RECORD OF DECISION

Onondaga Lake Bottom Subsite
of the Onondaga Lake Superfund Site
Towns of Geddes and Salina, Villages of Solvay and Liverpool, and City of Syracuse, Onondaga County, New York

NYSDEC

USEPA Region 2

JULY 2005

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ALBANY, NEW YORK

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

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Onondaga Lake Bottom Subsite
Towns of Geddes and Salina, Villages of Solvay and Liverpool, and City of Syracuse, Onondaga County, New York

Superfund Site Identification Number: NYD986913580
Operable Unit 2

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) documents the New York State Department of Environmental Conservation (NYSDEC) and US Environmental Protection Agency's (EPA's) selection of a remedy for the Onondaga Lake Bottom Subsite (site), which 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 (NCP), 40 Code of Federal Regulations (CFR) Part 300. This decision document explains the factual and legal basis for selecting the remedy for the site. Appendix III, attached, is an index that identifies the items that comprise the Administrative Record upon which the selection of the remedy is based.

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

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 addresses all areas of the lake where the surface sediments exceed a mean probable effect concentration quotient (PECQ) of 1 or a mercury PEC of 2.2 milligrams per kilogram (mg/kg).[1] The selected remedy will also attain a 0.8 mg/kg bioaccumulation-based sediment quality value (BSQV) for mercury on an area-wide basis for the lake and for other applicable areas of the lake to be determined during the remedial design. The selected remedy is also intended to achieve lakewide fish tissue mercury concentrations ranging from 0.14 mg/kg, which is for protection of ecological receptors, to 0.3 mg/kg, which is based on EPA's

[1] These cleanup criteria were developed to address acute toxicity to the sediment-dwelling (benthic) community in Onondaga Lake.

methylmercury National Recommended Water Quality criterion for the protection of human health for the consumption of organisms. The major components of the selected remedy include:

- Dredging of as much as an estimated 2,653,000 cubic yards (cy) of contaminated sediment/waste from the littoral zone[2] in Sediment Management Units (SMUs)[3] 1 through 7 to a depth that will prevent the loss of lake surface area, ensure cap effectiveness, remove non-aqueous-phase liquids (NAPLs), reduce contaminant mass, allow for erosion protection, and reestablish the littoral zone habitat. Most of the dredging will be performed in the in-lake waste deposit (ILWD) (which largely exists in SMU 1) and in SMU 2.

- Dredging, as needed, in the ILWD to remove materials within areas of hot spots (to improve cap effectiveness) and to ensure stability of the cap.

- Placement of an isolation cap over an estimated 425 acres of SMUs 1 through 7.

- Construction/operation of a hydraulic control system along the SMU 7 shoreline to maintain cap effectiveness. In addition, the remedy for SMUs 1 and 2 will rely upon the proper operation of the hydraulic control system, which is being designed under IRMs presently underway at the Semet Residue Ponds, Willis Avenue, and Wastebed B/Harbor Brook subsites to control the migration of contamination to the lake via groundwater from the adjacent upland areas.

- Placement of a thin-layer cap over an estimated 154 acres of the profundal zone.[4]

- Treatment and/or off-site disposal of the most highly contaminated materials (e.g., pure phase chemicals segregated during the dredging/handling process). The balance of the dredged sediment will be placed in one or more Sediment Consolidation Areas (SCAs), which will be constructed on one or more of Honeywell's Solvay wastebeds that historically received process wastes from Honeywell's former operations. The containment area will include, at a minimum, the installation of a liner, a cap, and a leachate collection and treatment system.

- Treatment of water generated by the dredging and sediment handling processes to meet NYSDEC discharge limits.

- Completion of a comprehensive lakewide habitat restoration plan.

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[2] The littoral zone is the portion of the lake in which water depths range from 0 to 9 meters (m) (30 feet [ft]).

[3] For investigation and remediation purposes, the site has been divided into eight SMUs based on water depth, sources of water entering the lake, physical and ecological characteristics, and chemical risk drivers. SMUs 1 through 7 cover the littoral zone and SMU 8 covers the profundal zone.

[4] The profundal zone is the portion of the lake in which water depths exceed 9 m (30 ft) within SMU 8.

- Habitat reestablishment will be performed consistent with the lakewide habitat restoration plan in areas of dredging/capping.[5]

- A pilot study will be performed to evaluate the potential effectiveness of oxygenation at reducing the formation of methylmercury in the water column, while preserving the normal cycle of stratification within the lake. An additional factor which will be considered during the design of the pilot study will be the effectiveness of oxygenation at reducing fish tissue methylmercury concentrations. If supported by the pilot study results, the pilot study will be followed by full-scale implementation of oxygenation in SMU 8. Furthermore, potential impacts of oxygenation on the lake system will be evaluated during the pilot study and/or the remedial design of the full-scale oxygenation system.

- Monitored natural recovery (MNR) in SMU 8 to achieve the mercury PEC of 2.2 mg/kg in the profundal zone and to achieve the BSQV of 0.8 mg/kg on an area-wide basis within 10 years following the remediation of upland sources, littoral sediments, and initial thin-layer capping in the profundal zone. An investigation will be conducted to refine the application of an MNR model and determine any additional remedial measures (e.g., additional thin-layer capping) needed in the profundal zone.

- Investigation to determine the appropriate area-wide basis for the application of the BSQV of 0.8 mg/kg. During remedy implementation, additional remedial measures may be needed (e.g., thin-layer capping) to meet the BSQV on an area-wide basis.

- Implementation of institutional controls including the notification of appropriate government agencies with authority for permitting potential future activities which could impact the implementation and effectiveness of the remedy.

- Implementation of a long-term operation, maintenance, and monitoring (OM&M) program to monitor and maintain the effectiveness of the remedy.

It will be certified on an annual basis that the institutional controls are in place and that remedy-related OM&M is being performed.

A Phase 1A Cultural Resource Assessment for various areas including Onondaga Lake is currently underway. If, based upon the results of this Cultural Resource Assessment, a Phase 1B Cultural Resource Assessment (to locate culturally sensitive areas) is determined to be necessary, it would be performed during the remedial design phase.

The selected remedy also includes habitat enhancement, which is an improvement of habitat conditions in areas where CERCLA contaminants do not occur at levels that warrant active remediation, but where habitat impairment due to stressors has been identified as a concern. Habitat enhancement will be performed along an estimated 1.5 mi (2.4 km) of shoreline (SMU 3) and over approximately 23 acres (SMU 5). Habitat enhancement will be performed consistent with

[5] The design and construction of the remedy must meet the substantive requirements for permits associated with disturbance to state and federal regulated wetlands (e.g., 6 New York Code of Rules and Regulations [NYCRR] Part 663, Freshwater Wetlands Permit Requirements) and navigable waters (e.g., 6 NYCRR Part 608, Use and Protection of Waters).

the lakewide habitat restoration plan. This component of the remedy is not intended to satisfy the requirements of CERCLA or the NCP, but is included in order to address requirements of state law.

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 (with the possible exception of the most stringent surface water standard for dissolved mercury); 3) is cost effective; and 4) utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. In keeping with the statutory preference for treatment that reduces toxicity, mobility, or volume of contaminated media as a principal element of the remedy, NAPLs will be treated and/or disposed of at an off-site permitted facility.

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 implemented to remove, treat, or contain the contaminated sediments.

ROD DATA CERTIFICATION CHECKLIST

The 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 16 – 21).

- Baseline risk represented by the contaminants of concern (see ROD, pages 27 – 33).

- Cleanup levels established for contaminants of concern and the basis for these levels (see ROD text boxes "Development of Sediment Effect Concentrations/Probable Effect Concentrations," [page 34]; "Development and Use of the Mean PEC Quotient," [page 37]; and "Application of the Mean PEC Quotient for Determining Remedial Areas/Volumes," [page 38]).

- Manner of addressing source materials constituting principal threats (see ROD, page 71).

- 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 56 and 81).

- 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 72 – 73).

AUTHORIZING SIGNATURES

Denise M. Sheehan //ss//	7/1/05
Denise M. Sheehan Acting Commissioner NYSDEC	Date
Kathleen C. Callahan //ss//	7/1/05
Kathleen C. Callahan Acting Regional Administrator EPA, Region 2	Date

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RECORD OF DECISION FACT SHEET
EPA REGION 2

Site

Site name:	Onondaga Lake Bottom Site
Site location:	Towns of Geddes and Salina; Villages of Solvay and Liverpool; and City of Syracuse, Onondaga County, New York
HRS score:	50
Listed on the NPL:	December 16, 1994

Record of Decision

Date signed:	July 1, 2005
Selected remedy:	Dredging and capping of contaminated sediments/wastes, oxygenation, and monitored natural recovery
Capital cost:	$414,000,000
Operation and maintenance cost:	$3,000,000 per year
Present-worth cost:	$451,000,000

Lead	NYSDEC
Primary Contact:	Timothy Larson, PE, Project Manager, NYSDEC (518) 402-9767
Secondary Contact:	Donald Hesler, Section Chief, NYSDEC (518) 402-9767

Main PRP	Honeywell International, Inc.

Waste

Waste type:	Volatile and semivolatile organic compounds; polychlorinated biphenyls; metals; and principal threat waste
Waste origin:	Discharges from upland sites to the lake
Contaminated media:	Sediment, surface water, and biota

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DECISION SUMMARY

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JULY 2005

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
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LIST OF ACRONYMS AND ABBREVIATIONS USED IN ROD AND RESPONSIVENESS SUMMARY

ARAR	applicable or relevant and appropriate requirement
ARCS	assessment and remediation of contaminated sediments
ASLF	Atlantic States Legal Foundation
BERA	baseline ecological risk assessment
BSQV	bioaccumulation-based sediment quality value
BTEX	benzene, toluene, ethylbenzene, and xylenes
C&D	construction and demolition
CAC	Citizens Advisory Committee
CAMP	Community Air Monitoring Plan
CCE	Citizens Campaign for the Environment
CEH	Council on Environmental Health [Onondaga County]
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CFR	Code of Federal Regulations
CHASP	Community Health and Safety Plan
cm	centimeter
CNY	Central New York
COC	chemical (or contaminant) of concern
CPOI	chemical parameter of interest
CT	central tendency
CTV	cap threshold value
cy	cubic yard
DNAPL	dense non-aqueous-phase liquid
DO	dissolved oxygen
EIS	environmental impact statement
EPA	Environmental Protection Agency
ER-L	effects range-low
ER-M	effects range-median
ESCSWCS	Empire State Chapter Soil and Water Conservation Society
ESF	Environmental Science and Forestry (SUNY)
FOCUS	Forging Our Community's United Strength
FS	feasibility study
ft	feet/foot
FWCA	Fish and Wildlife Coordination Act
FWIA	fish and wildlife impact analysis
g	gram
GSCC	Greater Syracuse Chamber of Commerce
HASP	health and safety plan
HHRA	human health risk assessment
HSRC	Hazardous Substance Research Center

ILWD	in-lake waste deposit
IRM	interim remedial measure
kg	kilogram
km	kilometer
lb	pound
LCP	Linden Chemicals and Plastics
m	meter
M	million
MANOVA	Multiple Analysis of Variance
Metro	Metropolitan Syracuse Sewage Treatment Plant
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mi	mile
mm	millimeter
MNR	monitored natural recovery
NAPL	non-aqueous-phase liquid
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
ng/L	nanograms per liter
NHPA	National Historic Preservation Act
NLSA	no loss of lake surface area
NOAA	National Oceanographic and Atmospheric Administration
NPL	National Priorities List
NRD	Natural Resource Damage
NRRB	National Remedy Review Board
NYCRR	New York Code of Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOL	New York State Department of Law
OLP	Onondaga Lake Partnership
OM&M	operation, maintenance, and monitoring
ORD	Office of Research and Development (USEPA)
OSHA	Occupational Safety and Health Administration
OSRTI	Office of Superfund Remediation and Technology Innovation (USEPA)
OSWER	Office of Solid Waste and Emergency Response
OU	operable unit
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCDD/PCDF	polychlorinated dibenzo-p-dioxin/polychlorinated dibenzofuran
PEC	probable effect concentration
PECQ	probable effect concentration quotient
ppm	parts per million
PRG	preliminary remediation goal
PRP	potentially responsible party
PSA	preliminary site assessment

QAPP	quality assurance project plan
RA	remedial action
RAGS	Risk Assessment Guidance for Superfund
RAO	remedial action objective
RD	remedial design
RI	remedial investigation
RME	reasonable maximum exposure
ROD	Record of Decision
RS	responsiveness summary
SCA	sediment consolidation area
SEC	sediment effect concentration
SEL	sediment effect level
SLRIDT	St. Louis River/Interlake/Duluth Tar Site
SMU	sediment management unit
SPDES	State Pollutant Discharge Elimination System
SQG	sediment quality guideline
SUNY	State University of New York
SVOC	semivolatile organic compound
SWAC	surface-weighted average concentration
SYW	Syracuse West (from US Geological Survey quadrant sheet; used to identify New York State wetlands)
TAG	Technical Assistance Grant
TSS	total suspended solids
TWA	time-weighted average
UCL	upper confidence limit
UFI	Upstate Freshwater Institute
μg/kg	micrograms per kilogram
μg/L	micrograms per liter
USACE	US Army Corps of Engineers
USC	US Code
USEPA	US Environmental Protection Agency
USFDA	US Food and Drug Administration
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
VOC	volatile organic compound
yr	year

SITE NAME, LOCATION, AND DESCRIPTION

On June 23, 1989, Onondaga Lake was added to the New York State Registry of Inactive Hazardous Waste disposal sites. On December 16, 1994, Onondaga Lake and areas upland that contribute or have contributed contamination to the lake system were added to the U.S. Environmental Protection Agency's (EPA's) National Priorities List (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 has been a release of hazardous substances, pollutants, or contaminants.

Onondaga Lake itself is a 4.6-square-mile (sq. mi) (12-square-kilometer [sq. km]), 3,000-acre lake, approximately 4.5 mi (7.2 km) long and 1 mi (1.6 km) wide, with an average water depth of 36 ft (11 m). The lake has two deep basins, a northern basin and a southern basin, that have maximum water depths of approximately 62 and 65 ft (19 and 20 m), respectively. The basins are separated by a saddle region at a water depth of approximately 56 ft (17 m). Most of the lake has a broad nearshore shelf in water depths of less than 12 ft (3.7 m). This nearshore shelf is bordered by a steep offshore slope in water depths of 12 to 24 ft (3.7 to 7.3 m).

During the summer months, the upper water of Onondaga Lake warms to a greater degree than the deeper water. This causes the water in the lake to stratify (separate) into two layers of water: the epilimnion, which is the warmer, less dense upper layer and is about 30 ft (9 m) thick, and the hypolimnion, which is the colder, denser, bottom layer. During the summer, the hypolimnion becomes anoxic (runs out of oxygen), which has numerous implications for the lake's chemistry and biota (e.g., fish and insect life).

For the purposes of the remedial investigation and feasibility study (RI/FS) and this Record of Decision (ROD), the sediments in the lake are divided into two regions based on these two layers of water: the littoral zone, which includes sediments along the shoreline in less than 30 ft (9 m) of water and which are in contact with the epilimnion, and the profundal zone, which includes sediments in the deep basins in more than 30 ft (9 m) of water, which are in contact with the hypolimnion.

The two largest tributaries to Onondaga Lake, namely Ninemile Creek and Onondaga Creek, contribute 30.4 and 31.4 percent, respectively, of the total water flow to the lake. Other tributaries, in a clockwise direction from the southeast section of the lake, include Ley Creek, Harbor Brook, the East Flume, Tributary 5A, Sawmill Creek, and Bloody Brook (see Figure 1 in the Figures section of this ROD [Appendix I]). In addition to the tributary streams, the treated effluent from the Onondaga County Metropolitan Wastewater Treatment Plant (Metro), located between Onondaga Creek and Harbor Brook, provides a significant portion (approximately 19 percent) of the water entering the lake.

Various local entities have discharged wastewater directly to these tributary streams and/or have waste sites that have, or potentially have, impacted these tributaries and the lake itself.

In general, the eastern shore of Onondaga Lake is urban and residential, and the northern shore is dominated by parkland, wooded areas, and wetlands. There are approximately 320 acres of state-regulated wetlands and numerous smaller wetlands directly connected to Onondaga Lake or within its floodplains.

The northwest upland areas in Liverpool and Lakeland are mainly residential, with interspersed urban structures and several undeveloped areas. Much of the western and southern lakeshore is covered by wastebeds that received wastes generated from Honeywell's former Solvay operations and, to a lesser extent, dredge spoils from the lake. Many of these wastebeds have been abandoned and recolonized by vegetation. Urban centers and industrial zones in Syracuse and Solvay dominate the landscape surrounding the southern and eastern shores of Onondaga Lake from approximately the New York State Fairgrounds to Ley Creek.

The area around Onondaga Lake is the most urban in central New York State. The region experienced significant growth in the twentieth century, and in 2000, Onondaga County was the tenth most populous county in the state. The city of Syracuse is located at the southern end of Onondaga Lake, and numerous towns, villages, and major roadways surround the lake (see Figure 1).

Historically, Onondaga Lake supported a cold-water fishery. Common species found in the lake included Atlantic salmon (*Salmo salar*), cisco (*Coregonus artedii*), American eel (*Anguilla rostrata*), and burbot (*Lota lota*). Today, Onondaga Lake supports a warm-water fish community that is dominated by gizzard shad (*Dorosoma cepedianum*), freshwater drum (*Aplodinotus grunniens*), carp (*Cyprinus carpio*), and white perch (*Morone americana*). Sunfish are abundant in the littoral zone.

Several important sportfish are found in the lake, including channel catfish (*Ictalurus punctatus*), largemouth bass (*Micropterus salmonides*), smallmouth bass (*Micropterus dolomieui*), and walleye (*Stizostedion vitreum*). The shores of Onondaga Lake provide habitat for various mammal species. Woodchuck (*Marmota monax*), muskrat (*Ondatra zibethicus*), and squirrels (e.g., *Sciurus carolinensis*) are regularly observed on the shores of Onondaga Lake. These and other small-mammal species support predators such as mink (*Mustela vison*), fox (*Vulpes fulva* and *Urocyon cinereoargenteus*), and coyote (*Canis latrans*). The less-disturbed shoreline of the northwest section of the lake provides habitat for more reclusive or larger species, such as beaver (*Castor canadensis*) and deer (*Odocoileus virginianus*). Typically, large bodies of water in urban areas provide important habitat to migrating bird species which use the lakeshore as a resting area during migration. Seasonal and resident bird species around the lake include waterfowl, gulls, shorebirds, songbirds, and raptors.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

Onondaga Lake has been the recipient of industrial and municipal sewage discharges for over 100 years. Honeywell has been a major contributor; however, other industries in the area have contributed contamination as well. Other contaminant sources to the lake include the Metro facility, industrial facilities and landfills along Ley Creek, the Crucible Materials Corporation (via Tributary 5A), and the former Oil City.

Honeywell International, Inc., and its predecessor companies operated manufacturing facilities in Solvay, New York, from 1881 until 1986. When Honeywell merged with its predecessor companies on December 1, 1999 (see the text box below [page 3]), it became liable for the contamination those companies introduced into the environment. For clarity, "Honeywell" is used throughout this ROD to refer to Honeywell International, Inc. and its predecessor companies. Honeywell, as a major contributor of contamination to the lake, has been named a potentially responsible party (PRP).

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.

Salt springs in the vicinity of Onondaga Lake supported a major salt recovery industry throughout the 1800s and were associated with the development of railroads and the Erie Canal in the region. This infrastructure supported the growth of additional industries, including former Honeywell operations (described in greater detail below), petroleum product storage (once known as "Oil City") adjacent to the southeastern shore of Onondaga Lake, fertilizer production, a steel foundry, a vehicle accessory manufacturing facility, pottery and china manufacturing, manufactured gas plants, and many other industries in the Syracuse area. These and other sites are more fully described in the RI/FS. An evolving municipal wastewater management system (initially with the development of a sewer system and later wastewater treatment facilities), now known as Metro, has been in existence since around 1896.

Honeywell International's Predecessor Companies

Honeywell International, Inc. predecessor companies include:

Allied Chemical and Dye Corp. (incorporated December 17, 1920)
General Chemical
Barrett Company
National Aniline and Chemical Company
Solvay Process Company
Semet Solvay Company
⇓
Allied Chemical Corporation (April 28, 1958)
⇓
Allied Corporation (April 27, 1981)
⇓
AlliedSignal, Inc. (September 18, 1985)
⇓
Honeywell International (Present)

Former Honeywell Operations: Production History and Releases

Honeywell's manufacturing processes were based on four major product lines collectively known as the Syracuse Works (see the text box below entitled "Product Lines and Periods of Production at the Syracuse Works"[page 4]). These processes resulted in releases of primarily mercury, organic contaminants, and calcite-related compounds (see the text box below entitled "What Contaminants are in Onondaga Lake?"[page 5]), as described below:

- Soda ash (sodium carbonate) and related products such as baking soda (sodium bicarbonate), sodium nitrite, sodium sesquicarbonate, ammonium bicarbonate, ammonium chloride, calcium chloride, and caustic soda (sodium hydroxide) were produced by a non-electrolytic cell process. The primary dissolved waste/contaminant associated with this process was ionic constituents (calcium, sodium, and chloride ions [Ca^{2+}, Na^{+}, and Cl^{-}, respectively]), and the primary solid component was Solvay waste, which is a white, chalky, calcite-related material.

- Benzene, toluene, xylene, naphthalene, and tar products from the recovery of coal distillation (coking) byproducts. The primary wastes/contaminants associated with this product line were benzene, toluene, ethylbenzene, and xylenes (BTEX), chlorinated benzenes, and polycyclic aromatic hydrocarbons (PAHs), especially naphthalene.

Product Lines and Periods of Production at the Syracuse Works

Facility	Product Line	Period of Production	Primary Contaminant Releases
Main Plant	Soda ash and related products Benzene, toluene, xylenes, naphthalene	1881 – 1986 1917 – 1970	Ionic waste constituents (Ca^{2+}, Na^{+}, and Cl^{-}), Solvay waste, BTEX, chlorinated benzenes, PAHs (especially naphthalene), and PCBs
Willis Avenue Plant	Chlorinated benzenes, hydrochloric acid, and chlor-alkali products	1918 – 1977	Mercury, BTEX, chlorinated benzenes, PAHs (especially naphthalene), PCBs, and dioxins/furans
Bridge Street Plant	Chlor-alkali products Hydrogen peroxide	1953 – 1979 1956 – 1969	Mercury, PCBs, and xylenes

Note: The Bridge Street Plant was sold to Linden Chemicals and Plastics (LCP) in 1979. LCP operated the plant until it closed in 1988.

- Chlorinated benzenes and byproduct hydrochloric acid from the chlorination of benzene. The primary wastes/contaminants associated with this product line were BTEX, chlorinated benzenes, and PAHs, especially naphthalene.

- Chlor-alkali products, including chlorine, caustic potash (potassium hydroxide), caustic soda (sodium hydroxide) produced by an electrolytic cell process, and related products such as potassium carbonate, hydrogen gas, and hydrogen peroxide produced by further reacting chlor-alkali byproducts with other chemicals. The primary wastes/contaminants associated with this product line were mercury, polychlorinated biphenyls (PCBs), and polychlorinated dibenzo-*p*-dioxin/polychlorinated dibenzofurans (PCDD/PCDFs).

Soda ash production at the Main Plant relied on local supplies of sodium chloride brine and limestone. Benzene, toluene, xylene, and naphthalene production at the Main Plant were based on fractional distillation of light oil, a byproduct that was produced by the coke ovens at the Syracuse Works until 1924, after which it was shipped to Syracuse from other locations. Benzene produced at the Main Plant served as the raw material for production of chlorinated benzenes at the Willis Avenue Plant, while xylene and other imported chemicals were used to produce hydrogen peroxide at the Bridge Street Plant.

Chlor-alkali production at both the Willis Avenue Plant and the Bridge Street Plant used mercury cells and diaphragm cells. Both types of cells are used in electrolytic processes for the production of chlorine, sodium hydroxide, and potassium hydroxide from purified sodium chloride and potassium chloride brine.

What Contaminants are in Onondaga Lake?

Honeywell released several of the major organic contaminants found at the Onondaga Lake subsite (e.g., low molecular weight PAHs [LPAHs], chlorinated benzenes, and BTEX) from at least as early as 1918, and began using PCBs and mercury as of the 1940s or possibly the late 1930s.

Benzene, Toluene, Ethylbenzene, and Xylenes: BTEX compounds are used by a number of manufacturers in industrial processes including the manufacture of other chemicals, some rubbers, paints, paint thinners, lubricants, pesticides, and fuel oil, and as cleaning solvents. Benzene, toluene, and xylenes compounds were produced at the benzol facility located at the Honeywell Main Plant and used at the Honeywell Willis Avenue Plant in the production of chlorinated benzenes. Benzene, toluene, and xylenes which were also part of Honeywell's waste streams, were released to the environment by Honeywell, and are each hazardous substances. In animals, benzene is not highly acutely toxic, but chronic exposure can result in central nervous system depression, immunosuppression, bone marrow depression, degenerative lesions of the gonads, fetal growth retardation, damage to genetic material, and solid tumors in several organs. Chronic exposure in humans can result in bone marrow depression, anemia, and leukemia. Breathing benzene can cause drowsiness, dizziness, and unconsciousness. Benzene is considered to be carcinogenic.

Chlorinated Benzenes: Chlorinated benzenes are a group of 12 cyclic aromatic compounds in which one to six hydrogen atoms of a benzene ring have been replaced by up to six chlorine substituents, including monochlorobenzene, dichlorobenzenes, trichlorobenzenes, tetrachlorobenzenes, pentachlorobenzene, and hexachlorobenzene. Chlorinated benzenes were produced by Honeywell's Willis Avenue Plant, which was in operation from 1918 until 1977. Chlorinated benzenes were also part of Honeywell's waste streams, were released to the environment by Honeywell, and are hazardous substances. Chlorinated benzenes are resistant to chemical and biological degradation and tend to accumulate in lipid- (fat-) containing tissues of animals and humans. Chlorinated benzenes have been shown to cause adverse reproductive effects in invertebrates and fish. Chlorinated benzenes can bioaccumulate in humans, and cause adverse health effects (e.g., hexachlorobenzene may cause liver damage).

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, or 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 sediment and the water column. Mercury is a known human and ecological toxicant. Methylmercury-induced neurotoxicity is the effect of greatest concern when exposure occurs to the developing fetus. Other adverse effects of mercury include reduced reproductive success, impaired growth and development, and behavioral abnormalities.

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. 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 ten 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.

In addition to the four major product lines, Honeywell facilities produced coke and producer gas (i.e., a mixture of carbon monoxide, nitrogen, hydrogen, methane, carbon dioxide, and oxygen). Other products were produced for short periods of time as pilot plant or developmental laboratory activity or as start-up operations that were later relocated. These products included:

- Nitric and picric acids.
- Salicylic acid and methylsalicylate.
- Benzyl chloride, benzoic acid, benzaldehyde, and phthalic anhydride.
- Phenol.
- Ammonia (via nitrogen fixation at the Bridge Street Plant).

Although not generally considered part of the Syracuse Works, the Barrett Division of the Semet-Solvay Chemical Company (one of Honeywell's predecessor companies) operated a paving material production facility from 1919 to 1983 at a location that is now part of the Wastebed B/Harbor Brook subsite. This part of the Wastebed B/Harbor Brook subsite consists of several buildings, aboveground storage tanks, and a gravel parking lot.

Former Honeywell Operations: Waste Management and Disposal

Waste was generated by most manufacturing processes at the Syracuse Works. Waste streams for disposal were discharged from the three plants to at least four different destinations: the Semet Residue Ponds (coke byproduct recovery only), Geddes Brook and Ninemile Creek (via the West Flume), the Solvay wastebeds, and directly to the lake (via the East Flume). The Solvay wastebeds are located in the towns of Camillus and Geddes, and in the city of Syracuse (see Figure 2). From approximately 1881 to 1986, these wastebeds were the primary means of disposal for the wastes produced by the Solvay operations. Initial Solvay waste disposal practices consisted of filling low-lying land adjacent to Onondaga Lake. Later, unlined wastebeds designed specifically for Solvay waste disposal were built using containment dikes constructed of native soils, Solvay waste, and cinders, or by using bulkheads made with timber along the lakeshore. The Syracuse Works also had a landfill in the center of Solvay Wastebed 15.

The discharge of Honeywell waste through the East Flume caused the formation of a large ILWD. The ILWD extends approximately 2,000 ft (610 m) into the lake, approximately 4,000 ft (1,219 m) along the lakeshore, and contains waste up to 45 ft (13.7 m) thick. The majority of the ILWD is within the boundaries of SMU[1] (see Figure 4), although some of the ILWD extends into the adjoining SMUs 2 and 7. The ILWD contains waste from all of Honeywell's product lines. The discharges of waste to Geddes Brook and Ninemile Creek through the West Flume, as well as the overflow from Solvay Wastebeds 9 to 15, also caused the formation of deposits of Honeywell wastes and resulted in the development of the deposits in the Ninemile Creek delta in the lake in SMU 4. The seeps overflow from Solvay Wastebeds 1 to 8 contributed to the formation of Honeywell wastes in the lake itself.

Two additional sites (the Mathews Avenue Landfill and the Willis Avenue Ballfield site) were used for disposal of industrial wastes and construction and demolition (C&D) debris from the Syracuse Works. A site known as the dredge spoils area located on the lakeshore northwest of the mouth

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[1] For investigation and remediation purposes, the site has been divided into eight SMUs based on water depth, sources of water entering the lake, physical and ecological characteristics, and chemical risk drivers. SMUs 1 through 7 cover the littoral zone and SMU 8 covers the profundal zone. See Figure 3 and the section below entitled "Sediment Management Units."

of Ninemile Creek was used for disposal of dredged material from the Ninemile Creek delta and nearshore areas north of Ninemile Creek. Additional information on these Honeywell sites, including a location map, can be found in Chapter 4 of the Onondaga Lake RI report.

In 1970, the Syracuse Works' Main Plant ceased production of benzene, toluene, xylenes, and naphthalene. In addition, releases of mercury from the Willis Avenue Plant and the Bridge Street Plant were reduced. In 1977, when the Willis Avenue Plant closed, the production of chlorinated benzenes and chlor-alkali products at the plant ceased. In 1979, the Bridge Street Plant was sold to Linden Chemicals and Plastics (LCP), which operated the plant until it closed in 1988. In 1986, the Main Plant ceased production of soda ash and related products, marking the end of manufacturing by Honeywell at the Syracuse Works. A time line of a summary of activities since 1986 is provided below.

Time Line of Activities at the Onondaga Lake Bottom Site Since Cessation of Honeywell Production in 1986

Date	Activity
June 23, 1989	Onondaga Lake was added to the New York State Registry of Inactive Hazardous Waste disposal sites.
	⇓
Consent Decree dated March 16, 1992	Honeywell consented to investigate the lake pursuant to the terms of a New York district court ("Consent Decree" – 89-CV-815).
	⇓
December 16, 1994	Onondaga Lake and areas upland of the lake that contribute or have contributed contamination to the lake system were added to EPA's NPL.
	⇓
1992 to 2000	An RI was conducted by Honeywell.
	⇓
2001	Additional investigation conducted by NYSDEC.
	⇓
December 2002	NYSDEC rewrote the RI report and issued it in December of 2002.
	⇓
November 2004	Honeywell completed the FS report. NYSDEC issued the Proposed Plan for public comment.

Satisfaction of all ROD requirements does not represent a settlement with the State of all statutory claims under the State and federal Superfund laws (e.g., State and federal claims for Natural Resource Damages under the Superfund laws are not resolved by satisfaction of all ROD requirements) or of statutory claims under other State and federal environmental laws or of claims under common law.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI and 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 November 2004 Proposed Plan identifies NYSDEC's preferred remedy[2] 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. NYSDEC later added three new repositories at libraries in Camillus, Liverpool, and the State University of New York (SUNY) College of Environmental Science and Forestry (ESF) (see Appendix VI, Responsiveness Summary).

NYSDEC conducted a public availability session in February 2003 to present the findings of the RI report to the public.

A notice of the commencement of the public comment period related to NYSDEC's preferred remedy, the public meeting dates, contact information, and the availability of the above-referenced documents was published in the *Syracuse Post-Standard* on November 29, 2004. The public comment period opened on November 29, 2004. NYSDEC held informal availability sessions on January 6, 2005 from 7:00 to 9:00 P.M. and on January 12 and February 16, 2005 from 3:00 to 5:00 P.M., and held formal public meetings on January 12 and February 16, 2005 at 7:00 P.M. 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 Proposed Plan and to answer questions from the public about the site and the remedial alternatives under consideration. Approximately 200 and 100 people, including residents, environmental groups, local businesspeople, and state and local government officials attended the January 12 and February 16 public meetings, respectively. The public comment period was closed on March 1, 2005.

A notice of the commencement of a subsequent public comment period was published in the *Syracuse Post-Standard* on April 1, 2005. The purpose of the subsequent public comment period was to solicit public comments on the Proposed Plan as approved by EPA on March 25, 2005, on the NRRB's recommendations related to its review of the Proposed Plan, and on NYSDEC and EPA's New York regional office's responses to these recommendations. Responses to the written comments received during the public comment periods and to comments received at the public meetings are included in the Responsiveness Summary (see Appendix VI).

In addition, NYSDEC has performed an extensive outreach program relative to the Proposed Plan. NYSDEC met with local stakeholders including the Onondaga Nation (five meetings), Onondaga County Legislature's Environmental Committee, Onondaga County's Department of the

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2 EPA abstained from concurring with the Proposed Plan prior to its release to the public in November 2004 since it was not subject to prior review by EPA's National Remedy Review Board (NRRB). The NRRB is an EPA peer review group that reviews all proposed Superfund cleanup decisions that meet certain cost-based or other review criteria to ensure that these proposed decisions are consistent with Superfund law, regulations, and guidance. Subsequent to the issuance of the Onondaga Lake Proposed Plan the NYSDEC met with the NRRB, the NRRB commented on the Proposed Plan and EPA and NYSDEC responded to the NRRB comments. EPA subsequently issued a letter on March 25, 2005 which stated that EPA concurred with NYSDEC's preferred remedy.

Environment, Onondaga Lake Partnership (which consists of federal, state, local, public, and private interests that are involved in managing the environmental issues of Onondaga Lake and the Onondaga Lake watershed), Atlantic States Legal Foundation (Technical Assistance Grant recipient), various local scientists associated with Upstate Freshwater Institute, professors from the State University of New York Syracuse College of Environmental Science and Forestry, and officials and residents of the Town of Camillus (the town in which a sediment consolidation area may be constructed) to discuss the Proposed Plan. NYSDEC also met with environmental organizations, including the Sierra Club, Citizens Campaign for the Environment, and the Central New York Air and Waste Management Association.

SCOPE AND ROLE OF OPERABLE UNIT

The NCP, 40 CFR Part 300, defines an operable unit (OU) 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 OUs, depending on the complexity of the problems associated with the site. OUs may address geographical portions of a site, specific site problems, or an initial phase 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, which are shown in Figure 5, are also considered by EPA to be OUs of the NPL site. The Onondaga Lake subsite is one of the OUs at the Onondaga Lake NPL site.

This ROD focuses only on the Onondaga Lake subsite of the Superfund NPL site. The primary objective of this action (the fourth OU for which a ROD has been issued) is to remediate the contamination within Onondaga Lake sediments such that any existing and potential future health and environmental impacts are eliminated or reduced, to the extent practicable.

The status of the other subsites is discussed below. Interim remedial measures (IRMs) are mentioned below to the extent that they address migration of contamination to the lake. The control of contamination migrating from these upland subsites to Onondaga Lake is an integral part of the overall remediation of Onondaga Lake.

Status of Other Onondaga Lake NPL Site Operable Units

The General Motors Ley Creek PCB Dredgings subsite includes areas along the banks of Ley Creek where PCB-contaminated dredge spoils removed from the creek were placed. A ROD was issued by NYSDEC in March 1997. The remediation of a 4,000-ft (1,219-m) stretch of the stream bank containing the dredge spoils (excavation and off-site disposal of PCB-contaminated sediments exceeding 50 parts per million [ppm] and site capping) was completed in August 2001.

In September 2000, NYSDEC issued a ROD for the LCP Bridge Street subsite. In March 2002, Honeywell entered into an administrative consent order with NYSDEC whereby it committed to implement the remedy at the site. The remedial design was approved in September 2004. Remedial construction activities, which include removal of impacted 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 a low-permeability cap; and pumping of groundwater inside the cutoff wall is currently underway. Remediation of the LCP Bridge Street subsite will control discharges of mercury and other contaminants to the West Flume, some of which ultimately migrate to Onondaga Lake through Geddes Brook and Ninemile Creek. It is anticipated that the bulk of the construction will be completed in 2005.

An RI/FS for the Geddes Brook/Ninemile Creek site is underway pursuant to the terms of the Consent Decree referenced in the "Site History" section, above. The RI/FS includes an evaluation of alternatives for remediating channel sediments in lower Ninemile Creek and floodplain soils/sediments along both lower Geddes Brook and lower Ninemile Creek. The remediation of both streams and associated floodplains, in conjunction with remediation of the LCP Bridge Street subsite, is expected to result in a significant reduction of loadings of mercury and other contaminants to Onondaga Lake. In July 2002, Honeywell entered into an administrative consent order with NYSDEC whereby it committed to perform an IRM for Geddes Brook. The IRM will include the removal of all sediments down to the underlying clay layer in the reach of the brook from the West Flume to the confluence with Ninemile Creek. Impacted soils and sediments within the floodplain along lower Geddes Brook will also be remediated. The IRM design is currently underway.

In March 2002, NYSDEC and EPA issued a ROD for the Semet Residue Ponds subsite. The selected remedy includes the excavation of the residue from the Semet Ponds and on-site processing of the residue into benzene, light oil, and a soft tar product to be used in manufacture of driveway sealer. It also includes groundwater collection and on-site treatment. In December 2003, NYSDEC and EPA determined that a potential modification of the remedy, which would allow for the residue to be utilized as an alternative fuel, may be evaluated by way of a focused FS/remedial design/remedial action Consent Order. The Consent Order was executed by NYSDEC and Honeywell in January 2004. A draft focused FS report is currently under review. The remedial design related to the groundwater component of the remedy is currently underway.

The Town of Salina Landfill subsite, which borders Ley Creek, received domestic, commercial, and industrial wastes from the 1950s to the 1970s. A Proposed Plan identifying a preferred remedy for the Salina Town Landfill subsite was released for public comment in January 2003. The proposed remedy included the construction of a 6 NYCRR Part 360 multilayer cap over the landfill areas north and south of the creek and construction of a groundwater and leachate collection trench north and south of the creek.

An RI/FS is presently underway for the Willis Avenue subsite. In March 2002, Honeywell entered into an administrative consent order with NYSDEC whereby it committed to implement an IRM for the lakeshore area downgradient of the Willis Avenue and Semet Residue Ponds subsites. The IRM consists of the design, construction, and operation of a hydraulic containment system. This IRM is planned to eliminate, to the extent practicable, the discharge of groundwater and NAPLs containing contaminants such as chlorinated benzenes, BTEX, naphthalene and other PAHs, and mercury to Onondaga Lake.

Actions will be taken by Honeywell to address wastes to be collected by the hydraulic containment systems for the Willis Avenue and Semet Residue Ponds subsites pursuant to CERCLA. Contaminated groundwater, once collected, will be treated at a wastewater treatment plant that will be constructed on the Willis Avenue subsite. The containment systems will also be designed to collect NAPLs, which will be treated and/or disposed of at an off-site permitted facility. Since these NAPL materials are highly mobile, have high concentrations of toxic compounds, and present a significant risk to human health and the environment should exposure occur, they are characterized as principal threat wastes.

The Willis/Semet IRM is also intended to eliminate, to the extent practicable, direct point-source discharges to the lake through stormwater conveyances (stormwater piping and outfalls associated with I-690), and to eliminate, to the extent practicable, potential impacts to fish and wildlife resources associated with ongoing discharges from the Willis Avenue and Semet Residue Ponds subsites. The design of the IRM is currently underway. Remedial efforts for Tributary 5A are being evaluated by Honeywell as part of the RI/FS for the Willis Avenue subsite.

An amendment to the Willis Avenue RI/FS administrative consent order was signed in 1996 for the performance of an IRM to address the discharge of site-related contaminants from the I-690 storm drain system. As part of the IRM, the system was cleaned and surveyed using video equipment. This work indicated that contaminated groundwater was entering the system through open pipe joints. Remedial work, including the testing and sealing of the open pipe joints, began in 1998 and was completed in 1999. A program for monitoring the effectiveness of the IRM indicated that residual contaminant concentrations were reduced but not eliminated. Due to this residual contamination, a pilot study was initiated in 2002 pursuant to an administrative consent order with NYSDEC to study the isolation of the underdrain (groundwater) flow from the stormwater (from I-690) within the eastern portion of the system. This pilot study is ongoing.

Honeywell is conducting an RI/FS for the Wastebed B/Harbor Brook subsite, which includes the East Flume. In November 2003, Honeywell entered into an administrative consent order with the NYSDEC whereby it committed to implement an IRM for the Wastebed B/Harbor Brook subsite. The IRM consists of the design, construction, and operation of a hydraulic containment system at the Wastebed B/Harbor Brook subsite along the shoreline from the Willis Avenue subsite to Harbor Brook and along the lower portion of Harbor Brook. The IRM is intended to isolate and collect contaminants including mercury, chlorinated benzenes, BTEX, naphthalene and other PAHs, and NAPLs from groundwater before they enter Onondaga Lake and Harbor Brook. Contaminated groundwater, once collected, will be treated at a wastewater treatment plant that is being constructed on Honeywell's Willis Avenue subsite.

The Wastebed B/Harbor Brook subsite IRM design will address collection of NAPLs, which will be treated and/or disposed of at an off-site permitted facility. This IRM will be designed so that it can be integrated with the Willis/Semet IRM (discussed above), resulting in a continuous hydraulic containment system along the entire lakeshore of SMUs 1 and 2 from Tributary 5A to Harbor Brook as well as upstream along the west bank of lower Harbor Brook. Since this IRM involves treatment of source materials constituting principal threat wastes, this IRM also addresses the statutory preference for treatment as a principal element. Pre-design sampling associated with the IRM is underway.

In March 2002, Honeywell entered into an administrative consent order with NYSDEC whereby it committed to implement an IRM for the East Flume. As documented in the Onondaga Lake RI report, the East Flume was historically one of the major discharge locations for mercury and other waste materials to the lake. The IRM for the East Flume includes the excavation of approximately 19,000 cubic yards (cy) (14,500 cubic meters [m^3]) of sediment from within the upper and lower East Flume, the abandonment of an existing 72-inch (183-cm) concrete pipe that discharges to the upper East Flume, and the extension of an existing 60-inch (152-cm) concrete pipe into Onondaga Lake.

An RI/FS is underway at the General Motors former Inland Fisher Guide (IFG) facility subsite. Three significant IRMs have been performed to prevent the migration of PCBs off of the site and into Ley Creek, a tributary to Onondaga Lake. An on-site industrial landfill that contained chromium-and PCB-contaminated material has been capped. The purpose of this IRM was to prevent these contaminants from leaching into the groundwater. A second IRM involved the removal of highly contaminated soil from a former discharge swale. This swale was used, in the 1950s and 1960s, as a conduit for the discharge of liquid process waste to Ley Creek. The swale was subsequently filled in, but the contaminated soil remained until the performance of this IRM. Over 26,000 tons of soil containing hazardous waste levels of PCBs have been removed from the site. The third significant IRM was the construction of a treatment pond and associated water treatment system. This pond collects all water that accumulates on site in any of the storm sewers or abandoned process sewers. The pond water is then sent through the treatment plant in order to meet permitted discharge limits, prior to discharge to Ley Creek. The purpose of this IRM was to stop the intermittent discharge of PCBs and other contaminants that occur during storm events. Construction activities associated with these IRMs have been completed.

SUMMARY OF SITE CHARACTERISTICS

Onondaga Lake is a 4.6-square mile (sq mi) (12-square kilometer [sq km]), 3,000-acre lake, approximately 4.5 mi (7.2 km) long and 1 mi (1.6 km) wide, with an average water depth of 36 ft (11 m). The lake has two deep basins, a northern basin and a southern basin, that have maximum water depths of approximately 62 and 65 ft (19 and 20 m), respectively. The basins are separated by a saddle region at a water depth of approximately 56 ft (17 m). Most of the lake has a broad nearshore shelf in water depths of less than 12 ft (3.7 m). This nearshore shelf is bordered by a steep offshore slope in water depths of 12 to 24 ft (3.7 to 7.3 m).

Site Geology/Hydrogeology

The bedrock geology beneath the lake consists of 500 to 600 ft (150 to 180 m) of sedimentary rocks of the Vernon Shale Formation, which are comprised of soft and erodible mudstones with some localized, discontinuous gypsum seams. The Syracuse Formation overlies the Vernon Formation to the south of Onondaga Lake to an elevation of 300 to 380 ft (90 to 120 m) above mean sea level. The Syracuse Formation is approximately 600 ft (180 m) thick and is comprised of shales, dolostones, and salts. In this formation, groundwater flowing upward to the north toward Onondaga Lake is the source of brines in the area that contribute to the background salinity levels in the lake.

Onondaga Lake is underlain by a thick layer of soft, unconsolidated sediments ranging from approximately 80 ft (24 m) to over 300 ft (90 m) thick beneath the mouth of Onondaga Creek at the south end of the lake.

Two primary hydrogeologic units exist at the lake: unconsolidated deposits and underlying bedrock shale. The unconsolidated deposits were formed by the combination of glacial processes, post-glacial (lacustrine) processes, and human activities. These unconsolidated deposits consist (from top to bottom) of layers of fill, marl, silt and clay, silt and fine sand, sand and gravel, and till overlying the shale bedrock.

Groundwater in the unconsolidated deposits, which overlies the silt and clay layer, comprises an unconfined groundwater zone that provides most of the discharge of groundwater to the lake. There is limited groundwater discharge from the deeper unconsolidated units to the lake. Groundwater from the bedrock discharges to the lower portion of the overlying unconsolidated deposits west of the lake. Total quantities of groundwater discharged to the lake are small compared to discharges of surface water to the lake.

A major influence on groundwater density is salinity (measured by total dissolved solids concentrations). The range in total dissolved solids concentrations in the area of the lake (400 milligrams per liter [mg/L] to almost 194,000 mg/L) is caused by the presence of Honeywell's Solvay wastes and naturally occurring salt brines.

Surface Water Hydrology

Onondaga Lake receives surface runoff from a drainage basin of 285 sq mi (738 sq km). Surface water flows primarily from the south and southeast into the lake through six tributaries: Ninemile Creek, Onondaga Creek, Ley Creek, Harbor Brook, Bloody Brook, and Sawmill Creek. In addition, lesser amounts of surface water are contributed to the lake through two industrial conveyances: the East Flume and Tributary 5A. Ninemile Creek and Onondaga Creek are the largest sources of water flow to the lake and together accounted for approximately 62 percent of the inflow into the lake from surface sources for the period from 1971 to 1989. Discharge from the Metro Plant accounted for approximately 19 percent of the total inflow during the same period. Ley Creek and Harbor Brook accounted for an estimated 8 and 2 percent of the total inflow, respectively. Contributions from all other tributaries, including Bloody Brook, the East Flume, Tributary 5A, and Sawmill Creek were minor in comparison and together accounted for the remaining 9 percent. The highest inflows of water and suspended solids from tributaries occur during the spring due to snowmelt and springtime rain events, peaking in March and April.

Water also enters the lake through an intermittent bidirectional flow from the Seneca River at the outlet of the lake. This bidirectional flow is possible because Onondaga Lake is part of the New York State Barge Canal System, and the elevation of the lake is controlled by a dam on the Oswego River at Phoenix, New York, downstream of the site. Flow from the outlet is sensitive to the rate of tributary inflow, wind speed and direction, water surface elevations in the river and lake, seiche (variation in the lake surface) activity in the lake, elevated salinity, and other factors. Due to the shallowness of the outlet channel, it is likely that only epilimnetic surface water flows out of the lake into the river. The annual contribution of the Seneca River to the lake has not been quantified but is believed to be less than 10 percent of the total flow to the lake on an annual basis.

The lake elevation can influence the characteristics of the nearshore sediments, including wetlands and parts of the littoral sediments that are subject to wave and ice disturbance. The lake is generally at its highest elevation in the early spring due to increased tributary flows and at its lowest elevation during the summer months. For the 30-year period from 1971 to 2000, maximum annual variations in lake levels ranged from 1.6 ft (0.5 m) in 1988 to 7.2 ft (2.2 m) in 1993, with an overall mean of 4.1 ft (1.25 m).

Based on the United States Geological Survey (USGS) data, the following observations have been made:

- The average lake elevation is 362.82 ft (110.59 m) above mean sea level.
- The highest lake level was 369.18 ft (112.53 m) above mean sea level.
- The lowest level was 361 ft (110 m) above mean sea level.

Onondaga Lake is stratified during summer, more weakly stratified in winter, and is vertically mixed in the spring and fall. Summer stratification is most pronounced from May through September due to temperature effects on water density. During summer stratification, the colder (and therefore denser) hypolimnion is unable to mix with the overlying warmer (and therefore less dense) epilimnion. The boundary between the epilimnion and the hypolimnion is called the thermocline and is the region in the water column where the temperature changes most rapidly with depth. In Onondaga Lake, the thermocline is located at approximately 30 ft (9 m) below the water surface. The epilimnetic waters continue to be mixed by wind and wave action, while the hypolimnion is isolated beneath the thermocline.

The hypolimnion receives organic and inorganic solids that settle by gravity from the epilimnion toward the lake bottom. As the summer progresses, biodegradation of the organic solids deplete the oxygen in the hypolimnion, creating anoxic conditions. The presence of an anoxic hypolimnion is not uncommon in stratified lakes. However, oxygen depletion in the hypolimnion of Onondaga Lake is exacerbated by loading of phosphorus to the lake from the Metro Plant discharge, and to a lesser degree from tributaries. Phosphorus is the limiting nutrient that, when it is increased, promotes the growth or productivity of phytoplankton, which in turn increases the organic loading of settling solids to the hypolimnion. Increased phytoplankton productivity also leads to decreased water clarity (due to the high mass of phytoplankton in surface water). In addition to anoxia, elevated concentrations of sulfides and ammonia found in the hypolimnion are considered evidence of advanced cultural eutrophication.

Waters within Onondaga Lake are more saline than in most inland lakes. Solvay Wastebeds 1 through 15 as well as Solvay waste that was disposed of directly in the lake and at other locations along and near the lakeshore are known to contribute calcium, sodium, and chloride to Ninemile Creek and/or the lake. In addition, naturally occurring salt brine, which was collected and evaporated in the vicinity of Onondaga Lake for many years, affects both groundwater and nearby surface water quality. Natural salt springs present near the lake result in saline wetlands. The USGS recently documented a saline spring in Onondaga Creek between Kirkpatrick and Spencer Streets; however, the daily load (on the order of 10 tons [9,000 kilograms {kg}]) is a minor contribution to the salt budget of the lake. The Geddes Brook/Ninemile Creek RI report estimated that the daily total dissolved solids load from Solvay Wastebeds 9 through 15 to Ninemile Creek is on the order of 440 tons (400,000 kg) based on two base-flow sampling events in 1998.

Most solids that enter the lake from tributary inflows settle to the lake bottom and are not transported out of the lake through the outlet. Suspended solids from the tributaries initially settle in nearshore sediment, where the water depth is less then 15 ft (4.5 m). With the exception of deltas formed at the mouth of some tributaries (e.g., Ninemile Creek, East Flume, and Ley Creek), nearshore sediment generally does not accumulate because it is frequently resuspended by wind and waves. Over time, sediment is carried to deeper waters by lake circulation and ultimately settles to the bottom in deeper parts of the lake.

Sediment Characteristics

Based on the depth of the thermocline during stratification, the Onondaga Lake RI report defined sediment located above the thermocline (i.e., 30 ft [9 m]) as littoral sediment and sediment located below the thermocline as profundal sediment. The intent of these designations was to distinguish between the different biological, physical, and chemical processes of the epilimnion and hypolimnion.

Littoral Sediment

Much of the sediment in water depths of less than 15 ft (4.5 m) consists generally of fine silts and clays, sand, and shell fragments.

High concentrations of calcite exist within the littoral sediments throughout most of the lake, due to disposal of Solvay waste during operation of the former Honeywell Main Plant from 1881 to 1986 and past and present input of naturally calcitic sediments from the tributaries. Available data indicate that external calcium loading to the lake decreased by 70 percent between 1983 to 1985 and 1987 to 1989, reflecting the cessation of Honeywell's activities at its Main Plant in 1986. Calcium carbonate deposition also decreased by 64 percent over the 1985 to 1989 time frame.

Oncolites are another form of calcite in littoral sediments of Onondaga Lake. Oncolites are small, oval or irregularly rounded, calcareous concretions that resemble elongated pebbles. Made up of calcium carbonate and a small fraction of organic material, they are found throughout the littoral sediments of the lake, especially along the northeast, north, and northwest shorelines. Oncolites are of relatively low mass and therefore are readily moved by waves and currents. Eventually, oncolites may become stationary if they grow to a sufficient size. In Onondaga Lake, oncolite formation is closely associated with discharges of calcium-laden wastes to the lake by Honeywell.

While much of the littoral zone is considered non-depositional due to wind and wave action, discrete areas at the mouths of the tributaries are depositional. These areas, called deltas, are created when the tributary enters the lake, the flow rate drops sharply, and suspended solids settle to the lake bottom. Sediment in these areas accumulates and reflects the composition of the suspended solids that were transported by the tributary into the lake. The delta at the mouth of Ninemile Creek was dredged in the 1960s to remove material that had accumulated over time.

Another historically depositional area within the littoral zone in the southern corner of Onondaga Lake is the area referred to as the ILWD. This area was formed primarily through the precipitation of calcite (calcium carbonate) and other Honeywell wastes from the overflow of dikes around Wastebed B and discharges via the East Flume.

Profundal Sediment

Profundal sediment (i.e., sediment in water depths greater than 30 ft [9 m]) is characterized by small particle size and relatively high moisture content and relatively high concentrations of phosphorus, nitrogen, and organic carbon, when compared to littoral zone sediments. This sediment is comprised of two units. The first unit extends to approximately 35 inches (90 centimeters [cm]) below the sediment surface and is composed of black clay with distinct layers or laminations. The clay has a sulfide smell and gas bubbles (presumably methane) are present. The second unit extends from approximately 35 inches (90 cm) to at least 16 ft (500 cm) below the sediment surface and is composed of dark gray clay with occasional wood fragments and snail shells. This unit also contains laminations, though they are less distinct than in the first unit. The laminations are attributed to deposition of calcite, clays, and diatoms (silica) associated with erosion of the watershed, productivity cycles within the lake, and other annual events.

Areas of Archaeological or Historical Importance

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 asserts 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. Later, 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 draft Phase 1A Cultural Resource Assessment for the project area was produced in October 2004; this report noted the likelihood that the proposed project might encounter both recorded and unrecorded prehistoric and historic resources. Consequently, it is likely that once the area of remedial impact becomes established, additional cultural resource investigations will be required before the remedy is implemented.

Results of the Remedial Investigation

To determine the nature and extent of contamination and assess risks to humans and the environment, as part of the RI, more than 6,000 samples were collected and analyzed for contaminants including metals, volatile organic compounds (VOCs), and semivolatile organic compounds (SVOCs). A human health risk assessment (HHRA) and baseline ecological risk assessment (BERA) were completed 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 reports were finalized by NYSDEC in December 2002. NYSDEC conducted a public availability session in February 2003 to present the findings of these documents to the public.

As a result of the RI studies and risk assessments, numerous contaminants were identified as chemical parameters of interest (CPOIs) (see the text box entitled "What are Chemical Parameters of Interest?"[page 17]). The RI report presents information on site history, field and laboratory investigations, physical characteristics of the site, sources of contamination, nature and extent of contamination, and fate and transport of contaminants. The results of the RI are summarized below.

Sediments

- Mercury contamination is found throughout the lake, with the most elevated concentrations detected in sediments in the Ninemile Creek delta and in the ILWD, which extends along the southern shoreline from near Tributary 5A to beyond Harbor Brook.

- Mercury contamination is widespread in the upper 6.5 ft (2 m) of the sediments in the lake, and it is even deeper in sediment in the Ninemile Creek delta and the ILWD. At the Ninemile Creek delta, mercury contamination extends to a depth of at least 16.4 ft (5 m) into the sediments. Mercury contamination extends to a depth of about 26.2 ft (8 m) and possibly greater into the sediment/waste in the ILWD.

- The organic contaminants (e.g., BTEX, chlorinated benzenes, low molecular weight PAHs [LPAHs], PCBs, and PCDD/PCDFs) are primarily found in the ILWD and the shoreline area of the Honeywell sites, with concentrations of these CPOIs in the waste several orders of magnitude higher than in most of the lake. At the ILWD, elevated concentrations of these CPOIs extend to a depth of at least 26.2 ft (8 m). High molecular weight PAHs (HPAHs) are concentrated in the sediments throughout much of the southern basin of the lake, with the highest concentrations occurring off the former Oil City shoreline region and the shoreline areas near the Honeywell sites.

- Elevated contaminant concentrations and visual evidence (e.g., liquids, droplets, sheens) indicate that NAPL (e.g., chlorinated benzenes, which were manufactured and released as a waste by Honeywell) exists throughout the ILWD and in an area off the Honeywell causeway. Based on data collected during the RI/FS, it was determined that the NAPLs and highly contaminated waste materials in these areas of the lake are highly mobile, at least when disturbed, have high concentrations of toxic compounds, and present a significant risk to human health and the environment should exposure occur; therefore, they are characterized as principal threat wastes. In the areas of the ILWD that are far from shore (approximately 660 to 980 ft [200 to 300 m]), it is most likely that these NAPLs were disposed of directly into the lake with the other wastes.

As discussed in the "Description of Lakewide Alternatives" section of this ROD, the volume of materials (contaminated sediments/wastes) in the littoral zone that exceed the cleanup criteria range from about 12 million cy to more than 20 million cy.

What are Chemical Parameters of Interest?

The **chemical parameters of interest**, or **CPOIs**, for the Onondaga Lake 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 include mercury and other metals, BTEX, chlorinated benzenes, PAHs, 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 Onondaga Lake subsite was performed as part of the RI. COPCs were developed using available contaminant concentration data for lake fish (fillets only; limited to species likely to be consumed by humans), and for water and sediments in the northern and southern basins of the lake. A total of 62 COPCs were identified in the HHRA that fall into the classes identified above plus pesticides and additional VOCs and SVOCs (see Table 1).

COCs: COCs are used in baseline ecological risk assessments (BERAs) to determine chemicals that may be harmful to the environment. A BERA for the Onondaga Lake subsite was performed as part of the RI. COCs were developed using toxicity values to establish conservative thresholds for adverse effects to ecology (water, surface sediment, surface soil, plants, fish, and wildlife). As presented in the BERA, numerous toxic chemicals were detected at elevated concentrations in various lake media. A total of 38 COCs were identified in the BERA that fall into the classes identified above plus pesticides and additional SVOCs (see Table 2).

