1	2.70	2.70	8.30	5.76	NA	NA
Benzo(a)pyrene (µg/kg)	NA	NA	1,600	374	150	150	1,400	557	NA	NA
Hexachlorobenzene (µg/kg)	NA	NA	26,000	2,168	ND	ND	17,500	5,322	NA	NA
Lead (mg/kg)	NA	NA	388	45.8	25.1	25.1	371	127	NA	NA
Mercury (mg/kg)	NA	NA	118	5.33	0.37	0.30	79.0	16.7	NA	NA
Methylmercury (µg/kg)	NA	NA	20.1	4.80	0.27	0.27	8.82	3.04	NA	NA
Total PAHs (µg/kg)	NA	NA	23,685	4,071	1,787	1,787	12,620	5,575	NA	NA
Total PCBs (µg/kg)	NA	NA	2,100	258	37	37	4,500	1,580	NA	NA
Phenol (µg/kg)	NA	NA	940	505	ND	ND	ND	ND	NA	NA
75 to 105 cm									60 to 90	
Arsenic (mg/kg)	NA	NA	101	14.6	3.60	3.60	22.7	10.2	NA	NA
Benzo(a)pyrene (µg/kg)	NA	NA	1,200	251	82	82	3,900	1,123	NA	NA
Hexachlorobenzene (µg/kg)	NA	NA	1,050	372	ND	ND	107,500	27,386	NA	NA
Lead (mg/kg)	NA	NA	374	50.9	14.8	14.8	144	57.6	NA	NA
Mercury (mg/kg)	NA	NA	28.3	3.09	0.42	0.26	3.76	2.79	121	40.37
Methylmercury (µg/kg)	NA	NA	14.9	2.94	0.35	0.35	3.51	2.34	NA	NA
Total PAHs (µg/kg)	NA	NA	17,661	3,296	943	943	55,180	15,785	NA	NA
Total PCBs (µg/kg)	NA	NA	2,500	441	27.5	27.5	133	133	NA	NA
Phenol (µg/kg)	NA	NA	700	401	ND	ND	ND	ND	NA	NA
Below 105 cm									Below 90 cm	
Arsenic (mg/kg)	NA	NA	37.6	7.69	NA	NA	10.3	9.35	NA	NA
Benzo(a)pyrene (µg/kg)	NA	NA	1,100	418	NA	NA	2,800	1,600	NA	NA
Hexachlorobenzene (µg/kg)	NA	NA	435	228	NA	NA	140,000	73,125	NA	NA
Lead (mg/kg)	NA	NA	321	44.1	NA	NA	115	86.7	NA	NA
Mercury (mg/kg)	NA	NA	30.2	1.57	NA	NA	10.4	8.85	126	6.59
Methylmercury (µg/kg)	NA	NA	4.36	1.10	NA	NA	3.14	3.09	NA	NA
Total PAHs (µg/kg)	NA	NA	15,654	4,867	NA	NA	41,860	23,621	NA	NA
Total PCBs (µg/kg)	NA	NA	475	167	NA	NA	ND	ND	NA	NA
Phenol (µg/kg)	NA	NA	780	285	NA	NA	ND	ND	NA	NA

Notes:

1. NA=Not analyzed

2. ND=Not detected

3. The sediment samples outside of the site limits, as defined in this Proposed Plan, are not included in these statistics. These include NM1, NM2, TN-17 and TN-18, which are located upstream of Amboy Dam in upper Ninemile Creek, and GB1, which is located in upper Geddes Brook. These data can be found in the RI report, and the statistics reported for upper Ninemile Creek and upper Geddes Brook in Appendix I of the RI include the data from these stations.

Table 4. Summary of Floodplain Soil/Sediment Data for Select Parameters from Geddes Brook and Ninemile Creek (1998, 2000, 2001, 2002, and 2007)

Parameter	Lower Ninemile Creek			Islands in Lower Ninemile Creek			Lower Geddes Brook			Geddes Brook IRM Sampling		
	Depth Interval (cm)	Maximum Detection	Average Detection	Depth Interval (cm)	Maximum Detection	Average Detection	Depth Interval (cm)	Maximum Detection	Average Detection	Depth Interval (cm)	Maximum Detection	Average Detection
Arsenic (mg/kg)	0 to 15	23.0	5.76	0 to 15	6.40	5.63	0 to 15	7.70	5.85	0 to 15	NA	NA
Benzo(a)pyrene (µg/kg)	0 to 15	14,000	654	0 to 15	320	248	0 to 15	8,000	1,067	0 to 15	780	340
Hexachlorobenzene (µg/kg)	0 to 15	890	91	0 to 15	745	423	0 to 15	1,650	263	0 to 15	880	328
Lead (mg/kg)	0 to 15	466	44.3	0 to 15	42.2	34.4	0 to 15	192	52.5	0 to 15	NA	NA
Mercury (mg/kg)	0 to 15	58.7	2.29	0 to 15	1.90	0.71	0 to 15	14.1	4.33	0 to 15	15.7	3.98
Methylmercury (µg/kg)	0 to 15	27.5	5.83	0 to 15	NA	NA	0 to 15	5.31	4.03	0 to 15	NA	NA
Total PAHs (µg/kg)	0 to 15	173,980	7,756	0 to 15	3,990	3,036	0 to 15	138,363	14,707	0 to 15	8,410	3,738
Total PCBs (µg/kg)	0 to 15	600	70.7	0 to 15	80.0	49.6	0 to 15	450	137	0 to 15	NA	NA
Phenol (µg/kg)	0 to 15	120	91.4	0 to 15	ND	ND	0 to 15	ND	ND	0 to 15	NA	NA
Arsenic (mg/kg)	15 to 30	31.0	5.91	15 to 45	6.00	5.68	15 to 30	8.90	5.82	15 to 30	NA	NA
Benzo(a)pyrene (µg/kg)	15 to 30	20,000	736	15 to 45	400	250	15 to 30	460	282	15 to 30	430	220
Hexachlorobenzene (µg/kg)	15 to 30	1,050	130	15 to 45	165	93	15 to 30	1,360	344	15 to 30	840	394
Lead (mg/kg)	15 to 30	317	36	15 to 45	39.8	35.1	15 to 30	173	50.7	15 to 30	NA	NA
Mercury (mg/kg)	15 to 30	59.5	3.79	15 to 45	4.70	0.99	15 to 30	33.7	11.7	15 to 30	39.1	6.14
Methylmercury (µg/kg)	15 to 30	NA	NA	15 to 45	NA	NA	15 to 30	NA	NA	15 to 30	NA	NA
Total PAHs (µg/kg)	15 to 30	283,060	8,693	15 to 45	4,590	2,976	15 to 30	4,992	2,947	15 to 30	4,720	2,370
Total PCBs (µg/kg)	15 to 30	1,050	143	15 to 45	140	59.1	15 to 30	800	462	15 to 30	NA	NA
Phenol (µg/kg)	15 to 30	66	55	15 to 45	ND	ND	15 to 30	ND	ND	15 to 30	NA	NA
Arsenic (mg/kg)	30 to 60	NA	NA	45 to 75	9.40	6.40	30 to 60	NA	NA	30 to 60	NA	NA
Benzo(a)pyrene (µg/kg)	30 to 60	1,700	298	45 to 75	270	270	30 to 60	NA	NA	30 to 60	4,000	690
Hexachlorobenzene (µg/kg)	30 to 60	6,400	1,006	45 to 75	20	20	30 to 60	NA	NA	30 to 60	8,100	2,840
Lead (mg/kg)	30 to 60	NA	NA	45 to 75	45.9	27.3	30 to 60	NA	NA	30 to 60	NA	NA
Mercury (mg/kg)	30 to 60	76.9	4.16	45 to 75	0.85	0.32	30 to 60	NA	NA	30 to 60	269	14.2
Methylmercury (µg/kg)	30 to 60	NA	NA	45 to 75	NA	NA	30 to 60	NA	NA	30 to 60	NA	NA
Total PAHs (µg/kg)	30 to 60	18,714	3,208	45 to 75	3,092	3,092	30 to 60	NA	NA	30 to 60	40,700	6,363
Total PCBs (µg/kg)	30 to 60	NA	NA	45 to 75	15	15	30 to 60	NA	NA	30 to 60	NA	NA
Phenol (µg/kg)	30 to 60	NA	NA	45 to 75	ND	ND	30 to 60	NA	NA	30 to 60	NA	NA
Arsenic (mg/kg)	60 to 90	NA	NA	75 to 105	5.40	3.95	60 to 90	NA	NA	60 to 90	NA	NA
Benzo(a)pyrene (µg/kg)	60 to 90	1,500	285	75 to 105	200	200	60 to 90	NA	NA	60 to 90	1,800	696
Hexachlorobenzene (µg/kg)	60 to 90	870	256	75 to 105	2	2	60 to 90	NA	NA	60 to 90	93	93
Lead (mg/kg)	60 to 90	NA	NA	75 to 105	34.3	20.1	60 to 90	NA	NA	60 to 90	NA	NA
Mercury (mg/kg)	60 to 90	43.1	2.71	75 to 105	0.28	0.12	60 to 90	NA	NA	60 to 90	156	7.18
Methylmercury (µg/kg)	60 to 90	NA	NA	75 to 105	NA	NA	60 to 90	NA	NA	60 to 90	NA	NA
Total PAHs (µg/kg)	60 to 90	16,404	2,857	75 to 105	2,832	2,832	60 to 90	NA	NA	60 to 90	17,950	7,012
Total PCBs (µg/kg)	60 to 90	NA	NA	75 to 105	ND	ND	60 to 90	NA	NA	60 to 90	NA	NA
Phenol (µg/kg)	60 to 90	NA	NA	75 to 105	ND	ND	60 to 90	NA	NA	60 to 90	NA	NA

Notes:

1. NA=Not analyzed

2. ND=Not detected

3. The floodplain data for Ninemile Creek upstream of the confluence with Geddes Brook and for Geddes Brook upstream of the West Flume were not included in these statistics because these floodplain areas are not within the site limits. These soil data can be found in the RI report, and statistics for upper Ninemile Creek and upper Geddes Brook are reported in Appendix I of the RI. The data from 2007 are reported in Appendix B of the Supplemental FS (Parsons, 2008a). The summary of the 2007 data provided by Parsons was revised by Earth Tech for NYSDEC.

Table 4 cont.

Parameter	2007 Geddes Brook			2007 Ninemile Creek OU-1		
	Depth Interval (cm)	Maximum Detection	Average Detection	Depth Interval (cm)	Maximum Detection	Average Detection
Arsenic (mg/kg)	0 to 30	13.1	9.81	0 to 30	12.3	6.94
Benzo(a)pyrene (µg/kg)	0 to 30	NA	NA	0 to 30	NA	NA
Hexachlorobenzene (µg/kg)	0 to 30	NA	NA	0 to 30	0.10	0.07
Lead (mg/kg)	0 to 30	NA	NA	0 to 30	NA	NA
Mercury (mg/kg)	0 to 30	36.0	5.72	0 to 30	12.0	2.07
Methylmercury (µg/kg)	0 to 30	NA	NA	0 to 30	NA	NA
Total PAHs (µg/kg)	0 to 30	NA	NA	0 to 30	20.3	5.02
Total PCBs (µg/kg)	0 to 30	NA	NA	0 to 30	NA	NA
Phenol (µg/kg)	0 to 30	NA	NA	0 to 30	NA	NA
Arsenic (mg/kg)	----	----	----	----	----	----
Benzo(a)pyrene (µg/kg)	----	----	----	----	----	----
Hexachlorobenzene (µg/kg)	----	----	----	----	----	----
Lead (mg/kg)	----	----	----	----	----	----
Mercury (mg/kg)	----	----	----	----	----	----
Methylmercury (µg/kg)	----	----	----	----	----	----
Total PAHs (µg/kg)	----	----	----	----	----	----
Total PCBs (µg/kg)	----	----	----	----	----	----
Phenol (µg/kg)	----	----	----	----	----	----
Arsenic (mg/kg)	30 to 60	17.4	6.99	30 to 60	11.1	5.91
Benzo(a)pyrene (µg/kg)	30 to 60	NA	NA	30 to 60	NA	NA
Hexachlorobenzene (µg/kg)	30 to 60	NA	NA	30 to 60	0.05	0.04
Lead (mg/kg)	30 to 60	NA	NA	30 to 60	NA	NA
Mercury (mg/kg)	30 to 60	14.7	3.94	30 to 60	3.60	0.69
Methylmercury (µg/kg)	30 to 60	NA	NA	30 to 60	NA	NA
Total PAHs (µg/kg)	30 to 60	NA	NA	30 to 60	8.25	2.83
Total PCBs (µg/kg)	30 to 60	NA	NA	30 to 60	NA	NA
Phenol (µg/kg)	30 to 60	NA	NA	30 to 60	NA	NA
Arsenic (mg/kg)	60 to 90	7.30	3.58	60 to 90	5.40	3.17
Benzo(a)pyrene (µg/kg)	60 to 90	NA	NA	60 to 90	NA	NA
Hexachlorobenzene (µg/kg)	60 to 90	NA	NA	60 to 90	0.01	0.01
Lead (mg/kg)	60 to 90	NA	NA	60 to 90	NA	NA
Mercury (mg/kg)	60 to 90	11.0	1.48	60 to 90	0.72	0.19
Methylmercury (µg/kg)	60 to 90	NA	NA	60 to 90	NA	NA
Total PAHs (µg/kg)	60 to 90	NA	NA	60 to 90	0.89	0.50
Total PCBs (µg/kg)	60 to 90	NA	NA	60 to 90	NA	NA
Phenol (µg/kg)	60 to 90	NA	NA	60 to 90	NA	NA

Table 5. Summary of Surface Water Data for Select Parameters from Geddes Brook and Ninemile Creek (1998)

Parameter	Upper Ninemile Creek		Lower Ninemile Creek		Upper Geddes Brook		Lower Geddes Brook	
	Maximum Detection	Average Detection	Maximum Detection	Average Detection	Maximum Detection	Average Detection	Maximum Detection	Average Detection
Dissolved Arsenic (µg/L-dis)	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic (µg/L)	ND	ND	ND	ND	ND	ND	ND	ND
Dissolved Lead (µg/L-dis)	ND	ND	ND	ND	ND	ND	1.2	1.2
Lead (µg/L)	1.8	1.8	1.7	1.7	ND	ND	1.8	1.8
Dissolved Methylmercury (ng/L-dis)	4.2E-02	4.1E-02	3.2E-02	2.1E-02	4.0E-02	2.9E-02	6.1E-02	3.7E-02
Dissolved Total Mercury (ng/L-dis)	ND	ND	ND	ND	ND	ND	1.4	1.4
Total Mercury (ng/L)	2.3	1.8	27	9.2	2.1	2.1	27	22
Hexachlorobenzene (µg/L)	ND	ND	ND	ND	ND	ND	ND	ND
Phenol (µg/L)	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene (µg/L)	ND	ND	ND	ND	ND	ND	ND	ND
Total PAHs (µg/L)	ND	ND	ND	ND	ND	ND	ND	ND
Total PCBs (µg/L)	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

1. ND=Not detected
2. Data collected during the GB/NMC RI from the West Flume (Station GB4) and the "Unnamed Creek" (Station GB5), both of which discharge to lower Geddes Brook, are not included in this data summary since these streams are outside of the scope of this remedy.
3. The water samples outside of the site limits, as defined in this ROD, are not included in these statistics. These include NM1 and NM2 upstream of Amboy Dam in upper Ninemile Creek, and GB1 in upper Geddes Brook. These data can be found in the RI report, and the statistics reported for upper Ninemile Creek and upper Geddes Brook in Appendix I of the RI include the data from these stations.

Table 6. Concentrations of Select Contaminants in Geddes Brook/Ninemile Creek Fish

Contaminants (only contaminants considered risk drivers are shown)	Units (wet weight)	Target Tissue Concentration Range (mg/kg) ²		Fish Concentrations (mg/kg)		
				Data from 1990, 1998, 2000, and 2002		
				Arithmetic Mean	95% UCL ⁴	Max Detection
Human Health Exposure - Fish Fillets			RME			
Mercury (as methylmercury) ⁵	mg/kg		0.6	0.55	0.73	2.5
Total PCBs ⁶	mg/kg		0.011 to 1.1	0.17	0.45	1.9
PCDD/PCDFs - TEQ as 2,3,7,8-TCDD ⁷	mg/kg		1.0E-07 to 1.0E-05	2.3E-06	5.9E-06	1.8E-05
Ecological Exposure - Small Fish (3 to 18 cm) Whole Fish ^{1, 3}						
Mercury (as methylmercury)	mg/kg	NOAEL	LOAEL			
		0.009	0.187	0.28	0.85	0.85
Ecological Exposure - Large Fish (18 to 60 cm) Whole Fish ^{1, 3}						
Mercury (as methylmercury)	mg/kg	NOAEL	LOAEL			
		0.014	0.345	0.56	1.9	1.9

Sources:

- Human health exposure data (fish fillets) were taken from Table 3.1 of Appendix B of the Geddes Brook/Ninemile Creek Human Health Risk Assessment (HHRA) report.
- Ecological exposure data (whole fish) were taken from Table I-2 of the Geddes Brook/Ninemile Creek FS report.
- Target tissue concentrations were taken from Appendix I of the Geddes Brook/Ninemile Creek FS report and from Attachment A-2 of Appendix A of the OU1 Supplemental FS report. Fish tissue PRGs can be found in the text boxes on pages 41 and 42 of the ROD.

Notes:

1. Mercury concentrations were adjusted from fillet to whole body concentrations by multiplying by a factor of 0.7, as developed in the Onondaga Lake Baseline Ecological Risk Assessment.
2. RME = reasonable maximum exposure; NOAEL = no-observed-adverse-effect-level; LOAEL = lowest-observed-adverse-effect-level.
3. NOAELs and LOAELs for small (3 to 18 cm) fish are based on the belted kingfisher and mink.
NOAELs and LOAELs for large (18 to 60 cm) fish are based on the great blue heron and river otter.
4. The maximum detected concentration was used as the 95% UCL if it was lower than the calculated UCL.
5. The human health target tissue concentration for mercury (0.6 mg/kg) is based on young child RME (non-cancer effects). The RME target concentration for adults is slightly higher (0.9 mg/kg). See the PRGs in fish tissue text box on page 42 of the ROD.
6. The human health target tissue concentrations for total PCBs based on RME carcinogenic risks at risk targets of 1E-05 and 1E-04 for adults are 0.11 mg/kg and 1.1 mg/kg, respectively. The RME targets based on non-cancer effects of 0.12 to 0.19 mg/kg fall within the range based on the carcinogenic risk target of 1E-05. A target concentration based on the 1E-06 risk level (0.011 mg/kg) is much lower than mean background concentrations in US waters and may not be achievable. See the PRGs in fish tissue text box on page 42 of the ROD.
7. The human health target tissue concentrations for PCDD/PCDFs based on RME carcinogenic risks at risk targets of 1E-05 and 1E-04 for adults are 1E-06 mg/kg and 1E-05 mg/kg, respectively. Non-carcinogenic targets could not be developed for PCDD/PCDFs. A target concentration based on the 1E-06 risk level (1E-07 mg/kg) is much lower than mean background concentrations in US waters and may not be achievable. See the PRGs in fish tissue text box on page 42 of the ROD.

Table 7

**Summary of Chemicals of Concern and
Medium-Specific Exposure Point Concentrations**

Scenario Timeframe: Current/Future
Medium: Lower Ninemile Creek

Exposure Point	Chemical of Concern	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration	Exposure Point Concentration Units	Statistical Measure
		Min	Max					
Fish Fillet	Arsenic	0.52	1.1	mg/kg-ww	4/26	5.1E-02	mg/kg-ww	95% Chebyshev
	Hexachlorobenzene	2.6E-04	0.11	mg/kg-ww	14/26	3.4E-02	mg/kg-ww	97.5% Chebyshev
	PCBs	0.023	1.89	mg/kg-ww	18/25	4.5E-01	mg/kg-ww	95% Chebyshev
	PCDDs/PCDFs	3.3E-07	1.8E-05	mg/kg-ww	24/25	5.9E-06	mg/kg-ww	95% Chebyshev
	Methylmercury	0.13	2.5	mg/kg-ww	36/36	7.3E-01	mg/kg-ww	H-UCL
	Dieldrin	0.0011	0.02	mg/kg-ww	5/25	5.7E-03	mg/kg-ww	95% Chebyshev
Surface Sediment	Arsenic	NA	23.7	mg/kg-dw	NA	6.7E+00	mg/kg-dw	H-UCL
	Hexachlorobenzene	NA	11	mg/kg-dw	NA	3.2E+00	mg/kg-dw	97.5% Chebyshev
	Benzo(a)pyrene	NA	1.1	mg/kg-dw	NA	5.5E-01	mg/kg-dw	97.5% Chebyshev
Surface Soil	Arsenic	NA	23	mg/kg-dw	NA	7.9E+00	mg/kg-dw	95% Chebyshev
	Benz(a)anthracene	NA	15	mg/kg-dw	NA	1.7E+00	mg/kg-dw	97.5% Chebyshev
	Benzo(a)pyrene	NA	14	mg/kg-dw	NA	1.6E+00	mg/kg-dw	97.5% Chebyshev
	Dibenz(a,h)anthracene	NA	3.1	mg/kg-dw	NA	3.7E-01	mg/kg-dw	97.5% Chebyshev

Key

mg/kg-ww: milligrams per kilogram wet weight
mg/kg-dw: milligrams per kilogram dry weight
NA: Data not available
H-UCL: Data are lognormally distributed
95% Chebyshev: Data are non-parametrically distributed.
97.5% Chebyshev: Data are non-parametrically distributed.

Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations

The table presents the chemicals of concern (COCs) and exposure point concentration for each of the COCs detected in fish tissue, surface sediment and surface soil (*i.e.*, the concentration that will be used to estimate the exposure and risk from each COC in each medium). The table includes the range of concentrations detected for each COC, as well as the frequency of detection (*i.e.*, the number of times the chemical was detected in the samples collected at the site), the exposure point concentration (EPC), and how the EPC was derived.

<p align="center">Table 8</p> <p align="center">Non-Cancer Toxicity Data Summary</p>	
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Ingestion

Chemical of Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Absorption Efficiency (for Dermal)	Adjusted RfD (for Dermal)	Adjusted Dermal RfD Units	Primary Target Organ	Combined Uncertainty /Modifying Factors	Sources of RfD: Target Organ	Dates of RfD:
Arsenic	Chronic	3E-04	mg/kg-day	1	3E-04	mg/kg-day	Skin	3	IRIS	04/08/2003
Hexachlorobenzene	Chronic	8E-04	mg/kg-day	1	8E-04	mg/kg-day	Liver	100	IRIS	04/08/2003
PCBs (highly chlorinated) (as Aroclor 1254)	Chronic	2E-05	mg/kg-day	1	2E-05	mg/kg-day	Immune System	300	IRIS	04/08/2003
PCDD/ PCDFs	Chronic	NA	mg/kg-day		NA	mg/kg-day				
Dieldrin	Chronic	5E-05	mg/kg-day	1	5E-05	mg/kg-day	Liver	100	IRIS	04/08/2003
Methylmercury	Chronic	1E-04	mg/kg-day	1	1E-04	mg/kg-day	Develop.	10	IRIS	04/08/2003
Benz(a)anthracene	Chronic	3E-02	mg/kg-day	1	3E-02	mg/kg-day	Kidney	3000	IRIS/NCEA	04/11/2003
Benzo(a)pyrene	Chronic	NA	mg/kg-day		NA	mg/kg-day				
Dibenz(a,h)anthracene	Chronic	3E-02	mg/kg-day	1	3E-02	mg/kg-day	Kidney	3000	IRIS/NCEA	04/11/2003

Key

NA: No information available
 IRIS: Integrated Risk Information System, U.S. EPA

IRIS: Integrated Risk Information System, U.S. EPA

Summary of Toxicity Assessment

This table provides non-carcinogenic risk information which is relevant to the contaminants of concern in fish tissue, surface sediments, and surface soils. Two of the COCs have toxicity data indicating their potential for adverse non-carcinogenic health effects in humans, while no data are currently available to evaluate noncancer health effects from exposure to PCDD/PCDFs and benzo(a)pyrene.

Table 9

Cancer Toxicity Data Summary

Ingestion

Chemical of Concern	Oral Cancer Slope Factor	Absorption Efficiency (for Dermal)	Adjusted Cancer Slope Factor (for Dermal)	Slope Factor Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
Arsenic	1.5E+00	1	1.5E+00	(mg/kg-day) ⁻¹	A	IRIS	04/08/2003
Hexachlorobenzene	1.6E+00	1	1.6E+00	(mg/kg-day) ⁻¹	B2	IRIS	04/08/2003
PCBs (highly chlorinated) (as Aroclor 1254)	2.0E+00	1	2.0E+00	(mg/kg-day) ⁻¹	B2	IRIS	04/08/2003
PCDD/ PCDFs	1.5E+05	1	1.5E+05	(mg/kg-day) ⁻¹	B2	HEAST	1997
Dieldrin	1.6E+01	1	1.6E+01	(mg/kg-day) ⁻¹	B2	IRIS	04/08/2003
Benz(a)anthracene	7.3E-01	1	7.3E-01	(mg/kg-day) ⁻¹	B2	IRIS	04/08/2003
Benzo(a)pyrene	7.3E+00	1	7.3E+00	(mg/kg-day) ⁻¹	B2	IRIS	04/08/2003
Dibenz(a,h)anthracene	7.3E+00	1	7.3E+00	(mg/kg-day) ⁻¹	B2	IRIS	04/08/2003

Key:

NA: No information available

IRIS: Integrated Risk Information System, U.S. EPA

HEAST: Health Effects Assessment Summary Tables

EPA Group:

A - Human carcinogen

B1 - Probable Human Carcinogen - Indicates that limited human data are available

B2 - Probable Human Carcinogen - Indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

Summary of Toxicity Assessment

This table provides carcinogenic risk information which is relevant to the contaminants of concern in fish tissue. Toxicity data for cancer risks for PCBs are for PCBs as a class; i.e., total PCBs, without differentiation with regard to level of chlorination or molecular weight.

Page 1

Risk Characterization Summary – Carcinogens (Reasonable Maximum Exposure)

Scenario Timeframe:	Current/Future
Receptor Population:	Recreation
Receptor Age:	Adult (18 and older)

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Fish	Fish Tissue	Fish Fillet	Arsenic	3.5E-06	--	--	3.5E-06
			Hexachlorobenzene	2.5E-06	--	--	2.5E-06
			Dieldrin	4.2E-06	--	--	4.2E-06
			PCBs	4.2E-05	--	--	4.2E-05
			PCDD/PCDFs	4.0E-05	--	--	4.0E-05
Total Risk =							9.2E-05
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Sediment	Surface Sediment	Lower Ninemile Creek	Arsenic	7.4E-07	--	3.8E-07	1.1E-06
			Hexachlorobenzene	3.7E-07	--	6.4E-07	1.0E-06
Total Risk =							2.1E-06

Page 2

Scenario Timeframe:		Current/Future					
Receptor Population:		Recreation					
Receptor Age:		Adult (18 and older)					
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Lower Ninemile Creek	Arsenic	8.7E-07	--	4.5E-07	1.3E-06
			Benzo(a)pyrene	8.5E-07	--	1.9E-06	2.7E-06
Total Risk =							4.1E-06
Scenario Timeframe:		Current/Future					
Receptor Population:		Recreation					
Receptor Age:		Young Child (less than 6)					
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Fish	Fish Tissue	Fish Fillet	Arsenic	1.1E-06	--	--	1.1E-06
			Dieldrin	1.3E-06	--	--	1.3E-06
			PCBs	1.3E-05	--	--	1.3E-05
			PCDD/PCDFs	1.3E-05	--	--	1.3E-05
Total Risk =							2.8E-05

Page 3

Scenario Timeframe:	Current/Future
Receptor Population:	Recreation
Receptor Age:	Older Child (6 to < 18)

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Fish	Fish Tissue	Fish Fillet	Arsenic	1.5E-06	--	--	1.5E-06
			Hexachlorobenzene	1.1E-06	--	--	1.1E-06
			Dieldrin	1.8E-06	--	--	1.8E-06
			PCBs	1.8E-05	--	--	1.8E-05
			PCDD/PCDFs	1.8E-05	--	--	1.8E-05
Total Risk =						4.0E-05	

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Sediment	Surface Sediment	Lower Ninemile Creek	Arsenic	4.8E-07	--	2.1E-06	2.6E-06
			Hexachlorobenzene	2.4E-07	--	3.5E-06	3.8E-06
			Benzo(a)pyrene	1.9E-07	--	3.7E-06	3.9E-06
Total Risk =							1.0E-05

Table 10

Page 4

Risk Characterization Summary – Carcinogens (Reasonable Maximum Exposure)

Scenario Timeframe: Current/Future
Receptor Population: Recreation
Receptor Age: Older Child (6 to < 18)

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Lower Ninemile Creek	Arsenic	5.7E-07	--	2.5E-06	3.0E-06
			Benz(a)anthracene	5.9E-08	--	1.1E-06	1.2E-06
			Benzo(a)pyrene	5.6E-07	--	1.1E-05	1.1E-05
			Dibenz(a,h)anthracene	1.3E-07	--	2.5E-06	2.6E-06
Total Risk =							1.8E-05

Key

-- : This route of exposure was not quantitatively evaluated in the baseline human health risk assessment.

Risk Characterization

This table provides carcinogenic risk estimates for the significant routes of exposure for the COCs noted above. These risk estimates are based on a reasonable maximum exposure (RME) and were developed by taking into account various conservative assumptions about the frequency and duration of exposure for each population, as well as the toxicity of the COCs. The COCs contributing most significantly to the risk level for all three populations are arsenic, hexachlorobenzene, dieldrin, PAHs, PCBs (total) and PCDD/PCDFs. The risk levels for these COCs indicate that if no clean-up action is taken, an individual would have a probability that exceeds the acceptable range for developing cancer as a result of site-related exposure to these COCs. Additional information can be found in the text of the ROD and the baseline human health risk assessment.

Table 11								
Risk Characterization Summary – Noncarcinogens (Reasonable Maximum Exposure)								
Scenario Timeframe:		Current/Future						
Receptor Population:		Recreation						
Receptor Age:		Adult (18 and older)						
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Noncarcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Fish	Fish Tissue	Fish Fillet	PCBs	Immune System	3.0	–	--	3.0
Total Hazard Index =								3.0
Scenario Timeframe:		Current/Future						
Receptor Population:		Recreation						
Receptor Age:		Young Child (less than 6)						
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Noncarcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Fish	Fish Tissue	Fish Fillet	PCBs	Immune System	4.7	--	--	4.7
			Methylmercury	Developmental	1.2	--	--	1.2
Total Hazard Index =								5.9
Scenario Timeframe:		Current/Future						
Receptor Population:		Recreation						
Receptor Age:		Young Child (less than 6)						
Scenario Timeframe:		Current/Future						
Receptor Population:		Recreation						
Receptor Age:		Older Child (6 < 18)						
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Noncarcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Fish	Fish Tissue	Fish Fillet	PCBs	Immune System	3.3	--	--	3.3
Total Hazard Index =								3.3

Risk Characterization

This table provides hazard quotients (HQs) for each route of exposure and the hazard index (sum of hazard quotients) for all routes of exposure. The Risk Assessment Guidance for Superfund (RAGS) states that, generally, a hazard index (HI) greater than 1 indicates the potential for adverse noncancer effects. The estimated HIs for the adult, older child, and young child recreators, indicate that the potential for adverse noncancer effects could occur from ingestion of fish fillet tissue containing PCBs for all three age groups and from methylmercury for young children. Additional information can be found in the text of the ROD and the baseline human health risk assessment.