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 and oncolites in sediments and calcium, chloride, salinity, ammonia, nitrite, phosphorus, and sulfide in water, as well as depleted dissolved oxygen and reduced water transparency (see Table 2).

Surface Water

- Concentrations of total mercury in lake water are highest in the nearshore areas around both Ninemile Creek and the ILWD. In the deep basins, water column total mercury concentrations increase significantly in the hypolimnion during summer stratification, with a high fraction of this hypolimnetic total mercury occurring in the dissolved phase.

- Concentrations of benzene, chlorobenzene, and dichlorobenzenes in lake water are highest near the Honeywell source areas in the vicinity of the East Flume and Harbor Brook.

Biota

- Mercury, PCBs, hexachlorobenzene, and PCDD/PCDFs have bioaccumulated in Onondaga Lake fish, and mercury has been found at elevated levels in benthic macroinvertebrates. It is likely that these contaminants have bioaccumulated in other biota (e.g., birds, mammals) as well; however, there are insufficient data to quantitatively assess the extent of bioaccumulation in these other biota. Consumption of fish drives the potential cancer risks and non-cancer hazards for humans (see the “Summary of Site Risks” section of this ROD).

- As discussed in the HHRA report, concentrations of mercury (as methylmercury) in tissue of edible-size fish collected from the lake since 1992 range from less than 0.1 to 5.1 milligrams per kilogram (mg/kg) (or ppm), with the average concentration of 1.1 mg/kg exceeding the US Food and Drug Administration limit of 1 mg/kg.

Impacts to Fish and Wildlife Resources

The contamination in the media described above has contributed to negative effects on the fish and wildlife resources around Onondaga Lake in a number of ways, including:

- Oncolite formation.
- Spring and fall turnover, which were not regular occurrences in the lake during the period of ionic waste discharges.
- Chloride loadings to Onondaga Lake from Solvay waste.
- Reduced species richness and a standing crop of macrophytes in the nearshore zone.
- Reduced species richness of zooplankton communities.
- Increased dominance of benthic macroinvertebrate communities by pollution-tolerant taxa.
- Reduced reproduction in the lake by numerous fish species.
- Elimination of cold-water fishery.
- Mercury, PCB, and PCDD/PCDF contamination of fish.
- Lack of amphibian reproduction in wetlands that are directly connected to lake water.
- Reduced species richness of amphibians and reptiles.

A detailed evaluation of the nature and extent of contamination, including contaminant distribution maps and concentration ranges of CPOIs in site media, can be found in Chapter 5 of the RI report.

Fate and Transport of Contaminants

Some of the key findings of the CPOI fate and transport analyses include:

<u>General</u>

- The lake is a sink for essentially all contaminants. For every CPOI examined, the estimated loads of contaminants entering the lake are at least five times greater than the loads leaving the lake.

- Several important contaminant source areas or mechanisms have been identified. These transport routes serve to deliver multiple contaminants to the lake. Among the routes and mechanisms are the following:

  – Ninemile Creek: This tributary has been and continues to be the single largest external source for total mercury. It has also been a source of PCDD/PCDFs, PCBs, lead, and chromium to the lake.

  – Harbor Brook: This tributary has been and continues to be a major source of LPAHs, particularly naphthalene, to the lake.

  – Ley and Onondaga Creeks: These tributaries appear to be ongoing sources of PCBs, and possibly PCDD/PCDFs, and are among the largest sources of lead to the lake.

  – East Flume: This tributary has been a long-term and important conduit for mercury, chlorinated benzenes, PAHs, and PCDD/PCDFs to the lake.

  – Honeywell lakeshore area groundwater: Transport of contaminants to the lake via groundwater represents the most important loading route for several CPOIs, including LPAHs such as naphthalene (from the Wastebed B/Harbor Brook site), chlorobenzene and dichlorobenzenes (from the Willis Avenue site), and all four BTEX compounds(from the Willis Avenue, Semet Residue Ponds, and Wastebed B/Harbor Brook sites). The NAPL plumes, which lie beneath the Willis Avenue and Wastebed B/Harbor Brook sites, contribute to the groundwater contamination and may also be contributing NAPL directly to the lake.

  – ILWD: Resuspension of these materials presents a significant source of mercury to the lake, perhaps representing the largest internal source to the water column. It is also a potentially important source of PCDD/PCDFs, BTEX, chlorinated benzenes, PCBs, PAHs, and other non-mercury CPOIs. Surface concentrations of several CPOIs are highly elevated in this waste area relative to the rest of the lake.

  – Profundal sediments: These sediments appear to be responsible for the increase in the hypolimnetic mercury inventory during summer stratification. This increase is believed to be a major source of mercury in the lake.

Mercury

- The lake sediments contain a huge reservoir of mercury. Both profundal and littoral sediments have high mercury inventories.

- Internal loads of mercury, generated via sediment resuspension and other mechanisms, probably yield a net load to the water column similar in magnitude to the externally derived loads, at least during the period of summer stratification.

- The primary removal mechanism for mercury in the water column of Onondaga Lake is particle settling. Deposition to the profundal sediments is the ultimate fate of most of the mercury in the lake, although data indicate that this mercury is not entirely sequestered from the environment.

- Internal sources of total mercury include the resuspension and transfer of materials from the ILWD and the transfer of dissolved and particulate mercury from the profundal sediments. Resuspension and transfer of materials from the ILWD contributes a significant flux to the epilimnion mercury budget, while the transfer of materials from profundal sediments is an additional source of total mercury to the hypolimnion.

- Wind-driven resuspension (i.e., resuspension of lake sediments during windy conditions) is a major mechanism for the release of contaminants from the ILWD and possibly other littoral zone sediments. Groundwater advection through these materials may also transport significant quantities of mercury, as well as other CPOIs, to the lake.

- Particle resuspension and increased diffusion associated with methane gas ebullition in the anoxic sediments (i.e., disturbance of the lake bottom sediments by escaping methane bubbles) are the likely mechanisms for the release of mercury from profundal sediments to the hypolimnetic water column.

- The primary source of methylmercury to the water column is the methylation of total mercury in the hypolimnetic water column during the recurring anoxic stratified period. Diffusion of methylmercury across the thermocline provides the majority of the methylmercury budget to the epilimnion during the summer stratified period. The methylmercury produced in the hypolimnion during stratification escapes to the oxic waters of the lake during the process of fall turnover, resulting in a substantial increase in the epilimnetic concentrations.

Chemical Parameters of Interest Other than Mercury

- The lake sediments represent a huge reservoir of contaminant mass for many other CPOIs. Significant contamination other than mercury exists in the littoral zone near the Honeywell lakeshore area, extending along the shore as far as Ley Creek for some compounds. This inventory of contamination cannot be considered sequestered as it is in an area subject to wind-driven waves. The ILWD is located in this region, representing a clear source of contamination to the water column of the lake.

- Low molecular weight organics, such as BTEX, chlorinated benzenes, and LPAHs, tend to be found in sediments offshore of Honeywell's former facilities. An apparent combination of rapid deposition and rapid biodegradation, as well as groundwater-based releases, has resulted in a sediment inventory that is primarily located near the source area.

- High molecular weight organics, such as HPAHs, PCDD/PCDFs, and PCBs, are present at elevated levels throughout the lake bottom sediments, reflecting their resistance to biodegradation as well as the extended period of discharge to the lake by Honeywell and possibly other sources.

- The likely sources of the current loads of BTEX, chlorinated benzenes, and LPAHs include groundwater and NAPL from the various Honeywell upland sites and the ILWD area.

- The largest sources of PCBs to the lake are likely the ILWD and Ley Creek.

- The largest sources of PCDD/PCDFs to the lake are likely Ninemile Creek (octachlorodibenzodioxin- and tetrachlorodibenzofuran-dominant), the East Flume (tetrachlorodibenzofuran-dominant), and Ley Creek (octachlorodibenzodioxin-dominant).

- Elevated levels of cadmium, chromium, copper, lead, nickel, and zinc are found in the lake sediments. The pattern of contamination suggests sources other than, or in addition to, Honeywell for many of these metals. In part because of their longevity in the environment, these metals can be found at levels above background throughout the sediments of the lake bottom.

<u>Calcite Precipitation and Ionic Wastes</u>

- The rate of calcite formation has diminished by at least half since the closure of Honeywell's Main Plant. Current sedimentation rates are about half of the pre-1986 sedimentation rates.

- Currently, ionic concentrations remain elevated with respect to other nearby water bodies, even though, overall, ionic concentrations in the lake water have been significantly reduced from conditions in the 1980s and earlier.

- Oncolites are found throughout the littoral zone along most of the northern part of the lake and may have had a significant effect on the ecological structure of the lake by creating an unstable substrate for macrophyte (aquatic plant) colonization, thus limiting macrophyte distribution.

A detailed evaluation of the fate and transport of CPOIs can be found in Chapter 6 of the RI report.

See Tables 3, 4, and 5 (in the Tables section of this ROD [Appendix II]) for summaries of sediment data from all depths, Table 6 for surface water data from all depths, and Table 7 for fish data.

Sediment Management Units

For investigation and remediation purposes, the site has been divided into eight SMUs based on water depth, sources of water entering the lake, and physical, ecological, and chemical characteristics (see Figure 3). The division of the site into SMUs allowed the development and evaluation of remedial alternatives appropriate to each area. The remedial alternatives evaluated for each SMU were then used in combination to develop comprehensive, lakewide remedial alternatives which would reduce site risks to humans and the environment. SMUs 1 through 7 are located in the littoral zone of the lake (i.e., water depths of 0 to 30 ft [0 to 9 m]), and SMU 8 covers the profundal zone (i.e., water depths of greater than 30 ft [9 m]).

SMU 1

SMU 1 is located at the southern end of Onondaga Lake and encompasses the majority of the ILWD. The ILWD was formed primarily through the deposition of calcium carbonate and other wastes from the overflow of dikes around Wastebed B and through discharges via the East Flume. These discharges into the lake are believed to have included a combination of cooling water, sanitary waste, Solvay waste, mercury wastes, and organic chemical wastes, which settled out and formed a large delta that is at a higher elevation than surrounding areas of the lake bottom. This waste material is typically described as very soft to soft, although there are some harder crusts. This softness, along with geophysical evidence of historical failures (i.e., underwater slumping or "landslides" associated with the ILWD), causes concern as to whether the wastes in their current configuration are sufficiently stable to prevent a portion of the ILWD from slumping in the future.

SMU 1 is located directly offshore of Wastebed B, and the East Flume and Harbor Brook enter Onondaga Lake here. SMU 1 extends approximately 3,850 ft (1,170 m) west from the mouth of Harbor Brook, encompassing a surface area of approximately 84 acres. At its widest point, SMU 1 extends approximately 2,200 ft (671 m) into the lake. Lake bathymetry indicates that the nearshore shelf (at water depths less than 13 ft [4 m]) is relatively broad and is bordered by a steeper offshore slope at water depths from 13 to 30 ft (4 to 9 m).

A portion of the SMU 1 shoreline is contiguous with the state-regulated wetland SYW-19 (see Figure 6), which is dominated by Phragmites while the rest of the shoreline is partially forested. Nearshore sediments are dominated by Solvay waste (e.g., calcium carbonate deposits). Macrophyte beds are lacking, fish reproduction appears low, and there is a severely impaired benthic community.

Multiple external sources for most of the CPOIs present in the lake have been identified in the vicinity of SMU 1, including the Wastebed B/Harbor Brook and the Willis Avenue subsites.

NAPL is present within layers of the ILWD and is typically found in small brown nodules. The NAPL does not appear to be present in continuous layers. Sheens were also noted on the lake surface at every location in this area during intrusive activities. There is evidence of mobility of the NAPL residual in the lake during intrusive activities such as well placement, sediment coring and sample collection, and likely during sediment resuspension caused by wind-driven waves. Since these NAPLs and other highly contaminated materials in the lake in this area are highly mobile, have high concentrations of toxic compounds, and present a significant risk to human health and the environment should exposure occur, they are characterized as principal threat wastes.

Risk concerns and associated CPOIs and stressors in SMU 1 include sediment toxicity to benthic macroinvertebrates (mercury, ethylbenzene, xylenes, chlorobenzene, dichlorobenzenes, trichlorobenzenes, PAHs, total PCBs); exposure of humans to sediments by wading (arsenic, PAHs, PCDD/PCDFs, hexachlorobenzene); exposure of fish to mercury and other CPOIs and subsequent human and wildlife consumption of fish; benthic macroinvertebrate/insect consumption by wildlife (PAHs, barium, chromium, mercury, methylmercury, selenium); a moderately to severely impaired benthic community (sediment toxicity); and impaired habitat conditions (limited macrophyte cover).

SMU 2

SMU 2 is located in the southern portion of the lake offshore from the causeway formerly used by Honeywell for loading and unloading materials. The SMU extends approximately 3,000 ft (914 m) along the southern shore of the lake, from the border with SMU 1 toward Tributary 5A. At its widest point, SMU 2 extends approximately 550 ft (170 m) into the lake. Lake bathymetry indicates that the nearshore shelf is relatively broad, except near the mouth of Tributary 5A, where it becomes steeper (*i.e.*, greater than 15 percent slope). Storm drains associated with I-690 discharge into this SMU.

Natural shoreline features, including vegetation, are lacking in SMU 2. The littoral zone sediments are dominated by calcium carbonate deposits. Macrophyte beds are lacking, there is a moderately impaired to severely impaired benthic community, and evidence of fish reproduction in the area is low to none.

Multiple external sources for most of the CPOIs present in the lake were identified in the vicinity of SMU 2, including the Semet Residue Ponds and the Willis Avenue subsites.

Stained fill material was observed at one location within SMU 2. The 0 to 10.5 ft (0 to 3.2 m) depth interval at this location contained black impacted fill material that was granular in nature (slag, brick, wood, etc.) and was, according to Honeywell, likely placed during the construction of the causeway in the 1970s. The staining of the fill material may be a result of NAPL in this area. The source of the contamination at this location is likely related to the NAPL (chlorinated benzenes) plume from the Willis Avenue site or from the I-690 storm drains in the area, which intercept a portion of the contaminated groundwater from the Honeywell site. The NAPLs and other highly contaminated materials in the lake in this area are also characterized as principal threat wastes.

Risk concerns and associated CPOIs and stressors in SMU 2 include sediment toxicity to benthic macroinvertebrates (mercury, ethylbenzene, xylenes, chlorobenzene, dichlorobenzenes, trichlorobenzenes, PAHs, total PCBs); exposure of humans to sediments by wading (arsenic, PAHs, PCDD/PCDFs, hexachlorobenzene); exposure of fish to mercury and other CPOIs and subsequent human and wildlife consumption of fish; benthic macroinvertebrate/insect consumption by wildlife (PAHs, barium, chromium, mercury, methylmercury, selenium); a moderately to severely impaired benthic community (sediment toxicity); and impaired habitat conditions (limited macrophyte cover and oncolites).

SMU 3

SMU 3 is located offshore of Honeywell's inactive Solvay Wastebeds 1 through 8, which were used to dispose of wastes from the manufacturing of soda ash via the Solvay process. SMU 3 extends approximately 8,000 ft (2,440 m) west from SMU 2. At its widest point, it extends approximately 825 ft (250 m) into the lake. Lake bathymetry indicates that the shelf is relatively steep in the southern part of SMU 3, becoming broader to the north.

The sediments are dominated by calcium wastes including oncolites. Macrophyte beds are generally sparse, but increase at the border with SMU 4. The immediate shoreline is erosional, but vegetation on the Solvay wastebeds supports terrestrial wildlife. Evidence suggests that fish reproduction is low. The benthic community impacts vary widely from slightly to severely impacted.

Risk concerns and associated CPOIs and stressors in SMU 3 include sediment toxicity to benthic macroinvertebrates in some areas (mercury, ethylbenzene, xylenes, dichlorobenzenes, total PCBs); impaired habitat conditions (calcitic sediments, unstable shoreline, limited macrophyte cover [except at the border of SMUs 3 and 4]); a slightly to moderately impaired benthic community (sediment toxicity in some areas); and impaired habitat conditions (limited macrophyte cover and oncolites).

SMU 4

SMU 4 is located along the shore of Onondaga Lake west of SMU 3 and includes the delta where Ninemile Creek discharges into the lake. SMU 4 extends approximately 3,300 ft (1,006 m) along the shore of the lake. At its widest point, it extends approximately 1,375 ft (420 m) into the lake. Lake bathymetry indicates that the shelf is relatively steep in the northern part of SMU 4, becoming broader to the south. The sediment load at the mouth of Ninemile Creek drives the depositional processes along the central portion of this SMU by discharging fine- and coarse-grained material to the lake. The sediment load from the creek influences the bathymetry and water depth in the central portion of this SMU.

SMU 4 is contiguous with state-regulated wetland SYW-10 (see Figure 6), which is a floodplain forest. Macrophyte beds are prevalent in the depositional areas of Ninemile Creek. During low water events in late summer, exposed sediments attract shorebirds. Evidence suggests significant fish reproduction in the area. Some sediments of the SMU include eroded Solvay wastebed materials and oncolites. The benthic community is moderately impacted.

Multiple external sources were identified in the vicinity of SMU 4, including the LCP Bridge Street site, West Flume, Geddes Brook and Ninemile Creek, and Honeywell's Solvay Wastebeds 1 through 15. The LCP Bridge Street site is located along the West Flume and consists of 20 acres of land used by Honeywell for chlor-alkali production. The West Flume discharges into Geddes Brook, which discharges into Ninemile Creek.

Risk concerns and associated CPOIs and stressors in SMU 4 include moderately impaired benthic community; habitat conditions (limited macrophyte cover in some areas); and exposure of fish to mercury and other CPOIs and subsequent human and wildlife consumption of fish.

SMU 5

SMU 5 includes the littoral zone along the northern and western shores of the lake. Sawmill Creek and Bloody Brook discharge into SMU 5. The Seneca River, the main discharge point for Onondaga Lake, is also located within SMU 5 at the northwestern end of the lake. SMU 5 extends approximately 30,000 ft (9,144 m) from the Ninemile Creek delta to the Ley Creek delta. At its widest point, it extends approximately 1,375 ft (420 m) into the lake. Lake bathymetry indicates that the nearshore shelf (at water depths less than 13 ft [4 m]) is relatively broad and is bordered by a steep offshore slope at water depths from 13 to 30 ft (4 to 9 m).

Habitat conditions vary significantly across SMU 5. The northwest section is contiguous with state-regulated wetland SYW-6 (see Figure 6), which includes floodplain forest and emergent wetlands. There are large macrophyte beds and overhanging vegetation that encourage fish reproduction. The remainder of the shoreline is dominated by human uses, including the Onondaga Lake Park and roadways. Some shoreline vegetation is present. The sediments throughout the SMU are dominated by calcium carbonate and oncolites. Macrophytes and fish reproduction decrease along the northeast section of the SMU. The benthic community is slightly to moderately impacted.

External sources for some CPOIs present in the lake were identified within the vicinity of SMU 5 in the Bloody Brook area. Bloody Brook runs through an industrial complex, some suburbs, and some major transportation rights of way, discharging into the middle of the northern side of the lake.

Risk concerns and associated CPOIs and stressors in SMU 5 include slightly impaired habitat conditions in some areas (oncolites and limited macrophyte cover in some areas) and slightly to moderately impaired benthic communities and limited macrophyte cover in some areas.

SMU 6

SMU 6 extends approximately 5,000 ft (1,500 m) along the eastern end of Onondaga Lake from the mouth of Ley Creek to 700 ft (213 m) south of the mouth of Onondaga Creek, and includes where Ley Creek, Onondaga Creek, and Metro discharge into Onondaga Lake. At its widest point, it extends approximately 1,925 ft (590 m) north into the lake. Lake bathymetry indicates that the nearshore shelf is relatively broad.

The SMU 6 shoreline is contiguous with state-regulated wetland SYW-12 (see Figure 6), which includes floodplain forest and emergent wetlands. Sediments are less dominated by calcium carbonate deposits than some other SMUs and oncolites are not abundant. Macrophyte beds are present, especially at the mouth of Onondaga Creek. Fish reproduction appears low. The benthic community is moderately to severely impacted.

Multiple external sources and potential sources for some of the CPOIs present in the lake were identified in the vicinity of SMU 6, including Ley Creek, Onondaga Creek, and the former Oil City area. The Ley Creek area contains the GM – IFG site, the GM Ley Creek Dredgings site, the Town of Salina Landfill, and the GM Old Ley Creek Channel site. The Onondaga Creek area includes the Niagara Mohawk – Erie Boulevard Manufactured Gas Plant site, the Niagara Mohawk – Hiawatha Boulevard Manufactured Gas Plant site, the Roth Steel site, and the American Bag and Metal site. The former Oil City area was used as a bulk storage and transfer facility for numerous industries. These sites are discussed further in the Onondaga Lake RI report. Although the Honeywell sites and former facilities (and related discharge points) are not located adjacent to the shoreline of SMU 6, the effects of Honeywell's facilities and discharges are evident in the sediments of this SMU based on the presence of Honeywell CPOIs.

Risk concerns and associated CPOIs and stressors in SMU 6 include sediment toxicity to benthic macroinvertebrates (mercury, ethylbenzene, xylenes, dichlorobenzenes, PAHs, total PCBs); sediment exposure to humans by wading (arsenic, PAHs, PCDD/PCDFs, hexachlorobenzene); exposure of fish to mercury and other CPOIs and subsequent human and wildlife consumption of contaminated fish; benthic macroinvertebrate/insect consumption by wildlife (PAHs, barium, chromium, mercury, methylmercury, selenium); and impaired habitat conditions (limited macrophyte cover).

SMU 7

SMU 7 is located at the southern corner of Onondaga Lake and includes the littoral zone located between SMU 1 and SMU 6. SMU 7 is located between Harbor Brook to the west and the

Onondaga Creek delta to the east and extends approximately 1,375 ft (420 m) along the shore of the lake. At its widest point, it extends approximately 2,200 ft (670 m) into the lake. Lake bathymetry indicates that the shelf is relatively broad near the shore, becoming slightly steeper at a water depth greater than 13 ft (4 m).

A portion of SMU 7 is contiguous with part of state-regulated wetland SYW-19 (see Figure 6), which is dominated by Phragmites. The remainder of the shoreline is in close proximity to the railway. Macrophyte beds are present. Calcium carbonate deposits and associated oncolites are less dominant than in other SMUs. Fish reproduction appears low and the benthic community is severely impacted.

Multiple external sources for most of the CPOIs present in the lake were identified in the vicinity of SMU 7, including Harbor Brook, which flows adjacent to the Lakeshore Area and the Penn-Can property (both part of the Wastebed B/Harbor Brook subsite). NAPL was observed in one boring in SMU 7. In addition, sheen was consistently noted at the water surface during installation of borings, consistent with the observations at the ILWD. NAPL was also noted in a number of sediment samples collected from Harbor Brook, as well as in samples of the marl deposit collected from beneath the sediments of Harbor Brook. Based on historic photos and sampling, it can be seen that the ILWD extends into a portion of SMU 7.

Risk concerns and associated CPOIs and stressors in SMU 7 include sediment toxicity to benthic macroinvertebrates (mercury, ethylbenzene, xylenes, chlorobenzene, dichlorobenzenes, trichlorobenzenes, PAHs, total PCBs); sediment exposure to humans by wading (arsenic, PAHs, PCDD/PCDFs, hexachlorobenzene); exposure of fish to mercury and other CPOIs and subsequent human and wildlife consumption of contaminated fish; benthic macroinvertebrate/insect consumption by wildlife (PAHs, barium, chromium, mercury, methylmercury, selenium); and impaired habitat conditions (limited macrophyte cover).

SMU 8

SMU 8 includes the entire profundal zone of Onondaga Lake, where the water depth is greater than 30 ft (9 m). It is approximately 22,000 ft (6,710 m) long and approximately 5,225 ft (1,590 m) wide at its widest part. SMU 8 has two basins, northern and southern, which are separated by a slight ridge, or saddle, that is approximately 56 ft (17 m) deep. The maximum depths of the northern and southern basins are 62 ft (19 m) and 65 ft (20 m), respectively. Lake bathymetry indicates that the profundal nearshore shelf is relatively steep, becoming broader towards the center of the lake.

SMU 8 is dominated by anoxic conditions during the summer months that limit the use of the sediments by the benthic community. Anoxic conditions also prevent fish from using the deepwater habitat during the summer. The extent to which fish use the hypolimnion under oxic conditions is unknown.

The ultimate fate of most of the sediment entering Onondaga Lake is burial in the profundal sediment. Therefore, the sources contributing to the contamination within SMUs 1 through 7, as discussed above, are also sources of contamination to the profundal sediments in SMU 8.

Risk concerns and associated CPOIs and stressors in SMU 8 include habitat impairment, with exclusion of the benthic community during periods of anoxia and exposure of fish to mercury and other CPOIs (e.g., PCBs) in the epilimnion and in the hypolimnion during those times that oxygen is available and subsequent human and wildlife consumption of contaminated fish.

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 (Reimann-Buechner Partnership, 1991). The primary objective of land-use planning efforts is to enhance the quality of the lake and lakeshore for recreational and commercial uses. Anticipated recreational uses of the lake include fishing without consumption restrictions and swimming. The Onondaga Nation similarly asserts it seeks to safely make greater use of lake.

Land Use

In general, the eastern shore of Onondaga Lake is mainly urban and residential, and the northern shore is dominated by parkland, wooded areas, and wetlands. The northwest upland is primarily residential, with interspersed urban structures and several undeveloped areas. Solvay wastebeds cover much of the western lakeshore. Urban centers and industrial zones dominate the landscape surrounding the south end of Onondaga Lake from approximately the New York State Fairgrounds to Ley Creek. Land around the southwest corner and southern portion of the lake is generally industrial and has been significantly modified as part of long-term development of the Syracuse area. 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]). No permitted swimming beaches or sanctioned swimming areas exist at Onondaga Lake (NYSDOH, 1995).

Fishing occurs, but the NYSDOH has a specific, restrictive advisory for Onondaga Lake which warns against eating walleye (*Stizostedion vitreum*), with consumption of all other species limited to no more than once per month (NYSDOH, 2005). The specific advisory also stipulates that infants, children under 15, and women of childbearing age should eat no fish from the lake. 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). The shoreline of the lake (especially in the park) is used for water-related recreation such as fishing and boating. In 1990, more than one million people used Onondaga Lake County Park, located along the northern half of the lake (Moore, pers. comm., 1991).

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 Onondaga Lake subsite. 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.

Human Health Risk Assessment

A site-specific HHRA was performed to quantitatively evaluate both cancer risks and non-cancer health hazards associated with potential current and/or future exposures to chemicals present in Onondaga Lake surface water, sediments, and fish in the absence of any action to control or mitigate those chemicals. The HHRA was prepared to evaluate potential risks associated with exposure to elevated concentrations of mercury, benzene, chlorobenzene, and other COPCs in surface water; mercury, benzene, xylenes, chlorinated benzenes, PAHs, PCBs, PCDD/PCDFs, and other COPCs in sediments; and mercury, hexachlorobenzene, PCBs, PCDD/PCDFs, and other COPCs in fish.

Hazard Identification

In addition to mercury (including methylmercury), approximately 60 other chemicals were identified as COPCs in one or more site media using a screening process comparing measured concentrations to risk-based concentrations. Risks were calculated for these COPCs in the HHRA. The COPCs that are associated with unacceptable levels of cancer risk or non-cancer hazard are known as COCs.

Exposure Assessment

Recreational visitors to Onondaga Lake are the receptors or individuals with the greatest potential for exposure to COPCs. Cancer risks and non-cancer health hazards were evaluated for young children (less than 6 years old), older children (6 years to less than 18 years old), and adults (18 years and over). In addition, it was assumed that people eat fish caught in Onondaga Lake, even though NYSDOH currently advises that women of childbearing age, infants, and children under the age of 15 should not eat any fish from Onondaga Lake and all others should eat no more than one meal per month of any species, with no walleye to be eaten at all. Recreational visitors were assumed to include anglers who eat fish from Onondaga Lake; people who swim, wade, or boat in the lake; and people who play or walk along the shoreline of the lake. The exposure point concentrations for the COCs, along with detection frequencies for these contaminants, are presented in Table 8.

In addition to consumers of fish, the HHRA also evaluated exposure to those who may contact contaminated sediments and water; specifically, current and future recreational users of Onondaga Lake and future construction workers. A summary of the results of the risk estimates is provided below in the “Risk Characterization” section.

In order to allow risk managers to consider various options when evaluating remediation strategies, the HHRA estimated cancer risks and non-cancer hazards based on a range of potential exposures under both the reasonable maximum exposure (RME) scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, and the central tendency (CT, or “typical”) scenario. Cancer risks and non-cancer health hazards were assessed for recreational visitors to Onondaga Lake and future construction workers 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 non-cancer effects. These measures were primarily derived and published by EPA. The three COCs (or COC groups) responsible for a majority of estimated site risks are methylmercury, PCBs, and PCDD/PCDFs.

- Methylmercury, which is the predominant form (95 percent or more) of total mercury in fish tissue, is a toxic chemical with which a number of adverse health effects have been associated in both human and animal studies. The critical health endpoint from exposure to methylmercury is developmental neurotoxicity.

- PCBs cause cancer in animals and probably cause cancer in humans. In addition, serious non-cancer 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 are probable human carcinogens, based on evidence in laboratory animals. 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 non-cancer health effects as well as cancer endpoints is presented in Tables 9 and 10, respectively.

Risk Characterization

The HHRA shows that cancer risks and non-cancer health hazards associated with ingestion of chemicals in sport fish (e.g., largemouth bass) from Onondaga Lake are above levels of concern. Fish ingestion is the primary pathway for exposure to COCs and for potential adverse health effects. Cancer risks and non-cancer health hazards calculated for the consumption of Onondaga Lake fish exceeded the target risk level range, as follows:

- **Cancer risks:** The calculated RME cancer risks (ranging from 2.4×10^{-4} to 7.8×10^{-4}) exceeded the high end of the target risk range (10^{-4}), and exceeded the low end of the target cancer risk (10^{-6}) by more than two orders of magnitude.[3] The CT fish ingestion cancer risk (about 4.5×10^{-5} for all recreational receptors) was below the high end of the target range but above the low end of the range. The cancer risk estimates for the COCs for the RME scenario are presented in Table 11.

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[3] 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.

- **Non-cancer health hazards:** The RME non-cancer hazard indices (ranging from about 18 to 28) exceeded the target hazard index (1) by more than an order of magnitude.[4] The calculated CT non-cancer hazard index (ranging from about 4.5 to 7) also exceeded the target. The non-cancer hazard quotients and indices for the COCs for the RME scenario are presented in Table 12.

RME cancer risks for most recreational exposure pathways (e.g., swimming, wading, boating) other than fish ingestion equaled or exceeded the low end of the target risk range of 1×10^{-6}, with the highest of these being about 3.5×10^{-5} for older child exposure to nearshore sediments from the southern basin of the lake. For the CT cancer risk calculations, the low end of the target range was equaled and slightly exceeded in one pathway other than fish ingestion, with a maximum CT risk of about 2×10^{-6} for young child exposure to nearshore sediments from the southern basin. RME cancer risks (3.7×10^{-6}) for exposure to south basin sediments for future construction workers 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.

None of the calculated non-cancer hazards (for both RME and CT scenarios) associated with pathways other than fish ingestion exceeded the target threshold of 1, indicating that exposure to lake COPCs from all pathways except fish consumption are not predicted to result in adverse non-cancer effects. (Note that risks due to the sediments and soils in the wetlands around the lake and the dredge spoils area near Ninemile Creek were calculated in the Onondaga Lake risk assessments but are not presented in this ROD. These areas are now being addressed as part of investigations taking place at other upland sites; i.e., the Ninemile Creek Dredge Spoils Area for state-regulated wetland SYW-6 [see Figure 6], Geddes Brook/Ninemile Creek for state-regulated wetland SYW-10, and the Wastebed B/Harbor Brook site for state-regulated wetlands SYW-12 and SYW-19.)

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, chlorinated benzenes, and other COCs and stressors in surface water; mercury, BTEX, chlorinated benzenes, PAHs, PCBs, PCDD/PCDFs, and other COCs and stressors in sediments; and mercury, chlorinated benzenes, PAHs, PCBs, PCDD/PCDFs, and other COCs in fish and other wildlife. The framework used for assessing site-related ecological risks is similar to that used for HHRAs 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,

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4 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.

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 non-cancer effects are the usual 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 Onondaga Lake 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 an aquatic macrophyte community to provide food and shelter for aquatic organisms and wildlife.

- Sustainability of phytoplankton and zooplankton communities as a food source for aquatic organisms and wildlife.

- Sustainability of a terrestrial plant community to provide food and shelter to invertebrates and wildlife.

- Sustainability of a benthic invertebrate community to serve as a food source for local fish and wildlife.

- Sustainability of fish populations.

- Sustainability of amphibian and reptile populations.

- Sustainability of insectivorous, benthivorous, piscivorous (fish-eating), and carnivorous bird populations.

- Sustainability of insectivorous and piscivorous mammal populations.

Detailed quantitative assessment of sustainability of selected populations of fish and wildlife were conducted by selecting individual species representative of various feeding preferences, predatory levels, and habitats. Receptors selected to represent the Onondaga Lake ecological community for the BERA included eight species of fish, six species of birds, and four species of mammals. The remaining receptors (i.e., both aquatic and terrestrial plants, phytoplankton and zooplankton, 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 Onondaga Lake 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, sediment, 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, BTEX, chlorinated benzenes, and PCDD/PCDFs, were detected at concentrations above ecological screening levels in various lake 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 Onondaga Lake ecosystem to determine if contamination has adversely affected plants and animals in and around the lake. Almost all lines of evidence indicate that input of chemicals and ionic waste in Onondaga Lake has produced adverse ecological effects at all trophic levels (levels of the food chain) examined.

As discussed in the BERA, mercury and possibly other chemicals have bioaccumulated in most organisms serving as a food source for biota in the lake, 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 in the lake. Many of the chemicals in the lake are persistent (i.e., would 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 site-specific sediment effects concentrations based on macroinvertebrate toxicity tests (see the text box entitled "Development of Sediment Effect Concentrations/Probable Effect Concentrations"[page 34]) suggest that adverse effects to benthic invertebrates due to contact with surface sediments will frequently occur in most areas of the lake. The greatest number of contaminants with exceedances and the greatest magnitude of those exceedances were found in areas in the southern portion of the lake (i.e., SMUs 1, 2, 6, and 7) and near Ninemile Creek (i.e., SMU 4).

This is confirmed by benthic community analysis, which indicates that these areas are moderately to severely impacted. As defined in the BERA, "moderately impacted" indicates that the macroinvertebrate community is altered to a large degree from the reference condition and "severely impacted" indicates that the macroinvertebrate community is limited to a few tolerant species, usually midges or worms, and often only one or two species are abundant. In addition, the aquatic macrophytes in the lake have been adversely affected by lake conditions, and the resulting loss of macrophyte habitat that formerly provided valuable feeding, spawning, and nursery areas has likely adversely affected the aquatic invertebrates and vertebrates living in Onondaga Lake.

Summary of Human Health and Ecological Risks

Key results of the HHRA include the finding that contamination in Onondaga Lake presents risks to human health that are above EPA guidelines. In addition, the primary sources of these cancer risks and non-cancer health hazards are due to mercury, PCBs, and PCDD/PCDFs as a result of the consumption of Onondaga Lake fish.

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 throughout the range of the point estimates of risk. Site-specific sediment toxicity data indicate that sediments are toxic to benthic macroinvertebrates on both an acute (short-term) and chronic (long-term) basis. Many of the contaminants in the lake 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 in the lake 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 RI report, BERA, and HHRA (all dated December 2002), the final FS report (dated November 29, 2004), the Proposed Plan (dated November 29, 2004), the comments on the Proposed Plan and RI/FS received from the public during the comment period, the comments on the Proposed Plan issued by EPA's National Remedy Review Board (NRRB) (dated February 18, 2005), the responses of NYSDEC and EPA Region 2 to the NRRB's comments (dated March 25, 2005), and this ROD (which includes the Responsiveness Summary).

Development of Sediment Effect Concentrations/Probable Effect Concentrations

To evaluate sediment quality in Onondaga Lake, toxicity of the sediment to sediment-dwelling (benthic) invertebrates was tested. Laboratory tests involved exposing the midge *Chironomus tentans* and the amphipod *Hyalella azteca* to Onondaga Lake sediments and observing their growth and survival. Since the results for *Chironomus tentans* were found to be the more sensitive test, these acute toxicity data were then used to develop the following five site-specific SECs:

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.

Threshold Effect Level (TEL) – The geometric mean of the concentration that represents the lowest 15th percentile of the concentrations at which toxic effects were observed and the 50th percentile (median) of the concentrations at which no toxic effects were observed. At concentrations below the TEL, toxic effects are rarely expected.

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.

Probable Effect Level (PEL) – The geometric mean of the ER-M and the 85th percentile of the concentration distribution for the no-effects data. At concentrations above the PEL, toxic effects are likely to occur.

Apparent Effect Threshold (AET) – The concentration of a chemical in sediment above which a particular toxic effect (e.g., increased mortality or decreased biomass) is always significant compared to reference concentrations. At concentrations above the AET, toxic effects are predicted to always occur.

The geometric mean of these five Onondaga Lake SECs was calculated to provide a single consensus-based probable effect concentration (PEC) for each contaminant. At concentrations above the PEC, adverse effects in sediments are expected to frequently occur. The derivation of these site-specific values is presented in the Onondaga Lake BERA. SECs and PECs were calculated for each of the CPOIs in the BERA. For mercury, the following SEC values were calculated: 0.51 mg/kg for ER-L, 0.99 mg/kg for TEL, 2.8 mg/kg for ER-M, 2.84 mg/kg for PEL, and 13 mg/kg for AET. Based on these five SECs, the PEC for mercury is 2.2 mg/kg. As discussed in the BERA, the SECs and PECs do not consider the potential effects that could occur throughout the food web as a result of bioaccumulation. However, bioaccumulation is considered in the development of PRGs for fish tissue and for a sediment quality value for mercury. See text boxes entitled, “Preliminary Remediation Goals for Fish Tissue” (page 40)and “Bioaccumulation-Based Sediment Quality Values (page 41).”

REMEDIAL ACTION OBJECTIVES

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 (TBC) guidance, and site-specific risk-based levels. There are no federal or New York State sediment cleanup standards for mercury or the other CPOIs found in Onondaga Lake sediments. Although the sediments are the primary focus of the remediation, the degree of attainment of New York State’s surface water standards and guidance values and site-specific fish target concentrations were also evaluated.

The RAOs for Onondaga Lake were 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 in the RI report as goals for controlling CPOIs within the lake and protecting human health and the environment. The RAOs for Onondaga Lake are:

- **RAO 1**: To eliminate or reduce, to the extent practicable, methylation of mercury in the hypolimnion.
- **RAO 2**: To eliminate or reduce, to the extent practicable, releases of contaminants from the ILWD and other littoral areas around the lake.
- **RAO 3**: To eliminate or reduce, to the extent practicable, releases of mercury from profundal sediments.
- **RAO 4**: To be protective of fish and wildlife by eliminating or reducing, to the extent practicable, existing and potential future adverse ecological effects on fish and wildlife resources and to be protective of human health by eliminating or reducing, to the extent practicable, potential risks to humans.
- **RAO 5**: To achieve surface water quality standards, to the extent practicable, associated with CPOIs.

In order to achieve these RAOs, preliminary remediation goals (PRGs) were established to provide additional information/goals with which remedial alternatives can be developed and selected. Onondaga Lake contains three primary media that have been impacted by CPOIs: sediments, biological tissue, and surface water. The following three PRGs have been developed, each addressing one of the affected media:

- **PRG 1**: Achieve applicable and appropriate sediment effect concentrations (SECs) for CPOIs and the bioaccumulation-based sediment quality value (BSQV) of 0.8 mg/kg for mercury, to the extent practicable, by reducing, containing, or controlling CPOIs in profundal and littoral sediments.
- **PRG 2**: Achieve CPOI concentrations in fish tissue that are protective of humans and wildlife that consume fish. This includes a mercury concentration of 0.2 mg/kg in fish tissue (fillets) for protection of human health based on the reasonable maximum exposure scenario and EPA's methylmercury National Recommended Water Quality criterion for the protection of human health for the consumption of organisms of 0.3 mg/kg in fish tissue. This also includes a mercury concentration of 0.14 mg/kg in fish (whole body) for protection of ecological receptors. These values represent the range of fish tissue PRGs.
- **PRG 3**: Achieve surface water quality standards, to the extent practicable, associated with CPOIs.

PRG 1– Sediments

Toxicity

The sediment PRG (PRG 1) is based on five site-specific SECs and one consensus-based probable effect concentration (PEC) for the CPOIs evaluated in the RI and risk assessments (see the text box called "Development of Sediment Effect Concentrations/Probable Effect Concentrations"[page 34]). The SECs and PECs were calculated using data from acute sediment toxicity testing using benthic macroinvertebrates. Benthic macroinvertebrates live in and around the sediments for most of their lives, and therefore experience the highest direct exposure to contamination in the lake.

As part of the FS report, the PEC values were incorporated into a mean PEC quotient (PECQ) approach to provide a consistent method of comparing the overall acute toxicity risk from the mixture of contaminants at various locations of the lake (see the text boxes called "Development and Use of the Mean PEC Quotient" [page 37] and Table 13) and to select a level of remediation that would address the risk of direct acute toxicity to the benthic macroinvertebrate community from the contamination in the lake sediments. Although chronic toxicity tests were conducted as part of the RI, insufficient data were available to develop SECs based on results of chronic toxicity testing.

The mean PECQ can be used as a basis for delineating areas of the lake to be remediated. The areas of the lake in which CPOI concentrations in the littoral sediment exceed a mean PECQ of 1 (see the text box called "Application of the Mean PEC Quotient for Determining Remedial Areas/Volumes" [page 38]) generally coincide well with those areas where acute toxicity to benthic macroinvertebrates was observed in the sediment toxicity tests. Therefore, the mean PECQ of 1 was determined to be protective and selected as a remediation goal to address direct acute toxicity to benthic invertebrates. In addition, since mercury in the lake is a primary concern and elimination or reduction of mercury is part of all five RAOs, the mercury PEC of 2.2 mg/kg was also selected as a remediation goal.

Figure 7 presents the mean PECQ distribution and the exceedances of the mercury PEC.

For all but one of the lakewide alternatives evaluated in this ROD, the primary criteria for remediation of sediment toxicity are the mean PECQ of 1 and the mercury PEC. To assess the feasibility of a cleanup based on an SEC to achieve a lower level of residual contamination, one alternative was developed using the effects range-low (ER-L) as the sediment toxicity remediation goal rather than the mean PECQ of 1 and mercury PEC criteria. The ER-L is the concentration at which acute toxic effects are rarely expected, and is more likely to also protect the macroinvertebrate community from chronic effects. (See Figure 8 for exceedances of the ER-L.)

Development and Use of the Mean PEC Quotient

The Onondaga Lake SECs and PECs were used to identify sediments in the lake to be considered for remediation, due to the sediment's direct, acute toxicity to the benthic community. Because of the large number of CPOIs and the differences in sources, transport, and fate, a further refinement of the SEC/PEC approach was used to develop a single number, the mean PECQ, which takes into account the presence and the concentrations of multiple chemicals in the sediments. Similar approaches have been used in many different regions of the US and Canada by federal and state agencies, monitoring programs, and ecological risk assessors to focus remediation on areas that are likely to have the greatest overall toxicity.

Mean PECQs for sediment samples were calculated in the following four-step process:

- The CPOIs were divided into five groups based on chemical class (i.e., metals, aromatics, chlorinated benzenes, PAHs, and PCBs).
- Each detected chemical concentration in a sample was divided by its PEC, resulting in a quotient of the concentration of that chemical in the sample to its respective PEC (e.g., a mercury concentration of 4.4 mg/kg was divided by the mercury PEC of 2.2 mg/kg for a mercury PECQ of 2).
- For each chemical group, all the resulting PECQs for a particular sample were summed, and the sum of the individual PECQs is divided by the total number of CPOIs for the group in that sample.
- The mean PECQs for each chemical group were summed, and the sum was divided by the total number of groups in the sum.

A simplified hypothetical example of the calculation of the mean PECQ for a sediment sample would be where only five CPOIs are present in the sample, and PECQs of 1, 2, 3, 4, and 5 were calculated for the five CPOIs. The mean PECQ for the sample would be the sum of the five individual PECQs (1 + 2 + 3 + 4 + 5 = 15) divided by the total number of PECQs calculated in the sample (i.e., 5), resulting in a mean PECQ of 3 (15/5) for the sample.

One component of the evaluation was to determine which CPOIs appeared to exhibit the strongest influence on observed acute toxicity on a lakewide basis. This analysis resulted in 23 of the 46 CPOIs for which SECs and PECs were calculated being included in the calculation of the final mean PECQ (see Table 13). In the case of Onondaga Lake, the mean PECQ for a sample was calculated based on the PECQs for each of the five chemical groups, which were then averaged to produce the overall mean PECQ for that sample.

Bioaccumulation

The mercury in fish is derived from a combination of food sources such as benthic macroinvertebrates, uptake from the water column through skin or gills, and incidental intake of suspended particles in the water column. Together, these exposure pathways result in the bioaccumulation of mercury in fish. To address the risk to wildlife and humans from consumption of contaminated fish, a BSQV was developed for this contaminant in addition to the benthic toxicity-based PEC of 2.2 mg/kg (see discussion under PRG 2 and associated text box [page 40]). As calculated, the BSQV of 0.8 mg/kg represents a concentration in sediments that, if not exceeded, is predicted to result in mercury concentrations in fish below levels of concern for wildlife that consume fish. Since this ecological-based target level was less than that for protection of adults (i.e., is also protective of human health), it was selected as the target BSQV against which surface-weighted average sediment concentrations will be compared.

Concentrations of PCBs, hexachlorobenzene, and PCDD/PCDFs in fish tissue were also determined to be risk drivers for human health and wildlife. PCBs, hexachlorobenzene, and

PCDD/PCDFs are not widespread in sediments in the lake and are found primarily in a few specific areas of the lake (e.g., SMUs 1, 2, 6, and 7). 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 exceed the cleanup criteria of the mean PECQ of 1 plus the mercury PEC and would be addressed under the remedial alternatives evaluated in this ROD.

Application of the Mean PEC Quotient for Determining Remedial Areas/Volumes

For Onondaga Lake, the mean PECQ for each sample is an indication of the relative risk of acute sediment toxicity posed by the suite of CPOIs at that location. Mean PECQs can be useful for ranking various stations with respect to relative risk and for prioritizing stations for remedial action. For example, if the mean PECQs at two stations are 20 and 1, the station with the higher quotient could be considered a higher priority for remediation.

The relationship of the mean PECQ to toxicity was evaluated by comparing the mean PECQ for each sediment station to the 1992 chironomid mortality data for that same station. There was a general trend showing that as the mean PECQs increased, mortality also increased. An analysis of this relationship suggested that there is an inflection point in the toxicity data around a mean PECQ value of 1 to 2, but the correlation coefficient for these data is rather small, and the data about this inflection point show a high degree of uncertainty. However, a mean PECQ value of 1 can be supported by the concept that if the concentration of a CPOI is equal to or greater than a corresponding acute toxicity threshold (i.e., the PEC for that CPOI), then toxicity would be anticipated to occur. The mean PECQ is simply the “average” quotient for the number of CPOIs detected in the sediments. A mean PECQ value of 1 suggests that on average, the concentrations of CPOIs do not exceed their corresponding PECs.

After evaluating the relationship of the mean PECQ to chironomid acute toxicity, along with the results for the 1992 amphipod acute mortality data, 2000 chironomid and amphipod chronic mortality data, and 2000 chironomid chronic non-emergence data, NYSDEC concluded that remediation of sediments in areas exceeding a mean PECQ of 1 would remediate those sediments where acute toxicity had been observed.

The use of the mean PECQ value of 1 (plus the PEC for mercury; see text) provides a measure of the areal limits of remediation of Onondaga Lake sediments that would protect the benthic community from acute toxicity resulting from direct exposure to CPOIs in the sediments. The mean PECQ methodology itself does not explicitly address chronic toxicity. However, the alternatives discussed in this ROD, other than the No Action Alternative, would result in a reduction of chronic toxicity to the benthic community in those areas of the lake where existing contaminated littoral sediments would be capped (assuming the cap is effective in keeping levels below the PECs) or where existing contaminated littoral sediments would be removed to the ER-L.

Applicability to RAOs

PRG 1 addresses RAOs 1 through 4 to various degrees, as follows.

- **RAO 1**: Methylation of mercury in the hypolimnion is influenced by two primary factors: anoxic conditions (meaning there is no oxygen) and the availability of mercury for methylation. By reducing mercury concentrations in the surface sediments to achieve a specific SEC value, PRG 1 reduces the amount of mercury that may be released into the hypolimnion. The reduction in the amount of mercury released from littoral and profundal sediments into the water column would, in turn, reduce methylation of mercury in the hypolimnion, thus addressing RAO 1.

- **RAO 2**: Reducing the concentration of CPOIs in the ILWD and other contaminated littoral sediments would limit the amount of CPOIs available for release, thus addressing RAO 2.

- **RAO 3**: Reducing, containing, or controlling mercury concentrations in profundal sediments would limit the amount of mercury available for release into the lake through methane gas ebullition or diffusion, thus addressing RAO 3.

- **RAO 4**: Remediating littoral and profundal sediment concentrations to achieve a specific SEC value would directly reduce adverse ecological effects to the benthic community. In addition, reductions of CPOI concentrations in sediment would reduce adverse effects associated with direct exposure of humans, fish, and wildlife to sediment, as well as adverse effects associated with bioaccumulation of CPOIs from sediment. Reductions of mercury concentrations in sediment would also reduce the amount of mercury released to the water column, thereby reducing mercury methylation in the hypolimnion. This, in turn, would make mercury less available for uptake by lake biota and would ultimately reduce potential risks to fish, wildlife, and humans, thus addressing RAO 4.

PRG 2 – Fish Tissue

The fish tissue PRG (PRG 2) primarily addresses RAO 4, which is to be protective of fish and wildlife by eliminating or reducing, to the extent practicable, existing and potential future adverse ecological effects on fish and wildlife resources and to be protective of human health by eliminating or reducing, to the extent practicable, potential risks to humans. A result of such a reduction could be that humans may consume fish in accordance with the state's general advisory for eating sport fish, which states that an individual eat no more than one meal (one-half pound) per week. The current fish consumption advisory in Onondaga Lake (see "Current and Potential Future Site and Resource Uses" section) is much more restrictive than this state-wide general advisory.

Quantitative target concentration ranges for protection of wildlife and humans consuming mercury-contaminated fish from Onondaga Lake were developed (see the text box on "Preliminary Remediation Goals for Fish Tissue" [page 40]). Of the overall concentration range (based on different degrees of ecological and human-health risk) presented in the text box, a range of 0.14 mg/kg for protection of wildlife to 0.3 mg/kg for protection of human health was selected as reasonable fish tissue PRGs. These values are based on site-specific risk calculations. The 0.3 mg/kg PRG is also the EPA National Recommended Water Quality criterion for methylmercury in fish tissue for the protection of humans consuming fish.

Preliminary Remediation Goals for Fish Tissue

Methylmercury is a bioaccumulative contaminant that was calculated to pose potential risks (i.e., hazard quotients above 1) to piscivorous birds, mammals, and humans consuming fish from Onondaga Lake. PRGs for mercury (as methylmercury) concentrations in fish tissue were developed for Onondaga Lake using risk-based methods. There are no federal or New York State cleanup standards for mercury in fish.

The concentrations of methylmercury for the PRGs for fish were calculated based on a hazard quotient of 1 for ecological receptors and non-cancer risk for humans. 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 human health hazard quotient of 1 for individual CPOIs indicates the "threshold level" below which non-cancer effects are not expected to occur. The PRGs were calculated using the same exposure assumptions and toxicity values as the HHRA and BERA.

Mercury fish and wildlife PRGs range from 0.01 to 0.3 mg/kg wet weight (ww) (i.e., 0.01 to 0.3 parts per million [ppm]), depending on species and whether the NOAEL or LOAEL is used to set the target hazard quotient. Avian mercury target levels range from 0.01 to 0.3 mg/kg ww in fish tissue and mammalian target levels range from 0.01 to 0.2 mg/kg ww in fish tissue.

Human health mercury PRG fish tissue concentrations for the reasonable maximum exposure (RME) scenario are 0.2 mg/kg ww and 0.3 mg/kg ww for young children and adults, respectively. In January 2001, EPA released a methylmercury National Recommended Water Quality criterion of 0.3 mg/kg in fish tissue for the protection of human health for the consumption of organisms. This criterion, which is slightly higher than and equal to the two site-specific human-health PRGs based on the RME exposure (0.2 mg/kg for children and 0.3 mg/kg for adults), is also considered to be a human health fish tissue PRG.

In addition, BSQVs were developed as estimates of the concentrations of total mercury in the surface sediments in the lake needed to reach human and wildlife fish tissue target concentrations (see the text box on "Bioaccumulation-Based Sediment Quality Values" [page 41]). The selected BSQV for mercury of 0.8 mg/kg was based on the most sensitive ecological receptor for assessing bioaccumulation. This value is expected to be protective of other ecological receptors and adult human consumers of fish. This BSQV (0.8 mg/kg) will be used to assess whether additional areas of the lake (beyond that needed to address areas exceeding the toxicity-based cleanup criteria) would need to be addressed during remedy implementation in order to meet the fish tissue PRGs.

Bioaccumulation-Based Sediment Quality Values

Since a variety of dynamic factors affect mercury levels in fish, mercury bioaccumulation-based sediment quality values (BSQVs) were also developed for Onondaga Lake to estimate the sediment mercury concentrations associated with the fish tissue PRGs. These BSQVs were derived to be protective of human health and the environment by reducing the potential for mercury bioaccumulation from the sediments into fish. The first step entailed calculating site-specific biota-sediment accumulation factors (BSAFs) for fish fillets consumed by people and for whole fish consumed by wildlife using lakewide fish and surface sediment data. BSAFs were calculated by dividing the average mercury concentration in fish tissue by the lakewide average mercury concentration in sediment. Lakewide averages were used because fish were assumed to move over large areas of the lake (i.e., animals that bioaccumulate mercury, such as fish, are typically not limited to one location in the lake), and because the locations of fish tissue samples collected in the lake were not specified.

The mercury PRGs for fish based on human and wildlife fish consumption were divided by the BSAF to calculate the target concentration of mercury in sediments. The fish tissue PRG of 0.14 mg/kg ww for protection of the river otter, the most sensitive ecological receptor for assessing bioaccumulation, was used to calculate a LOAEL-based sediment target of 0.8 mg/kg. As the ecological-based target level was less than the human health concentration (i.e., also protective of adult human health), it was selected as the target BSQV against which surface-weighted average sediment concentrations will be compared.

PRG 3 – Surface Water

The surface water PRG (PRG 3) directly addresses RAO 5, which is to achieve surface water quality standards, to the extent practicable, associated with CPOIs. With the exception of mercury, surface water concentrations of most of the CPOIs do not currently consistently exceed applicable standards and guidance values. New York State surface water quality standards (6 NYCRR Part 703) for mercury (i.e., the standard for protection of wildlife of 2.6 nanograms per liter [ng/L] dissolved mercury and the standard for protection of human health [via fish consumption] of 0.7 ng/L dissolved mercury) are currently consistently exceeded in Onondaga Lake. These two standards are considered to be protective of wildlife and humans exposed to mercury via fish consumption. They therefore take into account bioaccumulation of mercury from water into fish tissue.

Higher concentrations of dissolved mercury in surface waters are found primarily in the hypolimnion in summer and early fall, where the anoxic conditions cause mercury to change into more soluble forms. Exceedances of the standards for protection of wildlife and human health are found almost exclusively in the anoxic hypolimnion, with a maximum dissolved mercury concentration of 24 ng/L at the north deep basin station in 1999 at a depth of 59 ft (18 m). Reductions in the releases of mercury into the hypolimnion and eliminating anoxic conditions would help to achieve this PRG.

It is also noted that the highest total mercury concentration found in the lake in surface waters was 595 ng/L from the water column immediately above the sediment surface in SMU 1 in 2000, while the highest total mercury concentration closer to the surface of the water column was 103 ng/L at the border of SMUs 1 and 7 in 1999. Concentrations of dissolved mercury in 1999 and 2000 from the epilimnion (including nearshore areas) ranged from 1 to 7.8 ng/L, with some samples exceeding the standard of 2.6 ng/L and all samples exceeding the lowest standard of 0.7 ng/L.

There have also been exceedances of applicable surface water standards for other CPOIs related to Honeywell, such as chlorobenzene and dichlorobenzenes. The highest concentration of chlorobenzene recorded in the RI report was 12 µg/L in SMU 1 near the border with SMU 2 in 1999. This concentration exceeds the NYSDEC (6 NYCRR Part 703) standard for the protection of aquatic life (chronic) of 5 µg/L. The highest concentration of dichlorobenzenes recorded in the RI report was 6.6 µg/L in this same sample. This concentration exceeds the NYSDEC (6 NYCRR Part 703) surface water standard for total dichlorobenzenes for the protection of aquatic life (chronic) of 5 µg/L. Remediation of the external sources and contaminated sediments and NAPLs in this area would be needed to achieve this PRG for these CPOIs.

The narrative water quality standards for several of the physical parameters listed in 6 NYCRR Part 703.2 (i.e., turbidity, suspended and settleable solids, oil and floating substances) are consistently exceeded in the lake for various reasons (e.g., due to NAPLs and ionic wastes). Remediation of sediments and NAPLs, as defined in the selected remedy, will aid in achieving these standards.

Attainment of any one individual PRG will not be sufficient to establish the success or failure of the remedial program for the lake, in part because a variety of dynamic factors affect levels of mercury and other CPOIs in each medium. Rather, as per the NCP, the success or failure of the Onondaga Lake remedial program, as assessed every five years, will be based on attainment of all PRGs.

Because of the importance of Onondaga Lake as a natural resource, and to ensure that the remedy complies with NYSDEC regulations, the protection of habitat through remediation and restoration has been an important consideration in the development of the various capping and dredging alternatives. Throughout the analysis of the various alternatives, the goal of reestablishing productive aquatic habitat in the lake has been considered along with the need to provide an effective and permanent remedy to the adverse impacts of contamination on the fish and wildlife resources of the lake. Of particular concern is the protection of shoreline habitat and the ecological integrity of the littoral zone. A lakewide habitat restoration plan will be required as part of the remedial design.

DESCRIPTION OF ALTERNATIVES

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).