TABLE 12
GEDDES BROOK/NINEMILE CREEK OPERABLE UNIT 2 (REACH AB)
SUMMARY OF ALTERNATIVES

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Description	Alternative 1 consists of No Action and is retained as a baseline condition per the NCP.	Alternative 2 consists of removal of contaminated Ninemile Creek channel sediments in Reach AB to a depth to meet criteria (1.3 mg/kg mercury and RGs for other CPOIs) and removal of contaminated floodplain soils/sediments where concentrations exceed 1.3 mg/kg mercury (and PRGs for other CPOIs) to a depth of 2 ft (60 cm) in the floodplain, followed by placement of backfill and a habitat layer in the channel and floodplain.	Alternative 3 consists of removal of Ninemile Creek channel sediments and floodplain soils/sediments in Reach AB to various depths and placement of backfill and habitat layer. Specific components of this alternative are discussed in the text of the ROD.	Alternative 4 consists of full removal of Ninemile Creek channel sediments and floodplain soils/sediments in Reach AB to a depth to meet criteria (0.15 mg/kg mercury and PRGs for other CPOIs) and placement of backfill and habitat layer.
Remediated Area (Acres) Total Channel / Floodplain	0	10.8	15.5	16.4
Dredged/Excavated Volume (cy)	0	23,000	58,000	70,000
Mercury Mass Removed (Pounds)	0	430	640	690
Construction Time (Years)	0	1	1	2
Total Estimated Cost	\$0	\$9,900,000	\$16,500,000	\$21,100,000

TABLE 13
GEDDES BROOK/NINEMILE CREEK OPERABLE UNIT 2 RECORD OF DECISION
COST SUMMARY FOR SELECTED REMEDY - NINEMILE CREEK REACH AB

Site: Ninemile Creek OU-2 Location: Syracuse, New York		Project title: Selected Remedy (Alternative 3) - Removal and Backfill/Habitat Layer		
CAPITAL COSTS				
DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL COST
DIRECT CONSTRUCTION COSTS				
Reach AB				
1. Clearing (light)	5.3	ACRE	\$7,000	\$37,100
2. Clearing (heavy)	6.3	ACRE	\$18,000	\$113,400
3. Temporary roads	120,000	SF	\$4	\$480,000
4. Install temporary culvert channel crossing	1	LS	\$150,000	\$150,000
5. Install/remove 40' sheeting (purchased for NMC and re-used)	12,000	SF	\$10	\$120,000
6. Dredge channel sediment	15,600	CY	\$41	\$639,600
7. Hydraulically dredge from station 3+00 - 4+00.	700	CY	\$65	\$45,500
8. Remove floodplain soil/sediment adjacent to creek	9,400	CY	\$22	\$206,800
9. Install/remove temporary water control	2,500	LF	\$225	\$562,500
10. Excavation Dewatering	45	DY	\$2,800	\$126,000
11. Remove floodplain soil/sediment (SYW-10)	32,100	CY	\$16	\$513,600
12. Stockpile and decant channel sediment	15,600	CY	\$10	\$156,000
13. Stockpile and decant floodplain soil/sediment	41,500	CY	\$4	\$166,000
14. Onsite treatment of water				
a. Capital Costs	1.00	LS	\$900,000	\$900,000
b. O&M Costs	9,100,000	GAL	\$0.057	\$518,700
15. Install cover materials in existing channel				
a. Purchase sand layer	3,100	CY	\$20	\$62,000
b. Place sand layer	3,100	CY	\$21	\$65,100
c. Purchase erosion protection layer	6,200	CY	\$42	\$260,400
d. Place erosion protection layer	6,200	CY	\$21	\$130,200
e. Purchase gravel habitat layer	6,200	CY	\$34	\$210,800
f. Place gravel habitat layer	6,200	CY	\$21	\$130,200
16. Place backfill within floodplains				
a. Purchase backfill	21,100	CY	\$20	\$422,000
b. Place backfill	21,100	CY	\$9	\$189,900
c. Purchase topsoil layer	18,700	CY	\$26	\$486,200
d. Place topsoil layer	18,700	CY	\$8	\$149,600
17. Emergent wetland planting	5.3	ACRE	\$35,000	\$185,500
18. Forested wetland planting	6.3	ACRE	\$70,000	\$441,000
19. Local handling, transport and consolidation at LCP	57,100	CY	\$36	\$2,055,600
SUBTOTAL DIRECT CONSTRUCTION COSTS				\$9,523,700
OTHER CAPITAL COSTS				
1. Indirect Construction Costs (% of direct construction costs)	1	Lot	18%	\$1,714,266
2. Contingency (% of direct construction costs)	1	Lot	20%	\$1,904,740
3. Engineering, Design & Construction Oversight (% of direct construction costs and contingency)	1	Lot	17%	\$1,942,835
SUBTOTAL OTHER CAPITAL COSTS				\$5,561,841
TOTAL CAPITAL COSTS				\$15,085,541

TABLE 13
GEDDES BROOK/NINEMILE CREEK OPERABLE UNIT 2 RECORD OF DECISION
COST SUMMARY FOR SELECTED REMEDY - NINEMILE CREEK REACH AB

ANNUAL OPERATION, MAINTENANCE, AND MONITORING COSTS					
DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL COST	
1. Project Management Administration, and Reporting	1	LS	\$20,000	\$20,000	
2. Water and Sediment Monitoring	1	LS	\$20,800	\$20,800	
3. Cover Maintenance and Sampling (floodplain)	11.6	ACRE	\$750	\$8,700	
4. Cover Maintenance and Sampling (channel)	0	ACRE	\$1,500	\$0	
5. Baseline Maintenance and Monitoring (floodplain)	11.6	ACRE	\$750	\$8,700	
6. Baseline maintenance and Monitoring (channel)	3.9	ACRE	\$1,500	\$5,850	
7. Institutional Controls	1	LS	\$10,000	\$10,000	
SUBTOTAL ANNUAL O&M COSTS				\$74,050	
8. Contingency (% of subtotal)	20%			\$14,810	
9. Technical Support/Troubleshooting (% of subtotal and contingency)	10%			\$8,886	
TOTAL ANNUAL O&M COSTS				\$97,746	
PERIODIC COSTS					
DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL COST	
1. CERCLA Reviews (once every 5 years)	1	LS	\$50,000	\$50,000	
2. Wetland Monitoring Assessments (Years 1, 3, and 5)	1	LS	\$30,000	\$30,000	
3. Forested Wetland Monitoring Assessment (Years 10, 20, and 30)	1	LS	\$20,000	\$20,000	
TOTAL PERIODIC COSTS				\$100,000	
PRESENT VALUE ANALYSIS					
COST TYPE	YEAR	TOTAL COST	TOTAL COST PER YEAR	DISCOUNT FACTOR (7%)	PRESENT VALUE
Capital Cost	0	\$15,085,541	\$15,085,541	1.000	\$15,085,541
Annual OM&M Cost	1-30	\$2,932,380	\$97,746	12.409	\$1,212,934
Periodic Cost	1	\$30,000	\$30,000	0.935	\$28,037
Periodic Cost	3	\$30,000	\$30,000	0.816	\$24,489
Periodic Cost	5	\$80,000	\$80,000	0.713	\$57,039
Periodic Cost	10	\$70,000	\$70,000	0.508	\$35,584
Periodic Cost	15	\$50,000	\$50,000	0.362	\$18,122
Periodic Cost	20	\$70,000	\$70,000	0.258	\$18,089
Periodic Cost	25	\$50,000	\$50,000	0.184	\$9,212
Periodic Cost	30	\$70,000	\$70,000	0.131	\$9,196
TOTAL PRESENT VALUE OF ALTERNATIVE					\$16,498,000

Notes: Costs are based on Table F-1-2 in the OU2 Supplemental FS (Parsons, 2009) and have a +50%/-30% accuracy with the base year of 2008.
Costs for OU1 (including the Geddes Brook IRM) are not included in costs above.

TABLE 14
CHEMICAL-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)

Medium/Authority	Citation	Status	Requirement Synopsis
WATER			
Clean Water Act [Federal Water Pollution Control Act; as amended], 33 USC §§ 1251-1387	40 CFR Part 129	ARAR	Toxic Pollutant Effluent Standards for aldrin/dieldrin, DDT, endrin, toxaphene, benzidene and PCBs.
Clean Water Act	40 CFR Parts 122, 125 and 401	ARAR	Wastewater Discharge Permits; Effluent Guidelines, Best Available Technology and Best Management Practices.
Clean Water Act	40 CFR § 403.5	ARAR	Discharge to Publicly-Owned Treatment Works
Safe Drinking Water Act	40 CFR Parts 144-147	ARAR	Underground Injection Control Program
Safe Drinking Water Act, 42 USC §§ 300f - 300j-26	40 CFR Part 141	ARAR	National Primary Drinking Water Regulations
Toxic Substances Control Act (TSCA), Title 1, 15 USC § 2601	40 CFR §§ 761.65 – 761.75	ARAR	TSCA facility requirements: Establishes siting guidance and criteria for storage (761.65), chemical waste landfills (761.75), and incinerators (761.70).
USEPA	USEPA Federal Register, Volume 57, No. 246, December 22, 1992	ARAR	Ambient Water Quality Criteria
New York State Environmental Conservation Law (ECL) Article 15, Title 3 and Article 17, Titles 3 and 8	6 NYCRR Part 608	ARAR	<p>Part 608 includes the requirement to obtain a SPDES permit for certain discharges in any navigable waters of the State (6 NYCRR 608.5). The regulations contained in 6 NYCRR Parts 700 – 706 include water quality classifications, standards and guidance values.</p> <p>Note that:</p> <ul style="list-style-type: none"> Section 608.6(a) requires development and submission of a sufficiently detailed construction plan with a map); Section 608.9(a) requires that construction or operation of facilities that may result in a discharge to navigable waters demonstrate compliance with CWA §§ 301 – 303, 306 and 307 and 6 NYCRR §§ 751.2 (prohibited discharges) and 754.1 (effluent prohibitions; effluent limitations and water quality-related effluent limitations; pretreatment standards; standards of performance for new sources.)
	6 NYCRR Part 700	ARAR	Part 700 provides definitions and describes collection and sampling procedures.
	6 NYCRR Part 701	ARAR	Part 701 establishes classifications for surface waters and groundwater.
	6 NYCRR Part 702	ARAR	Part 702 establishes the deviation and use of these standards and guidance values.

Medium/Authority	Citation	Status	Requirement Synopsis
	6 NYCRR Part 703	ARAR	Part 703 establishes surface water and groundwater quality standards and groundwater effluent limitations.
	6 NYCRR Part 704	ARAR	Part 704 establishes criteria for thermal discharges.
	6 NYCRR Part 705	ARAR	Part 705 contains reference sources for related regulations.
	6 NYCRR Part 706	ARAR	Part 706 establishes additional procedures for the derivation of standards and guidance values that are protective of aquatic life from acute and chronic effects.

TABLE 15

CHEMICAL-SPECIFIC POTENTIAL CRITERIA, ADVISORIES AND GUIDANCE TO BE CONSIDERED (TBC)

Medium/Authority	Citation	Status	Requirement Synopsis
BIOTA			
International Joint Commission – United States and Canada	Great Lakes Water Quality Agreement of 1978, as amended	TBC	The concentration of total PCBs in fish tissue (whole fish, wet weight basis) should not exceed 0.1 µg/g for the protection of birds and animals that consume fish. Criterion for mercury is 0.5 µg/g mercury in whole fish [wet weight basis].
NOAA – Damage Assessment Center	Reproductive, Developmental and Immunotoxic Effects of PCBs in Fish: A Summary of Laboratory and Field Studies, March 1999 (Monosson, E.)	TBC	<p>The effective concentrations for reproductive and developmental toxicity fall within the ranges of the PCB concentrations found in some of the most contaminated fish. There are currently an insufficient number of studies to estimate the immunotoxicity of PCBs in fish.</p> <p>Improper functioning of the reproductive system and adverse effects on development may result from adult fish liver concentrations of 25 to 71 ppm Aroclor 1254.</p> <p>PCB Congener BZ #77: 0.3 to 5 ppm (wet wt) in adult fish livers reduces egg deposition, pituitary gonadotropin, and gonadosomatic index, alters retinoid concentration (Vitamin A), and reduces larval survival. 1.3 ppm in eggs reduces larval survival.</p>
DEC Division of Fish and Wildlife	Niagara River Biota Contamination Project: Fish Flesh Criteria for Piscivorous Wildlife, Technical Report 87-3, July 1987, pp. 41-48 and Table 26 (Newell <i>et al.</i>)	TBC	Provides a method for calculating concentrations of organochlorines in fish flesh for the protection of wildlife. The fish flesh criterion is 0.11 mg/kg wet wt for PCBs, 3 mg/kg for dioxin/furans, and 0.33 mg/kg for hexachlorobenzene.
SEDIMENT			
EPA Office of Emergency and Remedial Response	Guidance on Remedial Actions for Superfund Sites with PCB Contamination, EP A/540/G- 90/007, August 1990 (OSWER Dir. No. 9355.4-01).	TBC	Provides guidance in the investigation and remedy selection process for PCB-contaminated Superfund sites. Provides preliminary remediation goals for various contaminated media, including sediment (pp. 34-36) and identifies other considerations important to protection of human health and the environment.
NOAA – Damage Assessment Office	Development and Evaluation of Consensus-Based Sediment Effect Concentrations for PCBs in the Hudson River, MacDonald Environmental Services Ltd., March 1999	TBC	Estuarine, freshwater and saltwater sediment effects concentrations for total PCBs: Threshold Effect Concentration: 0.04 mg/kg Mid-range Effect Concentration: 0.4 mg/kg Extreme Effect Concentration: 1.7 mg/kg
NOAA (compilation of other literature sources for Sediment Quality Guidelines [SQGs])	Screening Quick Reference Tables for Organics (SQRTs)	TBC	Tables with screening concentrations for inorganic and organic contaminants.

Medium/Authority	Citation	Status	Requirement Synopsis
EPA Great Lakes National Program Office, Assessment and Remediation of Contaminated Sediments (ARCS) Program	Calculation and Evaluation of Sediment Effect Concentrations for the Amphipod <i>Hyalella azteca</i> and the midge <i>Chironomus riparius</i> , EPA 905- R96-008, September 1996	TBC	Provides sediment effect concentrations (SECs), which are defined as the concentrations of a contaminant in sediment below which toxicity is rarely observed and above which toxicity is frequently observed.
DEC Division of Fish, Wildlife and Marine Resources	Technical Guidance for Screening Contaminated Sediment, January 1999	TBC	Includes a methodology to establish sediment criteria for the purpose of identifying contaminated sediments. Provides sediment quality screening values for non-polar organic compounds, such as PCBs, and metals to determine whether sediments are contaminated (above screening criteria) or clean (below screening criteria). Also discusses the use of sediment criteria in risk management decisions.
WATER			
International Joint Commission – United States and Canada	Great Lakes Water Quality Agreement of 1978, as amended	TBC	The concentration of total PCBs in fish tissue (whole fish, wet weight basis) should not exceed 0.1 µg/g for the protection of birds and animals that consume fish. Criterion for mercury is 0.5 µg/g mercury in whole fish [wet weight basis].
DEC	DEC TOGS 1.1.2	TBC	New York State Groundwater Effluent Limitations
AIR			
DEC	New York Air Cleanup Criteria, January 1990	TBC	Provides guidance for the control of ambient air contaminants in New York State.

TABLE 16

LOCATION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)

Medium/Authority	Citation	Status	Requirement Synopsis
Fish and Wildlife Coordination Act	16 USC § 662	ARAR	Whenever the waters of any stream or other body of water are proposed or authorized to be impounded, diverted, the channel deepened, or the stream or other body of water otherwise controlled or modified for any purpose, by any department or agency of the United States, such department or agency first shall consult with the United States Fish and Wildlife Service, Department of the Interior, and with the head of the agency exercising administration over the wildlife resources of the particular State in which the impoundment, diversion, or other control facility is to be constructed, with a view to the conservation of wildlife resources by preventing loss of and damage to such resources.
Clean Water Act	33 CFR Parts 320-330	ARAR	Dredge and Fill in Wetlands
Section 404 of the Clean Water Act [Federal Water Pollution Control Act, as amended], 33 USC § 1344	33 CFR Parts 320-329	ARAR	Includes requirements for issuing permits for the discharge of dredged or fill material into navigable waters of the United States. A permit is required for construction of any structure in a navigable water.
National Historic Preservation Act, 16 USC § 470 <u>et seq.</u>	36 CFR Part 800	ARAR	Remedial Actions must take into account effects on properties in or eligible for inclusion in the National Registry of Historic Places.
Clean Water Act Section 401, 33 USC 1341	40 CFR Part 121	ARAR	State Water Quality Certification Program
Clean Water Act, Section 404, 33 USC § 1344	40 CFR Parts 230 and 231	ARAR	No activity which adversely affects an aquatic ecosystem, including wetlands, shall be permitted if a practicable alternative that has less adverse impact is available. If there is no other practical alternative, impacts must be minimized.
New York State ECL Article 11, Title 5	6 NYCRR Part 182	ARAR	The taking of any endangered or threatened species is prohibited, except under a permit or license issued by DEC. The destroying or degrading the habitat of a protected animal likely constitutes a "taking" of that animal under NY ECL § 11-0535.
New York State ECL Article 3, Title 3; Article 27, Titles 7 and 9	6 NYCRR § 373-2.2	ARAR	Establishes construction requirements for hazardous waste facilities within the 100-year floodplain.
New York State ECL Article 15, Title 5, 6 NYCRR Part 608 Use and Protection of Waters	6 NYCRR Part 608	ARAR	Protection of Waters Program

Medium/Authority	Citation	Status	Requirement Synopsis
New York State Freshwater Wetlands Law, Environmental Conservation Law (ECL) Article 24, Title 7	6 NYCRR Parts 662-665	ARAR	Defines procedural requirements for undertaking different activities in and adjacent to freshwater wetlands, and establishes standards governing the issuance of permits to alter or fill freshwater wetlands.

TABLE 17

**LOCATION-SPECIFIC POTENTIAL CRITERIA, ADVISORIES AND GUIDANCE TO BE
CONSIDERED (TBC)**

Medium/Authority	Citation	Status	Requirement Synopsis
EPA Office of Solid Waste and Emergency Response	Policy on Floodplain and Wetland Assessments for CERCLA Actions, August 1985	TBC	Superfund actions must meet the substantive requirements of the Floodplain Management Emergency Executive Order (E.O. 11988) and the Protection of Response 1985 Wetlands Executive Order (E.O. 11990). This memorandum discusses situations that require preparation of a floodplain or wetlands assessment and the factors that should be considered in preparing an assessment for response actions taken pursuant to Section 104 or 106 of CERCLA. For remedial actions, a floodplain/wetlands assessment must be incorporated into the analysis conducted during the planning of the remedial action.
Executive Order No. 11988, 42 Fed. Reg. 26951 (May 25, 1977)	Floodplain Management	TBC	Executive Order describes the circumstances where federal agencies should manage floodplains.
Executive Order No. 11990, 42 Fed. Reg. 26961 (May 25, 1977)	Protection of Wetlands	TBC	Executive Order describes the circumstances where federal agencies should manage wetlands.
Statement of Procedures on Floodplain Management and Wetlands Protection	http://www.epa.gov/compliance/resources/policies/nepa/floodplain-management-wetlands-statement-pg.pdf	TBC	<p>Sets forth EPA policy and guidance for carrying out Executive Orders 11990 and 11988.</p> <p><u>Executive Order 11988</u>: Floodplain Management requires federal agencies to evaluate the potential effects of actions they may take in a floodplain to avoid, to the extent possible, adverse effects associated with direct and indirect development of a floodplain. Federal agencies are required to avoid adverse impacts or minimize them if no practicable alternative exists.</p> <p><u>Executive order 11990</u>: Protection of Wetlands requires federal agencies conducting certain activities to avoid, to the extent possible, the adverse impacts associated with the destruction or loss of wetlands if a practicable alternative exists. Federal agencies are required to avoid adverse impacts or minimize them if no practicable alternative exists.</p>

TABLE 18 ACTION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)

Medium/Authority	Citation	Status	Requirement Synopsis
Section 10, Rivers and Harbors Act, 33 USC § 403	33 CFR Parts 320 - 330	ARAR	U.S. Army Corps of Engineers approval is generally required to excavate or fill, or in any manner to alter or modify the course, location, condition, or capacity of the channel of any navigable water of the United States.
Clean Air Act, 42 USC s/s 7401 et seq. (1970)	40 CFR Part 52	ARAR	Approval and Promulgation of Implementation Plans
Clean Air Act, 42 USC s/s 7401 et seq. (1970)	40 CFR Part 60	ARAR	Standards of Performance for New Stationary Sources
Clean Air Act, 42 USC s/s 7401 et seq. (1970)	40 CFR Parts 61 and 63	ARAR	Part 61- National Emission Standards for Hazardous Air Pollutants. Part 63 - National Emission Standards for Hazardous Air Pollutants for Source Categories.
Section 402 of the Clean Water Act	40 CFR Parts 121, 122, 125, 401 and 403.5	ARAR	Provisions related to the implementation of the National pollutant Discharge Elimination System (NPDES) program
Safe Drinking Water Act	40 CFR Parts 144 - 147	ARAR	SDWA underground injection control program
Section 404(b) of the Clean Water Act,	40 CFR Part 230	ARAR	Guidelines for Specification of Disposal Sites for Dredged or Fill Material. Except as otherwise provided under Clean Water Act Section 404(b)(2), no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences. Includes criteria for evaluating whether a particular discharge site may be specified.
Section 404(c) of the Clean Water Act, 33 USC § 1344(b)	33 CFR Parts 320, 323, 325, 329 and 330	ARAR	These regulations apply to all existing, proposed, or potential disposal sites for discharges of dredged or fill materials into U.S. waters, which include wetlands. Includes special policies, practices, and procedures to be followed by the U.S. Army Corps of Engineers in connection with the review of applications for permits to authorize the discharge of dredged or fill material into waters of the United States pursuant to Section 404 of the Clean Water Act.
Resource Conservation and Recovery Act	40 CFR Part 257	ARAR	Criteria for Classification of Waste Disposal Facilities
Resource Conservation and Recovery Act 42 USC s/s 6901 et seq. (1976)	40 CFR Part 261	ARAR	Identification and listing of hazardous waste
Subtitle C – Wastes			

Medium/Authority	Citation	Status	Requirement Synopsis
Resource Conservation and Recovery Act 42 USC s/s 6901 et seq. (1976)	40 CFR Part 262	ARAR	Standards applicable to generators of hazardous waste
Resource Conservation and Recovery Act 42 USC s/s 6901 et seq. (1976)	40 CFR § 262.11	ARAR	Hazardous waste determination
Resource Conservation and Recovery Act, 42 USC s/s 6901 et seq. (1976)	40 CFR Part 262.34	ARAR	Standards for Hazardous Waste Generators, 90-Day Accumulation Rule

Resource Conservation and Recovery Act, 42 USC s/s 6901 et seq. (1976)	40 CFR Part 264 and 265, Subparts B-264.10 - .19 F-264.90 - .101 G-264.110 - .120 J-264.190 - .200 S-264.550 - .555 X-264.600 - .603	ARAR	Standards for Owners/Operators of Hazardous Waste Treatment, Storage and Disposal Facilities. B- General Facility Standards F- Releases from Solid Waste Management Units G- Closure and Post Closure J- Tank Systems S- Special Provisions for Cleanup X- Miscellaneous Units
Section 3004 of the Resource Conservation and Recovery Act (Solid Waste Disposal Act, as amended), 42 USC § 6924	40 CFR § 264.13(b)	ARAR	Owner or operator of a facility that treats, stores or disposes of hazardous wastes must develop and follow a written waste analysis plan.
Resource Conservation and Recovery Act, 42 USC s/s 6901 et seq. (1976)	40 CFR Part 264 and 265, Subparts K-264.220 - .232 L-264.250 - .259 N – 264.300 - .317	ARAR	Standards for Owners/Operators of Hazardous Waste Treatment, Storage and Disposal Facilities. K- Surface Impounds L- Waste Piles – Landfills, Subtitle C
Section 3004 of the Resource Conservation and Recovery Act, as amended, 42 USC § 6924	40 CFR § 264.232	ARAR	Owners and operators shall manage all hazardous waste placed in a surface impoundment in accordance with 40 CFR Subparts BB (Air Emission Standards for Equipment Leaks) and CC (Air Emission Standards for Tanks, Surface Impoundments and Containers).
Resource Conservation and Recovery Act, 42 USC s/s 6901 et seq. (1976)	40 CFR Part 268	ARAR	Land disposal restrictions C- Prohibitions on Land Disposal
Toxic Substances Control Act (TSCA), Title 1, 15 USC § 2605	40 CFR Part 761	ARAR	Polychlorinated biphenyls (PCBs) manufacturing, processing, distribution in commerce, and use prohibitions
Hazardous Materials Transportation Act, as amended, 49 USC §§ 5101 – 5127	49 CFR Part 170.	ARAR	Transport of hazardous materials program procedures.
Hazardous Materials Transportation Act, as amended, 49 USC §§ 5101 – 5127	49 CFR Part 171	ARAR	Department of Transportation Rules for Transportation of Hazardous Materials, including procedures for the packaging, labeling, manifesting and transporting of hazardous materials.

Resource Conservation and Recovery Act, 42 USC s/s 6901 et seq. (1976)	62 Fed. Reg. 25997 and 63 Fed. Reg. 65874	ARAR	Subtitle C, Phase IV Supplemental Proposal on Land Disposal of Mineral Processing Wastes (62 FR 25997), and Hazard Remediation Waste Management requirements (63 FR 65874)
New York State ECL Article 17, Title 5	—	ARAR	It shall be unlawful for any person, directly or indirectly, to throw, drain, run or otherwise discharge into such waters organic or inorganic matter that shall cause or contribute to a condition in contravention of applicable standards identified at 6 NYCRR § 701.1.
New York State ECL Article 11, Title 5	NY ECL § 11-0503	ARAR	Fish & Wildlife Law against water pollution. No deleterious or poisonous substances shall be thrown or allowed to run into any public or private waters in quantities injurious to fish life, protected wildlife, or waterfowl inhabiting those waters, or injurious to the propagation of fish, protected wildlife, or waterfowl therein.
New York State ECL Article 19, Title 3 - Air Pollution Control Law. Promulgated pursuant to the Federal Clean Air Act, 42 USC § 7401	6 NYCRR Parts 200, 202, 205, 207, 211, 212, 219, and 257.	ARAR	Air Pollution Control Regulations. The emissions of air contaminants that jeopardize human, plant, or animal life, or is ruinous to property, or causes a level of discomfort is strictly prohibited.
New York State ECL Article 27, Title 7	6 NYCRR Part 360	ARAR	Solid Waste Management Facilities New York State regulations for design, construction, operation, and closure requirements for solid waste management facilities.
New York State ECL Article 27, Title 11	6 NYCRR Part 361	ARAR	Siting of Industrial Hazardous Waste Facilities establishes criteria for siting industrial hazardous waste treatment, storage and disposal facilities. Regulates the siting of new industrial hazardous waste facilities located wholly or partially within New York State. Identifies criteria by which the facilities siting board will determine whether to approve a proposed industrial hazardous waste facility.
New York State ECL Article 27, Title 3	6 NYCRR Part 364	ARAR	Standards for Waste Transportation Regulations governing the collection, transport and delivery of regulated wastes, including hazardous wastes.
New York State ECL Article 27, Title 9	6 NYCRR Parts 370 and 371	ARAR	New York State regulations for activities associated with hazardous waste management.
New York State ECL Article 3, Title 3; Article 27, Titles 7 and 9	6 NYCRR Part 372	ARAR	Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities. Includes Hazardous Waste Manifest System requirements for generators, transporters, and treatment, storage or disposal facilities, and other requirements applicable to generators and transporters of hazardous waste.

New York State ECL Article 3, Title 3; Article 27, Titles 7 and 9	6 NYCRR Part 373	ARAR	Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities. Includes Hazardous Waste Manifest System requirements for generators, transporters, and treatment, storage or disposal facilities, and other requirements applicable to generators and transporters of hazardous waste.
New York State ECL Article 27 Title 13	6 NYCRR Part 375-1,-2	ARAR	Environmental Remediation Programs. Establishes standards for the development and implementation of inactive hazardous waste disposal site remedial programs.
New York State ECL Article 27, Title 9	6 NYCRR Part 376	ARAR	Land Disposal Restrictions. PCB wastes including dredge spoils containing PCBs greater than 50 ppm must be disposed of in accordance with federal regulations at 40 CFR Part 761.
New York State ECL Article 15, Title 5, and Article 17, Title 3	6 NYCRR Part 608	ARAR	Use and Protection of Waters. A permit is required to change, modify, or disturb any protected stream, its bed or banks, or remove from its bed or banks sand or gravel or any other material; or to excavate or place fill in any of the navigable waters of the state. Any applicant for a federal license or permit to conduct any activity which may result in any discharge into navigable waters must obtain a State Water Quality Certification under Section 401 of the Federal Water Pollution Control Act. 33 USC § 1341.
New York State ECL, Article 1. Title 1, Article 3 Title 3, Article 15 Title 3, Article 17 Title 1, 3, and 8	6 NYCRR Part 700-706	ARAR	New York limitations on discharges of sewage, industrial waste or other wastes.
New York State ECL Article 17, Title 8	6 NYCRR Parts 750 – 758	ARAR	New York State Pollutant Discharge Elimination System (SPDES) Requirements Standards for Storm Water Runoff, Surface Water, and Groundwater Discharges, In general, no person shall discharge or cause a discharge to NY State waters of any pollutant without a permit under the New York State Pollutant Discharge Elimination System (SPDES) program.
Local County or Municipality Pretreatment Requirements	Local regulations	ARAR	Local regulations

<p align="center">TABLE 19</p> <p align="center">ACTION-SPECIFIC POTENTIAL CRITERIA, ADVISORIES, AND GUIDANCE TO BE CONSIDERED (TBC)</p>			
Medium/ Authority	Citation	Status	Requirement Synopsis
USEPA	Covers for Uncontrolled Hazardous Waste Sites (EPA/540/2-85-002; September 1985)	TBC	Covers for Uncontrolled Hazardous Waste Sites should include a vegetated top cover, middle drainage layer, and low permeability layer.
USEPA	Rules of Thumb for Superfund Remedy Selection (EPA 540-R-97-013, August 1997)	TBC	Describes key principles and expectations, as well as "best practices" based on program experience for the remedy selection process under Superfund. Major policy areas covered are risk assessment and risk management, developing remedial alternatives, and groundwater response actions.
USEPA	Land Use in the CERCLA Remedy Selection Process (OSWER Directive No. 9355.7-04, May 1995)	TBC	Presents information for considering land use in making remedy selection decisions at NPL sites.
USEPA	Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites (OSWER Directive 9285.6-08, February 2002)	TBC	Presents risk management principles that site managers should consider when making risk management decisions at contaminated sediment sites.
USEPA	Contaminated Sediment Strategy (EPA-823-R-98- 001, April 1998)	TBC	Establishes an Agency-wide strategy for contaminated sediments, with the following four goals: 1) prevent the volume of contaminated sediments from increasing; 2) reduce the volume of existing contaminated sediment; 3) ensure that sediment dredging and dredged material disposal are managed in an environmentally sound manner; and 4) develop scientifically sound sediment management tools for use in pollution prevention, source control, remediation, and dredged material management.
USEPA	Contaminated Sediment Remediation Guidance for Hazardous Waste Sites (OSWER 9355.0-85 December 2005)	TBC	Provides technical and policy guidance for addressing contaminated sediment sites nationwide primarily associated with CERCLA actions.
USEPA	Structure and Components of Five-Year Reviews (OSWER Directive 9355.7-02, May 1991) Supplemental Five-Year Review Guidance (OSWER Directive 9355.7-02A, July 1994) Second Supplemental Five-Year Review Guidance (OSWER 9355.7-03A, December 1995)	TBC	Provides guidance on conducting Five-Year Reviews for sites at which hazardous substances, pollutants, or contaminants remain on-site above levels that allow for unrestricted use and unlimited exposure. The purpose of the Five-Year Review is to evaluate whether the selected response action continues to be protective of public health and the environment and is functioning as designed.
USEPA	40 CFR Part 50	ARAR	Clean Air Act, National Ambient Air Quality Standards
USACE	USACE, Notice on Issuance of Nationwide Permits, 67 Fed. Reg. 2020 (Jan. 15, 2002).	TBC	Reissues Nationwide permits, General Conditions, and definitions with some modifications and one new general condition. Modifications include additional requirements to enhance aquatic protection.

Medium/ Authority	Citation	Status	Requirement Synopsis
DEC	Letter from William R. Adriance, Chief Permit Administrator, to Richard Tomer and Paul G. Leuchner, Chiefs of the New York and Buffalo Districts of USACE, re. <i>Section 401 Water Quality Certification</i> , January 15, 2002 Nationwide Permits (Mar. 15, 2002).	TBC	
DEC	New York Guidelines for Soil Erosion and Sediment Control	TBC	
DEC	Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants, 2000	TBC	Provides guidance for the control of toxic ambient air contaminants in New York State. Current annual guideline concentrations (AGCs) for PCBs are 0.01 µg/m ³ for inhalation of evaporative congeners (Aroclor 1242 and below) and 0.002 µg/m ³ for inhalation of persistent highly chlorinated congeners (Aroclor 1248 and above) in the form of dust or aerosols.
DEC	Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water	TBC	Provides guidance for ambient water quality standards and guidance values for pollutants
DEC	Technical and Operational Guidance Series (TOGS) 1.2.1 Industrial SPDES Permit Drafting Strategy for Surface Waters	TBC	Provides guidance for writing permits for discharges of wastewater from industrial facilities and for writing requirements equivalent to SPDES permits for discharges from remediation sites.
DEC	Technical and Operational Guidance Series (TOGS) 1.3.1 Waste Assimilative Capacity Analysis & Allocation for Setting	TBC	Provides guidance to water quality control engineers in determining whether discharges to water bodies have a reasonable potential to violate water quality standards and guidance values.
DEC	Technical and Operational Guidance Series (TOGS) 1.3.2 Toxicity Testing in the SPDES Permit Program	TBC	Describes the criteria for deciding when toxicity testing will be required in a permit and the procedures which should be followed when including toxicity testing requirements in a permit.
DEC	Technical and Operational Guidance Series (TOGS) 2.1.1, Guidance on Groundwater Contamination Strategy	TBC	
DEC, Division of Environ- mental Remedi- ation	Technical and Administrative Guidance Memorandum (TAGM) 4031 Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites	TBC	Provides guidance on fugitive dust suppression and particulate monitoring for inactive hazardous waste sites.
DEC	Interim Guidance on Freshwater Navigational Dredging, October 1994	TBC	Provides guidance for navigational dredging activities in freshwater areas.
DEC Division of Fish, Wildlife and Marine Resources	Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (FWIA), October 1994	TBC	Provides rationale and methods for sampling and evaluating impacts of a site on fish and wildlife during the remedial investigation and other stages of the remedial process
DEC TAGM 3028	“Contained-In Criteria for Environmental Media (November 30, 1992).	TBC	Provides “contained-in” concentrations/ action levels for environmental media and the basis for these criteria.