Principal threat wastes are those source materials considered to be highly toxic and which present a significant risk to human health or the environment should exposure occur, or are highly mobile such that they generally cannot be reliably contained. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of alternatives using the remedy selection criteria which are described below. This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.[5]

Detailed descriptions of the remedial alternatives for addressing the contamination associated with the site can be found in the FS report and the Proposed Plan. The FS report presents 14 lakewide alternatives. To facilitate the presentation and evaluation of these alternatives, the FS report alternatives were reorganized to formulate the seven remedial alternatives discussed below.[6] The alternatives presented below involve the following remedial technologies:

- Dredging (removal)
- Disposal and treatment at a sediment consolidation area (SCA)
- Isolation capping
- Thin-layer capping
- Oxygenation of the hypolimnion
- Monitored Natural Recovery (MNR)[7]

Each of the action alternatives also includes habitat improvement and/or restoration elements (i.e., habitat reestablishment and habitat enhancement). *Habitat reestablishment* is the restoration of habitat in areas where remediation substantially alters existing conditions. Reestablishment can be either restoring the same type of habitat that existed prior to remediation, or establishing a different type of habitat that has been deemed appropriate for the ecological conditions of the area. *Habitat enhancement* is improvement of habitat conditions in areas where CERCLA contaminants do not occur at levels that warrant active remediation, but where habitat impairment due to stressors has been identified as a concern. The design and construction of habitat improvement and 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). A comprehensive lakewide habitat restoration plan will be developed during the remedial design. Habitat reestablishment and habitat enhancement will be performed consistent with the lakewide habitat restoration plan. Any “habitat enhancement” actions performed at the site would be performed in conformance with the requirements of state law and not pursuant to the requirements of CERCLA or the NCP.

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5 *A Guide to Principal Threat and Low Level Threat Wastes*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, 9380.3-06FS, November 1991.

6 The descriptions of the remedial alternatives and the selected remedy presented below do not represent an offer of settlement by the State of the State’s pending litigation claims concerning the lake or lake system.

7 MNR involves allowing natural processes to decrease a number of factors – the concentration, mobility, bioavailability, toxicity and/or exposure – involving chemicals, combined with a systematic monitoring program to ensure that the recovery process is proceeding appropriately. MNR can occur through a variety of processes including the degradation of organic compounds, the burial of sediments containing chemicals by incoming clean sediments (although much of the sediment deposition continues to originate from the Tully Valley, including the residual effects of solution mining), and the conversion of compounds to less toxic forms. Much of SMU 8 appears to exhibit the types of processes (for example, the continuing deposition of sediments and the limited resuspension of pollutants) and the chemical characteristics that support the progress of natural recovery.

Technologies

Dredging

Dredging would involve permanent removal of sediments and wastes from Onondaga Lake to a specific design depth. Sediments can be dredged hydraulically, mechanically, or by a combination of the two. While hydraulic dredging was selected as the representative process for detailed evaluation, the actual dredging method(s) would be determined during the design phase. In developing alternatives that incorporate removal of contaminated sediments, the following six potential removal options were considered. These potential removal options are not mutually exclusive. In other words, combinations of these options could be employed as part of a remedial alternative for addressing lake contamination. For all dredging options, the littoral zone in the vicinity of the dredging would be restored to reestablish appropriate habitat and function following removal of contaminated sediments.

- Targeted dredging in areas with high CPOI concentrations and high groundwater upwelling velocities. Targeted dredging would increase the effectiveness of an isolation cap.
- Dredging (prior to capping) to ensure that the placement of the isolation cap would result in no loss of lake surface area.
- Dredging for erosion protection and to reestablish habitat.
- Dredging to remove NAPL.
- Dredging to reduce CPOI concentrations prior to capping, which would result in removal of a significant mass of CPOIs.
- Dredging to remove materials in areas of hot spots within the ILWD.
- Dredging for full removal to an SEC.

Targeted dredging would be performed to increase long-term cap effectiveness through removal of contaminated sediments in nearshore areas where groundwater upwelling velocities are high. Groundwater modeling indicates that predicted upwelling velocities are at their greatest near shore, which may prevent the cap from providing complete chemical isolation.

Dredging (prior to capping) would be performed to ensure that the placement of the isolation cap would not result in the loss of lake surface area. Under this option, sufficient sediment would be removed so that there would be no loss of lake surface area following isolation cap placement.

Dredging for erosion protection and to reestablish habitat would consist of removal to an optimal depth for reducing the erosive forces on the cap and reestablishing littoral zone habitat. The reestablished habitat may differ from the pre-remediation habitat primarily due to a change in bathymetry or water depth (in addition to the elimination of contamination through the placement of clean material). As part of the remedial design, the final water depth would be designed to meet a particular natural resource goal for each particular SMU while also maintaining littoral zone function.

The isolation cap would be armored (as needed) to prevent erosion caused by wind-driven waves, ice scour, currents from tributaries, and scour from propeller wash. The influence from these effects tends to decrease with increasing water depths. Therefore, with regard to minimizing erosive forces, the goal under this option is to remove nearshore sediments to a depth where erosion is not significant, which allows minimal armoring.

Dredging to remove NAPL would target NAPL in sediments and waste, which constitute an ongoing source (and potential source) of contamination to other media in the lake. As such, they are “principal threat wastes.”

This option includes a dredging/backfilling combination that removes material known, or anticipated, to contain NAPL, such as the southeast portion of SMU 2 (which is immediately adjacent to where NAPLs have accumulated in the shoreline area in the vicinity of the Honeywell causeway and where an onshore NAPL recovery IRM is underway). While NAPLs have been observed in the sediments (up to 13 ft [4 m]) in this area, the full extent is unknown. Based on the vertical extent of NAPLs in the NAPL recovery IRM area, the possibility exists that the NAPLs are as deep as 30 ft (9 m) below the top of the sediments. Accordingly, some of the alternatives assume a removal depth of 30 ft (9 m) in the area near the causeway, rather than the 13 ft (4 m) assumed for the other alternatives. As the depth estimates above are based on limited information, the actual areal and vertical extent of NAPL, as well as the volume of NAPL would be refined in the remedial design.

Dredging to reduce CPOI concentrations prior to capping, which would result in removal of a significant mass of CPOIs. The southern area of the lake near the Honeywell sites represents the largest repository of CPOIs within the lake, based on volume and CPOI concentrations. The removal of portions of the ILWD prior to isolation capping has the potential to greatly reduce the mass of CPOIs in SMU 1 and portions of SMUs 2 and 7, leaving behind significantly lower volumes and masses of wastes (and residual NAPLs) and significantly lower concentrations of CPOIs beneath the cap. The occurrence of “slumps,” or slope failures, within the ILWD, as noted during side-scan sonar imaging of the lake bottom, as well as the generally soft nature of the wastes/sediments (resulting in very low shear strengths in certain areas), represents a major engineering concern in the consideration of capping in this area. Thus, dredging to improve slope stability of the ILWD as well as dredging to improve overall geotechnical conditions for cap placement is also an important considerations.

While the ILWD in SMU 1 has been defined based on historical photographs, the extent of elevated concentrations of CPOIs and the extent of Solvay waste, based on visual observations has not been fully determined. Based on the existing data, the ILWD may be as deep as 45 ft (14 m) below the top of the sediments and extends into nearby SMUs 2 and 7. As the depth and volume estimates are based on limited information, the full areal and vertical extent of the ILWD, the distribution of highly elevated CPOI concentrations, and the geotechnical characteristics of the wastes would need to be refined in the remedial design.

Dredging to remove hot spots in the ILWD would be performed to remove additional waste material which would be defined as those wastes/sediments that contain CPOIs above threshold concentrations. This is included in one of the alternatives discussed below. The purpose of this additional removal in hot spot areas is to improve capping effectiveness, by reducing the concentrations of contaminants in the sediments before the isolation cap is placed. The hot spot threshold concentrations that would trigger the additional dredging are as follows:

- Benzene – 208 mg/kg

- Chlorobenzene – 114 mg/kg
- Dichlorobenzenes – 90 mg/kg
- Naphthalene – 20,573 mg/kg
- Xylene – 142 mg/kg
- Ethylbenzene – 1,655 mg/kg
- Toluene – 2,626 mg/kg
- Mercury – 2,924 mg/kg

The hot spots are defined as those wastes/sediments that contain select CPOIs (based on their presence at significantly elevated concentrations in the ILWD materials and/or the compounds to which the cap model was most sensitive) above threshold concentrations. Based on existing data only chlorobenzene, dichlorobenzenes, and xylenes exceed their respective cap threshold values in the ILWD.

The above concentrations were derived using a cap model developed by Honeywell and represent the maximum concentrations that could be present in the wastes/sediments and not cause failure of a cap with a 2.5-ft-thick isolation layer assuming an upwelling rate of 2.4 inches/year (6 cm/year). Capping effectiveness is related to cap thickness, contaminant concentrations below the cap, and the upwelling rate (rate at which groundwater flows up through the capped sediments/wastes). With regard to the upwelling rate, Honeywell's cap model predicts that the cap would be effective based on an assumed upwelling rate of 0.8 inches/year (2 cm/year). This assumption relies upon the proper construction/operation of a hydraulic control system which would be installed (as part of the Wastebed B/Harbor Brook IRM) along the lakeshore adjacent to SMU 1. While the capping model assumes an upwelling rate of 0.8 inches/year (2 cm/year), the hot spot threshold concentrations would be based on a higher (2.4 inches/year [6 cm/year]) upwelling rate.

The use of a higher upwelling rate in the development of these values would result in lower (more conservative) hot spot threshold concentrations than would be developed by assuming lower (e.g., 0.8 inches/year [2 cm/year] or 1.6 inches/year [4 cm/year]) upwelling rates. The use of these threshold concentrations for identifying hot spots within the ILWD provides a method for increasing the effectiveness of capping at the site. As refined cap modeling would be performed during the remedial design, it is possible that these concentrations may be modified. However, the hot spot concentrations would be based on an assumed upwelling rate of 2.4 inches/year (6 cm/year).

Dredging to an SEC relies primarily on full removal of contaminated sediments down to the SEC selected as the cleanup criterion. Some backfill would be required to establish reasonable bottom contours (bathymetry) and to reduce the impact of any residual CPOIs.

Disposal

Large sediment-dredging projects require large areas for dredged materials management (which includes dewatering, treatment, and final disposal) of the dredged sediment. Typically, the dredged sediment from a remediation project is either consolidated in an on-site location such as an SCA, if sufficient land area is available, or is solidified and transported to an off-site permitted landfill.

The assessment of various management disposal options included hydraulic dredging with disposal in an SCA and mechanical dredging with off-site disposal (at one or more permitted landfills). On-site consolidation of the sediment in an SCA is the selected sediment management option. On-site management in an SCA, designed, constructed, and monitored in accordance with federal and state guidance, is a proven and reliable technology for sediment and waste management that is protective of human health and the environment.

Management of the dredged sediments in an SCA would also be more cost-effective than off-site disposal, especially at sediment volumes exceeding 100,000 cy (76,500 m^3). Therefore, all of the action alternatives in the ROD assume that the dredged sediments would be disposed in an SCA(s). More specifically, the FS report and the alternatives discussed in this ROD assume that such an SCA would be constructed on one or more of the Solvay wastebeds (e.g., Wastebed 13). Wastebed 13 could accommodate a large sediment volume (potentially 2,400,000 cy [1,800,000 m^3] or more, depending on final elevation), and its relatively remote location would minimize disruption to and impacts on the community during construction and operation of an SCA. However, the actual Solvay wastebed location(s) on which the SCA(s) would be constructed would be based on geotechnical testing and screening that would be performed during the remedial design. Potential SCA locations include Wastebeds 1 through 8, Wastebeds 9 through 11, and Wastebeds 12 through 15. The remedial design of the SCA would be undertaken in accordance with state and federal requirements and guidance and would include the installation of an impermeable liner, leachate collection and treatment, and a cap.

It is assumed that preloading and stabilization of the wastebed materials would be required prior to construction of the SCA, but the extent to which preloading and stabilization would be required, if any, would be determined during the remedial design.

In keeping with the statutory preference for treatment that reduces toxicity, mobility, or volume of contaminated media as a principal element of the remedy, the remedy would include treatment and/or disposal of the most highly contaminated materials (e.g., pure phase chemicals segregated during the dredging/handling process) at an off-site permitted facility.

Water Treatment

Hydraulic dredging in Onondaga Lake would be performed SMU by SMU. Silt barriers would be used to contain resuspended sediment within each SMU dredging work zone. Sediment slurry, containing approximately 10 percent solids by weight, would be transported via a pipeline to the SCA for consolidation and treatment of the entrained water to remove CPOIs (including NAPL).

Four different treatment options (primary treatment, enhanced primary treatment, enhanced primary treatment with multimedia filtration, and advanced treatment), providing incrementally higher degrees of treatment, were considered for the supernatant. The specific treatment process used will be developed during the remedial design after additional sampling and treatability testing. In order to be sure that the cost of treatment was not underestimated, this ROD assumes that “advanced treatment” would be used.

The treatment train for “advanced treatment” consists of enhanced primary treatment, multimedia filtration, air stripping, and granular activated carbon treatment for additional VOC removal. This option includes pH adjustment to promote chemical precipitation of metals, including mercury.

During the remedial design, NYSDEC will issue discharge limits that would need to be met by the treated water at the point of discharge (end of pipe) to the lake. It is assumed that supernatant water will require advanced treatment before discharge. However, the actual level of treatment needed to ensure compliance with discharge limits would be determined during the remedial design and might vary depending on the levels and types of contaminants present in lake sediments in various areas (or SMUs) of Onondaga Lake.

Isolation Capping

Isolation capping involves placement of an engineered cap on top of the contaminated sediment. This material helps to prevent or retard the movement of contaminated porewater into the water column and minimize exposure of benthic organisms to the contaminated sediments. Most of the alternatives involve capping portions of the lake bottom to meet the following objectives:

- Provide physical isolation of the impacted sediments from benthic organisms and other animals, and human contact.

- Physically stabilize the sediment to prevent resuspension, contaminant mobilization, and sediment transport.

- Provide chemical isolation of impacted sediments from advective or diffusive flux or resuspension into the overlying surface waters.

Specific factors that would be evaluated as part of the design of the engineered cap include erosion, bioturbation, chemical isolation, habitat protection, settlement, static and seismic stability, and placement techniques. Modeling performed for chemical isolation was used to produce preliminary cap designs (see the text boxes below entitled “Groundwater Flow Model” [page 49] and “Isolation Capping Model” [page 50]), to ensure that there would be no predicted exceedances of the PEC of any of the CPOIs that have been shown to exhibit acute toxicity on a lakewide basis or NYSDEC sediment screening criteria for benzene, toluene, and phenol.

The results of a preliminary capping evaluation were used to produce the cap designs presented in the alternatives. Since the cap would be designed such that none of the PECs for the individual CPOIs (or the NYSDEC sediment criteria for benzene, toluene, and phenol) would be exceeded in the bioturbation layer, the model-predicted mean PECQ of the surficial materials following cap placement would be less than 1. The modeling indicates that the chemical isolation component of these caps should be between 1 to 2.5 ft (0.3 to 0.76 m) thick, depending on the area of the lake.

To ensure protection of human health and the environment, the caps would be designed to be an additional 50 percent thicker as a safety factor, plus an additional 6 inches (15.2 centimeters) to address possible mixing with underlying sediment and uneven application, which results in a total thickness of 2 to 4.25 ft (0.6 to 1.3 m) for the various SMUs. Settlement analysis was incorporated into the preliminary cap design to estimate the final elevation of the cap following settlement due to the weight of the cap.

Evaluations of wind-generated waves, flood flows at the mouths of tributaries, propeller wash from vessels, and ice scour predict that a cap armor layer consisting of gravel or sand (depending on location and water depth) and armor stone along the shoreline would provide physical stability for the cap. A 6-inch “habitat/bioturbation” layer was assumed for cap modeling purposes in order to incorporate assumed mixing of contaminants in the top layer of the isolation cap by benthic invertebrates. Actual habitat restoration requirements were not considered in the model.

For the isolation cap to be effective in certain areas of the lake, hydraulic control systems would need to be in place to minimize upwelling velocities in these areas. Due to the elevated concentrations of CPOIs and unstable areas within the littoral zone, as well as concerns for fish and wildlife exposures, isolation capping (rather than thin-layer capping) is evaluated in the alternatives for all littoral-zone SMUs (0 to 30 ft [0 to 9 m] water depths). However, if the evaluation of data collected during remedial design identifies areas, within the deeper portion of the littoral zone (i.e., 6 to 9 m), where thin-layer capping would be effective at isolating the contaminated sediments, NYSDEC will consider the use of thin-layer capping in these areas.

Groundwater Flow Model

A groundwater flow model was developed using the software programs Groundwater Vistas and SEAWAT-2000 to simulate groundwater flow beneath and in the vicinity of the southern part of Onondaga Lake.

The groundwater flow model domain encompasses an area of approximately 13 sq mi (34 sq km) surrounding the southern shoreline of Onondaga Lake and centered on the Honeywell sites. The nine-layer model represents seven hydrogeologic units, which were identified through 216 soil borings. Estimates of hydraulic conductivity of the hydrogeologic units were derived from in situ conductivity tests, laboratory permeability tests, specific capacity tests, and pumping tests.

The density of groundwater influences groundwater flow, and therefore a rigorous representation of the groundwater density distribution was incorporated into the model. A major influence on groundwater density is salinity (measured by groundwater total dissolved solids concentrations). The range in total dissolved solids concentrations in the area of the lake (400 mg/L to almost 194,000 mg/L) is caused by the presence of both leachate from Honeywell's inactive Solvay wastebeds and naturally occurring salt brines.

The results of the groundwater flow model included an estimate of the amount and velocity of the groundwater that flows upward through the lake sediments in the various SMUs, both with and without the proposed groundwater barrier wall and collection system along the lakeshore in the southern corner. These results were used in the isolation capping model.

Thin-Layer Capping

Thin-layer capping is included in all of the action alternatives for portions of the profundal sediments of Onondaga Lake. The objective of thin-layer capping is to provide an immediate decrease in surface sediment concentrations by introducing clean substrate into the upper layer of sediment, rather than to isolate surface sediments. It is anticipated that construction of the thin-layer cap and subsequent natural processes, such as bioturbation and sedimentation, would mix the new substrate with the underlying material or cover contaminated sediments, thereby reducing the surface concentration of the profundal sediments and the potential for adverse effects associated with CPOIs. During the remedial design the appropriate thickness and type of substrate would be identified. A thin-layer cap thickness of 4 inches (10 cm) was used for cost estimating purposes. The suitability of thin-layer capping at the base of the ILWD in the profundal zone (SMU 8) would be reviewed during the remedial design based on extensive data to be collected as part of the pre-design program.

Isolation Capping Model

A model was developed to assess the effectiveness of in-situ isolation capping of the littoral sediments of Onondaga Lake. 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. An isolation cap would consist of three layers:

1. An isolation layer, designed to prevent or limit vertical chemical migration.
2. An armor layer, designed to protect the isolation layer from erosional processes such as waves, ice scour, and propeller wash.
3. A habitat/bioturbation layer, designed to provide habitat for benthic macroinvertebrates and allow for bioturbation processes without exposure to contaminated sediment or disruption of the isolation layer material.

There are varying degrees of contamination in the sediments of each SMU; thus, each cap would need to be of a SMU-specific thickness to ensure that contaminants are contained. Therefore, the model was developed for each littoral zone SMU. The model was used to predict chemical concentrations in the habitat/bioturbation layer at steady state, with the primary means of contaminant transport within the isolation layer being through the processes of porewater advection and diffusion. 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. In addition, the bioturbation or biologically active zone is assumed to be confined to an approximately 6 inch (15 cm) layer above the chemical isolation layer, so that few contaminants are transported to the surface of the cap by organisms mixing the sediments.

The predicted concentrations of contaminants in sediments at the top of the cap were compared to the chemicals' PECs for the 23 CPOIs and NYSDEC sediment screening criteria* for benzene, toluene, and phenol to ensure that these concentrations would not be exceeded in the habitat/bioturbation layer in the future. The cap model was then used to determine the appropriate cap thickness in each littoral zone SMU and whether sediment removal is necessary in areas of high upwelling rates. The cap model will be re-run as part of the remedial design, incorporating any new remedial design data, and the cap design may be modified as appropriate.

* NYSDEC Technical Guidance for Screening Contaminated Sediments, January 1999.

Oxygenation

Oxygenation, as defined for this ROD, involves the introduction of oxygen into the hypolimnion to prevent the development of anoxic (no oxygen) conditions, which currently exist in summer and early fall (June through September). Oxygenation can be achieved using a number of methods including introducing pure oxygen, atmospheric air, or oxygen-enriched air to the water column. Maintaining oxygenated conditions in the hypolimnion is expected to reduce mercury methylation in the hypolimnion and reduce the concentrations of dissolved mercury. These effects, in turn, would be expected to result in decreased concentrations of mercury in fish tissue and decreased risk to fish consumers. Maintaining oxygenated conditions would also be expected to reduce the flux of methylmercury from profundal sediments.

A specific oxygenation system technology would be determined as appropriate, during the remedial design. The specific technology assumed for the purposes of the FS report involves a downflow contact oxygenation system that mixes pure oxygen bubbles with oxygen-depleted water inside a contact chamber so that no bubbles are released to the surrounding water column. This system uses a submersible pump, which draws water from the hypolimnion into the conical unit. Oxygen supplied from an onshore facility is injected at the top of the cone. The oxygenated water is then discharged back to the lake through a horizontal diffuser pipe at the same depth from which it was withdrawn. Oxygenation has been performed in other lakes and reservoirs, but not to specifically control methylmercury production. A pilot study would be performed to evaluate the potential effectiveness of oxygenation at reducing the formation of methylmercury in the water column, while preserving the normal cycle of stratification within the lake. An additional factor which would be considered during the design of the pilot study would be the effectiveness of oxygenation at reducing fish tissue methylmercury concentrations. If supported by the pilot study results, the pilot study would be followed by full-scale implementation of oxygenation in SMU 8. Furthermore, potential impacts of oxygenation on the lake system would be evaluated during the pilot study and/or the remedial design of the full-scale oxygenation system. Pilot testing may be coordinated, if feasible, with the Onondaga Lake Partnership, which is planning a similar pilot oxygenation study on the lake.

Monitored Natural Recovery

MNR is a sediment management tool that depends on a variety of physical, chemical, and biological processes that reduce chemical concentrations, exposure, and mobility. MNR requires a goal that defines the expected contaminant concentrations to be reached in a specified time period (assumed in the FS report to be 10 years following the remediation of upland sources, littoral sediments, and initial thin-layer capping in the profundal zone). The MNR alternative includes the completion of investigations during the remedial design to refine the application of a monitored natural recovery model (see the text box below entitled "Monitored Natural Recovery Model" [page 52]), long-term monitoring, and institutional controls to protect the integrity of the remedy and ensure long-term protectiveness of human health and the environment. Monitoring the effectiveness of natural recovery would be described in a long-term monitoring plan to be developed during the remedial design and would include evaluations of mercury and other CPOI concentrations in sediment, water, and fish over time.

Monitored Natural Recovery Model

Natural recovery can occur through a variety of physical, chemical, and biological processes that act singly or in combination to reduce contaminant concentrations, exposure, or mobility. This process can occur in various media at a site (e.g., water and sediments.

A one-dimensional, numerical model was developed using STELLA® Research software in order to determine whether MNR is a feasible technology for remediating the contaminated profundal sediments in Onondaga Lake which represent an important sink for contaminants and a potential exposure pathway to organisms. The primary purpose of the MNR model is to understand how natural recovery might occur (or fail to occur) in the future based on what is known about the lake system. The output or results from the model are presented in terms of expected mercury concentrations in surface sediments in the profundal areas of the lake. The model looks at present-day conditions and predicts how those conditions are expected to change several years in the future.

Another purpose of the model is to provide information on how sediment surfaces might react during and after remedial actions. The model focuses on changes in the sediment surface and provides information on reactions to inputs such as isolation or thin-layer caps. Thin-layer capping is a remediation technique (along with MNR) that is evaluated for profundal sediments. The model was used to assess the long-term solid and dissolved contaminant fate and transport associated with natural recovery by simulating the diffusion, bioturbation, groundwater mediated advection, settling, burial, and degradation mechanisms likely to be present at the Onondaga Lake site. By assessing these mechanisms over time, a prediction of contaminant concentrations and fluxes in the future was obtained. Using the sediment data currently available (primarily from 1992 for the profundal sediments), the model predicts that any area that had an observed total mercury concentration of 6.7 mg/kg or less in 1992 would be expected to achieve the mercury PEC of 2.2 mg/kg by 2014. Thus, the model suggests that most of the profundal zone would be amenable to MNR as a remedial alternative. However, additional MNR modeling would need to be performed during the remedial design phase based upon additional sampling that would take place prior to remediation.

Description of Lakewide Alternatives

The No-Action Alternative and all other alternatives assume that controls of upland sources of hazardous substances will be implemented separately pursuant to CERCLA and the state Superfund law. Costs for remediating upland sources are not included in the costs for these alternatives. With the exception of the No-Action Alternative, all alternatives for the littoral zone (SMUs 1 through 7) include varying amounts of dredging, isolation capping, NAPL removal, and habitat reestablishment and enhancement. With the exception of the No-Action Alternative, all alternatives for the profundal zone (SMU 8) include oxygenation, MNR, and varying amounts of thin-layer capping. Table 14 presents the littoral- and profundal-specific alternatives for each SMU for each alternative.

Alternative 1 – No Action

Dredged Volume (cy):	0
Capital Cost:	$0
Average O&M Annual Costs:	$0
Present-Worth O&M Costs:	$0
Present-Worth Cost:	$0
Construction Time:	0 years

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 does not include any physical remedial measures that address the problem of sediment 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.

Alternative 2 – Dredging for No Loss of Lake Surface Area and Erosion Protection and to Reestablish Habitat, and Isolation Capping in SMUs 1 to 7; Targeted Dredging to 4 m (13 ft) for NAPL Removal in SMU 2; Targeted Dredging in SMUs 3 and 6; and Phased Thin-Layer Capping, Oxygenation, and Monitored Natural Recovery in SMU 8.

Dredged Volume (cy):	1,207,000
Capital Cost:	$275,000,000
Annual O&M Costs:	$3,000,000
Present-Worth O&M Costs:	$37,000,000
Present-Worth Cost:	$312,000,000
Construction Time:	4 years

Under this alternative, all areas of the lake where the surface sediments exceed a mean PECQ of 1 or the mercury PEC (2.2 mg/kg) would be addressed (see Figure 7). This alternative includes:

- Dredging of an estimated 354,000 cy (271,000 m^3) of sediment in SMU 1, prior to capping, to minimize erosive forces on the cap, prevent a loss of lake surface area, and reestablish habitat. Capping of approximately 84 acres in SMU 1.
- Dredging of an estimated 169,000 cy (129,000 m^3) of sediment in SMU 2, prior to capping, to remove NAPL to a 13-ft (4-m) depth in the vicinity of the causeway, minimize erosive forces on the cap, prevent a loss of lake surface area, and reestablish habitat. Capping of approximately 16 acres in SMU 2.

- Dredging of an estimated 75,000 cy (57,000 m^3) of sediment in SMU 3, prior to capping, to maintain cap effectiveness in the absence of hydraulic containment, to minimize erosive forces on the cap, prevent a loss of lake surface area, and reestablish habitat. Capping of approximately 29 acres in SMU 3.

- Dredging of an estimated 135,000 cy (103,000 m^3) of sediment in SMU 4, prior to capping, to minimize erosive forces on the cap, prevent a loss of lake surface area, and reestablish habitat. Capping of approximately 75 acres in SMU 4.

- Dredging of an estimated 140,000 cy (107,000 m^3) of sediment in SMU 5, prior to capping, to minimize erosive forces on the cap, prevent a loss of lake surface area, and reestablish habitat. Capping of approximately 60 acres in SMU 5.

- Dredging of an estimated 245,000 cy (187,000 m^3) of sediment in SMU 6, prior to capping, to maintain cap effectiveness in the absence of hydraulic containment, to minimize erosive forces on the cap, prevent a loss of lake surface area, and reestablish habitat. Capping of approximately 123 acres in SMU 6.

- Dredging of an estimated 89,000 cy (68,000 m^3) of sediment in SMU 7, prior to capping, to minimize erosive forces on the cap, prevent a loss of lake surface area, and reestablish habitat. Construction/operation of a hydraulic control system along the SMU 7 shoreline to maintain cap effectiveness. Capping of approximately 38 acres in SMU 7.

- Isolation capping over an estimated 425 acres of the littoral zone, as noted for each littoral SMU above.

- Thin-layer capping over an estimated 154 acres of the profundal area (SMU 8) based on the current extent of exceedances of mean PECQ of 1.

- Oxygenation of the hypolimnion (SMU 8) to reduce methylation of mercury, reduce dissolved mercury concentrations, and reduce methylmercury flux from profundal sediments, thereby reducing mercury bioaccumulation in fish tissue.

- MNR in the profundal area (SMU 8), with a contingency of additional capping.

- Treatment and/or disposal of the most highly contaminated materials (e.g., pure phase chemicals segregated during the dredging/handling process) at an off-site permitted facility. Consolidation of the balance of the dredged sediments in one or more SCAs constructed on one or more of the Honeywell wastebeds.[8] The SCA(s) will include, at a minimum, the installation of a liner, a cap, and a leachate collection and treatment system.

- Treatment of water generated by sediment dewatering, produced at the SCA(s) through sediment consolidation, prior to discharge of the water back to Onondaga Lake.

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[8] Wastebed 13, which was evaluated in the FS report, could accommodate a large sediment volume (potentially 2,400,000 cy [1,800,000 m^3] or more, depending on final elevation). The actual Solvay wastebed location(s) on which the SCA(s) would be constructed would be determined during the remedial design and be based on an evaluation of the potential impacts on the local community, geotechnical stability of the wastebeds, SCA construction requirements, wastebed size, the means for transporting dredged materials to the SCA, costs, etc.

- Institutional controls including the notification of appropriate government agencies with authority for permitting potential future activities which could impact the implementation and effectiveness of the remedy.

This alternative would also include habitat enhancement along an estimated 1.5 mi (2.4 km) of shoreline (SMU 3) and over approximately 23 acres (SMU 5) to stabilize calcite deposits and oncolites and promote submerged macrophyte growth.[9]

The dredging and capping components of this alternative would occur over a period of approximately four years.

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.

Alternative 3 – Dredging of the ILWD to 2 m (6.5 ft) and Isolation Capping in SMU 1; Dredging for No Loss of Lake Surface Area and Erosion Protection and to Reestablish Habitat, and Isolation Capping in SMUs 2 to 7; Targeted Dredging to 4 m (13 ft) for NAPL Removal in SMU 2; Targeted Dredging in SMUs 3 and 6; and Phased Thin-Layer Capping, Oxygenation, and Monitored Natural Recovery in SMU 8.

Dredged Volume (cy):	1,868,000
Capital Cost:	$333,000,000
Annual O&M Costs:	$3,000,000
Present-Worth O&M Costs:	$37,000,000
Present-Worth Cost:	$370,000,000
Construction Time:	4 years

This alternative is the same as Alternative 2, except for how it addresses the ILWD in SMU 1. Under this alternative, dredging would be performed to a depth of 6.5 ft (2 m) on average in the ILWD prior to capping, resulting in an additional 661,000 cy (505,000 m^3) waste/sediment being removed. This alternative would result in the dredging of 1,868,000 cy (1,427,000 m^3) of sediments and the capping of 579 acres.

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.

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9 This component of the remedy is not intended to satisfy the requirements of CERCLA or the NCP, but is included in order to address requirements of state law.

Alternative 4 – Dredging of the ILWD to 2 m (6.5 ft); Removal in Areas of Hot Spots in the ILWD to a Maximum Depth of 3 m (10 ft) and Isolation Capping in SMU 1; Dredging for No Loss of Lake Surface Area and Erosion Protection and to Reestablish Habitat, and Isolation Capping in SMUs 2 to 7; Targeted Dredging to 9 m (30 ft) for NAPL Removal in SMU 2; Targeted Dredging in SMUs 3 and 6; and Phased Thin-Layer Capping, Oxygenation, and Monitored Natural Recovery in SMU 8.

Dredged Volume (cy):	2,653,000
Capital Cost:	$414,000,000
Annual O&M Costs:	$3,000,000
Present-Worth O&M Costs:	$37,000,000
Present-Worth Cost:	$451,000,000
Construction Time:	4 years

This alternative is the same as Alternative 2 except that it includes the performance of additional dredging of the ILWD to reduce average CPOI concentrations in sediments/wastes remaining under the cap, as well as additional dredging in SMU 2 to remove NAPLs.

Under this alternative, dredging would be performed to a depth of 6.5 ft (2 m) on average in the ILWD, as for Alternative 3; however, dredging would also be performed to remove material from hot spot areas to a depth of 3.3 ft (1 m) below the 6.5 ft (2 m) dredge cut for a total depth of removal of up to 10 ft (3 m) in hot spot areas. The hot spots would be defined as those wastes/sediments that contain CPOIs above threshold concentrations. The purpose of this additional removal in hot spot areas would be to improve capping effectiveness. The hot spot threshold concentrations that would trigger the additional dredging are as follows:

- Benzene – 208 mg/kg
- Chlorobenzene – 114 mg/kg
- Dichlorobenzenes – 90 mg/kg
- Naphthalene – 20,573 mg/kg
- Xylene – 142 mg/kg
- Ethylbenzene – 1,655 mg/kg
- Toluene – 2,626 mg/kg
- Mercury – 2,924 mg/kg

Capping effectiveness is related to cap thickness, contaminant concentrations below the cap, and the upwelling rate at which groundwater flows upward through the capped sediments/wastes. These concentrations, which were developed using the cap model developed by Honeywell, represent the maximum concentrations that could be present in the wastes/sediments and not cause failure of a cap with a 2.5-ft-thick isolation layer, assuming an upwelling rate of 2.4 inches/year (6 cm/year).

The remedy would include additional dredging, if needed, to address geotechnical concerns with the ILWD.[10] Accordingly, up to 10 ft (3 m) on average of the ILWD would be removed under this alternative prior to capping and would result in an additional 1,212,000 cy (927,000 m^3) of waste/sediment being removed (relative to Alternative 2) from the ILWD.

Under this alternative, NAPLs would be removed from SMU 2 to an estimated depth of 30 ft (9 m). However, the actual depth of removal would be determined during the remedial design based on the extent of NAPLs delineated as a result of remedial design sampling. This would include the NAPL removal described in Alternative 2, as well as the removal of the NAPL which may be present within the marl unit beneath the lake sediments. Accordingly, this alternative would result in an additional 234,000 cy (179,000 m^3) of additional sediments/marl being removed (relative to Alternative 2) from SMU 2.

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.

Alternative 5 – Dredging of the ILWD to 5 m (16.4 ft) and Isolation Capping in SMU 1; Dredging for No Loss of Lake Surface Area and Erosion Protection and to Reestablish Habitat, and Isolation Capping in SMUs 2 to 7; Targeted Dredging to 9 m (30 ft) for NAPL Removal in SMU 2; Targeted Dredging in SMUs 3 and 6; and Phased Thin-Layer Capping, Oxygenation, and Monitored Natural Recovery in SMU 8.

Dredged Volume (cy):	3,724,000
Capital Cost:	$499,000,000
Annual O&M Costs:	$3,100,000
Present-Worth O&M Costs:	$38,000,000
Present-Worth Cost:	$537,000,000
Construction Time:	4 years

This alternative is the same as Alternative 2, except that it includes the performance of additional dredging in the ILWD in SMU 1 to reduce average CPOI concentrations in sediments/wastes remaining under the cap, as well as additional dredging of the NAPL-contaminated sediments in SMU 2. Specifically, under this alternative, approximately 16.4 ft (5 m) of the ILWD would be removed prior to capping and would result in an additional 2,283,000 cy (1,745,000 m^3) of waste/sediment being removed from SMU 1. In addition, 403,000 cy (308,000 m^3) of NAPL and other contaminated sediments would be removed from SMU 2 (as would be done under Alternative 4).

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

[10] The nature of the wastes, as well as geophysical evidence of historical failures (i.e., underwater slumping or “landslides” associated with the ILWD) might require the removal of additional wastes to ensure the long-term stability of the cap.

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.

Alternative 6 – Dredging for Full Removal (based on mean PECQ of 1 and the mercury PEC criteria) in SMUs 1 to 4, 6, and 7; Dredging for No Loss of Lake Surface Area and Erosion Protection and to Reestablish Habitat, and Isolation Capping in SMU 5; and Phased Thin-Layer Capping, Oxygenation, and Monitored Natural Recovery in SMU 8.

Dredged Volume (cy):	12,184,000++
Capital Cost:	$1,292,000,000
Average O&M Annual Cost:	$2,800,000
Present-Worth O&M Costs:	$35,000,000
Present-Worth Cost:	$1,327,000,000
Construction Time:	10 years

Alternative 6 differs from Alternative 2 by utilizing dredging to remove all sediments in all SMUs (except 5 and 8) that exceed the mean PECQ of 1 or the mercury PEC. This alternative includes dredging for no loss of lake surface area, for erosion protection, and for habitat reestablishment prior to isolation capping in SMU 5. This alternative includes thin-layer capping in SMU 8 to the same criteria.

This alternative involves dredging approximately 10,977,000 cy (8,400,000 m^3) more than Alternative 2, for a total of 12,184,000 cy (9,315,300 m^3) from 385 acres of the littoral zone, and capping 60 acres in SMU 5. This amount of dredging would require placement of roughly 8,200,000 cy (6,270,000 m^3) of backfill material to maintain reasonable water depths and bathymetry.

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.

Alternative 7 – Dredging for Full Removal (based on ER-L criteria) in SMUs 1 to 4, 6, and 7; Dredging for No Loss of Lake Surface Area and Erosion Protection and to Reestablish Habitat, and Isolation Capping in SMU 5; and Thin-Layer Capping and Oxygenation in SMU 8.

Dredged Volume (cy):	20,121,000
Capital Cost:	$2,086,000,000
Average O&M Annual Cost:	$5,700,000
Present-Worth O&M Costs:	$71,000,000
Present-Worth Cost:	$2,157,000,000
Construction Time:	17 years

This alternative is based on remediating areas of the lake where sediments exceed the ER-Ls (rather than the mean PECQ of 1 and the mercury PEC). It is included to evaluate removal and capping based on a more protective site-specific SEC.

Alternative 7 differs from Alternative 2 by dredging in the littoral zone to the ER-L (except for SMU 5) of any of the CPOIs shown to exhibit a relationship with benthic toxicity on a lakewide basis (see Figure 8). The remediation of the lake to the ER-L expands upon Alternative 2 by capping an additional 289 acres in SMU 5 (for a total of 349 acres in the littoral zone). This alternative includes dredging for no loss of lake surface area, for erosion protection, and for habitat reestablishment prior to isolation capping in SMU 5. An additional 1,826 acres in the profundal zone (for a total of 1,980 acres in the profundal zone) exceed the ER-L criteria (instead of the mean PECQ criteria) and would be capped. This alternative would include dredging an additional 18,914,000 cy (14,461,000 m^3) of sediment (for a total of 20,121,000 cy [15,384,000 m^3]) from the littoral zone. This would require more than 14,600,000 cy (11,163,000 m^3) of backfill material to maintain reasonable water depths and bathymetry. In addition, the entire bottom of the lake in SMU 8 would be covered with a thin-layer cap.

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.

COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy, NYSDEC and EPA considered the factors set out in CERCLA Section 121, 42 USC §9621, by conducting a detailed analysis of the viable remedial alternatives pursuant to the NCP, 40 CFR §300.430(e)(9), and OSWER Directive 9355.3-01 (*Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA: Interim Final*, October 1988). The detailed analysis consisted of an assessment of the individual alternatives against each of nine evaluation criteria and a comparative analysis focusing upon the relative performance of each alternative against those criteria.

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 between 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, with respect to these parameters, a remedy may employ.

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, 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 and Proposed Plan, 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 report, RI/FS report addendum (if any), and Proposed Plan.

A comparative analysis of these alternatives based upon the evaluation criteria noted above, follows.

Overall Protection of Human Health and the Environment

Alternative 1, the no-action alternative, would not be protective of human health and the environment, since it would not actively address the contaminated sediments and water in Onondaga Lake. The "active" remediation 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 PRGs for the littoral and profundal areas and would result in residual risks less than the no-action alternative. With regard to eliminating or reducing releases of contaminants from the ILWD and other littoral areas around the lake (RAO 2), Alternatives 2 through 7, which result in dredging to depths ranging from 1 to 8 m in the ILWD, would result in progressively greater reduction in the concentration and mass of CPOIs prior to capping.

Alternatives 2 through 6 are equally protective of fish and wildlife by eliminating or reducing existing and potential future adverse ecological effects on fish and wildlife resources and are equally protective of human health by eliminating or reducing potential risks to humans (RAO 4), achieve CPOI concentrations in fish tissue that are protective of humans and wildlife that consume fish (PRG 2), reduce methylation of mercury in the hypolimnion (RAO 1), reduce releases of mercury from profundal sediments (RAO 3), and achieve surface water quality standards (RAO 5 and PRG 3), to the extent that they also meet RAO 2. With regard to achieving applicable and appropriate SECs for CPOIs and the BSQV for mercury (PRG 1), Alternatives 2 through 6 are equally proficient, however, they are not predicted, in the short-term, to achieve the BSQV for mercury on a lakewide basis or in SMU 8.

Since Alternative 7 includes thin-layer capping throughout all of SMU 8, as well as oxygenation, it would be the most effective alternative in achieving RAOs 1 and 3. In addition, Alternative 7 would meet the BSQV for mercury on a lakewide basis and in SMU 8, and it would be the most effective at meeting RAOs 2, 4, and 5 and PRGs 1, 2, and 3, since it would address all areas exceeding the ER-L.

Modeling performed for chemical isolation was used to produce preliminary cap designs to ensure that there would be no predicted exceedances of the PEC of any of the CPOIs that have been shown to exhibit acute toxicity on a lakewide basis or NYSDEC sediment screening criteria for benzene, toluene, and phenol. All of the alternatives which employ capping would be protective to the extent that the cap functions properly. If the cap fails via contaminant breakthrough and/or a catastrophic event (e.g., slope failure), the cap would need to be repaired and sediments contaminated by the release would need to be remediated (e.g., removed, capped in place). In the event of failure, the impacts would be expected to be greatest under those alternatives that involve capping of the greatest mass/highest concentrations of contaminants. Accordingly, Alternative 4 provides more protection than Alternatives 2 and 3. While Alternative 5 would remove more material than Alternative 4, similar concentrations would remain. In addition, Alternative 4 includes cap enhancement in residual hot spot areas and additional dredging, if needed, to address geotechnical concerns with the ILWD. These components of Alternative 4, which are not components of Alternative 5, provide Alternative 4 with greater cap reliability relative to Alternative 5. Alternative 6 would provide greater protection than Alternative 5, and Alternative 7 would be the most protective alternative, because it would result in the further reduction of surface concentrations.

Alternatives 3, 4, and 5 address (through dredging to various depths in the ILWD and removal of NAPL-contaminated sediments in SMU 2) the masses and concentrations of the CPOIs that would remain under the cap in SMUs 1 and 2. While the cap under Alternative 2 would be protective based on modeling studies, reducing the masses and concentrations increases the reliability of and, therefore, the protectiveness of the cap. Accordingly, with regard to the ILWD, the level of protectiveness increases progressively from Alternative 2 through Alternative 7 (with the exception of Alternative 5 discussed above).

With regard to contaminant mass removal, Alternatives 2 and 3 also address a portion of the NAPL within SMU 2. The information currently available indicates that the NAPL present in sediments in the area of the causeway in SMU 2 extends to a depth of approximately 13 ft (4 m), and the corresponding volume of sediment that would be required to remove this NAPL along with other contaminated sediments (under Alternatives 2 and 3) is about 169,000 cy (129,000 m^3). Alternatives 4 and 5 provide for greater mass removal in SMU 2 relative to Alternatives 2 and 3, as they include the NAPL removal described above, as well as the removal of the NAPL which may be present within the marl unit beneath the lake sediments. This would provide greater protectiveness by preventing the NAPL from further impacting the environment.

For Alternatives 6 and 7, which consist of full removal to the cleanup criteria for the littoral zone SMUs (with the exception of SMU 5), an additional level of long-term protectiveness would be achieved through sediment removal, instead of capping.

Compliance with ARARs

Since there are currently no federal or state promulgated standards for contaminant levels in sediments, the ER-Ls, mean PECQ of 1, and mercury PEC have been used in this ROD as TBC criteria. New York State has promulgated surface water standards which are enforceable standards for various surface water contaminants. In addition, EPA publishes water quality criteria under the authority of Section 304(a) of the Clean Water Act (CWA) based solely on data and scientific judgments about the relationship between pollutant concentrations and environmental and human health effects. CWA Section 303©) and its implementing regulations require states and authorized tribes to adopt water quality criteria to protect designated uses in their water quality standards.

In general, Alternatives 2, 3, 4, 5, 6, and 7 would be expected to comply with all of the designated chemical-specific ARARs, while Alternative 1 (no action) would not, since there would be no active remediation associated with the sediments. However, it may not be feasible to meet the New York State surface water quality standards for mercury (i.e., the standard for protection of wildlife of 2.6 ng/L dissolved mercury and the standard for protection of human health [via fish consumption] of 0.7 ng/L dissolved mercury). Oxygenation of the hypolimnion, as proposed in all of the active alternatives, would change the lake's anoxic chemical conditions, which is a primary cause of high concentrations of dissolved mercury (total mercury as well as methylmercury). While this, along with a reduction in inputs of mercury, would substantially reduce the frequency and magnitude of the exceedances of these two standards, it is possible that these standards would not be met all of the time during the post-remediation period. If the post-remediation monitoring indicates that it would be technically impracticable to consistently meet these standards, an ARAR waiver might be needed.

Alternative 7 would be expected to reduce water column concentrations to a greater degree than would Alternatives 2, 3, 4, 5, and 6.

During remedy implementation, any short-term exceedances of surface water ARARs in the lake due to dredging or capping would be expected to be limited to the area in the vicinity of the work zone. Sufficient engineering controls would need to be put in place during dredging 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) should ensure that there are no exceedances of surface water ARARs caused by the supernatant discharge from the SCA.

The principal location-specific ARARs applicable to the remediation are Environmental Conservation Law (ECL) Article 24 Freshwater Wetlands, ECL Article 15 Use and Protection of Waters, and 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 protected waters, such as dredging and filling. The design and construction of the remedy must meet 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).

CWA Section 404 includes requirements related to the discharge of dredged or fill material into navigable waters of the United States and prohibits activities which adversely affect an aquatic ecosystem, including wetlands. In addition, Superfund actions must be taken in accordance with 40 CFR Part 6, Appendix A, “Statement of Procedures on Floodplain Management and Wetlands Protection,” Executive Order 11990, “Protection of Wetlands,” Executive Order 11988, Floodplain Management, EPA’s 1985 Policy on Floodplains and Wetland Assessments for CERCLA Actions, and the Fish & Wildlife Coordination Act. 40 CFR Part 6, Appendix A sets forth EPA policy and guidance for carrying out Executive Orders 11990 and 11988. Executive Order 11990 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, and to avoid adverse impacts or minimize them if no practicable alternative exists. Executive Order 11988 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, and to avoid adverse impacts or minimize them if no practicable alternative exists.

EPA’s 1985 Policy on Floodplains and Wetland Assessments for CERCLA Actions 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. In addition, it requires that in cases where a proposed remedial action will take place within or affect wetlands or the 100-year and 500-year floodplains, a Statement of Findings be prepared to document this decision in the ROD. This statement must include: the reasons why the proposed action must be located in or affect the floodplain or wetlands; a description of significant facts considered in making the decision to locate in or affect the floodplain or wetlands including alternative sites and actions; a statement indicating whether the proposed action conforms to applicable state or local floodplain/wetland protection standards; a description of the steps taken to design or modify the proposed act to minimize the potential harm to or within the floodplain or wetlands; and a statement indicating how the proposed action affects the natural or beneficial values of the floodplains or wetlands. The Statement of Findings has been attached as Appendix V of this ROD.

The Fish & Wildlife Coordination Act requires that 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 (USFWS), Department of the Interior, and with the head of the agency exercising administration over 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. Consultation with the USFWS will be undertaken during the remedial design.

In addition, the National Historic Preservation Act (NHPA) has also been determined to be an ARAR for this project. The NHPA requires that remedial actions must take into account effects on properties in or eligible for inclusion in the National Registry of Historic Places. Cultural resource investigations conducted pursuant to the NHPA are ongoing. A draft Phase 1A Cultural Resource Assessment for the project area was produced in October 2004; this report noted the likelihood that the proposed project might encounter both recorded and unrecorded prehistoric and historic resources. Consequently, it is likely that once the area of remedial impact becomes established, additional cultural resource investigations will be required before the remedy is implemented.

Since all of the alternatives except the no-action alternative include dredging and/or capping within the lake, the final design of the remedy must meet the substantive requirements of the regulations (e.g., ECL Article 15). Alternatives that reestablish appropriate littoral zone habitat and function, that do not result in unacceptable changes in water depth or the loss of lake surface area, and do not result in a diminishment of natural resource values throughout the lake would more readily meet the requirements. All of the alternatives except the no-action alternative would be designed to comply with all of the designated location-specific and action-specific ARARs. The development of a lakewide habitat restoration plan is essential to provide a comprehensive evaluation of the selected alternative's ability to meet the requirements of Articles 15 and 24 and to develop appropriate bathymetry and habitat reestablishment requirements for each SMU.

Long-Term Effectiveness and Permanence

Permanence of the Remedial Alternative

Since Alternative 1 would involve no active remedial measures, it would not be effective in the long-term in controlling exposure.

Alternatives 6 and 7 provide the greatest long-term effectiveness and permanence by removal of all of the sediment that exceeds the cleanup criteria from SMUs 1 through 7 (with the exception of SMU 5). For SMU 8 (profundal zone), all of the action alternatives include MNR and/or thin-layer capping to remediate the contaminated sediments and oxygenation to maintain the proper chemical conditions (and, hence, greatly reduce the methylation of mercury) in the hypolimnion. Oxygenation of the hypolimnion would need to be actively maintained for Alternatives 2, 3, 4, 5, 6, and 7 to be effective. If the oxygenation system was suspended during the summer months, the oxygen demand of the profundal sediments would rapidly cause the loss of oxygen in the hypolimnion. This would result in the resumption of mercury methylation in the hypolimnion, and could adversely impact biota acclimated to the oxygenated conditions in the profundal zone.

Alternatives 2, 3, 4, and 5 incorporate the removal of increasing volumes of contaminated sediments prior to capping. These alternatives include an isolation cap in the littoral zone, which is a key component of these alternatives' protectiveness. Consolidation and disposal in an aboveground containment area (i.e., SCA) is more proven, more easily maintained, and more easily monitored than capping of wastes and contaminated sediments in an underwater environment, thereby making it more permanent and more reliable. Therefore, as the volume of material being removed increases, the permanence of the alternative increases.

For the contaminated sediments that would be left in the lake, the isolation cap would be designed to ensure long-term chemical isolation, including the ability to prevent ice scour and other types of erosion and to ensure its structural integrity. The integrity of the cap would be maintained through active operation and maintenance of an on-shore groundwater barrier wall and collection system along SMUs 1 and 2 (which will be installed as IRMs associated with the Willis Avenue, Semet Residue Ponds, and Wastebed B/Harbor Brook upland sites) and SMU 7 to prevent upwelling of contaminants through the sediment cap. In addition, the development and implementation of a monitoring and maintenance program to ensure that cap integrity and effectiveness is maintained would be included.

With regard to SMU 2, Alternatives 4 and 5 would remove sediments/marl contaminated with NAPL down to a depth of approximately 30 ft (9 m) and would be more effective in satisfying EPA's preference for treatment of principal threat waste than would Alternatives 2 and 3, which would remove and treat contaminated NAPL down to a depth of approximately 13 ft (4 m).

Reduction of Residual Risk

Residual risk in Onondaga Lake 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, therefore, be effective in reducing residual risk.

Alternatives 2, 3, 4, 5, and 6 would remediate all areas of the lake that exceed either the mean PECQ of 1 or the mercury PEC. These cleanup criteria address acute sediment toxicity to benthic macroinvertebrates. For those areas that are capped and covered with a clean substrate layer, it is expected that the concentrations of CPOIs in the clean substrate overlying the isolation cap would remain low enough to reduce chronic toxicity. Alternative 7 would remediate all areas of the lake exceeding the ER-Ls and, therefore, would result in the lowest residual risk of acute and chronic toxicity.

A mercury concentration goal in sediments of 0.8 mg/kg was developed for the site to address bioaccumulation concerns (see the text box entitled "Bioaccumulation-Based Sediment Quality Values" [page 41]). In order to evaluate alternatives with respect to the bioaccumulation goal, the estimated post-remediation surface area-weighted average concentration (SWAC) in each SMU corresponding to each respective alternative was compared to the 0.8 mg/kg goal, since animals that bioaccumulate mercury, such as fish, are not limited to one location in the lake.

An analysis of the SWACs predicted to remain in the lake after the remediation indicates that all alternatives other than the no-action alternative would be protective for the littoral zone as a whole (SMUs 1 to 7). The residual mercury concentrations in the profundal zone (SMU 8) surface sediments are predicted to drop significantly from the 1992 concentrations. However, based on the 10-year MNR modeling with oxygenation, they may not reach the 0.8 mg/kg value throughout the profundal sediments under Alternatives 2 through 6, and may therefore require additional remedial measures (e.g., thin-layer capping). Under Alternative 7, the 0.8 mg/kg goal would be attained throughout the profundal sediments. Measuring the progress toward meeting the 0.8 mg/kg BSQV, along with the fish tissue PRGs (upon which the BSQV is based), will be one of the goals of the monitoring program.

Adequacy and Reliability of Controls

Since Alternative 1 would involve no active remedial measures, the migration of contaminants would continue.

Alternatives 6 and 7 provide the greatest long-term effectiveness and reliability of controls, since these alternatives would remove the largest volumes of contaminated sediment and place them in a secure SCA. The technology used in constructing containment facilities, such as the SCA, is well established and dependable. Since the contamination would be removed from the environment, the control and maintenance of the contained material is highly reliable, and monitoring of the SCA and treatment systems would be easily accomplished.

The progressive removal of additional contaminated sediments from the lake under Alternatives 2, 3, 4, and 5 provides increasing reliability, since each alternative relies progressively less on an isolation cap in order to be protective. Therefore, the greater the amount of sediment that is removed, the more permanent and reliable is the alternative. For the contaminated sediments left in the lake, reliability would be addressed through installation of a cap designed to ensure long-term chemical isolation, prevent ice scour and other types of erosion, and provide long-term stability. The integrity of this cap would be maintained through active operation and maintenance of an on-shore groundwater barrier wall and collection system along SMUs 1, 2, and 7 to prevent upwelling of contaminants through the sediment. All of the removed sediments would be permanently secured.

All of the action alternatives include oxygenation and thin-layer capping in SMU 8. An oxygenation system would have to be actively maintained in order to oxygenate the hypolimnion. The system's ability to address the mercury methylation in Onondaga Lake would need to be assessed as part of a pilot study during the remedial design phase. Alternatives 2 through 6 also include MNR in the profundal zone. Areas that do not achieve the mercury BSQV of 0.8 mg/kg and the PRGs for fish during the MNR period would require additional remedial measures. This may include thin-layer capping beyond the initial estimate of 154 acres, which is based on current exceedances of the mean PECQ of 1, if monitoring indicates it has been effective in reducing surface sediment concentrations.

Reduction of Toxicity, Mobility, or Volume through Treatment

Degree of Expected Reduction in Toxicity, Mobility, or Volume Through Treatment

Alternative 1 (no action) would provide no reduction in toxicity, mobility, or volume through treatment or otherwise. For the action alternatives, the dredging of contaminated sediments and their placement in a secure, lined SCA would result in a reduced mobility for these materials, as would in-lake capping. In addition, those NAPLs removed from the dredged material would be treated and/or disposed of off site.

Oxygenation, which is included in Alternatives 2, 3, 4, 5, 6, and 7, is expected to reduce the toxicity of mercury in SMU 8 by reducing methylation and the degree to which mercury is dissolved in the hypolimnion. Although thin-layer capping and MNR are expected to reduce the surface sediment concentrations in the profundal zone under all of the action alternatives, the volume of mercury and other key CPOIs in profundal sediments would not be reduced, since there would be no sediment removal prior to thin-layer capping. However, a combination of all three remedial components (oxygenation, MNR, and thin-layer capping),along with control of upland sites and remediation of the littoral zone, would be expected to reduce the overall bioavailability and mobility of contaminants in the profundal zone and hypolimnion.

Degree to Which Treatment Would Be Irreversible

For the NAPLs that are treated, the treatment would be irreversible and permanent.

Oxygenation of the hypolimnion would need to be actively maintained for Alternatives 2, 3, 4, 5, 6, and 7 to be effective. If the oxygenation system was suspended during the summer months, the oxygen demand of the profundal sediments would rapidly cause the loss of oxygen in the hypolimnion and would result in the resumption of mercury methylation in the hypolimnion. Thus, the treatment afforded by oxygenation is reversible. As a result, the overall irreversibility of this treatment in the hypolimnion would be low, but equivalent, in Alternatives 2, 3, 4, 5, 6, and 7.

Type and Quantity of Residuals

Alternatives 6 and 7 would remove all contaminated sediments down to their respective cleanup criteria in the littoral zone, except for areas within SMU 5 which would be capped. Alternatives 2, 3, 4, and 5 would isolate littoral sediments using an engineered isolation cap and would also progressively remove higher concentrations and/or masses of CPOIs in the ILWD and the NAPL in SMU 2, with Alternative 2 removing the least volume and Alternative 5 removing the greatest volume. Alternatives 2, 3, 4, 5, and 6 would address contamination in the profundal sediments through oxygenation, thin-layer capping, and MNR.

All of the action alternatives would generate treatment residuals which would have to be appropriately handled.

EPA Preference for Treatment as a Principal Remedy

The treatment and/or disposal of NAPLs at an off-site facility and oxygenation in the hypolimnion are critical components of the alternatives that meet EPA's treatment preference. The larger the volume of NAPLs that are removed from the lake and treated, the more an alternative satisfies this EPA preference for treatment.

EPA's statutory preference for treatment of principal threat materials has been considered as part of this remedy. Given the extraordinary volume of materials being evaluated (e.g., greater than 4,000,000 cy [3,060,000 m^3] of sediments and wastes within the ILWD, some of which contain NAPLs), treatment of all principal threat wastes (which are present in various portions of the ILWD) is impracticable. However, the implementation of any of these alternatives would include the off-site treatment and/or disposal of all NAPLs that were segregated during the dredging/handling process.

Short-Term Effectiveness

Alternative 1 (no action) does not include any physical construction measures in any areas of contamination and, therefore, would not present any potential adverse impacts to on-site workers, the environment, or the community as a result of its implementation.

Alternatives 2 through 7 could present some limited adverse impacts to on-site workers through dermal contact and inhalation related to dredging activities. Noise from the dredging work and from the on-site treatment processes could present some limited adverse impacts to on-site workers and nearby residents. In addition, post-dredging sampling activities could 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 would, however, be mitigated by following appropriate health and safety protocols, by exercising sound engineering practices, and by utilizing proper protective equipment.

Alternatives 2 through 7 would require the transport of significant volumes of capping and backfill material, which may involve use of local roadways and would cause an increase in traffic. Alternatives 6 and 7 would result in the greatest amount of traffic related to the transport of these materials. If mechanical dredging is used, the amount of traffic on local roads would increase commensurate with the amount of dredging. However, during the remedial design, various means would be evaluated for minimizing potential adverse impacts (e.g., traffic, odors associated with dredged sediments) on the community.

Under Alternatives 2, 3, 4, 5, and 6, MNR would take up to 10 years to achieve objectives in the profundal area, while oxygenation would be expected to produce immediate benefits in terms of methylmercury reduction. Since no activities would be performed under the no-action alternative, no time would be required to implement this alternative. Construction activities associated with the implementation of Alternatives 2, 3, 4, and 5 would be completed within four years. Implementation of Alternatives 6 and 7 would take significantly longer because of the increased dredging volumes, requiring 10 and 17 years, respectively.

Short-term impacts to the ecological community from implementation of all of the alternatives, except the no-action alternative, would include temporary loss of lake habitat and aquatic communities. The impact duration could be significantly greater for the implementation of Alternatives 6 and 7 because of the additional dredging and backfilling required under these alternatives, which could substantially increase the time before the area could be recolonized. However, if the construction was phased (i.e., not performed over the entire lake at once), this impact would be decreased.

The public would be excluded from the work areas of the lake during the time they are under remediation. The impact duration would be significantly greater for the implementation of Alternatives 6 and 7 because of the 10- to 17-year estimated construction durations, respectively.

Implementability

Reliability of Technology

Alternative 1 would be the easiest to implement, as there are no activities to undertake. Aquatic capping (isolation and thin-layer), dredging, treatment of segregated NAPLs (if employed), oxygenation, and MNR are all implementable technologies that have been used at other sites. However, aquatic capping presents challenges not typically associated with capping of upland sites (e.g., landfills). These issues would be addressed during the remedial design. SCA-type facilities have been successfully constructed and operated at numerous sites. Furthermore, the application of oxygenation (to address mercury methylation within Onondaga Lake) would require pilot testing before full-scale implementation.

Reliability (in terms of being able to construct and operate the technology) of the remedial components to be used in all of the alternatives is high. All of the action alternatives can be constructed and operated; however, Alternatives 6 and 7 would involve dredging and containing a much larger volume of sediments than the other alternatives. Construction of the SCA under Alternatives 6 and 7 would be challenging because of its size (i.e., approximately 282 and 442 acres, respectively, with 50 ft [15 m] high dikes). The large volumes of sediment involved in these alternatives might stretch the limits of the ability to contain the dredge spoils on nearby Honeywell properties. For Alternatives 2, 3, 4, and 5, there would be sufficient capacity at the proposed SCA location(s) on one or more the Solvay wastebeds to contain the sediment generated. Alternative 5, while implementable, would be more difficult to implement than Alternative 4 due to the removal of an additional 1,071,000 cy associated with Alternative 5.

All of the action alternatives include near-shore capping. As a result, institutional controls would be required. Institutional controls would include notification of appropriate government agencies with authority for permitting potential future activities which could impact the implementation and effectiveness of the remedy. Institutional controls would be needed to ensure long-term effectiveness of alternatives containing a capping component. The duration of these institutional controls would be dependent on lake conditions and the specifics of the institutional control.

Ability to Monitor Effectiveness of Remedy

A monitoring program would be developed during the design that would be used to assess remedy effectiveness. Monitoring to ensure that the remedial technologies are performing as specified in the design (e.g., cap integrity) would also be a component of the monitoring program. Monitoring programs would be needed for each of the action alternatives and are expected to include, at a minimum, sampling of biological tissue (e.g., fish, invertebrates), surface water, and sediments within the lake before, during, and following remediation; sampling of the aquatic cap to determine its integrity (chemically and structurally); determining the effectiveness of the thin-layer cap; and sampling of the SCA to determine its integrity (chemically and structurally). The specific monitoring programs required to evaluate remedy effectiveness would depend on the specific alternative. The scope of the program, including sampling and analytical details, would be determined during the remedial design.

The monitoring program, although comprehensive and broad in scope, would be comprised of sampling and analytical methods that should be readily implementable. Since direct visual inspections of the aquatic cap may be complicated by underwater conditions, alternative methods to determine cap structural integrity would need to be developed during the remedial design.

Ease of Undertaking Additional Remedial Actions as Needed

The remedial technologies to be utilized as part of the alternatives, generally, do not preclude other remedial actions from being implemented as needed. For example, settling of the cap could potentially necessitate adding more material to maintain suitable littoral water depths. In addition, capped materials could be excavated, if necessary, or additional cap material could be placed. However, such additional remedial actions would need to comply with ARARs (e.g., 6 NYCRR Part 608).

Ability to Obtain Approvals from Other Agencies

It is expected that the necessary administrative approvals from other agencies can be acquired for all alternatives.

Availability of Adequate On-Site or Off-Site Treatment, Storage Capacity, and Disposal Services

There would be sufficient capacity at the SCA to contain the sediment generated under Alternatives 2, 3, 4, and 5. However, due to the large volume of sediment removal associated with Alternatives 6 and 7, it is possible that the capacity at the SCA would be inadequate and that additional containment cells would need to be constructed or that a significant volume of material would have to be disposed of at an off-site facility.

Availability of Necessary Equipment and Personnel

The technology, equipment, subcontractors, personnel, and facilities required to successfully complete all alternatives are available in the environmental marketplace.

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 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, in compliance with the 1988 EPA guidance document, "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA."

The estimated capital, operation, maintenance, and monitoring (OM&M), and present-worth costs for each of the alternatives are presented below.

Lakewide Alternative	Capital Costs	Average O&M Annual Cost	Present-Worth O&M Costs	Present-Worth Costs
1	$0	$0	$0	$0
2	$275,000,000	$3,000,000	$37,000,000	$312,000,000
3	$333,000,000	$3,000,000	$37,000,000	$370,000,000
4	$414,000,000	$3,000,000	$37,000,000	$451,000,000
5	$499,000,000	$3,100,000	$38,000,000	$537,000,000
6	$1,292,000,000	$2,800,000	$35,000,000	$1,327,000,000
7	$2,086,000,000	$5,700,000	$71,000,000	$2,157,000,000

As can be seen by the cost estimates, in general, the cost of each alternative increases with increases in the area of the lake bottom remediated and with the amount of sediment removed.

There is no cost associated with Alternative 1, the no-action alternative. Alternatives 2, 3, 4, and 5, which include the use of dredging and capping technologies to address sediments that exceed a mean PECQ of 1 or the mercury PEC, as well as significant removals in the ILWD and in SMU 2, range in estimated present-worth cost from $312,000,000 (for Alternative 2) to $537,000,000 (for Alternative 5). Alternatives 6 and 7, which depend upon full removal in the littoral zone with the exception of SMU 5 (versus partial removal and capping) to the appropriate cleanup criteria, range in estimated present-worth cost from $1,327,000,000 to $2,157,000,000, respectively.

Support Agency Acceptance

EPA has determined that the remedy selected by NYSDEC, the lead agency for this site, meets the requirements for remedial action set forth in CERCLA Section 121, 42 USC §9621. EPA has adopted this remedy's selection by cosigning this ROD. NYSDOH concurs with the selected remedy; its letter of concurrence is attached (see Appendix IV).

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 VI to this document.

The Onondaga Nation asserted a lack of coordination with it regarding the proposed remedy and the timing of the public comment period. However, EPA Region 2 and NYSDEC have had five meetings with the Onondaga Nation since the NRRB meeting concerning the Proposed Plan and intend to continue discussions with the Onondaga Nation throughout the design phase of the project. The concerns raised by the Onondaga Nation are further discussed in the Responsiveness Summary.

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 act 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 these wastes is made on a site-specific basis through a detailed analysis of alternatives, using the remedy selection criteria which are described below. This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

Elevated contaminant concentrations and visual evidence (e.g., liquids, droplets, sheens) indicate that NAPL (e.g., chlorinated benzenes, which were manufactured and released as a waste by Honeywell) exists throughout the ILWD and in an area off the Honeywell causeway. Based on data collected during the RI/FS, it was determined that the NAPLs and highly-contaminated waste materials in these areas of the lake are highly mobile, at least when disturbed, have high concentrations of toxic compounds, and present a significant risk to human health and the environment should exposure occur; therefore, they are characterized as principal threat wastes.

EPA's statutory preference for treatment of principal threat materials has been considered as part of this remedy. Given the extraordinary volume of materials being evaluated (e.g., greater than 4,000,000 cy [3,060,000 m^3] of sediments and wastes within the ILWD, some of which contain NAPLs), treatment of all principal threat wastes (which are present in various portions of the ILWD) is impracticable. However, the implementation of any of these alternatives would include the off-site treatment and/or disposal of all NAPLs that would be segregated during the dredging/handling process. The appropriate means for collecting and handling these sediments and materials would be determined during the remedial design.

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 4 (Dredging of the ILWD to 2 m [6.5 ft]; Removal in Areas of Hot Spots in the ILWD to a Maximum Depth of 3 m [10 ft] and Isolation Capping in SMU 1; Dredging for No Loss of Lake Surface Area and Erosion Protection and to Reestablish Habitat, and Isolation Capping in SMUs 2 to 7; Targeted Dredging to 9 m (30 ft) for NAPL Removal in SMU 2; Targeted Dredging in SMUs 3 and 6; and Phased Thin-Layer Capping, Oxygenation, and Monitored Natural Recovery in SMU 8) best satisfies the requirements of CERCLA Section 121, 42 U.S.C. §9621, and provides the best balance of tradeoffs among the remedial alternatives with respect to the NCP's nine evaluation criteria, 40 CFR §300.430(e)(9).

Alternatives 2 through 6 address the same surface area of contaminated lake bottom sediments. The major difference between Alternatives 2 through 6 is how each respective alternative would address SMU 1. In general, the alternatives call for successively greater depths of excavation and, therefore, increasing volumes of waste to be removed. Specifically, Alternatives 2, 3, 4, 5, and 6 call for removal depths of up to 0.8, 2, 3, 5, and 8 meters, respectively, within the ILWD. The long-term effectiveness of the alternatives for the ILWD increases with increasing amounts of removal, since less waste would be contained in the aquatic environment. The reliability of the aquatic cap is enhanced with removal of the more highly concentrated wastes. Therefore, Alternative 4, which includes hot spot removals to a depth of 3 m (10 ft) below grade, provides a greater degree of reliability than Alternatives 2 and 3. The highest concentrations of the majority of CPOIs, on average, are found in the upper 3 m (10 ft) of the ILWD. While Alternative 5 includes approximately 2 m (6.5 ft) of additional removal within SMU 1 (relative to Alternative 4), this removal does not target hot spot areas. Therefore, it does not increase cap reliability commensurate with the increased $86 million in estimated present-worth costs over Alternative 4. In addition, unlike Alternative 5, Alternative 4 includes cap enhancements in any residual hot spot areas. Since the cap enhancements would be placed over the most highly-contaminated sediments, this component of Alternative 4 provides greater cap reliability than does Alternative 5.

Another significant difference among Alternatives 2 through 6 relates to SMU 2. Alternatives 4, 5, and 6 would remove NAPLs to a depth of 9 m (30 ft) in the vicinity of the causeway (the assumed area of NAPLs is shown on Figure 4.26 of Honeywell's November 2004 FS report) and, thus, result in a greater reduction in the concentrations and masses of CPOIs prior to capping than would Alternatives 2 and 3, thus, providing greater long-term effectiveness and cap reliability. Since Alternatives 4, 5, and 6 would remove and treat a larger volume of NAPLs than Alternatives 2 and 3 would, they would satisfy the NCP's preference for treatment of principal threat waste to a greater degree than Alternatives 2 and 3.

Under Alternatives 6 and 7, an estimated 11 million and 18.9 million additional cy of material, respectively, would be removed from the lake, compared to Alternative 2. While Alternatives 6 and 7 would provide greater long-term effectiveness than Alternative 4, the greater volumes of material to be removed and disposed would likely exceed the capacity for a single SCA. Multiple containment cells would likely be needed or, alternatively, significant volumes of material would have to be disposed of at an off-site facility. The $876,000,000 and $1,706,000,000 in incremental costs over Alternative 4 associated with the additional removals called for under Alternatives 6 and 7, respectively, would not be cost effective. A properly designed and constructed aquatic cap, together with the other elements of Alternative 4, would provide a similar degree of protection offered by Alternatives 6 and 7 at significantly less cost, in less time and with greater ease of implementation.

Alternative 4 would remove up to 3 m (10 ft) of some of the most highly-concentrated wastes from the ILWD. This removal would facilitate construction of a structurally-stable cap and would result in the removal of substantial quantities of the principal threat waste. The residual waste could be effectively contained under the engineered cap. The sediments removed from the lake could be contained in one or more SCAs on one or more of Honeywell's Solvay wastebeds. Finally, continued OM&M of the cap would ensure its continued effectiveness. For all of these reasons, Alternative 4 is protective of human health and the environment, provides long-term effectiveness, is able to achieve the ARARs more quickly, or as quickly, as the other alternatives, is cost-effective, and offers the best balance of tradeoffs among the alternatives.

Therefore, the selected remedy will provide the best balance of tradeoffs among alternatives with respect to the evaluation criteria. NYSDEC and EPA believe that the selected remedy will treat principal threat wastes, be protective of human health and the environment, comply with ARARs, be cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. The selected remedy also will meet the statutory preference for the use of treatment as a principal element.

Description of the Selected Remedy

The selected remedy (Alternative 4) will address all areas of the lake where the surface sediments exceed a mean probable effect concentration (PEC) quotient of 1 or the mercury PEC of 2.2 mg/kg (see Figure 7). The selected remedy will also attain a 0.8 mg/kg bioaccumulation-based sediment quality value (BSQV) for mercury on an area-wide basis for the lake and for other applicable areas of the lake to be determined during the remedial design. The selected remedy is also intended to achieve lakewide fish tissue mercury concentrations ranging from 0.14 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 for the consumption of organisms. The remedy includes dredging prior to isolation capping in SMUs 1 to 7 to a depth that will prevent the loss of lake surface area, ensure cap effectiveness, remove NAPLs, reduce contaminant mass, allow for erosion protection, and reestablish habitat. Dredging will also be performed as needed in the ILWD (which largely exists in SMU 1) to remove materials within areas of hot spots and to ensure stability of the cap. Most of the dredging will be performed in the ILWD (which largely exists in SMU 1) and in SMU 2. In SMU 8, the remedy calls for phased thin-layer capping, oxygenation, and MNR. The littoral zone in the vicinity of the dredging/capping will be restored to reestablish appropriate habitat and function following removal of contaminated sediments.

The selected remedy (see Figure 9) will include the dredging of as much as an estimated 2,653,000 cy (2,030,000 m^3) of sediments and/or wastes from the littoral zone, with most of the dredging (approximately 75 percent) being performed in SMUs 1 and 2. It will also include the use of isolation capping over an estimated 425 acres (approximately 42 percent) of the littoral zone (between SMUs 1 to 7). An estimated 154 acres (approximately 8 percent) of the profundal zone (SMU 8) will receive a thin-layer cap. Specifically, the components of the selected remedy within each SMU include:

- **SMU 1** – Dredging of an estimated 1,566,000 cy (1,197,000 m^3) of sediments and/or wastes from the ILWD, prior to capping, to prevent a loss of lake surface area, reduce average CPOI concentrations in sediments and/or wastes remaining under the cap, for erosion protection, and to reestablish habitat. Capping of the entire SMU (approximately 84 acres). Capping effectiveness will rely upon the proper functioning of the hydraulic control system which will be installed, operated, monitored and maintained as part of the Wastebed B/Harbor Brook Barrier IRM.

  Dredging will be performed to remove sediments and/or wastes to an average depth of 6.5 ft (2 m) prior to capping. This will provide an adequate water depth to allow for the establishment of a productive habitat after capping, reduce average CPOI concentrations in sediments and/or wastes remaining under the cap, and allow for erosion protection for the cap. While the average dredge cut across SMU 1 will be 6.5 ft (2 m), the actual depth of dredging in the various portions of SMU 1 will be determined during the remedial design. The determination will be based on various factors, including contaminant distribution, habitat needs, and erosional concerns.

  In areas defined as hot spots, dredging will also be performed to remove an additional 3.3 ft (1 m) of sediments and/or wastes (below the dredge cut described above). The hot spots will be defined as those sediments and/or wastes that contain CPOIs above threshold concentrations. The purpose of this additional removal in hot spot areas is to improve capping effectiveness. The hot spot threshold concentrations that will trigger the additional dredging are as follows:

  - Benzene – 208 mg/kg
  - Chlorobenzene – 114 mg/kg
  - Dichlorobenzenes – 90 mg/kg
  - Naphthalene – 20,573 mg/kg
  - Xylene – 142 mg/kg
  - Ethylbenzene – 1,655 mg/kg
  - Toluene – 2,626 mg/kg
  - Mercury – 2,924 mg/kg

  As refined modeling will be performed during the remedial design, it is possible that these concentrations may be modified. However, the hot spot concentrations will be based on an assumed upwelling rate of 2.4 inches/year (6 cm/yr).

  If during the remedial design or construction it becomes apparent that concentrations (hot spots) exceeding these threshold values are present at depths greater than 3.3 ft (1 m) below the dredge cut, NYSDEC and EPA will evaluate the need for additional remediation (e.g., increase the cap thickness to contain those CPOIs to ensure cap effectiveness) in these areas of the ILWD.

The removal of an average of 6.5 ft (2 m) of materials and deeper removal in the area of the hot spots is expected to improve the reliability of capping of the ILWD. This removal will likely reduce the average contaminant concentrations, as well as the maximum concentrations of some of the contaminants, in the residual waste. Furthermore, the available data indicate that the remedy will result in the removal of a significant portion of the contaminant mass present within the ILWD.

The remedy will include additional dredging, if needed, to address geotechnical concerns with the ILWD. The nature of the sediments and/or wastes, as well as geophysical evidence of historical failures (i.e., underwater slumping or "landslides" associated with the ILWD), might require the removal of additional sediments and/or wastes or other engineering measures to ensure the long-term stability of the cap. Adequate data will be gathered during the remedial design to enable the determination of appropriate measures to ensure that the cap will be structurally sound and otherwise effective in all areas of the lake slated for remediation.

As the ILWD extends to some extent beyond SMU 1's boundary into SMUs 2 and 7, the removal and capping of the ILWD sediments and/or wastes in the adjacent SMUs will be performed in a similar fashion to SMU 1.

- **SMU 2** – Dredging of an estimated 403,000 cy (308,000 m^3) of sediments and/or wastes prior to capping. This includes dredging to remove NAPL to an estimated 30-ft (9-m) depth in the vicinity of the causeway (the assumed area of NAPLs is shown on Figure 4.26 of Honeywell's November 2004 FS), as well as dredging to shallower depths in other areas to prevent a loss of lake surface area, for erosion protection and to reestablish habitat. Dredging will also be performed to remove sediments and/or wastes from the portion of the ILWD which extends into SMU 2. The removal of these ILWD materials in SMU 2 will be performed consistent with how these materials will be addressed in SMU 1.

  Capping of approximately 16 acres in SMU 2. Capping effectiveness will rely upon the proper functioning of the hydraulic control system which will be installed, operated, monitored, and maintained as part of the Willis/Semet Barrier IRM (the design of which is underway).

- **SMU 3** – Dredging of an estimated 75,000 cy (57,000 m^3) of sediments and/or wastes prior to capping to maintain cap effectiveness (targeted dredging) in the absence of a hydraulic control system, to prevent a loss of lake surface area, for erosion protection and to reestablish habitat. Capping of approximately 29 acres.

  If data collected as part of the remedial design of the Onondaga Lake remediation indicate that the construction/operation of a hydraulic control system along the SMU 3 shoreline to maintain cap effectiveness (in lieu of the portion of dredging described above that is otherwise necessary to maintain cap effectiveness) would be at least as effective as the dredging described above, NYSDEC may allow the construction/operation of a hydraulic control system in place of a portion (that required to maintain cap effectiveness) of the dredging described above.

- **SMU 4** – Dredging of an estimated 135,000 cy (103,000 m^3) of sediments and/or wastes prior to capping to prevent a loss of lake surface area, for erosion protection and to reestablish habitat. Although mercury does not exceed the PEC in the surface sediment interval at all of the sampling stations in SMU 4, concentrations of mercury exceed the PEC at sediment intervals just below the surface in the top 3.3 ft (1 m) at all stations in this SMU. Since these surface sediments are subject to erosion, it is assumed that all of SMU 4 (approximately 75 acres) will require capping.

- **SMU 5** – Dredging of an estimated 140,000 cy (107,000 m^3) of sediments and/or wastes prior to capping to prevent a loss of lake surface area, for erosion protection and to reestablish habitat. Capping of approximately 60 acres.

  In SMU 5, there were a limited number of sampling locations where CPOI concentrations in sediment exceeded either the mean PECQ of 1 or the mercury PEC. The above remedial actions are proposed to address the estimated areas represented by these sample results. During remedial design, an additional investigation of the sediments in the vicinity of these locations will be conducted to delineate the extent of the actual sediment areas and volumes exceeding the mean PECQ of 1 or the mercury PEC. This further delineation will be used to determine the scope and extent of capping and/or dredging activities needed to address these limited areas.

- **SMU 6** – Dredging of an estimated 245,000 cy (187,000 m^3) of sediments and/or wastes prior to capping to maintain cap effectiveness (targeted dredging) in the absence of a hydraulic control system, to prevent a loss of lake surface area, for erosion protection and to reestablish habitat. Capping of approximately 123 acres.

  If data collected as part of the remedial design of the Onondaga Lake remediation indicate that the construction/operation of a hydraulic control system along the SMU 6 shoreline to maintain cap effectiveness (in lieu of the portion of the dredging described above that is otherwise necessary to maintain cap effectiveness) would be at least as effective as the dredging described above, NYSDEC may allow the construction/operation of a hydraulic control system in place of a portion (that required to maintain cap effectiveness) of the dredging described above.

- **SMU 7** – Dredging of an estimated 89,000 cy (68,000 m^3) of sediments and/or wastes prior to capping, to prevent a loss of lake surface area, for erosion protection and to reestablish habitat. Dredging will also be performed to remove sediments and/or wastes from the portion of the ILWD which extends into SMU 7. The removal of these ILWD materials will be performed consistent with how these materials will be addressed in SMU 1. The selected remedy also includes the construction/operation of a hydraulic control system along the SMU 7 shoreline to maintain cap effectiveness. Capping of approximately 38 acres.

  If data collected as part of the remedial design of the Onondaga Lake remediation indicate that targeted dredging in SMU 7 (in lieu of the construction/operation of a hydraulic control system described above) would be at least as effective as the hydraulic control system, NYSDEC may allow targeted dredging in place of a hydraulic control system for SMU 7.

- **SMU 8** – Thin-layer capping over an estimated 154 acres (approximately 8 percent) of the profundal area. The appropriate thickness and type of substrate for thin-layer capping will be determined during the remedial design. The suitability of thin-layer capping at the base of the ILWD in the profundal zone (SMU 8) will be reviewed during the remedial design based on extensive data to be collected as part of the pre-design program. An MNR program will be performed in the profundal area, as discussed further below.

A pilot study will be performed to evaluate the potential effectiveness of oxygenation at reducing the formation of methylmercury in the water column, while preserving the normal cycle of stratification within the lake. An additional factor which will be considered during the design of the pilot study will be the effectiveness of oxygenation at reducing fish tissue methylmercury concentrations. If supported by the pilot study results, the pilot study will be followed by full-scale implementation of oxygenation in SMU 8. Furthermore, potential impacts of oxygenation on the lake system will be evaluated during the pilot study and/or the remedial design of the full-scale oxygenation system.

- The isolation caps that will be constructed in the littoral zone (SMUs 1 through 7) will consist of various layers each of which serves a specific purpose. The first layer on top of the sediments is referred to as the mixing layer. The mixing layer addresses the fact that mixing takes place between sediments and the initial layer of cap material during actual cap placement. Above the mixing layer is the chemical isolation layer which “isolates” contaminants in the sediments below the cap. The chemical isolation layer will be a minimum of 12 inches (30 cm) thick. The thickness of the chemical isolation layer is determined, based on computer modeling, such that concentrations of contaminants within the sediments do not result in unacceptable levels of exposure to aquatic life . For any given contaminant, a concentration greater than the PEC of any of the CPOIs that have been shown to exhibit acute toxicity on a lakewide basis or NYSDEC sediment screening criteria for benzene, toluene, and phenol, is considered an unacceptable level of exposure. During the remedial design the actual thickness of the chemical isolation layer will be determined, based on additional sediment sampling and additional cap modeling.

  Above the chemical isolation layer is the habitat restoration layer. The habitat restoration layer will consist of a minimum thickness of 12 inches (30 cm) of suitable habitat material. The specific thickness(es) and type(s) of substrate material to be used for the habitat layer will be determined as part of the remedial design based on the comprehensive lakewide habitat restoration plan.

  Because of the limitations of computer modeling and other factors associated with cap construction, a 50 percent buffer or safety layer will be added during cap construction. The thickness of the overall cap is thereby increased by a thickness equal to 50 percent of the thickness of the chemical isolation layer. As part of the remedial design, a decision will be made as to what portion of the buffer layer will be considered part of the habitat restoration layer. The remaining portion of the buffer layer will be added to the modeled chemical isolation layer to represent the actual chemical isolation layer portion of the cap.

  An erosion (armor) layer will be included in the cap design/construction, where needed, and at a location between the chemical isolation layer and the habitat restoration layer.

  The point of compliance, with respect to ensuring that the isolation portion of the cap is effective in preventing unacceptable concentrations of contaminants (i.e. a concentration greater than the PEC of any of the CPOIs that have been shown to exhibit acute toxicity on a lakewide basis or NYSDEC sediment screening criteria for benzene, toluene, and phenol) from entering the habitat restoration layer portion of the cap, will be at the bottom of the habitat restoration layer.

  The remedial design will include flexibility in dredge depth (with regard to hot spot threshold concentrations as they may be modified as a result of the additional cap modeling that will be performed during the remedial design) and cap thickness so that cap effectiveness and cost effectiveness can be attained.

Predicted settlement of the cap will be determined based on pre-design sampling. The estimated settlement will be evaluated to determine if additional removal beyond that contained in the ROD is necessary in order to maintain an acceptable water depth.

The cap in the areas in front of Ninemile Creek and other tributaries will be designed to meet multiple objectives, including protecting against erosion forces from the tributary and from within the lake, providing a natural transition between fish and wildlife habitats in the lake and tributary, and ensuring that the cap will not disrupt the water flow into Onondaga Lake, including under 100-year-flow conditions. If it is determined during the pre-design investigation that the flow would be affected, additional dredging will be included to ensure that the impact to the flow is minimized to the extent practicable.

- Habitat reestablishment will be performed in areas where dredging/capping will occur. The habitat restoration layer with a minimum thickness of 12 inches (30 cm) will be placed on all areas capped within the littoral zone. The specific thickness(es) and type(s) of substrate material to be used for the habitat layer in these areas will be determined during the remedial design as part of the comprehensive lakewide habitat restoration plan.

- The design and construction of the remedy, including the habitat restoration layer, will need to meet 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 for habitat restoration will be developed as part of the lakewide habitat restoration plan.

- The majority of the dredged sediments will be disposed in one or more SCAs constructed on one (or more) of the Solvay wastebeds. Based on evaluations to be conducted during the design, as well as during construction, it is likely that a portion of the dredged materials (e.g., NAPLs) will be treated and/or disposed of at an off-site permitted facility rather than at the SCA. The appropriate means for collecting and handling these sediments and materials will be determined during the remedial design. The FS report assumed that the SCA would be constructed on Wastebed 13 based on its capacity, as well as other factors. However, the actual Solvay wastebed location(s) on which the SCA(s) will be constructed will be determined during the remedial design and be based on an evaluation of the potential impacts on the local community, geotechnical stability of the wastebeds, SCA construction requirements, wastebed size, the means for transporting dredged materials to the SCA, costs, etc. This ROD assumes that preloading and stabilization of the wastebed materials will be required prior to construction of the SCA, but the extent to which preloading and stabilization will be required, if any, will be determined during the remedial design. The remedial design of the SCA will be undertaken in accordance with state and federal requirements and guidance and will include, at a minimum, the installation of an impermeable liner, leachate collection and treatment, and a cap.

- Treatment of water generated by the dredging/sediment handling processes as a result of dewatering of the sediments at the SCA. During the remedial design, NYSDEC will issue discharge limits (that will be protective of Onondaga Lake) that will need to be met by the treated water prior to its discharge (end of pipe) back to the lake. It is assumed that the water will require “advanced treatment” (which includes enhanced primary treatment, multimedia filtration, air stripping, and granular activated carbon treatment for additional VOC removal, and pH adjustment as defined in the FS report) in order to meet discharge limits. However, the actual treatment technologies needed to ensure compliance with discharge limits will be determined during the remedial design and might vary depending on the levels and types of contaminants present in lake sediments in various areas (or SMUs) of Onondaga Lake.

- Implementation of institutional controls including notification of appropriate government agencies with authority for permitting potential future activities which could impact the implementation and effectiveness of the remedy.

- Implementation of a long-term OM&M program to monitor and maintain the effectiveness of the remedy. The long-term monitoring will be performed to assess the effectiveness of the remedy in achieving the RAOs and PRGs and to ensure that the remedial technologies are performing as specified in the remedial design. The program will be designed to monitor and evaluate the effectiveness of the various remedy components including containment at the SCA, isolation capping, thin-layer capping, effectiveness of the groundwater control structures, oxygenation, MNR, and habitat reestablishment and enhancement. Types of monitoring which will likely be employed include sampling within the lake before, during, and following remediation, including sampling of biological tissue (e.g., fish, invertebrates), measurements of the effects on the environment (e.g., toxicity testing, community analysis), and sampling of surface water and sediments; sampling of the aquatic cap to determine its integrity (chemically and structurally), and sampling of the SCA to determine its integrity (chemically and structurally).

It will be certified on an annual basis that the institutional controls are in place and that remedy-related OM&M is being performed.

The selected remedy also includes habitat enhancement, an improvement of habitat conditions in areas where CERCLA contaminants do not occur at levels that warrant active remediation, but where habitat impairment due to stressors has been identified as a concern. Habitat enhancement will be utilized along an estimated 1.5 mi (2.4 km) of shoreline (SMU 3) and over approximately 23 acres (SMU 5) to stabilize calcite deposits and oncolites and promote submerged macrophyte growth. The habitat enhancement will be performed consistent with the lakewide habitat restoration plan. This component of the remedy is not intended to satisfy the requirements of CERCLA or the National Oil and Hazardous Substances Pollution Contingency Plan, but is included in order to address requirements of state law.

As part of the remedy, the BSQV of 0.8 mg/kg for mercury will be applied on an area-wide basis. The BSQV is a means to assess areas of the lake that may be contributing to exceedances of the fish tissue PRGs, which range from 0.14 to 0.3 mg/kg mercury. An additional investigation will be conducted during the remedial design to determine the appropriate areas within the lake for applying the BSQV and to determine whether the SWACs of mercury predicted to remain in the sediments following remediation of SMUs 1 through 7 and at the end of the 10-year MNR period will meet the BSQV. If this investigation indicates that mercury in surficial sediments in the applicable areas will exceed 0.8 mg/kg, then additional remedial measures (e.g., additional thin-layer capping in SMU 8 beyond the estimated 154 acres) will be implemented, as needed, during construction so that (after remediation in SMUs 1 through 7, and at the end of the 10-year MNR period in SMU 8) surficial sediment concentrations of mercury are predicted to meet 0.8 mg/kg on an area-wide basis.

The remedy will include MNR in SMU 8 to achieve the mercury PEC of 2.2 mg/kg in the profundal zone and to achieve the BSQV of 0.8 mg/kg on an area-wide basis within 10 years following the remediation of upland sources, littoral sediments, and initial thin-layer capping in the profundal zone. An investigation will be conducted during the remedial design to refine the application of an MNR model and determine any additional remedial measures (e.g., additional thin-layer capping) needed in the profundal zone.

The remedial design will include the collection of additional site data (e.g., sediment cores) to delineate in detail the various areas in which remedial activities will be performed, dredging areas and volumes, capping areas, etc. While hydraulic dredging was assumed for the purpose of the detailed evaluation in the FS report and this ROD, the actual dredging method(s) will be determined during the design.

During the remedial design, treatability studies (e.g., water treatment) will be performed if necessary.

The remediation of the Onondaga Lake subsite will need to be coordinated with upland remedial activities. The control of contamination migrating to the lake from the various upland sites (e.g., Willis Avenue, Semet Residue Ponds, Wastebed B/Harbor Brook, LCP Bridge Street, and Geddes Brook/Ninemile Creek) is an integral part of the overall cleanup of Onondaga Lake. To prevent the recontamination of lake sediments, active sources of contamination to a given portion of the lake will need to be shut off prior to performing cleanup activities in that area of the lake. For example, the hydraulic control systems which will be installed/operated as part of the Wastebed B/Harbor Brook and Willis/Semet Barrier IRMs will address the ongoing releases of contaminants from these upland areas to SMUs 1 and 2, respectively. These systems will need to be constructed and operating prior to cleanup activities commencing in this part of the lake.

Furthermore, the effectiveness of the capping of SMUs 1 and 2 will rely upon the proper functioning of these hydraulic control systems. Likewise, the effectiveness of capping in SMU 7 will rely upon the proper functioning of the hydraulic control system which will be installed along the lakeshore as part of the remedy for this portion of the lake. Therefore, the timing of remedial activities in Onondaga Lake will need to be coordinated with the remedial work which will be performed as part of the interim and final remedies at these upland sites.

Cultural resource investigations conducted pursuant to the NHPA are ongoing. A draft Phase 1A Cultural Resource Assessment for the project area was produced in October 2004; this report noted the likelihood that the proposed project might encounter both recorded and unrecorded prehistoric and historic resources. Consequently, it is likely that once the area of remedial impact becomes established, additional cultural resource investigations will be required before the remedy is implemented.

A draft wetlands & floodplains assessment for this project was completed in October 2004, the first step towards a comprehensive wetlands and floodplains assessment as described under EPA's Policy on "Floodplains & Wetlands Assessments for CERCLA Actions" (1985). Since various project elements had not been designed and other wetlands and floodplains impacts were still being assessed at that time, the report will need to be updated as appropriate during the remedial design.

The updated assessment will be included as an appendix to the final remedial design document in its entirety.

Because this remedy 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. 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.

Summary of the Estimated Remedy Costs

The cost for the selected remedy is $451,000,000. This total cost estimate is comprised of capital costs of $414,000,000 and annual O&M costs of $3,000,000 (or $37,000,000 in O&M 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. 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, in compliance with the 1988 EPA guidance document, "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA."

In addition to the preceding information, see Tables 15 and 16 entitled "Cost Estimate Input Data for Selected Remedy" and "Cost Summary for Selected Remedy," respectively.

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 the lake due to consumption of contaminated fish and may present unacceptable cancer risks for some recreational visitors exposed to nearshore sediment in the lake. 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 (Reimann-Buechner Partnership, 1991). The primary objective of land-use planning efforts is to enhance the quality of the lake and lakeshore 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 and surface water.

Under the selected remedy, it is estimated that concentrations of contaminants in fish will be reduced within ten years 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 lake, and to support reevaluation of the NYSDOH fish consumption advisory.

STATUTORY DETERMINATIONS

Under CERCLA Section 121 and the NCP, the lead agency must select remedies 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 and PRGs will be met through the implementation of this remedy in combination with the remediation of the upland subsites and impacted tributaries both directly and indirectly by reducing the external inputs to the lake, reducing and isolating the contaminant inventories in the lake, and by eliminating or reducing internal processes (e.g., methylation in the anoxic waters, resuspension of contaminated wastes/sediments) in the lake. While a mechanistic model does not exist to predict the behavior of mercury and other CPOIs in the lake after remediation, the predicted reductions (on the order of 90 percent) in inputs and inventories are expected to reduce the exposures and uptake of contaminants in humans and wildlife. BSQVs were developed for Onondaga Lake to provide a conservative total mercury concentration in sediments below which bioaccumulation is expected to be low enough to result in mercury concentrations in fish that are protective for human and wildlife consumption. These values are based on the average littoral zone and lakewide mercury sediment concentrations, since fish are mobile and may be exposed to various locations in the lake. A BSQV of 0.8 mg/kg for mercury based on the most sensitive receptor, the river otter, is considered protective of all adult human and ecological receptors modeled in the Onondaga Lake risk assessments.

Following implementation of the selected remedy, the average mercury concentration in the littoral zone, the primary foraging area for birds and mammals, is predicted to be about 0.5 mg/kg, a reduction of 86 percent from the current average mercury concentration in the littoral zone (3.5 mg/kg). On a lakewide basis, the average mercury concentration is predicted to be about 1 mg/kg, a reduction of 67 percent from the current average mercury concentration for the entire lake (2.9 mg/kg). While this concentration is higher than the BSQV of 0.8 mg/kg, it should be noted that virtually all data on mercury surface sediment concentrations used to establish baseline conditions for the profundal zone are from 1992 and therefore would not account for reductions in mercury concentrations attributable to natural recovery from 1992 to the present. Therefore, following implementation of the selected remedy, the average lakewide mercury concentration may be less than 1 mg/kg. Additional data will be collected as a part of the remedial design process, and these data will be used in future predictions of natural recovery. Additional remedial measures (e.g., additional thin-layer capping) will be implemented in profundal areas that do not achieve acceptable goals (e.g., achieving the mercury BSQV of 0.8 mg/kg, achieving PRGs for fish ranging from 0.14 to 0.3 mg/kg) during the 10-year MNR period or sooner if data indicate this goal will not be achieved as anticipated.

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 ER-Ls, mean PECQ of 1, and mercury PEC 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 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
- 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
- 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, November 1991
- NYSDEC Guidelines for the Control of Toxic Ambient Air Contaminants, DAR-1, November 12, 1997
- NYSDEC Technical Guidance for Screening Contaminated Sediments, January 1999

A summary of the action-specific, chemical-specific, and location-specific ARARs, as well as TBCs, is also presented in Tables 17 through 22.

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 trade-offs 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 lower the average contaminant concentrations in surface sediments, 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. Given the extraordinary volume of materials being evaluated (e.g., greater than

4,000,000 cy [3,060,000 m^3] of sediments and wastes within the ILWD, some of which contain NAPLs), treatment of all principal threat wastes (which are present in various portions of the ILWD) is impracticable. However, the off-site treatment and/or disposal of all NAPLs that will be segregated during the dredging/handling process (The appropriate means for collecting and handling these materials will be determined during the remedial design), and oxygenation in the hypolimnion to address mercury methylation in the lake, are critical components of the selected remedy which meet EPA's treatment preference.

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, released for public comment on November 29, 2004, identified Alternative 4 (Dredging the In-Lake Waste Deposit to an average 2 m [6.5 ft] depth with Additional Removal in Areas of Hot Spots [to an additional 1 m [3.3 ft] in depth] in the In-Lake Waste Deposit, Isolation Capping of the In-Lake Waste Deposit; /Dredging for No Loss of Lake Surface Area and for Erosion Protection and to Reestablish Habitat, Isolation Capping in SMUs 2-7; Targeted Dredging to 9 m (30 ft) depth for NAPL removal in SMU 2; Targeted Dredging in SMUs 3 and 6; and Phased Thin Layer Capping, Oxygenation, Monitored Natural Recovery in SMU 8) as the preferred remedy. Based upon 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

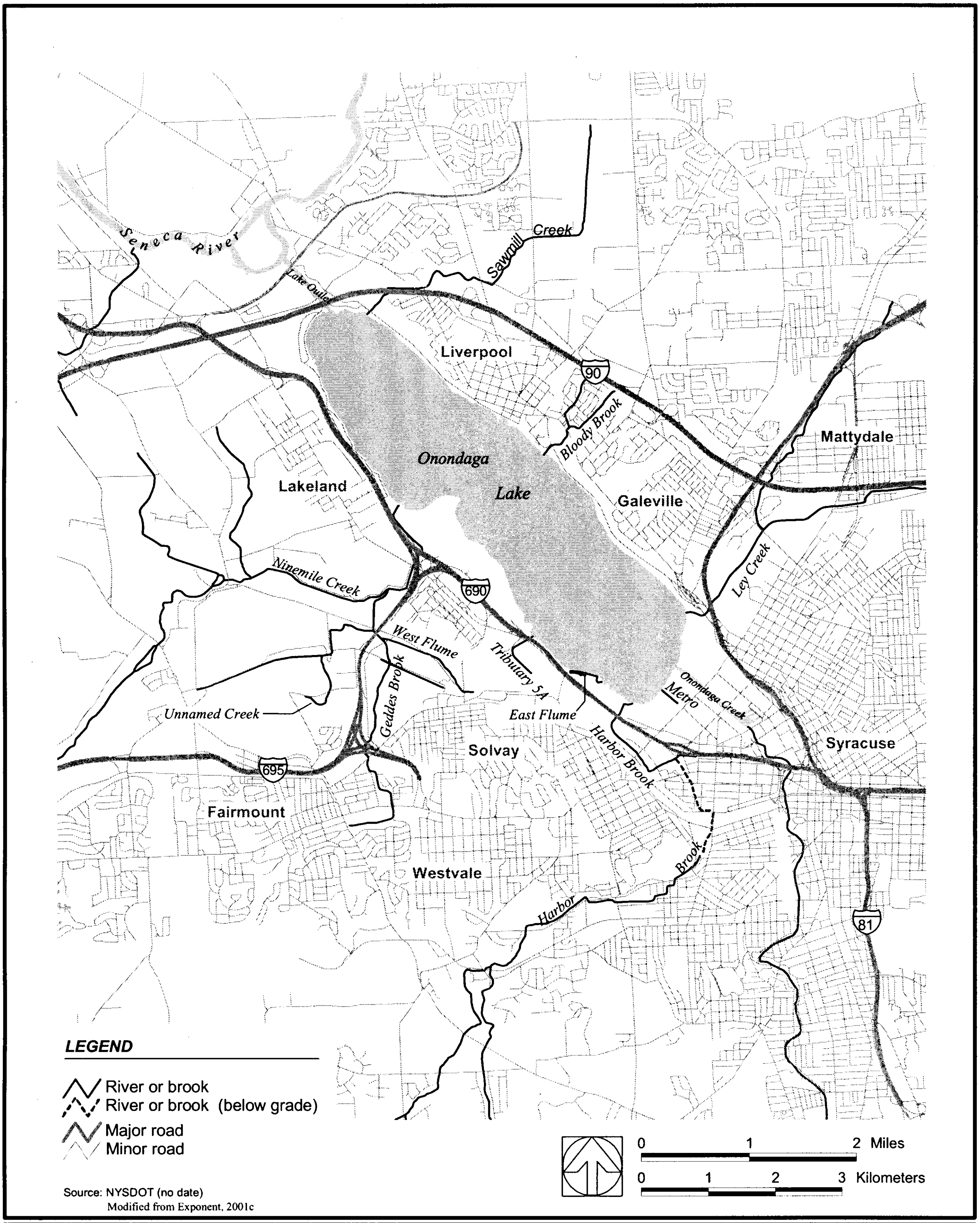


Figure 1 Onondaga Lake Area Tributaries and Roads

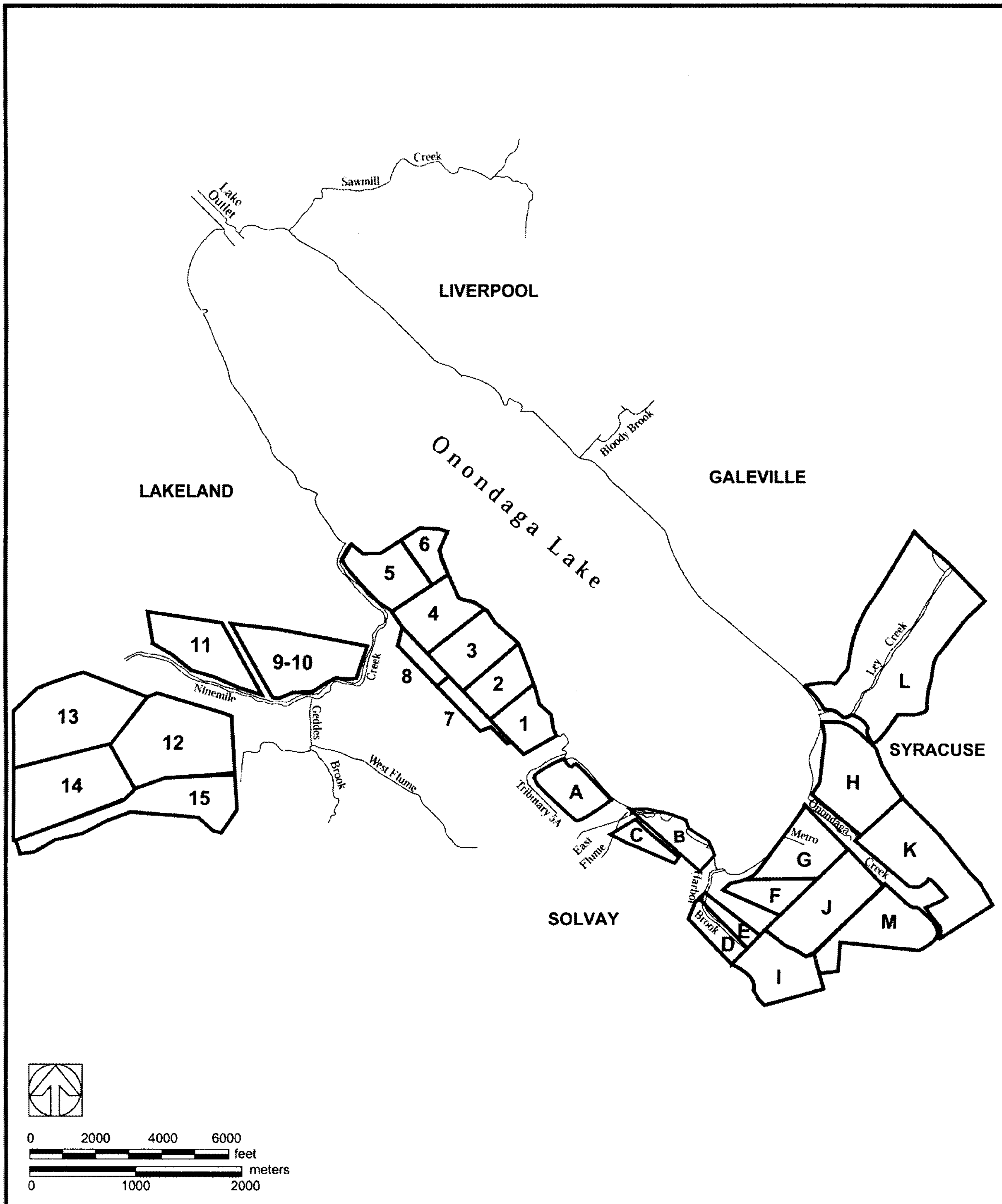


Figure 2: Historical Locations of Solvay Wastebeds

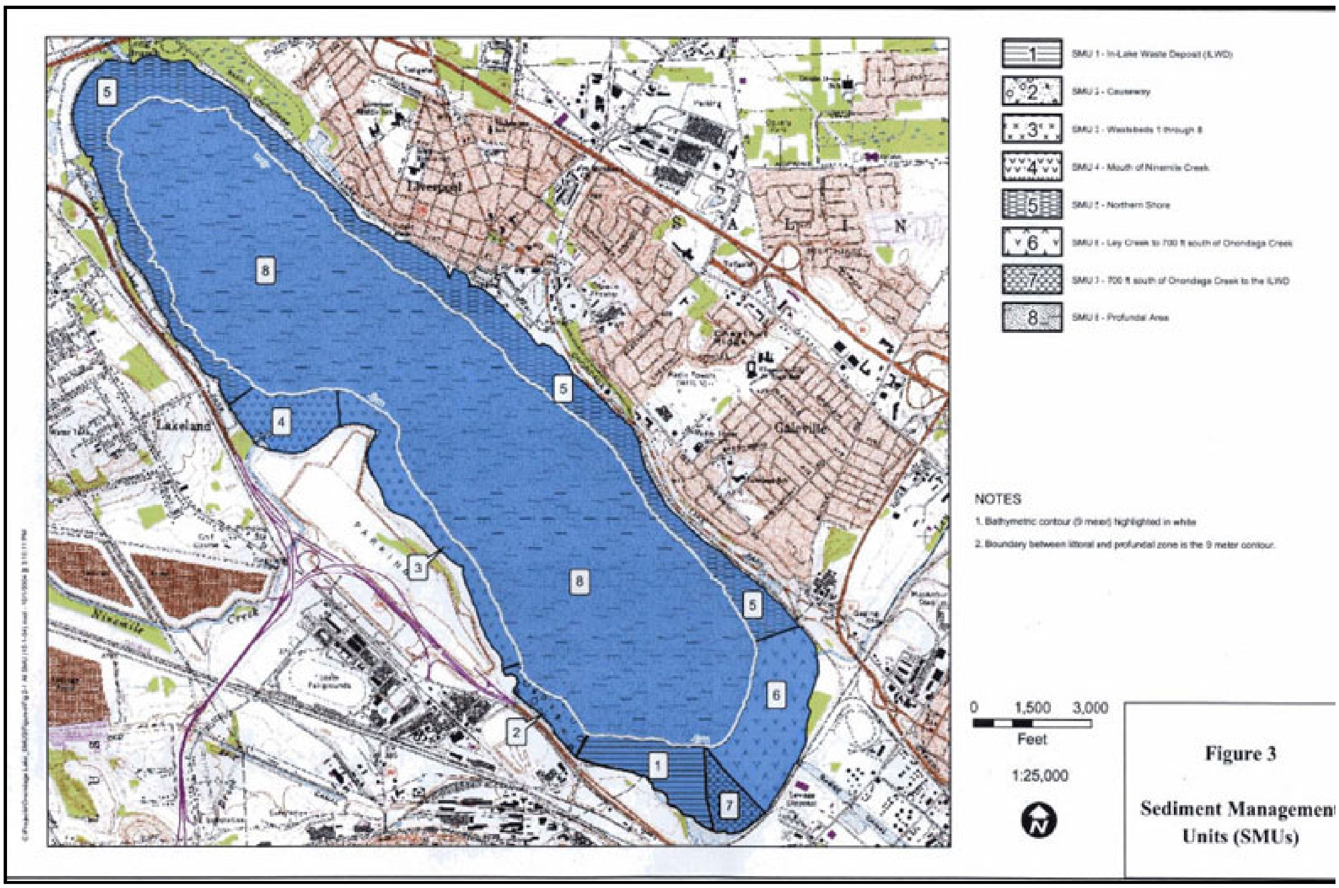
Figure 3 Sediment Management Units Onondaga Lake Record of Decision

More information from this division:

Division of Environmental Remediation
Onondaga Lake Page

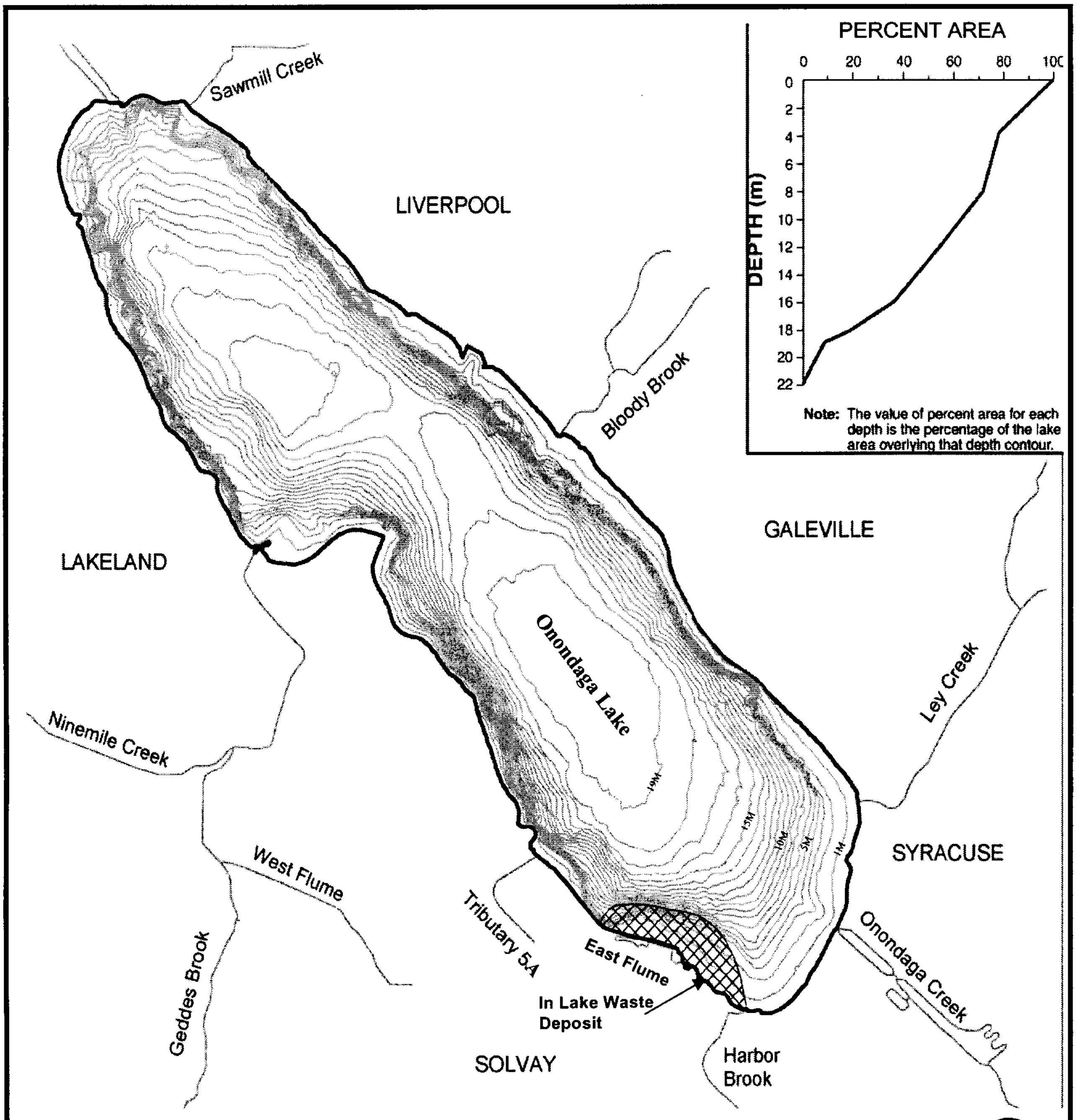
Page links:

Onondaga Lake Bottom Record of Decision



SMU 1 In-Lake Waste Deposit (ILWD)
SMU 2 Causeway
SMU 3 Wastebeds 1 through 8
SMU 4 Mouth of Ninemile Creek
SMU 5 Northern Shore
SMU 6 Ley Creek to 700 ft south of Onondaga Creek
SMU 7 700 ft South of Onondaga Creek to the ILWD
SMU 8 Profundal Area

Back to top of page



Bathymetry is in 1 meter intervals.