APPENDIX III

ADMINISTRATIVE RECORD INDEX

Administrative Record Index

Operable Unit 2 of the Geddes Brook/Ninemile Creek Site

APPENDIX III

(New York State Inactive Hazardous Waste Disposal Site #7-34-030)

RI/FS Activities

Documents *

Remedial Investigation/Feasibility Study Work Plans	<p>Citizen Participation Plan for the Onondaga Lake National Priority List Site (1996)</p> <p>New York State's Revision of the Sampling and Analysis Part of the Geddes Brook/Ninemile Creek Remedial Investigation Work Plan (Bein 1998)</p> <p>Letter from A.J. Labuz to Timothy Larson containing additional data (Labuz 1998)</p> <p>New York State's Revision of the Geddes Brook/Ninemile Creek Remedial Investigation Work Plan (NYSDEC 2000)</p> <p>Ninemile Creek/ Geddes Brook Sediment IRM Sampling Plan (BBL 2000)</p> <p>Ninemile Creek Supplemental Sampling Program - Floodplain Sampling and Analysis Work Plan (O'Brien & Gere 2002)</p> <p>Work Plan for Young of Year Fish Collection in Ninemile Creek (TAMS 2002)</p> <p>Interim Remedial Measure Work Plan for the Geddes Brook Site (Parsons 2003)</p>
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Remedial Investigation Reports	<p>Ninemile Creek/Geddes Brook Sediment IRM Investigation Report (BBL 2001)</p> <p>New York State's Revision of the Geddes Brook/Ninemile Creek Remedial Investigation Report (TAMS 2003c)</p> <p>New York State's Revision of the Geddes Brook/Ninemile Creek Baseline Ecological Risk Assessment (TAMS 2003b)</p> <p>New York State's Revision of the Geddes Brook/Ninemile Creek Human Health Risk Assessment Report (TAMS 2003a)</p> <p>New York State Department of Law.003. State of New York's Determinations Disapproving and Revising Honeywell's Remedial Investigation, Baseline Ecological Risk Assessment, and Human Health Risk Assessment Reports for the Geddes Brook/Ninemile Creek Site (Spiegel/Gershon [Office of the Attorney General] and Larson [NYSDEC], July 31, 2003)</p> <p>Phase 1A Cultural Resources Survey (Pratt and Pratt, 2003).</p>
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Feasibility Study	<p>Geddes Brook/Ninemile Creek Feasibility Study Report (Parsons 2005)</p> <p>Email from Tim Larson regarding comments (1st wave) on Draft Geddes Brook/Ninemile Creek Operable Unit 1 Supplemental Feasibility Study Report (September 29, 2008)</p> <p>Email from James O’Loughlin regarding responses to Tim Larson’s September 29, 2008 (1st wave) email</p> <p>Email from Tim Larson regarding comments (2nd wave) on Draft Geddes Brook/Ninemile Creek Operable Unit 1 Supplemental Feasibility Study Report (October 3, 2008)</p> <p>Email from Tim Larson regarding comments (3rd wave) on Draft Geddes Brook/Ninemile Creek Operable Unit 1 Supplemental Feasibility Study Report (October 6, 2008, 12:53PM)</p> <p>Email from Tim Larson regarding comments (4th wave) on Draft Geddes Brook/Ninemile Creek Operable Unit 1 Supplemental Feasibility Study Report (October 6, 2008, 5:29PM)</p> <p>Email from Shane Blauvelt regarding responses to Tim Larson’s email dated as follows: October 3, 2008 (2nd wave); October 6, 2008, 12:53PM (3rd wave); and October 6, 2008, 5:29PM (4th wave) [October 20, 2008]</p> <p>Draft Final Geddes Brook/Ninemile Creek Operable Unit 1 Supplemental Feasibility Study Report (Parsons 2008)**</p> <p>Memo from Robert Nunes regarding Contaminated Sediment Risk Management Principles - Geddes Brook/Ninemile Creek Subsite/Onondaga Lake NPL site (January 21, 2009)</p>
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Feasibility Study (continued)	<p>Email from Tim Larson regarding comments (1st wave) on Draft Geddes Brook/Ninemile Creek Operable Unit 2 Supplemental Feasibility Study Report (March 18, 2009)</p> <p>Email from Tim Larson regarding comments (2nd wave) on Draft Geddes Brook/Ninemile Creek Operable Unit 2 Supplemental Feasibility Study Report (April 1, 2009)</p> <p>Email from Tim Larson regarding comments (3rd wave) on Draft Geddes Brook/Ninemile Creek Operable Unit 2 Supplemental Feasibility Study Report (April 3, 2009)</p> <p>Letter from Timothy Larson to John McAuliffe (Honeywell) stating May 2009 Supplemental Feasibility Study was sufficiently complete to generate Geddes Brook/Ninemile Creek Operable Unit 2 Proposed Plan (May 18, 2009)</p> <p>Draft Final Geddes Brook/Ninemile Creek Operable Unit 2 Supplemental Feasibility Study Report (Parsons 2009)**</p> <p>Memo from Robert Nunes regarding Contaminated Sediment Risk Management Principles - Operable Unit 2 of the Geddes Brook/Ninemile Creek Subsite/Onondaga Lake NPL site (September 25, 2009)</p>
Proposed Plan Released	Proposed Plan (May 18, 2009)
Start of Public Comment Period	Notice of Public Meeting and Opportunity to Comment (May 19, 2009)
Public Meetings Held	<p>Documentation and Transcript of June 11, 2009 Public Meeting (Attached to the Record of Decision as Appendix VI)</p> <p>Written Comments on Selected Remedy (Attached to the Record of Decision as Appendix V)</p>
Record of Decision Issued	Record of Decision and Responses to Comments (Responsiveness Summary) - October 1, 2009

Enforcement Documents	<p>RI/FS Consent Decree for the Onondaga Lake Sediments (March 16, 1992)</p> <p>Stipulation and Order Amending Consent Decree (January 22, 1998)</p> <p>Stipulation and Order Amending Consent Decree (July 12, 2000)</p> <p>Order on Consent - Ninemile Creek/Geddes Brook Sampling Plan (November 10, 2000)</p> <p>Stipulation and Order Amending Consent Decree (March 19, 2001)</p> <p>Stipulation and Order Amending Consent Decree (May 30, 2002)</p> <p>Amendment to Order on Consent - Geddes Brook IRM (July 22, 2002)</p> <p>Stipulation and Order Amending Consent Decree (May 28, 2004)</p> <p>Stipulation and Order Amending Consent Decree (November 23, 2004)</p> <p>Stipulation and Order Amending Consent Decree (August 2, 2005)</p> <p>Stipulation and Order Amending Consent Decree (May 12, 2006)</p> <p>Stipulation and Order Amending Consent Decree (January 10, 2007)</p> <p>Stipulation and Order Amending Consent Decree (June 14, 2007)</p>
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* Data are summarized in several of these documents. The actual data, QA/QC, chain of custody, etc. are compiled at various NYSDEC office locations and can be made available at the NYSDEC Region 7 office upon request. References listed in these documents and in this Record of Decision are incorporated by reference into the Administrative Record. Many of the references listed in the documents are publicly available and readily accessible. Most of the guidance documents referenced in the documents are available on EPA or NYSDEC websites. If copies of the referenced documents cannot be located, contact the NYSDEC Project Manager (Timothy J. Larson, 518-402-9676). Copies of administrative record documents that are not available in the administrative record files in the NYSDEC Region 7 office or at Atlantic States Legal Foundation can be made available at one of those locations upon request.

** The November 2008 and May 2009 “Draft Final” Supplemental Feasibility Studies (SFSs) were the primary source of information utilized by the NYSDEC in drafting the Record of Decision (ROD) documents for OU1 and OU2, respectively. The documents were designated as “Draft” since a feasibility study is never deemed to be complete until a ROD is issued for a site, due to the fact that there may be a need to supplement or correct information contained in the FS up until the time that the ROD is issued. Accordingly, the

November 2008 and May 2009 SFS documents represent the final versions of the FS even though they carry a “Draft” designation. Emailed comments and responses to comments on earlier versions of the SFS documents are included in this administrative record since the final versions of the SFSs were prepared by Honeywell and its consultants and there were certain comments which NYSDEC and EPA had submitted which were not adequately addressed to NYSDEC and EPA’s satisfaction in the November 2008 and the May 2009 SFS documents, or certain statements in the documents with which NYSDEC and/or EPA did not agree. Notwithstanding any continued disagreements with respect to such comments or statements, NYSDEC determined that the information contained in the final SFSs was sufficient for NYSDEC and EPA to develop the OU2 Proposed Plan and ROD. The OU2 ROD is based upon all documents which are included in the Administrative Record.

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TAMS. 2003a. Geddes Brook/Ninemile Creek Human Health Risk Assessment Report. Original document prepared for Honeywell, East Syracuse, NY by Exponent, Bellevue, WA. Revision prepared for New York State Department of Environmental Conservation, Albany, NY by TAMS Consultants, Inc., New York, NY and YEC, Valley Cottage, NY. July.

APPENDIX IV

STATEMENT OF FINDINGS: FLOODPLAINS AND WETLANDS

Appendix IV

Record of Decision

Geddes Brook/Ninemile Creek OU2 Onondaga Lake Superfund Site

Statement of Findings: Floodplains and Wetlands

Need to Affect Floodplains and Wetlands

Geddes Brook/Ninemile Creek Operable Unit 2 (OU2) soil and sediments are currently contaminated with mercury and other contaminants. OU2 lies within the 100-year floodplain; therefore, cleanup of the contaminated soil and sediments, which pose a risk both to human and ecological receptors, will involve extensive remedial work within the floodplain. The floodplain also contains a portion of a State Class I wetland, Wetland SYW-10, which is directly connected to the lower reach of Ninemile Creek (see ROD Figure 2).

NYSDEC and EPA have determined that there is no practicable alternative that is sufficiently protective of human health and the environment which would not result in the removal of contaminated soil/sediment. Consequently, since remedial action is necessary, any remedial action that might be taken would necessarily affect floodplains and wetlands associated with the OU2 portion of the Geddes Brook/Ninemile Creek site. The following four remedial alternatives were considered:

- Alternative 1 – “No Action”.
- Alternative 2 – Removal of contaminated Ninemile Creek channel sediments in Reach AB to a depth to meet criteria (1.3 mg/kg mercury and cleanup criteria for other chemical parameters of interest (CPOIs) in the channel and removal of contaminated floodplain soils/sediments where concentrations exceed 1.3 mg/kg mercury (and RGs for other CPOIs) to a depth of 2 ft (60 cm) in the floodplain, followed by placement of backfill and a habitat layer in the channel and floodplain.
- Alternative 3 – Removal of Ninemile Creek channel sediments and floodplain soils/sediments in Reach AB to various depths and placement of backfill and habitat layer. (Cleanup criteria which would be met under this alternative are discussed below.)
- Alternative 4 – Full removal of Ninemile Creek channel sediments and floodplain soils/sediments in Reach AB to a depth to meet criteria (0.15 mg/kg mercury and RGs for other CPOIs) and placement of backfill and habitat layer.

The No-Action alternative does not entail removal or capping/backfilling of contaminated soil/sediment; under this alternative, no remedial actions would take place within delineated floodplains or wetlands. Under this alternative, contaminated soil/sediment at the site would remain in place and would continue to be a potential source of contamination to Ninemile Creek and the wetlands and floodplains. Consequently, the No-Action alternative would not be protective of human health and the environment. The implementation of any of the action alternatives would be more protective of human health and the environment than the no-action alternative (since they would, to varying degrees, meet the RAOs and cleanup levels for the site and would result in residual risks

which would be less than residual risks under the no-action alternative); all action alternatives would involve substantial actions within the floodplain and wetland.

The selected remedy, Alternative 3, for the Ninemile Creek portion of OU2, addresses the remedial action objectives (RAOs) and cleanup levels by removing mercury, arsenic, lead, hexachlorobenzene, phenol, polycyclic aromatic hydrocarbons, polychlorinated biphenyls, and dioxins/furans from Geddes Brook and Ninemile Creek. Implementing the selected remedy will also control an existing source of contamination to Onondaga Lake and allow for remediation of the lake to proceed consistent with a Court-ordered schedule for the Lake Bottom Subsite. The selected remedy addresses all areas of the Ninemile Creek portion of OU2 such that concentrations of mercury and other CPOIs following remediation are expected to be below the New York State Department of Environmental Conservation's sediment criteria (including the "Lowest Effects Level" of 0.15 milligrams per kilogram [mg/kg] for mercury) in the top 2 feet of channel sediments and 6 NYCRR Part 375 unrestricted use soil cleanup objectives (including the objective of 0.18 mg/kg for mercury) in the top 2 feet in floodplain areas. The selected remedy will also attain a 0.8 mg/kg site-specific bioaccumulation-based sediment quality value (BSQV) for mercury in sediments for protection of wildlife consumption of fish and 0.6 mg/kg site-specific BSQV for mercury in floodplain soils for protection of wildlife consumption of terrestrial invertebrates. The selected remedy is also expected to achieve fish tissue mercury concentrations ranging from 0.1 mg/kg, which is for protection of ecological receptors, to 0.3 mg/kg, which is based on EPA's methylmercury National Recommended Water Quality criterion for the protection of human health from the consumption of organisms.

The selected remedy includes the dredging/excavation and removal of contaminated channel sediments and floodplain soils/sediments in lower Ninemile Creek. Following dredging/excavation to remove all significant contamination in the stream or floodplain, the area will be backfilled to bring the sediment or ground surface up to the designed elevation, if needed, and a habitat layer will be placed. Restoration of the stream bed and banks, wetlands (including forested areas), and habitats will be performed following sediment and soil removal and placement of a sand base level and backfill, where needed. This will include placement of a habitat layer with appropriate substrate types and thicknesses, as well as plantings of appropriate species of wetland and upland vegetation. Backfilled areas would include a minimum of 1 foot of suitable habitat material with a suitable amount of organic material. The details of habitat restoration will be developed during the remedial design.

Effects of Proposed Action on the Natural and Beneficial Values of Floodplains and Wetlands

The RAOs for OU2 include the elimination or reduction, to the extent practicable, of further transport of sediments and soils containing mercury and other CPOIs from the channel and floodplain of lower Geddes Brook and lower Ninemile Creek to Geddes Brook, Ninemile Creek, and, ultimately, Onondaga Lake. Since the selected remedy is expected to achieve the RAOs, sediments and soils contaminated with mercury and other contaminants will no longer function as a source of contamination to the wetlands and floodplains associated with OU2. Furthermore, backfilling activities will not significantly alter the capacity of the floodplain or channel, and should not result in any increase in downstream flooding events. Any short-term negative impacts to the natural or beneficial values associated with the OU2 soils and sediments will be more than compensated for by the long-term benefits to the Geddes Brook/Ninemile Creek ecosystem once these soils and sediments are removed. Further, it is anticipated that no long-term adverse effects to floodplain

resources will result due to implementation of the selected remedy.

Restoration of the stream bed and banks, wetlands, and floodplains will be performed following sediment and soil removal and placement of backfill. The remedy includes design and implementation of a Site-wide habitat restoration plan that will specify restoration details for each section of the Site. Goals of the habitat restoration plan, to be developed during remedial design, will include, but will not be limited to, providing connectivity of the stream with the surrounding floodplain/wetland, the establishment of diverse habitats and native vegetation (e.g., vernal pools, forested floodplains), and no net loss of wetland areas following remediation. Natural stream restoration techniques will be used in designing both the channel remedy and the habitat layer with the goal of creating a diversity of stream and near-stream habitats and minimizing hardening of the channel and banks, to the extent feasible. Additionally, the specific thickness(es), type(s) of substrate material, and specifications for vegetation to be used for the habitat layer will be developed in the restoration plan.

Compliance with Applicable State or Local Floodplains Protection Standards

The primary location-specific ARARs applicable to the remediation are ECL Article 24 Freshwater Wetlands, ECL Article 15 Use and Protection of Waters, and Clean Water Act (CWA) Section 404. For freshwater wetlands, 6 NYCRR Part 663 regulates activities conducted in or adjacent to regulated wetlands. Article 15 is implemented by 6 NYCRR Part 608 which regulates alterations to beds and banks of streams such as dredging and filling.

The primary New York State standard for protection of freshwater wetlands applicable to the remediation is Environmental Conservation Law, Article 24, and Title 7. For freshwater wetlands, 6 NYCRR Parts 662 through 665 regulates activities conducted in or adjacent to regulated wetlands. The selected remedy will comply with this standard.

The selected remedy will also comply with Executive Order 11988: Floodplain Management; Executive Order 11990: Protection of Wetlands, and EPA's Statement of Procedures on Floodplains Management & Wetlands Protection. Accordingly, draft floodplains and wetlands assessments have already been developed for the Geddes Brook/Ninemile Creek site; these assessments will be refined as necessary during the remedial design process.

Measures to Mitigate Potential Harm to the Floodplains and Wetlands

The forested portion of SYW-10 is a valuable Class I wetland which is limited along the shores of Onondaga Lake. Therefore, during remedial design a focused study will take place to evaluate criteria such as contaminant concentrations, habitat value, size, location within SYW-10, and engineering considerations to determine what portions of SYW-10 would require remediation. The details of this focused study will be developed during design. Based on the outcome of this study it may be determined that a portion of SYW-10 is appropriate to be excluded from remediation so that area can continue to provide valuable forested wetland functions.

Implementation of the selected remedy will entail removal and, where needed, backfilling of Ninemile Creek soil/sediment, resulting in temporary physical disturbances to the wetlands and floodplains. Measures to minimize potential adverse impacts that cannot be avoided will be evaluated as part of and incorporated into the remedial design. Common practices include field

demarcation of wetland/floodplain areas and implementation of soil/sediment erosion and/or resuspension control measures (e.g., installation of silt fencing, hay bales, hay/straw mulch, jute matting) to minimize impacts from construction activities. The negative ecological effects resulting from the placement of backfill would be limited temporarily (it is expected that benthic recolonization would take less than three years) and be offset by the positive long-term effects of clean cover system materials for benthic habitat.

Measures will also be employed during dredging activities to prevent creek sediments that are resuspended during remediation activities from being transported to downstream areas during flooding events (100- and 500-year storms). For example, energy barriers such as sheet piles and/or silt curtains could be used during dredging activities to minimize the transport of resuspended sediments from the areas being dredged to downstream areas.

Monitoring will occur during dredging operations. Monitoring of surface water in the vicinity of the work zones will be conducted to measure potential exceedances of ambient water quality criteria due to resuspension as a result of dredging operations. Should this monitoring indicate that elevated levels of suspended sediments are being generated by dredging activities, operations will be modified so as to reduce those levels. Possible actions that could be taken in this regard include slowing down the rate of sediment removal, changing the depth of the dredge cut, modifications to movement of the dredge equipment, and cessation of dredging activities.

APPENDIX V

RESPONSIVENESS SUMMARY

GEDDES BROOK/NINEMILE CREEK SITE OPERABLE UNIT 2 RESPONSIVENESS SUMMARY

Table of Contents

Please note that a list of acronyms/abbreviations are contained on page xv of this Record of Decision.

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Attachments

Attachment 1 Comment and Response Index

Attachment 2 Letters and Email Submitted During the Public Comment Period and Oral
Comments Made During the Public Meeting

GEDDES BROOK/NINEMILE CREEK SITE OPERABLE UNIT 2 REMEDIAL INVESTIGATION/FEASIBILITY STUDY AND PROPOSED PLAN RESPONSIVENESS SUMMARY

INTRODUCTION

This Responsiveness Summary (RS) provides a summary of comments and concerns received during the public comment period related to the Operable Unit 2 (OU2) Geddes Brook/Ninemile Creek Site remedial investigation and feasibility study (RI/FS) reports and Proposed Plan, and provides responses of the New York State Department of Environmental Conservation (NYSDEC) and United States Environmental Protection Agency (EPA) to those comments and concerns. The RI/FS reports (TAMS/Earth Tech, 2003a,b,c; Parsons, 2005, 2009) describe the nature and extent of the contamination at the site and evaluate remedial alternatives to address this contamination. The Proposed Plan (NYSDEC and EPA, 2009) identifies NYSDEC and EPA's preferred remedy and the basis for that preference.

Public involvement in the review of Proposed Plans is stipulated in Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, and Sections 300.430(f)(3)(i)(F) and 300.430(f)(5)(iii)(B) of the National Oil and Hazardous Substances Pollution Contingency Plan. These regulations provide for active solicitation of public comment.

All public comments received are addressed in this RS, which was prepared following guidance provided by EPA in EPA 540-R-92-009 and OSWER¹ Directive 9836.0-1A. The comments presented in this document have been considered in NYSDEC and EPA's final decision in the selection of a remedy to address the contamination at the OU2 portion of the Geddes Brook/Ninemile Creek site.

The text of this RS explains the public review process and how comments were responded to and provides responses to frequent comments. In addition to this text, there are two attachments:

- | | |
|--------------|---|
| Attachment 1 | The Comment and Response Index, which contains summaries of every comment received and NYSDEC/EPA's response. |
| Attachment 2 | Comments provided during the public comment period, including letters, e-mails, and oral statements. This attachment contains copies of every comment received. |

¹ Office of Solid Waste and Emergency Response.

PUBLIC REVIEW

NYSDEC and EPA rely on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. To this end, the OU2 Proposed Plan for the Geddes Brook/Ninemile Creek Site was made available to the public on May 19, 2009. A fact sheet was released with the Proposed Plan and both documents are available at NYSDEC's website (<http://www.dec.ny.gov/chemical/37558.html>).

The complete Administrative Record file, which contains the information (including the Geddes Brook/Ninemile Creek RI, Human Health Risk Assessment [HHRA], Baseline Ecological Risk Assessment [BERA], FS and Supplemental FS) upon which the selection of the remedy has been based, is available at the locations listed in the text box below.

Information Repositories for the Geddes Brook/Ninemile Creek Operable Unit 2 Site Administrative Record

Atlantic States Legal Foundation

658 West Onondaga Street
Syracuse, NY 13204-3711
(315) 475-1170
Please call for hours of availability

NYSDEC, Region 7 Office

615 Erie Boulevard West
Syracuse, NY 13204-2400
(315) 426-7400
Hours: M – F, 8:30 a.m. – 4:45 p.m.
Please call for an appointment

NYSDEC Central Office

625 Broadway
Albany, NY 12233-7013
(518) 402-9767
Hours: M – F, 8:30 a.m. – 4:45 p.m.
Please call for an appointment

Onondaga County Public Library

Syracuse Branch at the Galleries
447 South Salina Street
Syracuse, NY 13204-2494
Hours: M, Th, F, Sat, 9:00 a.m. – 5:00 p.m.;
Tu, W, 9:00 a.m. – 8:30 p.m.
Phone: (315) 435-1800

PUBLIC COMMENT PERIOD AND PUBLIC MEETING

The public comment period is intended to gather information about the views of the public regarding both the remedial alternatives and general concerns about the site. A notice of the commencement of the public comment period, the public meeting date, the preferred remedy, contact information, and the availability of above-referenced documents was provided in a fact sheet distributed to the public on May 18, 2009 and published in the *Syracuse Post-Standard* on May 19, 2009.

The public comment period for the OU2 Geddes Brook/Ninemile Creek RI/FS and Proposed Plan commenced on May 19, 2009 and continued until July 3, 2009. During that period, a public meeting was held on June 11, 2009 at the New York State Fairgrounds in Syracuse, New York. Approximately 40 people, including residents, local business people, media, and state and local government officials, attended the public meeting. A question-and-answer session followed the formal presentation at the public meeting. A complete transcript of the public meeting can be found in Appendix VI of this ROD.

RECEIPT AND IDENTIFICATION OF COMMENTS

Public comments on the RI/FS and the Proposed Plan were received in several forms, including:

- Written comments submitted to NYSDEC via e-mail.
- Written comments mailed to NYSDEC.
- Oral comments made at the public meeting.

Each of the five written submissions received a commenter number as follows:

- Commenter 1 – Onondaga Nation (Joseph J. Heath)
- Commenter 2 – Onondaga County (Jean M. Smiley)
- Commenter 3 – Atlantic States Legal Foundation (Samuel H. Sage and Don Hughes)
- Commenter 4 – Citizens Campaign for the Environment (Sarah Eckel)
- Commenter 5 – Nine Mile Creek Conservation Council (Fred Miller)

Oral comments made during the June 11, 2009 public meeting, including both comments made in the form of statements and during the question and answer session, were assigned an oral comment number (e.g., OC1) in the order of when the oral comment occurred during the public meeting. These numbers were assigned for the convenience of readers and to assist in the organization of this RS; there was no priority or special treatment given to one commenter over another in the responses to comments.

In addition to being summarized in the Comment and Response Index (Attachment 1), copies of all written submissions have been included in Attachment 2. The commenter number associated with each written submission is marked at the top of the first page of each letter and the sub-numbers of the individual comments are marked in the margin next to the text that begins the comment.

In addition to being summarized in the Comment and Response Index (Attachment 1), all oral comments received during the public meeting are contained in the public meeting transcript included in Attachment 2.

NYSDEC and EPA carefully considered each comment received and made every effort to be fully responsive.

ORGANIZATION OF THE COMMENT AND RESPONSE INDEX

The Comment and Response Index (Attachment 1) contains a complete listing of all comments and NYSDEC and EPA's responses. The index allows readers to find answers to specific questions they have raised and is organized as follows:

- The first column lists the name of the commenter.
- The second column identifies the alphanumeric file code assigned to each comment (e.g., 1.a., OC1.a.).
- The third column provides a summary of the comment.
- The fourth column provides the response to the comment.

Example:

Name/Agency	Comment Code	Comment Summary	Response
Samuel H. Sage, Atlantic States Legal Foundation (including comments from Don Hughes)	3.a	The commenter agrees that the preferred remedy (Alternative 3) is far better than Alternative 2 and supports use of the sediment consolidation area (SCA) at Wastebed 13.	The comment is acknowledged. Contaminated sediments and soils removed from the Ninemile Creek OU2 portion of the site and the associated floodplain will be disposed of at Honeywell's LCP Bridge Street subsite containment system or the SCA that will be constructed at Wastebed 13 as part of the remediation of the Onondaga Lake Bottom subsite. A decision as to the specific disposal location will be made during the design phase. This decision will consider various factors including the design and construction schedules for the Ninemile Creek OU2 remedy as well as the SCA so that remediation of Ninemile Creek is not unnecessarily delayed.

In a few instances, a commenter may appear in the Comment and Response Index more than once, because he/she sent letters that were different from their oral statements, or made different oral statements. If an individual spoke for a group and then wrote a letter in his/her own name (or vice-versa), the submissions were coded separately and each appears in the Comment and Response Index.

RESPONSES TO FREQUENT COMMENTS

The responses below are for comments that were made by many commenters and were typically a combination of several comments on a similar topic. One answer has been provided for each frequent comment. If a specific comment is considered part of a frequent comment, the response in the Comment and Response Index will indicate to “see response to Frequent Comment #1” (or other appropriate comment number). If a specific comment needed response beyond what is in the frequent comment response, that additional, comment-specific response is in the Comment and Response Index.

Frequent Comment #1: Several commenters expressed concern that there is insufficient data to select a remedy for the site. Specifically, the commenters refer to an over reliance on mercury as an indicator of contamination and indicate that the database contains an inadequate number of samples and/or an inadequate range of analytes.

(Comments 1.a, 1.c, 1.e, 1.f, 1.n, 3.b, OC4.b, OC4.d, and OC5.g)

Response to Frequent Comment #1:

Use of Mercury as an Indicator Based on its Prevalence and Highly Elevated Concentrations

The sampling program in Reach AB concentrated on mercury since it was the contaminant at the plant site that was most prevalent and most elevated. Mercury was prevalent and elevated as is shown by the 169 shallow (0 to 2 ft) floodplain soil samples, where 78 percent of the samples were greater than the NYSDEC (2005) rural background concentration of 0.18 mg/kg, 65 percent of the samples were greater than three times that value (0.54 mg/kg), and concentrations as high as 77 mg/kg were found.

The other contaminants that were retained as chemical parameters of interest (CPOIs) in the FS (Parsons, 2005, Section 2.5) tended not to be nearly as extensive or as elevated as mercury, as shown in the following summary of results from Reach AB. Arsenic was greater than the NYSDEC (2005) rural background concentration of 13 mg/kg in about 8 percent of the 40 shallow floodplain samples in which it was analyzed with a high of 18.4 mg/kg. Lead was greater than the NYSDEC (2005) rural background concentration of 63 mg/kg in about 9 percent of the 34 shallow floodplain soil samples in which it was analyzed with a high of 115 mg/kg. Benzo(a)pyrene was greater than the NYSDEC (2005) rural background concentration of 1 mg/kg in 5 percent of the 57 shallow floodplain soil samples in which it was analyzed with a high of 2.5 mg/kg. Hexachlorobenzene was detected in 24 percent of the 65 shallow floodplain soil samples in which it was analyzed, but none of those concentrations (the high was 0.57 mg/kg) exceeded the Benthic Aquatic Life Chronic Toxicity value of 117 mg/kg.

The Results Indicate that the Horizontal and Vertical Extent of Mercury Contamination was Determined

The mercury sampling program included collecting 206 samples in the floodplain and 143 samples in the sediment of Reach AB (all depths). The horizontal extent of the elevated concentrations across the floodplain were consistent with the observed historic high water mark (which matches the 50-year return interval) since the 1953 start of the operation of the Bridge Street plant (e.g., compare Figures 3 and 6a of the Proposed Plan). The mercury concentration vertical profiles strongly suggest a distinct horizon below which the mercury concentration drops dramatically. As

shown in Figures 6a, 6b, and 6c of the Proposed Plan and this ROD, high concentrations (greater than 3 mg/kg) of mercury are seen throughout the floodplain of Reach AB in the top 2 ft. By the time the samples are at a depth of 2 to 3 ft, mercury concentrations are less than 0.5 mg/kg except for three areas within the Reach AB floodplain, as follows:

- The spits on either side of the mouth of Ninemile Creek, which were formed as the Solvay wastes deposited in Onondaga Lake. The extremely high deposition caused a build-up of at least 6 feet of wastes with elevated concentrations of mercury at the mouth of the stream (e.g., see log and results from Station NMC-SED-70 as presented in Appendix B of the OU2 Supplemental FS [Parsons, 2009]).
- The bank on the west side of the stream in the downstream 500 ft of the stream. There are mounds of soil along this section, which appear to be dredge spoils, where the “clean” horizon is expected to be about 1 to 2 ft deeper than the rest of the area.
- Two isolated samples with concentrations of about 2 and 6 mg/kg on the east bank of the stream in the upper and central portions of Reach AB.

In the Reach AB channel sediments (see Figures 6a through 6c of the Proposed Plan and this ROD and RI Figures 5-1a and 5-1b), the mercury concentrations also drop dramatically at a depth of 2 ft. The shallow depth of contamination may be a result of or partially a result of the dredging of most of this reach in the 1960s. Much of the lower portion of Reach AB contains less than 2 ft of more recent, mercury-contaminated sediment with marl or other native materials within the top 1 to 2 ft.

These patterns show that the mercury contamination within Reach AB is generally less than 3 ft deep in the floodplain and sediments except for those isolated areas with a clear cause for suspecting a deeper accumulation of contaminated sediments/soils (e.g., spits, dredge spoil mounds). Additional sampling will be completed in these areas during design.

The Results Indicate that Other Contaminants are Generally Limited to the Materials with Elevated Mercury Concentrations

Based on the understanding of contamination being limited horizontally by depositional patterns at high flow, and vertically by a horizon of native material that existed prior to Honeywell operations, there should be no significant contamination by other contaminants beyond the extent of the mercury contamination.

The sampling of the Reach AB floodplain, which included a total of 206 samples from depths ranging from 0 to 3 ft, included subsets of samples that were analyzed for contaminants other than mercury, including but not limited to, arsenic (23 percent of all samples), VOCs (13 percent), PAHs (35 percent), other SVOCs and PCBs (19 percent), hexachlorobenzene (38 percent), and phenol (22 percent). For those contaminants that were clearly associated with the Bridge Street Plant (e.g., PCBs and hexachlorobenzene), the only floodplain detections were in samples where mercury was at least 0.7 mg/kg and generally higher. Out of the 37 samples collected in the Reach AB floodplain below 2 ft that were analyzed for mercury, there were no exceedances of the selected cleanup levels for arsenic (8 samples), lead (5 samples), PCBs (5 samples), and PAHs (13 samples), and there were no detections of hexachlorobenzene and phenol (13 samples) below 2 ft.

Out of the 73 sediment samples collected in the Reach AB channel below 2.5 ft² (which is the average depth of sediment removal for the selected remedy), lead (22 samples), PCBs (22 samples), and PAHs and hexachlorobenzene (8 samples), had no exceedances of the selected cleanup levels. Below 2.5 ft, arsenic (22 samples) slightly exceeded the cleanup level of 33 mg/kg in two samples from 2.5 to 5 ft (both at Station TN-5-2 which is at the upper end of Reach AB near the “Ponded Area” and has low levels [less than 0.5 mg/kg] of mercury below 2.5 ft), and phenol (8 samples) slightly exceeded the cleanup level of 0.53 mg/kg in one sample from 2.5 to 3.5 ft (also at Station TN-5-2). For both arsenic and phenol, data are available at this location below these depths (below 5 ft for arsenic and 3.5 ft for phenol) and show no exceedances. These exceedances of the cleanup levels for arsenic and phenol below 2.5 ft occurred at the very upstream limit of Reach AB (Station TN-5-2), which may be upstream of the area dredged in the 1960s. This area will be further sampled during design and the data will be used to determine if additional removal (beyond 2.5 ft in this area) or an isolation cap is needed in this area.

Additional Sampling Will Be Performed During Design

As noted above, additional sampling will be conducted during design at depths below what was previously sampled (3 ft) in select areas of the floodplain (e.g., spits, dredge spoil mounds). Additional sampling will also be conducted in the channel sediments in select areas. As noted in Footnotes 11 (page 67) and 17 (page 88) of the Proposed Plan, “sampling during the pre-design investigation would include the other CPOIs (as well as mercury) to ensure that the remedy is protective for all CPOIs.”

Summary

The sampling results are consistent with the understanding that the primary source of contamination was the Honeywell LCP Bridge Street Plant site, and mercury was by far the most prevalent and elevated contaminant associated with that site. The deposition of mercury and other contaminants would have been constrained both horizontally and vertically by the history of the site, and by the mechanisms of deposition. The data support the use of mercury as an indicator of contamination, and those mercury results were used successfully to identify the extent of contamination. However, as discussed above, data for the other CPOIs have been collected during the RI/FS and factored into the remedy selection. Also, as noted in the Proposed Plan, data for the CPOIs other than mercury will continue to be collected during design to ensure that the remedy is protective for all CPOIs.

Frequent Comment #2: Several commenters expressed concern that further investigation is needed at upgradient or upland sites (including Wastebeds 1 through 8 and LCP Bridge Street OU2) before a remedy for Ninemile Creek can be selected.
(Comments 1.b, 1.i, 3.d, OC4.d, and OC5.b)

Response to Frequent Comment #2:

Operable Unit 2 of the Geddes Brook/Ninemile Creek site includes the channel sediments, surface water, and floodplain soils/sediments of the section of lower Ninemile Creek from the downstream

² Based on the mid-point of the sample interval.

end of OU1 to Onondaga Lake. This section of lower Ninemile Creek (Reach AB) flows adjacent to the western edge of the Wastebeds 1 through 8 site, which is undergoing a separate RI/FS.

The eastern and central portions of Wastebeds 1 through 8 have been found to contain highly-elevated concentrations of benzene, toluene, ethylbenzene, and xylenes (BTEX), naphthalene and other PAHs, and phenols in soils/wastes at the base of the Solvay waste. However, in the area west of the original Ninemile Creek channel (see Figure 4 of this ROD) (i.e., the area adjacent to the OU2 portion of the current Ninemile Creek), of these compounds, only phenol has been found at concentrations greater than about 100 µg/L in the shallow and intermediate groundwater, and other contaminants (e.g., BTEX and naphthalene) were generally less than 10 µg/L, with somewhat higher concentrations (but still less than about 100 µg/L) in the old Ninemile Creek channel material near the OU2 portion of the current Ninemile Creek (based on RI data). Relatively low levels of contamination (less than about 0.1 mg/kg for BTEX, and less than about 1 mg/kg for total PAHs and phenol) were found in the surface and subsurface soils (down to a depth of about 20 ft) adjacent to the OU2 portion of Ninemile Creek based on RI data.

Pursuant to an RI/FS work plan for Wastebeds 1 through 8 (O'Brien & Gere, 2006), and based on an ongoing remedial investigation, Honeywell has initiated a Focused Feasibility Study to evaluate remedial alternatives for Wastebeds 1 through 8. Based on this ongoing work, remedial measures, for Wastebeds 1 through 8, would not require significant modification to the Ninemile Creek OU2 site channel or floodplain, and therefore would not impact remedy selection for Ninemile Creek OU2. However, any remedial measures along the western edge of the Wastebeds 1 through 8 site, which might be needed to address contamination from and/or erosion of the Wastebeds 1 through 8 site, would be performed prior to and/or coordinated with the remediation of Reach AB of lower Ninemile Creek.

The LCP Bridge Street OU2 site is undergoing a separate investigation due to a xylene-contaminated groundwater plume, which resulted in localized contamination of sediment in the West Flume. However, the xylene contamination does not extend to the mouth of the West Flume, and therefore does not extend to Geddes Brook, Ninemile Creek or Onondaga Lake from this source. In addition, the West Flume was remediated and is being monitored as part of the LCP Bridge Street OU1 site. The localized groundwater contamination will be addressed in the LCP Bridge Street OU2 ROD.

It should be noted though that preliminary results from an investigation of an unnamed tributary which adjoins Geddes Brook upstream of the culverts beneath the Conrail railroad tracks indicates that elevated levels of mercury are present in tributary sediment and floodplain soils (Honeywell, 2009). The presence of contamination in the unnamed tributary appears to be the result of historic overflows from the wastebeds when they were in use as settling basins or from backflow of Geddes Brook. Additional investigation of the unnamed tributary is presently being conducted, and if warranted, contamination in the unnamed tributary will be addressed under either the Geddes Brook Interim Remedial Measure (IRM) prior to remediating contaminated channel sediment and floodplain soil/sediment in and adjacent to lower Geddes Brook.

Frequent Comment #3: Several commenters expressed concern about the potential loss of some or all of the forested wetland near the mouth of Ninemile Creek as a result of the remediation. (Comments 1.d, 2.b, and 5.f)

Response to Frequent Comment #3:

The forested portion of SYW-10 is a valuable Class I wetland, which is limited along the shores of Onondaga Lake. During the remedial design, a study will be conducted to evaluate criteria such as contaminant concentrations, habitat value, size, location within SYW-10, and engineering considerations to determine which portions of SYW-10 would be remediated. Based on the outcome of this study, it may be determined that a portion of SYW-10 does not require remediation and may therefore be retained as a forested wetland.