Water surface elevation is 363.39 Feet (110.76 Meters) above mean sea level

Figure 4

ONONDAGA LAKE
SYRACUSE, NEW YORK

Approximate Location of the In-Lake Waste Deposit

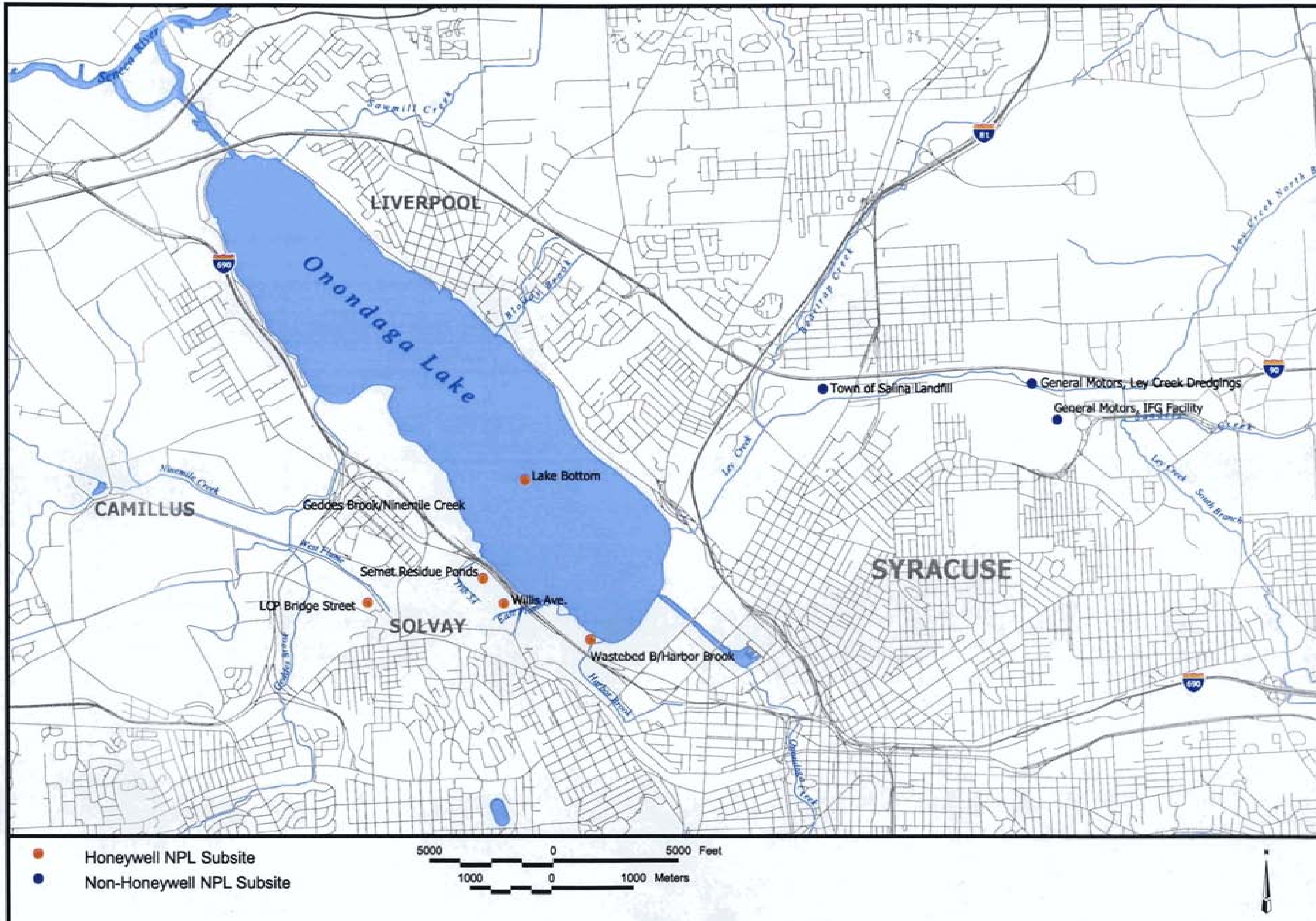


Figure 5: Location of Onondaga Lake NPL Subsites

Figure 6: Aerial View of Onondaga Lake

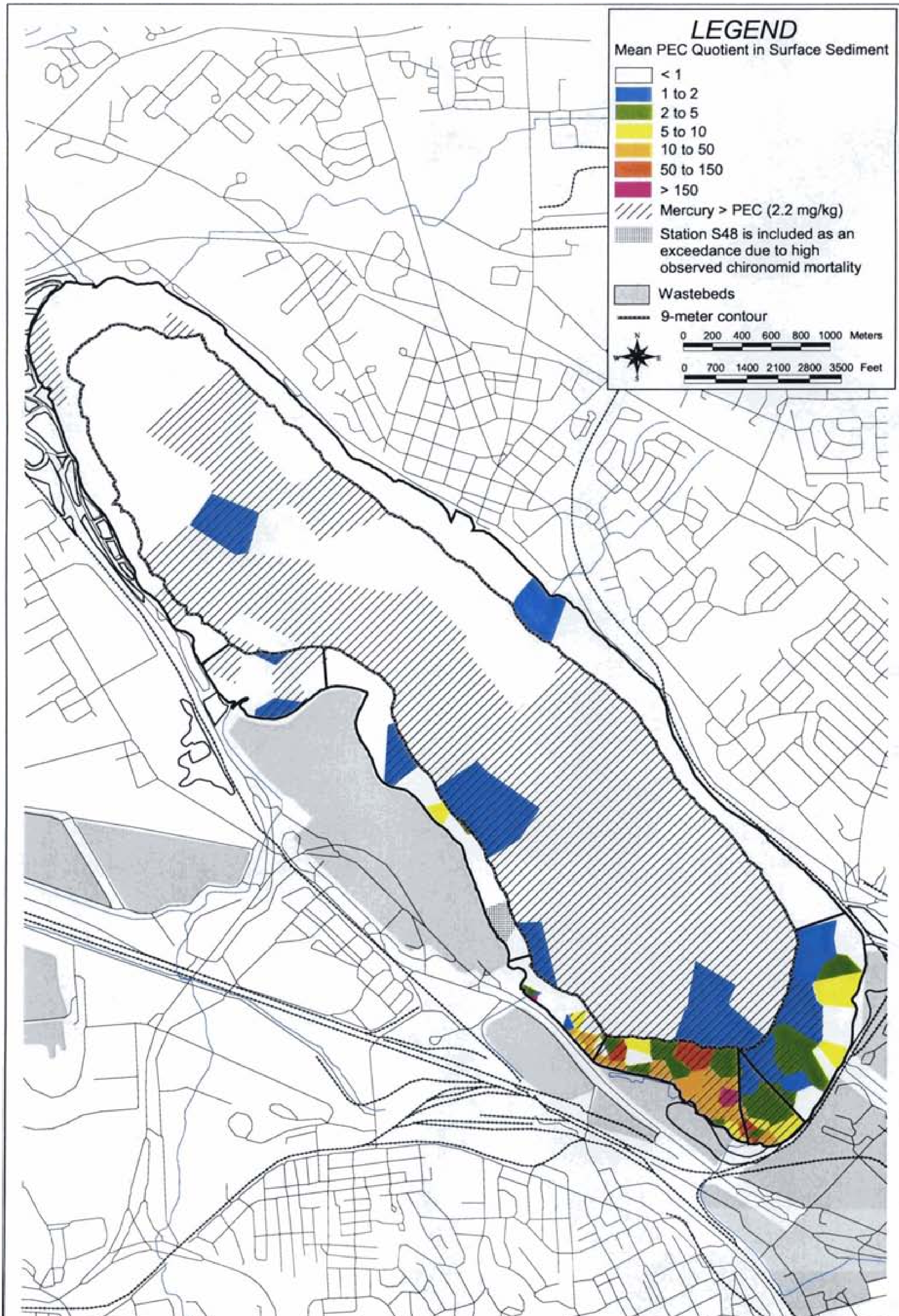


Figure 7

Mean PEC Quotient Distribution and Exceedances of the Mercury PEC

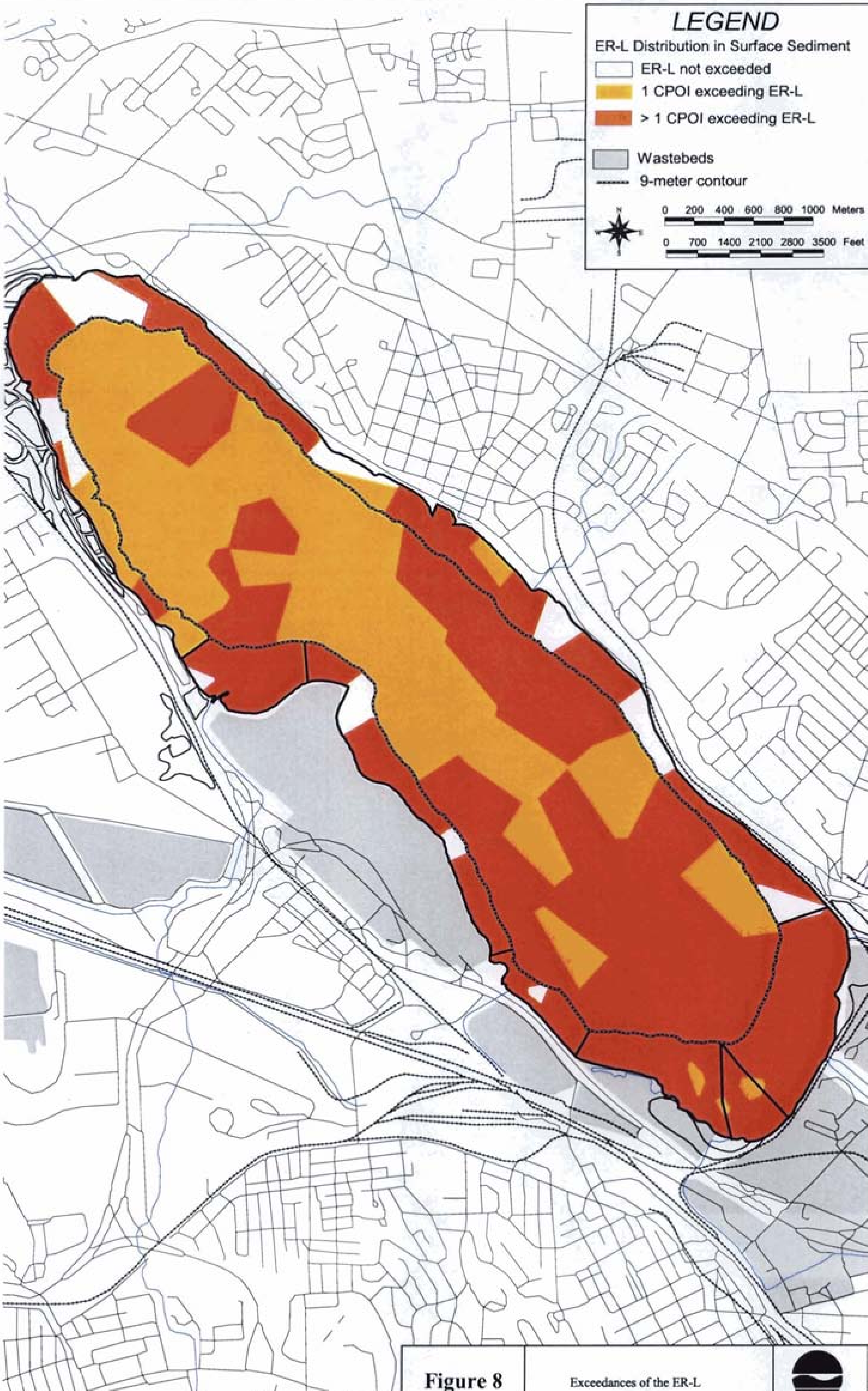
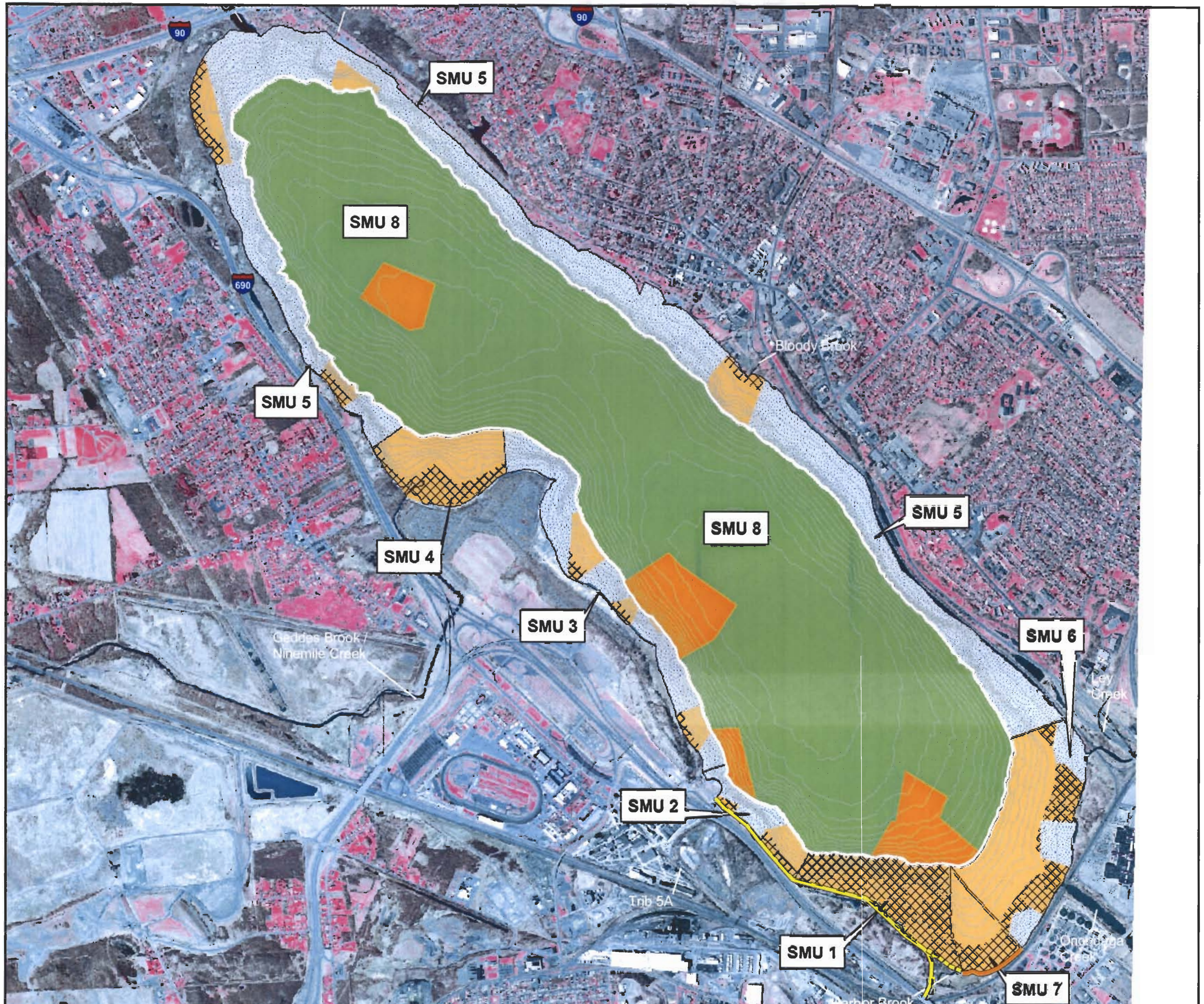


Figure 8 Exceedances of the ER-L



Littoral Areas Not Requiring Remediation

Conceptual Isolation Capping Areas

Conceptual Thin Layer Capping Areas

Conceptual Areas to be Dredged

Profundal Area Monitored Natural Recovery and Oxygenation

SMU 7 Barrier Wall (Location is Conceptual)

Willis/Semet-Wastebed B/Harbor Brook Barrier Wall (Part of Interim Remedial Measure, Location is Conceptual. Dashed Section to be determined as part of design.)

NOTES

1. Profundal bathymetric boundary at 30 ft (9m) highlighted in white

2. Boundary between SMUs shown as black line

3. Bathymetric contours are at 1-meter intervals based on current bathymetry

4. SMU = Sediment Management Unit

5. Actual areas of capping and dredging will be determined as part of the Remedial Design.

N

0 750 1,500 3,000 4,500 6,000 Feet

Figure 9
Onondaga Lake Selected Remedy

Onondaga Lake
Syracuse, New York

APPENDIX II

TABLES

Table 1: Contaminants of Potential Concern for the Onondaga Lake HHRA

Contaminant	Fish Tissue (Fillets)	Northern Basin Sediments	Southern Basin Sediments	Onondaga Lake Surface Water
Metals/Inorganics				
Aluminum			·	NA-S
Antimony	·	·	·	NA-S
Arsenic (inorganic)	·	·	·	NA-S
Barium		·	·	NA-S
Cadmium		·	·	·
Chromium	·	·	·	·
Copper			·	
Cyanide	·		·	NA-S
Iron		·	·	
Lead			·	
Manganese	·	·	·	·
Methylmercury	·	·	·	·
Mercury (inorganic)	·	·	·	·
Nickel			·	
Selenium	·			NA-S
Thallium		·	·	NA-S
Vanadium	·		·	NA-S
Zinc	·			
Volatile Organic Compounds				
Benzene		·	·	·
Bromodichloromethane				·
Chlorobenzene			·	·
Chloroform				·
Methylene Chloride			·	
Total Xylenes (sum)			·	
Semivolatile Organic Compounds				
Bis(2-ethylhexyl)phthalate	·			NA-S
Dibenzofuran			·	NA-S
1,2-Dichlorobenzene				·
1,3-Dichlorobenzene			·	·
1,4-Dichlorobenzene			·	·
1,2,4-Trichlorobenzene				·
Hexachlorobenzene	·	·	·	

Table 1 (cont.)

Contaminant	Fish Tissue (Fillets)	Northern Basin Sediments	Southern Basin Sediments	Onondaga Lake Surface Water
Polycyclic Aromatic Hydrocarbons				
Acenaphthylene			·	NA-S
Benz(a)anthracene		·	·	NA-S
Benzo(a)pyrene		·	·	NA-S
Benzo(b)fluoranthene		·	·	NA-S
Benzo(g,h,i)perylene			·	NA-S
Benzo(k)fluoranthene			·	NA-S
Chrysene			·	NA-S
Dibenz(a,h)anthracene		·	·	NA-S
Fluoranthene			·	NA-S
Indeno(1,2,3-cd)pyrene			·	NA-S
2-Methylnaphthalene			·	NA-S
Naphthalene		·	·	NA-S
Phenanthrene			·	NA-S
Pesticides				
Aldrin	·			NA-S
delta-BHC	·			NA-S
Chlordanes (total)	·			NA-S
2,4'-DDE	·			NA-S
4,4-DDD	·			NA-S
4,4'-DDE	·			NA-S
4,4'-DDT	·			NA-S
Dieldrin	·		·	NA-S
Heptachlor Epoxide	·			NA-S
Polychlorinated Biphenyls				
Aroclor 1016	·			NA-S
Aroclor 1221			·	NA-S
Aroclor 1242	·		·	NA-S
Aroclor 1248	·		·	NA-S
Aroclor 1254		·	·	NA-S
Aroclor 1260	·		·	NA-S
Aroclor 1254/1260	·			NA-S
Aroclor 1268		·		NA-S
Total PCBs (sum)	·	·	·	NA-S
Dioxins/Furans				
Total PCDD/PCDF TEQ	·	·	·	NA

Notes: · - Specified contaminant identified as a contaminant of potential concern (COPC).
NA - This analyte or parameter group not analyzed in specified exposure area.
NA-S - This analyte not analyzed in shallow surface water (0-3 m). Data from deeper samples (6-12 m water depth) used to qualitatively evaluate this COPC.

Table 2: Contaminants and Stressors of Concern Selected for Onondaga Lake Media in the BERA

Contaminant	Water	Sediment	Soil	Plants	Fish
Metals					
Antimony		·	·		·
Arsenic		·	·	·	·
Barium	·		·		
Cadmium		·	·	·	
Chromium		·	·	·	·
Copper	·	·	·	·	
Iron			·		
Lead	·	·	·	·	
Manganese	·	·	·		
Mercury/Methylmercury	·	·	·	·	·
Nickel		·	·	·	
Selenium		·	·	·	·
Silver		·	·	·	
Thallium			·	·	
Vanadium		·	·	·	·
Zinc	·	·	·	·	·
Cyanide	·		·		
Volatile Organic Compounds					
Benzene		·	·		
Chlorobenzene	·	·	·		
Dichlorobenzenes (Sum)	·	·	·		
Ethylbenzene		·			
Toluene		·			
Trichlorobenzenes (Sum)	·	·	·		
Xylene isomers		·			
Semivolatile Organic Compounds					
Bis(2-ethylhexyl)phthalate	·				
Dibenzofuran		·			
Hexachlorobenzene		·	·		
Phenol		·	·		
Polycyclic aromatic hydrocarbon (total)		·	·		
Pesticides/Polychlorinated Biphenyls					
Aldrin			·		
Chlordane isomers		·	·		
DDT and metabolites		·	·		·
Dieldrin		·	·		
Endrin					·
Hexachlorocyclohexanes			·		
Heptachlor and heptachlor epoxide		·			
Total PCBs (sum)		·	·		·
Dioxins/Furans					
Total dioxins/furans		·			·
Stressors of Concern					
Calcium	·	·			
Oncolites		·			
Chloride	·				
Salinity	·				
Ammonia	·				
Nitrite	·				
Phosphorus	·				
Sulfide	·				
Dissolved oxygen	·				
Transparency	·				

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

Table 3: Concentrations of Select Contaminants in Onondaga Lake Sediments (1992)

		0-2 cm		0 to 30 cm		30 to 60 cm		60 to 90 cm		90 to 120 cm		120 to 150 cm		150 to 180 cm		180 to 210 cm	
Analyte	Units	Maximum Detection	Mean	Maximum Detection	Mean	Maximum Detection	Mean	Maximum Detection	Mean	Maximum Detection	Mean	Maximum Detection	Mean	Maximum Detection	Mean	Maximum Detection	Mean
Arsenic	mg/kg	11.2	3.0	8.00	4.04	9.90	3.96	11.0	3.91	9.80	5.03	6.70	6.10	NA	NA	NA	NA
Barium	mg/kg	890	179	708	177	707	169	352	135	208	154	148	128	NA	NA	NA	NA
Cadmium	mg/kg	14.2	2.5	22.8	10.8	53.6	21.5	55.9	11.3	85.8	10.2	22.1	4.35	4.00	3.90	4.80	2.95
Chromium	mg/kg	1,990	79.2	1,190	186	1,710	341	625	116	608	81.5	234	49.7	63.3	34.8	67.4	43.2
Mercury	mg/kg	68.9	3.9	74.0	11.1	76.0	20.0	71.0	9.47	60.9	12.0	72.7	20.1	62.6	16.3	60.7	32.2
Nickel	mg/kg	650	27.8	219	53.4	232	85.3	114	40.0	102	33.4	72.2	30.9	29.6	24.4	42.6	31.6
Zinc	mg/kg	276	114	453	268	705	335	651	218	783	192	476	147	263	119	264	206
Benzene	µg/kg	5,700	447	12,000	959	17,000	1,058	24,000	2,474	18,000	2,872	34,000	3,978	13,000	13,000	16,000	16,000
Toluene	µg/kg	4,200	149	14,000	1,440	32,000	2,156	22,000	2,500	28,000	3,621	15,000	3,713	ND	ND	17,000	9,050
Ethylbenzene	µg/kg	1,300	658	9,100	3,465	6,400	2,385	15,000	3,741	6,600	2,590	4,000	1,929	ND	ND	1,700	1,700
Xylene (Total)	µg/kg	13,000	3,619	110,000	7,964	120,000	9,569	110,000	22,081	140,000	26,251	85,000	22,026	36,000	36,000	43,000	43,000
Chlorobenzene	µg/kg	43,000	3,025	360,000	19,026	160,000	11,445	220,000	16,937	150,000	26,389	250,000	34,576	170,000	85,003	72,000	72,000
1,2-Dichlorobenzene	µg/kg	7,900	1,050	24,000	1,630	270,000	13,958	150,000	23,036	270,000	47,269	220,000	47,701	310,000	310,000	160,000	160,000
1,3-Dichlorobenzene	µg/kg	6,800	1,487	39,000	1,185	41,000	3,556	26,000	4,668	24,000	5,016	11,000	3,054	6.00	6.00	ND	ND
1,4-Dichlorobenzene	µg/kg	16,000	1,380	250,000	8,436	760,000	34,386	460,000	47,826	530,000	70,362	550,000	66,600	710,000	355,003	300,000	300,000
Hexachlorobenzene	µg/kg	1,200	63.0	20,000	1,059	7,700	441	17,000	847	3,400	479	1,100	283	1,300	1,300	1,900	955
Naphthalene	µg/kg	30,000	3,415	150,000	19,530	740,000	137,000	630,000	108,538	870,000	200,750	360,000	90,573	NA	NA	50,000	50,000
Aroclor-1016	µg/kg	180	135	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1221	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1232	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1242	µg/kg	ND	ND	830	757	890	645	1,800	1,450	430	430	ND	ND	ND	ND	ND	ND
Aroclor-1248	µg/kg	1,100	173	4,200	680	6,900	1,092	2,800	769	3,800	804	770	378	810	810	390	390
Aroclor-1254	µg/kg	100	80.7	510	350	540	335	240	195	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1260	µg/kg	1,000	218	1,800	373	2,900	647	1,900	589	4,100	693	2,000	556	320	320	190	190
Total PCBs (sum)	µg/kg	2,100	255.6	6,000	1,028	9,800	1,671	4,500	1,308	6,000	1,441	2,510	887	1,130	1,130	580	580

Source: These values were taken from Appendix G1 of the Onondaga Lake RI report.
NA=not analyzed
ND=not detected

Table 4: Concentrations of Select Contaminants in Lake Stratigraphy Sediment Samples Collected from Onondaga Lake (1992)

Analyte	Concentration Units	Measurement Basis	Maximum Detection	Mean
0-5 cm				
Cadmium	mg/kg	dw	12.8	5.2
Chromium	mg/kg	dw	194	54
Mercury	mg/kg	dw	4.4	2.8
Nickel	mg/kg	dw	51	22
Zinc	mg/kg	dw	510	186
5-15 cm				
Cadmium	mg/kg	dw	11	4.6
Chromium	mg/kg	dw	292	74
Mercury	mg/kg	dw	3.1	1.4
Nickel	mg/kg	dw	80	28
Zinc	mg/kg	dw	597	231
15-30 cm				
Cadmium	mg/kg	dw	37	20
Chromium	mg/kg	dw	749	264
Mercury	mg/kg	dw	70	31
Nickel	mg/kg	dw	221	80
Zinc	mg/kg	dw	576	324
30-100 cm				
Cadmium	mg/kg	dw	50	17
Chromium	mg/kg	dw	646	151
Mercury	mg/kg	dw	42	6.9
Nickel	mg/kg	dw	149	52
Zinc	mg/kg	dw	609	263
100-200 cm				
Cadmium	mg/kg	dw	65	14
Chromium	mg/kg	dw	535	56
Mercury	mg/kg	dw	29	17
Nickel	mg/kg	dw	108	24
Zinc	mg/kg	dw	727	156
200-300 cm				
Cadmium	mg/kg	dw	1.4	0.77
Chromium	mg/kg	dw	29	11
Mercury	mg/kg	dw	51	30
Nickel	mg/kg	dw	68	17
Zinc	mg/kg	dw	421	70

Source: These values were taken from Appendix G1 of the Onondaga Lake RI report.
Note: Intervals reported include data from anywhere within that interval. For example, data reported for 0 to 5 cm include data collected from 0 to 2, 0 to 4, and 2 to 5 cm.

Table 5: Concentrations of Select Contaminants in Onondaga Lake Sediments (2000)

		0 to 5 cm [1]		0 to 15 cm [2]		15 to 30 cm		30 to 100 cm		100 to 200 cm	
Analyte	**Concentration Units**	**Maximum Detection**	**Mean**	**Maximum Detection**	**Mean**	**Maximum Detection**	**Mean**	**Maximum Detection**	**Mean**	**Maximum Detection**	**Mean**
Arsenic	mg/kg	19	5.55	47.3	6.13	39.7	6.78	33.6	8.47	38.9	9.23
Barium	mg/kg	1,640	277	2,070	357	22,600	696	4,760	637	4,120	587
Cadmium	mg/kg	2.6	0.97	14.9	2.11	42	3.80	88.5	9.22	47.6	5.47
Chromium	mg/kg	229	64.5	4,180	237	4,950	283	6,310	486	11,300	487
Methylmercury	µg/kg	61.1	16.0	121	12	NA	NA	NA	NA	NA	NA
Total Mercury	mg/kg	12	3.39	77.7	5.62	55	6.23	48.6	10.3	87.1	9.59
Nickel	mg/kg	107	25	1,670	88.6	1,610	96.3	2,020	129	4,640	174
Zinc	mg/kg	160	77.1	421	127	2,260	154	1,530	221	819	158
Benzene	µg/kg	30,000	6,104	42,000	2,050	180,000	5,550	270,000	7,640	140,000	9,780
Toluene	µg/kg	6,900	2,430	8,300	2,040	37,000	4,080	47,000	7,220	230,000	13,600
Ethylbenzene	µg/kg	71,000	14,400	7,000	1,210	13,000	1,820	13,000	1,890	18,000	2,280
Xylene (Total)	µg/kg	330,000	86,262	150,000	15,212	270,000	23,352	240,000	31,884	430,000	43,358
Chlorobenzene	µg/kg	2,900	1,450	1,000,000	36,900	310,000	38,200	640,000	48,200	210,000	16,700
1,2-Dichlorobenzene	µg/kg	1,800	1,100	48,000	6,360	200,000	14,400	55,000	7,550	24,000	4,800
1,3-Dichlorobenzene	µg/kg	ND	ND	37,000	5,240	7,000	1,820	35,000	2,970	2,100	435
1,4-Dichlorobenzene	µg/kg	4,200	2,300	170,000	13,115	460,000	24,700	120,000	11,400	24,000	4,360
Hexachlorobenzene	µg/kg	ND	ND	140	140	300	280	ND	ND	110	100.5
Hexachlorobenzene (GC/ECD)	µg/kg	247	60.1	6,750	205	2,630	148	981	114	356	66.7
Naphthalene	µg/kg	26,000,000	5,210,000	170,000	26,300	560,000	50,500	770,000	51,300	1,300,000	111,000
Aroclor 1016	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	µg/kg	ND	ND	1,550	1,020	2,390	1,200	1,680	1,300	4,460	2,750
Aroclor 1232	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	µg/kg	161	49.6	10,500	734	4,160	643	17,900	1,160	1,810	315
Aroclor 1248	µg/kg	60.5	60.5	122	61.1	170	132	5,150	1,220	1,540	815
Aroclor 1254	µg/kg	142	56.8	1,010	157	2,480	351	9,430	583	1,440	266
Aroclor 1260	µg/kg	57.6	28.8	1,020	117	878	146.7	1,880	228	1,600	256
Aroclor 1268	µg/kg	75.6	75.6	313	119	58	33.4	376	130	237	105
Total PCBs (sum)	µg/kg	5,780	761	20,955	1,155	4,663	1,045	29,210	1,730	4,486	728
PCDD/PCDF TEQs (mammalian)	ng/kg	8.37	8.37	165	46.6	715	102	426	140	284	73.1

Table 5 (cont.)

Analyte	Concentration Units	200 to 300 cm Maximum Detection	Mean	300 to 400 cm Maximum Detection	Mean	400 to 500 cm Maximum Detection	Mean	500 to 600 cm Maximum Detection	Mean	600 to 700 cm Maximum Detection	Mean	700 to 800 cm Maximum Detection	Mean
Arsenic	mg/kg	11.8	6.70	26.9	8.01	29.2	6.75	67.2	7.90	44.5	6.37	26.4	4.63
Barium	mg/kg	1,810	357	1,540	278	1,050	205	954	147	1,170	189	134	91.1
Cadmium	mg/kg	16.6	2.72	22.2	3.17	4.8	1.08	3.5	0.98	3.2	0.82	1.2	0.33
Chromium	mg/kg	260	39.6	158	36.5	72.5	23.6	68.7	20.1	89.8	20.4	22.8	14.8
Methylmercury	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Mercury	mg/kg	125	26.0	110	16.9	28.9	3.56	6.2	1.21	2.7	0.84	0.85	0.35
Nickel	mg/kg	106	25.7	71.6	25.9	85.1	22.5	62.9	18.4	53	17.7	22.1	14.7
Zinc	mg/kg	539	159	613	158	574	104	252	84.9	189	74.4	99.9	64.0
Benzene	µg/kg	3,600	807.9	9,300	1,200	6,300	959.7	4,400	917.6	3,600	740	34	21.6
Toluene	µg/kg	18,000	3,047	16,000	4,610	8,900	2,260	20,000	4,140	19,000	4,440	230	133
Ethylbenzene	µg/kg	7,100	1,500	40,000	7,670	15,000	2,450	4,900	1,240	11,000	2,293	90	58.5
Xylene (Total)	µg/kg	93,000	14,245	276,000	39,458	123,000	19,337	70,000	7,276	166,000	21,836	640	165
Chlorobenzene	µg/kg	6,700	1,990	24,000	8,170	9,400	2,740	16,000	8,700	5,600	3,370	ND	ND
1,2-Dichlorobenzene	µg/kg	29,000	13,300	5,500	3,500	5,000	3,000	1,600	1,500	2,100	1,490	ND	ND
1,3-Dichlorobenzene	µg/kg	650	270	180	150	700	700	ND	ND	2,400	2,400	ND	ND
1,4-Dichlorobenzene	µg/kg	49,000	11,700	6,900	3,097	4,400	3,770	3,100	2,750	13,000	5,970	ND	ND
Hexachlorobenzene	µg/kg	1,600	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene (GC/ECD)	µg/kg	1,880	294	398	69.3	159	38.8	35	9.01	50	14.8	ND	ND
Naphthalene	µg/kg	210,000	70,700	250,000	57,360	85,000	20,800	67,000	14,800	190,000	53,300	3,800	1,130
Aroclor 1016	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	µg/kg	492	194	229	152	269	196	104	62.5	516	215	162	92.8
Aroclor 1248	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	17.7	17.7	ND	ND
Aroclor 1254	µg/kg	180	124.5	135	87.7	78.1	63.8	36.9	24.8	32.9	22.2	15.5	15.5
Aroclor 1260	µg/kg	1,050	297	487	121	66.7	39.5	35	24.3	53.7	29.5	ND	ND
Aroclor 1268	µg/kg	141	73	1260	397	355	355.0	ND	ND	ND	ND	ND	ND
Total PCBs (sum)	µg/kg	1,550	407	1,520	419	545	236	204	81	666	166	178	113
PCDD/PCDF TEQs (mammalian)	ng/kg	149	36	129	28	37.2	10.7	3.68	2.38	1.22	0.53	0.18	0.18

Source: These values were taken from Appendix G1 of the Onondaga Lake RI report except for the methylmercury, total PCBs, and PCDD/PCDF TEQs values, which were obtained from the Onondaga Lake database.

ND=not detected
NA=not analyzed

1. The statistics for the 0 to 5 cm depth interval include data collected from 0 to 2 cm.
2. The statistics for the 0 to 15 cm depth interval include data collected from 2 to 15 cm.
3. PCDD/PCDF TEQs were calculated using World Health Organization TEFs for mammals.

Table 6: Concentrations of Select Contaminants in Surface Water of Onondaga Lake

Contaminant	Units	NYSDEC Standard/Guidance for Human Consumption of Fish	NYSDEC Standard/Guidance for Wildlife Protection	NYSDEC Standard/Guidance for Fish Propagation, Aquatic (Chronic)	NYSDEC Standard/Guidance for Fish Survival, Aquatic (Acute)	Surface Water Concentrations [1,2]											
						1992 data, 0 to 9 meters			1992 data, below 9 meters			1999 data, 0 to 9 meters			1999 data, below 9 meters		
						Number of Detects/Number of Samples	Average Detection	Max Detection	Number of Detects/Number of Samples	Average Detection	Maximum Detections	Number of Detects/Number of Samples	Average Detection	Maximum Detections	Number of Detects/Number of Samples	Average Detection	Maximum Detections
Benzene	µg/L	10	--	210	760	0/56	ND	ND	0/36	ND	ND	2/12	3.21	6.3	NA	NA	NA
Benzo(a)pyrene	µg/L	0.0012	--	--	--	0/2	ND	ND	0/2	ND	ND	NA	NA	NA	NA	NA	NA
Chlorobenzene	µg/L	400	--	5	--	0/56	ND	ND	0/36	ND	ND	2/12	6.26	12	NA	NA	NA
Dichlorobenzenes (sum)	µg/L	--	--	5	--	0/56	ND	ND	0/36	ND	ND	10/12	0.89	6.6	NA	NA	NA
Ethylbenzene	µg/L	--	--	17	150	0/56	ND	ND	0/36	ND	ND	0/12	ND	ND	NA	NA	NA
Fluorene	µg/L	--	--	0.54	4.8	0/2	ND	ND	0/2	ND	ND	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	µg/L	3.E-05	--	--	--	0/2	ND	ND	0/2	ND	ND	NA	NA	NA	NA	NA	NA
Naphthalene	µg/L	--	--	13	110	0/2	ND	ND	0/2	ND	ND	NA	NA	NA	NA	NA	NA
Phenanthrene	µg/L	--	--	5	45	0/2	ND	ND	0/2	ND	ND	NA	NA	NA	NA	NA	NA
Phenol [3]	µg/L	--	--	--	--	0/2	ND	ND	0/2	ND	ND	NA	NA	NA	NA	NA	NA
Total PCBs	µg/L	1.E-06	1.2E-04	--	--	0/2	ND	ND	0/2	ND	ND	NA	NA	NA	NA	NA	NA
Pyrene	µg/L	--	--	4.6	42	0/2	ND	ND	0/2	ND	ND	NA	NA	NA	NA	NA	NA
Toluene	µg/L	6,000	--	100	480	0/56	ND	ND	0/36	ND	ND	1/12	0.16	0.16	NA	NA	NA
Mercury-Dissolved	ng/L	0.70	2.6	770	1,400	66/66	2.58	5.40	40/40	4.86	10.7	47/47	2.21	11.4	26/26	8.05	24.0
Mercury-Total	ng/L	--	--	--	--	66/66	5.73	14.8	40/40	12.4	28.5	47/47	9.83	103	26/26	13.2	26.8
Methylmercury-Dissolved	ng/L	--	--	--	--	66/66	0.23	0.86	40/40	2.59	9.17	47/47	0.91	12.6	26/26	3.22	15.3
Methylmercury-Total	ng/L	--	--	--	--	66/66	0.56	1.62	39/40	5.06	12.4	47/47	1.88	12.1	26/26	4.19	14.3
Trichlorobenzenes	µg/L	--	--	5	--	0/56	ND	ND	0/36	ND	ND	NA	NA	NA	NA	NA	NA
Total Xylenes	µg/L	--	--	65	590	0/56	ND	ND	0/36	ND	ND	1/12	0.33	0.33	NA	NA	NA

Source: These data were taken from Tables G1-62 to G1-65 of Appendix G1 of the Onondaga Lake RI report.
The NYSDEC screening/guidance values are for Class B/C waters from Division of Water Technical and Operational Guidance Series (1.1.1).
Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. NYSDEC. June 1998.

Notes:
1. ND=Not detected
2. NA=Not analyzed
3. The surface water standards for phenols (1 µg/L for total chlorinated phenols and 5 µg/L for unchlorinated phenols) are for aesthetic considerations rather than for protection of human health or aquatic (ecological) resources.
4. Additional sampling of water from directly above the sediment surface in 2000 had the following results:
   Eight samples for total unfiltered mercury ranged from 6.8 to 595 ng/L with an average of 115 ng/L. Dissolved mercury ranged from 1.2 to 6.1 ng/L with an average of 3.5 ng/L.
   Eight samples for unfiltered methylmercury ranged from 0.21 to 3.84 ng/L with an average of 1.6 ng/L. Dissolved methylmercury ranged from 0.034 to 3.84 ng/L with an average of 1.3 ng/L.
   These data are presented in Table B1-51 of Appendix B1 of the Onondaga Lake RI report.

Table 7: Concentrations of Select Contaminants in Onondaga Lake Fish

Contaminants (only contaminants considered risk drivers are shown)	Units (wet weight)	Target Tissue Concentration Range (mg/kg)		Fish Concentrations 1992 to 2000 data: Arithmetic Mean	95% UCL	Max Detection
Human Health Exposure - Fish Fillets		**RME**				
Mercury (as methylmercury) [7]	mg/kg	0.2		1.05	1.08	5.07
Total PCBs [8]	mg/kg	0.03 to 0.3		0.67	0.91	3.90
Arsenic	mg/kg	ND		0.33	0.80	1.05
PCDD/PCDFs - TEQ as 2,3,7,8-TCDD [9]	mg/kg	4E-07 to 4E-06		1.01E-05	1.95E-05	4.60E-05
Ecological Exposure - Small Fish (3 to 18 cm) Whole Fish		**NOAEL**	**LOAEL**			
Mercury (as methylmercury)	mg/kg	0.009	0.187	0.27	0.35	0.91
Total PCBs	mg/kg	0.013	3.15	0.98	3.49	3.49
DDT and metabolites (sum)	mg/kg	0.005	0.049	0.05	0.07	0.10
Ecological Exposure - Large Fish (18 to 60 cm) Whole Fish		**NOAEL**	**LOAEL**			
Mercury (as methylmercury)	mg/kg	0.014	0.341	0.68	0.75	2.88
Total PCBs	mg/kg	0.019	9.6	1.57	2.12	11.1
DDT and metabolites (sum)	mg/kg	0.014	0.15	0.096	0.24	1.44

Sources: -- Human health exposure data (fish fillets) were taken from Table 3.1 from Appendix B of the Onondaga Lake Human Health Risk Assessment (HHRA) report.
-- Ecological exposure data (whole fish) were taken from Tables H-5 and H-6 from Appendix H of the Onondaga Lake Baseline Ecological Risk Assessment (BERA) report and converted from dry weight to wet weight based on the average percent solids in fish (24 percent).
-- Target tissue concentrations were taken from Appendix G of the Onondaga Lake FS.

Notes:
1. Mercury and methylmercury fish data from the BERA were combined and converted from dry weight to wet weight. Results are provided in Section I.3.2 of Appendix I of the Onondaga Lake FS.
2. Contaminant concentrations differ between the various data sets due to factors including the portion of fish analyzed (contaminants accumulate in various body parts) and age and/or species of fish.
3. ND = Not developed because arsenic was only detected in 2 of 11 samples. See Appendix G of the Onondaga Lake FS for details.
4. RME = reasonable maximum exposure; NOAEL = no-observed-adverse-effect-level; LOAEL = lowest-observed-adverse-effect-level
5. 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, osprey, and river otter.
6. Only avian fish target concentrations are presented for DDT and metabolites.
7. The human health target tissue concentration for mercury (0.2 mg/kg) is based on young child RME (non-cancer effects). The RME target concentration for adults is slightly higher (0.3 mg/kg).
8. The human health target tissue concentrations for total PCBs are based on RME carcinogenic risks at risk targets ranging from 1E-05 (0.03 mg/kg) to 1E-04 (0.3 mg/kg). The RME targets based on non-cancer effects of 0.04 mg/kg for high molecular weight PCBs and 0.1 mg/kg for low molecular weight PCBs fall within the range based on carcinogenic risks. A target concentration based on the 1E-06 risk level was not selected as a goal since it is much lower than mean background concentrations in US waters and may not be achievable (see Appendix G of the Onondaga Lake FS).
9. The human health target tissue concentrations for PCDD/PCDFs are based on RME carcinogenic risks at risk targets ranging from 1E-05 (4E-07 mg/kg) to 1E-04 (4E-06 mg/kg). Non-carcinogenic targets could not be developed for PCDD/PCDFs. A target concentration based on the 1E-06 risk level was not selected as a goal since it is much lower than mean background concentrations in US waters and may not be achievable (see Appendix G of the Onondaga Lake FS).

Table 8

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

Scenario Timeframe: Current/Future
Medium: Fish
Exposure Medium: Fish Tissue

Exposure Point	Chemical of Concern	Concentration Detected		Concen-tration Units	Frequency of Detection	Exposure Point Concentration	Exposure Point Concentration Units	Statistical Measure
		Min	Max					
Fish Fillet	PCBs - total	30	3,903	ug/kg-ww	128/130	9.1E-01	mg/kg	95% UCL-T
	PCDD/PCDFs	0.25	45.98	ng/kg-ww	30/30	2.0E-05	mg/kg	95% UCL-T
	Mercury	0.04	5.07	mg/kg-ww	728/728	1.1	mg/kg	95% UCL-T

Key

ug/kg-ww: micrograms per kilogram wet weight
ng/kg-ww: nanograms per kilogram wet weight
mg/kg-ww: milligrams per kilogram wet weight
mg/kg: milligrams per kilogram
95% UCL-T: 95% Upper Confidence Limit of Log-Transformed Data

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

This table presents the chemicals of concern (COCs) and exposure point concentrations (EPCs) for each of the COCs detected in fish tissue (i.e., the concentration that will be used to estimate the exposure and risk from each COC in the fish tissue). 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 EPC, and how the EPC was derived. The table indicates that all three COCs were detected at significant frequencies. The 95% UCL of the log-transformed data was used as the EPC for each COC.

Table 9

Non-Cancer Toxicity Data Summary

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:
PCBs (less chlorinated) (as Aroclor 1016)	Chronic	7E-05	mg/kg-day	1	7E-05	mg/kg-day	Reduced Birth Weight	100	IRIS	02/25/02
PCBs (highly chlorinated) (as Aroclor 1254)	Chronic	2E-05	mg/kg-day	1	2E-05	mg/kg-day	Immune System	300	IRIS	02/25/02
PCDD/PCDFs	Chronic	NA	mg/kg-day	--	NA	mg/kg-day	--	--		
Mercury (as methylmercury)	Chronic	1E-04	mg/kg-day	1	1E-04	mg/kg-day	Develop-mental	10	IRIS	02/25/02

Key

NA: No information available
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. 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 non-cancer health effects from exposure to PCDD/PCDFs. Toxicity information is presented for both less chlorinated PCBs (Aroclors 1016, 1221, and 1242) and highly chlorinated PCBs (Aroclors 1248, 1254, 1260, and 1268), as all Aroclors have been detected. Toxicity information for mercury is presented for methylmercury, as this is the toxic form of mercury present in fish tissue.

Table 10

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
PCBs - total	2.0E+00	1	2.0E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/20/02
PCDD/PCDFs	1.5E+05	1	1.5E+05	$(mg/kg\text{-}day)^{-1}$	B2	HEAST	1997
Mercury (as methylmercury)	NA	--	--	$(mg/kg\text{-}day)^{-1}$	C	IRIS	05/20/02

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

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. Although mercury is classified as a Group C possible human carcinogen, no cancer slope factor is available for quantitative analysis.

Table 11

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	PCBs (total)	2.8E-04	--	--	2.8E-04
			PCDD/PCDFs	4.5E-04	--	--	4.5E-04
			Mercury	--	--	--	--
						Total Cancer Risk =	**7.3E-04**

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	PCBs (total)	8.7E-05	--	--	8.7E-05
			PCDD/PCDFs	1.4E-04	--	--	1.4E-04
			Mercury	--	--	--	--
						Total Cancer Risk =	**2.3E-04**

Table 11

Page 2

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
Fish	Fish Tissue	Fish Fillet	PCBs (total)	1.2E-04	--	--	1.2E-04
			PCDD/PCDFs	2.0E-04	--	--	2.0E-04
			Mercury	--	--	--	--
						Total Cancer Risk =	**3.2E-04**

Key

— : Toxicity criteria are not available to quantitatively address this route of exposure.
N/A: Route of exposure is not applicable to this medium.

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 total cancer risks for these COCs are 7.3E-04, 2.3E-04, and 3.2E-04 for the adult recreator, young child recreator, and the older child recreator, respectively. The COCs contributing most significantly to the risk level for all three populations are PCBs (total) and PCDD/PCDFs. Although mercury is classified as a Group C possible human carcinogen, no cancer slope factor is available for quantitative analysis. The risk levels for these COCs indicate that if no clean-up action is taken, an individual would have an increased probability of about 7 in 1,000 (adult recreator), 2 in 1,000 (young child recreator), or 3 in 1,000 (older child recreator) of developing cancer as a result of site-related exposure to these COCs. As presented in the HHRA and the text of this ROD, the total RME cancer risks for all COPCs for this route of exposure are 7.8E-04, 2.4E-04, and 3.4E-04 for the adult recreator, young child recreator, and the older child recreator, respectively.

Table 12

Page 1

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 (less chlorinated)	Reduced BW	2.4	–	--	2.4
			PCBs (highly chlorinated)	Immune System	10.3	--	--	10.3
			PCDD/PCDFs	NA	--	--	--	--
			Mercury (as methylmercury)	Developmental	3.9	–	--	3.9
							Total Non-Cancer Hazards =	**16.6**

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 (less chlorinated)	Reduced BW	3.8	--	--	3.8
			PCBs (highly chlorinated)	Immune System	16.0	--	--	16.0
			PCDD/PCDFs	NA	--	--	--	--
			Mercury (as methylmercury)	Developmental	6.0	--	--	6.0
							Total Non-Cancer Hazards =	**25.8**

Table 12

Page 2

Risk Characterization Summary - Noncarcinogens (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	Primary Target Organ	Noncarcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Fish	Fish Tissue	Fish Fillet	PCBs (less chlorinated)	Reduced BW	2.6	--	--	2.6
			PCBs (highly chlorinated)	Immune System	11.2	--	--	11.2
			PCDD/PCDFs	NA	--	--	--	--
			Mercury (as methylmercury)	Developmental	4.2	--	--	4.2
							Total Non-Cancer Hazards =	**18.0**

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 non-cancer effects. Two of the COCs (PCBs and mercury) have toxicity data indicating their potential for adverse non-carcinogenic health effects in humans, while no data are currently available to evaluate non-cancer health effects from exposure to PCDD/PCDFs. The estimated HIs of 16.6, 25.8, and 18.0 for adult, young child, and older child recreators, respectively, indicate that the potential for adverse non-cancer effects could occur from ingestion of fish fillet tissue containing less chlorinated PCBs, highly chlorinated PCBs, and mercury. As presented in the HHRA and the text of this ROD, the total RME non-cancer HIs for all COPCs for this route of exposure are 18.2, 28.3, and 19.8 for the adult recreator, young child recreator, and the older child recreator, respectively.

Table 13

Contaminants Used in Mean PEC Quotient for Onondaga Lake

Group	Contaminant
Metals	Mercury
Aromatics	Ethylbenzene
	Xylenes
Chlorinated Benzenes	Chlorobenzene
	Dichlorobenzenes
	Trichlorobenzenes
Polycyclic Aromatic Hydrocarbons (PAHs)	Acenaphthene
	Acenaphthylene
	Anthracene
	Benz[a]anthracene
	Benzo[a]pyrene
	Benzo[b]fluoranthene
	Benzo[g,h,i]perylene
	Benzo[k]fluoranthene
	Chrysene
	Dibenz[a,h]anthracene
	Fluoranthene
	Fluorene
	Indeno[1,2,3-cd]pyrene
	Naphthalene
	Phenanthrene
	Pyrene
Polychlorinated Biphenyls (PCBs)	Total PCBs

Table 14: ONONDAGA LAKE SUBSITE RECORD OF DECISION – LAKEWIDE ALTERNATIVES

Cleanup Criterion	Lakewide Alternative 1	Lakewide Alternative 2	Lakewide Alternative 3	Lakewide Alternative 4	Lakewide Alternative 5	Lakewide Alternative 6	Lakewide Alternative 7
	No Action	**Mean PEC Quotient of 1 and Mercury PEC**	**Mean PEC Quotient of 1 and Mercury PEC**	**Mean PEC Quotient of 1 and Mercury PEC**	**Mean PEC Quotient of 1 and Mercury PEC**	**Mean PEC Quotient of 1 and Mercury PEC**	**ER-L**
Description	Lakewide Alternative 1 consists of No Action and is retained as a baseline condition per the NCP.	Lakewide Alternative 2 consists of the following remedial activities on a SMU-specific basis: • SMU 1 – Dredging for NLSA and H&E / Capping / Habitat Reestablishment • SMU 2 – Dredging for NLSA and H&E and Targeted Dredging to 4 Meter Depth (for NAPL Removal) / Capping / Habitat Reestablishment • SMU 3 – Habitat Enhancement / Dredging for NLSA and H&E and Targeted Dredging / Capping / Habitat Reestablishment • SMU 4 – Dredging for NLSA and H&E / Capping / Habitat Reestablishment • SMU 5 – Habitat Enhancement / Dredging for NLSA and H&E / Capping / Habitat Reestablishment • SMU 6 – Dredging for NLSA and H&E and Targeted Dredging / Capping / Habitat Reestablishment • SMU 7 – Dredging for NLSA and H&E / Capping / Habitat Reestablishment • SMU 8 – Phased Thin-Layer Capping to Mean PECQ1, Mercury PEC and BSQV / Oxygenation / MNR	Lakewide Alternative 3 consists of the following remedial activities on a SMU-specific basis: • SMU 1 – Dredging of the ILWD to 2 Meter Depth /Capping / Habitat Reestablishment • SMU 2 – Dredging for NLSA and H&E and Targeted Dredging to 4 Meter Depth (for NAPL Removal) / Capping / Habitat Reestablishment • SMU 3 – Habitat Enhancement / Dredging for NLSA and H&E and Targeted Dredging / Capping / Habitat Reestablishment • SMU 4 – Dredging for NLSA and H&E / Capping / Habitat Reestablishment • SMU 5 – Habitat Enhancement / Dredging for NLSA and H&E / Capping / Habitat Reestablishment • SMU 6 – Dredging for NLSA and H&E and Targeted Dredging / Capping / Habitat Reestablishment • SMU 7 – Dredging for NLSA and H&E / Capping / Habitat Reestablishment • SMU 8 – Phased Thin-Layer Capping to Mean PECQ1, Mercury PEC and BSQV / Oxygenation / MNR	Lakewide Alternative 4 consists of the following remedial activities on a SMU-specific basis: • SMU 1 – Dredging of the ILWD to 2 Meter Depth with Removal in Hot Spot Areas / Capping / Habitat Reestablishment • SMU 2 – Dredging for NLSA, H&E and Targeted Dredging to 9 Meter Depth (for NAPL Removal) / Capping / Habitat Reestablishment • SMU 3 – Habitat Enhancement / Dredging for NLSA and H&E and Targeted Dredging / Capping / Habitat Reestablishment • SMU 4 – Dredging for NLSA and H&E / Capping / Habitat Reestablishment • SMU 5 – Habitat Enhancement / Dredging for NLSA and H&E / Capping / Habitat Reestablishment • SMU 6 – Dredging for NLSA and H&E and Targeted Dredging / Capping / Habitat Reestablishment • SMU 7 – Dredging for NLSA, and H&E / Capping / Habitat Reestablishment • SMU 8 – Phased Thin-Layer Capping to Mean PECQ1, Mercury PEC and BSQV / Oxygenation / MNR	Lakewide Alternative 5 consists of the following remedial activities on a SMU-specific basis: • SMU 1 – Dredging to 5 Meter Depth / Capping / Habitat Reestablishment • SMU 2 – Dredging for NLSA, H&E and Targeted Dredging to 9 Meter Depth (for NAPL Removal) / Capping / Habitat Reestablishment • SMU 3 – Habitat Enhancement / Dredging for NLSA and H&E and Targeted Dredging / Capping / Habitat Reestablishment • SMU 4 – Dredging for NLSA and H&E / Capping / Habitat Reestablishment • SMU 5 – Habitat Enhancement / Dredging for NLSA and H&E / Capping / Habitat Reestablishment • SMU 6 – Dredging for NLSA and H&E and Targeted Dredging / Capping / Habitat Reestablishment • SMU 7 – Dredging for NLSA and H&E / Capping / Habitat Reestablishment • SMU 8 – Phased Thin-Layer Capping to Mean PECQ1, Mercury PEC and BSQV/ Oxygenation / MNR	Lakewide Alternative 6 consists of the following remedial activities on a SMU-specific basis: • SMU 1 - Full Removal (Dredging to Mean PECQ1 and Mercury PEC) • SMU 2 – Full Removal (Dredging to Mean PECQ1 and Mercury PEC) • SMU 3 – Full Removal (Dredging to Mean PECQ1 and Mercury PEC) • SMU 4 – Full Removal (Dredging to Mean PECQ1 and Mercury PEC) • SMU 5 – Habitat Enhancement / Dredging for NLSA and H&E / Capping to Mean PECQ1 / Habitat Reestablishment • SMU 6 – Full Removal (Dredging to Mean PECQ1 and Mercury PEC) • SMU 7 – Full Removal (Dredging to Mean PECQ1 and Mercury PEC) • SMU 8 – Phased Thin-Layer Capping to Mean PECQ1, Mercury PEC and BSQV / Oxygenation / MNR	Lakewide Alternative 7 consists of the following remedial activities on a SMU-specific basis: • SMU 1 – Full Removal (Dredging to ER-L) • SMU 2 – Full Removal (Dredging to ER-L) • SMU 3 – Full Removal (Dredging to ER-L) • SMU 4 – Full Removal (Dredging to ER-L) • SMU 5 – Habitat Enhancement / Dredging for NLSA and H&E / Capping to ER-L / Habitat Reestablishment • SMU 6 – Full Removal (Dredging to ER-L) • SMU 7 – Full Removal (Dredging to ER-L) • SMU 8 – Thin-Layer Capping to ER-L / Oxygenation
Capped Acres Total Littoral/ Profundal	0	579 425/154	579 425/154	579 425/154	579 425/154	214 60/154	2,329 349/1,980
Dredged Volume (cy)	0	1,207,000	1,868,000	2,653,000	3,724,000	12,184,000++	20,121,000++
Capping & Dredging Duration (Years)	0	4	4	4	4	10	17
Total Cost	$0	$312,000,000	$370,000,000	$451,000,000	$537,000,000	$1,327,000,000++	$2,157,000,000++

TABLE 15
COST ESTIMATE INPUT DATA FOR SELECTED REMEDY

SMU	DREDGING		CAPPING			
	Dredged Area (AC)	Sediment (CY)	Cap Area (AC)	Sand [1] (CY)	Gravel (CY)	Rock (CY)
Quantities						
1	84	1,566,000	84	635,200	80,700	5,100
2	10	403,000	16	312,523	10,400	4,300
3	11	75,000	29	129,400	17,600	0
4	22	135,000	75	300,600	60,500	0
5	24	140,000	60	248,900	40,900	0
6	33	245,000	123	471,000	103,900	0
7	13	89,000	38	293,100	38,900	900
8	0	0	154	91,100	0	0
TOTAL	197	2,653,000	579	2,481,823	352,900	10,300
Durations						
Number Crews:		4		4	4	2
Production Rate (CY/HR):		600		400	380	140
Duration (HR):		4,422		6,204	929	74
Shifts/Day:		2		2	2	2
Hours/Shift:		8		8	8	8
Duration (DA):		276		388	58	5
Days/Month:		20		20	20	20
Duration (MO):		15		20	3	1
Months/Year:		7		7	7	7
Duration (YR):		2.1		2.8	0.4	0.1

SCA Size	232	AC
SCA Dike Height	14	FT

TOTAL CONSTRUCTION DURATION		
Dredging Duration:	15	MO
Capping Duration:	21	MO
In Lake Construction Duration [2]:	23	MO
In Lake Construction Duration [3]:	4	YR

Notes:
(1) Sand volume includes volume of wetland substrate material, when applicable
(See Appendix E of the Onondaga Lake FS).
(2) Assumes capping can be performed concurrent with dredging after a two month lag.
(3) Based on 7 working months per year.

TABLE 16
COST SUMMARY FOR SELECTED REMEDY

Note: Cost estimates assumed that all disposal was onsite at an SCA. Based on evaluations to be conducted during design, as well as during construction, it is likely that a portion of the dredged materials (e.g., NAPLs) will be treated and/or disposed of at an off-site permitted facility rather than at the SCA.