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NYSDEC. 2005. Concentrations of Selected Analytes in Rural New York State Surface Soils: A Summary Report on the Statewide Rural Surface Soil Survey. August.

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O'Brien & Gere. 2008. Draft Remedial Investigation Wastebeds 1 through 8 Site, Geddes, New York. Prepared by O'Brien & Gere for Honeywell. April. (NYSDEC comments dated October 27, 2008)

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Parsons. 2009. Geddes Brook/Ninemile Creek Operable Unit 2 Supplemental Feasibility Study Report. Draft Final. Prepared by Parsons, Liverpool, NY in association with Exponent and QEA for Honeywell, East Syracuse, NY. May.

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TAMS/Earth Tech. 2003c. Geddes Brook/Ninemile Creek Remedial Investigation Report. Original document prepared for Honeywell, East Syracuse, NY by Exponent, Bellevue, WA. Revision prepared for New York State Department of Environmental Conservation, Albany, New York by TAMS/Earth Tech, New York, NY and YEC, Valley Cottage, NY. July.

RESPONSIVENESS SUMMARY

ATTACHMENT 1

Comment and Response Index

Name/Agency	Comment Code	Comment Summary	Response
Onondaga Nation, Joseph J. Heath (July 3, 2009 letter which includes a copy of their March 31, 2009 comment letter on the draft OU2 Supplemental FS report)	1.a.	The Nation expressed concern that insufficient data exist regarding contamination at this site to select a remedy.	See response to Frequent Comment #1.
	1.b.	The Nation expressed concern that the Wastebeds 1 through 8 site would recontaminate Ninemile Creek OU2 and that further study is needed.	See response to Frequent Comment #2.
	1.c.	The Nation expressed concern that it appears that the removals proposed (locations and depths) are based solely on mercury and not other contaminants.	See response to Frequent Comment #1.
	1.d.	The Nation requests that further sampling be completed in the forested wetland area in the hopes that some of the area would not be destroyed. If forested areas are impacted by remediation, deed restrictions or other measures should be employed to allow the restoration of the forested wetland to succeed.	NYSDEC/EPA agree that further sampling will be completed in this area during remedial design. If forested wetland areas are impacted by remediation, these wetlands will be restored. Any potential future impact to these wetlands would be regulated through State and federal permitting requirements for wetlands. See also response to Frequent Comment #3.
	1.e.	The Nation strongly believes that the FS demonstrates that additional study is needed to characterize the site and select a remedy.	See response to Frequent Comment #1.
	1.f.	The Nation expressed concern that the sampling is spatially inadequate and additional sampling should be completed at a greater depth to support remedial decisions.	See response to Frequent Comment #1.

Name/Agency	Comment Code	Comment Summary	Response
	1.g.	The Nation expressed concern that the sampling omits important contaminants other than mercury and that further sampling should be completed in SYW-10 and in Ninemile Creek surface water prior to selecting a remedy.	See response to Frequent Comment #1. Also, as noted in Footnotes 11 (page 67) and 17 (page 88) of the Proposed Plan, "sampling during the pre-design investigation would include the other CPOIs (as well as mercury) to ensure that the remedy is protective for all CPOIs."
	1.h.	The Nation identified errors in the concentration units for lead and arsenic in select data tables in Honeywell's March 2009 Preliminary Draft OU2 Supplemental FS.	A similar comment was included in NYSDEC's April 1, 2009 comment letter and the errors were corrected in Honeywell's May 2009 Draft Final OU2 Supplemental FS.
	1.i.	The Nation expressed concern that the upstream and upgradient sites (LCP OU2 and Wastebeds 1 through 8) should be addressed prior to remediating Ninemile Creek.	See response to Frequent Comment #2.
	1.j.	The Nation requests that the remedy should avoid precluding habitat restoration options and cleanup objectives should meet levels that are protective regardless of the substrate being placed.	<p>Habitat restoration is an integral part of the remediation and the details of habitat restoration will be developed during remedial design. The goals of the habitat restoration plan will include, but will not be limited to, providing connectivity of the stream with the surrounding floodplain/wetland, the establishment of diverse habitats and native vegetation (e.g., vernal pools, forested floodplains), and no net loss of wetland areas following remediation. As noted in the ROD, natural stream restoration techniques will be used in designing both the channel remedy and the habitat layer with the goal of creating a diversity of stream and near-stream habitats and minimizing hardening of the channel and banks, to the extent feasible.</p> <p>The cleanup objectives will be met regardless of the substrate that is placed. The goal for the concentrations of the clean material for mercury, other chemical parameters of interest, and other constituents will be NYSDEC's sediment criteria (including the lowest effects level of 0.15 mg/kg] for mercury) in sediments and 6 NYCRR Part 375 unrestricted use soil cleanup objectives (including the objective of 0.18 mg/kg for mercury) in soils.</p>

Name/Agency	Comment Code	Comment Summary	Response
	1.k.	The Nation requests that the remedy should ensure suitable habitat exists for cold water fish passage up from Onondaga Lake and that sufficient contamination is removed for those that consume fish.	The habitat restoration plan to be developed during design will include appropriate habitat (water depth) to allow fish passage throughout the OU1 and OU2 portions of Ninemile Creek. Also, it is anticipated that the remedy will achieve USEPA's National Recommended Water Quality Criterion for methylmercury, as measured in fish tissue, of 0.3 mg/kg and is a Remediation Goal (as identified in the Geddes Brook/Ninemile Creek OU1 and OU2 RODs).
	1.l.	The Nation requests that additional survey of wetland plants be completed prior to work commencing and that any rare, protected, or native plants be protected during the remediation.	A survey of the wetlands has commenced and will be completed during the design. Also, the design would include measures to protect any rare, protected, or native plants, where feasible.
	1.m.	The Nation requests that steps to be taken during the remediation work to protect birds and animals and restore habitat should be identified.	A habitat restoration plan will be developed during design to identify measures which will be needed to restore habitat and protect wildlife during remedial activities in accordance with the ROD. The requirements identified in the plan will need to be met during remediation.
	1.n.	The Nation expressed concern that none of the alternatives evaluated are adequate because the site has not been sufficiently characterized in context of the regulations or a holistic approach.	See response to Frequent Comment #1.
Jean M. Smiley, Onondaga County Executive Office	2.a.	The County is interested in seeing the State and Honeywell achieve the stated remedial goals for the site.	The comment is acknowledged.
	2.b.	The County requests that the remedy have sufficient flexibility for the forested portion of the SYW-10 wetland.	See response to Frequent Comment #3.

Name/Agency	Comment Code	Comment Summary	Response
Samuel H. Sage, Atlantic States Legal Foundation (including comments from Don Hughes)	3.a.	The commenter agrees that the preferred remedy (Alternative 3) is far better than Alternative 2 and supports use of the sediment consolidation area (SCA) at Wastebed 13.	<p>The comment is acknowledged.</p> <p>Contaminated sediments and soils removed from the Ninemile Creek OU2 portion of the site and the associated floodplain will be disposed of at Honeywell's LCP Bridge Street subsite containment system or the SCA that will be constructed at Wastebed 13 as part of the remediation of the Onondaga Lake Bottom subsite. A decision as to the specific disposal location will be made during the design phase. This decision will consider various factors including the design and construction schedules for the Ninemile Creek OU2 remedy as well as the SCA so that remediation of Ninemile Creek is not unnecessarily delayed.</p>
	3.b.	The commenter expressed concern that the existing data are inadequate to support the Proposed Plan.	See response to Frequent Comment #1.
	3.c.	The commenter expressed concern that chemicals of concern other than mercury such as lead, arsenic, hexachlorobenzene, phenol, PCBs, PAHs, and dioxins/furans must also be monitored.	<p>As noted in Footnotes 11 (page 67) and 17 (page 88) of the Proposed Plan, "sampling during the pre-design investigation would include the other CPOIs (as well as mercury) to ensure that the remedy is protective for all CPOIs."</p> <p>See also response to Frequent Comment #1.</p>
	3.d.	The commenter expressed concern that the schedule for a decision on the OU2 remedy appears to be rushed and that the RI/FS for Wastebeds 1 through 8 has not been completed.	See response to Frequent Comment #2.
	3.e.	The commenter states that the proposed remedy does not correct many injuries inflicted on Geddes Brook and Ninemile Creek such as losses of wetlands and stream sinuosity and these losses should be compensated under the Natural Resources Damage Assessment program.	<p>The purpose of the remedy is to protect public health and the environment. Natural resource damages are addressed separately.</p> <p>NYSDEC is the designated Natural Resource Trustee for the State of New York. Other Natural Resource Trustees include the Onondaga Nation and the Department of Interior through the U.S. Fish and Wildlife Service. The Natural Resource Trustees are coordinating their efforts and they are working cooperatively with Honeywell to pursue a natural resource damage assessment and plan for restoration activities related to the Onondaga Lake NPL site.</p>

Name/Agency	Comment Code	Comment Summary	Response
Sarah Eckel, Citizens Campaign for the Environment	4.a.	The commenter indicated that the group, in general, supports the clean-up plan.	The comment is acknowledged.
	4.b.	The commenter supports use of the two disposal options (LCP Bridge Street site or SCA at Wastedbed 13) and recommends regular testing and reporting and installing a liner.	The comment is acknowledged. Long-term monitoring of the LCP Bridge Street site containment facility is a component of the remedy for that site. A liner will be installed as part of the construction of the SCA at Wastedbed 13 and monitoring would also be performed in and around the SCA.
	4.c.	The commenter looks forward to the Proposed Plan for the remediation of the wastebeds and expects that the plans and monitoring for the wastebeds will be shared with the Citizen Participation Working Group.	Toward the end of the RI/FS phase, the Proposed Plan and RI/FS documents for the site will be made available to the community. This will be an opportunity for the public to review the documents and offer input regarding NYSDEC and EPA's preferred remedy. During the public comment period, the NYSDEC and EPA will hold a public meeting to present the conclusions of the RI/FS, to elaborate further on the reasons for recommending the preferred remedy, to answer questions regarding the proposed cleanup plan, and to receive public comments.
	4.d.	The commenter suggested that the Geddes Brook/Ninemile Creek site be subject to participation and review of the Onondaga Lake Citizen Participation Working Group.	The appropriateness of including the Geddes Brook/Ninemile Creek site in the Onondaga Lake Bottom Subsite Citizen Participation Plan and associated Working Group will be considered.
	4.e.	The commenter requests that design-phase documents for GB/NMC OU1 and OU2 be provided to the public for review and comment.	Design phase documents will be made available to the public at the public repositories and via website posting. The Department may issue corresponding Fact Sheets to inform the public of the availability of a given design phase document and to summarize the given document's purpose and content. DEC will consider public input received on design phase documents as the design process moves forward. Depending upon the level of public interest expressed, the Department may host public availability sessions, as appropriate, to help inform the public and answer questions. Formal solicitation of public comments within a prescribed time frame is not planned.

Name/Agency	Comment Code	Comment Summary	Response
	4.f.	The commenter suggested that a World Wide Web-based document repository be developed for key documents for each of the sites as well as project updates and schedules for public comment.	The NYSDEC Region 7 web site includes select documentation for Onondaga Lake, Geddes Brook/Ninemile Creek, and other select sites. It is anticipated that select future design documents will also be placed on this site. It is anticipated that fact sheets will continue to be developed to summarize key milestones and schedules for public involvement. The site address is: http://www.dec.ny.gov/chemical/37558.html
	4.g.	The commenter suggests that signage be placed along and near all project sites including, but not limited to, the Geddes Brook/Ninemile Creek projects and the Onondaga Lake shore.	Public outreach is a standard component of a site's remedial program and may include signage to provide information about the progress of on-site cleanup activities and, where appropriate, to ensure public safety. The posting of signage will be considered during the remedial design.
Fred Miller, Nine Mile Creek Conservation Council	5.a.	The commenter supports the cleanup but has several concerns.	The comment is acknowledged. Responses to specific, stated concerns are provided in the responses that follow.
	5.b.	The commenter expressed concern that the historic Ninemile Creek channel could provide a conduit for contamination from Wastebeds 1 through 8 to recontaminate the creek.	In 1926, the lowest reach of Ninemile Creek (<i>i.e.</i> , Reach AB) was re-routed to accommodate the construction of Wastebeds 1 through 8. The findings of the ongoing RI and Focused Feasibility Study for the Wastebeds 1 through 8 site indicate that the historic channel is not a significant source of contamination to Ninemile Creek. See also response to Frequent Comment #2.
	5.c.	The commenter expressed concern that since the marl layer is only present near the lake and not farther upstream, additional consideration should be given to obtain the most effective excavation depth for maximum removal of contaminants.	Although the marl was not found in the upper portion of the Reach AB channel, sediment cores indicate that mercury concentrations decline below a depth of about 2.5 ft in this area. However, there is one core location (TN-5-2) which is at the upper end of Reach AB near the Poned Area where there are exceedances of the cleanup levels for arsenic down to 5 ft and phenol down to 3.5 ft. For both of these parameters, there are no exceedances at this location below these depths. See also response to Frequent Comment #1.
	5.d.	The commenter expressed concern that long-term monitoring to ensure Alternative 3 provides the same level of protection as Alternative 4 will be ineffective.	NYSDEC and EPA prefer Alternative 3 because it provides the same overall protection of human health and the environment and compliance with ARARs, as Alternative 4. Alternative 3 also presents less short-term risks and is more implementable than Alternative 4. Long-term monitoring is a component of both Alternative 3 and Alternative 4.

Name/Agency	Comment Code	Comment Summary	Response
	5.e.	The commenter suggested that the LCP Bridge Street site containment facility is not a suitable site for the placement of contaminated sediment and soil from the remediation of the Geddes Brook/Ninemile Creek site. The SCA at Wastebed 13 is the better selection.	<p>The LCP site containment facility was designed with the capability to receive sediment and soil from the remediation of the Geddes Brook/Ninemile Creek site. The facility includes a subsurface barrier wall which was installed around the facility, and groundwater extraction wells, to contain site-impacted shallow and deep groundwater. The barrier wall was installed to a depth of approximately 55 feet and is keyed into low-permeability glacial till. A temporary, low-permeability cap has been installed at the facility and the final cap will be constructed after the placement of sediments from the Geddes Brook/Ninemile Creek site has been completed. Long-term monitoring of groundwater, surface water, sediment, and biota is being conducted to ensure the effectiveness of the remedy. This facility can adequately contain the contaminated materials from the Geddes Brook/Ninemile Creek site and be protective of public health and the environment.</p> <p>As was noted in the ROD, the SCA at Wastebed 13 will also be considered. A decision as to the specific disposal location would be made during the design phase. This decision would consider various factors including the design and construction schedules for the Ninemile Creek OU2 remedy as well as the SCA so that remediation of Ninemile Creek is not unnecessarily delayed.</p>
	5.f.	The commenter expressed concern with the removal of the forested wetlands.	See response to Frequent Comment #3.
	5.g.	The commenter expressed concern that the lower remediation area is owned by Onondaga County and not Honeywell and there is no binding agreement to protect the forested wetland in perpetuity.	Onondaga County has indicated in their letter dated June 29, 2009 that is included as part of this responsiveness summary, that it supports preserving as much of this forested wetland area as possible. Since it is a regulated federal and state wetland, it is unlikely that the area would be fragmented and developed. The current alignment of the County's proposed bike trail in this area just west of Ninemile Creek is along I-690 and is not expected to impact the forested wetland.
	5.h.	The commenter requested the riparian buffer be maintained over as large an area as possible.	The comment is noted and this issue will be evaluated as part of the remedial design.
James Corbett, Onondaga County Legislature	OC1.a. (transcript page 30)	The commenter supports the cleanup.	The comment is acknowledged.

Name/Agency	Comment Code	Comment Summary	Response
	OC1.b. (transcript page 30)	The commenter supports habitat enhancements in the channel, stream banks, and wetlands.	The comment is acknowledged.
	OC1.c. (transcript page 31)	The commenter stated that an important consideration of this project is the ability for the County to extend the bike trail along the west shore and over Ninemile Creek.	<p>The comment is acknowledged.</p> <p>NYSDEC will work with Onondaga County and Honeywell with the intent that the remediation of Ninemile Creek, and associated floodplains, would not impact the extension of the bike trail.</p> <p>See also response to Comment OC7.a.</p>
Fred Miller, Nine Mile Creek Conservation Council	OC2.a. (transcript page 33)	The commenter requests that a visual representation of the riparian zone be developed and presented.	Generating a visual rendering of the anticipated restoration of the riparian zone post-remedy will be considered during the design phase.
	OC2.b. (transcript page 34)	The commenter expressed concern that since the forested wetland, which is a valuable environmental asset, is County (not Honeywell) property, that the area should be placed into a conservationship or otherwise protected into the future.	Onondaga County has indicated in a letter that is included as part of this responsiveness summary that it supports preserving as much of this forested wetland area as possible. Since it is a regulated federal and state wetland, it is unlikely that the area would be fragmented and developed. The current alignment of the County's proposed bike trail in this area just west of Ninemile Creek is along I-690 and is not expected to impact the forested wetland.
Sarah Eckel, Citizens Campaign for the Environment	OC3.a. (transcript page 36)	The commenter indicated that the group supports the preferred alternative.	The comment is acknowledged.
	OC3.b. (transcript page 36)	The commenter requests that NYSDEC provide for public involvement during the design phase.	Public involvement is an important part of the remedial process and will take place during the remedial design phase.
	OC3.c. (transcript page 37)	The commenter suggests that signage be placed along and near all project sites including, but not limited to, the Geddes Brook/Ninemile Creek projects and the Onondaga Lake shore.	See response to Comment 4.g.

Name/Agency	Comment Code	Comment Summary	Response
	OC3.d. (transcript page 37)	The commenter thanks N Y S D E C for addressing contamination from Wastebeds 1 through 8 and looks forward to the proposed remedial plan for the Wastebeds 1 through 8 site.	The comment is acknowledged.
Lindsay Speer	OC4.a. (transcript page 38)	The commenter is glad to see a fuller extent of remediation than there was on the Onondaga Lake Bottom site.	The comment is acknowledged.
	OC4.b. (transcript page 38)	The commenter expressed concern about inadequate sampling and that the depth of contamination is not known in some areas.	See response to Frequent Comment #1.
	OC4.c. (transcript page 39)	The commenter expressed concern about the possibility of failure of caps in the creek.	As discussed in the Proposed Plan and this ROD, the depths of removal for the remedy are expected to eliminate the need for an isolation cap. If an isolation cap is determined to be needed in a portion of the stream, Honeywell will be required to ensure the effectiveness of the isolation cap through a monitoring and maintenance program. The scope of the program would be determined during remedial design.
	OC4.d. (transcript page 39)	The commenter expressed concerns about the timing of the plan with respect to potential contamination from Wastebeds 1 through 8 as well as inadequate testing.	See responses to Frequent Comments #1 and #2.
	OC4.e. (transcript page 40)	The commenter expressed concern about the continued channelization of Ninemile Creek and suggests that the creek could be remeandered if the wastebeds were removed and the land restored.	<p>Natural stream restoration techniques will be used in designing both the channel remedy and the habitat layer with the goal of creating a diversity of stream and near-stream habitats and minimizing hardening of the channel and banks, to the extent feasible.</p> <p>Removal of the wastebeds was not considered under this ROD since the Ninemile Creek channel and floodplains can be remediated without wastebeds excavation. Providing for meandering of the restored Ninemile Creek channel via wastebeds excavation would not likely be feasible due to the volume of material involved.</p>

Name/Agency	Comment Code	Comment Summary	Response
	OC4.f. (transcript page 40)	The commenter is encouraged by the work to enhance diversity in the floodplains, habitat, and available structure and looks forward to seeing those designs in more detail.	The comment is acknowledged. Also, a habitat restoration plan will be developed during design and will be available for the Onondaga Nation's review.
	OC4.g. (transcript page 40)	The commenter requests that a full survey of the flora and fauna in the forested wetland be completed prior to remediating this area.	Surveys of the wetlands, including flora and fauna, have commenced and will be completed during design prior to remediation.
Don Hughes	OC5.a. (transcript page 41)	The commenter agrees with the request of Fred Miller to incorporate additional graphics into the presentation.	See response to Comment OC2.a.
	OC5.b. (transcript page 41)	The commenter expressed concern about the timing of the plan for OU2 with respect to Wastebeds 1 through 8.	See response to Frequent Comment #2.
	OC5.c. (transcript page 42)	The commenter suggests that the work on Wastebeds 1 through 8 and Ninemile Creek OU2 be coordinated and questioned "what is the rush" with OU2.	The work has been and will continue to be coordinated. The remedial work for OU2 (and OU1) needs to be completed prior to commencing dredging and capping in the lake in Sediment Management Unit (SMU) 4 which is off of the mouth of Ninemile Creek. Dredging within Onondaga Lake is scheduled to begin in May 2012 in accordance with the Federal Consent Decree (89-CV-815) between the State of New York and Honeywell. See also response to Frequent Comment #2.
	OC5.d. (transcript page 43)	The commenter questioned the schedule for cleaning up the site.	See response to Comment OC5.c.
	OC5.e. (transcript page 44)	The commenter expressed concern that the entire site is underlain by fine, coarse sand and gravel so mobile contaminants are going to move.	Any contamination associated with Wastebeds 1 through 8 site will be addressed by the remedy for the wastebeds.

Name/Agency	Comment Code	Comment Summary	Response
	OC5.f (transcript page 44)	The commenter expressed concern with the use of the LCP Bridge Street site for containment since it is not a lined facility and encourages NYSDEC/EPA to require that all material be contained at the SCA.	See response to Comment 5.e.
	OC5.g (transcript page 45)	The commenter expressed concern about the adequacy of the data to select and cost alternatives.	See response to Frequent Comment #1.
	OC5.h (transcript page 45)	The commenter questioned the mercury cleanup objective for Alternative 4 and indicated that the objective for sediments should be lower than for soils.	For Alternative 4, the same cleanup level for mercury (0.15 mg/kg) is used for stream sediments, wetland sediments/soils, and non-wetland soils. This value is based on NYSDEC's low effects screening level in sediments and is lower than the calculated site-specific bioaccumulation-based sediment and soil values (0.8 and 0.6 mg/kg).
Albert Breezy	OC6.a. (transcript page 47)	The commenter questioned benefits of the remediation to other water bodies (downstream) connected to Onondaga Lake.	It is expected that the remediation of Geddes Brook, Ninemile Creek, Onondaga Lake, and other upland sites and tributaries would improve conditions at those sites. Furthermore, because fish migrate between Onondaga Lake and these other water bodies, fish in these other areas may also benefit from the remediation of this site.
Don Hughes	OC7.a. (transcript pages 50 through 54)	The commenter questioned the timing of the County's construction of the bike trail and the remediation of the site.	NYSDEC and Honeywell are looking into what specific remedial measures may be needed along the alignment of the bike trail (including any bridge structures) in the event that the County moves forward with the bike trail construction prior to implementation of the Geddes Brook/Ninemile Creek OU2 remedy.
	OC7.b. (transcript pages 57 and 58)	The commenter questioned the mercury cleanup objective of 0.15 ppm and whether that refers to fish, sediments or soils.	The mercury cleanup level of 0.15 mg/kg is for stream sediments, wetland sediments/soils, and non-wetland soils. The remediation goals for fish tissue are discussed in the ROD. The selected remedy is intended to achieve fish tissue mercury concentrations ranging from 0.1 mg/kg, which is for protection of ecological receptors, to 0.3 mg/kg, which is based on EPA's methylmercury National Recommended Water Quality criterion for the protection of human health from elevated risks due to consumption of fish.

Name/Agency	Comment Code	Comment Summary	Response
Male Voice	OC8.a. (transcript page 59)	The commenter questioned the location of the deep sediments and marl.	The marl is present near the upper portion of the stream bed in the downstream portion of Reach AB as shown on Figure 10 of this ROD. Thicker sediments overlying the marl are found just downstream of Reach AB within the mouth of Ninemile Creek. As noted in Footnote 15 of the Proposed Plan (page 86), the channel sediments between Stations 0+00 and 3+00 (lower 300 ft [90 m]), which are downstream of Reach AB, are being addressed under the Onondaga Lake remedy. In this lower 300-ft reach, the concentrations of mercury in the sediments and the depth to marl are significantly greater (see data for Stations NMC-SED-70 through NMC-SED-74 in Appendix B of the OU2 Supplemental FS; note that these data are not shown in Figures 6a through 6c of the ROD since they are downstream of Reach AB). The depth of removal in this lower 300 ft downstream of Reach AB is expected to be greater than 2.5 ft (75 cm) and will be developed as part of the dredge/cap designs for Sediment Management Unit (SMU) 4 of the lake.
	OC8.b. (transcript page 60)	The commenter asked if there is a demarcation for the marl.	The upstream demarcation of the marl within the upper portion of the stream bed is shown on Figure 10 of the ROD and is approximately 1,900 ft (Station 19+00) upstream from the most downstream point of Ninemile Creek (Station 0+00).
Don Hughes	OC9.a. (transcript page 61)	The commenter questioned why the difference in cost between Alternatives 3 and 4 is not proportionate to the difference in volume.	As a result of its deeper removals (up to a depth of 8 ft into the sediments), Alternative 4 would require installation and removal of significantly (greater than ten times) more sheet pile than Alternative 3.
Dereth Glance	OC10.a. (transcript pages 62 and 63)	The commenter questioned the schedule to complete the design.	It is anticipated that preliminary design documents will be submitted in 2010 and that the design of the OU2 remedy will be completed in 2011.
	OC10.b. (transcript pages 63 and 64)	The commenter questioned why the annual costs for operation and maintenance is about \$20,000 greater for Alternative 3 than Alternative 4.	Since less residual contamination would remain on-site under Alternative 4 than Alternative 3, the annual operation, maintenance and monitoring (OM&M) costs for Alternative 4 do not include costs for maintenance and monitoring of the cover in the floodplain nor estimated costs for institutional controls. Institutional controls, which are included in the OM&M cost estimates, are assumed for Alternatives 2 and 3 but not Alternative 4. See Tables F-1-2 and F-1-3 in Appendix F of the OU2 Supplemental FS (Parsons, 2009).

Name/Agency	Comment Code	Comment Summary	Response
Les Monostory	OC11.a. (transcript page 66)	The commenter questioned mercury levels in fish and concentration goals.	<p>As shown in Table 6 of the Proposed Plan and this ROD, concentrations of mercury in fillets of edible-size fish collected from the Geddes Brook/Ninemile Creek site averaged about 0.6 mg/kg wet weight (mg/kg) with a maximum detection of 2.5 mg/kg. Additional discussion of fish tissue data can be found in the ROD.</p> <p>The selected remedy is intended to achieve fish tissue mercury concentrations ranging from 0.1 mg/kg, which is for protection of ecological receptors, to 0.3 mg/kg, which is based on EPA's methylmercury National Recommended Water Quality criterion for the protection of human health from elevated risks due to consumption of fish.</p>
Bill Morris	OC12.a. (transcript page 71)	The commenter questioned the method of transport of dredged material to the disposal site and clean material to replace it.	<p>Contaminated sediments and soils dredged/excavated from the site will likely be transported to the LCP Bridge Street containment area and/or the SCA at Wastedbed 13 by truck and/or as a slurry to the SCA via a pipeline to be constructed for the lake remedy. The transport method and final disposal location will be determined during design.</p> <p>The source of replacement material (clean backfill and habitat layer material) will be determined during design. It is assumed that these materials would be trucked to the Site.</p>

RESPONSIVENESS SUMMARY

ATTACHMENT 2

**Letters/Email Submitted During the Public Comment Period and Oral Comments
Received During the Public Meeting**

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July 3, 2009

VIA E-MAIL and FIRST CLASS MAIL

Mr. Timothy Larson, P.E.
Remedial Bureau D
New York State Department of Environmental Conservation
625 Broadway, 12th Floor
Albany, New York, 12233-7016

RE: Geddes Brook / Ninemile Creek OU2 Proposed Plan

Dear Mr. Larson:

I am writing on behalf of the Onondaga Nation, for whom I am General Counsel, regarding the Geddes Brook / Ninemile Creek Operable Unit 2 Proposed Remedial Action Plan, provided to the Onondaga Nation under consultation with DEC and Honeywell.

The Onondaga Nation would like to thank the DEC for the opportunity to review and comment on the documents related to this portion of the Onondaga Lake Superfund Site. As noted in the Nation's March 31, 2009 comments on the Feasibility Study for Geddes Brook /Ninemile Creek OU2 (attached), the Nation is strongly concerned that not enough information exists regarding the type and distribution of contaminants in this site to make informed decisions regarding the best remediation for the site. This is due to significant data gaps within this site, as well as the fact the results for the Wastebeds 1-8 Remedial Investigation are not yet available.

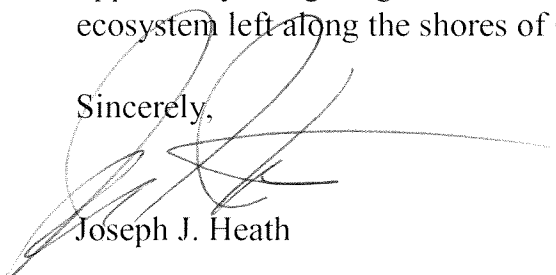
Wastebeds 1-8 are adjacent to this site, and the elevation change to 80 feet of waste material is certainly contributing surface and groundwater flow to Ninemile Creek, including backflow which will affect and possibly recontaminate OU-2. The Onondaga Nation is not reassured by the statement made by the DEC in our April 21, 2009 conference call that "not much" from Wastebeds 1-8 is affecting Ninemile Creek, and suggests that further study is needed.

It also appears that the location and depth of contaminated sediment removal is based solely on mercury concentrations. This does not seem appropriate in a creek that is also contaminated by Hexachlorobenzene, Benzo(a)pyrene, PCBs, Arsenic, Lead, PAHs, and

judging by their presence at upstream sites, VOCs, SVOCs, Xylene, pesticides, and cyanide.

Additionally, the Nation would like to express its deep concern for the forested wetland (SWY-10) adjacent to Ninemile Creek that has suffered contamination. Particularly in this case, the Onondaga Nation advocates for further sampling, in the hopes that some areas of the wetland may be spared the destruction of the cleanup activities. However, decisions regarding whether or not a particular area will be cleaned up must be based on knowledge, not on the lack thereof. It is also important that in the remediation of this site, deed restrictions or other mechanisms be put into place to ensure that this area will have the opportunity to again grow into a forested wetland. There is not enough of this type of ecosystem left along the shores of Onondaga Lake.

Sincerely,



Joseph J. Heath

Enc.

cc: Onondaga Nation Council of Chiefs
Donald Hesler, DEC Division of Remediation

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March 31, 2009

VIA E-MAIL and FIRST CLASS MAIL

Mr. Timothy Larson
Project Manager, Remedial Bureau D
New York State Department of Environmental Conservation
625 Broadway, 12th Floor
Albany, New York, 12233-7016

RE: Geddes Brook / Ninemile Creek OU2 Supplemental FS Report

Dear Mr. Larson:

I am writing on behalf of the Onondaga Nation, for whom I am General Counsel, to submit comments on the DRAFT Onondaga Lake Dredging, Sediment Management, & Water Treatment Initial Design Submittal, provided to the Onondaga Nation as part of NYSDEC's ongoing consultation with the Nation concerning the clean-up of Onondaga Lake.

Background and the Nation's Interconnectedness with the Lake:

The region of Onondaga Lake and the Onondaga Lake watershed has been the homeland of the Onondaga since the dawn of time. The Nation has been the trustee and steward of Onondaga Lake since time immemorial and will continue to be so forever, as that is what is mandated by the *Gayanashagowa*, the Great Law of Peace. In the 1794 Treaty of Canandaigua the United States government recognized Onondaga Lake as part of the Onondaga Nation's aboriginal territory.

The Lake is the spiritual, cultural and historic center of the Haudenosaunee Confederacy. Over one thousand years ago, the Peacemaker brought the Mohawk, Oneida, Onondaga, Cayuga, and Seneca Nations together on the shores of Onondaga Lake. At the lakeshore, these warring Nations accepted the message of peace, laid down their arms, and formed the Haudenosaunee Confederacy. The Confederacy was the first representative democracy in the West.

To symbolize the Confederacy, the Peacemaker chose a white pine, the Tree of Peace. The Peacemaker chose the white pine because the white pine's needles are clustered in groups of five, just as the five founding Nations of the Confederacy clustered together for strength. The boughs of the white pine represent the laws that protect all the people. An eagle was placed at the top of the tree to watch for danger from without and within. Four white roots of peace reach out in the four directions towards anyone or any Nation who wishes to come under this tree of peace.

As the birth place of the Confederacy and democracy, the Lake is sacred to the Haudenosaunee. The Onondaga Nation has resided on the Lake and throughout its watershed since time immemorial, building homes and communities, fishing, hunting, trapping, collecting plants and medicine, planting agricultural crops, performing ceremonies with the natural world dependent on the Lake, and burying ancestors – the mothers, fathers and children of the Onondaga Nation. The Onondaga Nation views its relationship to this area as a place where we will forever come from and will return to.

It brings great sadness to the people of the Onondaga Nation that despite their long stewardship of the Lake and its watershed, it took only one hundred years of abuse to wreak havoc to the Lake, its tributaries and all the plants, animals and marine life that depend on the Lake and its watershed. Industry interfered with the Onondaga Nation's relationship to the land and disturbed the ancestors that were interred throughout the watershed – either by direct excavation or contamination, or indirect efforts such as construction on top of grave sites. The Onondaga Nation wishes to bring about a healing between their homelands around the Lake. They must in order to protect the future generations “whose faces are looking up from the earth.”

In the spirit of its treaties with the United States, the Nation will continue to provide its perspective to the federal and state governments on the actions undertaken with respect to Onondaga Lake. The Nation remains committed to contributing to the healing of relationship between the people of Central New York and the land. In furtherance of that goal, the Nation has committed substantial resources to understanding the actions taken with respect to Onondaga Lake. Wherever possible, the Nation will continue to share its understanding and knowledge with the public and with New York State and the United States.

The Onondaga Nation is committed to maintaining its sovereignty and its independence. Nothing in this document or in any action taken by the Nation should be construed in any way as implying approval or agreement with any NYSDEC decisions or actions which fall short of fully remediating and restoring all natural resources in the

Nation's aboriginal territory.

Overview

We understand that the purpose of the Feasibility Study is to develop, screen and evaluate alternatives for remedial action. See 40 CFR 300.430(e). Because of gaps in the consultation process prior to this date, the comments presented here go further in scope to the adequacy of the investigation to support an adequate FS and reach into the future to consider likely concerns with the remedial alternatives evaluated here. On balance, however, the Nation strongly believes that this FS clearly demonstrates that additional study is needed to adequately characterize this site to ensure that the alternative remedial measures go as far as possible towards eliminating, reducing or controlling risks to human health and the environment. See 40 CFR 300.430(a).

Adequately Characterize the Site

The Sampling is Spatially Inadequate.

It is vitally important the Feasibility Study document that any remedial alternative is fully protective of the public health and the environment. This FS is based on limited sampling. For example, there is no sampling below the depth of 2-3 feet deep in the floodplains and wetlands. . As a result, the FS evaluates remedial alternatives that are based on the assumption that dredging 2-3 feet of soils will be protective. In light of the relative mobility of contaminants and duration of deposition of the contamination at this site, the sampling depth of 3 feet is inadequate to fully characterize the site. The Nation respectfully requests that NYSDEC require additional sampling to a greater depth to support any decisions on the remedial alternative for this site.

The Sampling Omits Important Contaminants

In addition, the sampling failed to account for the full range of contaminants of concern. For example, in the channel, PCBs, Arsenic, and Lead were sampled only at the two bends and not along the reach of the stream; all other samples in the channel looked solely at mercury. Similarly, a range of contaminants (Hexachlorobenzene, Benzo(a)pyrene, PCBs, Arsenic, Lead, Mercury, and Total PAHs) were only sampled for on the edges of the wetland and near 1-690; there was no sampling for anything other than mercury along the length of Wastebeds 1-8 or in the center of the wetland. Seeing as the wastes in Wastebeds 1-8 have not been adequately characterized at this point, this is deeply concerning. Further testing in Wetland SYW-10, in and around Ninemile Creek, and also of Ninemile Creek's surface waters near points of elevated specific conductivity should be required before any decisions regarding an adequate remedy may be made.

The source of contamination to Geddes Brook and Ninemile Creek was primarily the LCP Bridge St. Plant and other industries on that property, which produced more

contaminants of concern than just these listed above. Based on the characteristics of the contamination present at the other sites, sampling should include analysis for the presence of VOCs, SVOCs, Xylene, pesticides, and cyanide. Each of these contaminants has been found or tested for either upstream at the LCP Bridge Street Site or Wastebeds 1-8.

The FS documents areas characterized by elevated specific conductivity resulting from the leaching from the Solvay Wastebeds. These areas should be further sampled for a wider range of contaminants known to be present in or co-mingled with the Solvay Waste. The FS indicates that there is a long stretch of Ninemile Creek that has only been sampled for mercury in the sediments. Without a broader range of sampling to characterize the leachate, it will not be possible to adequately determine and justify a remedy for this site.

Another example of the effects of limited sampling is the proposal in Alternative 4 to leave the upland forested wetland untouched. This decision is not adequately supported by the available data. Specifically, in the only sample taken in this area that was tested for a range of contaminants beyond mercury, a high concentration of benzo(a)pyrene was documented. Further testing is clearly necessary to identify and evaluate remedial alternatives for this portion of the site.

Finally, we note that there appears to be an error in the units for lead and arsenic in the data tables for this report. This is deeply concerning, as there is a large difference between parts per billion and parts per million. In order to be confident in the data that is presented can be relied upon, it is essential that these details be correct. Errors of this nature raise questions about whether the data has been appropriately analyzed and that the appropriate risk and hazard analysis will be applied.

Coordinate Remediation with Wastebeds 1-8

The timing of the remediation of this site is a complex issue, given all of the other subsites that affect it. In particular, the upstream / upgradient sites need to be addressed prior to remediation of this site to prevent re-contamination. LCP Bridge Street OU2 (xylene plume) is only at the FS stage; Wastebeds 1-8 is at the RI stage. Both pose a threat of further contamination of Ninemile Creek. Therefore, the selection of a remedial alternative should be coordinated with the selection of a remedy and restoration options for Wastebeds 1-8.

Avoid Precluding Habitat Restoration Options

Most engineers would agree that streams "have a mind of their own", although they still mistakenly believe it to be possible to control a stream, to bend it to the will of humans. When designs fail, they go back to the drawing board and build their design bigger and stronger, to imprison the stream once again, for a time. But a stream is an entity unto itself.

When we respect the inherent nature of a stream, and its need to move, meander, and flow through a series of riffles, runs, and pools, we enable the stream to be much healthier. Riprap is second only to concrete in the harm that it does to an aquatic ecosystem, as it forces a stream into unnatural shapes which the stream will then resist against. The Nation is especially concerned about the proposed "armor layer" and any "chemical isolation layer." Creating a uniform bottom to the creek out of materials which do not have the ability to shift and move decreases the habitat that the creek might provide unless this remedy is coordinated with that for Wastebeds 1-8. Recontamination and structural problems with both remedies can be avoided by creating a remedy that allows the Creek to over time, move the "immovable" objects, and shift its banks. Whether or not gravel is an appropriate substrate is also questioned, noting the surrounding wetlands. A silt or muck-bottom may be more appropriate. Cleanup objectives should meet levels that are protective regardless of the substrate being placed.

Protect Fish Habitat

Ninemile Creek is a known trout stream. Any remedy should ensure that suitable habitat exists for cold water fish passage up from Onondaga Lake. Equally as important, all contamination needs to be removed so that fishermen and women, especially those who fish for subsistence use, are protected. As discussed above, adequate chemical characterization and sampling of the site is critical to ensure that the potential effects on the fish populations are adequately evaluated.

Protecting native vegetation and forest ecosystems

A survey of the wetland plants in SYW-10 and along the floodplains is needed prior to work commencing, so that any rare, protected, or native plants might be saved and transplanted prior to the area being disturbed. This is particularly the case with SWY-10, which is a stable forested wetland. If any section of this wetland is uncontaminated and can be left undisturbed, it should be, to promote the re-establishment of this forest ecosystem. In the future, after remediation is complete, planting of native trees along Ninemile Creek would provide shade, habitat, and food for the macroinvertebrates in the stream.

Protect Wildlife During and After Remediation

The FS should address the steps that will be taken during the remediation work to protect all birds and animals, including large and small four-legged animals as well as insects and bats, which live in the wetland and floodplains. In addition, it is important to document the steps will be taken to restore their habitat once the remediation work is done.

Additional Concerns

Conclusion

Operable Unit 2 of the Geddes Brook/Ninemile Creek subsite of the Onondaga Lake NPL site does not exist in isolation, but is part of an interconnected whole. NYSDEC must view this site in the context of the best thinking that can be brought to bear. NYSDEC should not limit its review to merely ensuring that the minimal requirements of the NYSDEC and EPA regulations are met. Those regulations require that sufficient site characterization and analysis are conducted to ensure that the alternative remedial measures eliminate, reduce or control risks to human health and the environment. However, NYSDEC should evaluate the site in the context of the larger forces which inform our understanding of the natural world, and the interconnectedness of all things. Viewed in this light, it is clear that none of the remedial alternatives presented in this document are adequate, because the site has not been adequately characterized or understood either in the context of the regulations or in this broader context. NYSDEC must require Honeywell to collect further information to inform its assessment of this site, particularly regarding the impacts from WB1-8, the contamination in the wetland, and depth of contamination to understand what remedy is appropriate.

Please contact me directly, or Lindsay Speer of my office if you have any questions about these comments.

Sincerely,

/s/ Joseph J. Heath

Joseph J. Heath

cc: Onondaga Nation Council of Chiefs
DEC Commissioner Alexander P. Grannis
EPA Region 2 Regional Administrator
Don Hesler, DEC
Richard Mustico, P.E., LCP Bridge Street Project Manager, DEC
Robert Nunes, EPA
Susan Edwards, Wastebeds 1-8 Project Manager, DEC

JJH/les



County of Onondaga
Office of the County Executive

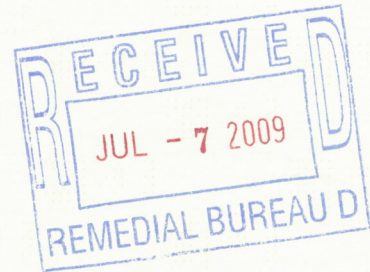
John H. Mulroy Civic Center, 14th Floor
421 Montgomery Street, Syracuse, New York 13202

Phone: 315.435.3516 Fax: 315.435.8582

Joanne M. Mahoney
County Executive

Jean M. Smiley
Administrator for Physical Services

ongov.net



June 29, 2009

Timothy Larson
NYS Department of Environmental Conservation
625 Broadway, 12th Floor
Albany, New York 12233-7013

Dear Mr. Larson:

I offer the following comments with regard to the Proposed Plan for Operable Unit 2 (OU2) of the Geddes Brook/Ninemile Creek site. The County, as owner of the site, is very interested in seeing the State and Honeywell achieve stated remedial goals for the site. The site is within the County's most used park, adjacent to what will soon be an important extension of the park's west shore trail, and is part of the shoreline on a lake where hundreds of millions of public and private dollars are being spent to restore a valuable resource that has been lost to this community for too many years.

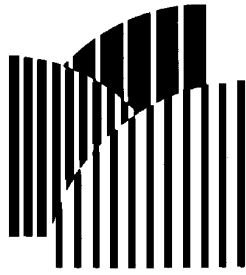
The County's comment at this time has to do with SYW-10, the forested wetland north of Ninemile Creek and contiguous with the planned route of the Park's west shore trail extension. Such wetlands are relatively rare in this locale. When the west shore trail extension was planned, it was anticipated that trail users would be able to view and enjoy this ecological feature. Consequently, it was discouraging to see that in order to meet remediation objectives, it might be necessary to entirely destroy most, if not all, of this unique landscape.

The County's request at this time is that DEC and Honeywell remain as flexible as possible, without compromising remediation goals, in developing and implementing remediation plans for the site with an eye toward preserving as much of this forested wetland feature as practical. It is understood and appreciated that tentative plans call for restoring the ecological integrity of the site if remediation efforts require destruction of the existing wetland. However it is also our understanding that such restoration efforts would take decades to realize and that the outcome of restoration is not certain. If remediation and restoration objectives can be met without leaving a significant amount of contamination on site and suffering the loss of this valued feature for several decades, we are hopeful that the State and Honeywell can and will act with sufficient flexibility to revise the remedy or the manner of its proposed implementation so as to maximize removal of contaminants while preserving this unique resource.

Respectfully,

Jean M. Smiley
Administrator for Physical Services

cc: David Coburn
Joanne M. Mahoney
John McAuliffe



**ATLANTIC STATES
LEGAL FOUNDATION, INC.**

03 July 2009

Mr. Timothy Larson, P.E.
Remedial Bureau D
New York State Department of Environmental Conservation
625 Broadway, 12th Floor
Albany, New York 12233-7016

Re: Geddes Brook / Ninemile Creek OU2 Proposed Plan

Dear Timothy Larson:

The attached comments represent Atlantic States Legal Foundation's formal submittal to the hearing record for the PRAP for Geddes Brook/Ninemile Creek OU2 Subsite of the Onondaga Lake Superfund Site.

The comments submitted have been prepared by Atlantic States Legal Foundation with the assistance of our technical consultants Hughes Consulting. Financial support for employing these technical consultants is acknowledged from the EPA TAG program.

If our comments require further clarification or elaboration, we will be happy to provide supplemental materials to you.

Very truly yours,

Samuel H. Sage, President

Cc: Robert Nunes
Donald Hesler

Comments of Atlantic States Legal Foundation
on Operable Unit 2 of the Geddes Brook/Ninemile Creek Site,
Onondaga County, New York

July 3, 2009

prepared by Donald Hughes, Hughes Consulting Services

ASLF applauds the efforts of the NYSDEC and Honeywell Inc. to clean up the extensive contamination that exists in Geddes Brook and Ninemile Creek. This cleanup effort is long overdue; these tributaries have suffered from decades of abuse from both the Wastebeds and discharges from the LCP facility, as well as runoff from numerous landfills and other industrial operations. Honeywell/Allied Chemical's past operations have resulted in extensive deposits of Solvay waste, extensive calcite precipitation, and contamination from a host of substances including hexachlorobenzene; mercury, other toxic elements; PCBs; PAHs; and polychlorinated dibenzo-dioxins and -furans— among the most notoriously toxic substances known. The tributaries and wildlife that frequent them, and people who live near, drive by and recreate there have paid a terrible price for these many decades of abuse.

ASLF agrees that the preferred alternative, #3, is far better than Alternative #2. Further, we are glad to see the NYSDEC and USEPA are recommending the SCA as an option for disposal of the contaminated sediments and soils from Operable Unit 2. ASLF repeats its assertion that:

The former LCP chlor-alkali facility, despite its status as a remediated site, is NOT a suitable disposal site. Please refer to comment #2 of Comments of Atlantic States Legal Foundation on Operable Unit 1 of the Geddes Brook/Ninemile Creek Site, Onondaga County, New York, submitted to NYSDEC in January 2009.

However, ASLF has several concerns regarding the Proposed Plan for Operable Unit 2. The concerns are based on a detailed review of the Proposed Plan, the Remedial Investigation Report (TAMS, 2003), and related documents. In general, we note that:

- 1) The data used to support the selection of an alternative are inadequate.
- 2) There is far too much emphasis being placed on mercury. The Remedial Investigations have clearly shown that, in addition to mercury, there are a host of both inorganic and organic contaminants of concern. The Fact Sheet for this Plan identifies lead, arsenic, hexachlorobenzene, phenol, PCBs, PAHs, and polychlorinated dioxins and furans in addition to mercury. The HHRA also identifies DDT (and its metabolites) and dieldrin as exceeding human health criteria, due to their concentrations in fish tissue. Most of the above contaminants pose significant ecological risks as well. In addition, zinc and aluminum have been specifically identified as substances which cause ecological risk.
- 3) The schedule seems unduly rushed to accommodate construction of a recreational trail by Onondaga County. Selection of an alternative should probably be delayed for several reasons. The data—particularly for sediments— are inadequate at this point, so much so that the calculated volumes of sediments requiring removal could be seriously in error. In addition,

there is considerable uncertainty surrounding remediation of Wastebeds 1-8 which abut Operable Unit 2.

4. Uncorrected injuries to the environment must be addressed under Natural Resources Damage Assessment (NRDA).

Comment 1. The existing data are inadequate to support the Proposed Plan.

A central feature of Alternative 3, which is the selected (“preferred”) alternative, is the division of Ninemile Creek Reach AB into two segments; the lower 1,600 ft (500m) and upper 1,100 ft (340m). This division is based on the presence of “a natural formation of uncontaminated marl.” The marl layer is supposed to exist in the lower 1,600 ft., ending at or near Station 19+00. The marl layer is said to be only 1-2 feet below the sediment surface, so that only the top layer of sediments need to be removed. However the data underlying this demarcation are sketchy at best.

Data presented in the RI Report (TAMS and YEC, 2003), and in the Proposed Plan, show that sediment cores were collected at the following stations (sediment transect number):

- 11+00 (TN-2)
- 19+00 (TN-3)
- 24+00 (TN-4)

Thus, there is a gap of ~800 ft between TN-2 and TN-3, and a gap of ~500 ft between TN-3 and TN-4. Marl was found at TN-2 and TN-3, but not at TN-4. At TN-4, as well as upstream sites there are extensive deposits of Solvay waste. Due to the large gaps between the transects, there is considerable uncertainty about the marl layer. Furthermore, the presence or absence of the marl layer does not necessarily mean that the contamination ends there. See Comment #2.

In contrast, maps shown in the WorkPlan for Wastebeds 1-8 show the marl layer extending under all of Reach AB, which contradicts the assumption that the marl layer ends at station 19+00.

Comment 2. There is far too much emphasis being placed on mercury as a measure of cleanup. Other chemicals of concern, including lead, arsenic, hexachlorobenzene, phenol, PCBs, PAHs, and polychlorinated dioxins and furans must be monitored.

The Proposed Plan (p.66, Footnote 10) notes that

“A Pre-Design Investigation (PDI) will be performed to gather additional channel sediment data from Reach AB. The data will be reviewed during design to determine the appropriate depth of sediment removal. This will include an evaluation of the vertical and areal distribution of *mercury*, potential post-removal residual concentrations, the potential thickness and type of backfill materials...”

There is no mention of collecting data for other contaminants. This presupposes that other contaminants follow the same contamination pattern as mercury—that when mercury is

removed, everything else will be removed as well. However, the data, limited as they are, clearly indicate that this is NOT the case.

Attached to these comments (Appendix A) are a collection of figures taken from Appendix K of the Remedial Investigation Report (TAMS and YEC, 2003). These figures show the vertical patterns of contamination in sediment cores taken from Reach AB. The first five figures show the distribution of mercury in cores from transects TN-1 through TN-5. These show that, by removing the top ~60-75 cm of sediments in Reach AB, one will very effectively reduce mercury concentrations.

However, other contaminants do not show the same pattern of concentration versus depth. For example, hexachlorobenzene (Figure 6) reaches a maximum concentration of ~500 ug/kg in core TN5-1 a depth of 75-105 cm. This pattern is *completely different* from the pattern observed for mercury. Other contaminants, namely arsenic (Figures 7 and 8) and iron (Figures 9 and 10) also display patterns which are very dissimilar to that of mercury. Note also that arsenic occurs in excess of the Severe Effects Level (33 mg/kg) identified as causing toxicity to benthic life.

These patterns demonstrate that Honeywell, with the oversight of NYSDEC and USEPA, must undertake the PDI and demonstrate cleanup objectives for contaminants in addition to mercury. Hexachlorobenzene is of particular concern, because it is highly bioaccumulative, toxic, and have been identified, along with mercury and PCBs, as a persistent toxic substance slated for “virtual elimination” in the Great Lakes (International Joint Commission, 1992, and many later reports).

As noted in our previous comments:

“Hexachlorobenzene (HCB) occurs at alarmingly high concentrations in the sediments of both Geddes Brook and Ninemile Creek. HCB is above the wildlife bioaccumulation criteria of 252 µg/kg in many cores, especially at depths greater than 75 cm (see Figure 5-10, GB/NMC RI; TAMS, July 2003).” Referring to data pertaining to Operable Unit 1, we stated: *“The human health criterion of 3.15 µg/kg is exceeded in every sample, at all depths. ASLF recommends that HCB be used, in addition to mercury, as a primary indicator of whether portions of the site are adequately cleaned up.”*

Comment 3. The schedule for a decision on the remediation of Operable Unit 2 appears to be rushed.

When the plan for Operable Unit 1 were released in November 2008, and discussed at a public meeting in December, it was stated that the plan for Operable Unit 2 would be contingent on a decision, or at least a better understanding of, the contamination issues associated with Wastebeds 1- 8. The Remedial Investigation for Wastebeds 1 – 8 has yet to be made public, nor has a Feasibility Study been produced. Obviously no plan of action has been proposed for these Wastebeds. The rush to produce a Plan, and thereby a ROD, for OU2 appears to be due to Onondaga County’s desire to construct a recreational trail across Ninemile Creek and onto the Wastebeds. This is not appropriate, given that there are significant amount of benzene, toluene,

xylenes (BTEX) as well as phenol contained in the wastebeds. These contaminants are mobile, and may already be leaching into Ninemile Creek.

Comment 4. Uncorrected injuries to the environment must be addressed under Natural Resources Damage Assessment (NRDA).

The State and USEPA must recognize that this remediation effort will not correct many injuries inflicted on Geddes Brook and Ninemile Creek. In particular, meanders that were destroyed due to construction of Wastebeds 1-8, followed by Wastebeds 9-11, will not be restored under this proposed Remedy. While ASLF applauds the creation of habitat along Geddes Brook, this does not compensate for the loss of significant wetlands and stream sinuosity in Ninemile Creek. This loss should be compensated through the NRDA.

Appendix A. Contamination Patterns Observed in Sediments within Reach AB

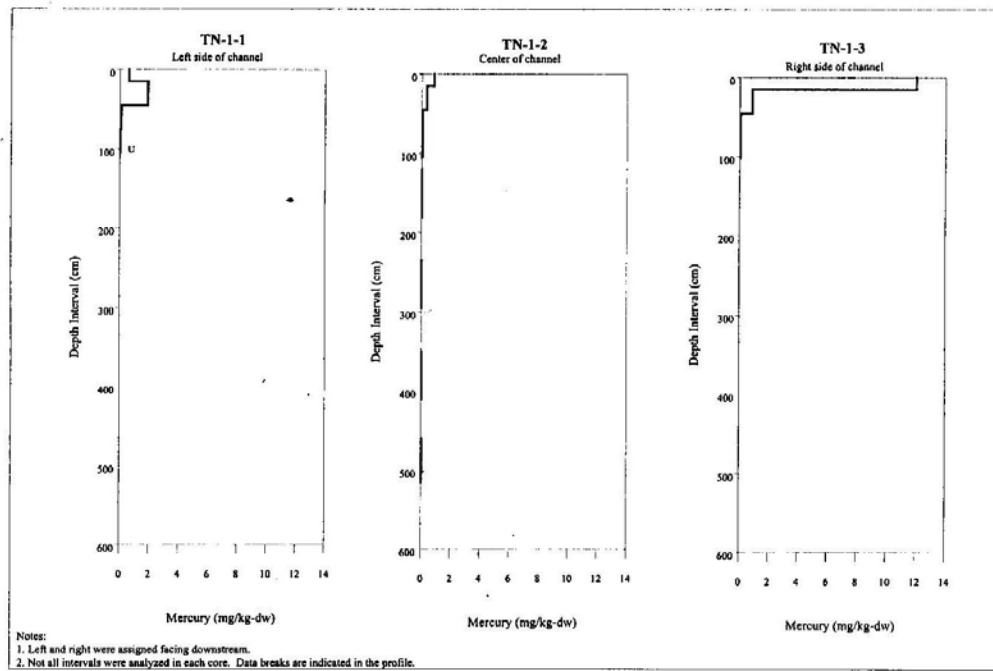


Figure K1-28
Mercury in Lower Ninemile Creek Sediment Transect TN-1 (2001)

TAMS

Figure 1. Mercury, transect TN-1

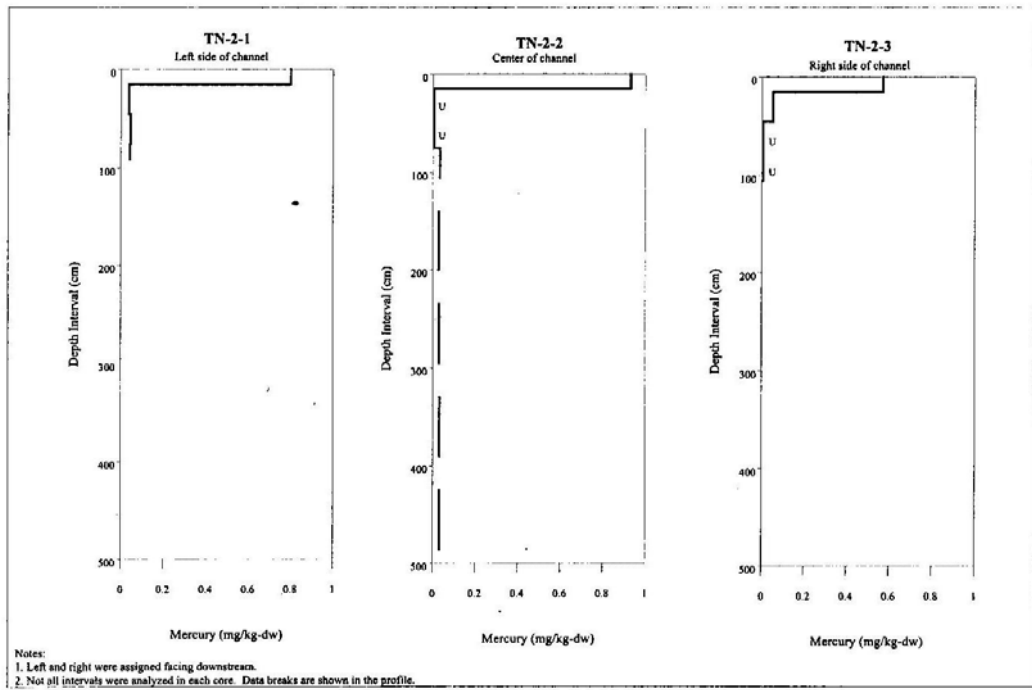


Figure K1-27
Mercury in Lower Ninemile Creek Sediment Transect TN-2 (2001)

TAMS

Figure 2. Mercury, transect TN-2

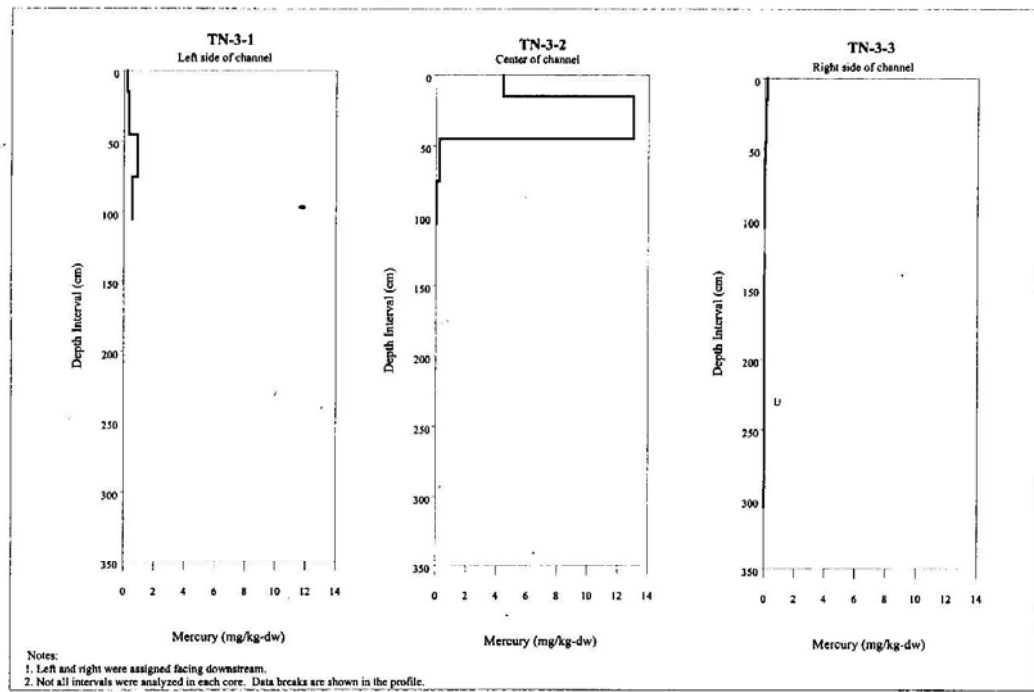


Figure K1-26
Mercury in Lower Ninemile Creek Sediment Transect TN-3 (2001)

TAMS

Figure 3. Mercury, transect TN-3

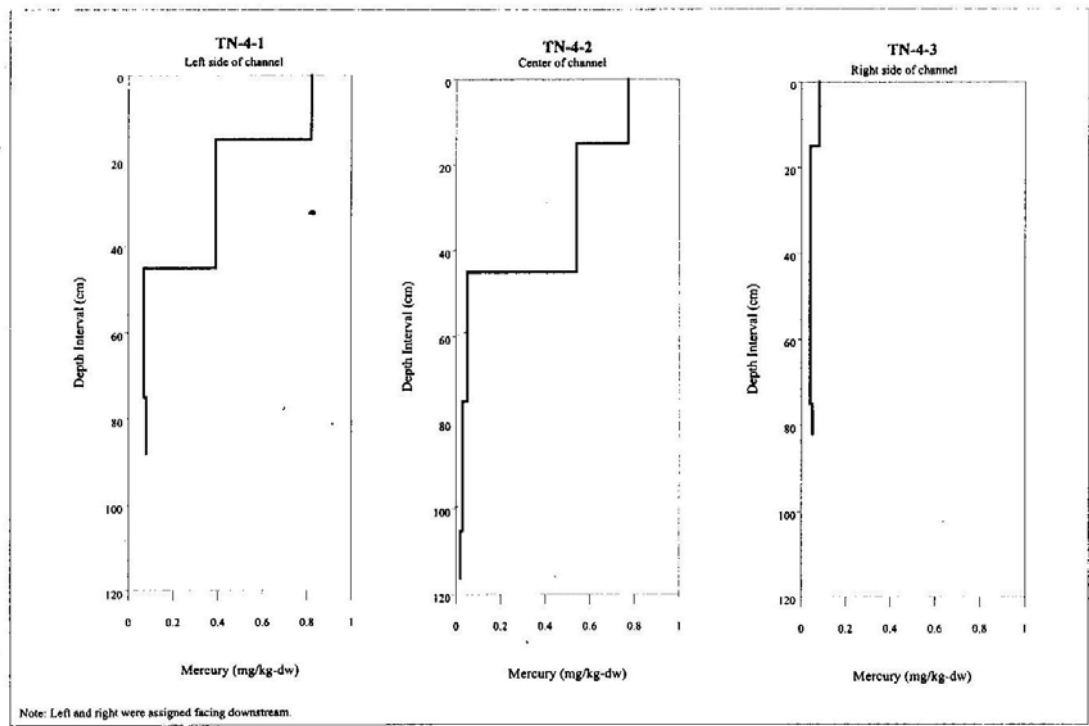


Figure K1-25
Mercury in Lower Ninemile Creek Sediment Transect TN-4 (2001)

TAMS

Figure 4. Mercury, transect TN-4

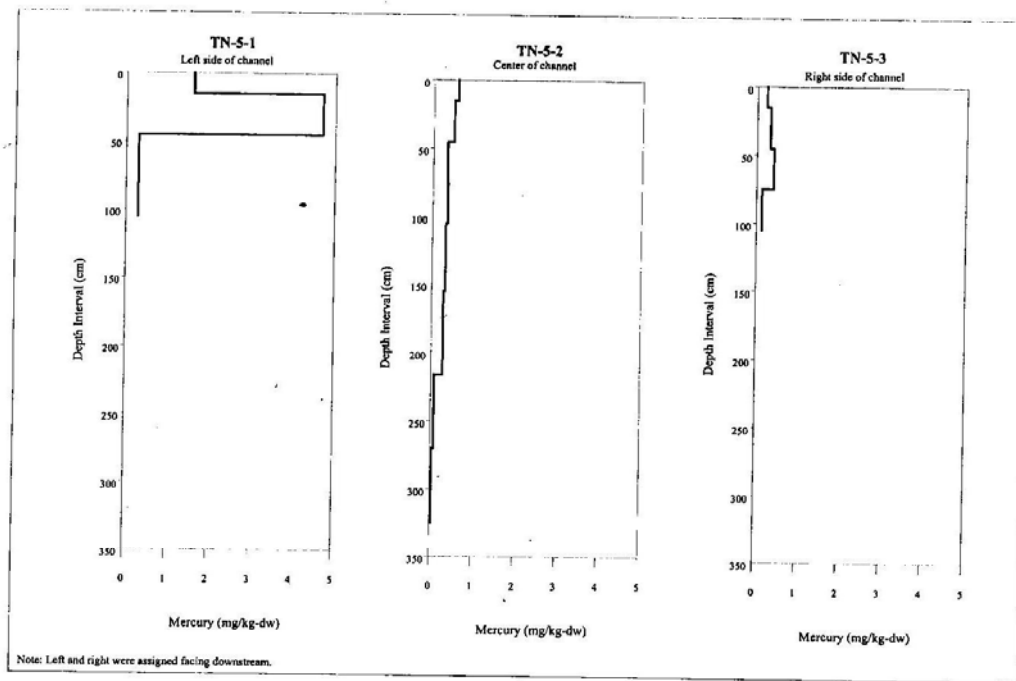


Figure K1-24
Mercury in Lower Ninemile Creek Sediment Transect TN-5 (2001)

TAMS

Figure 5. Mercury, transect TN-5

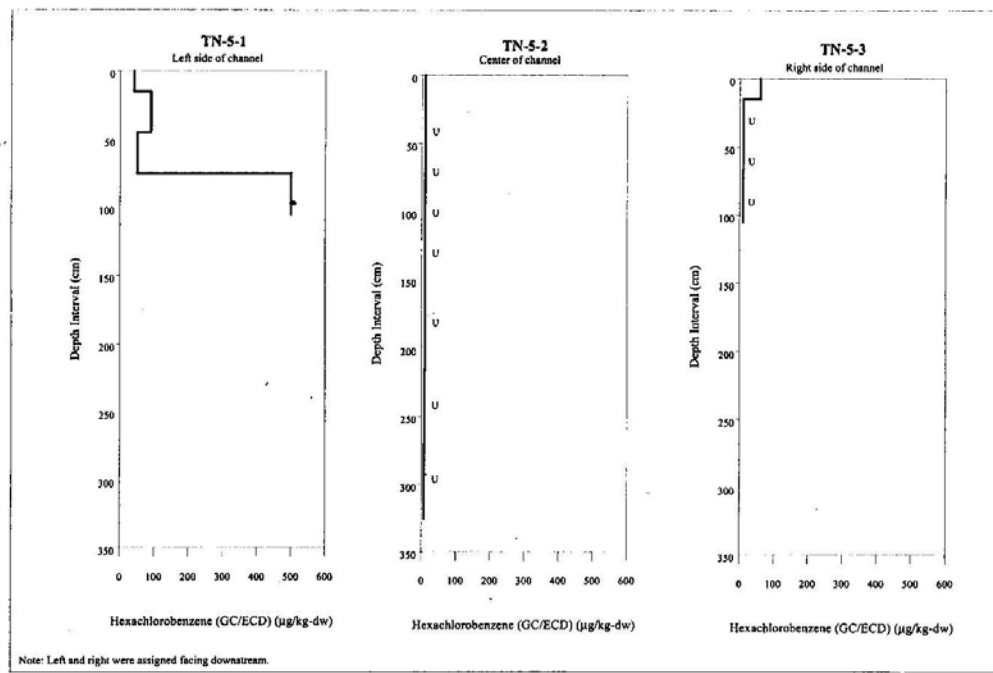


Figure K16-16
Hexachlorobenzene (ECD) in Lower Ninemile Creek Sediment Transect TN-5 (2001)

TAMS

Figure 6. Hexachlorobenzene, transect TN-5

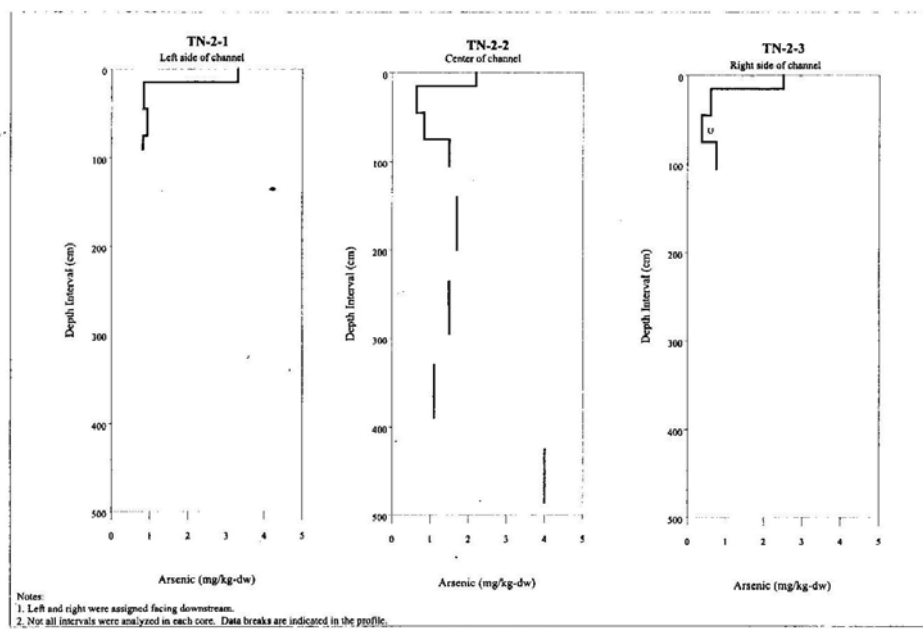


Figure K4-18
 Arsenic in Lower Ninemile Creek Sediment Transect TN-2 (2001)

TAMS

Figure 7. Arsenic, Transect TN-2

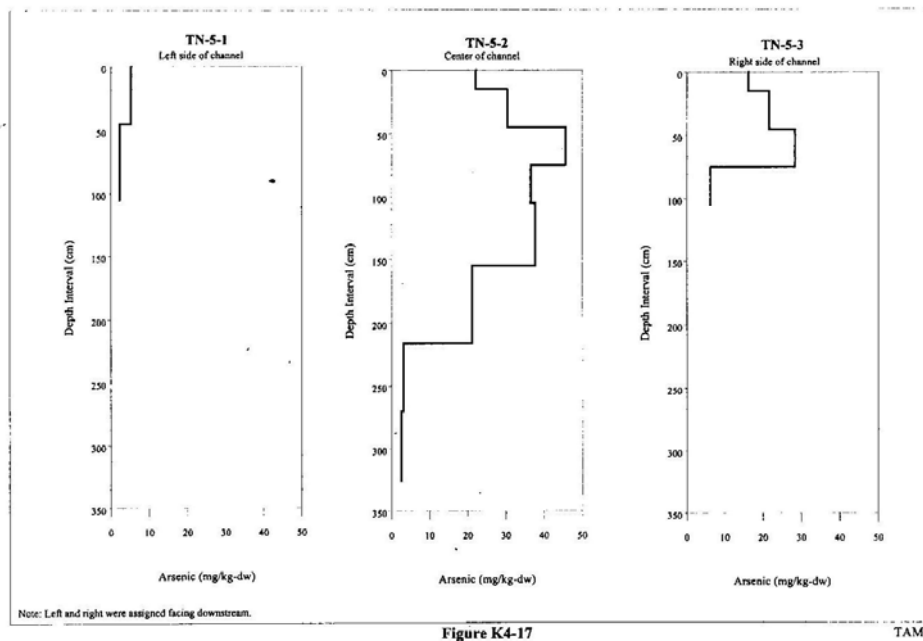


Figure 8. Arsenic, Transect TN-5

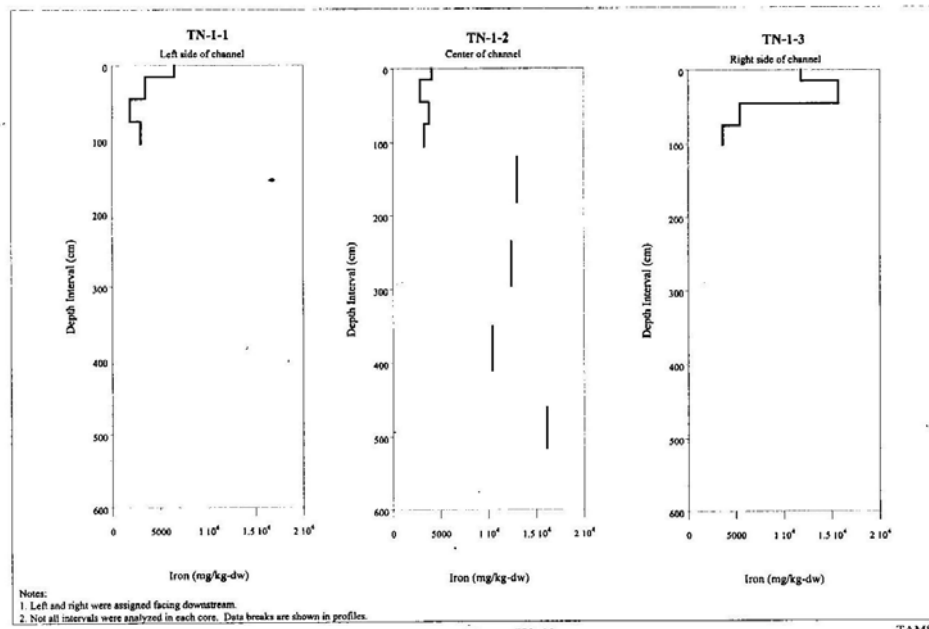


Figure K8-19
Iron in Lower Ninemile Creek Sediment Transect TN-1 (2001)

TAMS

Figure 9. Iron, Transect TN-1



June 24, 2009

Timothy Larson

Geddes Brook/ Ninemile Creek Site- Public Comments

New York State Department of Environmental Conservation

625 Broadway, 12th Floor

Albany, NY 12233-7016

RE: GEDDES BROOK/NINEMILE CREEK OPERABLE UNIT 2

Citizens Campaign for the Environment (CCE) is an 80,000 member non-profit, non-partisan environmental advocacy organization that works to empower communities and advocate solutions that protect public health and the natural environment. CCE has 4,000 members in Onondaga County and continues to educate our members on the progress of the overall Onondaga Lake clean-up.