Task	Qty	Unit	Cost: Labor	Equipment	Materials	Subcont	TOTAL
Direct Construction Costs							
Mobilization/ Demobilization							
Equipment Fabrication	1	LS	0	594,000	0	0	594,000
Mobilization	1	LS	1,649,726	758,951	1,519,471	11,666	3,939,815
Demobilization	1	LS	1,478,489	530,434	57,024	43,276	2,109,223
Interim Year Startup	3	EA	1,059,999	798,268	19,958	477	1,878,703
Site Preparation and Facility Construction							
Clearing and Grubbing	235	AC	0	0	0	1,255,385	1,255,385
Install Fence	14,140	LF	0	0	0	254,664	254,664
Construct Gravel Equipment Area	200	LF	0	0	9,302	0	9,302
Construct Gravel Admin. Area	200	LF	0	0	9,302	0	9,302
Install Work Lighting	95	EA	0	342,079	0	0	342,079
Electrical Power	1	LS	0	0	0	5,940	5,940
Water Line	1	LS	0	0	0	5,940	5,940
Contaminated Water Control System	1	LS	0	0	118,800	0	118,800
Decon Facility	1	LS	1,323	0	594	8,465	10,382
Barrier Wall	65,000	SF	0	0	0	3,427,024	3,427,024
Dredging - SMU 1 thru SMU 7							
Bathymetry Survey - Pre-Dredging	1	LS	0	0	0	3,858	3,858
Sediment Sampling - Pre-Dredging	579	AC	2,188,471	580,409	117,018	1,574,912	4,460,810
Recover and Remove Barge	1	LS	0	0	0	154,440	154,440
Hydraulic Dredging with Cutter Head	2,653,000	CY	13,007,189	6,721,632	945,530	0	20,674,349
Transfer to SCA	2,653,000	CY	3,293,621	596,393	216,684	0	4,106,697
Operation of SCA	1	LS	354,469	141,777	39,396	364,832	900,474
Sheen Treatment	13	MO	427,897	9,896	4,503	602,231	1,044,525
Dredge Containment	2,653,000	CY	141,771	125,883	447,854	0	715,508
Dredge Monitoring	2,653,000	CY	2,056,291	1,379,632	157,589	316,634	3,910,145
Bathymetry Survey - Post Dredging	1	LS	0	0	0	3,858	3,858
Sediment Sampling - Post Dredging	197	AC	744,631	197,545	39,828	207,067	1,189,071
Sediment Cap							
Cap Containment	579	AC	407,046	369,854	1,173,353	0	1,950,253
Sand	579	AC	22,484,012	10,261,658	22,879,933	0	55,625,602
Rock	579	AC	144,481	57,547	318,540	24,779	545,347
Gravel	579	AC	3,388,409	1,444,901	8,321,952	0	13,155,263
Backfill							
Backfill	0	CY	0	0	0	0	0
Habitat & Vegetation Restoration							
Habitat & Vegetation Restoration	1	LS	0	0	0	1,526,272	1,526,272
Rip Rap	1	LF	1,977	2,262	60,178	0	64,417
SCA Construction							
Construct SCA	232	AC	6,847,096	2,396,179	11,036,410	7,060,604	27,340,288
Preloading	1	LS	6,945,712	894,780	29,009,892	197,708	37,048,092
Stabilization under Dikes	1	LS	0	0	0	17,151,837	17,151,837
Construct Cap over SCA	232	AC	2,772,406	1,143,276	16,284,669	0	20,200,351
Water Treatment							
Construct Water Treatment Facility	1	LS	1,187,454	976,864	1,590,039	44,930,160	48,684,516
Water treatment for dredged material	3,435,635,000	GA	0	0	0	20,521,085	20,521,085
Dismantle WTP	1	LS	0	0	0	1,188,000	1,188,000
Indirect Construction Costs							
Institutional Controls	1	LS	305,649	0	0	0	305,649
Studies, Design, and Planning							
Pre-Design, Remedial Design, Agency Oversight	1	LS	11,845,025	0	0	0	11,845,025
Engineering and Const. Oversight							
Project Management	1	LS	8,883,768	0	0	0	8,883,768
Construction Management	1	LS	11,845,025	0	0	0	11,845,025
Health and Safety	4,422	HR	1,026,950	52,529	570,101	0	1,649,580
Construction Cost Contingency							
Construction Cost Contingency	1	LS	82,663,666	0	0	0	82,663,666
CONSTRUCTION COSTS SUBTOTAL							***414,000,000***

Task	NPV Factor	Qty	Unit	Cost: Labor	Equipment	Materials	Subcont	TOTAL	NPV TOTAL
Operation and Maintenance									
O&M During Construction and Off Season									
Off-hour security	1.000	34	MO	1,505,338	0	0	0	1,505,338	1,505,338
Long Term O&M (30 years)									
O&M Management and Technical Support	12.409	1	YR	305,668	0	0	0	305,668	3,793,030
Natural recovery monitoring - Profundal Zone	12.409	1	YR	65,768	29,462	5,940	140,136	241,307	2,994,373
O&M for SCA - 1st 5 years	4.100	1	YR	28,807	1,901	4,424	77,067	112,199	460,014
O&M for SCA - Remaining 25 years	8.309	1	YR	14,403	950	475	38,534	54,362	451,705
Lake Cap Monitoring	12.409	1	YR	190,233	85,220	17,181	261,059	553,693	6,870,780
5-Year Reviews	2.156	1	YR	242,656	0	0	0	242,656	523,167
Lake Cap Maintenance	2.156	1	YR	714,294	282,720	964,461	0	1,961,475	4,228,941
Aeration in Profundal Zone - Capital	1.000	4	LS	0	0	0	6,177,600	6,177,600	6,177,600
Aeration in Profundal Zone - Operation	4.100	4	YR	0	0	0	190,080	190,080	779,328
SMU 5 Pilot Study	4.100	1	YR	0	0	0	118,800	118,800	487,080
SMU 7 Barrier Wall Pump and Treat	12.409	1	YR	0	0	0	121,760	121,760	1,510,926
Waste and O&M Contingency									
Waste and O&M Contingency	1.000	1	LS	7,069,236	0	0	0	7,069,236	7,069,236
OPERATION AND MAINTENANCE COSTS SUBTOTAL									***37,000,000***
Total Lake Remediation Project Costs									**451,000,000**

TABLE 17

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			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.
	6 NYCRR Part 608	ARAR	Note that: C Section 608.6(a) requires development and submission of a sufficiently detailed construction plan with a map); C 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.

Medium/Authority	Citation	Status	Requirement Synopsis
	6 NYCRR Part 702	ARAR	Part 702 establishes the deviation and use of these standards and guidance values.
	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 18

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	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. 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. 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.
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 *et al.)*	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 *Hyalella azteca* and the midge *Chironomus riparius*, 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). Screening values are not cleanup goals. Also discusses the use of sediment criteria in risk management decisions.
DEC	TAMS, Onondaga Lake Baseline Ecological Risk Assessment (2002)	TBC	DEC/TAMS developed 5 site-specific SECs based on mortality results found for the chironomid sediment toxicity test in 1992: C Effects Range-Low (ER-L): 10^{th} percentile of the concentration distribution for effects data C Threshold Effect Level (TEL): Geometric mean of the 15^{th} percentile of the concentration distribution for the effects data and the median distribution for the no-effects data C Effects Range-Median (ER-M): Median of the concentration distribution for the effects data C Probable Effect Level (PEL): Geometric mean of the ERM and the 85^{th} percentile of the concentration distribution for the no-effects data C Apparent Effects Threshold (AET): Concentration above which effects are always expected (i.e., the highest no-effects concentration)
SOIL			
DEC-Division of Environmental Remediation	Technical Administrative Guidance Memorandum No. 94- Remediation HWR-4046	TBC	Recommended Soil Cleanup Objectives
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 19

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 et seq.	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.
Fish and Wildlife Coordination Act 16. U.S.C. § 662	N/A	ARAR	Whenever the waters of any stream or other body of water are proposed or authorizes 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 Unite States Fish and Wildlife Service, Department of the Interior, and with the head of the agency exercising administration over 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.

Medium/Authority	Citation	Status	Requirement Synopsis
Statement of Procedures on Floodplain Management and Wetlands Protection	40 CFR Part 6, Appendix A	ARAR	Sets forth EPA policy and guidance for carrying out Executive Orders 11990 and 11988. Executive Order 11988: 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. Executive order 11990: 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 nor practicable alternative exists.
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
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 20

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 Floodplains and Waste 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) (see RI Table 9-3: Location-Specific ARARs). 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.

TABLE 21

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©) 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

Medium/Authority	Citation	Status	Requirement Synopsis
Resource Conservation and Recovery Act 42 USC s/s 6901 et seq. (1976) Subtitle C – Wastes	40 CFR Part 261	ARAR	Identification and listing of hazardous waste
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	ARAR	Inactive Hazardous Waste Disposal Sites. 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

TABLE 22

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

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 draft November 2002)	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

Medium/ Authority	Citation	Status	Requirement Synopsis
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.
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. *Section 401 Water Quality Certification*, 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/m3 for inhalation of evaporative congeners (Aroclor 1242 and below) and 0.002 µg/m3 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

Medium/ Authority	Citation	Status	Requirement Synopsis
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
Onondaga Lake Site

APPENDIX III

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

RI/FS Activities	Document*
Remedial Investigation / Feasibility Study Work Plans	Onondaga Lake RI/FS Sampling and Analysis Plan. Volume 1: Field Sampling Plan. PTI Environmental Services (1991) Onondaga Lake RI/FS Sampling and Analysis Plan. Volume 2: Quality Assurance Project Plan. PTI Environmental Services (1991) Onondaga Lake RI/FS Work Plan. PTI Environmental Services (1991) Onondaga Lake RI/FS Sediment Processes Study Work Plan and Sampling and Analysis Plan. PTI Environmental Services (1992) Onondaga Lake Site Health Assessment, ATSDR (July 24, 1995) Citizen Participation Plan for the Onondaga Lake National Priority List Site (1996) Supplemental Mercury Methylation and Remineralization Studies Work Plan. PTI Environmental Services (1996) Onondaga Lake RI/FS Supplemental Lake Water Sampling Work Plan. Exponent (1999) Onondaga Lake RI/FS Supplemental Data Phase 2A Work Plan and Dredge Material Disposal Area Addendum. Exponent (2000) Work Plan for Supplemental Sampling in Onondaga Lake – 2001. Onondaga Lake RI/FS. TAMS (2001)

Remedial Investigation Reports	Onondaga Lake RI/FS Site History Report. PTI Environmental Services (1992) Onondaga Lake RI/FS Geophysical Survey Report. PTI Environmental Services (1992) Onondaga Lake RI/FS Bioaccumulation Investigation Data Report. PTI Environmental Services (1993) Onondaga Lake RI/FS Ecological Effects Investigation Data Report. PTI Environmental Services (1993) Onondaga Lake RI/FS Mercury and Calcite Mass Balance Investigation Data Report. PTI Environmental Services (1993) Onondaga Lake RI/FS Substance Distribution Investigation Data Report. PTI Environmental Services (1993) Onondaga Lake RI/FS Reference Lake Selection Report (1993) Onondaga Lake RI/FS Supplemental Mercury Methylation and Remineralization Studies Data Report. PTI Environmental Services (1997) New York State's Revision of the Onondaga Lake Calcite Modeling Report. NYSDEC/TAMS (1998) New York State's Revision of the Onondaga Lake Mercury Modeling Report. NYSDEC/TAMS (1998)
Remedial Investigation Reports (cont.)	Onondaga Lake Baseline Ecological Risk Assessment. Prepared by TAMS and YEC for New York State Department of Environmental Conservation (December 2002) Volume 1: Text, Tables, and Figures Volume 2: Appendices Onondaga Lake Human Health Risk Assessment Report. Prepared by TAMS and YEC for New York State Department of Environmental Conservation (December 2002) Volume 1: Text, Tables, Figures and Appendices A-D Volume 2: Appendix E Onondaga Lake Remedial Investigation Report. Prepared by TAMS and YEC for New York State Department of Environmental Conservation (December 2002) Volume 1: Text, Tables, and Figures Volume 2: Appendices A-D Volume 3: Appendices E-I

Feasibility Study	Onondaga Lake RI/FS Preliminary Overview of Sediment Remediation Alternatives (1992) Letter from Timothy J. Larson and Andrew J. Gershon regarding the May 2003 draft Feasibility Study Report (November 28, 2003) Draft Feasibility Study Report for Onondaga Lake. Parsons (May 2004) Volume 1: Executive Summary and Sections 1-6 Volume 2: Appendices A-G Volume 3: Appendices H-N Responses to NYSDEC Comments on Onondaga Lake Draft Feasibility Study Report (May 2004) E-mail from Jim Nicotri regarding Action Item #10, SMU Boundaries (May 27, 2004) E-mail from Timothy J. Larson regarding Action Item #10, SMU Boundaries (June 1, 2004) Memo from Tom Drachenberg regarding Action Item #23, ECL Article 15 and NYCRR Part 608 (June 8, 2004) E-mail from Ed Glaza regarding Backup Info on SMU 1 Hotspots Table (October 25, 2004). Letter from Donald J. Hesler regarding responses to Tom Drachenberg's June 8, 2004 memo regarding Action Item #23, ECL Article 15 and NYCRR Part 608 and Ed Glaza's October 25, 2004 email regarding Backup Information on SMU 1 Hotspots Table (June 30, 2005) E-mail from Don Hesler regarding NYSDEC comments on Appendix H (August 12, 2004). E-mail from Timothy J. Larson regarding NYSDEC comments on Appendices J and K (August 12, 2004). E-mail from Timothy J. Larson regarding NYSDEC comments on Section 5 and Appendix I (August 27, 2004). E-mail from Timothy J. Larson regarding NYSDEC comments on Sections 1 -4, Appendices A, B, G, and M (August 30, 2004). E-mail/Letter from Timothy J. Larson regarding NYSDEC comments on Draft Final Appendices E and F, and on Narrative Summaries Associated with Section 4 and Appendices D, H, I, J, and N (September 8, 2004). E-mail/Letter from Donald J. Hesler regarding NYSDEC comments on Narrative Summaries Associated with Section 5 and Appendices K and L (September 15, 2004). E-mail/Letter from Timothy J. Larson regarding NYSDEC comments on Appendix D (September 30, 2004). E-mail/Letter from Timothy J. Larson regarding NYSDEC comments on Appendix N (October 7, 2004).

Feasibility Study (Cont.)	E-mail/Letter from Timothy J. Larson regarding NYSDEC comments on Draft Final Appendix I (October 22, 2004). E-mail/Letter from Timothy J. Larson regarding NYSDEC comments on Draft Final Appendices J, K, L, and M (October 25, 2004). E-mail/Letter from Timothy J. Larson regarding NYSDEC comments on Draft Final Section 4 (November 8, 2004). E-mail/Letter from Timothy J. Larson regarding NYSDEC comments on Draft Final Section 5 (November 11, 2004). Draft Feasibility Study Report for Onondaga Lake. Parsons (November 2004)** Volume 1: Executive Summary and Sections 1-6 Volume 2: Appendices A-G Volume 3: Appendices H-N
National Remedy Review Board	NRRB Presentation Package (January 2005) National Remedy Review Board Recommendations for the Onondaga Lake Superfund Site (February 18, 2005) Response to National Remedy Review Board Recommendations for the Lake Bottom Sub-Site of the Onondaga Lake Superfund Site (March 25, 2005)
Proposed Plan Released Start of Public Comment Period	Proposed Plan (November 2004) Onondaga Lake Subsite Proposed Plan Basis for Development of Alternative 4 (Bridging Document) (November 2004) Notices of Public Meetings and Opportunity to Comment EPA Proposed Plan Concurrence Letter (March 25, 2005)
Public Meetings Held	Documentation and Transcripts of Meetings (Attached to the Record of Decision) Written Comments on Selected Remedy (Attached to the Record of Decision)
Record of Decision Issued	Record of Decision and Responses to Comments (Responsiveness Summary) - July 1, 2005 Public Notice of Administrative Record Availability

Enforcement Documents	RI/FS Consent Decree for the Onondaga Lake Sediments (March 16, 1992) United States Environmental Protection Agency. Joint Request for Information. Mailing No. 1 (June 13, 1996) AlliedSignal, Inc. Response to Joint Request for Information. Mailing No. 1. Prepared by Whiteman Osterman & Hanna (August 19, 1996) New York State Department of Environmental Conservation. Supplemental Joint Request for Information. Mailing No. 2 (March 10, 1997) AlliedSignal, Inc. Supplemental Response to Joint Request for Information. Mailing No. 2. Prepared by Whiteman Osterman & Hanna (May 14, 1997) Letter from NYSDEC and EPA to Honeywell regarding Notice of Liability, June 23, 1997 Stipulation and Order Amending Consent Decree (January 22, 1998) New York State Attorney General. Supplemental Joint Request for Information. Mailing No. 3 (March 2, 1999) AlliedSignal, Inc. Supplemental Response to Joint Request for Information. Mailing No. 3. Prepared by Hunton & Williams (April 22, 1999) New York State Department of Environmental Conservation. Supplemental Joint Request for Information. Mailing No. 4 (December 22, 1999) Honeywell International Inc. Supplemental Response to Joint Request for Information. Mailing No. 4. Prepared by Hunton & Williams (February 29, 2000) New York State Department of Environmental Conservation. Supplemental Joint Request for Information. Mailing No. 5 (June 30, 2000) Stipulation and Order Amending Consent Decree (July 12, 2000) Honeywell International Inc. Supplemental Response to Joint Request for Information. Mailing No. 5. Prepared by Hunton & Williams (August 4, 2000) Stipulation and Order Amending Consent Decree (March 16, 2001) Stipulation and Order Amending Consent Decree (May 30, 2002) Stipulation and Order Amending Consent Decree (January 29, 2004) Stipulation and Order Amending Consent Decree (May 28, 2004)

* 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. Bibliographies in these documents and in the references cited in this Record of Decision are incorporated by reference in the Administrative Record. Many of the documents referenced in the bibliographies are publicly available and readily accessible. Most of the guidance documents referenced in

the bibliographies are available on EPA or NYSDEC websites. If copies of the referenced documents cannot be located, contact the NYSDEC Project Manager (Timothy J. Larson, 518-402-9767). 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.

**This November 2004 “Draft” of the Feasibility Study (FS) was the primary source utilized by the NYSDEC in drafting the Record of Decision (ROD) The document is 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 2004 FS document represents the final version of the FS even though it carries a “Draft” designation. Earlier FS documents and comment letters are included in the record since the final version of the FS was prepared by Honeywell and its consultants and there were certain earlier comments which NYSDEC and EPA had submitted which were not adequately addressed to NYSDEC and EPA’s satisfaction in the November 2004 FS document or certain statements in the document 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 FS was sufficient for it to develop the ROD. Earlier FS documents are included in the Administrative Record for the purpose of clarifying NYSDEC and EPA findings with respect to specific issues that may not be adequately expressed in the November 2004 FS. The ROD is based upon all documents which are included in the Administrative Record.

APPENDIX IV

NYSDOH LETTER OF CONCURRENCE

STATE OF NEW YORK
DEPARTMENT OF HEALTH

Flanigan Square, 547 River Street, Troy, New York 12180-2216

Antonia C. Novello, M.D., M.P.H., Dr.P.H.
Commissioner

Dennis P. Whalen
Executive Deputy Commissioner

June 24, 2005

Mr. Dale Desnoyers, Director
Division of Environmental Remediation
NYS Dept. of Environmental Conservation
625 Broadway - 12th Floor
Albany, NY 12233-7011

Re: Record of Decision
Onondaga Lake Bottom Sediments
Site ID# 734030
Syracuse, Onondaga County

Dear Mr. Desnoyers,

My staff has reviewed the Record of Decision for the Onondaga Lake Bottom Sediments site north of Syracuse in Onondaga County. Based upon that review I understand that the selected remedy addresses contamination in the Lake with the ultimate goal of reducing contamination in fish to levels that will no longer present an unacceptable health risk to the public via consumption. The remedy, which should result in a long-term reduction in toxicity, mobility, and volume of the key contaminants in Onondaga Lake, includes:

- Removal of approximately 2.6 million cubic yards of contaminated sediments and NAPLs by dredging;
- Isolation capping of about 425 acres of the littoral zone;
- Thin-layer capping of about 154 acres of contaminated sediments in the profundal zone, along with aeration of the deep water column, and monitored natural recovery;
- Construction of a sediment consolidation area on one or more of Honeywell's waste beds in the Town of Camillus (or another site, if preferred);
- Control of upland sources of contaminated groundwater or runoff; and
- Improvements to aquatic habitat throughout the Lake.

I concur with the selected remedy as it will prevent human exposure to contaminated sediments and support an eventual recreational fishery unhindered by fish consumption concerns.

If you have any questions, please call Geoff Laccetti at (518) 402 7871.

RECEIVED
JUN 29 2005
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DIVISION OF
ENVIRONMENTAL REMEDIATION

Sincerely,

Steven M. Bates, Assistant Director
Bureau of Environmental Exposure Investigation

cc: G. A. Carlson, Ph.D.
Mr. G. Litwin/ Mr. G. Laccetti/ File
Ms. H. Hamel
Dr. L Novick – OCHD.
Mr. D. Coburn – Onondaga Co. Office of the Environment
Mr. D. Hesler/ Mr. T. Larson – DEC
Mr. J. Burke – DEC Region 7

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APPENDIX V

STATEMENT OF FINDINGS: FLOODPLAINS AND WETLANDS

Appendix V

Record of Decision

Onondaga Lake Bottom Subsite
of the Onondaga Lake Superfund Site

Statement of Findings: Floodplains and Wetlands

Need to Affect Floodplains and Wetlands

Onondaga Lake sediments are currently contaminated with mercury and other contaminants. Onondaga Lake lies within the 100-year floodplain, therefore, cleanup of the contaminated sediments, which pose a risk both to human and ecological receptors, may involve extensive remedial work within the floodplain adjacent to the lake. The selected remedy addresses all areas of the lake where the surface sediments exceed a mean probable effect concentration quotient (PECQ) of 1 or a mercury PEC of 2.2 milligrams per kilogram (mg/kg).[1] The selected remedy will also attain a 0.8 mg/kg bioaccumulation-based sediment quality value (BSQV) for mercury on an area-wide basis for the lake and for other applicable areas of the lake to be determined during the remedial design. The selected remedy is also intended to achieve lakewide fish tissue mercury concentrations ranging from 0.14 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 for the consumption of organisms. The major components of the selected remedy include:

- Dredging of as much as an estimated 2,653,000 cubic yards (cy) of contaminated sediment/waste from the littoral zone[2] in Sediment Management Units (SMUs)[3] 1 through 7 to a depth that will prevent the loss of lake surface area, ensure cap effectiveness, remove non-aqueous-phase liquids (NAPLs), reduce contaminant mass, allow for erosion protection, and reestablish the littoral zone habitat. Most of the dredging will be performed in the in-lake waste deposit (ILWD) (which largely exists in SMU 1) and in SMU 2.

- Dredging, as needed, in the ILWD to remove materials within areas of hot spots (to improve cap effectiveness) and to ensure stability of the cap.

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1 These cleanup criteria were developed to address acute toxicity to the sediment-dwelling (benthic) community in Onondaga Lake.

2 The littoral zone is the portion of the lake in which water depths range from 0 to 9 meters (m) (30 feet [ft]).

3 For investigation and remediation purposes, the site has been divided into eight SMUs based on water depth, sources of water entering the lake, physical and ecological characteristics, and chemical risk drivers. SMUs 1 through 7 cover the littoral zone and SMU 8 covers the profundal zone. (See Record of Decision Figure 3.)

- Placement of an isolation cap over an estimated 425 acres of SMUs 1 through 7.

- Construction/operation of a hydraulic control system along the SMU 7 shoreline to maintain cap effectiveness. In addition, the remedy for SMUs 1 and 2 will rely upon the proper operation of the hydraulic control system, which is being designed to control the migration of contamination to the lake via groundwater from the adjacent upland areas.

- Placement of a thin-layer cap over an estimated 154 acres of the profundal zone.[4]

- Treatment and/or off-site disposal of the most highly contaminated materials (e.g., pure phase chemicals segregated during the dredging/handling process). The balance of the dredged sediment will be placed in one or more Sediment Consolidation Areas (SCAs), which will be constructed on one or more of Honeywell's Solvay wastebeds that historically received process wastes from Honeywell's former operations. The containment area will include, at a minimum, the installation of a liner, a cap, and a leachate collection and treatment system.

- Treatment of water generated by the dredging and sediment handling processes to meet NYSDEC discharge limits.

- Completion of a comprehensive lakewide habitat restoration plan.

- Habitat reestablishment will be performed consistent with the lakewide habitat restoration plan in areas of dredging/capping.[5]

- Habitat enhancement will be performed consistent with the lakewide habitat restoration plan.

- A pilot study will be performed to evaluate the potential effectiveness of oxygenation at reducing the formation of methylmercury in the water column, while preserving the normal cycle of stratification within the lake. An additional factor which will be considered during the design of the pilot study will be the effectiveness of oxygenation at reducing fish tissue methylmercury concentrations. If supported by the pilot study results, the pilot study will be followed by full-scale implementation of oxygenation in SMU 8. Furthermore, potential impacts of oxygenation on the lake system will be evaluated during the pilot study and/or the remedial design of the full scale oxygenation system.

- Monitored natural recovery (MNR) in SMU 8 to achieve the mercury PEC of 2.2 mg/kg in the profundal zone and to achieve the BSQV of 0.8 mg/kg on an area-

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4 The profundal zone is the portion of the lake in which water depths exceed 9 m (30 ft) within SMU 8.

5 The design and construction of the remedy must meet the substantive requirements for permits associated with disturbance to state and federal regulated wetlands (e.g., 6 New York Code of Rules and Regulations [NYCRR] Part 663, Freshwater Wetlands Permit Requirements) and navigable waters (e.g., 6 NYCRR Part 608, Use and Protection of Waters).

wide basis within 10 years following the remediation of upland sources, littoral sediments, and initial thin-layer capping in the profundal zone. An investigation will be conducted to refine the application of an MNR model and determine any additional remedial measures (e.g., additional thin-layer capping) needed in the profundal zone.

- Investigation to determine the appropriate area-wide basis for the application of the BSQV of 0.8 mg/kg. During remedy implementation, additional remedial measures may be needed (e.g., thin-layer capping) to meet the BSQV on an area-wide basis.

- Implementation of institutional controls including the notification of appropriate government agencies with authority for permitting potential future activities which could impact the implementation and effectiveness of the remedy.

- Implementation of a long-term operation, maintenance, and monitoring (OM&M) program to monitor and maintain the effectiveness of the remedy.

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 excavation and isolation capping of these sediments. Consequently, since remedial action is necessary, any remedial action that might be taken would necessarily affect floodplains and wetlands associated with Onondaga Lake. The following seven remedial alternatives were considered[6]:

- Alternative 1 – No Action

- Alternative 2 – Dredging for No Loss of Lake Surface Area and Erosion Protection and to Reestablish Habitat, and Isolation Capping in SMUs 1 to 7; Targeted Dredging to 4 m (13 ft) for NAPL Removal in SMU 2; Targeted Dredging in SMUs 3 and 6; and Phased Thin-Layer Capping, Oxygenation, and Monitored Natural Recovery in SMU 8.

- Alternative 3 – Dredging of the ILWD to 2 m (6.5 ft) and Isolation Capping in SMU 1; Dredging for No Loss of Lake Surface Area and Erosion Protection and to Reestablish Habitat, and Isolation Capping in SMUs 2 to 7; Targeted Dredging to 4 m (13 ft) for NAPL Removal in SMU 2; Targeted Dredging in SMUs 3 and 6; and Phased Thin-Layer Capping, Oxygenation, and Monitored Natural Recovery in SMU 8.

- Alternative 4 – Dredging of the ILWD to 2 m (6.5 ft); Removal in Areas of Hot Spots in the ILWD to a Maximum Depth of 3 m (10 ft) and Isolation Capping in SMU 1; Dredging for No Loss of Lake Surface Area and Erosion Protection and to Reestablish Habitat, and Isolation Capping in SMUs 2 to 7; Targeted Dredging to 9 m (30 ft) for NAPL Removal in SMU 2; Targeted Dredging in SMUs 3 and 6;

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6 Under Alternatives 2 through 6, all areas of the lake where the surface sediments exceed a mean PECQ of 1 or the mercury PEC (2.2 mg/kg) would be addressed. Under Alternative 7, all areas of the lake where the surface sediments exceed effects range-low (ER-L) values would be addressed.

and Phased Thin-Layer Capping, Oxygenation, and Monitored Natural Recovery in SMU 8.

- Alternative 5 – Dredging of the ILWD to 5 m (16.4 ft) and Isolation Capping in SMU 1; Dredging for No Loss of Lake Surface Area and Erosion Protection and to Reestablish Habitat, and Isolation Capping in SMUs 2 to 7; Targeted Dredging to 9 m (30 ft) for NAPL Removal in SMU 2; Targeted Dredging in SMUs 3 and 6; and Phased Thin-Layer Capping, Oxygenation, and Monitored Natural Recovery in SMU 8.

- Alternative 6 – Dredging for Full Removal (based on mean PECQ of 1 and the mercury PEC criteria) in SMUs 1 to 4, 6, and 7; Dredging for No Loss of Lake Surface Area and Erosion Protection and to Reestablish Habitat, and Isolation Capping in SMU 5; and Phased Thin-Layer Capping, Oxygenation, and Monitored Natural Recovery in SMU 8.

- Alternative 7 – Dredging for Full Removal (based on ER-L criteria) in SMUs 1 to 4, 6, and 7; Dredging for No Loss of Lake Surface Area and Erosion Protection and to Reestablish Habitat, and Isolation Capping in SMU 5; and Thin-Layer Capping and Oxygenation in SMU 8.

The No-Action alternative does not entail excavation or capping of contaminated sediments; under this alternative, no remedial actions would take place within delineated floodplains or wetlands. However, contaminated sediments in the lake would remain in place and would continue to be a potential source of contamination to the lake and its adjacent wetlands and floodplains. Consequently, the No-Action alternative would not be protective of human health and the lake 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 remedial action objectives [RAOs] and preliminary remediation goals [PRGs] for the littoral and profundal areas and would result in residual risks less than the no-action alternative), including the wetlands and floodplains adjacent to the lake; and all action alternatives would involve substantial actions within floodplains.

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

The RAOs for Onondaga Lake include the elimination or reduction of contaminant releases from the ILWD and other littoral areas, and from profundal sediments, all of which are located within the 100-year floodplain. Since the selected remedy will be expected to achieve the RAOs, sediments contaminated with mercury and other contaminants will no longer function as a source of contamination to wetlands and floodplains associated with Onondaga Lake. Furthermore, capping activities will not significantly alter the capacity of the floodplain, and should not result in any increase in downstream flooding events. Accordingly, it is anticipated that no long-term adverse effects to floodplain resources will result due to implementation of the selected remedy, since any short-term negative impacts to the natural or beneficial values associated with the lake bottom sediments, which are already compromised by existing contamination, will be more than compensated for by the long-term benefit to the Onondaga Lake ecosystem once these sediments are removed and/or capped. Further, the habitat reestablishment component of the selected remedy will also provide additional habitat value to the lake and shoreline through the installation of various substrate and vegetation on the cap surface. The details for habitat reestablishment (e.g., type and thickness of substrates and vegetation) will be developed during the remedial design, based upon a comprehensive lakewide habitat restoration plan. These measures will serve to enhance floodplain resources associated with the Onondaga Lake bottom, as well as wetland resources associated with Onondaga Lake. It is not anticipated that the landward extent of the floodplain will be impacted by implementation of the selected remedy.

Compliance with Applicable State or Local Floodplain Protection Standards

Four New York State regulated wetlands occur along or near the lake's shoreline near the mouths of Harbor Brook (SYW-19), Ley Creek (SYW-12), and Ninemile Creek (SYW-10), and along the northwest shoreline of the lake (SYW-6) (See Record of Decision Figure 6). These areas are now being addressed as part of investigations taking place at other upland sites (i.e., the Ninemile Creek Dredge Spoils Area for state-regulated wetland SYW-6, Geddes Brook/Ninemile Creek for state-regulated wetland SYW-10, and the Wastebed B/Harbor Brook site for state-regulated wetlands SYW-12 and SYW-19).

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

The selected remedy will also comply with applicable or relevant and appropriate substantive requirements relating to floodplains and wetlands, including Executive Order 11988: Floodplain Management; Executive Order 11990: Protection of Wetlands, and 40 CFR Part 6, Appendix A. Accordingly, draft floodplains and wetlands assessments have already been prepared for the preferred remedy; these assessments will be refined as necessary during the remedial design process.

Measures to Mitigate Potential Harm to the Floodplains and Wetlands

Implementation of the selected remedy will entail excavation and capping of lake sediments, 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. Furthermore, any impacts to wetlands will be mitigated in accordance with the lakewide habitat restoration plan.

Measures will also be employed during capping and dredging activities to prevent in-lake sediments that are resuspended during remediation activities from being transported to other parts of the lake or downstream of the lake during flooding events (100-year and 500-year storms). For example, silt curtains will be used during dredging activities to minimize the transport of resuspended sediments from the areas being dredged to other parts of the lake. In addition, monitoring will occur during both dredging and capping operations. Should this monitoring indicate that elevated levels of suspended sediments are being generated by dredging or capping operations, 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, changes to the depth of the dredge cut, modifications to movement of the dredge equipment, and cessation of dredging/capping activities.

APPENDIX VI

RESPONSIVENESS SUMMARY

(under separate cover)

ONONDAGA LAKE BOTTOM SUBSITE
OF THE ONONDAGA LAKE SUPERFUND SITE

SYRACUSE, NEW YORK

RESPONSIVENESS SUMMARY

RECORD OF DECISION
Appendix VI

NYSDEC

USEPA Region 2

JULY 2005

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ALBANY, NEW YORK

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

TAMS/EARTH TECH
NEW YORK, NEW YORK

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ONONDAGA LAKE RI/FS AND PROPOSED PLAN RESPONSIVENESS SUMMARY

Table of Contents

Please note that a list of acronyms/abbreviations and the references for this Responsiveness Summary are contained in the Record of Decision (Volume 1).

Attachments

List of Figures

List of Tables

The following tables are in the text of the responses to Technical Comments:

ONONDAGA LAKE RI/FS AND PROPOSED PLAN RESPONSIVENESS SUMMARY

PUBLIC REVIEW PROCESS

INTRODUCTION

This Responsiveness Summary (RS) provides a summary of comments and concerns received during the public comment period related to the Onondaga Lake Bottom Subsite of the Onondaga Lake Superfund Site remedial investigation and feasibility study (RI/FS) and the Proposed Plan, and provides the responses of the New York State Department of Environmental Conservation (NYSDEC) to those comments and concerns. The RI/FS reports (TAMS, 2002a,b,c; Parsons, 2004) describe the nature and extent of the contamination at the Onondaga Lake site and evaluate remedial alternatives to address this contamination. The Proposed Plan (NYSDEC, 2004) identifies NYSDEC'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 (CERCLA) 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 (NCP). 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 the US Environmental Protection Agency (EPA) in EPA 540-R-92-009 and the Office of Solid Waste and Emergency Response (OSWER) in OSWER 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 Onondaga Lake site.

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

Attachment 1	The National Remedy Review Board (NRRB) recommendations letter and responses (see the section below called "EPA's National Remedy Review Board Process").
Attachment 2	The Comment and Response Index, which contains summaries of every comment received and NYSDEC's response.
Attachment 3	Comments provided during the public comment period, including letters, e-mails, and oral statements. This attachment contains copies of every comment received.

EPA'S NATIONAL REMEDY REVIEW BOARD PROCESS

The NRRB is an EPA peer review group that reviews all proposed Superfund cleanup decisions that meet certain cost-based or other review criteria to ensure that these proposed decisions are consistent with Superfund law, regulations, and guidance. EPA asked the Onondaga Nation, Honeywell, and the Atlantic States Legal Foundation (ASLF) to submit comments on the Proposed Plan to the NRRB prior to the Board's meeting with NYSDEC on February 8, 2005. The NRRB reviewed the Proposed Plan and information package provided by EPA Region 2 describing the proposed remedial action and discussed related issues with a number of representatives from EPA Region 2, NYSDEC (including its consultant, TAMS/Earth Tech), and the Onondaga Nation on February 8, 2005.

Following this meeting, the NRRB completed its review of the Proposed Plan for the Onondaga Lake Bottom site and presented a number of written recommendations in a letter dated February 18, 2005. NYSDEC and EPA Region 2 prepared written responses to the NRRB's recommendations in a letter submitted to the Board on March 25, 2005. The letter from the NRRB, along with NYSDEC and EPA Region 2's responses to NRRB's recommendations, was made available to the public on April 1, 2005, and, together with the comments submitted by the Onondaga Nation, Honeywell, and ASLF, these documents have been included in the Administrative Record. Since some, but not all, of the comments submitted to the NRRB were included in the NRRB's recommendations and NYSDEC and EPA Region 2's responses thereto, for completeness of the record, NYSDEC also included the responses to the questions raised in these comment letters in the Comment and Response Index (Attachment 2).

In a March 25, 2005 letter to NYSDEC, EPA indicated that the agency concurs with the Proposed Plan. This letter also indicated that NYSDEC should extend the public comment period to solicit public comments on the Proposed Plan as approved by EPA on March 25, 2005, on the NRRB's recommendations related to its review of the Proposed Plan, and on NYSDEC and EPA Region 2's responses to these recommendations. The comment period was reopened as discussed in the section entitled "Public Comment Period and Public Availability Sessions and Meetings," below.

PUBLIC REVIEW PROCESS

NYSDEC relies 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 Proposed Plan for the Onondaga Lake Bottom Subsite of the Onondaga Lake Superfund Site, Syracuse, New York was made available to the community on November 29, 2004. A fact sheet and a five-page executive summary were released with the Proposed Plan and are all available on NYSDEC's Web site (http://www.dec.state.ny.us/website/der/projects/ondlake).

The complete Administrative Record file, which contains the information (including the Onondaga Lake RI, Human Health Risk Assessment [HHRA], Baseline Ecological Risk Assessment [BERA], and FS) upon which the selection of the response action has been based, is available at the asterisked locations listed in the text box below. The other listed repositories contain the key documents (e.g., RI/FS reports, Proposed Plan, and Record of Decision [ROD]) but do not contain the entire Administrative Record.

Information Repositories for the Onondaga Lake Superfund Site Administrative Record

***Atlantic States Legal Foundation**
658 West Onondaga Street
Syracuse, NY 13204
(315) 475-1170
Please call for hours of availability

Liverpool Public Library
310 Tulip Street
Liverpool, NY 13088
Hours: M – Th, 9:00 a.m. – 9:00 p.m.; F, 9:00 a.m. – 6:00 p.m.; Sat, 10:00 a.m. – 5:00 p.m.; Sun, 12:00 p.m. – 5:00 p.m.
Phone: (315) 457-0310

Maxwell Memorial Library
14 Genesee Street
Camillus, NY 13031
Hours: M – W, 10:00 a.m. – 8:00 p.m.; Th – F, 10:00 a.m. – 5:00 p.m.; Sat, 10:00 a.m. – 3:00 p.m.
Phone: (315) 672-3661

Moon Library
SUNY ESF
1 Forestry Drive
Syracuse, NY 13210
Hours: check http://www.esf.edu/moonlib/
Phone: (315) 470-6712

*** NYSDEC, Region 7**
615 Erie Blvd. West
Syracuse, NY 13204
(315) 426-7400
Hours: M – F, 8:30 a.m. – 4:45 p.m.
Please call for an appointment

NYSDEC
625 Broadway
Albany, NY 12233-7016
(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
Syracuse, NY 13204-2400
447 South Salina Street
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 AVAILABILITY SESSIONS AND MEETINGS

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 November 29, 2004 and published in the *Syracuse Post-Standard* on November 29, 2004.

The public comment period for the Onondaga Lake RI/FS and Proposed Plan commenced on November 29, 2004 and continued until March 1, 2005. During that period, two public availability sessions were held on January 6 and 12 and a public meeting was held on January 12, 2005 at the New York State Fairgrounds in Syracuse, New York. Approximately 150 people, including residents, local business people, university students, media, and state and local government officials, attended the public meeting and approximately 75 people attended each availability session.

At the request of many concerned citizens, an additional availability session and public meeting were held at the New York State Fairgrounds in Syracuse on February 16, 2005. Approximately 100 people attended this availability session and public meeting. A question-and-answer session followed the formal presentation at both public meetings. Complete transcripts of both public meetings can be found in Appendix VII of the ROD.

Pursuant to terms of the Consent Decree entered in federal court, the ROD, of which this RS is a part, was to be issued by NYSDEC on April 1, 2005. However, at EPA's request, NYSDEC requested the Court to extend the ROD date until July 1, 2005. This allowed time for the new public comment period (see the "EPA's National Remedy Review Board Process" section, above), which ran from April 1 to 30, 2005. Not only did the extended public comment period provide more time for the public to review the Proposed Plan and other project-related documents, but it afforded NYSDEC and EPA the opportunity to have further dialogue with the Onondaga Nation regarding the Proposed Plan.

The NRRB's recommendations related to its review of the Proposed Plan, along with NYSDEC and EPA Region 2's responses to these recommendations, were posted on NYSDEC's Web site so as to be available for review by the public during the new public comment period.

RECEIPT AND IDENTIFICATION OF COMMENTS

Public comments on the RI/FS, Proposed Plan, and NRRB recommendations and NYSDEC and EPA Region 2 responses were received in several forms, including:

- Written comments submitted to NYSDEC via e-mail.
- Written comments submitted at one of the public availability sessions or meetings.
- Written comments mailed or faxed to NYSDEC.

- Oral comments made at the first public meeting (no oral comments were given at the second public meeting).

Each submission received, whether written or contained in the transcript of the first public meeting, was assigned one of the following letter codes:

S – State agencies and officials.
N – Onondaga Nation.
R – Regional agencies and officials.
L – Local agencies and officials.
G – Groups and associations.
H – Honeywell.
P – Public (individuals).
O – Oral (comments presented at the January 12, 2005 public meeting; there were no oral comments presented at the February 16, 2005 public meeting).

These codes 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 commentor over another in the responses to comments.

Within each of the coded categories, the comments were put in alphabetical order (based on last name) and assigned a number, such as S-1, P-1, and so on. In addition, each separate comment was assigned a separate sub-number. Thus, if a citizen made three different comments (e.g., within a letter), they are designated as P-1.1, P-1.2, and P-1.3. The exception to this alphabetization is the comments received during the second comment period; they were placed after those received during the first comment period.

Directories that list all comments received and the associated coding for the initial comment period and the second comment period are included in the Tables section of this RS (RS Tables 1 and 2).

In addition to being summarized in the Comment and Response Index (Attachment 2), copies of all written submissions have been included in Attachment 3. The alphanumeric code 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.

Oral comments (i.e., made at the January 12, 2005 public meeting) are part of the transcript, and have been coded in the same manner as the written comments. In addition to being summarized in the Comment and Response Index (Attachment 2), oral comments are in Attachment 3, which provides full copies of all comments. It should be noted that a distinction has been made between oral comments delivered at the first public meeting and questions that were asked and responded to during the question-and-answer session at each of the public meetings. Because these questions have already been replied to as recorded in the transcripts (Appendix VII of the ROD), they have not been summarized in the Comment and Response Index (Attachment 2).

LOCATING RESPONSES TO COMMENTS

COMMENT AND RESPONSE INDEX

The Comment and Response Index (Attachment 2) contains a complete listing of all comments and NYSDEC'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 commentor, according to type (e.g., group, public).
- The second column identifies the alphanumeric file code assigned to each comment (e.g., G-11.3, P-3.2, etc.).
- The third column provides a summary of the comment.
- The fourth column provides the response to the comment or a reference to see responses to frequent, technical, or other comments (see section below).

Example:

Name/Agency	Comment Code	Comment Summary	Response
Mary Ann Coogan, Supervisor, Town of Camillus	L-1.6	Ability of Wastebed 13 to carry the load of the SCA should be evaluated now. If there are any doubts, the siting of the SCA should be reevaluated.	No final site (e.g., Wastebed 13) for the SCA has been identified. Before a final site is selected, candidate locations will undergo a geotechnical evaluation to determine, among other things, their load-carrying capacity. The final site selection will be made during the remedial design.

In a few instances, a commentor may appear in the Comment and Response Index more than once, because he/she sent different letters, 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.

It was not always clear if a commentor intended to represent an organization/group or simply himself/herself. The reader is advised to examine both the group (G) listing for the name of the group, firm, or association used on the letterhead of a written submission and the public (P) list for his/her own name.

KINDS OF RESPONSES

Due to the complexity of the Onondaga Lake project and the large number of comments received, comments are addressed according to three categories: frequent comments, technically detailed comments, and individual comments. These categories are defined as follows:

- **Frequent comments** are comments that were made by many commentors. A frequent comment may be a combination of several comments on a similar topic. Frequent comments and the associated responses are in the text of the RS below, in the section called “Summary of Public Comments and NYSDEC Responses.”

- **Technically detailed comments** are those that required a lengthy scientific or engineering explanation. Technical comments and the associated responses are in the text of the RS below, in the section called “Summary of Public Comments and NYSDEC Responses.”

- **Individual comments** are answered directly in the Comment and Response Index (Attachment 2).

NYSDEC carefully considered each comment received and made every effort to be fully responsive. All comments received are addressed in this RS, and a copy of every comment is provided in Attachment 3. A summary of the selected remedy and the public response to the Proposed Plan is provided below.

SUMMARY AND PUBLIC RESPONSE

OVERVIEW

SELECTED REMEDY

The selected remedy addresses all areas of the lake where the surface sediments exceed a mean probable effect concentration quotient (PECQ) of 1 or a mercury PEC of 2.2 milligrams per kilogram (mg/kg).[1] The selected remedy will also attain a 0.8 mg/kg bioaccumulation-based sediment quality value (BSQV) for mercury on an area-wide basis for the lake and for other applicable areas of the lake to be determined during remedial design. The selected remedy is also intended to achieve lakewide fish tissue mercury concentrations ranging from 0.14 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 for the consumption of organisms. The major components of the selected remedy include:

- Dredging up to an estimated 2,653,000 cubic yards (cy) of contaminated sediment from the littoral zone[2] in Sediment Management Units (SMUs)[3] 1 through 7 to a depth that will prevent the loss of lake surface area, ensure cap effectiveness, remove non-aqueous-phase liquids (NAPLs), reduce contaminant mass, allow for erosion protection, and reestablish the littoral zone habitat. Most of the dredging will be performed in the in-lake waste deposit (ILWD) (which largely exists in SMU1) and in SMU 2.

- Dredging, as needed, in the ILWD to remove materials within hot spots and to ensure stability of the cap.

- Placement of an isolation cap over an estimated 425 acres within SMUs 1 through 7.

- Construction/operation of a hydraulic control system along the SMU 7 shoreline to maintain cap effectiveness. In addition, the remedy for SMUs 1 and 2 will rely upon the proper operation of the hydraulic control system, which is being designed to control the migration of contamination to the lake via groundwater from the adjacent upland areas.

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1 These cleanup criteria were developed to address acute toxicity to the sediment-dwelling (benthic) community in Onondaga Lake.

2 The portion of the lake in which water depths range from 0 to 30 ft.

3 For investigation and remediation purposes, the site has been divided into eight SMUs based on water depth, sources of water entering the lake, and physical, ecological, and chemical characteristics.

- Placement of a thin-layer cap over an estimated 154 acres of the profundal zone (the portion of the lake in which water depths exceed 30 feet [ft]) within SMU 8.

- Treatment and/or off-site disposal of the most highly contaminated materials (e.g., pure phase chemicals segregated during the dredging/handling process). The balance of the dredged sediment will be placed in a Sediment Consolidation Area (SCA), which will be constructed on one or more of Honeywell's Solvay wastebeds that historically received process wastes from Honeywell's former operations. The containment area will include, at a minimum, the installation of a liner, a cap, and a leachate collection and treatment system.

- Treatment of water generated by the dredging and sediment handling processes to meet NYSDEC discharge limits.

- Completion of a comprehensive lakewide habitat restoration plan.

- Habitat reestablishment will be performed consistent with the lakewide habitat restoration plan in areas of dredging/capping.

- Performance of an oxygenation pilot study to evaluate the effectiveness of oxygenation at reducing the formation of methylmercury in the water column, fish tissue methylmercury concentrations, and methane gas ebullition as well as to understand any other impacts. The pilot study would be followed by full-scale implementation (if supported by the pilot study) in SMU 8.

- Monitored natural recovery (MNR) in SMU 8.

- Institutional controls consisting of notification of appropriate government agencies with authority for permitting potential future activities which could impact the implementation and effectiveness of the remedy.

- Implementation of a long-term operation, maintenance, and monitoring (OM&M) program to monitor and maintain the effectiveness of the remedy (e.g., cap repair).

PUBLIC COMMENTS

The public response to NYSDEC's Proposed Plan was generally supportive. Many of the public's comments indicate that the cleanup should proceed without delay. However, this support was not without concerns and additional desires. A large number of comments expressed the desire for a holistic vision of the lake post-remediation. As part of this "vision," many citizens indicated that the lake should be cleaned up for use by the community and that public access to the entire shoreline should be guaranteed. The idea of extending the current park system and bike path completely around the lake was very popular.

Many citizens asked for better access to information regarding the remediation and increased and continued communication with the public. Several comments called for formal mechanisms to encourage citizen participation as the project goes forward into design and construction. These suggestions included the formation of a Citizens Advisory Committee, the creation of a "lake keeper" position, and the direct involvement of communities in the design process. Information (e.g., scheduling) on the upland sites was also requested.

Many in the community expressed concern regarding the safety and potential impacts of the SCA, particularly with regard to releases of toxics (including volatile compounds), odors, impacts of noise and traffic, stability of the wastebeds, and the reliability of the dredging/pumping equipment. Commentors also often requested further study on the siting of the SCA and asked that locations other than Wastebed 13 (or any other area not near residences) be considered.

Multiple comments touched on two related concerns: environmental sampling and mercury modeling. A great deal of concern was expressed that sampling programs (pre-design and long-term monitoring) be capable of enabling NYSDEC and other reviewers to be able to:

- Confirm all of the sources of contamination.

- Understand the relative importance of each source.

- Understand how contamination from each source is transported to the rest of the lake.

- Understand any fate processes (e.g., methylation of mercury) that are relevant.

- Based on these understandings, confirm that the remedial action objectives (RAOs) and the preliminary remediation goals (PRGs) are appropriate and that the selected remedy will address the RAOs and PRGs.

- Be able to measure whether the RAOs and PRGs are achieved after remediation is complete (measure the success of the remedy).

It should be noted that commentors often seemed to confuse pre-design sampling with long-term monitoring. To clarify, pre-design sampling refers to data that will be used directly in engineering and design, such as the characteristics (e.g., chemical concentrations and geotechnical aspects) of sediments to be dredged or capped, or concentrations of chemicals in supernatant (water above the settled dredged material at the SCA) that are needed to design the water treatment systems. Long-term monitoring incorporates data that will be used to assess the effectiveness of remedial actions (caps, oxygenation, etc.) and any changes in the lake as a whole, such as concentrations of mercury in water or fish, and methylation or resuspension rates.

With respect to pre-design sampling and long-term monitoring, comments urged that data collection should be of high quality and extensive, and should begin as soon as possible. It was strongly suggested that local highly respected research institutions be directly involved in the sampling programs or constitute a peer review panel. To assist in the interpretation of these data, the development of a mechanistic model for mercury and other contaminants was urged.

Several technically knowledgeable groups or agencies (e.g., Upstate Freshwater Institute [UFI], Onondaga County, Syracuse University, State University of New York – College of Environmental Science and Forestry [SUNY ESF], ASLF, Honeywell) submitted comments and questions on specific technical aspects of the RI, FS, and Proposed Plan. These topics included, among others, mapping of contamination, cleanup criteria, mercury cycling, modeling (e.g., of groundwater and capping), MNR, oxygenation, and removal and disposal of sediments and NAPLs.

A few comments suggested different and/or innovative technologies that could be considered for remediation.

Several commentors opposed the preferred remedy. These typically fell into two groups: those that felt the plan was too aggressive and those that felt that the plan was not extensive enough.

The commentors who stated that the plan was too aggressive overwhelmingly believed that dredging will only cause more problems, chiefly by resuspending the contamination in the lake and stirring things up. They also tended to feel that the current risks were minimal and called for letting the natural sediment burial process continue to prevent releases of contaminants. It should be noted that some of these comments appeared to confuse the processes and remedial actions in the littoral and profundal zones, which are two distinct areas within the lake.

Those commentors who felt that the remedial plan was not adequate tended to call for complete removal of contaminated material from the lake, and stated that leaving any contamination in the lake was simply postponing the final resolution of the problem to future generations.

SUMMARY OF PUBLIC COMMENTS AND NYSDEC RESPONSES

FREQUENT COMMENTS AND RESPONSES

Frequent comments are comments that were made by many commentors. A frequent comment is 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: What additional benefits and associated risk reductions are afforded by dredging increasing volumes of sediment in Alternatives 2 through 5?
(Comments L-1.7, H-1.1, H-1.12, P-53.6)

Response to Frequent Comment #1: While the components of Alternatives 2 through 5 are identical in SMUs 3, 4, 5, 6, and 8, they differ with respect to both the remediation of the ILWD in SMUs 1, 2, and 7 and the NAPLs containing chlorinated benzenes present in SMU 2. The removal of portions of the ILWD prior to isolation capping has the potential to greatly reduce the mass of chemical parameters of interest (CPOIs) in SMU 1 and portions of SMUs 2 and 7, leaving behind significantly lower volumes and masses of wastes (and residual NAPLs) and significantly lower concentrations of many of the CPOIs beneath the cap. This will improve the effectiveness of the cap in isolating contaminants beneath the cap. The occurrence of "slumps" or slope failures within the ILWD, as was noted during side-scan sonar imaging of the lake bottom, as well as the generally soft nature of the wastes/sediments (resulting in very low shear strengths in certain areas), represent a significant engineering concern associated with capping in this area. Thus, dredging to improve slope stability of the ILWD and to improve overall geotechnical conditions for cap placement are also important considerations for SMU 1 and portions of SMUs 2 and 7.

In SMU 2, NAPLs have been observed in the sediments (up to a depth of 13 ft [4 m]), although the full extent has not been defined. Based on the vertical extent of NAPLs in the NAPL recovery Interim Remedial Measure (IRM) area (which is immediately adjacent to Onondaga Lake), the possibility exists that the NAPLs in SMU 2 are as deep as 30 ft (9 m) below the top of the sediments. With regard to NAPLs in SMU 2, Alternatives 2 and 3 include partial NAPL removal (to a depth of 4 m), while Alternatives 4 and 5 include full NAPL removal (to a depth of 9 m) in SMU 2.

NYSDEC and EPA believe that the additional dredging afforded by Alternative 4 (the selected remedy) relative to Alternatives 2 and 3 is warranted because Alternative 4 involves more removal of contaminated sediments and NAPL, which corresponds to a greater degree of cap effectiveness, and long-term reliability and permanence of the overall remedy for the lake and a reduced possibility of remedy failure. All of the alternatives which employ capping in a given area would be protective to the extent that the cap functions properly. If the cap fails via contaminant breakthrough and/or a catastrophic event (e.g., slope failure), it would need to be repaired and sediments contaminated by the release would need to be remediated (e.g., removed, capped in place). In the event of a failure, the impacts would be expected to be greatest under those alternatives that involve capping of the greatest mass/highest concentrations of contaminants. Accordingly, Alternative 4 provides more protection than Alternatives 2 and 3 would.

It should also be noted that the ILWD is in an area of the lake that is likely to be subjected to high erosive forces from wave action, ice scour, anchor drag, etc., and much of the additional dredging would be in areas near creek mouths and along an exposed shoreline where flow from the creeks can be extreme in flood conditions, or where wave action is high. In addition, some of the additional waste materials which would be removed from the lake under Alternative 4, but would remain under an isolation cap under Alternatives 2 and 3, have been characterized as principal threat wastes including large quantities of highly contaminated waste material and NAPLs. The implementation of any of these alternatives would include the off-site treatment and/or disposal of all NAPLs that were segregated during the dredging/handling process. The treatment of NAPLs at an off-site facility is a critical component of the alternatives that meets EPA's treatment preference. The larger the volume of NAPLs that are removed from the lake and sent for off-site treatment, the more an alternative satisfies this preference for treatment. Thus, Alternative 4 would satisfy the NCP's preference for treatment of principal threat waste to a greater degree than would Alternatives 2 and 3. While Alternative 5 would remove more contaminated materials from the ILWD than Alternative 4, cap reliability would not increase commensurately with the increased $86 million in estimated present-worth cost over Alternative 4 since Alternative 5 would involve the capping of sediments with contaminant concentrations similar to those for Alternative 4.

The human health and ecological risk reductions associated with various remedial alternatives were presented in the FS report. Table I.26 (included in Attachment 1 of this RS) shows the estimated residual surface-weighted average concentrations (SWACs) for mercury and polychlorinated biphenyls (PCBs) in sediment for the various remedial alternatives evaluated in the FS report. Table I.28 (included in Attachment 1 of this RS) shows the estimated percent reductions and the estimated residual tissue concentrations for prey fish and sport fish prior to and following remediation. Table I.28 shows that under the no-action alternative on both a littoral and lakewide basis, the estimated concentrations of mercury and PCBs would exceed the upper end of the target tissue concentration range for sport fish, and that the estimated concentrations of mercury would exceed the upper end of the target concentration range for prey fish greater than 18 centimeters (cm) in length.

Following implementation of Alternative 4 (see values under column F1 – H in Table I.28), the estimated concentrations of mercury and PCBs in fish would be at or below the upper end of the target tissue concentration range for all fish on both a littoral and lakewide basis. While the residual risks for Alternatives 2 through 5 (which are equivalent to the residual risks presented in the tables for Alternatives F1 through H in the FS report) are shown to be equal, it should be understood that Honeywell's analysis in the FS report assumed that these alternatives would be equally successful in achieving RAO 2, which is to eliminate or reduce releases of contaminants from the ILWD and other littoral areas around the lake. However, as discussed above, the selected alternative (Alternative 4) would employ more reliable capping in the ILWD and more removal of NAPL in SMU 2 and thus would be better able to meet the RAOs for the site than would Alternatives 2 and 3, and would be more cost-effective than Alternative 5.

Frequent Comment #2: An alternative should be included that isolates the waste in place by moving the barrier wall far out into the lake past the edge of the ILWD and filling in the area rather than dredging. Also consider damming portions of the lake, dewatering the area, and then capping. (Comments P-3.2, O-13.2)

Response to Frequent Comment #2: The construction of a barrier wall around the ILWD, followed by capping, was not carried forward in the development of alternatives during the FS for the site because of regulatory and construction issues regarding filling in a portion of Onondaga Lake.

Regulatory Concerns

Any remedy incorporating dredging or placement of fill in protected streams or navigable waters in New York State must meet the substantive technical requirements of Environmental Conservation Law (ECL) Article 15 Water Resources Title 5 Protection of Water. The applicable standards are found at 6 New York Code of Rules and Regulations (NYCRR) Part 608.8 and require that the proposal: a) is reasonable and necessary; b) will not endanger the health, safety or welfare of the people of the State; and c) will not cause unreasonable, uncontrolled or unnecessary damage to the natural resources of the State.

This applicable, or relevant and appropriate requirement (ARAR) protects the waters of the state from unreasonable or unnecessary impact from dredge and fill activities. A barrier wall around the ILWD would result in the loss of at least 84 acres of littoral habitat, impact navigation, and decrease the natural resource value of the lake. This damage would not be warranted as there are other options available (as were evaluated in the FS report and the Proposed Plan) for remediating the ILWD portion of Onondaga Lake that would meet the requirements of 6 NYCRR Part 608 and not result in unreasonable and unnecessary damage.

Construction Concerns

The ILWD covers about 84 acres of the lake bottom with water depths ranging from under 1 ft to over 30 ft. The quantity of materials needed to fill this area to above flood level would likely be in excess of 2 million cy. The in-lake barrier wall would be several thousand feet in length and would need to be constructed in a manner where it would be strong enough to support the ILWD and the fill materials and be able to withstand wind, wave, and ice erosive forces. Accordingly, a cofferdam-type barrier wall might be required, which would involve the placement of a large quantity of additional materials. Therefore, it is likely that the construction of a barrier wall around the ILWD and the subsequent filling of this area would require the placement of a larger quantity of materials than the total quantity of capping materials that would be required by Alternative 4 for all of the SMUs combined.

Frequent Comment #3: Why does NYSDEC believe that Honeywell's recommended alternative and other alternatives based on the mean probable effect concentration quotient (PECQ) of 2 are not protective?
(Comments H-1.3, H-1.16, H-2.3)

Response to Frequent Comment #3: One of the RAOs identified in the Onondaga Lake RI report is to eliminate or reduce existing and potential future adverse effects on fish and wildlife resources. To address this RAO in the FS report, areas of sediment were selected for inclusion in the remedial alternatives based on various site-specific criteria.

The mean PECQ approach was proposed by Honeywell as one of the criteria to use for determining remedial areas. The mean PECQ is a single unitless index that has the potential to account for both the presence and concentrations of multiple contaminants in sediment samples. NYSDEC evaluated the mean PECQ approach to determine whether it could be applied to Onondaga Lake.

There were three main reasons for selecting the mean PECQ of 1 as the basis for remediating Onondaga Lake sediments:

- First, a mean PECQ value of 1 can be considered an "average" hazard quotient. The concept of the hazard quotient is based on the inference that if the concentration of a CPOI is less than or equal to its corresponding toxicity threshold (e.g., the PEC for that CPOI), then toxicity would not be anticipated to occur. The mean PECQ is the "average" hazard quotient for the number of CPOIs detected in the sediments. Discounting additive toxicity, a mean PECQ of 1 signifies that on average, none of the CPOIs are present in concentrations that exceed their corresponding PEC, and that acute toxicity is not likely to occur.