CCE commends the New York State Department of Environmental Conservation (DEC) for moving forward with upland remediation and creating actionable plans that provide clear remediation efforts for the overall remediation of Onondaga Lake. In general, CCE supports the clean-up plan proposed by the DEC and Honeywell for Geddes Brook/Ninemile Creek Operable Unit 2. CCE offers the following specific comments in relation to the clean-up and methods for communicating those plans/results to the public.

1. **WASTE DISPOSAL**- Assuming that the LCP site has the capacity to safely store dredge materials over the long term, CCE supports the dredge/waste materials being stored at the LCP site or Wastebed 13, for the express purpose of continuing to hold Honeywell accountable for the contamination of those materials. To adequately address public concern over the storage and long-term control of those materials CCE recommends regular testing and reporting of the areas around the deposited dredge materials and installing a liner to alleviate these concerns.
2. **WASTEBED REMEDIATION**- CCE is pleased that the proposed plan for Geddes Brook/Ninemile Creek OU2 addresses contamination from the wastebeds. CCE looks forward to the proposed plan for remediation of those wastebeds. CCE also fully expects that plans and monitoring regarding the wastebeds will be shared with the Citizen Participation Working Group.
3. **CITIZEN PARTICIPATION WORKING GROUP**- CCE *again* strongly recommends that remediation of Geddes Brook/Ninemile Creek and any other additional upland remediation including but not limited to wastebeds and tributaries be subject to participation and review of the Citizen Participation Working Group.

While CCE understands the expediency related to dividing these projects into operable units, it does not change the fact that the reason these sites are being remediated is from the contamination associated with Onondaga Lake. While in the minds of DEC, engineers, and the responsible party these are clearly defined different projects- they all impact the state of the Lake and should therefore be included in the transparency and public review of the Citizen Participation Working Group.

4. **DESIGN PHASE PUBLIC COMMENT**- The design phase for remediation of Geddes Brook/Ninemile Creek Operable Units 1 and 2 will include critical planning in relation to waste disposal, water treatment, new infrastructure, habitat disturbances, and dredging methods. These plans are without a doubt directly related to Onondaga Lake bottom clean-up, tributary remediation, and wastebed remediation. It is imperative that the DEC provide public comment periods, public hearings, and a full and robust explanation of WHY these plans were chosen and the alternatives, in a clear and publicly accessible manner. The citizens of Onondaga County must be engaged on these essential design plans, that the citizens will be forced to live with over the short and long term.
5. **WEB-BASED REPOSITORY**- CCE also recommends, for the purposes of consistency and ease of communication, that Honeywell and the DEC construct a comprehensive web-based document repository. Records of Decision, proposed plans, and final decisions should all be posted- from Onondaga Lake bottom remediation to Geddes Brook/Ninemile Creek to the West Flume project. These documents should be housed with project updates and deadlines for public comment. As this comprehensive clean-up plan moves forward it is imperative that the DEC provides a clear overall picture of the projects that are impacting the health of Onondaga Lake and provide a clearer understanding of the reason why smaller projects are being done before the larger project of Lake bottom clean-up.
6. **SIGNAGE**- CCE recommends that signage be placed along and near all project sites including but not limited to the Geddes Brook/Ninemile Creek projects and the Onondaga Lake shore. Again, this will solidify the whole of the actions and incorporate all the work being done in the area to clean-up Onondaga Lake, as all these are connected to the full health and restoration of the Lake.

Thank you for your thoughtful consideration of CCE's' comments,

Best Regards,

Sarah Eckel
CNY Program Coordinator

cc: Adrienne Esposito, Executive Director
Dereth Glance, Executive Program Director

From: derf mil <derfmil@yahoo.com>
To: <tjlarson@gw.dec.state.ny.us>
Date: 7/2/2009 6:50 PM
Subject: GB/NMC OU2 PP Comments

Nine Mile Creek Conservation Council, Inc.
P.O. Box 2501
Liverpool, NY 13089-2501
www.ninemileccc.org

Responses on matter to:

Fred Miller, President
7730 Apricot Lane
Liverpool, NY 13090
315-622-9400

July 2, 2009

Mr. Timothy Larson, PE
Project Manager
N.Y. State Department of Environmental Conservation
625 Broadway
12th Floor
Albany, NY 12233-7013
518-402-9789
tjlarson@gw.dec.state.ny.us

Re: Public Comment Submission to NYSDEC re: Comments Operable
Unit-2 of the
Geddes Brook-Nine Mile Creek Site, Onondaga County, NY.
(GB/NMC OU-2 PP Comments), Proposed Plan dated 5/18/09.

Dear Mr. Larson:

The Nine Mile Creek Conservation Council, Inc. (NMCCC) is a river conservation group serving Nine Mile Creek and associated tributaries. The

organization is involved with a variety of river and watershed conservation and protection issues within our watershed.

On June 11th, 2009 the NMCCC attended the DEC and EPA public meeting at the New York State Fairgrounds. Prior to that NMCCC attended a public information meeting on June 2, 2009 provided by Honeywell at their offices regarding OU-2.

We support the clean up but hold several concerns:

A) The data indicates groundwater mounding under Wastebeds 1-8. The gravel along the old 9 Mile creekbed could provide a convenient conduit for contaminated groundwater to flow south back into the creek post remediation resulting in recontaminating the sediments along the river. We have concerns that Solvay waste and related chemicals that were co-disposed/co-mingled (e.g., benzene, toluene, PAH's) in Wastebed 1-8 can migrate into 9 Mile Creek through groundwater movements or erosion. More analysis on this situation needs to be considered.

B) The marl layer is being utilized as a depth marker for excavation. The river was previously dredged. Thus the marl layer is only present near the lake and not further up-river. This issue needs to be given more thought with regard to obtaining the most effective excavation depths for maximal removal of contaminants.

C) The discussion comparing Alternative 3 (the preferred alternative in plan) with Alternative 4 includes the thought that long-term monitoring will ensure that Alternative 3 provides the same level of protection as Alternative 4. In our experience, long term monitoring is ineffective. It is important to get the remediation correct the first time and avoid revisiting to correct actions at a later date.

D) The plan presented two options for the disposal of contaminated material at either the LCP site or Wastebed 13. The LCP site is not properly designed to accept contaminated materials. The NMCCC stated our position in our OU-1 letter of comment submission: "LCP is an unlined site and former industrial chemical plant. We have concerns with adding more contaminants to this already contaminated site and the pumping of ground water forever. Based upon monitoring various clean up proposals over the years we think Wastebed 13 to be a superior site with added engineering improvements and provides a more sensible selection for the GB-NMC waste". With proper controls to ensure that contaminated effluents do not reach Nine Mile Creek through the gravel deposits that underlie Wastebed 13 this is the better selection.

E) We have concerns about the removal of the established forested wetlands along the northwest side of the river as part of the clean up plan. It

appears that much of the mercury contamination in this area is the result of sediment deposition during flood events. It may not pose much of a threat if left undisturbed. More thought is needed whether to completely remove the trees, only partially or not at all. If completely removed it will take 50 plus years to reach maturity. We believe more thought on the solution for this area is in order.

F) The lower remediation area is owned by Onondaga County (Parks). The general community perception is this area is owned by Honeywell which is not the case. We see no evidence of a binding agreement for the long term which will protect the forest-wetlands in perpetuity against being converted into intensive recreational use (e.g., ballfields, etc.). If the area is to be a wildlife habitat refuge it must not be fragmented and developed. This is a relatively small area. The area should remain whole and not broken into non-contiguous segments by trails, roads, etc., as it will then not serve the purpose of a wildlife habitat refuge into the decades ahead. Clear language to that effect must be implemented into an agreement protecting the area into the decades ahead with certainty.

G) We would like to see as thick a riparian buffer implemented along the 690 highway and up river under the highway bridges. We understand there are various N.Y. State Department of Transportation requirements for highway and bridge maintenance. With the large scope of the Nine Mile Creek remediation process all parties should look towards implementing some new concepts and ideas to obtain a significant riparian buffer in this area.

We appreciate DEC holding the public session on June 11, 2009. NMCCC looks forward to continuing involvement in the process.
Submitted for NMCCC from compiled comments and data.

Sincerely,
Fred Miller, President NMCCC

James A. Corbett
Onondaga County Legislator
133 Blackstone Way
Syracuse, New York 13219
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E-mail: jcorbet7@twcnny.rr.com

June 10, 2009

Because of a previous commitment I will not be able to attend the public meeting and speak on the next phase of Nine Mile Creek's cleanup. Please accept the following as my comments.

** The lake cleanup continues to be one of the most important projects in Central New York. I am pleased to hear progress is continuing to be made on the tributaries into Onondaga Lake and the upland sites, primarily in Geddes which is part of my legislative district. The cleanup of these uplands is the key that will allow lake dredging to begin in 2012.

** As our Onondaga County Legislative representative to the DEC Region 7 Fish & Wildlife Management Board, I was happy to hear of the visit by DEC Commissioner Pete Grannis to fish Nine Mile Creek. Nine Mile Creek's reputation as one of the best trout streams in the state is well earned, both with local and stocked fish. I am encouraged to hear habitat enhancements will be taking place not only within Nine Mile Creek to support fish migrating from Onondaga Lake and upstream, but also other enhancements along the banks and in the wetlands to support diverse habitats throughout the area.

** An important consideration for this project is the ability for the County to extend the bike trail along the western shores of the lake and over Nine Mile Creek. With 1.5 million plus visitors enjoying Onondaga Lake Park each year, the ability to extend the trail will only enhance the recreational opportunities for visitors and increase the access to the trail for residents on the western side of the lake. As Chairman of the Environmental Protection Committee I am pleased to hear the County, DEC and Honeywell are working together to address any environmental issues necessary to ensure safety to the public and are moving forward to make this happen.

Thank you,

Jim Corbett

PARSONS ENGINEERING OF NEW YORK

NYSDEC/EPA Public Meeting

June 11, 2009

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[START BR_012.MP3]

MS. DIANE CARLTON: Let's get started so we can get you out in a reasonable period before the next thunderstorm rolls through.

I'd like to welcome everyone to our meeting on the Nine Mile Creek Geddes Operable Unit Two. We are going to be discussing the proposed remedy for the site. We'll have a short PowerPoint presentation that Tim Larson from our DEC office in Albany will be making.

I'm Diane Carlton with the DEC here in Syracuse, for those of you that don't know me. Following Tim's presentation, those of you that filled out the official comment cards, we will call you based on how you registered. First registration will be called up first. When we get through those, if there's anybody else that has additional comments that they'd like to make, certainly that's

possible, and then maybe we can take some informal questions and answers 'cause we don't have a real big group here.

So I'm going to turn it over to Tim Larson. He's an engineer with our office in Albany, and he's the project manager on the site. Tim?

MR. TIM LARSON: Thank you, Diane, and thank you, everybody, for coming out on this less-than-desirable, I guess, weather we have out there. But at least it's not snow or ice so I guess that's pretty good.

As Diane said I'm going to be walking through a presentation, relatively brief presentation as far as the topic of discussion tonight. And that's Geddes Brook Nine Mile Creek Operable Unit 2. And once I get through the presentation, we will basically entertain any kind of statements that individuals would like to make, or any kind of questions.

And I do have--I believe I have sufficient number of handouts, as far as the slides go. So if somebody didn't get a copy of the slides and would like one, it's on the table by the front door. I guess with that having been said, we'll get started.

Now, what I'm going to do is basically start kind of out large and then kind of zoom in on the actual site itself. Here's Onondaga Lake. And there's various subsites. Basically, the umbrella to everything falls under, as far as these various sites go, is the Onondaga Lake NPL site. And there's various subsites associated with this NPL site. You have GM Ley Creek PCB Dredgings, GM IFG Fisher Guide. You have basically Town of Salina landfill, Wastebed B Harbor Brook. You have Willis Avenue, Semmit Residue Ponds. You basically have the LCP Bridge Street site, Geddes Brook Nine Mile Creek and the

lake itself.

Next slide, please.

And like I said, kind of zooming in a little bit more. And we do have a larger poster board here. I realize in your handouts, this particular slide is difficult to see, but like I said, we do have a poster board over there, if you'd like to take a look at it after the presentation.

And the main point of this is it shows kind of the orientation of the various tributaries that are going to be the focus of discussion. Basically, I guess we can move from the lake upstream. We have Nine Mile Creek here and then basically it continues up above where Geddes Brook intersects it and you have basically Geddes Brook here and then you have the West Flume leading to Bridge Street. Bridge Street was a source of contamination to the West Flume to Geddes

Brook and to Nine Mile Creek. And this also basically shows various Solvay wastebeds. In particular, Wastebed 13 is an area I'll be talking about a little bit later in the presentation. And that's one of two possible locations for the material, soil and sediments to be brought to--from the remediation of Geddes Brook Nine Mile Creek.

Next, please.

We have Geddes Brook and then basically, once again, Nine Mile Creek. And there's an adjacent site, Wastebeds 1 through 8. And historically, there was questions as far as what the remediation of Wastebeds 1 through 8 would be. And that issue led us to actually breaking up Nine Mile Creek into two operable units, with Operable Unit 1 including Geddes Brook, and the focus of discussion tonight, Operable Unit 2, which is this location right here.

Briefly, before I get into a discussion of Operable Unit 2, I wanted to kind of rewind a little bit on Operable Unit 1. And we were here on December 10th for a similar public meeting, similar to the meeting we have tonight. And the focus of that discussion was Operable Unit 1. And during that public meeting, we presented the proposed plan for Operable Unit 1.

Since that public meeting, the public comment period closed on the proposed plan for OU1 and also for the response action associated with the Geddes Brook IRM. And on April 29th, the Geddes Brook IRM response action document was finalized and also the proposed plan, taking into account public comment, was finalized and became the record of decision for Operable Unit 1. And that also was finalized on April 29th.

And with respect to the

alternatives that were ultimately selected in those two decision documents, they were consistent with the proposed alternatives that were in the document. So disposal at Bridge Street was selected for Geddes Brook, and the alternative that we presented on, you know, back in December was the alternative three one that was actually carried forward into the ROD for OU1.

Now, the next three topics I'd like to talk about are the remedial investigation. Where we basically investigate soil, sediment, surface water associated with a particular site for various parameters, collect information, then we go through an ecological risk assessment and a human health risk assessment.

Once we basically compile that information, we go into the feasibility study where we basically evaluate various

remedial alternatives and then we actually generate our proposed plan, which discusses the various alternatives, along with our preferred remedial alternative.

Next, please.

The Geddes Brook remedial investigation--and this work was done, for the most part, consistent to a point where it included Operable Unit 1 and Operable Unit 2. And basically, it was initiated in 1998 and continued through 2002. And as I said previously, samples were analyzed for sediment, surface water, floodplain soils and fish as well.

The most prevalent contaminant we found was mercury. Other contaminants we found included arsenic, lead, PAHs, PCBs, hexachlorobenzene and phenol. And as I said, ecological risk was done, and a human health risk assessment was done. And based on the outcome of those risk assessments, it was determined that

unacceptable risks were identified to both humans and wildlife.

Next, please.

The next three slides are very difficult to see, I realize that. But hopefully, for the most part, you can see colors. And red basically is the highest concentration, and these dot plots are for mercury, and this particular one is 0 to 1 foot. And as we go down, the lower we get, we want to basically see the blue and the purples. That was basically are approaching, or at, background or, in essence, very, very low levels.

So as we basically move through the slide, you can see where we have some locations that obviously aren't, you know, the blue, the purple, like I talked about, there's actually a red location there. If you can move to the next one Diane. This is 1 to 2 feet.

And as we basically go through

these, you can see the colors are basically moving away, for the most part, not in every location, but for the most part, they're moving away from the highest concentrations to the lower concentrations. And then once we get from 0 to 1, 1 to 2--and then next slide Diane, please--2 to 3, there's very many locations that are basically down where we're talking about, the blues and the purples, which are--the purples, I think, are .15. PPM for mercury, which, once again, is a concentration where we're getting down background upstream concentrations.

Now, the areas I'm going to be talking about are basically the channel and the floodplain area we have here, and we also have floodplain here. We do have some contamination in the floodplain soils as well. And we'll get into a discussion as far as how we're going to rectify that

contamination in a moment or two. If we can move on, Diane.

So as I said, we basically did the remedial investigation and basically did the risk assessments. And once we had that information in hand, we got into the feasibility study where we actually looked at various remedial alternatives. And we had a feasibility study that was generated back in 2005 that included both Operable Unit 1 and Operable Unit 2.

There was various questions we had, associated with the alternatives that were evaluated. And we spent time between then and the initiation of the supplemental feasibility study in May 2009, collecting some additional data, as I said, breaking the site up into two operable units, getting a better handle on remedial boundaries. We evaluated new remedial alternatives. And Operable Unit 2 also included additional samples that

were collected post-RI, up through 2008.

So we had the initial 2005 feasibility study. It was supplemented with additional information in the 2009 supplemental feasibility study, May 2009, had the various alternatives that we evaluated in the proposed plan, including our preferred alternative.

Next, please.

As part of the feasibility study, there's various criteria that are evaluated to ultimately determine what the most appropriate alternative is. And these various alternatives--or I'm sorry, these various criteria are basically listed on this particular slide where we have overall protection of human health and the environment, compliance with applicable or relevant and appropriate requirements, ARARs. Long-term effectiveness and permanence. That's basically how long--do we have a level of

comfort that the remedy will actually be in place and perform as it's intended? Reduction of toxicity, mobility or volume through treatment. Short-term effectiveness, any issues we basically have kind of near-term rather than long-term, associated with implementing the various remedial alternatives. Ease of implementation, once again, relatively self-explanatory, I believe. Cost. Support agency acceptance. And the one where basically the purpose of being here tonight is community acceptance, to basically present these various alternatives and hear what you basically have as far as comments and your thoughts associated with the various alternatives, including our preferred alternative.

Next, please.

With respect to the disposal of material from Operable Unit 2--and that includes sediment and floodplain soil as

well, there's two options that were evaluated. Option A, which is consolidation at Honeywell's containment system at the LCP Bridge Street site. Or the other option is the sediment containment area to be constructed on Wastebed 13. Option B was disposal of contaminated sediments at an off-site permitted landfill in Rochester. And I have a slide that's coming up--actually, a couple slides. Actually, it shows the two locations.

The preferred disposal option is Option A, with material going to the LCP Bridge Street site or to the SCA to be constructed at Wastebed 13. The material being disposed of at either of these two locations, these two locations, the technology's proven and reliable, and we feel that both of these locations will be protective of human health and the environment.

Next, please. Next one.

And this shows the two possible locations. Once again, we got Nine Mile Creek here, and here is Geddes Brook. LCP Bridge Street, the facility has actually been constructed, has a temporary cover on top of it, and is awaiting the potential for material being disposed of from Geddes Brook and/or Nine Mile Creek. The other disposal location that is being considered and will be evaluated in the remedial design will be the sediment containment area that will be located up on Wastebed 13. And that location of Wastebed 13 was something that was previously presented to the public. We got comment on that, and the decision of the SCA being located at Wastebed 13 is a decision also that has been made.

Next, Diane.

Here's a brief overview--and I'm going to get into more detail as far as

the four alternatives that were considered in the proposed plan. The first alternative--and we're required to basically only include this as a point of comparison--is no-action alternative.

Alternative two is partial removal of mercury to a number of 1.3 PPM and other significant contaminants. And these other significant contaminants are the contaminants that I identified earlier on this slide that were identified in the remedial investigation they include arsenic, lead, PAHs, PCBs, hexachlorobenzene and phenol. So that's what's being referred to when you talk about other significant contaminants.

Alternative three, which is our preferred alternative, is removal based on limits defined by physical features and to various depths. And I'm going to get into a discussion on this in greater detail in a moment.

Alternative four is basically as near to complete removal as possible to a mercury number of .15. And once again, the .15 number is basically approaching background upstream concentrations and also remediating the other significant contaminants as well.

First alternative, no-action alternative. Once again, it's a baseline for comparison purposes. There's no material being removed, there's no cost, and there's no construction time. So this is basically literally doing nothing for this alternative. Next, please.

Alternative two, partial removal of mercury to 1.3 and other significant contaminants. This consists of dredging excavating material, 23,000 cubic yards, area remediated, 10.8. Capital cost, annual O&M, present worth. Total present worth cost, 9.9 million for this. And anticipated construction time for this

alternative would be a year.

Next, please.

Alternative two--I'm sorry--okay.

Yes. Alternative two basically shows what's being done. And there's a removal in the channel and the floodplains, primarily once again to the 1.3 PPM number. However, we do have clean-up numbers for the other significant contaminants as well, and they would basically be addressed in this alternative.

Next, please.

Alternative three, and this is the preferred alternative for both DEC and EPA. And this consists of dredging 58,000 cubic yards, a 15.5-acre remediated area. Capital cost, 15.1 million. Various other costs there. Total. Present worth cost, 16.5 million. Construction time of one year.

Next, please.

And this alternative is a removal alternative. And fortunately, the contamination that we have, we're seeing generally the top 2 to 3 feet within the channel. And unlike alternative--I'm sorry--Operable Unit 1, where part of the alternative included capping, we feel very confident that this particular alternative can be achieved, the objectives, by basically doing a removal without needing a cap. We are, as part of remedial design, going to go out and collect additional samples. We're going to be sampling for mercury. We're going to be sampling for the other parameters as well. And we do have a contingency that if we do see something unusual, there's an option of capping, as far as this alternative goes. But based on the information we have right now, I'm confident and actually hopeful that it will be a removal alternative without capping.

Alternative two is a removal to 1.3 PPM for mercury and other contaminants. Alternative four, which I'm going to get into in a second, is removal to .15, all right? This is a forested wetland we have right here. And actually, one of the poster boards we have up here very nicely shows the forested wetland. What we have is we have mature trees that exist in that location. So one thing we're looking at doing as part of alternative three is evaluating a portion of the forested wetland to determine, based on the concentrations if we can save some of these mature trees.

Alternative two and alternative four are, you know, primarily just going after blazing these trees to the ground in an effort to achieve the clean-up number. What we're looking to do is, once again, weigh the benefits of the mature trees against the contaminants we actually see.

And we're going to be doing additional work as part of the design to determine if, in fact, we can save some of those trees. We'll be doing additional sediment sampling. We may be doing, you know, additional types of samples. I'm not sure.

Evaluations of Indiana bat is an item that's basically coming up. It's a, I guess, endangered species or protected species that has been found around Onondaga Lake, and there's thought that possibly this might be a habitat location for at least part of the year. So, you know, once again, it's an aggressive alternative. We're looking at removing the material so basically we don't need a cap. We basically place some fill and then we put habitat material on top of it. And as part of this alternative, there's going to be diversity as far as the habitat goes, topography-wise, in the

channel, as well as the floodplains to try to basically improve the habitat from what it actually is right now.

This particular slide is a poster board over here, and I would encourage people to basically take a look at it after the presentation if they have not already. And it gets into more specifics as far as what's being done in the various locations. Some of you may have--may remember from the presentation that Operable Unit 1, there's some heavily-armored stone under Reach BC, which is kind of up here. We do have that armored stone as protection on 690 along this area as well. We're looking at basically moving the material on top of that armored stone, replacing it with clean material. Likewise, we're moving material on the floodplains, on the Wastebeds 1 through 8 side, replacing that with clean material, and the area of the forested wetland and

the two pieces of land that basically jut out here would be remediated and clean material would be placed there as well. So over the entire footprint of the site channel, as well as floodplain sediments, material would be removed and clean material would be placed back in there, suitable habitat material.

Next, please.

This is alternative four. And it consists of dredging approximately 70,000 cubic yards, 16.4 acres remediated area. Capital cost, 20 million. Present worth, total cost, 21.1 million. And construction time, approximately two years.

Next, please.

Similar to alternative two, as far as actually what's being done--not that they're the same alternative by any reach, alternative two was remediating to 1.3 PPM. This is going down to .15 PPM

for mercury and, once again, addressing the other contaminants identified, that we identified in the remedial investigation as well. We have clean-up numbers for those.

The one thing I do want to add, there's an area for alternative four right here in this area. And this is not forested wetland. It's called forested upland so it's not actually part of the wetland. And concentrations we had in here were, I think, you know, .2 PPM or less, generally around there. So that area is included in alternative four. It's not included in alternative three. And once again, based on the concentrations that we saw and the fact that we have mature trees in this location, for alternative three, we thought it was appropriate to basically keep the mature trees and not basically go after them based on the concentrations we

saw. However, since this alternative is actually cleaning up to .15, that actual additional area is included.

Next, please.

As I've said numerous times throughout the presentation, the preferred alternative is alternative three. Alternative three is the same overall protection, human health and the environment, compliance with state and federal regulations as alternative four. Represents less short-term risk, is more implementable, has a significantly lower cost. Capital costs--I'm sorry--present worth cost, 16.5 versus 21.1 million for alternative 4. And with respect to alternative one and two, alternative three is more protective of human health and the environment. So basically, alternative three, we feel gives you the same protection that alternative four. It's more protective than alternative one and

two. And alternative three is cheaper than--less expensive than alternative four. And that's the basis of why we thought it was the best alternative. And once again, the various criteria that I showed earlier in the presentation were evaluated to ultimately arrive at this decision of alternative three being the preferred alternative.

Next, please.

The public comment period associated with the proposed plan, the RI, the feasibility study and the risk assessments was already initiated. It's ongoing. And it's scheduled to conclude on July 3rd.

Once the public comment period is concluded, we'll be issuing a record of decision for Geddes Brook Nine Mile Creek, and that's scheduled for October 30th of this year. And the record of decision is where we actually select an alternative.

The record of decision also includes the transcript of this meeting tonight. It includes all the comments that we received during the public comment period. And we basically address all those comments as well. That information is included in the record of decision.

And after we generate the ROD, we actually get into design and we anticipate starting construction of the first part. Once again, as far as kind of moving upstream, downstream, we have Geddes Brook then we have Nine Mile Creek Operable Unit 1 and Operable Unit 2. So as far as moving upstream and downstream, Geddes Brook would be the first thing to be remediated, and we're anticipating that to begin in 2010.

And that basically concludes the presentation. Maybe, Diane, if you can do statements and then questions at this point in time. And maybe you can just put

up the next slide that shows people where they can send comments to, either via mail or email. And if people do want more information on this project, Geddes Brook Nine Mile Creek Operable Unit 2 or Operable Unit 1 or Onondaga Lake, you can track down information at this particular Web site, which is a DEC Web site.

And I guess, Diane, we're going to do statements first? Okay. All right.

I basically received a letter from James Corbett--is there correct?--Onondaga County legislator. And unfortunately, he was not able to attend tonight so he gave us some information that he would like us to read, and I'm going to do so at this point in time. It's not that lengthy. And it's dated June 10th, 2009.

Because of a previous commitment, I will not be able to attend the public meeting and speak on the next phase of

Nine Mile Creek's cleanup. Please accept the following as my comments.

First one. The lake cleanup continues to be one of the most important projects in Central New York. I am pleased to hear progress is continuing to be made on the tributaries into Onondaga Lake, in the upland sites, primarily in Geddes Brook, which is part of my legislative district. The cleanup of these uplands is the key that will allow lake dredging to begin in 2012.

Second comment. As our Onondaga County legislative representative to the DEC Region 7 Fish & Wildlife Management Board, I was happy to hear of the visit by DEC Commissioner Pete Grannis to fish Nine Mile Creek. Nine Mile Creek's reputation as one of the best trout streams in the state is well earned, both for local and stocked fish. I'm encouraged to hear habitat enhancements will be taking place

not only within Nine Mile Creek to support fish migrating from Onondaga Lake and upstream, but also other enhancements along the banks and in the wetlands to support diverse habitats throughout the area.

Last comment. An important consideration for this project is the ability for the county to extend the bike trail along the western shores of the lake and over Nine Mile Creek. With 1.5 million-plus visitors enjoying Onondaga Lake Park each year, the ability to extend the trail will only enhance the recreational opportunities for visitors and increase the access to the trail for residents on the western side of the lake.

As Chairman of the Environmental Protection Committee, I am pleased to hear the county, DEC, and Honeywell are working together to address any environmental issues necessary to ensure safety to the

public and are moving forward to make this happen. Thank you. Jim Corbett.

Diane, we had some other ones as well?

All right. Looks like the first one we have up is Fred Miller, representing Nine Mile Creek Conservation Council. Fred? And actually, Diane, we have a mic right behind the laptop there.

MR. DON HUGHES: [Off mic]

MR. TIM LARSON: Absolutely.

Yeah. Don, what we're doing, we're doing statements first, not questions and answers. We're going to get through that and then we're going to do questions and answers, similar to what we did last time, for the last public meeting. Yes, Fred?

MR. FRED MILLER: [Off mic]

MR. TIM LARSON: Here, Fred, I don't know if the mic's on. Here, the only--here - -.

FEMALE VOICE: There we go.

Don't touch the buttons.

MR. FRED MILLER: We--the Nine Mile Creek Conservation Council Board attended the Honeywell public information meeting at their offices last week. And one of the things that at least I came away with was that I got--I think some of the other members of the board, trying to get a visual representation of what the final riparian zone will look like. And thinking of a computer-generated graphic of a progression over 5, 10, 15, 20 years out. For those of us who are used to looking at development plans and engineering plans, it's self-explanatory. I think for the average person who doesn't deal with that on a consistent basis, it might not be as representative to them in that type of plan form as it would be to us. We're familiar with it.

So we thought that we'd like to get a visualization and what does that

look like? How wide is the riparian zone, visually? We've seen the--some of the photographs and enhanced photographs that are basic in some of the standard watercolor renditions, but we thought that might be an enhancing factor for the whole project if something like that could be done so that we could really get a hands-on approach to it.

Also underneath the highway, due to DOT restrictions on the maintenance and flood control, et cetera, we'd like to see something there in a more visual form to--that's--to put in that context to get a visual representation. I think it would help everybody in the area as well.

And also, we had one just concern that the remediation area, that's basically county park property, not Honeywell property. And one of the things that we were concerned about--I know it's an area of public policy that perhaps

Honeywell doesn't--or doesn't need to address, but for our own concerns is that we viewed this area as possibly being a legacy wetlands forest for the future, if left alone for 1 or 200 years, it would be a fabulous area. Since it's on county parks property, we had concerns of how it could be generated in the plan that would lend support that the area should be put into some type of conservationship or protection into the future so it doesn't fall victim to shortsighted planning at any of the county levels where turns into a soccer field, a baseball field that the futurists filled in or disturbed in any way 10, 20, 30 years away. The opportunity here for reforestation and remediation into the future is quite a valuable environmental asset around the lake, at least in terms of a view shed at this point.

MR. TIM LARSON: Okay.

MR. FRED MILLER: That's all I have to say, unless someone else from the Board has any comment. Thank you.