- Second, the mean PECQs were derived using only acute toxicity data for a single, relatively insensitive species.[4] They do not take into account the potential for chronic toxicity impacts or variations in sensitivity by other benthic species. Given the lack of chronic toxicity data in the derivation of the PECs, the selection of a remediation value higher than a mean PECQ of 1 cannot be justified.

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[4] Two species were used for toxicity testing done in 1992, *Chironomus tentans* and *Hyalella azteca*, using both mortality and growth as test effects. Since *C. tentans* mortality was the most sensitive effect, only those test results were used to derive mean PECQs. Forty-two day toxicity tests were conducted in 2000, also using *C. tentans* and *H. azteca*, but including the more sensitive endpoint of chironomid emergence. Too few studies, however, were conducted in 2000 to be integrated into (or otherwise used in) the derivation of mean PECQs. Those tests do add qualitative credibility to the usefulness of the mean PECQ of 1.

- Third, a review of all of the sediment toxicity data collected in 1992 (see Slides 1 and 2 in Attachment 1 of this RS) and 2000 (see Slides 3, 4, and 5 in Attachment 1of this RS) shows that the areas of the lake that exceed the mean PECQ of 1 and a mercury PEC of 2.2 mg/kg generally coincide well with the areas of the lake where acute toxicity to the benthic macroinvertebrates was shown to occur.[5]

For these reasons, the mean PECQ of 1 was determined to be protective and was used along with exceedances of the mercury PEC of 2.2 mg/kg in five of the seven alternatives in the Proposed Plan and this ROD, including NYSDEC's selected alternative.

There was no apparent statistical basis for the use of a mean PECQ of 2 for defining areas for remediation. There was no clear inflection point at a mean PECQ of 2 and the use of the PECQ of 2 was not supported by the toxicity data. Alternatives based on the mean PECQ of 2, including Honeywell's recommended alternative, were included in Honeywell's FS report but were not carried into the Proposed Plan since they were determined by NYSDEC not to be protective.

Frequent Comment #4: A monitoring program for sediment, water, and biota should begin as soon as possible. These data may be used to develop a fate and transport model to optimize the remedial design. The work should also include a biological assessment for wildlife and vegetation and monitoring of mercury in fish, waterfowl, and deer. These data should be available to all stakeholders. Monitoring efforts should be coordinated with existing monitoring programs conducted by Onondaga County, Upstate Freshwater Institute, and the State University of New York - College of Environmental Science and Forestry. Atlantic States Legal Foundation suggested that an independent scientific team be assembled to develop the plans.
(Comments G-1.8, G-4.7, G-4.8, G-9.3, G-10.2, G-11.16, G-11.18, G-11.19, O-1.7, O-7.3, O-7.5, O-20.4)

Response to Frequent Comment #4: The development and implementation of a monitoring program for various site media (e.g., sediment, water, and biota) is required in this ROD and will begin as soon as practicable. The monitoring will be designed to serve as the baseline against which remedy performance can be measured. Sampling and analysis of fish will be a critical part of the monitoring program. The inclusion of wildlife and vegetation in the program will be considered by NYSDEC. As additional data are acquired, NYSDEC will consider whether it is appropriate to develop or refine fate and transport models for the site. If such models are developed or refined, they will be used, as appropriate, to optimize the remedial design as implementation proceeds. The monitoring program will be overseen by NYSDEC as part of the Superfund process. However, since NYSDEC is aware that numerous experts in the field are already conducting monitoring of the lake under various programs and exploring the development of models for Onondaga Lake, the Superfund monitoring program will consider the possibility of

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5 It should be noted that the relationship between the mean PECQ values and the toxicity data from 1992 was not particularly strong (see Slides 1 and 2 in Attachment 1 of this RS). This is due in part to the high degree of variability in the occurrence of toxicity in Onondaga Lake sediments, which may be related to the wide range of concentrations of the CPOIs in any given sediment sample. Such problems are inherent in any large scale sediment study, and are exacerbated in Onondaga Lake because of the extensive perturbation of the lake ecosystem that occurred over an extended period of time.

the existing programs and expertise locally available in both the design and execution of the monitoring program, as appropriate under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA, also known as Superfund), and the NCP. It is expected that efforts will be made to release the results of this monitoring as quickly as possible.

Frequent Comment #5: There appears to be a lack of progress and coordination in addressing the upland sites relative to the lake. The Administrative Record should include a matrix showing the expected sequence and schedule of remedial actions at all external sources, in relation to the start of design and actual implementation of the lakewide cleanup that is ultimately selected. Start and end dates should be specified for each upland site, as well as the lake.
(Comments N-1.3, G-3.1, G-6.6, G-11.1, G-11.14, P-49.1, O-1.1, O-1.2, O-7.7)

Response to Frequent Comment #5: As is identified in the Proposed Plan and this ROD, the timing of remedial activities in Onondaga Lake will need to be coordinated with the remedial work performed as part of the interim and final remedies at these upland areas. Provided below is the "Onondaga Lake and Upland Site Remedial Work Sequencing Matrix," which is based on currently available information. The matrix identifies those upland remedial activities that will be required to address the migration of contaminants (via the groundwater and surface water pathways) to Onondaga Lake. In general, these activities will need to be performed prior to the performance of remedial activities within a respective SMU, or a portion of a SMU, of Onondaga Lake.

Such remedial activities will be performed via various means (e.g., as part of the remedy selected in a ROD for the upland site [identified as ROD/RD/RA {Record of Decision, Remedial Design, Remedial Action} in the matrix], or as part of an IRM that a responsible party has agreed to implement). The upland remedial work components associated with addressing the groundwater and/or surface water pathways at the Semet Residue Ponds site, the Linden Chemicals and Plastics (LCP) Bridge Street site, and the Ley Creek Dredgings site have already been selected in RODs issued for those sites. It is possible that additional IRMs will be performed to address the migration of contaminants from the upland sites to Onondaga Lake. Please note that if additional areas are identified as contaminant sources to Onondaga Lake via the groundwater or surface water pathways, they will be added to this matrix.

While specific future dates are not provided, the matrix clearly identifies those upland sites where remedial work will be required to eliminate ongoing releases of contaminants to a given portion of the lake, prior to performing cleanup activities in that area of the lake. Projected dates for performing remedial activities in the lake, as well as at the various upland sites, will be provided to the public as they become available.

There has been considerable progress made with addressing the upland sites over the past few years. Remedial construction work has been performed in the lakeshore area (north of the former Willis Avenue Plant) through the operation of recovery wells to collect chlorinated benzene product from the subsurface, as well as work to stop the flow of contaminants from the I-690 storm drain system into Onondaga Lake. Construction of a wastewater treatment plant on the former Willis Avenue site commenced in the spring of 2005. This plant will be used to clean (treat) contaminated groundwater that will be collected from a number of sites, as well as from shoreline areas, to prevent the continued discharge of contaminated groundwater to the lake.

It is anticipated that the final construction activities associated with the cleanup of the former LCP Bridge Street site will be completed this year. In addition, NYSDEC and EPA anticipate proposing a cleanup plan for Geddes Brook and Ninemile Creek (downstream of the LCP Bridge Street site) for public review during 2005.

Work is also underway to design extensive subsurface barrier walls and groundwater collection systems along portions of the lakeshore to stop the flow of contaminated groundwater to the lake in these areas. Furthermore, a number of significant remedial activities have been performed at sites adjacent to Ley Creek and upstream of Onondaga Lake. Several investigations are underway for a number of other upland sites. The results of these investigations will be used to identify proposed remedies for these upland sites. As indicated by the above examples, considerable progress has been made with the various subsites. NYSDEC is committed to completing remediation at these upland sites in a timely manner to allow remedial activities to begin in the lake.

In regard to coordination, as is stated in the Proposed Plan, the remediation of the Onondaga Lake Bottom subsite will need to be coordinated with upland remedial activities. The control of contamination migrating to the lake from the various upland sites (e.g., Willis Avenue, Semet Residue Ponds, Wastebed B/Harbor Brook, LCP Bridge Street, and Geddes Brook/Ninemile Creek) is an integral part of the overall cleanup of Onondaga Lake. To prevent the recontamination of lake sediments, ongoing releases of contamination to a given portion of the lake will need to be eliminated prior to performing cleanup activities in that area of the lake. For example, the hydraulic control systems which will be installed/operated as part of the Wastebed B/Harbor Brook and Willis/Semet Barrier IRMs will address the ongoing releases of contaminants via migration of groundwater from these upland areas to SMUs 1 and 2, respectively. These systems will need to be constructed and operating prior to cleanup activities commencing in that part of the lake.

Furthermore, the effectiveness of the capping proposed for SMUs 1 and 2 would rely upon the proper functioning of the noted hydraulic control systems. Likewise, the effectiveness of capping in SMU 7 would be a function of the effectiveness of the hydraulic control system, which is proposed to be installed along the lakeshore as part of the remedy for that portion of the lake.

Onondaga Lake and Upland Site Remedial Work Sequencing Matrix

SMU	Upland Remedial Work to be Completed Prior to Work in Respective Sediment Management Units (SMUs) of Onondaga Lake[1]	
	Groundwater Pathway[2]	**Surface Water Pathway[2]**
SMU 1	– Wastebed B/Harbor Brook barrier IRM	East Flume (East Flume IRM) Harbor Brook (Wastebed B/Harbor Brook ROD/RD/RA)
SMU 2	– Willis/Semet IRM	Tributary 5A – groundwater barrier (Semet Residue Ponds ROD/RD/RA) – sediment (Willis Avenue ROD/RD/RA)
SMU 3	– Wastebeds 1 – 8 ROD/RD/RA	– Wastebeds 1-8 ROD/RD/RA
SMU 4	– Wastebeds 1 – 8 ROD/RD/RA	Ninemile Creek System – LCP Bridge Street ROD/RD/RA *(major construction began in late 2004, anticipated construction completion December 2005)* – Upland area – Wetlands and ponded area – West Flume – Geddes Brook sediment/floodplain soil IRM – Geddes Brook/Ninemile Creek ROD/RD/RA
SMU 5	N/A	
SMU 6		Upper Ley Creek – General Motors – IRMs *(construction completed on landfill cap, end-of-pipe treatment, and drainage swale IRMs by late spring 2005)* – ROD/RD/RA – Ley Creek floodplains – Ley Creek Dredgings ROD/RD/RA (completed) Lower Ley Creek – Salina Landfill ROD/RD/RA – Old Ley Creek Channel ROD/RD/RA – Wetland SYW-12 under Wastebed B/Harbor Brook ROD/RD/RA
SMU 7	– Wastebed B/Harbor Brook (IRM) – SMU 7 barrier wall (Lake ROD/RD/RA)	Harbor Brook (Wastebed B/Harbor Brook ROD/RD/RA)
SMU 8	Contingent on completion of remedial work in SMUs 1 to 7. To the extent that appropriate opportunities may arise for beginning some portion of work in SMU 8 in advance of all such completion, such opportunities would be explored. The oxygenation pilot will be implemented as soon as possible.	
Notes:	[1] Refers to upland remedial work which will need to be completed prior to working in a SMU (or a specific portion of the SMU). [2] If additional areas are identified that are contaminant sources to Onondaga Lake via the groundwater or surface water pathways, they will be added to this matrix.	

Frequent Comment #6: NYSDEC's preferred alternative is inadequate as it will leave some contaminants in place. The entire lake should be cleaned up regardless of time and cost. Capping only certain areas of contamination is not "treating" the problem but only covering it up. (Comments N-1.2, G-11.13, P-6.1, P-39.1, P-45.2, P-52.10, P-52.12, P-54.1, O-22.1)

Response to Frequent Comment #6: Consistent with EPA's guidance for conducting remedial investigations and feasibility studies (RI/FSs) under CERCLA and the NCP, the time needed to implement the remedy (which relates to implementability and short-term effectiveness) and its cost must be considered as part of a nine-criteria evaluation.[6] Based on NYSDEC and EPA's evaluation of these criteria, the selected alternative provides the best balance of tradeoffs among the remedial alternatives with respect to the NCP's evaluation criteria. In addition, because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory five-year review will be conducted within five years after initiation of remedial action. The five-year reviews 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.

While up to approximately 2.65 million cy of the most contaminated material in the lake will be removed by dredging, some contaminated material will be left in place. However, the remaining contaminated material will contain generally lower levels of contamination than the dredged material. Contaminated sediments remaining in the littoral zone will be capped and isolated from the environment. Isolation capping involves placement of an engineered cap on top of the contaminated sediment. This material helps to prevent or retard the movement of contaminated porewater into the water column and minimize exposure of benthic organisms to the contaminated sediments. The use of an isolation cap in the lake would achieve the following objectives:

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

Specific factors that would be evaluated as part of the design of the engineered cap include erosion, bioturbation, chemical isolation, habitat protection, settlement, static and seismic stability, and placement techniques. Modeling performed for chemical isolation was used to produce preliminary cap designs to ensure that there would be no predicted exceedances of the PEC of any of the CPOIs that have been shown to exhibit acute toxicity on a lakewide basis or NYSDEC sediment screening criteria for benzene, toluene, and phenol.

The modeling indicates that the chemical isolation component of these caps should be from 1 to 2.5 ft (0.3 to 0.76 m) thick, depending on the area of the lake. The isolation caps will be sufficiently thick to effectively separate contaminated sediment from aquatic organisms which dwell or feed on, above, or within the caps. To ensure protection of human health and the environment, the caps

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[6] The nine evaluation criteria consist of: overall protection of human health and the environment; compliance with ARARs; long-term effectiveness and permanence; reduction of toxicity, mobility, or volume; short-term effectiveness; implementability; cost; support agency acceptance; and community acceptance.

would be designed to be an additional 50 percent thicker as a safety factor, plus an additional 6 inches (15 cm) to address possible mixing with underlying sediment and uneven application, which results in a total thickness of 2 to 4.5 ft (0.6 to 1.3 m) for the various SMUs. In-situ isolation capping has been successfully used to address contaminated sediment at several Superfund sites, many of which were constructed over a decade ago.

In the profundal zone, sediments would not be dredged. A thin-layer cap would be placed over the sediments in a portion of this zone.

Frequent Comment #7: Dredging could have serious adverse impacts on the lake and its downstream flow, as well as the biological community. If there is any dredging, it should be limited to nearshore areas.
(Comments R-3.4, P-5.1, P-16.5, P-17.1, P-17.5, P-18.1, P-21.1, P-21.3, P-25.1, P-25.3, P-32.1, P-45.1, P-53.1, P-53.6)

Response to Frequent Comment #7: Dredging will have some short-term water quality impacts. The disturbance of bottom sediments by dredging will result in increases in the levels of some suspended solids in the lake near the area of dredging. However, modern environmental dredges are relatively precise machines that can carefully remove targeted sediments without excessive disturbance of the lake bottom. Thus, it is expected that only a small fraction of the material dredged will actually enter the water column and that much of this material will settle in the immediate work area and will, as a result, be removed by continuing dredging operations. The remaining dredged material that does not quickly settle to the bottom within the work zone will be contained with a silt curtain that will encircle the work zone.

The FS report provides estimates of the water quality impacts of dredging operations. The analysis suggests that, except in the immediate work vicinity, dredging operations will not cause a contravention of the New York State water quality standards applicable to the lake. In addition, considerable monitoring will occur during both dredging and capping operations. Should it be determined that unacceptable levels of suspended sediments are being generated by dredging operations, there will be an opportunity to modify operations so as to reduce those levels. Possible actions that could be taken in this regard include slowing down the rate of sediment removal, changes to the depth of the dredge cut, and modifications to the movement of the dredge equipment.

It should also be noted that all dredged areas and some areas that are not to be dredged will be capped by covering any residual contamination with clean material. The cap will isolate any solids that migrate to these areas during dredging operations. Thus, for a number of reasons, environmental dredging is not expected to have long-term adverse impacts on the lake, its downstream flow, and the biological community. There will be a recolonization of the benthic community after dredging/capping and associated habitat enhancements. It should also be remembered that the areas selected for dredging and capping, which are generally limited to the nearshore areas of the lake (i.e., from the shore out to the 9-m water depth), are not currently isolated from the environment. The RI report indicated that resuspension of contaminated material in the littoral zone is currently one of the largest sources of contamination to the lake. With the proper controls and monitoring programs in place, the short-term impacts from dredging are expected to be considerably less than the current impacts from resuspension.

Frequent Comment #8: A fund should be set up by Honeywell in advance of the remediation to cover the cost of the remediation and associated long-term monitoring and maintenance of the remedial systems in the lake (e.g., isolation caps, oxygenation systems), at the SCA (e.g., liner and treatment systems), and at the upland sites (e.g., groundwater barrier walls/collection systems). The county and local communities should not have to pay for expenses resulting from the lake cleanup. NYSDEC should require Honeywell to remain involved for at least 30 years after the remediation is completed. The final plan should include formal legal protections, long-term financial assurances, or other protections to address this concern.
(Comments R-3.8, L-1.12, L-2.2, L-3.5, G-1.2, G-1.3, G-3.3, G-11.17, O-1.3, O-6.5, O-7.4, O-11.2)

Response to Frequent Comment #8: As a preliminary point of clarification, the ROD does not address who will implement the selected remedy. Rather, the ROD documents the selection of a particular remedy. However, EPA and NYSDEC agree that financial assurance options will be evaluated. For EPA, such an approach is a matter of established policy. For example, EPA's model consent decree for the performance of remedial design and remedial action (RD/RA) by responsible parties, which is used across the country at federal Superfund sites, includes a financial assurance provision that may be used to secure a responsible party's financial commitment to remediate, operate and maintain a site. Recent New York State legislation has provided NYSDEC with enhanced legal authority concerning financial assurance.

Frequent Comment #9: Has the final location for the SCA been determined? How will NYSDEC determine which wastebed to use? Some commentors have concerns with their future well being due to living near the site proposed for the SCA. The SCA should be located in or near the lake rather than in the town of Camillus. Using a site along the lakeshore, such as Wastebeds 1 through 8, will significantly reduce the length of slurry pipeline that would be needed. If the SCA is ultimately located in the town of Camillus, the town should be involved in the design process for the development of the area after closure of the SCA. Some commentors expressed concern regarding noise and traffic issues related to the SCA.
(Comments L-1.1, L-1.3, L-1.4, G-3.18, G-11.32, P-4.1, P-11.1, P-11.3, P-28.1, P-28.3, P-33.1, O-3.1, O-3.2, O-9.3, O-18.3)

Response to Frequent Comment #9: The final location for the SCA has not been determined. Potential SCA locations include Wastebeds 1 through 8, Wastebeds 9 through 11, and Wastebeds 12 through 15. For cost-estimating purposes in the FS report, it was assumed that an SCA would be constructed on one of the Solvay wastebeds (e.g., Wastebed 13). Wastebed 13 could accommodate a large sediment volume (potentially 2,400,000 cy or more, depending on final elevation), and its relatively remote location would minimize disruption to and impacts on the community during construction and operation of an SCA. However, the actual Solvay wastebed location(s) on which the SCA(s) would be constructed would be determined during remedial design and be based on an evaluation of the potential impacts on the local community, geotechnical stability of the wastebeds, SCA construction requirements, wastebed size, the means for transporting dredged materials to the SCA, costs, etc.

Once the SCA location has been determined, NYSDEC and EPA will work with the local community to address the various concerns that the community may have (e.g., noise, odors, traffic).

Frequent Comment #10: The operations at the SCA should be shut down if there are unacceptable odor releases. Will there be a daily cover placed to eliminate releases from the SCA during the period of operation until final capping? NYSDEC and Honeywell should monitor air

quality in and around the SCA and keep the homeowners informed of the results and any issues. A demonstration-size SCA in the area farthest from residential areas should be used to evaluate odor-control techniques. There should also be monitoring of noise, groundwater quality, and surface water quality and the operation of the SCA should not violate federal, state, or local standards and regulations.
(Comments L-1.2, L-1.9, G-11.32, P-4.3, P-28.1, P-32.1, O-3.1, O-18.3)

Response to Frequent Comment #10: An odor mitigation plan will be developed during the project's design phase. The plan will be based, in part, on results of the large-scale sediment sampling and analysis program that will be conducted prior to initiation of remedial design. As a result of this sampling, it is expected that considerable information will be accumulated on the potential for odor generation at the wastebeds and the best techniques for controlling those odors. The potential need for a demonstration-size SCA will be evaluated as part of remedial design.

An extensive monitoring program will be conducted during operation of the SCA. The program will encompass variables such as air, water, and groundwater quality; noise levels; and potential odor emissions. Details of the program will be shared with the public during the project's design phase, which is when the type and locations of monitors, as well as the performance standards, will be established. Measures to minimize or eliminate impacts on the surrounding community, such as use of a daily cover, will be selected during the design phase. The SCA will be designed to be operated in conformance with federal, state, and local standards and regulations.

Frequent Comment #11: Why does NYSDEC believe that Honeywell's recommended alternative, which includes much less dredging than NYSDEC's preferred remedy and thus a smaller SCA, is not sufficiently protective of humans and the environment?
(Comments L-1.7, H-1.1, H-1.12, P-10.3, P-22.2, P-40.1, P-43.1)

Response to Frequent Comment #11: There are three main differences between the selected remedy and the alternative that was recommended by Honeywell in its FS report, as described below. The items noted below account for the approximately 2 million cy difference between the selected remedy and Honeywell's recommended alternative. The selected remedy was determined by NYSDEC and EPA to be more protective of human health and the environment; provides greater long-term effectiveness; is cost effective; and offers the best balance of the evaluation criteria between the two alternatives. The selected remedy also will meet the statutory preference for the use of treatment as a principal element to a greater extent than would Honeywell's recommended alternative. An additional discussion on the benefits of NYSDEC and EPA's selected remedy and the associated risk reductions is included in the response to Frequent Comment #1, above.

1. Cleanup Criteria

The selected remedy uses a protective value of a mean PECQ of 1 (instead of the mean PECQ value of 2 proposed by Honeywell), which results in the remediation of an estimated 223 acres not addressed in Honeywell's recommended alternative (89 acres in the littoral zone and 134 acres in the profundal zone). A discussion as to why NYSDEC and EPA believe that use of a mean PECQ of 2 (as proposed by Honeywell) is not an appropriate cleanup value for Onondaga Lake is included in the response to Frequent Comment #3, above.

2. Cap Effectiveness and Long-Term Reliability

The selected remedy includes a significant level of reliability (beyond that included in Honeywell's recommended alternative) since it includes dredging and removal in the ILWD of 6.5 ft (2 m) (on average) with additional removal in hot spots[7] (up to an additional 3.3 ft [1 m] in depth), whereas only the top 2.6 ft (0.8 m) (on average) of the ILWD would be dredged and removed under Honeywell's recommended alternative. The reliability of the cap is enhanced since this area contains some of the highest concentrations of the more mobile (and thus difficult to isolate with a cap) contaminants such as benzene, toluene, ethylbenzene, and xylenes (BTEX), chlorobenzene, and dichlorobenzenes. Thus, the selected remedy includes the removal of an additional 1.4 million cy (relative to Honeywell's proposal) from the ILWD, which:

- Reduces the average contaminant concentrations in sediments/wastes remaining under the cap.
- Allows for the placement of a thicker cap, as necessary, to protect human health and the environment (see response to Frequent Comment #6, above).
- Provides an adequate water depth to allow for the establishment of a productive habitat after capping.
- Allows for erosion protection of the cap.

The selected remedy also includes dredging, if necessary, to address geotechnical concerns, including the evidence of historical failures (i.e., underwater slumping or "landslides") associated with the ILWD to ensure long-term stability of the cap.

The selected remedy includes NAPL (containing chlorinated benzenes and other contaminants) removal in the causeway area of SMU 2 based on evidence from on-shore data, which suggest that the removal would need to extend to approximately 30 ft (9 m) in depth. Honeywell limits its NAPL removal proposal to the deepest sediment core in this area, which is 13 ft (4 m) in depth. Thus, the remedy would result in the removal of up to an additional 234,000 cy of material from SMU 2, relative to Honeywell's proposal.

3. No Loss of Lake Surface Area

While Honeywell's proposal would result in the loss of 6 acres of lake surface area (by filling in 6 acres of the lake), NYSDEC and EPA's selected remedy would not result in the loss of any lake surface area and would be in line with New York's water resources laws, while still remaining cost effective, among other factors, under the balancing criteria of CERCLA.

Frequent Comment #12: There have been many years of study, and the lake cleanup should begin as soon as possible to accelerate the return of this lake to a valuable resource and asset to the community. Some commentors also indicated that the NYSDEC plan is also appropriate in that

[7] The additional removal of hot spots in the ILWD is based on areas which would exceed maximum contaminant threshold concentrations derived assuming an upwelling rate of 6 cm/yr instead of the 2 cm/yr used in Honeywell's recommended alternative. See response to Technical Comment #9.

it includes long-term monitoring programs such as inspection and repairs of the cap in the lake and at the SCA.
(Comments R-3.2, L-2.1, L-3.1, L-3.3, G-4.1, G-6.12, G-7.1, G-7.4, G-11.13, H-1.13, P-2.1, P-10.1, P-36.1, P-40.1, P-46.1, P-56.1, O-2.1, O-4.1, O-5.1, O-6.1, O-6.3, O-6.6, O-7.1, O-8.9, O-10.6, O-12.1, O-16.1, O-20.1, O-24.1, O-25.1)

Response to Frequent Comment #12: Onondaga Lake has been studied for many years, as NYSDEC, Honeywell, various institutions, and other interested parties have attempted to understand this complex system. Knowing what is contaminating the lake, where it is coming from, where the contaminants are, and what their effects are is a difficult and critical process. An understanding of the contamination and its effects is crucial to protect the community and the environment. While NYSDEC and EPA believe the selected remedy should be implemented as soon as possible, further investigatory and planning work will be needed as part of remedial design, including data collection and design document preparation, before the final lake cleanup takes place.

Sampling and other forms of long-term monitoring (e.g., inspection and repairs of the cap in the lake, air and groundwater monitoring at and near the SCA) will take place during implementation of the selected remedy, and will continue indefinitely to ensure the health of the community, the lake, and the environment. Monitoring programs will be adaptable so that they can change depending on the progress of the lake remediation or the results of new findings.

Frequent Comment #13: We hope that Honeywell will agree to implement the NYSDEC preferred remedy. What is Honeywell's position on this? If they do not, will the taxpayers be paying for the remediation? If Honeywell implements the remedy and the project goals are still not met, can Honeywell walk away from the project? If the project goals are still not met after Honeywell completes the remediation and/or Honeywell does not follow through on the project, what would be the next steps with respect to cleaning up the lake?
(Comments L-3.4, P-4.5, P-29.3, O-6.4)

Response to Frequent Comment #13: While NYSDEC cannot speak for Honeywell at this time with respect to their position on the remediation of Onondaga Lake, NYSDEC will continue to work with Honeywell in an effort to expedite the remediation of Onondaga Lake in a manner that is protective of human health and the environment and is not a burden on taxpayers. The obligation of remediating Onondaga Lake continues with remedial action monitoring after the initial remediation (e.g., dredging, capping) has been completed. The purpose of the remedial action monitoring is to ensure the continued effectiveness of the remediation and to take corrective measures (e.g., repair damage to cap). See also response to Frequent Comment #8.

Frequent Comment #14: The lake should be restored to its original natural conditions and functions and the remediation should use solutions that are ecologically sustainable and not rely on costly technologies.
(Comments G-1.3, G-1.6, G-3.16, P-31.2, P-51.1)

Response to Frequent Comment #14: The selected remedy was developed to selectively isolate most of the contamination in the lake without causing long-term disturbances to the lake and while allowing the lake to restore its natural functions. The complete removal of all the contaminants to levels below the mean PECQ of 1 or effects range-low (ER-L) values would involve removing 12 to 20 million cy of material just from the littoral zone, and the removal of all the contaminated profundal zone sediment would be on a similar scale. The feasibility of this removal is questionable, and would require among other things either significantly larger disposal sites or a technology which would remove the contaminants so that the dredged spoils could be used in a beneficial manner.

Given the mix of contaminants present in lake sediments (e.g., metals, chlorinated benzenes, BTEX, PCBs, polycyclic aromatic hydrocarbons [PAHs]) and their wide range of physicochemical characteristics (e.g., volatility, partitioning, solubility, susceptibility to chemical or biological degradation, density), it would be difficult and/or infeasible to treat these spoils. Therefore, the FS report and the Proposed Plan concentrated on technologies and practices that would most effectively protect human and ecological health by eliminating the releases/exposure of these contaminants.

It is anticipated that the remedial actions will be completed within four years of their start. The primary remedial action in the littoral zone of the lake will be capping, with dredging to address several issues relating to the effectiveness and placement of the cap. The cap will be placed relatively quickly and will be designed to isolate the contaminants from the environment and allow a natural benthic community to develop. After the dredged sediments are pumped to and disposed of at the SCA, the area will be capped and made available for reuse. Once the SCA is capped, the cost and maintenance will be relatively modest, consisting primarily of monitoring.

The treatment of the supernatant is also anticipated to be completed within a relatively short time frame (i.e., within four years of the start of remedial activities in the lake). The operation of the groundwater barrier wall and collection system with respect to limiting groundwater flow towards Onondaga Lake will need to be maintained in perpetuity and the treatment of collected groundwater will likely need to be maintained until such time as the concentration of contaminants in the groundwater is no longer of concern. The remediation of the profundal zone is based primarily on MNR and oxygenation of the hypolimnion. As discussed in the FS report (primarily in Appendix N), MNR was determined to be an appropriate remedial approach for the profundal zone based on the available data, which show that current sedimentation rates are burying the more contaminated profundal sediments with cleaner material. The oxygenation program uses a relatively modest expenditure to increase the oxygen levels in the lake. This will in turn allow the natural processes in the lake to control the production of methylmercury and dissolved forms of mercury, and may allow a benthic/hypolimnetic community to redevelop. Once the lake ecosystem begins to be restored, the technological efforts to return Onondaga Lake to its prior function should be reduced by assistance from natural processes. Additional contingency measures (e.g., additional thin-layer capping) will be implemented in profundal areas that do not achieve acceptable goals (e.g., achieving the mercury BSQV of 0.8 mg/kg, achieving PRGs for fish) during the 10-year MNR period or sooner, if data indicate this goal will not be achieved as anticipated. See also response to Frequent Comment #6.

Frequent Comment #15: The lake should be clean enough to support both a warm-water and a cold-water fishery.
(Comments G-1.9, O-26.1, O-26.2, O-26.3)

Response to Frequent Comment #15: The focus of a CERCLA-based remediation is to address releases of hazardous substances consistent with the NCP. There are programs, such as those administered by the Onondaga Lake Partnership (OLP), to improve fisheries in the lake that are unrelated to NYSDEC and EPA's program for addressing hazardous substances in the lake under CERCLA. Nonetheless, changes that may take place in the lake due to the remediation, as well as the long-term monitoring program, may provide additional information for the OLP to assess the feasibility of fishery improvements under other programs. During the remedial design, there will be coordination with the OLP, to the extent appropriate, consistent with CERCLA and the NCP.

Frequent Comment #16: NYSDEC rejected Honeywell's mercury fate and transport model in 1998 for a variety of reasons. A contaminant fate and transport model for mercury and organic contaminants should be developed based on a comprehensive monitoring program and should be an integral part of the rehabilitation efforts. The model should be used to help answer important questions such as how much lower will concentrations of contaminants in fish be following remediation. The modeling effort could be performed outside of the Superfund process by independent parties not related to Honeywell and NYSDEC. This would not delay the remediation. (Comments G-4.2, G-4.5, G-4.7, G-11.19, H-1.2, P-10.2, P-17.6, O-7.5, O-9.1, O-9.2, O-20.3)

Response to Frequent Comment #16: At the outset of this project, NYSDEC anticipated that a comprehensive mechanistic model would be developed during the RI/FS process to describe mercury behavior and mass. During this process NYSDEC determined that the model developed by Honeywell was not reliable as a predictive tool for assessing the impact of various remedial scenarios on mercury in Onondaga Lake. At that time (1998), NYSDEC decided to end the modeling process and proceed with collection of additional sediment, water, and biota data, along with development of a simpler mass balance approach for the summer stratified period in order to complete the RI report. Even with the simpler approach, the mercury mass balances presented by Honeywell in its RI report did not identify sources for the majority of the mercury inputs to the lake. NYSDEC rejected Honeywell's document and, after collecting additional information on mercury cycling, NYSDEC rewrote the RI report in 2002. NYSDEC's RI report presents the results of the simplified mass balance approach and identifies the major sources and sinks of mercury in the lake system and their relative importance. A summary of the results of this mass balance is presented in the response to Technical Comment #14. The FS process used models for specific issues in the lake where such modeling is sufficiently reliable, including groundwater movement, isolation capping, and MNR.

To further examine the potential changes in fish concentrations after implementation of the selected remedy, an assessment of the potential concentrations of methylmercury in the media that the fish would be exposed to (water and food) after remediation was conducted during development of the Proposed Plan. The assessment (see response to Technical Comment #16) indicated that the exposure of fish to methylmercury in the water may be reduced by more than half (54 to 64 percent) following remediation. Exposure to methylmercury via the littoral (near shore) zone food chain may be reduced from less than 10 percent for SMU 5 to 86 percent for SMU 1. Exposure to methylmercury via the pelagic (deep water) zone food chain may be reduced by 26 to 96 percent. Thus, it is reasonable to expect to see significant, noticeable reductions in the mercury concentrations in the fish of Onondaga Lake (especially pelagic fish) following source control and lake remediation. If the selected remedy does not at least achieve the range of fish tissue PRGs specified in the ROD, the remedy will be reevaluated at a minimum as part of the five-year review under CERCLA, and could be addressed through a modification of the ROD.

It is possible that refinements of these estimates based on the length of exposure time and the relative importance of individual routes of exposure to various species of fish could be made with a more complex mechanistic model; however, it is unlikely that the final conclusion – that it is reasonable to expect to see a significant reduction in the concentrations of contaminants in fish as a result of the remediation within a relatively short period of time (i.e., less than 10 years after remediation) – would be changed. As additional data are acquired, NYSDEC will consider whether it is appropriate to develop or refine fate and transport models for the site. If such models are developed or refined, they will be used, as appropriate, to optimize the remedial design as implementation proceeds.

Frequent Comment #17: Many of the key decisions will be made during the remedial design stage. There should be transparency and citizen participation throughout the design and implementation process. Also, a citizens advisory committee (CAC) should be established. Direct public participation and meetings will be needed on the siting and design of the SCA. This should include a 90-day public comment period for the review of designs and related environmental impact statement for the SCA. The CAC should include concerned citizens and groups, as well as key stakeholders and research institutions to discuss the design and monitoring activities.
(Comments L-1.8, L-2.1, G-6.3, G-6.4, G-7.3, G-9.1, G-10.3, G-11.20, P-4.4, P-33.4, P-36.5, P-37.3, P-37.4, P-37.5, O-1.5, O-7.6, O-17.3, O-21.1)

Response to Frequent Comment #17: NYSDEC will conduct an extensive public outreach program during the remedial design and construction phases. These activities are anticipated to include the holding of public meetings and the distribution of fact sheets, etc., on a periodic basis, as well as at key stages of the project, such as during the siting and design of the SCA. The objective of the outreach program will be to update the public on the project status, as well as to solicit public comment. The concept of a CAC will be evaluated by NYSDEC and EPA following issuance of the ROD.

Frequent Comment #18: There should be opportunities for land development near the lake. There should also be more parkland and a recreational trail (but no commercial-type development) around the lakeshore.
(Comments L-3.2, P-7.1, P-20.1, P-22.2, P-23.1, P-24.1, P-29.5, P-38.1, P-41.1, O-6.2, O-8.1, O-8.8)

Response to Frequent Comment #18: Onondaga Lake is a tremendous resource to the surrounding community. NYSDEC will make every effort to ensure that remedial activities associated with Onondaga Lake and the surrounding areas support the beneficial uses of these areas by the local community.

Frequent Comment #19: There should be a group or staff of people to monitor the lake, such as a “lake keeper” staff. Efforts should be made to recruit and train local community members for jobs related to restoration of the lake. Such positions can be in conjunction with local universities and include volunteers and interns. The lake should serve as an educational resource for the community.
(Comments G-1.7, G-1.8, G-6.11, G-10.3, P-19.1, P-19.3, O-17.4)

Response to Frequent Comment #19: The ROD is the means of documenting the selection of the remedy. The issues raised concerning the community participation in the implementation of the remedy cannot be resolved at this time.

Frequent Comment #20: The goals and objectives of the remediation should be clearly defined, as well as the time frame to meet those goals. The community, NYSDEC, and other parties should identify their vision for the future of the lake, including the cleanup of industrial contamination in the

lake and at the subsites, further improvements at Metro, lake habitat restoration, etc. This should be included in the plan.
(Comments G-3.10, G-11.15, P-29.2, P-29.6, P-29.7, O-7.2, O-8.1, O-9.1, O-18.5)

Response to Frequent Comment #20: As was stated at the public meetings and in the Proposed Plan, NYSDEC, in conjunction with the New York State Department of Health (NYSDOH) and EPA, identified site-specific objectives and goals for the Onondaga Lake remediation that are protective of human health and the environment. It is difficult for NYSDEC to commit to specific start and end dates for the various elements of this work (e.g., design, construction, monitoring), since there are many issues to address before work begins or can be deemed complete. Public outreach and involvement will continue throughout this process. Should there be a need to modify design or construction activities as a result of public concerns, the time frame would change. General time frames for the remedial work are included in the ROD.

The ROD outlines what NYSDEC and EPA believe is the most appropriate remedial approach. The ROD and federal law (CERCLA) do not dictate how a community should use a site (in this case, Onondaga Lake). While the community's vision can be developed outside of the state and federal regulatory process, NYSDEC is willing to work with community representatives to coordinate local visions or plans.

Many of the upland sites are privately owned. While remediation may restrict future use, it does not mandate how privately owned property must be used. Additionally, the ROD states that habitat restoration will be evaluated on a lakewide basis during the remedial design.

Metro improvements are well underway and, when completed, will be state of the art. Continued monitoring and maintenance will evaluate compliance with water quality standards and protection of the lake with respect to Metro's discharge.

Frequent Comment #21: Has NYSDEC or Honeywell determined how much the value of properties near the SCA will change?
(Comments P-11.4, P-28.2, P-33.3)

Response to Frequent Comment #21: NYSDEC has not determined whether the value of properties near the SCA would change nor is NYSDEC aware that Honeywell has conducted such an evaluation. However, NYSDEC would take the necessary steps such that any impacts to the surrounding community would be minimized. During design and construction of the SCA, NYSDEC will make every effort to ensure that, following remediation, the area will be available for future uses that are beneficial to the community.

TECHNICALLY DETAILED COMMENTS AND RESPONSES

Technically detailed comments were typically asked by only one commentor, and so are not included as frequent comments, which were typically asked by multiple parties. Note that the Comment and Response Index (Attachment 2 of this Responsiveness Summary) contains responses to individual comments, or references to frequent or technically detailed comments, as appropriate. Technically detailed comments are typically those for which the response is relatively lengthy; designation of a comment as a "technical comment" (TC) is not meant to imply that it necessarily warrants a more thorough response, or that frequent or individual comments aren't also technical in nature. If a specific comment is considered to need a detailed technical response, the response in the Comment and Response Index will indicate to “see response to Technical Comment #1” (or other appropriate comment number).

Technical Comment #1: Oxygenation is experimental; its ecological and recreational use ramifications are not known; it is not inexpensive; and it requires constant long-term operation and maintenance. Why is it included as part of the preferred remedy, rather than increasing the amount of thin-layer capping or isolation capping in the profundal zone. What supplemental remedies will be proposed if it is technically impracticable or does not work?

Response to Technical Comment #1: The selected remedy calls for phased thin-layer capping, oxygenation, and MNR to remediate the profundal zone and hypolimnion of the lake. Oxygenation was selected as part of the remedy because it provides a cost-efficient method (relative to full removal of profundal sediments exceeding the cleanup criteria) to significantly reduce the amount of mercury methylation and associated mercury exposure in the lake.

Active hypolimnetic oxygenation is a widely used technology to maintain oxygen resources in eutrophic lakes and ponds. Many of these programs have been active for years; in fact, oxygenation has been used in the U.S. for over 150 years. More recently, hypolimnetic oxygenation was begun at Lake Amish in Alberta in 1988 (Aku et al., 1997) and at Irondequoit Bay, NY (Monroe County Department of Health, 2002) in 1993. Both of these lakes, as well as others, have been studied extensively to assess various changes to their ecosystems. While there are specific components that will likely be unique to Onondaga Lake, the science of oxygenation is not new or experimental, and there are not likely to be major unforeseen problems that would preclude it from being a long-term solution.

Oxygenation of the lake’s hypolimnion would be conducted in phases, with the initial phase (a pilot study) evaluating the effectiveness associated with implementation of oxygenation. The selected remedy includes implementation of an oxygenation pilot study prior to full-scale implementation because the exact way in which the lake ecosystem will be altered by oxygenation is not known. However, maintaining oxic conditions is a very effective method of eliminating the production of methylmercury in the water column in the lake.

A pilot study will be performed to evaluate the potential effectiveness of oxygenation at reducing the formation of methylmercury in the water column, while preserving the normal cycle of stratification within the lake. An additional factor which will be considered during the design of the pilot study will be the effectiveness of oxygenation at reducing fish tissue methylmercury concentrations. If supported by the pilot study results, the pilot study will be followed by full-scale implementation of oxygenation in SMU 8. Furthermore, potential impacts of oxygenation on the lake system will be evaluated during the pilot study and/or the remedial design of the full-scale oxygenation system.

Technical Comment #2: What evidence supports the design thickness of the sediment cap as being able to preclude contaminant migration? Methylation of mercury will still occur under the cap and can still be transported through the sand and gravel material of the cap and enter the water column.

Response to Technical Comment #2: The sediment cap proposed for Onondaga Lake consists of three layers which have different purposes and material requirements. These layers, from bottom to the top, include:

- An isolation layer, which will be designed to prevent or limit vertical chemical migration.

- An armor layer, which will be designed to protect the isolation layer from erosional processes such as waves, ice scour, and propeller wash. This armor (erosion) layer will be included where needed and at the appropriate depth.

- A habitat/bioturbation layer, which will be designed to provide habitat for benthic macroinvertebrates and allow for bioturbation processes without exposure to contaminated sediment or disruption of the isolation layer material. The specific thickness(es) and type(s) of substrate material to be used for the habitat layer will be determined during remedial design as part of the comprehensive lakewide habitat restoration plan.

Many of the sediment caps currently in place at other sites are composed of sand, the material proposed for use in the isolation layer of the sediment caps for Onondaga Lake. As discussed in the Onondaga Lake FS report, some of these projects where sand caps have been used include the West Eagle Harbor/Wyckoff Island site in Washington and Soda Lake in Wyoming, among many others (Hazardous Substance Research Centers [HSRC], 2005). The armor layer, which will likely consist of gravel, will serve to protect the isolation (sand) layer rather than inhibit chemical transport.

As discussed in detail in Appendix H of the FS report, design of the isolation layer was based on a model described in the EPA/US Army Corps of Engineers (USACE) guidance for in-situ subaqueous capping (Palermo et al., 1998). The model was used to evaluate the migration of contaminants through the isolation layer of the sediment cap and incorporates both advection and diffusion/dispersion as transport mechanisms. The thickness of the isolation layer in the cap is a component of the model that influences chemical transport and was chosen for each SMU to ensure that there would be no predicted exceedances of the cleanup criteria in the habitat layer. Because of the limitations of computer modeling and other factors associated with cap construction, a 50 percent buffer or safety layer will be added during cap construction. The thickness of the overall cap is thereby increased by a thickness equal to 50 percent of the thickness of the chemical isolation layer. As part of the remedial design, a decision will be made as to what portion of the buffer layer will be considered part of the habitat restoration layer. The remaining portion of the buffer layer will be added to the modeled chemical isolation layer to represent the actual chemical isolation layer portion of the cap. Furthermore, an additional layer will be placed below the isolation layer to address possible mixing with underlying sediment and uneven placement.

Modeling efforts indicate that the proposed material (at the thicknesses specified in the FS report following hot spot removal, where needed) will be effective at preventing chemical migration beyond the isolation layer of the cap. The cap model was used to determine the appropriate thickness of the isolation layer in each littoral zone SMU and whether sediment removal is necessary in areas of elevated concentrations and/or high upwelling rates so that the cleanup criteria are not exceeded for over 1,000 years at the top of the cap. Frequent monitoring will occur during and after placement of the cap to ensure that it is effective at isolating the contaminated sediment over the long term.

Methylation of mercury is primarily carried out by sulfate-reducing bacteria that thrive under anoxic conditions. Under oxic conditions, mercury primarily demethylates; that is, the methyl group is removed from mercury, reverting it back to an inorganic form. Unlike the profundal sediments, which have anoxic water above them during the stratified period, the littoral sediments always have oxygenated water above and likely are oxygenated some distance into the sediments. While it is possible that methylation may take place deep in the littoral sediments, data from the RI report do not indicate that significant amounts of methylmercury are transported across the sediment-water interface in the littoral zone. This is reflected in the water column data where the methylmercury concentrations in the oxygenated epilimnion are typically very low (less than 1 nanogram per liter [ng/L]). This is also reflected in the benthic macroinvertebrates from the littoral zone where, except for SMU 1, the concentrations of methylmercury are uniformly low (10 to 20 micrograms per kilogram [µg/kg] for chironomids).[8]

The proposed cap, including the isolation and habitat layers, is expected to encourage higher rates of bioturbation and bioirrigation, which would cause the habitat layer to be even more oxygenated. The cap will be comprised of clean materials and will be conducive to benthic communities. Once it is in place, the potential for methylmercury to be released from the littoral sediments below the cap to the water column above the cap will be significantly less than current conditions.

Technical Comment #3: Information on the contamination in the wetlands near the mouths of Ley Creek (Wetland SYW-12) and Harbor Brook (Wetland SYW-19) should be provided. These areas should be remediated and restored as valuable wetland habitat.

Response to Technical Comment #3: Contamination at Wetlands SYW-12, located between the mouths of Ley and Onondaga Creeks, and SYW-19, at the mouths of Harbor Brook and the East Flume, as well as two other wetlands adjacent to the lake (Wetlands SYW-6 and SYW-10), was documented in the Onondaga Lake RI report and evaluated with respect to human health and ecological risks in the HHRA and BERA. Sediment was sampled at four locations from two depth intervals (i.e., 0 to 0.5 ft and 0.5 to 1 ft [0 to 15 cm and 15 to 30 cm]) in each of these four wetlands in August 2000. Wetland SYW-19, in particular, was determined to be severely contaminated and requires further investigations, as stated in Section 5.4 of the RI report:

> "*Due to the extensive contamination in Wetland SYW-19...this wetland area is undergoing further investigation as part of the Preliminary Site Assessment (PSA) and RI for the Wastebed B/Harbor Brook site*."

During the Onondaga Lake RI, the maximum detection of total mercury in wetlands (60.2 mg/kg) was found near the mouth of Harbor Brook in Wetland SYW-19, and total mercury concentrations in this wetland were significantly higher than values reported for the other wetland stations. The maximum detections of dichlorobenzenes, hexachlorobenzene, phenol, and PAHs were also seen in Wetland SYW-19.

Elevated concentrations of PCBs, chromium, and cadmium were detected in Wetland SYW-12 (as discussed in Chapter 5 of the RI report), and will be further addressed as part of the Wastebed B/Harbor Brook RI/FS. Wetland SYW-12 has undergone numerous modifications over the years. At one time there was a pier adjacent to the mouth of Ley Creek. A harbor was cut into the shore, linking the lake with the railroad tracks where the mouth of Onondaga Creek used to be, immediately in front of what is now the Carousel Center. Also, a review of aerial photographs (as

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[8] The average methylmercury concentration (79 µg/kg) in SMU 1 chironomids is almost an order-of-magnitude greater than for any other area of the lake. See also response to Technical Comment #16.

presented in Chapter 4 of the RI report) suggests that this wetland was disturbed and filled at various times. Borings collected by Onondaga County in 2003 indicated that a layer of "tar like material" is found throughout most of the wetland at depths of about 4 to 10 ft (1 to 3 m).

The Wastebed B/Harbor Brook RI/FS will determine if Wetlands SYW-12 and SYW-19 need to be remediated and, if so, the extent of the remediation. If remediation is determined to be necessary, then wetland restoration plans will be developed during remedial design. It is likely that those plans would include strategies for improving habitat beyond the existing conditions in those areas requiring remediation where poor habitats currently exist.

Technical Comment #4: The effectiveness of the groundwater remediation along the lakeshore is critical to the success of the preferred remedy. A scenario for which the barrier walls are found to be ineffective should have been evaluated.

Response to Technical Comment #4: Currently, design and effectiveness of the sediment cap in SMUs 1, 2, and 7 depend on the success of a groundwater barrier wall and collection system to significantly reduce the upwelling rate to 2 cm/year or less within these SMUs. This barrier wall and collection system is also needed along SMUs 1 and 2 to control the releases of contaminants via migration of contaminated groundwater from the Semet Residue Ponds, Willis Avenue, and Wastebed B/Harbor Brook sites to the lake.

In addition, the selected remedy includes dredging to remove material in the hot spot areas of the ILWD to a depth of 3.3 ft (1 m) below the initial 6.6 ft (2 m) [on average] dredge cut for a total estimated removal depth of 10 ft (3 m) within the hot spot areas of the ILWD. The hot spots are defined as those wastes/sediments that contain select CPOIs (based on their presence at significantly elevated concentrations in the ILWD materials and/or the compounds for which the cap model was most sensitive) above threshold concentrations. The purpose of the hot spot removal is to improve capping effectiveness. The hot spot threshold concentrations that would trigger the additional dredging are as follows:

- Benzene – 208 mg/kg.
- Chlorobenzene – 114 mg/kg.
- Dichlorobenzenes – 90 mg/kg.
- Naphthalene – 20,573 mg/kg.
- Xylene – 142 mg/kg.
- Ethylbenzene – 1,655 mg/kg.
- Toluene – 2,626 mg/kg.
- Mercury – 2,924 mg/kg.

The above concentrations were developed using the cap model developed by Honeywell and represent the maximum concentrations that could be present in the wastes/sediments and not cause failure of a cap with a 2.5-ft-thick isolation layer assuming an upwelling rate of 2.4 inches/year (6 cm/year). Capping effectiveness is related to cap thickness, contaminant concentrations below the cap, and the upwelling rate (rate at which groundwater flows up through the capped sediments/wastes). With regard to the upwelling rate, Honeywell's cap model predicts that the cap would be effective based on an assumed upwelling rate of 0.8 inches/year (2 cm/year). This assumption relies upon the proper construction/operation of a hydraulic control system which would be installed (as part of the Wastebed B/Harbor Brook IRM) along the lakeshore adjacent to SMU 1. While the capping model assumes an upwelling rate of 0.8 inches/year (2 cm/year), the hot spot threshold concentrations were developed by NYSDEC by assuming a higher (2.4

inches/year [6 cm/year]) upwelling rate. See response to Technical Comment #9 for additional information related to this higher upwelling rate.

The use of a higher upwelling rate in the development of these values resulted in lower (more conservative) hot spot threshold concentrations than would be developed by assuming lower (e.g., 0.8 inches/year [2 cm/year] or 1.6 inches/year [4 cm/year]) upwelling rates. The use of these threshold concentrations for identifying hot spots within the ILWD provides a method for increasing the effectiveness of capping at the site. As refined cap modeling would be performed during remedial design, it is possible that these concentrations may be modified. However, the hot spot threshold concentrations would need to be based on an assumed upwelling rate of 2.4 inches/year (6 cm/year).

Based on the evaluations performed during the RI/FS process and as a part of the design of the IRMs, it is expected that the groundwater barrier wall and collection system will be effective in significantly reducing the groundwater upwelling rates and in controlling contaminant releases from the upland sites. However, if the groundwater barrier wall and collection system is shown to not be effective based on data generated from the planned monitoring program, additional remedial activities would be considered and selected as appropriate pursuant to state and federal Superfund laws and regulations. These would likely include modifications to the design and/or operation of the barrier/collection system, the placement of additional capping materials, or the removal of additional contaminated sediments.

Technical Comment #5: The effects range-median (ER-M) or probable effect level (PEL) values (or an average of these values) should be selected as reasonable indicators of acute toxicity rather than the probable effect concentrations (PECs). Clarify if the sediment effect concentrations (SECs) for the organic contaminants were normalized to organic carbon content. Also, the PECs do not include any margin of safety for chronic toxicity.

Response to Technical Comment #5: One of the RAOs identified in the ROD is to be protective of fish and wildlife by eliminating or reducing existing and potential future adverse ecological effects on fish and wildlife resources and to be protective of human health by eliminating or reducing potential risks to humans. To address this RAO, areas of sediment were selected for inclusion in the remedial alternatives based on various site-specific criteria as part of the Onondaga Lake FS report.

The mean PECQ approach was proposed by Honeywell as one of the criteria to use for determining remedial areas. The mean PECQ is a single unitless index that accounts for both the presence and concentrations of multiple contaminants in sediment samples. NYSDEC evaluated and refined the mean PECQ approach proposed by Honeywell prior to inclusion in the FS report and Proposed Plan.

In order to select a value that would be protective of aquatic life in Onondaga Lake, NYSDEC carefully evaluated the benthic toxicity tests in the RI/FS process and developed site-specific SECs using these data sets. The use of a geometrically averaged PEC was developed from the site-specific SECs as a consensus-based value based on methodologies published in the literature (e.g., MacDonald et al., 2000; Ingersoll et al., 2000). As discussed in Chapter 9 of the Onondaga Lake BERA, the use of any one of the five individual SECs alone will always present interpretation issues, as follows:

"*Based on the results of the SEC evaluations described above, it can be concluded that no one of the methodologies employed accurately describe or predict threshold concentrations of toxicity in Onondaga Lake sediments, nor can any one methodology accurately attribute the toxicity observed to any single contaminant. These values cannot be absolute because of the exposure of organisms to a complex mixture of metals and other contaminants which make it difficult to attribute the toxicity to any particular contaminant. However, collective evaluation through a strength-of-evidence approach does provide useful information*."

During NYSDEC's review of the mean PECQ methodology, the PEC for each contaminant was compared to the other initial SECs, as well as to an alternative PEC based on only the ER-M and the PEL. As can be seen in TC Tables 1 and 2 (in the "Tables" section of this RS), the PEC, based on all five SECs, is at least as protective (lower) than the ER-M, the PEL, or the alternative PEC (mean of ER-M and PEL). In 42 out of 47 cases, the PEC was more protective (lower) than the ER-M/PEL averaged value. In three out of 47 cases, the PEC was less protective (greater) than the ER-M/PEL averaged value. In two out of the 47 cases, the PEC was equal to the ER-M/PEL averaged value. Thus, the use of the ER-M/PEL averaged value was analyzed and determined to be less protective of the environment. On that basis, the ER-M/PEL average was rejected in favor of the PEC approach for identifying areas to be remediated. Also, see response to the NRRB's recommendation #5 (Attachment 1 of this RS).

The concentrations of organic contaminants were not normalized to organic carbon, consistent with the discussion in MacDonald et al. (2000), which stated that use of a dry-weight-normalized basis "*predicted sediment toxicity as well or better than organic carbon-normalized SQGs* [sediment quality guidelines] *in field collected sediments*." Thus, the Onondaga Lake SEC/PEC values for the organics are on a dry-weight basis.

The ROD discusses the basis for selecting a mean PECQ of 1 for inclusion in the cleanup criteria for the lake. Additional discussion of chronic toxicity and of why the mean PECQ criterion selected for use for the lake was determined to be protective of aquatic invertebrates is included in the response to Technical Comment #7.

Technical Comment #6: The Proposed Plan indicates that only 23 of the 46 CPOIs were used in the calculation of mean PECQs. It is unclear why some contaminants were retained and others were not. A more conservative approach based on all 46 CPOIs should be used.

Response to Technical Comment #6: A number of contaminants were removed from the mean PECQ analysis to increase the predictive power of the mean PECQ methodology. This is discussed in detail below.

During the development of the FS report (Appendix J), NYSDEC reviewed the mean PECQ methodology to assess whether the mean PECQ was predictive of toxicity as measured in the 1992 data and to optimize the methodology by the use of different variations as suggested in the literature. This review included an assessment of each of the individual contaminants, different endpoints, and use of independent methods of assessment. As the comment notes, half of the original 46 contaminants or CPOIs were removed from the mean PECQ calculations; however, this was done to improve the predictive power of the methodology. Some of these deletions were obvious choices. For example, the PECQs of manganese and dibenzofuran (see figures in Appendix J of the FS report) did not show any relationship with chironomid mortality, nor would they be expected to, based on literature toxicology data. Keeping such contaminants in the PECQ calculations would have the effect of obscuring the relationship between the mean PECQ and toxicity. Removing them from the PECQ calculation makes the calculation a more accurate and powerful predictor of areas that require remediation because only those parameters which actually have a toxic effect on a lakewide basis at this site were assessed.

In addition to contaminants that did not show any relationship with chironomid mortality based on both Onondaga Lake toxicity testing and the relevant literature, other contaminants did not exhibit a relationship between PECQ and mortality based on toxicity testing even though toxicity might be expected based on the literature. Examples of these contaminants include cadmium and pesticides. Finally, some of these contaminants appeared to have some marginal relationship to mortality, such as toluene and chlorobenzene.

To resolve whether these individual contaminants had a true influence (statistically significant) on invertebrate mortality on a lakewide basis, a Multiple Analysis of Variance (MANOVA) was conducted. The derivation of the SECs and the assessment of the individual PECQs looked at each contaminant individually, as if only that contaminant was contributing to the toxicity in the samples. The MANOVA examined the influence of all of the independent variables (the concentrations of the contaminants) on the dependent variables (chironomid and amphipod mortality) and established whether there is a statistically significant relationship between each contaminant and mortality.

Note that the MANOVA used the concentrations of contaminants directly, and that this analysis was therefore independent of the SEC methodology. The information from this MANOVA analysis was used in the selection of the final list of contaminants in the mean PECQ analysis, which included only those contaminants that had a statistically significant relationship to mortality on a lakewide basis. As noted above, this allowed the mean PECQ methodology to have a greater predictive ability than if it also used contaminants whose concentrations were not associated with toxicity in a manner that was statistically significant. A summary of the analysis is provided below.

Multiple Analysis of Variance for Chironomid and Amphipod Mortality Rates and Chemical Concentrations in Onondaga Lake

MANOVA models can be used to look at a series of dependent variables as they are influenced by one or more independent factors.