MR. TIM LARSON: Thank you, Fred. Let's see. Next one we had up was Sarah Eckel, Citizens Campaign for the Environment.

MS. SARAH ECKEL: My name's Sarah Eckel. I'm the Central New York Program Coordinator for Citizens Campaign for the Environment. CC is an 80,000-member, non-profit, non-partisan advocacy organization working throughout New York State.

And in general, CC supports the preferred cleanup alternative number three by the DEC for Geddes Brook Nine Mile Creek. However, CC believes the DEC should provide ample opportunity for public involvement in the design phase to the citizen participation working groups. CC understands that some of the most important decisions are going to be made

during the design phase, including waste disposal, water treatment, new infrastructure, habitat disturbances and dredging methods. And we know these issues and other issues along with them will impact the local community, and we want to make sure the design phase is transparent and accessible to the public.

We would like to, once again, recommend that there's educational signage placed around the public access points to Geddes Brook and Nine Mile Creek to educate the public on the cleanup progress, timelines, and to ensure issues associated with recreational use are well noted.

We'd like to thank the DEC for addressing the contamination coming from Wastebeds 1 through 8, and we look forward to the plan for cleaning those up as well. And thank you again for the opportunity to speak today.

MR. TIM LARSON: Thank you. Next we had up was Lindsay Speer.

MS. LINDSAY SPEER: My name I is Lindsay Speer. I'm a community organizer on behalf of the Onondaga Nation. I want to just state there we have - - consulting government to government with the DEC and so they're commenting during the public comment period. Tonight I'm making comments on my own behalf.

And in general, I'm glad to see that there is a fuller extent of remediation in this site than there was on the Onondaga Lake bottom. However, I am really concerned about the inadequate sampling that was done prior to coming up with the plans. Throughout most of the creek length, a lot of the sampling was only done 1 or 2 feet deep, and still, we're finding contamination. So we don't actually know what the depth of contamination actually is. And so it

concerns me that the plan is to then if they find more contamination then cap it. I would like to know more--I think there needs to be more information about what exists prior to plans actually being made.

And any contingency plan should actually be for removal instead of capping. Streams cannot have caps in them. Streams, by their own nature, remove the things that are in their way. And so I strongly am concerned that there is strong possibility of failure for caps in this creek.

I'm also very concerned about the timing of the plan. Right now, there is, you know, we have not heard about Wastebeds 1 through 8. We don't know what sort of contamination is there or getting into Geddes Brook Nine Mile Creek. And again, this comes into where there is inadequate testing. Only mercury was tested for a long--the majority of the

length near Wastebeds 1 through 8.

So I think that we need to--I'm very concerned that there's a timing gap, that Wastebeds 1 through 8 need to be looked at first.

I am also concerned about the continued channelization of Geddes Brook Nine Mile Creek. Obviously, 690 poses a problem in terms of where the creek would go to one side, but you do have a large area where the wastebeds currently are where the creek could then be remeandered if the wastebeds were removed and the land put back to its natural state.

I'm encouraged by the work to encourage diversity in the floodplains, the habitat, and structure available along the creek. I look forward to seeing those designs in more detail. And I would encourage that there be a full survey of the flora and fauna in the forested wetland prior to its destruction so that

we know exactly what is there and what needs to be replaced. Thank you.

MR. TIM LARSON: Thank you. Next up, we have--

MR. DON HUGHES: [interposing]
Don Hughes.

MR. TIM LARSON: --Don Hughes.

MR. DON HUGHES: Thank you.

Well, I'd actually like to echo a lot of the comments that you've just heard from Fred Miller, first off, that you folks at DEC really could make better use, I think, of Honeywell's resources. They have an army of consultants, PR people and so forth, as all these graphics around the room. Make that part of the talk. That would be helpful, I think.

And what Lindsay was just talking about in terms of the timing, we were just here in December, as you noted, Tim. And my understanding was that we were--the decision to segregate Nine Mile Creek into

Operable Unit 1 versus Operable Unit 2 was because of Wastebeds 1 through 8 having impact on the creek. And so I was rather surprised when this announcement came out that, low and behold, already we've got a plan for Operable Unit 2. And as far as I know, there's not a remedial investigation that's out for Wastebeds 1 through 8, much less a plan for Wastebeds 1 through 8.

So it seems to me that these two sites should be coordinated. Do Wastebeds 1 through 8 and section A -- Operable Unit 2, the lower section of Nine Mile, in conjunction with one another. The question is, what's--what is the rush here? There's plenty of work to do that Honeywell's got to do, just working on Operable Unit 1 on the lake and so forth.

There's a--I got a few other questions and--I'll give you the mic when I'm done. The--

MR. TIM LARSON: [interposing]

Well, Don, if you have questions, what we can do is we can just hold off on those.

MR. DON HUGHES: We can just talk. You've got a mic. How about that? Yes, okay. What is the schedule? You talked about the Geddes Brook IRM, but beyond that, what's the schedule for cleaning up this site?

MR. TIM LARSON: All right. Don, what I'd like to do is we can come back to that--and Lindsay, if you had questions too for me, that's fine. We can entertain those. What I'd like to do is get through--now, I think there was one other person basically who--

MR. DON HUGHES: [interposing]
Well, let me finish my statement then. If you don't want to get into a dialogue or questions then--

MR. TIM LARSON: [interposing]
No, I do, Don. It's just timing-wise. I'd prefer to do the statements now and

then we'll get into the questions in a minute. That's all.

MR. DON HUGHES: Okay. That's fine. One other thing to notice about this site is, if you look at the remedial investigation, the entire area is underlain by fine, coarse sand and gravel so any mobile contaminants are going to move. So that's something to keep in mind in designing the remediation.

I would take issue, fundamentally, with the--with putting LCP and the sediment containment area as being equals. They are not equals. The sediment containment area is a lined, properly-designed landfill. The LCP site is not. It's an abandoned, partially-remediated site, chemical manufacturing plant. It has no liner. It has a requirement to pump ground water in perpetuity. And I would encourage the DEC and the EPA to have all the contaminated

material put in the SCA, not in LCP.

I agree with what Lindsay said about the adequacy of the data. It's hard for me to understand how we can--that the agencies can put a fixed number for the cost of alternative four when there's--there really isn't a lot of sediment data. There's a lot of floodplain data, but the sediment data is--there's big gaps. There's hundreds of meters where there simply are no cores.

And my last comment is about--again, this is relevant to the comparison of the alternatives. Alternative four, as a cleanup objection of .15 parts per million. I take it that applies to both sediments and soils. And my comment on that is that the cleanup objective for sediments should be much more stringent than it is for soils because in sediments, you have the opportunity for bioaccumulation so--and that's really what

this is all about is to prevent mercury, hexachlorobenzene, dioxins, PCBs, et cetera from accumulating in fish.

Thank you.

MR. TIM LARSON: Thank you, Don.

And the last person we have as far as making a statement, Albert--is it Breezy?

FEMALE VOICE: - -.

MR. TIM LARSON: Okay. And Albert, who do you represent?

MR. ALBERT BREEZY: The Oswego County American Legion. I'm--

MR. TIM LARSON: [interposing]
Mic - -.

MR. ALBERT BREEZY: Oswego County American Legion. I am Chairman for the-- I'm an officer of the conservation-- whatever you want to call it.

MR. TIM LARSON: Okay. Thank you.

MR. ALBERT BREEZY: I was brought up on a large farm. I know a little bit

about this stuff. I went over to Korea, and you probably know what Korea was like. I know a little bit about environmental and stuff like that. And then I worked for Solvay Process or Allied Chemical or Honeywell, whatever you want to call it now.

Now, my question is, when you get done, I know you're not going to be able to tell me tonight, but in the later days, you can probably come up with an answer of how this is going to help Oneida Lake and Oswego River and possibly some of the feed-offs off of--on Oswego River up through there, like, lake in Pulton [phonetic], which is contaminated. Now, maybe it'll help that too. I don't know. I know--I do know a little bit about this stuff, that stuff feeds back into other tributaries or--you know what I'm saying.

MR. TIM LARSON: Okay. I think I understand, sure.

MR. ALBERT BREEZY: Now, maybe you can get a feedback later through the letter, you know, through the mail on this stuff and figure out what's going on here.

MR. TIM LARSON: Okay. So Albert, in essence, you're kind of questioning what's going on, basically kind of downstream of Onondaga Lake? Is that generally kind of what the question is?

MR. ALBERT BREEZY: Yeah.

MR. TIM LARSON: Okay.

MR. ALBERT BREEZY: Yeah.

MR. TIM LARSON: Okay.

MR. ALBERT BREEZY: Fair enough.

MR. TIM LARSON: All right.

That's fine. Thank you. I think that was it, as far as statements go. Albert, I will get back to that. Could be. It's possible.

Was there anybody else who wanted to make a statement before we actually get

into questions and answers? Okay.

All right. What we could do, Don, I know you had a few questions. Lindsay, maybe you do. But Albert, let's tackle that one first. What we're looking at doing is remediating Onondaga Lake, obviously, and that basically is set. We're working on that. And prior to actually getting out there and remediating Onondaga Lake, we want to make sure we turn off the sources of material basically leading into the lake, such as Geddes Brook and Nine Mile Creek.

Based on the remediation of the upland sites and based on remediation that we're basically doing associated with the lake, there's going to be a lot of benefits, from a toxicity standpoint, and we believe bioaccumulation standpoint as well in the lake. And although we haven't done any kind of extensive evaluation downstream, I would think that benefit

would be carried downstream as well, and I would assume there would be benefits that exist. I know obviously, lake--excuse me--fish basically enter and leave the lake relatively frequently, and I know basically there's various programs to actually tag those fish and check fish concentrations so I think the question is, once we get the lake remediated, hopefully things will, you know, continue to migrate benefits downstream so--okay?

So Don, I know you had some questions.

MR. DON HUGHES: First question is about the schedule.

MR. TIM LARSON: Yes. The schedule--no? I heard something.

MR. DON HUGHES: [Off mic]

MR. TIM LARSON: I guess speak loudly 'cause we're basically recording this, Don. So I'll try to summarize. Hopefully I'll do it correctly what your

comments are.

MR. DON HUGHES: [Off mic]

MR. TIM LARSON: Right. Okay.

As far as, like I said before, what we're looking at doing is remediating Onondaga Lake. And before we actually get out there and remediate the lake, we're looking at basically turning off various sources that are contributing or have contributed to the lake.

We're looking at starting the dredging in the lake in May of 2012. So what we're looking at doing is basically completing the remediation of Geddes Brook and Nine Mile Creek such that the remediation of the lake is not unnecessarily postponed. We're not going to be remediating off of the mouth of Nine Mile Creek and the lake until we've remediated Nine Mile Creek and Geddes Brook. So as far as, you know, that's kind of what we're looking at. We're

looking at moving things as quickly as we, you know, possible as we can, Don, but, you know, once again, we're trying to get things done effectively, appropriately, and timely enough so it doesn't jeopardize the dredging that's scheduled to take place the beginning May of 2012.

MR. DON HUGHES: That's it.

MR. TIM LARSON: That's it?

MR. DON HUGHES: [Off mic]

MR. TIM LARSON: I mean, if you have a more detailed--

MR. DON HUGHES: [interposing]
[Off mic]

MR. TIM LARSON: Okay.

MR. DON HUGHES: The schedule then was presented to us, by - -, was that the County was going to be putting in the trail and that section would be remediated.

MR. TIM LARSON: Yeah, we got to hold on. You can't hear any of this,

correct? Okay. All right. Don, why don't you come up and just--we'll just do a tag team on this mic.

MR. DON HUGHES: Okay. So anyway, so the schedule that I understood from a meeting that Fred referenced was that Onondaga County wants to go ahead and put in a trail, which is relevant to this whole cleanup because it goes right through that area, the area that's between the highway, 690 and--

MR. TIM LARSON: [interposing] -
- I got to speak as well. Maybe we can back up, Diane, to one of the figures. There we go. Oop, that's it. Okay. So--

MR. DON HUGHES: [interposing]
[Off mic]

MR. TIM LARSON: Yeah, Don, if you could just--

MR. DON HUGHES: [interposing]
Okay. So there'll be a--

MR. TIM LARSON: [interposing]

Okay.

MR. DON HUGHES: So there'll be a--what's? Oh, okay. Okay. So you got the trail coming along 690 and then a bridge will be constructed and then would go over to the wastebeds. My understanding is that, that the County wants to get that project moving this year so that that part would be remediated first and then the rest of the site would be deferred some number of years, 'til maybe 2011 or 2012. So that's the question, is, is that about correct?

MR. TIM LARSON: As I said during the presentation, Don, we're look--we're anticipating to start Geddes Brook in--next year, 2010. And obviously, once we've completed the RODs, the record of decision, we have to go through design. And also, like I said, we're basically progressing from upstream downstream, so you're going to remediate Geddes Brook,

then you're going to remediate Operable Unit 1 portion of Nine Mile Creek and then basically move downstream.

It's our hope to basically work with Honeywell, as we have in the past, and come up with a schedule of which a schedule has not been finalized yet, where once again, we can, in essence, fast track the remediation of Geddes Brook and Nine Mile Creek, once again, as fast as we possibly can, but once again, making sure we ensure it's a quality and effective remedy that we implement so that basically it doesn't postpone any work we actually do in the lake.

We've not gone as far, since we haven't actually got into the details of design, to determine exactly what is happening when any more specific than that, Don. But like I said, we're hoping that the process of remediation starts with the Geddes Brook in 2010.

MR. DON HESLER: [Off mic]

MR. TIM LARSON: You got to
speak--

MR. DON HESLER: [interposing]
You want to--I wish we could get this - -.

MR. TIM LARSON: We could, we
could.

MR. DON HESSLER: I'm Don Hesler
with the DEC. I think the one part that
is missing that Don was asking about was,
if the bridge work takes place before
we're actually down there remediating that
lower part of Nine Mile Creek, what are we
going to be doing? And the answer to that
is, we've been working with Honeywell. We
talked to them a number of years ago about
the bridge when we thought that the bridge
was going to be, you know, constructed a
few years back. If the bridge was to take
place this summer, we'd be working with
Honeywell in the area where the footprint
of the bridge is, areas where the

infrastructure would be going in piers, what have you. We'd work with them to take out the appropriate material prior to the bridge construction. Just so that material's out of there, it's gone, and then, you know, then they could build a bridge and then we'd continue working downstream with the regular schedule.

MR. TIM LARSON: So that really shouldn't impede us moving forward with-- starting with Geddes Brook and moving downstream, Don. Next?

MR. DON HUGHES: Yeah, mainly I thought it would just be beneficial for everyone here to know how this is going to play out.

The other question was about the cleanup objective. Alternative four says .15 PPM of mercury in what, soils, sediments, both?

MR. TIM LARSON: And actually, I'm glad you raised that, Don, 'cause the

.15 relates to a toxicity number, we have bioaccumulation numbers as well that we're addressing for mercury. Is it on? It's on. Okay.

As far as the .15 goes, that's a cleanup number that's applied on a point-by-point basis as a toxicity number. We have bioaccumulation numbers for mercury and they're applied on, like, an area basis, all right? We do basically have numbers for [mic cuts out] as well. And we have a number of .8 wildlife consumption of fish number. And once again, this is applied on a SWAC, surface weighted area, basis.

MR. DON HUGHES: The question is, does that .15 PPM number, what does that refer to? Are we talking about fish? Are we talking about sediments? Are we talking about soil?

MR. TIM LARSON: That number is-- .15 is in sediment. And--

MR. DON HUGHES: [Off mic]

MR. TIM LARSON: Sediment and
soil.

MR. DON HUGHES: [Off mic]

MR. TIM LARSON: In wetland
soils, yes. I'm sorry, Don. I didn't
understand your question. Next?

MALE VOICE: Don't want to--this
is just something to clarify. In the
PRAP, it talks about digging down to the
marl layer. And it suggests that the marl
layer is 1 to 2 feet below the sediments.
And it distinguishes that from the
depositional area where the sediments are
5 to 10 feet deep. There's the--are the
deep sediments upstream, as it says in the
PRAP or are they actually downstream?

MR. TIM LARSON: I know where the
marl is that we're talking about. You're
talking about in the areas that are not
marl--the marl's in the lower part of
reach AB, okay? Marl's not in the upper

part of reach AB. Does that answer your question? Okay.

MALE VOICE: Is there a demarcation?

MR. TIM LARSON: As far as exactly where the marl is?

MALE VOICE: Don't need exact, just approximate.

MR. TIM LARSON: I'm sorry, what? All right. So - -.

MALE VOICE: [Off mic]

MR. MIKE SPEARA: The marl is downstream at this point - - depositional - -.

MR. TIM LARSON: Mike, if you can come over.

MR. MIKE SPERA: - - that's actually covered under - -.

MR. TIM LARSON: So Mike, where is the actual upstream-most location then?

MR. MIKE SPERA: I think for the purposes--

MR. TIM LARSON: [interposing]

Around there? Okay.

MR. MIKE SPERA: - -.

MR. TIM LARSON: Okay. So basically, we're looking at the figure associated with alternative three, and there's a black line that basically--I'd say not quite 50% downstream, but cuts the site. And that's the demarcation line. Downstream of that, the marl is located.

MR. DON HUGHES: - - let me ask-- while I'm up here, one more--promise this is the last question. The difference between alternative four and alternative three is about \$4.5 million. But the difference in volume is not that big, you know, it's not proportional. Can you explain why that--why is that?

MR. TIM LARSON: Sure. This is a similar issue that we basically discussed as part of our Operable Unit 1. When you get down to a certain depth, you basically

have stability problems and you basically have to use sheeting to kind of make sure that you, in essence, don't have sloughing, you know, basically where you're doing the removal. As we basically go down deeper, like would be required for alternative four, the sheeting comes into play, and installing sheeting is very expensive so that's a significant portion of the difference between the two alternatives. Not the only difference, but that's a significant difference.

Is that it, Don?

MR. DON HUGHES: That's--I'm--
that's my - -.

MR. TIM LARSON: Okay. Any other questions? Yes?

MS. DEREETH GLANCE: I have two questions. I trust that - -.

MR. TIM LARSON: Okay. Dereth Glance Citizens Campaign for the Environment.

MS. DEREETH GLANCE: I just want to know if we anticipate the initial design submittal for public review by the end of 2009 or, you know, kind of a sense of the schedule - - design - - finished design plan.

My second question is there's about a 20 - - some differences in - - the reasons behind - -.

MR. TIM LARSON: Okay.

MS. DEREETH GLANCE: - -.

MR. TIM LARSON: Okay. And if I don't get it correct, please correct me. But I believe the first part of the question was, will we have the design that will be available for public viewing by the end of 2009. As I said earlier, the ROD is basically scheduled to be completed in October--on October 30th of this year. I don't think it's realistic to anticipate we would have any kind of design documents we could share that shortly after the ROD

being finalized. I would imagine sometime the earlier part of 2010 would be more realistic.

MS. DEREETH GANCE: [Off mic]

MR. TIM LARSON: It'd be more-- that'd be more realistic, Dereth. I just can't go further than that at this point in time.

And the second question, help me out again.

MS. DEREETH GLANCE: The operation - - difference between - - there's about - -.

MR. TIM LARSON: Okay. I will actually see if I can basically defer to some others in the audience, and if we can, I'll have to get back to you on that, Dereth. Mike, can you help out in that? If not, we might have to table that and I'll get back to you formally on that, Dereth, as part of the response. We'll get back--we'll address that as part of

the transcript for this public meeting.
Off the top of my head, Dareth, I don't
know.

MR. MIKE SPERA: [Off mic]

MR. TIM LARSON: Do you have an
answer? Sure. Once again, Mike Spera
with AECOM.

MR. MIKE SPERA: Consultant to
New York State DEC. Generally, the
alternative four is slightly lower in the
maintenance and cost, that also includes
monitoring since it is cleaning up to each
of the PRGs. There is likely less
monitoring associated with that
alternative. But the differences are
pretty small, 20,000 per year difference.
The area of the remedies are both about
the same between alternatives three and
four as well so that's probably the likely
cause of the slight difference in cost.

MR. TIM LARSON: Thank you, Mike.
Was that it, Dereth? Okay. Any other

questions from the audience? Yes, sir.

Les?

MR. LES MONOSTORY: Les Monostory with the Isaac Walton League. I guess I got a couple of sort of practical questions as an angler and representative of the Sportsman Federation. What sort of mercury levels are found presently in a fish in Geddes Brook and Nine Mile Creek, and how will those levels be increased by this project and by the overall lake project? I think you mentioned some sort of a goal in terms of concentrations in the fish flesh.

MR. TIM LARSON: I'll have to get back to you, Les, on the actual concentrations that we found in the fish in Nine Mile Creek. I don't have that off the top of my head. But once again, as far as the remedy we're looking at, it includes clean material being placed over the entire site, and that's basically the

channel sediments as well as the floodplain.

So as far as once we actually remediate the site, any ongoing contribution of mercury from the site to fish that are coming in contact with Nine Mile Creek, we think is basically going to be greatly reduced. I think that's very similar to the remediation that's taking place in the lake, as far as remediation that's taking place in the littoral zone. We believe that covering those materials with clean sediment is also going to contribute to basically minimizing the impact of mercury that basically goes into the fish.

Concentrations of--thank you. Concentrations that we have in the sediments, I mean, there's various ways the fish can basically get mercury. As we know, mercury's methylated. That's primarily the form of mercury that's

basically found in the fish. And that can basically come up through the food chain. That basically can actually be the methylmercury absorbed in the fish themselves. So, you know, once again, Nine Mile Creek, it's very clear that we're placing clean material everywhere so as far as the impact of mercury from the site on fish, like I said, is going to be greatly reduced, if not eliminated.

Did that address your concern, Les?

MR. LES MONOSTORY: [Off mic]

MR. TIM LARSON: Okay.

MS. DEREETH GLANCE: [Off mic]

MR. TIM LARSON: See, that's hard to say, Dereth. What we're going to be doing is we're going to be monitoring the fish, obviously, as far as the concentrations go. And back in the early stages of the project, in the early '90s, we spent approximately two years going

through modeling efforts to try to get a handle on bioaccumulation and the predictions of how it goes through the food chain and how quickly something like that, you know, might happen as far as the reduction goes. It's very complicated. Like I said, the mercury can basically get into the fish from various sources. It's, you know, complicated.

So basically what we're looking at doing is, I mean, are we basically talking kind of the lake here now, Dereth, or both or--

MS. DERETH GLANCE: [interposing]
[Off mic]

MR. TIM LARSON: --just in general? All right. In general. That's fine. Yeah, just in general. Right.

As far as, you know, remediating, like I said, Nine Mile Creek, the entire site's being remediated so that's pretty straightforward as far as shutting off the

sources of mercury and methylmercury to the fish.

As far as the lake goes, once again, we have various remediations. We're doing dredging, we're doing capping, and also, we're evaluating minimizing the generation of methylmercury in the hypolimnion through oxygenation or nitrification.

So what we're looking at doing is going after the possible sources of mercury and methylmercury that ultimately can get into the fish, reducing those so that, once again, over time we're seeing reductions of concentrations, hopefully put Onondaga Lake on par with basically other water bodies in New York State.

So Les, did you have another question or was that it?

MR. LES MONOSTORY: That was it, thanks.

MR. TIM LARSON: Okay. Any other

questions? Yes, sir.

MR. BILL MORRIS: Bill Morris, Nine Mile Creek Conservation Council. Do you--has any thought been given at this point as to how the sediments are going to be delivered to the disposal site, and where you're going to get however-ever-many thousand yards of clean material to replace it?

MR. TIM LARSON: The easy answer is not in great detail, all right? As far as the material going up from Geddes Brook and Nine Mile Creek, there's two probable ways of it going up there. There's going to be a pipeline that's basically going to run from the lake up to the SCA at Wastebed 13. So there's a possibility that we could tap in--slurry the material, tap into that pipeline and have it basically pumped up to the SCA.

As far as going to Bridge Street, you know, it's possible something similar

could be done. The other option is basically trucking. So those are, you know, the two primary options. Has not been determined yet. That's going to be a decision that's going to be made as far as the design goes.

And the other question?

MR. BILL MORRIS: [Off mic]

MR. TIM LARSON: Replacement material. That also is something we'll evaluate, basically as far as the remedial design. I don't know we have an actual location yet where the material's going to be coming from, but this is also, you know, something that's currently being evaluated as far as the lake goes. And with respect to the volumes we're using for the lake, you know, this is not nearly that significant as far as volume goes. So once again, that's going to be dealt with as part of remedial design.

Thank you.

Any other questions? Going once,
going twice. All right. Thank you,
everybody, for coming out on a miserable,
rainy night like this. I will be hanging
around here for a while and various
members of our team will be around as
well, so if you have any questions, feel
free to stop up.

Thank you, everybody.

[END BR_012.MP3]

APPENDIX VI

**TRANSCRIPT FOR JUNE 11, 2009
PUBLIC MEETING**

PARSONS ENGINEERING OF NEW YORK

NYSDEC/EPA Public Meeting

June 11, 2009

Ubiquus Reporting

Irvine, CA

(949) 477 4972

New York, NY

(212) 227 7440

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[START BR_012.MP3]

MS. DIANE CARLTON: Let's get started so we can get you out in a reasonable period before the next thunderstorm rolls through.

I'd like to welcome everyone to our meeting on the Nine Mile Creek Geddes Operable Unit Two. We are going to be discussing the proposed remedy for the site. We'll have a short PowerPoint presentation that Tim Larson from our DEC office in Albany will be making.

I'm Diane Carlton with the DEC here in Syracuse, for those of you that don't know me. Following Tim's presentation, those of you that filled out the official comment cards, we will call you based on how you registered. First registration will be called up first. When we get through those, if there's anybody else that has additional comments that they'd like to make, certainly that's

possible, and then maybe we can take some informal questions and answers 'cause we don't have a real big group here.

So I'm going to turn it over to Tim Larson. He's an engineer with our office in Albany, and he's the project manager on the site. Tim?

MR. TIM LARSON: Thank you, Diane, and thank you, everybody, for coming out on this less-than-desirable, I guess, weather we have out there. But at least it's not snow or ice so I guess that's pretty good.

As Diane said I'm going to be walking through a presentation, relatively brief presentation as far as the topic of discussion tonight. And that's Geddes Brook Nine Mile Creek Operable Unit 2. And once I get through the presentation, we will basically entertain any kind of statements that individuals would like to make, or any kind of questions.

And I do have--I believe I have sufficient number of handouts, as far as the slides go. So if somebody didn't get a copy of the slides and would like one, it's on the table by the front door. I guess with that having been said, we'll get started.

Now, what I'm going to do is basically start kind of out large and then kind of zoom in on the actual site itself. Here's Onondaga Lake. And there's various subsites. Basically, the umbrella to everything falls under, as far as these various sites go, is the Onondaga Lake NPL site. And there's various subsites associated with this NPL site. You have GM Ley Creek PCB Dredgings, GM IFG Fisher Guide. You have basically Town of Salina landfill, Wastebed B Harbor Brook. You have Willis Avenue, Semmit Residue Ponds. You basically have the LCP Bridge Street site, Geddes Brook Nine Mile Creek and the

lake itself.

Next slide, please.

And like I said, kind of zooming in a little bit more. And we do have a larger poster board here. I realize in your handouts, this particular slide is difficult to see, but like I said, we do have a poster board over there, if you'd like to take a look at it after the presentation.

And the main point of this is it shows kind of the orientation of the various tributaries that are going to be the focus of discussion. Basically, I guess we can move from the lake upstream. We have Nine Mile Creek here and then basically it continues up above where Geddes Brook intersects it and you have basically Geddes Brook here and then you have the West Flume leading to Bridge Street. Bridge Street was a source of contamination to the West Flume to Geddes

Brook and to Nine Mile Creek. And this also basically shows various Solvay wastebeds. In particular, Wastebed 13 is an area I'll be talking about a little bit later in the presentation. And that's one of two possible locations for the material, soil and sediments to be brought to--from the remediation of Geddes Brook Nine Mile Creek.

Next, please.

We have Geddes Brook and then basically, once again, Nine Mile Creek. And there's an adjacent site, Wastebeds 1 through 8. And historically, there was questions as far as what the remediation of Wastebeds 1 through 8 would be. And that issue led us to actually breaking up Nine Mile Creek into two operable units, with Operable Unit 1 including Geddes Brook, and the focus of discussion tonight, Operable Unit 2, which is this location right here.

Briefly, before I get into a discussion of Operable Unit 2, I wanted to kind of rewind a little bit on Operable Unit 1. And we were here on December 10th for a similar public meeting, similar to the meeting we have tonight. And the focus of that discussion was Operable Unit 1. And during that public meeting, we presented the proposed plan for Operable Unit 1.

Since that public meeting, the public comment period closed on the proposed plan for OU1 and also for the response action associated with the Geddes Brook IRM. And on April 29th, the Geddes Brook IRM response action document was finalized and also the proposed plan, taking into account public comment, was finalized and became the record of decision for Operable Unit 1. And that also was finalized on April 29th.

And with respect to the

alternatives that were ultimately selected in those two decision documents, they were consistent with the proposed alternatives that were in the document. So disposal at Bridge Street was selected for Geddes Brook, and the alternative that we presented on, you know, back in December was the alternative three one that was actually carried forward into the ROD for OU1.

Now, the next three topics I'd like to talk about are the remedial investigation. Where we basically investigate soil, sediment, surface water associated with a particular site for various parameters, collect information, then we go through an ecological risk assessment and a human health risk assessment.

Once we basically compile that information, we go into the feasibility study where we basically evaluate various

remedial alternatives and then we actually generate our proposed plan, which discusses the various alternatives, along with our preferred remedial alternative.

Next, please.

The Geddes Brook remedial investigation--and this work was done, for the most part, consistent to a point where it included Operable Unit 1 and Operable Unit 2. And basically, it was initiated in 1998 and continued through 2002. And as I said previously, samples were analyzed for sediment, surface water, floodplain soils and fish as well.

The most prevalent contaminant we found was mercury. Other contaminants we found included arsenic, lead, PAHs, PCBs, hexachlorobenzene and phenol. And as I said, ecological risk was done, and a human health risk assessment was done. And based on the outcome of those risk assessments, it was determined that

unacceptable risks were identified to both humans and wildlife.

Next, please.

The next three slides are very difficult to see, I realize that. But hopefully, for the most part, you can see colors. And red basically is the highest concentration, and these dot plots are for mercury, and this particular one is 0 to 1 foot. And as we go down, the lower we get, we want to basically see the blue and the purples. That was basically are approaching, or at, background or, in essence, very, very low levels.

So as we basically move through the slide, you can see where we have some locations that obviously aren't, you know, the blue, the purple, like I talked about, there's actually a red location there. If you can move to the next one Diane. This is 1 to 2 feet.

And as we basically go through

these, you can see the colors are basically moving away, for the most part, not in every location, but for the most part, they're moving away from the highest concentrations to the lower concentrations. And then once we get from 0 to 1, 1 to 2--and then next slide Diane, please--2 to 3, there's very many locations that are basically down where we're talking about, the blues and the purples, which are--the purples, I think, are .15. PPM for mercury, which, once again, is a concentration where we're getting down background upstream concentrations.

Now, the areas I'm going to be talking about are basically the channel and the floodplain area we have here, and we also have floodplain here. We do have some contamination in the floodplain soils as well. And we'll get into a discussion as far as how we're going to rectify that

contamination in a moment or two. If we can move on, Diane.

So as I said, we basically did the remedial investigation and basically did the risk assessments. And once we had that information in hand, we got into the feasibility study where we actually looked at various remedial alternatives. And we had a feasibility study that was generated back in 2005 that included both Operable Unit 1 and Operable Unit 2.

There was various questions we had, associated with the alternatives that were evaluated. And we spent time between then and the initiation of the supplemental feasibility study in May 2009, collecting some additional data, as I said, breaking the site up into two operable units, getting a better handle on remedial boundaries. We evaluated new remedial alternatives. And Operable Unit 2 also included additional samples that

were collected post-RI, up through 2008.

So we had the initial 2005 feasibility study. It was supplemented with additional information in the 2009 supplemental feasibility study, May 2009, had the various alternatives that we evaluated in the proposed plan, including our preferred alternative.

Next, please.

As part of the feasibility study, there's various criteria that are evaluated to ultimately determine what the most appropriate alternative is. And these various alternatives--or I'm sorry, these various criteria are basically listed on this particular slide where we have overall protection of human health and the environment, compliance with applicable or relevant and appropriate requirements, ARARs. Long-term effectiveness and permanence. That's basically how long--do we have a level of

comfort that the remedy will actually be in place and perform as it's intended? Reduction of toxicity, mobility or volume through treatment. Short-term effectiveness, any issues we basically have kind of near-term rather than long-term, associated with implementing the various remedial alternatives. Ease of implementation, once again, relatively self-explanatory, I believe. Cost. Support agency acceptance. And the one where basically the purpose of being here tonight is community acceptance, to basically present these various alternatives and hear what you basically have as far as comments and your thoughts associated with the various alternatives, including our preferred alternative.

Next, please.

With respect to the disposal of material from Operable Unit 2--and that includes sediment and floodplain soil as

well, there's two options that were evaluated. Option A, which is consolidation at Honeywell's containment system at the LCP Bridge Street site. Or the other option is the sediment containment area to be constructed on Wastebed 13. Option B was disposal of contaminated sediments at an off-site permitted landfill in Rochester. And I have a slide that's coming up--actually, a couple slides. Actually, it shows the two locations.

The preferred disposal option is Option A, with material going to the LCP Bridge Street site or to the SCA to be constructed at Wastebed 13. The material being disposed of at either of these two locations, these two locations, the technology's proven and reliable, and we feel that both of these locations will be protective of human health and the environment.

Next, please. Next one.

And this shows the two possible locations. Once again, we got Nine Mile Creek here, and here is Geddes Brook. LCP Bridge Street, the facility has actually been constructed, has a temporary cover on top of it, and is awaiting the potential for material being disposed of from Geddes Brook and/or Nine Mile Creek. The other disposal location that is being considered and will be evaluated in the remedial design will be the sediment containment area that will be located up on Wastebed 13. And that location of Wastebed 13 was something that was previously presented to the public. We got comment on that, and the decision of the SCA being located at Wastebed 13 is a decision also that has been made.

Next, Diane.

Here's a brief overview--and I'm going to get into more detail as far as

the four alternatives that were considered in the proposed plan. The first alternative--and we're required to basically only include this as a point of comparison--is no-action alternative.

Alternative two is partial removal of mercury to a number of 1.3 PPM and other significant contaminants. And these other significant contaminants are the contaminants that I identified earlier on this slide that were identified in the remedial investigation they include arsenic, lead, PAHs, PCBs, hexachlorobenzene and phenol. So that's what's being referred to when you talk about other significant contaminants.

Alternative three, which is our preferred alternative, is removal based on limits defined by physical features and to various depths. And I'm going to get into a discussion on this in greater detail in a moment.

Alternative four is basically as near to complete removal as possible to a mercury number of .15. And once again, the .15 number is basically approaching background upstream concentrations and also remediating the other significant contaminants as well.

First alternative, no-action alternative. Once again, it's a baseline for comparison purposes. There's no material being removed, there's no cost, and there's no construction time. So this is basically literally doing nothing for this alternative. Next, please.

Alternative two, partial removal of mercury to 1.3 and other significant contaminants. This consists of dredging excavating material, 23,000 cubic yards, area remediated, 10.8. Capital cost, annual O&M, present worth. Total present worth cost, 9.9 million for this. And anticipated construction time for this

alternative would be a year.

Next, please.

Alternative two--I'm sorry--okay.

Yes. Alternative two basically shows what's being done. And there's a removal in the channel and the floodplains, primarily once again to the 1.3 PPM number. However, we do have clean-up numbers for the other significant contaminants as well, and they would basically be addressed in this alternative.

Next, please.

Alternative three, and this is the preferred alternative for both DEC and EPA. And this consists of dredging 58,000 cubic yards, a 15.5-acre remediated area. Capital cost, 15.1 million. Various other costs there. Total. Present worth cost, 16.5 million. Construction time of one year.

Next, please.

And this alternative is a removal alternative. And fortunately, the contamination that we have, we're seeing generally the top 2 to 3 feet within the channel. And unlike alternative--I'm sorry--Operable Unit 1, where part of the alternative included capping, we feel very confident that this particular alternative can be achieved, the objectives, by basically doing a removal without needing a cap. We are, as part of remedial design, going to go out and collect additional samples. We're going to be sampling for mercury. We're going to be sampling for the other parameters as well. And we do have a contingency that if we do see something unusual, there's an option of capping, as far as this alternative goes. But based on the information we have right now, I'm confident and actually hopeful that it will be a removal alternative without capping.

Alternative two is a removal to 1.3 PPM for mercury and other contaminants. Alternative four, which I'm going to get into in a second, is removal to .15, all right? This is a forested wetland we have right here. And actually, one of the poster boards we have up here very nicely shows the forested wetland. What we have is we have mature trees that exist in that location. So one thing we're looking at doing as part of alternative three is evaluating a portion of the forested wetland to determine, based on the concentrations if we can save some of these mature trees.

Alternative two and alternative four are, you know, primarily just going after blazing these trees to the ground in an effort to achieve the clean-up number. What we're looking to do is, once again, weigh the benefits of the mature trees against the contaminants we actually see.

And we're going to be doing additional work as part of the design to determine if, in fact, we can save some of those trees. We'll be doing additional sediment sampling. We may be doing, you know, additional types of samples. I'm not sure.

Evaluations of Indiana bat is an item that's basically coming up. It's a, I guess, endangered species or protected species that has been found around Onondaga Lake, and there's thought that possibly this might be a habitat location for at least part of the year. So, you know, once again, it's an aggressive alternative. We're looking at removing the material so basically we don't need a cap. We basically place some fill and then we put habitat material on top of it. And as part of this alternative, there's going to be diversity as far as the habitat goes, topography-wise, in the

channel, as well as the floodplains to try to basically improve the habitat from what it actually is right now.

This particular slide is a poster board over here, and I would encourage people to basically take a look at it after the presentation if they have not already. And it gets into more specifics as far as what's being done in the various locations. Some of you may have--may remember from the presentation that Operable Unit 1, there's some heavily-armored stone under Reach BC, which is kind of up here. We do have that armored stone as protection on 690 along this area as well. We're looking at basically moving the material on top of that armored stone, replacing it with clean material. Likewise, we're moving material on the floodplains, on the Wastebeds 1 through 8 side, replacing that with clean material, and the area of the forested wetland and

the two pieces of land that basically jut out here would be remediated and clean material would be placed there as well. So over the entire footprint of the site channel, as well as floodplain sediments, material would be removed and clean material would be placed back in there, suitable habitat material.

Next, please.

This is alternative four. And it consists of dredging approximately 70,000 cubic yards, 16.4 acres remediated area. Capital cost, 20 million. Present worth, total cost, 21.1 million. And construction time, approximately two years.

Next, please.

Similar to alternative two, as far as actually what's being done--not that they're the same alternative by any reach, alternative two was remediating to 1.3 PPM. This is going down to .15 PPM

for mercury and, once again, addressing the other contaminants identified, that we identified in the remedial investigation as well. We have clean-up numbers for those.

The one thing I do want to add, there's an area for alternative four right here in this area. And this is not forested wetland. It's called forested upland so it's not actually part of the wetland. And concentrations we had in here were, I think, you know, .2 PPM or less, generally around there. So that area is included in alternative four. It's not included in alternative three. And once again, based on the concentrations that we saw and the fact that we have mature trees in this location, for alternative three, we thought it was appropriate to basically keep the mature trees and not basically go after them based on the concentrations we

saw. However, since this alternative is actually cleaning up to .15, that actual additional area is included.

Next, please.

As I've said numerous times throughout the presentation, the preferred alternative is alternative three. Alternative three is the same overall protection, human health and the environment, compliance with state and federal regulations as alternative four. Represents less short-term risk, is more implementable, has a significantly lower cost. Capital costs--I'm sorry--present worth cost, 16.5 versus 21.1 million for alternative 4. And with respect to alternative one and two, alternative three is more protective of human health and the environment. So basically, alternative three, we feel gives you the same protection that alternative four. It's more protective than alternative one and

two. And alternative three is cheaper than--less expensive than alternative four. And that's the basis of why we thought it was the best alternative. And once again, the various criteria that I showed earlier in the presentation were evaluated to ultimately arrive at this decision of alternative three being the preferred alternative.

Next, please.

The public comment period associated with the proposed plan, the RI, the feasibility study and the risk assessments was already initiated. It's ongoing. And it's scheduled to conclude on July 3rd.

Once the public comment period is concluded, we'll be issuing a record of decision for Geddes Brook Nine Mile Creek, and that's scheduled for October 30th of this year. And the record of decision is where we actually select an alternative.

The record of decision also includes the transcript of this meeting tonight. It includes all the comments that we received during the public comment period. And we basically address all those comments as well. That information is included in the record of decision.

And after we generate the ROD, we actually get into design and we anticipate starting construction of the first part. Once again, as far as kind of moving upstream, downstream, we have Geddes Brook then we have Nine Mile Creek Operable Unit 1 and Operable Unit 2. So as far as moving upstream and downstream, Geddes Brook would be the first thing to be remediated, and we're anticipating that to begin in 2010.

And that basically concludes the presentation. Maybe, Diane, if you can do statements and then questions at this point in time. And maybe you can just put

up the next slide that shows people where they can send comments to, either via mail or email. And if people do want more information on this project, Geddes Brook Nine Mile Creek Operable Unit 2 or Operable Unit 1 or Onondaga Lake, you can track down information at this particular Web site, which is a DEC Web site.

And I guess, Diane, we're going to do statements first? Okay. All right.

I basically received a letter from James Corbett--is there correct?--Onondaga County legislator. And unfortunately, he was not able to attend tonight so he gave us some information that he would like us to read, and I'm going to do so at this point in time. It's not that lengthy. And it's dated June 10th, 2009.

Because of a previous commitment, I will not be able to attend the public meeting and speak on the next phase of

Nine Mile Creek's cleanup. Please accept the following as my comments.

First one. The lake cleanup continues to be one of the most important projects in Central New York. I am pleased to hear progress is continuing to be made on the tributaries into Onondaga Lake, in the upland sites, primarily in Geddes Brook, which is part of my legislative district. The cleanup of these uplands is the key that will allow lake dredging to begin in 2012.

Second comment. As our Onondaga County legislative representative to the DEC Region 7 Fish & Wildlife Management Board, I was happy to hear of the visit by DEC Commissioner Pete Grannis to fish Nine Mile Creek. Nine Mile Creek's reputation as one of the best trout streams in the state is well earned, both for local and stocked fish. I'm encouraged to hear habitat enhancements will be taking place

not only within Nine Mile Creek to support fish migrating from Onondaga Lake and upstream, but also other enhancements along the banks and in the wetlands to support diverse habitats throughout the area.

Last comment. An important consideration for this project is the ability for the county to extend the bike trail along the western shores of the lake and over Nine Mile Creek. With 1.5 million-plus visitors enjoying Onondaga Lake Park each year, the ability to extend the trail will only enhance the recreational opportunities for visitors and increase the access to the trail for residents on the western side of the lake.

As Chairman of the Environmental Protection Committee, I am pleased to hear the county, DEC, and Honeywell are working together to address any environmental issues necessary to ensure safety to the

public and are moving forward to make this happen. Thank you. Jim Corbett.

Diane, we had some other ones as well?

All right. Looks like the first one we have up is Fred Miller, representing Nine Mile Creek Conservation Council. Fred? And actually, Diane, we have a mic right behind the laptop there.

MR. DON HUGHES: [Off mic]

MR. TIM LARSON: Absolutely.

Yeah. Don, what we're doing, we're doing statements first, not questions and answers. We're going to get through that and then we're going to do questions and answers, similar to what we did last time, for the last public meeting. Yes, Fred?

MR. FRED MILLER: [Off mic]

MR. TIM LARSON: Here, Fred, I don't know if the mic's on. Here, the only--here - -.

FEMALE VOICE: There we go.

Don't touch the buttons.

MR. FRED MILLER: We--the Nine Mile Creek Conservation Council Board attended the Honeywell public information meeting at their offices last week. And one of the things that at least I came away with was that I got--I think some of the other members of the board, trying to get a visual representation of what the final riparian zone will look like. And thinking of a computer-generated graphic of a progression over 5, 10, 15, 20 years out. For those of us who are used to looking at development plans and engineering plans, it's self-explanatory. I think for the average person who doesn't deal with that on a consistent basis, it might not be as representative to them in that type of plan form as it would be to us. We're familiar with it.

So we thought that we'd like to get a visualization and what does that

look like? How wide is the riparian zone, visually? We've seen the--some of the photographs and enhanced photographs that are basic in some of the standard watercolor renditions, but we thought that might be an enhancing factor for the whole project if something like that could be done so that we could really get a hands-on approach to it.

Also underneath the highway, due to DOT restrictions on the maintenance and flood control, et cetera, we'd like to see something there in a more visual form to--that's--to put in that context to get a visual representation. I think it would help everybody in the area as well.

And also, we had one just concern that the remediation area, that's basically county park property, not Honeywell property. And one of the things that we were concerned about--I know it's an area of public policy that perhaps

Honeywell doesn't--or doesn't need to address, but for our own concerns is that we viewed this area as possibly being a legacy wetlands forest for the future, if left alone for 1 or 200 years, it would be a fabulous area. Since it's on county parks property, we had concerns of how it could be generated in the plan that would lend support that the area should be put into some type of conservationship or protection into the future so it doesn't fall victim to shortsighted planning at any of the county levels where turns into a soccer field, a baseball field that the futurists filled in or disturbed in any way 10, 20, 30 years away. The opportunity here for reforestation and remediation into the future is quite a valuable environmental asset around the lake, at least in terms of a view shed at this point.

MR. TIM LARSON: Okay.

MR. FRED MILLER: That's all I have to say, unless someone else from the Board has any comment. Thank you.

MR. TIM LARSON: Thank you, Fred. Let's see. Next one we had up was Sarah Eckel, Citizens Campaign for the Environment.

MS. SARAH ECKEL: My name's Sarah Eckel. I'm the Central New York Program Coordinator for Citizens Campaign for the Environment. CC is an 80,000-member, non-profit, non-partisan advocacy organization working throughout New York State.

And in general, CC supports the preferred cleanup alternative number three by the DEC for Geddes Brook Nine Mile Creek. However, CC believes the DEC should provide ample opportunity for public involvement in the design phase to the citizen participation working groups. CC understands that some of the most important decisions are going to be made

during the design phase, including waste disposal, water treatment, new infrastructure, habitat disturbances and dredging methods. And we know these issues and other issues along with them will impact the local community, and we want to make sure the design phase is transparent and accessible to the public.

We would like to, once again, recommend that there's educational signage placed around the public access points to Geddes Brook and Nine Mile Creek to educate the public on the cleanup progress, timelines, and to ensure issues associated with recreational use are well noted.

We'd like to thank the DEC for addressing the contamination coming from Wastebeds 1 through 8, and we look forward to the plan for cleaning those up as well. And thank you again for the opportunity to speak today.

MR. TIM LARSON: Thank you. Next we had up was Lindsay Speer.

MS. LINDSAY SPEER: My name I is Lindsay Speer. I'm a community organizer on behalf of the Onondaga Nation. I want to just state there we have - - consulting government to government with the DEC and so they're commenting during the public comment period. Tonight I'm making comments on my own behalf.

And in general, I'm glad to see that there is a fuller extent of remediation in this site than there was on the Onondaga Lake bottom. However, I am really concerned about the inadequate sampling that was done prior to coming up with the plans. Throughout most of the creek length, a lot of the sampling was only done 1 or 2 feet deep, and still, we're finding contamination. So we don't actually know what the depth of contamination actually is. And so it

concerns me that the plan is to then if they find more contamination then cap it. I would like to know more--I think there needs to be more information about what exists prior to plans actually being made.

And any contingency plan should actually be for removal instead of capping. Streams cannot have caps in them. Streams, by their own nature, remove the things that are in their way. And so I strongly am concerned that there is strong possibility of failure for caps in this creek.

I'm also very concerned about the timing of the plan. Right now, there is, you know, we have not heard about Wastebeds 1 through 8. We don't know what sort of contamination is there or getting into Geddes Brook Nine Mile Creek. And again, this comes into where there is inadequate testing. Only mercury was tested for a long--the majority of the

length near Wastebeds 1 through 8.

So I think that we need to--I'm very concerned that there's a timing gap, that Wastebeds 1 through 8 need to be looked at first.

I am also concerned about the continued channelization of Geddes Brook Nine Mile Creek. Obviously, 690 poses a problem in terms of where the creek would go to one side, but you do have a large area where the wastebeds currently are where the creek could then be remeandered if the wastebeds were removed and the land put back to its natural state.

I'm encouraged by the work to encourage diversity in the floodplains, the habitat, and structure available along the creek. I look forward to seeing those designs in more detail. And I would encourage that there be a full survey of the flora and fauna in the forested wetland prior to its destruction so that

we know exactly what is there and what needs to be replaced. Thank you.

MR. TIM LARSON: Thank you. Next up, we have--

MR. DON HUGHES: [interposing]
Don Hughes.

MR. TIM LARSON: --Don Hughes.

MR. DON HUGHES: Thank you.

Well, I'd actually like to echo a lot of the comments that you've just heard from Fred Miller, first off, that you folks at DEC really could make better use, I think, of Honeywell's resources. They have an army of consultants, PR people and so forth, as all these graphics around the room. Make that part of the talk. That would be helpful, I think.

And what Lindsay was just talking about in terms of the timing, we were just here in December, as you noted, Tim. And my understanding was that we were--the decision to segregate Nine Mile Creek into

Operable Unit 1 versus Operable Unit 2 was because of Wastebeds 1 through 8 having impact on the creek. And so I was rather surprised when this announcement came out that, low and behold, already we've got a plan for Operable Unit 2. And as far as I know, there's not a remedial investigation that's out for Wastebeds 1 through 8, much less a plan for Wastebeds 1 through 8.

So it seems to me that these two sites should be coordinated. Do Wastebeds 1 through 8 and section A -- Operable Unit 2, the lower section of Nine Mile, in conjunction with one another. The question is, what's--what is the rush here? There's plenty of work to do that Honeywell's got to do, just working on Operable Unit 1 on the lake and so forth.

There's a--I got a few other questions and--I'll give you the mic when I'm done. The--

MR. TIM LARSON: [interposing]

Well, Don, if you have questions, what we can do is we can just hold off on those.

MR. DON HUGHES: We can just talk. You've got a mic. How about that? Yes, okay. What is the schedule? You talked about the Geddes Brook IRM, but beyond that, what's the schedule for cleaning up this site?

MR. TIM LARSON: All right. Don, what I'd like to do is we can come back to that--and Lindsay, if you had questions too for me, that's fine. We can entertain those. What I'd like to do is get through--now, I think there was one other person basically who--

MR. DON HUGHES: [interposing]
Well, let me finish my statement then. If you don't want to get into a dialogue or questions then--

MR. TIM LARSON: [interposing]
No, I do, Don. It's just timing-wise. I'd prefer to do the statements now and

then we'll get into the questions in a minute. That's all.

MR. DON HUGHES: Okay. That's fine. One other thing to notice about this site is, if you look at the remedial investigation, the entire area is underlain by fine, coarse sand and gravel so any mobile contaminants are going to move. So that's something to keep in mind in designing the remediation.

I would take issue, fundamentally, with the--with putting LCP and the sediment containment area as being equals. They are not equals. The sediment containment area is a lined, properly-designed landfill. The LCP site is not. It's an abandoned, partially-remediated site, chemical manufacturing plant. It has no liner. It has a requirement to pump ground water in perpetuity. And I would encourage the DEC and the EPA to have all the contaminated

material put in the SCA, not in LCP.

I agree with what Lindsay said about the adequacy of the data. It's hard for me to understand how we can--that the agencies can put a fixed number for the cost of alternative four when there's--there really isn't a lot of sediment data. There's a lot of floodplain data, but the sediment data is--there's big gaps. There's hundreds of meters where there simply are no cores.

And my last comment is about--again, this is relevant to the comparison of the alternatives. Alternative four, as a cleanup objection of .15 parts per million. I take it that applies to both sediments and soils. And my comment on that is that the cleanup objective for sediments should be much more stringent than it is for soils because in sediments, you have the opportunity for bioaccumulation so--and that's really what

this is all about is to prevent mercury,
hexachlorobenzene, dioxins, PCBs, et
cetera from accumulating in fish.

Thank you.

MR. TIM LARSON: Thank you, Don.

And the last person we have as far as
making a statement, Albert--is it Breezy?

FEMALE VOICE: - -.

MR. TIM LARSON: Okay. And
Albert, who do you represent?

MR. ALBERT BREEZY: The Oswego
County American Legion. I'm--

MR. TIM LARSON: [interposing]
Mic - -.

MR. ALBERT BREEZY: Oswego County
American Legion. I am Chairman for the--
I'm an officer of the conservation--
whatever you want to call it.

MR. TIM LARSON: Okay. Thank
you.

MR. ALBERT BREEZY: I was brought
up on a large farm. I know a little bit

about this stuff. I went over to Korea, and you probably know what Korea was like. I know a little bit about environmental and stuff like that. And then I worked for Solvay Process or Allied Chemical or Honeywell, whatever you want to call it now.

Now, my question is, when you get done, I know you're not going to be able to tell me tonight, but in the later days, you can probably come up with an answer of how this is going to help Oneida Lake and Oswego River and possibly some of the feed-offs off of--on Oswego River up through there, like, lake in Pulton [phonetic], which is contaminated. Now, maybe it'll help that too. I don't know. I know--I do know a little bit about this stuff, that stuff feeds back into other tributaries or--you know what I'm saying.

MR. TIM LARSON: Okay. I think I understand, sure.

MR. ALBERT BREEZY: Now, maybe you can get a feedback later through the letter, you know, through the mail on this stuff and figure out what's going on here.

MR. TIM LARSON: Okay. So Albert, in essence, you're kind of questioning what's going on, basically kind of downstream of Onondaga Lake? Is that generally kind of what the question is?

MR. ALBERT BREEZY: Yeah.

MR. TIM LARSON: Okay.

MR. ALBERT BREEZY: Yeah.

MR. TIM LARSON: Okay.

MR. ALBERT BREEZY: Fair enough.

MR. TIM LARSON: All right.

That's fine. Thank you. I think that was it, as far as statements go. Albert, I will get back to that. Could be. It's possible.

Was there anybody else who wanted to make a statement before we actually get

into questions and answers? Okay.

All right. What we could do, Don, I know you had a few questions. Lindsay, maybe you do. But Albert, let's tackle that one first. What we're looking at doing is remediating Onondaga Lake, obviously, and that basically is set. We're working on that. And prior to actually getting out there and remediating Onondaga Lake, we want to make sure we turn off the sources of material basically leading into the lake, such as Geddes Brook and Nine Mile Creek.

Based on the remediation of the upland sites and based on remediation that we're basically doing associated with the lake, there's going to be a lot of benefits, from a toxicity standpoint, and we believe bioaccumulation standpoint as well in the lake. And although we haven't done any kind of extensive evaluation downstream, I would think that benefit

would be carried downstream as well, and I would assume there would be benefits that exist. I know obviously, lake--excuse me--fish basically enter and leave the lake relatively frequently, and I know basically there's various programs to actually tag those fish and check fish concentrations so I think the question is, once we get the lake remediated, hopefully things will, you know, continue to migrate benefits downstream so--okay?

So Don, I know you had some questions.

MR. DON HUGHES: First question is about the schedule.

MR. TIM LARSON: Yes. The schedule--no? I heard something.

MR. DON HUGHES: [Off mic]

MR. TIM LARSON: I guess speak loudly 'cause we're basically recording this, Don. So I'll try to summarize. Hopefully I'll do it correctly what your

comments are.

MR. DON HUGHES: [Off mic]

MR. TIM LARSON: Right. Okay.

As far as, like I said before, what we're looking at doing is remediating Onondaga Lake. And before we actually get out there and remediate the lake, we're looking at basically turning off various sources that are contributing or have contributed to the lake.

We're looking at starting the dredging in the lake in May of 2012. So what we're looking at doing is basically completing the remediation of Geddes Brook and Nine Mile Creek such that the remediation of the lake is not unnecessarily postponed. We're not going to be remediating off of the mouth of Nine Mile Creek and the lake until we've remediated Nine Mile Creek and Geddes Brook. So as far as, you know, that's kind of what we're looking at. We're

looking at moving things as quickly as we, you know, possible as we can, Don, but, you know, once again, we're trying to get things done effectively, appropriately, and timely enough so it doesn't jeopardize the dredging that's scheduled to take place the beginning May of 2012.

MR. DON HUGHES: That's it.

MR. TIM LARSON: That's it?

MR. DON HUGHES: [Off mic]

MR. TIM LARSON: I mean, if you have a more detailed--

MR. DON HUGHES: [interposing]
[Off mic]

MR. TIM LARSON: Okay.

MR. DON HUGHES: The schedule then was presented to us, by --, was that the County was going to be putting in the trail and that section would be remediated.

MR. TIM LARSON: Yeah, we got to hold on. You can't hear any of this,

correct? Okay. All right. Don, why don't you come up and just--we'll just do a tag team on this mic.

MR. DON HUGHES: Okay. So anyway, so the schedule that I understood from a meeting that Fred referenced was that Onondaga County wants to go ahead and put in a trail, which is relevant to this whole cleanup because it goes right through that area, the area that's between the highway, 690 and--

MR. TIM LARSON: [interposing] -
- I got to speak as well. Maybe we can back up, Diane, to one of the figures. There we go. Oop, that's it. Okay. So--

MR. DON HUGHES: [interposing]
[Off mic]

MR. TIM LARSON: Yeah, Don, if you could just--

MR. DON HUGHES: [interposing]
Okay. So there'll be a--

MR. TIM LARSON: [interposing]

Okay.

MR. DON HUGHES: So there'll be a--what's? Oh, okay. Okay. So you got the trail coming along 690 and then a bridge will be constructed and then would go over to the wastebeds. My understanding is that, that the County wants to get that project moving this year so that that part would be remediated first and then the rest of the site would be deferred some number of years, 'til maybe 2011 or 2012. So that's the question, is, is that about correct?

MR. TIM LARSON: As I said during the presentation, Don, we're look--we're anticipating to start Geddes Brook in--next year, 2010. And obviously, once we've completed the RODs, the record of decision, we have to go through design. And also, like I said, we're basically progressing from upstream downstream, so you're going to remediate Geddes Brook,

then you're going to remediate Operable Unit 1 portion of Nine Mile Creek and then basically move downstream.

It's our hope to basically work with Honeywell, as we have in the past, and come up with a schedule of which a schedule has not been finalized yet, where once again, we can, in essence, fast track the remediation of Geddes Brook and Nine Mile Creek, once again, as fast as we possibly can, but once again, making sure we ensure it's a quality and effective remedy that we implement so that basically it doesn't postpone any work we actually do in the lake.

We've not gone as far, since we haven't actually got into the details of design, to determine exactly what is happening when any more specific than that, Don. But like I said, we're hoping that the process of remediation starts with the Geddes Brook in 2010.

MR. DON HESLER: [Off mic]

MR. TIM LARSON: You got to
speak--

MR. DON HESLER: [interposing]
You want to--I wish we could get this - -.

MR. TIM LARSON: We could, we
could.

MR. DON HESSLER: I'm Don Hesler
with the DEC. I think the one part that
is missing that Don was asking about was,
if the bridge work takes place before
we're actually down there remediating that
lower part of Nine Mile Creek, what are we
going to be doing? And the answer to that
is, we've been working with Honeywell. We
talked to them a number of years ago about
the bridge when we thought that the bridge
was going to be, you know, constructed a
few years back. If the bridge was to take
place this summer, we'd be working with
Honeywell in the area where the footprint
of the bridge is, areas where the

infrastructure would be going in piers, what have you. We'd work with them to take out the appropriate material prior to the bridge construction. Just so that material's out of there, it's gone, and then, you know, then they could build a bridge and then we'd continue working downstream with the regular schedule.

MR. TIM LARSON: So that really shouldn't impede us moving forward with-- starting with Geddes Brook and moving downstream, Don. Next?

MR. DON HUGHES: Yeah, mainly I thought it would just be beneficial for everyone here to know how this is going to play out.

The other question was about the cleanup objective. Alternative four says .15 PPM of mercury in what, soils, sediments, both?

MR. TIM LARSON: And actually, I'm glad you raised that, Don, 'cause the

.15 relates to a toxicity number, we have bioaccumulation numbers as well that we're addressing for mercury. Is it on? It's on. Okay.

As far as the .15 goes, that's a cleanup number that's applied on a point-by-point basis as a toxicity number. We have bioaccumulation numbers for mercury and they're applied on, like, an area basis, all right? We do basically have numbers for [mic cuts out] as well. And we have a number of .8 wildlife consumption of fish number. And once again, this is applied on a SWAC, surface weighted area, basis.

MR. DON HUGHES: The question is, does that .15 PPM number, what does that refer to? Are we talking about fish? Are we talking about sediments? Are we talking about soil?

MR. TIM LARSON: That number is-- .15 is in sediment. And--

MR. DON HUGHES: [Off mic]

MR. TIM LARSON: Sediment and
soil.

MR. DON HUGHES: [Off mic]

MR. TIM LARSON: In wetland
soils, yes. I'm sorry, Don. I didn't
understand your question. Next?

MALE VOICE: Don't want to--this
is just something to clarify. In the
PRAP, it talks about digging down to the
marl layer. And it suggests that the marl
layer is 1 to 2 feet below the sediments.
And it distinguishes that from the
depositional area where the sediments are
5 to 10 feet deep. There's the--are the
deep sediments upstream, as it says in the
PRAP or are they actually downstream?

MR. TIM LARSON: I know where the
marl is that we're talking about. You're
talking about in the areas that are not
marl--the marl's in the lower part of
reach AB, okay? Marl's not in the upper

part of reach AB. Does that answer your question? Okay.

MALE VOICE: Is there a demarcation?

MR. TIM LARSON: As far as exactly where the marl is?

MALE VOICE: Don't need exact, just approximate.

MR. TIM LARSON: I'm sorry, what? All right. So - -.

MALE VOICE: [Off mic]

MR. MIKE SPEARA: The marl is downstream at this point - - depositional - -.

MR. TIM LARSON: Mike, if you can come over.

MR. MIKE SPERA: - - that's actually covered under - -.

MR. TIM LARSON: So Mike, where is the actual upstream-most location then?

MR. MIKE SPERA: I think for the purposes--

MR. TIM LARSON: [interposing]

Around there? Okay.

MR. MIKE SPERA: - -.

MR. TIM LARSON: Okay. So basically, we're looking at the figure associated with alternative three, and there's a black line that basically--I'd say not quite 50% downstream, but cuts the site. And that's the demarcation line. Downstream of that, the marl is located.

MR. DON HUGHES: - - let me ask-- while I'm up here, one more--promise this is the last question. The difference between alternative four and alternative three is about \$4.5 million. But the difference in volume is not that big, you know, it's not proportional. Can you explain why that--why is that?

MR. TIM LARSON: Sure. This is a similar issue that we basically discussed as part of our Operable Unit 1. When you get down to a certain depth, you basically

have stability problems and you basically have to use sheeting to kind of make sure that you, in essence, don't have sloughing, you know, basically where you're doing the removal. As we basically go down deeper, like would be required for alternative four, the sheeting comes into play, and installing sheeting is very expensive so that's a significant portion of the difference between the two alternatives. Not the only difference, but that's a significant difference.

Is that it, Don?

MR. DON HUGHES: That's--I'm--
that's my - -.

MR. TIM LARSON: Okay. Any other questions? Yes?

MS. DEREETH GLANCE: I have two questions. I trust that - -.

MR. TIM LARSON: Okay. Dereth Glance Citizens Campaign for the Environment.

MS. DEREETH GLANCE: I just want to know if we anticipate the initial design submittal for public review by the end of 2009 or, you know, kind of a sense of the schedule - - design - - finished design plan.

My second question is there's about a 20 - - some differences in - - the reasons behind - -.

MR. TIM LARSON: Okay.

MS. DEREETH GLANCE: - -.

MR. TIM LARSON: Okay. And if I don't get it correct, please correct me. But I believe the first part of the question was, will we have the design that will be available for public viewing by the end of 2009. As I said earlier, the ROD is basically scheduled to be completed in October--on October 30th of this year. I don't think it's realistic to anticipate we would have any kind of design documents we could share that shortly after the ROD

being finalized. I would imagine sometime the earlier part of 2010 would be more realistic.

MS. DEREETH GANCE: [Off mic]

MR. TIM LARSON: It'd be more-- that'd be more realistic, Dereth. I just can't go further than that at this point in time.

And the second question, help me out again.

MS. DEREETH GLANCE: The operation - - difference between - - there's about - -.

MR. TIM LARSON: Okay. I will actually see if I can basically defer to some others in the audience, and if we can, I'll have to get back to you on that, Dereth. Mike, can you help out in that? If not, we might have to table that and I'll get back to you formally on that, Dereth, as part of the response. We'll get back--we'll address that as part of

the transcript for this public meeting.
Off the top of my head, Dareth, I don't
know.

MR. MIKE SPERA: [Off mic]

MR. TIM LARSON: Do you have an
answer? Sure. Once again, Mike Spera
with AECOM.

MR. MIKE SPERA: Consultant to
New York State DEC. Generally, the
alternative four is slightly lower in the
maintenance and cost, that also includes
monitoring since it is cleaning up to each
of the PRGs. There is likely less
monitoring associated with that
alternative. But the differences are
pretty small, 20,000 per year difference.
The area of the remedies are both about
the same between alternatives three and
four as well so that's probably the likely
cause of the slight difference in cost.

MR. TIM LARSON: Thank you, Mike.
Was that it, Dereth? Okay. Any other

questions from the audience? Yes, sir.

Les?

MR. LES MONOSTORY: Les Monostory with the Isaac Walton League. I guess I got a couple of sort of practical questions as an angler and representative of the Sportsman Federation. What sort of mercury levels are found presently in a fish in Geddes Brook and Nine Mile Creek, and how will those levels be increased by this project and by the overall lake project? I think you mentioned some sort of a goal in terms of concentrations in the fish flesh.

MR. TIM LARSON: I'll have to get back to you, Les, on the actual concentrations that we found in the fish in Nine Mile Creek. I don't have that off the top of my head. But once again, as far as the remedy we're looking at, it includes clean material being placed over the entire site, and that's basically the

channel sediments as well as the floodplain.

So as far as once we actually remediate the site, any ongoing contribution of mercury from the site to fish that are coming in contact with Nine Mile Creek, we think is basically going to be greatly reduced. I think that's very similar to the remediation that's taking place in the lake, as far as remediation that's taking place in the littoral zone. We believe that covering those materials with clean sediment is also going to contribute to basically minimizing the impact of mercury that basically goes into the fish.

Concentrations of--thank you. Concentrations that we have in the sediments, I mean, there's various ways the fish can basically get mercury. As we know, mercury's methylated. That's primarily the form of mercury that's

basically found in the fish. And that can basically come up through the food chain. That basically can actually be the methylmercury absorbed in the fish themselves. So, you know, once again, Nine Mile Creek, it's very clear that we're placing clean material everywhere so as far as the impact of mercury from the site on fish, like I said, is going to be greatly reduced, if not eliminated.

Did that address your concern, Les?

MR. LES MONOSTORY: [Off mic]

MR. TIM LARSON: Okay.

MS. DEREETH GLANCE: [Off mic]

MR. TIM LARSON: See, that's hard to say, Dereth. What we're going to be doing is we're going to be monitoring the fish, obviously, as far as the concentrations go. And back in the early stages of the project, in the early '90s, we spent approximately two years going

through modeling efforts to try to get a handle on bioaccumulation and the predictions of how it goes through the food chain and how quickly something like that, you know, might happen as far as the reduction goes. It's very complicated. Like I said, the mercury can basically get into the fish from various sources. It's, you know, complicated.

So basically what we're looking at doing is, I mean, are we basically talking kind of the lake here now, Dereth, or both or--

MS. DERETH GLANCE: [interposing]
[Off mic]

MR. TIM LARSON: --just in general? All right. In general. That's fine. Yeah, just in general. Right.

As far as, you know, remediating, like I said, Nine Mile Creek, the entire site's being remediated so that's pretty straightforward as far as shutting off the

sources of mercury and methylmercury to the fish.

As far as the lake goes, once again, we have various remediations. We're doing dredging, we're doing capping, and also, we're evaluating minimizing the generation of methylmercury in the hypolimnion through oxygenation or nitrification.

So what we're looking at doing is going after the possible sources of mercury and methylmercury that ultimately can get into the fish, reducing those so that, once again, over time we're seeing reductions of concentrations, hopefully put Onondaga Lake on par with basically other water bodies in New York State.

So Les, did you have another question or was that it?

MR. LES MONOSTORY: That was it, thanks.

MR. TIM LARSON: Okay. Any other

questions? Yes, sir.

MR. BILL MORRIS: Bill Morris, Nine Mile Creek Conservation Council. Do you--has any thought been given at this point as to how the sediments are going to be delivered to the disposal site, and where you're going to get however-ever-many thousand yards of clean material to replace it?

MR. TIM LARSON: The easy answer is not in great detail, all right? As far as the material going up from Geddes Brook and Nine Mile Creek, there's two probable ways of it going up there. There's going to be a pipeline that's basically going to run from the lake up to the SCA at Wastebed 13. So there's a possibility that we could tap in--slurry the material, tap into that pipeline and have it basically pumped up to the SCA.

As far as going to Bridge Street, you know, it's possible something similar

could be done. The other option is basically trucking. So those are, you know, the two primary options. Has not been determined yet. That's going to be a decision that's going to be made as far as the design goes.

And the other question?

MR. BILL MORRIS: [Off mic]

MR. TIM LARSON: Replacement material. That also is something we'll evaluate, basically as far as the remedial design. I don't know we have an actual location yet where the material's going to be coming from, but this is also, you know, something that's currently being evaluated as far as the lake goes. And with respect to the volumes we're using for the lake, you know, this is not nearly that significant as far as volume goes. So once again, that's going to be dealt with as part of remedial design.

Thank you.

Any other questions? Going once,
going twice. All right. Thank you,
everybody, for coming out on a miserable,
rainy night like this. I will be hanging
around here for a while and various
members of our team will be around as
well, so if you have any questions, feel
free to stop up.

Thank you, everybody.

[END BR_012.MP3]