The mortality rates for chironomids and amphipods were measured at 79 stations in 1992 and at 15 stations in 2000 (see Chapter 9 of the BERA report). The MANOVA analyses were done using the following contaminants of concerns (COCs):

- Cadmium
- Chromium
- Copper
- Lead
- Mercury
- Nickel
- Zinc
- Benzene
- Toluene
- Ethylbenzene
- Xylene (Total)
- Chlorobenzene
- Dichlorobenzenes (Sum)

- Trichlorobenzenes (Sum)
- Total PAHs (16 compounds or naphthalene and sum of other PAHs)
- PCBs (Sum of Aroclors 1248, 1254, and 1260)

Other COCs (antimony, arsenic, manganese, selenium, silver, vanadium, hexachlorobenzene, dibenzofuran, phenol, chlordane [sum], and DDT and metabolites) were not included since these COCs were not analyzed in many of the 1992 samples and, for some (e.g., manganese, hexachlorobenzene), were not expected to be contributing to acute toxicity in the lake. In the MANOVA modeling, the dependent variables are the mortality rates of chironomids and amphipods and the independent variables are the concentrations of the COCs.

MANOVA is used to evaluate the effects of independent variables on multiple dependent variables. The main purpose of using a MANOVA for this assessment was to evaluate the lack of difference for a set of dependent variables as a criterion for reducing a set of independent variables to a smaller, more easily modeled number of variables and to identify the independent variables that influence a set of dependent variables the most.

Statistical software was used to perform the MANOVA. The widely accepted significance level (alpha [α]) chosen was 5 percent ($\alpha = 0.05$). The output of the MANOVA includes the F-test values and p-values for each COC. The COCs with p-values less than alpha are considered to have significant contribution to the mortality rates. These COCs are included in the mortality model.

In addition to the MANOVA analysis, a stepwise regression analysis was performed for the mortality rates of chironomids and amphipods separately. Similar to the MANOVA, the stepwise regression method is used to study the effect of the independent variables (the COCs) on the mortality rates. The difference between the stepwise regression and the MANOVA is that the stepwise regression can only take one dependent variable (mortality rate) at a time. In other words, there is no interaction between the two dependent variables (chironomid and amphipod mortality rates). In many ecological or biological studies, the dependent variables often have strong actual or potential interactions that are addressed by using the MANOVA analysis.

For Onondaga Lake, a total of 12 different models were developed using both MANOVA and stepwise regression, including four MANOVA models and eight stepwise regression models. The four MANOVA models were based on either the 1992 data alone or the 1992 and 2000 data combined. For each data set, concentrations of total PAHs and naphthalene plus the remaining PAHs were modeled separately. The four models for the chironomid and four models for the amphipod assessments in the stepwise regression analysis included these same variations. Based on this quantitative assessment, the COCs that were statistically significant across the 12 MANOVA and stepwise regression models were mercury, ethylbenzene, xylene, chlorobenzene, dichlorobenzenes, trichlorobenzenes, naphthalene, other PAHs (15 compounds), and total PCBs. The fact that these 23 COCs had a statistically significant relationship supported NYSDEC's decision to retain them.

The purpose of removing contaminants from the mean PECQ analysis was not to reduce the number or complexity of the calculations, but rather to increase the predictive power of the mean PECQ methodology. In addition to the mean PECQ analysis, NYSDEC also assessed the lakewide data for each individual contaminant of the initial 46 to determine whether the use of the final form of the mean PECQ caused any contamination in the lake to be overlooked. This assessment resulted in the inclusion of the localized area of the lake associated with Station S48 (which has high mortality and high benzene concentrations) for remediation (see Section 2.7 of the FS).

Technical Comment #7: The mean PECQ methodology does not explicitly address chronic toxicity and the mean PECQ threshold of 1 does not appear to be adequate for the protection of benthic organisms. A mean PECQ threshold of 0.3, which will result in additional areas requiring remediation, may be adequate.

Response to Technical Comment #7: Figures J.14 and J.15 in Appendix F of the Onondaga Lake FS report show a general trend of increasing mortality with increasing mean PECQ values. However, the correlation is relatively weak (r^2 values of about 0.5 for chironomid mortality and about 0.6 for amphipod mortality), and the statistical significance has not been established. It is difficult to quantitatively associate any level of biological or toxicological response with any particular mean PECQ value. Therefore, NYSDEC decided to use the mean PECQ as an integrated hazard quotient (HQ). An HQ is defined as a risk threshold divided by the expected exposure level. When the HQ is less than 1, the level of exposure does not exceed the corresponding risk threshold, and harm is not anticipated. The mean PECQ of 1 is the point at which, on average, risk thresholds for COPCs specifically derived from acute toxicity studies conducted within Onondaga Lake are not exceeded. Figures J.14 and J.15 show that some mortality to chironomids and amphipods does occur below the mean PECQ of 1. However, the low coefficient of determination (r^2) value for the relationships suggests that this apparent toxicity cannot be explained by the mean PECQ/mortality relationship, and could result from other factors.

Integration of toxicity data into the mean PECQ provides a single index for identification and demarcation of areas to be remediated. This process is more efficient than attempting to develop as many as 46 individual maps of Onondaga Lake (potentially one for each COPC) and overlaying these maps to identify and delineate areas to be remediated. When the areas of the lake that exceed a mean PECQ of 1 and a mercury PEC of 2.2 mg/kg are compared to locations where toxicity tests were conducted, it becomes apparent that these site-specific cleanup values address nearly every sample location where acute toxicity in laboratory testing was observed.

Chronic toxicity is not explicitly addressed by the mean PECQ methodology, and it is possible that, following remediation, areas will remain in the lake where chronic toxicity to benthic organisms could occur. However, the areas of the lake to be remediated based on the mean PECQ of 1 and the mercury PEC of 2.2 mg/kg will be dredged and/or capped, and the cap material will be clean substrate, thus eliminating the potential for chronic toxicity in those areas.

The Onondaga Lake BERA discussed two components of the RI that were relevant to chronic toxicity – the benthic macroinvertebrate community analyses conducted in 1992 and 2000 and the chronic sediment toxicity testing conducted in 2000. The benthic macroinvertebrate community analyses provide an indirect measure of the occurrence of chronic toxicity at the population and community levels. The chronic sediment toxicity testing done in 2000 was purposefully limited to a small number (i.e., 15) of stations in the lake with the specific objective of observing whether or not the results of the 42-day chronic toxicity tests were significantly more sensitive than the results of the 10-day acute toxicity tests conducted in 1992. There was never an intent to use these chronic data to derive SECs for cleanup criteria.

Those two components of the RI, as described in the BERA, would not be useful for developing chronic SECs for two reasons:

- First, the calculations used to develop the SECs underlying the PECQ require that a certain proportion of the macroinvertebrate sampling stations be unimpaired. The BERA analysis found that benthic communities at every station in the lake were impaired to some degree when compared to the reference lake (Otisco Lake), which is in a rural setting.

- Second, the variability of the data from the limited number of chronic toxicity tests conducted in 2000 was even greater than that for the 1992 acute toxicity testing. This is expected due to the nature of the chronic toxicity testing (e.g., longer term, more sensitive endpoints). Given the relatively weak correlation found between acute sediment toxicity and the mean PECQ, it is apparent that the data from the 2000 chronic toxicity tests are too variable to attempt development of chronic SECs.

There are numerous possible causes for the benthic community to be impacted throughout the lake. Onondaga Lake has been subjected to numerous environmental insults over the past 100 years, including the impacts of urbanization, discharges from numerous industries and agricultural activities, wastewater treatment discharges, and runoff from road surfaces. It would be difficult to identify areas where chronic toxicity was occurring solely as a result of specific contaminants from past industrial discharges of hazardous wastes/substances as opposed to areas where chronic toxicity was occurring as a result of some other cause or process (e.g., anoxic conditions, temperature, substrate, light). It can be noted, however, that most of the littoral zone stations which were classified in the BERA to be moderately or severely impaired (based on the benthic community data) are within the areas to be remediated based on the mean PECQ of 1 and the mercury PEC cleanup values.

Technical Comment #8: Most of the sediment data in SMU 1 were collected within the top 2 m. The limited data at depths greater than 2 m cannot be considered representative of conditions over the 84-acre area of SMU 1.

Response to Technical Comment #8: The selected remedy includes the dredging (to a maximum depth of 3 m) in areas identified as hot spots in which select contaminants exceed threshold concentrations. The purpose of the additional removal is to improve the reliability of capping in this area. As stated in the ROD, the threshold concentrations may be modified during remedial design as a result of refined cap modeling. Most of the sediment data were collected within the top 2 m. However, there are data from cores that extend below a depth of 2 m in and near the ILWD which indicate that elevated concentrations of select CPOIs (including samples whose concentrations exceed the cap threshold values for xylenes and dichlorobenzenes) exist at or below a depth of 2 m. It is for this reason that the remedial design will include an extensive sediment coring program in the ILWD to better define the horizontal and vertical extent and nature of the contamination. The results of this program will be used to identify the areas in which hot spot removal between depths of 2 and 3 m is warranted.

Technical Comment #9: Honeywell believes that the depth of removal and associated cap design (thickness) in its recommended alternative is sufficiently protective since many conservative assumptions were used in its cap model. In addition, Honeywell believes that its remedy for SMU 1, rather than the preferred remedy, is a more appropriate balance of the statutory and regulatory criteria governing remedy selection.

Response to Technical Comment #9: NYSDEC proposed dredging and capping as remedial measures in SMU 1 (see pages 74 to 76 in the Proposed Plan). Although NYSDEC utilized the capping model developed by Honeywell, NYSDEC did not consider Honeywell's inputs to the model mentioned in the comment to be overly conservative, as Honeywell suggests. For example, Honeywell indicated that its model was conservative since it used the highest concentrations of each contaminant, regardless of what depth it was found at in a particular SMU. However, the highest concentrations of contaminants were typically found in the upper layers (in the upper 1 to 3 m) of the waste/sediment in SMU 1. Thus, the use of the worst-case sediment concentrations in the model was reasonable, rather than conservative, since, in actuality, the highest concentrations for most contaminants were detected in the region that would be in contact with the cap. Therefore, NYSDEC developed threshold concentrations for identifying hot spots within the ILWD to provide a method for increasing the effectiveness of capping at the site. Another example is that for the more mobile contaminants that were of most concern with respect to capping effectiveness (chlorobenzene, dichlorobenzenes, BTEX), there were no reliable site-specific data regarding porewater concentration or partitioning coefficients. Where this was the case, the use of literature-based values for partition coefficients is reasonable, but not conservative, because those values represent the best (but not biased) estimate for those parameters.

Finally, Honeywell's use of an upwelling velocity (the rate at which groundwater flows up through the capped sediments/wastes) of 2 cm/yr was based on a groundwater model prediction of a future condition. While NYSDEC does not dispute the groundwater model construction and calibration within the upland areas, the model has not been calibrated or validated by comparing the predicted upwelling rates to measured values within the lake sediments. Unfortunately, Honeywell's attempts to collect usable upwelling rates in the ILWD were not successful. Thus, based on additional analyses performed prior to the issuance of the Proposed Plan (as discussed in more detail below), NYSDEC used a more conservative upwelling rate (6 cm/yr) to develop sediment cap threshold values (CTVs) that represent the maximum concentrations that could be present in the wastes/sediments and not cause failure of a cap with a 2.5-ft isolation layer. The development of CTVs based on this higher upwelling rate is intended to improve the reliability of capping.

Capping effectiveness is related to cap thickness, contaminant concentrations below the cap, and the upwelling rate. Generally, under conditions with high upwelling rates, advection becomes the dominant mechanism of contaminant transport, and changes in other factors (i.e., contaminant concentrations and cap thickness) have less of an effect on cap effectiveness. NYSDEC used the value of 6 cm/yr for the upwelling velocity as a reasonable measure of conservancy (a factor of 3 greater than the value predicted by Honeywell). This value was determined through the additional analysis illustrated by the predicted values presented in TC Figure 1 (in the "Figures" section of this RS), which shows the CTVs for benzene, chlorobenzene, dichlorobenzenes, and xylenes (the compounds to which the model design was most sensitive) at upwelling rates ranging from 2 to 20 cm/yr. As shown on this figure, the CTVs decrease significantly as upwelling velocities increase from 2 cm/yr to about 6 cm/yr for a 2.5-ft isolation layer. Above approximately 8 to 10 cm/yr, there is less of a change in the CTVs with increasing upwelling velocities. Thus, the upwelling rate of 6 cm/yr was used as a conservative measure to address the uncertainty of the groundwater model.

In regard to a comparison between NYSDEC and Honeywell's remedies for SMU 1, the selected remedy, as supported and stated in detail in the Proposed Plan and this ROD:

- Is more permanent and reliable.
- Provides greater long-term effectiveness and cap reliability.
- Provides a better balance of tradeoffs with respect to the evaluation criteria.

Technical Comment #10: The mercury in the profundal zone (SMU 8) sediments is the primary source of methylmercury; however, there is almost no remedial action planned for the sediments in SMU 8.

Response to Technical Comment #10: The lake was divided into eight SMUs based on the nature and extent of contamination and the physical/chemical/limnological characteristics of each SMU. The profundal zone (SMU 8) includes certain critical characteristics that guided the selection of remedial alternatives. The boundary between the littoral zone and the profundal zone was defined in the RI report as the 9-m water depth contour, which is the typical depth of the thermocline. The vast differences in the limnological processes and chemistry as they relate to COCs, especially mercury, between the epilimnion and the hypolimnion were the basis for this definition. There are certainly other ways to define the littoral/profundal zone boundary (e.g., light penetration, sediment type, macrophyte distribution), but the thermocline was determined by NYSDEC (as documented in Section 3.7 of the RI report) to be the most important in terms of contaminant transport and fate.

As described in Chapter 3 of the RI report, the epilimnion is oxic, rapidly and extensively mixed, and contains the bulk of the biota in the lake. The littoral sediments are subjected to wind-driven wave resuspension and extensive bioturbation, and contain unique hot spots of contaminants. These hot spots are found in areas of Honeywell wastes which were deposited under artificial depositional regimes and are now erosional. In contrast, the hypolimnion/profundal zone is a depositional zone with little mixing of the water column and which currently has few, if any, benthic organisms based on limited data from the RI. Also, fish would not be expected to inhabit the hypolimnion during anoxic periods.

Since the littoral sediments represent an ongoing source of contamination due to the extensive deposits and the very active processes causing releases in these erosional zones, dredging and isolation capping were selected for the littoral SMUs. On the other hand, the profundal zone contains sediments that are very stable where highly contaminated sediments from historical depositions are being covered by less-contaminated sediments. Thus, full removal (dredging) of contaminated sediments from SMU 8 was not included in any of the alternatives in the Proposed Plan. Isolation capping was also not included in the alternatives for SMU 8 due to the stable nature of the profundal sediments and the minimal groundwater upwelling velocities in the deep portion of the lake. Based on the analyses and models prepared by Honeywell for the FS report, it was determined by NYSDEC that thin-layer capping in areas that exceed a mean PECQ of 1, oxygenation, and MNR is the most appropriate approach for attaining the RAOs in the profundal sediments and hypolimnion, as documented in the Proposed Plan and this ROD. As discussed in Appendix N of the FS report, inclusion of MNR in an overall remedy for large contaminated sediments sites is consistent with EPA guidance.

MNR modeling conducted by Honeywell based on high-resolution cores indicated that this process will reduce the surface sediment (those sediments which could provide habitat for a benthic community in deep waters, or up to a 10-cm depth) concentrations to levels below the mercury PEC within the MNR period of 10 years, as long as the starting concentration is below 6.7 mg/kg. During the MNR period, concentrations of mercury at the surface of the entire profundal zone are expected to decline to the PEC within a reasonable time frame (10 years) following remediation (based on modeling conducted in the FS report using the 1992 0 to 2 cm data). However, since this model only addressed mercury, the mean PECQ of 1 (based on 23 CPOIs) was applied to the profundal zone to select areas for thin-layer capping. The selected remedy includes thin-layer capping over approximately 150 acres of the profundal zone. The amount of thin-layer capping needed in the profundal zone will be reassessed based on additional data to be collected during pre-design.

Technical Comment #11: There are many things that could go wrong with the controls proposed for the SCA. The commentor identifies several such problems, including possible failure of the pumping system and associated piping.

Response to Technical Comment #11: Reasonable steps can be taken to avoid problems and to control the consequences of those that may occur. Good design practice calls for the implementation of a wide array of monitoring systems that can detect both potential system upsets and releases of contaminants to the environment. Considerable care will be taken during remedial design to specify the use of the most reliable dredging and materials handling equipment and to require that the operation of that equipment be closely monitored. The SCA will be constructed in accordance with applicable laws, regulations, and guidance, which directly address these issues.

There are several techniques available to limit or avoid the discharge of sediment slurry during dredging and pumping operations. In similar circumstances, pressure sensors have been placed along the route of the fluid pipelines to detect pressure changes. Should a section of line fail, pressure would noticeably drop and fluid pumping would be halted until the problem had been corrected. Thus, the quantity of material that could be discharged from a line failure would be limited and could readily be recovered by various means.

Another approach that has been taken when contaminated slurry is being pumped is to use a double-walled piping system, which was used in the cost estimates in Appendix F of the FS report and in the cost estimate for the selected remedy. In this case, slurry released from the inner pipe would be captured by the second or outer line and would not be discharged to the environment. While there is a low probability of pipeline failure, steps would be taken to minimize slurry release in the event of failure. The potential use of these techniques will be evaluated during remedial design.

With respect to air quality, air monitoring will occur throughout project implementation. Monitoring equipment will be placed at various locations including the dredging site, the SCA, and possibly other locations. The monitoring data will be used to determine if operations are proceeding as anticipated or if modifications and corrective actions are necessary.

Technical Comment #12: The mapping methodology employed by TAMS [for NYSDEC] in the RI report has, in all likelihood, led to distortions in the predicted distribution of contaminants shown in the FS report. This has resulted in underestimates of mercury, chlorinated benzenes, BTEX, and possibly other contaminants in the profundal zone. Our [ASLF's] sediment maps show that these chemicals permeate sediments located beyond the rather artificial 9-m boundary used to separate the profundal and littoral zones. In fact, many maps in the FS report (which were taken from the RI report) support this same conclusion.

SMU 1 should be expanded into the deeper waters of the lake so as to include this contamination. These highly contaminated sediments should be subject to the same dredging and capping remedial approach as the other sediments in the ILWD. SMU 7 and SMU 2 should be reexamined in this light.

Response to Technical Comment #12: The contaminant distribution maps presented in Chapter 5 of the RI report (which did utilize the 9-m contour as a boundary) agree well with the maps included in Appendix B of ASLF's comment letter, which indicate elevated concentrations of contaminants in the top 30 cm of the profundal zone immediately adjacent to the ILWD. The maps in the RI report were meant to assist in the evaluation of the contaminant distribution, transport, and fate and to present contaminant distributions for all CPOIs, not only for the surface sediments but also for deep sediments down to 8 m (the vertical extent of the RI data).

In Appendix I of the RI report, a different method of portraying the data (i.e., kriging) was presented for mercury contamination, which also used the 9-m contour as a boundary and showed elevated mercury concentrations in the profundal zone in the south end of the basin (see also response to Comment G-11.36 in the Comment and Response Index). Honeywell's FS report used a simpler method (i.e., Thiessen polygons) of presenting the chemical distribution data for the purpose of estimating volumes. During its review of the FS report, NYSDEC assessed the suitability of the Thiessen polygon method by comparing the areas and volumes presented in the FS report with estimates based on the mapping presented in the RI report and determined that the volume estimates were adequate for the purposes of the FS report.

NYSDEC is aware that contamination extends from the ILWD past the 9-m boundary into SMU 8. As noted in the response to Technical Comment #10, the boundaries of the SMUs were drawn based on several factors, including whether the area is above or below the thermocline in the summer stratified period. The differences between the epilimnion and hypolimnion in terms of settling, resuspension, and water chemistry make the 9-m contour a reasonable boundary, as is discussed in more detail in Chapters 3 and 5 of the RI report. Because NYSDEC is aware of this contaminant distribution in SMU 8, the selected remedy includes thin-layer capping in the area adjacent to the ILWD based on exceedances of the mean PECQ of 1. Furthermore, the suitability of thin-layer capping at the base of the ILWD in SMU 8 will be further evaluated during remedial design and remedy implementation based on the additional data to be collected. If extremely high concentrations of contaminants are found in this area, additional remedial measures will be considered.

Technical Comment #13: Treatment of the sediments should be required to separate out highly contaminated material. Soil washing technologies, which have been demonstrated on sediments in Saginaw Bay, among other places, could be a very effective way to separate the calcareous Solvay waste from the NAPL which occurs in and near the ILWD. Another potential benefit of soil washing lies in its ability to separate sand from fine-grained silts and clays. In the case of Onondaga Lake, this technology could potentially be used to generate clean capping material, while reducing the amount of sediments being disposed of in the SCA. In our examination of boring logs from the lake (Stations S329 to S334), ASLF has noted that considerable sand deposits exist within the lake.

Response to Technical Comment #13: Although soil washing was an effective treatment for use at Saginaw Bay, it cannot be inferred that it would be as effective a treatment for the Onondaga Lake sediments. Pilot studies would be needed to assess the efficacy of soil washing as a treatment technology for the lake sediments; to date, no such studies have been conducted. This technology was evaluated in the Onondaga Lake FS report (Parsons, 2004), but was determined to not be viable, since it can be difficult to implement due to complex treatment requirements for extraction fluid, lack of full-scale applications to date, and lack of commercial availability.

A number of factors should be considered when evaluating the possibility of processing contaminated sediments. As suggested by the comment, sediment grain size is an important variable since coarse-grained sediment can be expected to be relatively free of contamination in comparison to fine-grained material. As mentioned in the comment, the boring logs (which are general field descriptions and are not quantitative) for two locations – Stations S329 and S330 – do indicate that the material collected there is predominantly sandy (and, thus, coarse-grained). Based on contamination levels from the RI data, these two stations would not be targeted for remediation.

An assessment of the laboratory analysis for particle size determination presented in the RI report shows that the sediments in the 8-m cores from stations within the ILWD (Stations S309 to S315) typically exhibit a low sand fraction, with over 90 percent fine-grained material (silt and clay, less than 0.075 mm). These cores, which are likely to be more representative of the material that would be targeted for removal than would Stations S329 and S330, suggest that size separation of dredged sediments is not likely to be efficient or even feasible. Thus, should a washing technology be considered for lake sediments, it can be expected that little or no benefit would be obtained by utilizing a size-separation technology ahead of the treatment system. Based on our research, Saginaw Bay contaminants were PCBs and other industrial organics that were adsorbed, at least in part, to native sediments with a greater variety of grain sizes than found in Onondaga Lake.

Another factor that will influence the viability of applying soil-washing methods to Onondaga Lake sediment is that the targeted material has highly variable physical and contamination characteristics as a result of the many manufacturing processes that took place at the former Honeywell facilities along the lake. Soil washing systems perform best when the incoming contaminated material exhibits consistent properties (note, however, that there is limited experience with this technology, although its application has been increasing). This enables the designers to optimize the treatment process for the specific material that would be processed. The variability of Onondaga Lake sediments would make it difficult to design a single well-defined processing system to handle all targeted material. Thus, soil washing probably does not have general applicability to Onondaga Lake sediments and is therefore not part of the selected remedy. See also response to Comment O-18.2.

Technical Comment #14: The observation (reflected in the mercury mass balance for the water column of Onondaga Lake as presented in Tables 6-20 to 6-25 of the RI report) that the measured losses of mercury exceed the measured inputs of mercury by a large extent suggests that there is not an adequate understanding of the sources of mercury to the lake.

Response to Technical Comment #14: As discussed in the RI report, the mercury mass balance for the water column of Onondaga Lake, based on sources and sinks identified in Honeywell's 1992 RI/FS work plan, was incomplete, as the sources of roughly 75 percent of the mercury input was not accounted for. As described in the RI report (Sections 6.1.1.5 and 6.1.3), NYSDEC obtained supplemental information that identified additional sources of mercury (i.e., profundal sediments and the ILWD) that account for the gaps in the total mercury mass balance for the stratified period and provide for an understanding of sources of mercury to the lake.

The mass balance for total mercury for the stratified period, based on the analyses conducted for the RI and subsequent refinements of the resuspension fluxes (see response to Technical Comment #17, below), is presented in TC Table 3 below.[9]

TC Table 3 Summary of Lake Mass Balance for Stratified Period for Total Mercury

Sources (g)			**Sinks (g)**	
Epilimnetic Sources	External Sources	3,360	Settling to Lake Bottom	10,700
	Wind-Induced Resuspension	6,300	Outflow	660
	Diffusion: Littoral Zone	72	Volatilization	46
Hypolimnetic Sources	Diffusion: Profundal Zone	43		
	Particle Exchange: Ebullition	880		
Total Sources		~10,700	Total Sinks	~11,400

The selected remedy (along with remediation of the upland subsites, including impacted tributaries) will address the RAOs and PRGs both directly and indirectly by reducing the external inputs to the lake, reducing and isolating the contaminant inventories in the lake, and by eliminating or reducing internal processes (e.g., methylation in the anoxic waters, resuspension of contaminated wastes/sediments) in the lake. The predicted reductions (on the order of 90 percent) in inputs and inventories are expected to reduce the exposures and uptake of contaminants in humans and wildlife in a manner that is protective and consistent with the NCP.

Technical Comment #15: Although there has been a marked decrease in mercury loading to the lake since the early 1970s, there has been no corresponding change in fish mercury concentrations. One might speculate that total mercury loads to the lake do not regulate mercury levels in fish, but rather that these levels are regulated by the very high rate of methylmercury production. The RI/FS did not determine if the supply of methylmercury to fish largely occurs in the hypolimnion, as opposed to the littoral sediments. It is not clear how the reduction in total mercury loads or control of methylation in the hypolimnion will address mercury concentrations in fish.

Response to Technical Comment #15:

Sediment Concentrations and Potential Reductions in Mercury

Contaminant concentrations in sediments throughout the lake will be significantly reduced by the following:

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9 TC Table 3 is based on a presentation by Gbondo-Tugbawa et al. (2005) at the Third International Conference on the Remediation of Contaminated Sediments, New Orleans, LA. This table is similar to Table 6-20 in the RI report, which presented the mercury mass balance for the stratified period based on the sources and sinks as per the 1992 work plan. Table 6-20 was updated to include mercury loading supplied by wind-driven resuspension and methane ebullition, as reflected in TC Table 3. In the RI report these additional loads were discussed in the text and in other tables and figures, but were not included in the formal mass balance table because they were not part of the original sampling programs in 1992. The RI report presented a range of mercury loads from resuspension (2,000 to 20,000 g); however, subsequent to the completion of the RI report, a more refined analysis (Gbondo-Tugbawa et al., 2005) of the meteorological data allowed for the determination of the more precise value of 6,300 g.

- Reduction of external inputs, which will result in a reduction in future inventories and concentrations in the lake.

- Removal and capping of littoral sediments requiring remediation, which will result in a direct reduction in inventories and concentrations.

- Implementation of thin-layer capping and MNR in the profundal zone.

These actions will either remove or isolate (by capping) 89 to 99 percent of the various contaminant inventories in the lake (see FS report Table 5.3). This will cause the lakewide surface area-weighted average mercury concentration in the sediments to be reduced by 67 percent (from about 2.9 to 1.0 mg/kg, assuming that the profundal sediments only reach a concentration of about 1.2 mg/kg as predicted by the MNR model presented in the FS report), with the littoral zone being reduced by 86 percent (from about 3.5 to 0.5 mg/kg) (see FS report Tables I.24 and I.26).

This reduction in surface sediment concentrations for mercury and other CPOIs will immediately reduce impacts to the benthic community due to direct-contact toxicity. For bioaccumulative CPOIs, such as PCBs and hexachlorobenzene, the reduction in concentration is expected to directly reduce the uptake of these contaminants by the benthic community.

The uptake of mercury from the sediments by the benthic community (which is a food source for fish) is highly dependent on the production and subsequent increased concentrations of methylmercury in sediment and porewater. The ratio of methylmercury to total mercury in sediments is dependent on mercury concentration in a logarithmic manner (Krabbenhoft et al., 1999), in which the most direct relationship occurs in sediments with low total mercury concentrations (less than 1 to 2 mg/kg). At higher concentrations of total mercury, the influence of total mercury concentrations on methylmercury concentrations is not as strong (i.e., little additional methylmercury is evidently produced with increasing total mercury [Krabbenhoft et al., 1999]). The selected remedy will significantly reduce the total mercury concentrations in the surface sediments of areas to be remediated to very low concentrations (i.e., predicted to be 0.2 mg/kg or less at the top of the cap). This would reduce the total mercury concentrations to the level (i.e., less than 1 to 2 mg/kg) in which there is a strong relationship with methylmercury; therefore, a decrease in the methylmercury concentrations would be expected.

The removal and capping of sediments and the reduction of external inputs, in addition to oxygenation, will indirectly address surface water contamination. The three major sources of total mercury to the water column of the lake are the following:

- External upland sources (i.e., the Honeywell subsites and the tributaries draining those sites).

- Resuspension of littoral zone sediments/wastes (especially in the ILWD).

- Releases from the profundal sediments via both diffusion and ebullition.

The remediation of external sources is expected to eliminate or reduce total mercury loads from the upland sources resulting in a 70 percent decrease in total mercury loading to the lake (see Tables N.2 and N.3 in Appendix N of the FS report). The remediation in SMUs 1 to 7 would virtually eliminate resuspension as a source in the littoral zone from areas containing mercury at concentrations greater than the mercury PEC (i.e., 2.2 mg/kg). The RI report indicates that releases from the profundal sediments are a significant source of total mercury to the water column, based on the 1992 mercury mass balance which suggests that the downward mercury flux on settling particles increases by 30 percent in the hypolimnion relative to the downward flux from the epilimnion. It was concluded that this is at least partially due to ebullition of methane from the sediments facilitating the migration of mercury both by directly carrying sediments into the water column and by increasing the rate of diffusion. As presented by UFI at the Onondaga Lake Scientific Forum in 2004, the rate of ebullition from the sediment has dropped by a factor of about six since 1992, suggesting that this source of mercury to the water column has already dropped substantially. Thus, based on reduction of external and internal sources of mercury to the lake, a reduction in total mercury concentrations in the water column is expected (see Appendix I of the FS report).

The oxygenation component of the remediation is expected to have two additional benefits. The first is the reduction in total and dissolved mercury concentrations. Based on the data for the 1992 stratified period and 1999 fall turnover, it is evident that under the anoxic conditions of the stratified period, the concentrations of dissolved and total mercury increase substantially. However, when that water is oxygenated during other times of the year, chemical processes take place which rapidly strip this mercury out of the system (see RI report Figures 5-142 and 5-143). Thus, oxygenation of the hypolimnion is also expected to reduce the total mercury concentration in the water column. The second benefit of oxygenation is the elimination of methylation that occurs under anoxic conditions in the hypolimnion.

Fish Mercury Concentrations

A major factor in the uptake of mercury by biota is the methylation that takes place under anoxic conditions. Hypolimnetic dissolved oxygen (DO) is generally depleted from summer to early fall due to cultural eutrophication (Owens and Effler, 1996). Prior to 1987, the lake regularly failed to turn over in the spring due to salinity stratification (Owens and Effler, 1996). The water inputs from the surrounding tributaries tended to plunge into the hypolimnion due to their high salinity and caused a significant saline stratification. The failure of the lake to turn over exacerbated the depletion of the DO in the hypolimnion (Owens and Effler, 1996). Turnover resumed after the Honeywell Main Plant closed in 1986, although saline inputs (e.g., from the wastebeds) continue to enter the lake. However, exactly how these changes affect methylmercury cycling and exposures has not been fully defined. For example, while a lack of turnover may maximize the conditions for methylation in the hypolimnion, it may also limit the amount of exposure in the epilimnion that occurs from releases caused by the approach of turnover.

A comparison of the annual average mercury concentrations in smallmouth bass (the species with the most extensive sampling record) with the mercury profile in the 1996 high-resolution sediment core collected during the RI from the southern basin (which serves as a surrogate for the gross total mercury load to the lake) provides some insight (as discussed below) into the relationship between sediment and fish (see TC Figure 2 in the Figures section of this RS). (It should be noted that the dates associated with this 1996 core, as shown in TC Figure 2, are rough estimates since assigning exact years of deposition to the slices of sediment cores is somewhat subjective. This is because each slice does not necessarily represent a single year that can be directly compared to the fish data, but instead represents a variable length of time depending on the thickness of the interval sampled, the sediment flux rate at the time that the sediment was deposited, and the amount of compaction that has occurred in the sediments, as well as the thickness of the slice analyzed.) The history of Honeywell's discharges of mercury to the lake system is discussed in Chapter 4 of the RI report. It should be noted that the fish data presented in the figures for this response are shown as annual averages and do not account for differences in fish size. However, normalizing mercury concentrations to fish length does not change the relationships discussed below.

As shown in TC Figure 2, there was a substantial decrease in mercury concentrations in fish and sediment after mercury controls were installed at Honeywell's facilities in 1970. When the Willis Avenue plant closed in 1977, a second decrease in mercury concentrations occurred in both fish and sediment. However, from 1979 to 1981, average mercury concentrations in fish increased from 0.7 to 1.2 mg/kg. Concentrations also increased slightly in sediment during this period, possibly coincident with the transfer of the Bridge Street plant from Allied Chemical to LCP.

From 1980 to 1986, Honeywell diverted its wastebed overflows from the lake to Metro in an experimental attempt to use the ionic wastes to precipitate out phosphorus. While this diversion of the overflow appeared to cause a drop in the total mercury inputs into the lake (as seen in the core profiles), it appears to have continuously increased the inputs of methylmercury to the epilimnion, since it is known that methylation of mercury occurs in the sewage treatment plant (McAlear, 1996). This likely resulted in decreases in mercury flux to the sediments, but an increase in average mercury in fish levels occurred at the same time.

In the late 1980s, a brief but sharp increase in the fish and sediment mercury concentrations occurred between the time that the Main Plant shut down in 1986 (reducing the solids flux and the effects of salinity on the turnover regime) and the time that the Bridge Street plant shut down in 1988 (reducing the mercury load to the lake), as discussed by Rowell (1992) and cited in Chapter 6 of the RI report. After the 1988 closure of the Bridge Street plant, the mercury concentrations in both fish and sediments dropped. After 1990, the mercury concentrations in fish have generally reverted to the levels seen in the late 1970s, with some minor perturbations in both sediment and fish concentrations.

These patterns suggest that both processes (loading of total mercury and methylation) play a role in the uptake of methylmercury in fish. Thus, the selected remedy was developed to address the sources of both total mercury and methylation. When average mercury in fish and sediment are directly compared, using the data from 1974 to 1996 (TC Figure 3), a linear relationship is suggested for Onondaga Lake. This relationship supports the use of the BSQV, which was derived using a direct empirical relationship between mercury concentrations in fish and sediment.

However, the plot in TC Figure 3 does not suggest a particularly strong relationship between total mercury loading and mercury concentrations in fish. This result would be expected because of the inherent uncertainty in the dating of the high-resolution sediment core mentioned above. In addition, mercury uptake is most directly affected by the amount of methylmercury that the fish are exposed to, not the total mercury concentrations in sediments. An example of the way in which these two processes may not always move in the same direction is the period in the early 1980s when Honeywell waste was diverted through the Metro plant. This diversion likely resulted in increased methylmercury loads while also reducing the total mercury load to the lake.

If the fish and sediment data shown in TC Figure 2 are separated into three distinct periods of Honeywell operations (1974 to 1979, prior to diversion to Metro; 1980 to 1986, during diversion to Metro; and post-1986, after closure of the Main Plant), three distinct relationships are suggested despite the relatively small data sets (TC Figure 4). In the 1970s, there is a weak but positive relationship between total mercury loading (as represented by the sediment concentrations in the 1996 profundal core) and fish mercury concentrations during a time when turnover is impaired.

During the early 1980s, there was no apparent relationship between total mercury loading and fish mercury concentrations. However, concentrations of mercury in fish were higher than they were during the 1970s. Turnover was still impaired, but a significant amount of total mercury from Honeywell's diversion of overflow was being removed at Metro, thus resulting in lower total mercury loads to the lake, although the methylmercury load to the epilimnion was increasing. This suggests that the impact of the diversion to Metro during this period was great enough to overwhelm the apparent relationship between total mercury loading and fish mercury concentrations that was seen in the 1970s.

After Honeywell ceased operations at the Main Plant in 1986, the lake was in a more typical stratification regime and a stronger apparent relationship between total mercury loading and mercury concentrations in fish was seen. During this time, concentrations of mercury in fish were higher in comparison to the sediment concentrations than were seen in previous years. This suggests that exposures of fish to methylmercury may have increased during this time, even when the total mercury loading (as represented by the 1996 high-resolution profundal sediment core) was consistent with the 1970s levels. TC Figure 4 highlights the complexity of the system as total loading and methylation interact and also shows that both processes can play a role in the uptake of mercury in fish.

Technical Comment #16: A basic understanding of mercury inputs and transformations is lacking, such that stakeholders cannot be assured that the remediation program will be successful (e.g., reductions in mercury concentrations in fish). How will it be possible for NYSDEC, as stewards of this resource, to communicate to stakeholders how the lake will respond to remediation activities? The development of a well-tested and credible model that also addresses the fate and transport of selected components of the organic contaminants would go a long way in demonstrating this understanding and guiding the rehabilitation effort.

Response to Technical Comment #16: Analyses performed for the RI/FS, based on data collected during the RI/FS, provide for an understanding of mercury inputs and transformations. This understanding was used to develop the RAOs and PRGs upon which the selected remedy is based. More important than gross mercury loading to the lake in terms of uptake in biota (e.g., fish) is the fact that total mercury is methylated in the lake under anoxic conditions. Methylmercury is much more easily taken up from the environment and more strongly accumulated in biota than non-organic forms of mercury. The following is an assessment of fish exposure to methylmercury and how remediation is expected to reduce those exposures. The primary routes of exposure for fish are directly from the water column and through the food chain.

Water Column Mercury Concentrations

High rates of methylation occur in the anoxic hypolimnion, which appears to be the dominant source of methylmercury to the water column. The reduction of the total mercury loads to the lake and oxygenation of the hypolimnion are expected to substantially reduce this source of methylmercury to the system and significantly reduce the concentration of methylmercury throughout the water column. The RI report estimated that hypolimnetic methylation contributed approximately 230 g during the stratified period in 1992, representing more than half of the total methylmercury budget for Onondaga Lake (see RI report Table 6-23). While this methylmercury production occurs in the hypolimnion, it is not considered isolated from the rest of the lake. In the mass balance for the epilimnion during the 1992 stratified period, it was estimated that 110 g of methylmercury (about 43 percent of the epilimnion's budget) cross the thermocline from the hypolimnion into the epilimnion. While the mass balance approach is an important way to assess sources, a more direct measure of the exposure to the biota and the possible changes that will occur with oxygenation can be seen in the actual water column methylmercury concentrations.

During the first phase of the RI, water samples were collected by Honeywell once a month from April to December of 1992 at the north and south deep basin stations either at depths of 3, 9, and 15 m or at depths of 0, 3, 6, 9, 12, 15, and 18 m. In April, the lake was still completely mixed from spring turnover and was well oxygenated throughout the water column (see TC Figures 5 and 6 in the Figures section of this RS), with total methylmercury concentrations ranging from 0.31 to 0.36 ng/L. Summer stratification was established by May 25, and oxygen concentrations were already depressed in the hypolimnion and were at or very close to anoxia at 18 m. In May, average methylmercury concentrations ranged from 0.19 to 0.35 ng/L in the well-mixed and oxygenated epilimnion. However, methylmercury in the hypolimnion started at 0.35 ng/L at 12 m, increased to 0.69 ng/L at 15 m, and finally peaked at 1.86 ng/L at 18 m. This suggests that the effects of anoxia/methylation in the water column were already being seen in May.

In the summer stratification period, hypolimnetic methylmercury concentrations were elevated to a maximum of about 12 ng/L, with an average for the period of about 4 to 6 ng/L. At the same time, low concentrations on the order of 0.3 ng/L were detected at depths of 0 and 6 m in the epilimnion. Of particular note are the epilimnetic data from the 9-m depth, which is at the bottom of the oxygenated epilimnion but just above the thermocline. As can be seen in TC Figure 6, concentrations of methylmercury at 9 m during the summer (ranging from 0.49 to 1.02 ng/L with an average of 0.71 ng/L) were about twice those seen in the upper waters of the epilimnion during this period. With the onset of fall turnover, the methylmercury-rich hypolimnetic waters mixed with the epilimnetic water and produced concentrations of methylmercury between 1 and 2 ng/L throughout the water column into December.

During the second phase of the RI, Honeywell collected additional samples to further assess the importance of fall turnover in mercury (and methylmercury) fate and transport. The sampling started during the stratified period in September 1999 and continued through the turnover process into December (see RI report Figures 5-143 and 5-145). In September 1999, the average total methylmercury concentration in the surface water (0 m depth) was 0.98 ng/L, roughly three times that of 1992. The average methylmercury concentration of 2.4 ng/L (0 m depth) from October to December reflects the rise during the turnover process and is greater than the concentrations seen in 1992.

In 2000, on an approximately biweekly basis, Sharpe (2004) collected epilimnetic (0 m depth) and hypolimnetic (12, 15, and 18 m depths) water samples for methylmercury analyses. These data exhibit a pattern similar to the 1992 data. In April and early May 2000, very low concentrations (less than 0.1 ng/L) of methylmercury were detected at the 0 m depth, with slightly higher concentrations (mean of 0.25 ng/L) during the stratified period, and a rise to about 1 ng/L during turnover.

In late July 2000, water samples were collected by Honeywell from just above the sediment-water interface in both the profundal and littoral zones. The samples from the profundal zone had methylmercury concentrations ranging from 1.93 to 3.84 ng/L, which is consistent with the hypolimnetic water column data collected in 1992 and 2000. The littoral zone samples were from locations in the Ninemile Creek delta and the ILWD subject to resuspension. In the Ninemile Creek delta, the methylmercury concentration (0.214 ng/L) was consistent with the well-oxygenated epilimnion. The samples from the ILWD contained higher concentrations (0.405 to 0.827 ng/L) than are typically seen in the epilimnion prior to turnover, which was likely due to resuspended contaminated material. It is expected that these elevated concentrations would be for the most part eliminated with the partial removal and capping proposed in the ILWD.

Fish Exposure to Mercury

Based on the water column data presented above, an assessment can be made of the exposure of fish to methylmercury in the water column and how that exposure may be affected by the remedial program. The data from the spring turnover, when the entire water column is well oxygenated, give the best insight into the effects that oxygenation of the hypolimnion will have on the methylmercury regime in the water column. During this time, only very low concentrations (less than or equal to 0.3 ng/L) of methylmercury are seen in the water column. In 1992, these same concentrations of methylmercury are seen in the surface (0 to 6 m) water throughout the summer stratified period. If the entire water column of the lake is kept oxic by the remedial program, it would be expected that the water column methylmercury concentrations would be maintained at these low levels.

Currently, methylmercury builds up in the hypolimnion during the stratified period, which lasts roughly four months of the year. This methylmercury increase starts concurrent with the decline in oxygen levels in May. A concentration of 1.8 ng/L of methylmercury was seen at 18 m in May 1992, when hypolimnetic oxygen levels ranged from 0.5 to 4.1 mg/L. During this time (at the beginning of the stratified period in May 1992), it is reasonable to assume that there were no fish in the hypolimnion, since most of the hypolimnion exhibited DO levels less than 4 mg/L, which is less than the NYSDEC average daily DO standard for fish propagation and survival (5 mg/L).

Although fish are not likely to be exposed directly to hypolimnetic waters during the stratified period, there is evidence that methylmercury from the hypolimnion is crossing the thermocline into the epilimnion, where fish are expected to be. At the 9 m water depth at the bottom of the epilimnion during the stratified period, fish can be exposed to methylmercury concentrations that are at least twice the concentrations seen throughout the water column during the spring turnover period and in the top of the epilimnion during the stratified period. It is likely that littoral zone fish (smallmouth and largemouth bass, bluegill, catfish) are not subject to this exposure since the more desirable habitat (macrophyte beds) for these species is restricted to depths of less than 6 m in Onondaga Lake, while more pelagic fish (walleye and white perch) are likely to be exposed to this additional dose of methylmercury near the thermocline. Walleye (a top predator) have the highest concentrations of mercury in the lake, and white perch (a planktivore) have mercury concentrations substantially higher than littoral-zone fish with a similar trophic level (bluegill) and often have higher concentrations than top-trophic-level littoral predators (bass). It is expected that oxygenation of the lake would reduce this exposure to methylmercury crossing the thermocline by at least 50 percent to concentrations consistent with spring turnover levels.

During fall turnover, the hypolimnetic waters, with their elevated mercury and methylmercury concentrations, are mixed with the epilimnetic waters, resulting in methylmercury concentrations that are about three to five times higher than during spring turnover. These elevated concentrations are found throughout the lake and typically persist for at least three months (from the onset of turnover [mixing] in the beginning of October until sampling ended in December), and affect all fish species. It is expected that remediation will reduce these exposures by a factor of 3 to 6 to levels that are similar to spring turnover conditions.

A potential change in the exposure of littoral- and pelagic-zone fish to water-column methylmercury is presented below in TC Tables 4 and 5, respectively, based on the RI data collected from April to December 1992. Samples were collected at two locations (north and south deep basins) once a month. In the tables, the year is divided into three periods of four months. The spring turnover period is represented by a single set of samples (April), the summer stratified period in 1992 is represented by five sets of samples (May to September), and the fall turnover period is represented by three sets of samples (October to December). There are no samples from the winter stratified period. While the tables below are based on the 1992 RI data, data from water sampling in 2000 (Sharpe, 2004) reflect similar trends, with low concentrations in the upper epilimnion in spring and summer with an increase during the approach to fall turnover.

TC Table 4 Exposure of Littoral Zone Fish to Water Column Methylmercury

Time Period (Percent of year)	Current Concentrations[1]	Weighted Concentration[1, 2]	Weighted Concentration Due to Remediation[1, 3]	Percent Reduction
Spring (33.3%)	0.3	0.1	0.1	0
Summer (33.3%)	0.3	0.1	0.1	0
Fall (33.3%)	1.4	0.47	0.1	78 %
Weighted Average Concentration	N/A	0.67	0.3	55 %

Notes: [1] All units are in ng/L.
[2] Concentration times percent of year.
[3] Predicted concentration following remediation (0.3 ng/L) for all seasons times percent of year.

TC Table 5 Exposure of Pelagic Zone Fish to Water Column Methylmercury

Time Period (Percent of year)	Current Concentrations[1]	Weighted Concentration[1, 2]	Weighted Concentration Due to Remediation[1, 3]	Percent Reduction
Spring (33.3%)	0.3	0.1	0.1	0
Summer (33.3%)	0.7	0.23	0.1	57%
Fall (33.3%)	1.4	0.47	0.1	78%
Weighted Average Concentration	N/A	0.80	0.3	62%

Notes: [1] All units are in ng/L.
[2] Concentration times percent of year.
[3] Predicted concentration following remediation (0.3 ng/L) for all seasons times percent of year.

Uptake of Mercury Through the Ingestion of Benthic Macroinvertebrates

The lower levels of the aquatic-based food chain include the benthic macroinvertebrates in the littoral zone and the zooplankton in the pelagic/profundal zone.

As discussed in Chapter 2 of the RI report and Chapter 7 of the BERA report, macroinvertebrate samples were collected in 1992 and 2000 from various locations in the lake (see Figures 7-5 and 7-9 of the BERA report). SWACs for total mercury and average methylmercury concentrations in the surface (0 to 15 cm) sediments for each SMU are presented in TC Table 6 below. SWACs were not calculated for methylmercury due to the significantly smaller data set as compared to mercury.

TC Table 6 Total Mercury SWACs and Average Methylmercury Concentrations for Surface Sediments by SMU

SMU	Current Mercury SWAC (mg/kg)	Average Methylmercury Concentration (µg/kg)
1	20.49	20.5
2	2.88	6.4
3	1.36	2.1
4	2.10	4.2
5	0.77	3.1
6	2.54	8.6
7	9.32	12.2
8	2.61	22.5
Littoral Zone (SMUs 1 – 7)	3.59	13.2

The combined 1992 and 2000 data for methylmercury concentrations in chironomids for SMUs 1 through 7 are shown on TC Figure 7. The average methylmercury concentration (79 µg/kg) in SMU 1 chironomids is almost an order-of-magnitude greater than for any other area of the lake. The chironomids in the rest of the littoral SMUs all have similar lower concentrations (5 to 20 µg/kg, with an average of 10.8 µg/kg) and are all elevated above the non-detect levels seen in Otisco Lake, which is the reference lake for the Onondaga Lake project.

Implementation of the selected remedy will substantially reduce the sediment SWACs for total mercury in SMUs 1, 2, 3, 4, 6, and 7 as a result of the use of clean fill for capping materials (the SWAC for SMU 5 will not be substantially reduced since the selected remedy includes limited [approximately 10 percent of the total area of the SMU] remediation in this SMU). For the benthivorous fish that primarily reside in the southern corner of the lake, it can be expected that exposure to methylmercury through the food chain will be reduced by as much as an order of magnitude following remediation. This is based on the assumption that concentrations of methylmercury in SMU 1 chironomids will be reduced from the current average in SMU 1 (79 µg/kg) to the average concentration in the other littoral zone SMUs (10.8 µg/kg) (a reduction of 86 percent) or less. SMU 1 represents about 8 percent of the area of the littoral zone of the lake and contains significantly greater chironomid methylmercury concentrations than the rest of the littoral zone (see TC Figure 7). For those fish that range over the entire littoral zone, it can be expected that exposure to methylmercury in the littoral food chain would also be reduced, but to a lesser extent.

Zooplankton Mercury Concentrations

Zooplankton samples were collected in May (spring), August (summer), and November (fall) of 1992. The results are presented in TC Table 7 below.

TC Table 7 Zooplankton Data from 1992

Season	Station	Methylmercury Concentration (µg/kg)	
		Assemblage	Daphnids
Spring	W1	32	NC
	W2	41	NC
Summer	W1	33	220
	W2	26	300
Fall	W1	81	230
	W2	65	250

Notes: Data taken from 1993 PTI report.
NC = not collected.

Two types of samples were collected, as follows:

- **Assemblages** were bulk samples of the materials in the collection net, which included large numbers of smaller copepods and larger species, and possibly other material such as large colonial phytoplankton and daphnids.

- **Daphnids** were collected by sorting the bulk samples in the field. Twenty individual *Daphnia* sp. were collected for each sample.

The assemblage sampling indicates that methylmercury concentrations were relatively stable between spring and summer collections, with average concentrations of 36.5 and 29.5 µg/kg, respectively. The methylmercury concentrations increased by about a factor of two during the fall turnover (average of 73 µg/kg), showing a clear response to the increase in epilimnetic water concentrations of methylmercury. It can be noted that these assemblage concentrations are three to seven times greater than the concentrations seen in most of the littoral zone benthic invertebrates (chironomids) and that concentrations in the fall samples approach the SMU 1 methylmercury results for macroinvertebrates.

The daphnid sampling indicates that the methylmercury concentrations are stable from summer to fall, with average concentrations of 260 and 240 µg/kg, respectively. (Note that a daphnid sample could not be collected in the spring.) This lack of change in the methylmercury body burdens indicates that the daphnids are not affected by the increase in epilimnetic water concentrations at fall turnover and suggests that their exposure does not change across the summer stratified and fall turnover periods. It can also be noted that these concentrations are roughly eight times greater than the assemblage concentrations, 25 times greater than the macroinvertebrate methylmercury concentrations seen in the littoral zone outside of SMU 1, and about three times greater than the average SMU 1 macroinvertebrate methylmercury results.

An important pattern seen in the zooplankton results is that the daphnids have substantially greater concentrations of methylmercury than the assemblages. There are a few possible explanations for this. The first is that the assemblage samples were bulk samples and were not sorted. It is possible that other material with lower concentrations of methylmercury (e.g., phytoplankton) may have been included in the sample, causing dilution. However, this would imply that the majority of the sample was something other than zooplankton.

The second possibility is that there are ecological differences between daphnids and the smaller copepods. In particular, it is well documented that daphnids migrate vertically on a diurnal basis, moving into deeper water during the day to avoid predation by planktivorous fish (e.g., white perch) that selectively feed on these large zooplankton (Wetzel, 1983). While there is evidence that the smaller zooplankton also migrate, they do not appear to do so nearly to the same extent as daphnids. Thus, it is believed that the daphnids spend a majority of their time at the very bottom of the epilimnion or in the thermocline, where the methylmercury concentrations are elevated throughout the summer, while the smaller copepods are primarily in the upper epilimnion where the methylmercury concentrations remain at the spring turnover concentrations of around 0.2 to 0.3 ng/L. This concept is supported by the fact that while the assemblage concentrations rise during the fall turnover, reflecting the increase in epilimnetic water concentrations, the daphnid concentrations do not. This suggests that the daphnids are exposed to elevated concentrations throughout the summer and fall. A third possible reason for some of the differences seen is that the larger daphnids may have different feeding habits, which affects the amount and type of food that is processed. Another possibility is that *Daphnia* ssp. may simply concentrate more mercury than other species just as some fish species concentrate more than others do (reasons may be based on food, environmental factors, or internal biological makeup). There is at least one laboratory experiment which shows that *Daphnia mendotae* accumulated more monomethylmercury under certain conditions than did either of two copepod species which were also tested (Pickhardt et al., 2004).

Based on the patterns in the zooplankton results, an assessment of the exposure of fish to methylmercury from the littoral food chain and how the remedial program will affect this exposure can be made. Zooplankton present a much larger potential exposure to methylmercury through the food chain than the littoral benthic macroinvertebrates do because they occupy a larger area of the lake and have concentrations at least three times higher than the methylmercury concentrations in the littoral benthic macroinvertebrates. However, it should be recognized that fish that feed on zooplankton (e.g., white perch, bluegill) preferentially select the large individuals (e.g., daphnids), which have concentrations about 25 times higher than the littoral benthic macroinvertebrates outside of SMU 1. The concept that the daphnids are continually exposed to elevated concentrations of methylmercury in the water column throughout the summer and fall, resulting in highly elevated methylmercury body burdens, and are preferentially selected as prey at the bottom of the pelagic food chain is reflected in the fish data. The white perch, which feed predominantly in the pelagic zone on zooplankton, have higher concentrations of mercury than the trophic-level-equivalent species in the littoral zone (bluegill). The top predator of the pelagic zone (walleye, which feed on other pelagic fish such as white perch) consistently have the highest mercury concentrations in the lake (see TC Figure 8).

Reductions in total mercury loads to the hypolimnion and oxygenation of the hypolimnion to eliminate methylation of mercury in the water column are expected to greatly reduce or eliminate this exposure of zooplankton to water column methylmercury to levels at or below the spring turnover concentrations of 0.2 to 0.3 ng/L. This should cause the concentrations of methylmercury in all zooplankton to drop to around 30 to 40 µg/kg, which corresponds to zooplankton concentrations during spring turnover (see TC Tables 8 and 10 below), and possibly to drop to around 10 µg/kg, which corresponds to the concentrations seen in benthic macroinvertebrates outside of SMU 1 (see TC Tables 9 and 11 below). These scenarios represent potential drops in methylmercury exposure through the pelagic food chain of between 26 and 96 percent.

TC Table 8 Reductions in Methylmercury Concentrations in the Assemblage Zooplankton if Fall Concentrations are Reduced to Spring Concentrations of 36.5 µg/kg

Time Period (Percent of Year)	1992 Concentrations in Zooplankton[1]	Weighted Concentration[1, 2]	Weighted Concentration Due to Remediation[1, 3]	Percent Reduction
Spring (33.3%)	36.5	12.1	12.1	0
Summer (33.3%)	29.5	9.8	9.8	0
Fall (33.3%)	73	24.3	12.1	50%
Total (100%)	N/A	46.2	34	26%

Notes: [1] All units are in µg/kg.
[2] Concentration times percentage of year.
[3] Assumes spring and summer concentrations will not change but that concentrations during fall turnover will decrease to spring levels (36.5 µg/kg) or less.

TC Table 9 Reductions in Methylmercury Concentrations in the Assemblage Zooplankton if Concentrations are Reduced to Littoral Chironomid Levels of 10.8 µg/kg

Time Period (Percent of Year)	1992 Concentrations in Zooplankton[1]	Weighted Concentration[1, 2]	Weighted Concentration Due to Remediation[1, 3]	Percent Reduction
Spring (33.3%)	36.5	12.2	3.6	70%
Summer (33.3%)	29.5	9.8	3.6	63%
Fall (33.3%)	73	24.3	3.6	85%
Total (100%)	N/A	46.3	10.8	77%

Notes: [1] All units are in µg/kg.
[2] Concentration times percentage of year.
[3] Assumes concentrations for all seasons will decrease to levels in littoral chironomids outside of SMU 1 of 10.8 µg/kg.

TC Table 10 Reductions in Methylmercury Concentrations in the Daphnid Zooplankton if Concentrations are Reduced to Assemblage Spring Concentrations of 36.5 µg/kg

Time Period (Percent of Year)	1992 Concentrations in Zooplankton[1]	Weighted Concentration[1, 2]	Weighted Concentration Due to Remediation[1, 3]	Percent Reduction
Spring (N/A)	N/A	N/A	N/A	N/A
Summer (50%)	260	130	18.2	86%
Fall (50%)	240	120	18.2	85%
Total (100%)	N/A	250	36.5	85%

Notes: [1] All units are in µg/kg.
[2] Concentration times percentage of year.
[3] Assumes summer and fall concentrations will decrease to spring assemblage levels (36.5 µg/kg) or less.

TC Table 11 Reductions in Methylmercury Concentrations in the Daphnid Zooplankton if Concentrations are Reduced to Littoral Chironomid Levels of 10.8 µg/kg

Time Period (Percent of year)	1992 Concentrations in Zooplankton[1]	Weighted Concentration[1, 2]	Weighted Concentration Due to Remediation[1,3]	Percent Reduction
Spring (N/A)	N/A	N/A	N/A	N/A
Summer (50%)	260	130	5.4	96%
Fall (50%)	240	120	5.4	96%
Total (100%)	N/A	250	10.8	96%

Notes: [1] All units are in µg/kg.
[2] Concentration times percentage of year.
[3] Assumes concentrations in summer and fall will decrease to levels in littoral chironomids outside of SMU 1 of 10.8 µg/kg.

Profundal Benthic Macroinvertebrates

Based on limited data from the RI, a benthic community does not currently exist in the profundal zone of Onondaga Lake due to the summer anoxia. Following remediation, it is expected that the concentrations of total mercury in the profundal surface sediments will decline (predicted to be 1 mg/kg or less) due to MNR and concentrations of methylmercury in the overlying water will decrease to low levels (0.3 ng/L) due to reduced loads and oxygenation. While the desired concentration of DO in the hypolimnion for the remedy will be determined in design, a benthic community may develop in the profundal zone in response to oxygenation. If so, this benthic community would represent an additional route of exposure to methylmercury for fish in the lake.

It is expected that conditions in the profundal zone following remediation will be similar to conditions in much of the littoral zone (e.g., relatively low mercury concentrations [SWAC of about 1 mg/kg or less], relatively high oxygen concentrations). Thus, it is reasonable to assume that these benthic organisms would have methylmercury concentrations similar to those of the littoral zone macroinvertebrates. It is acknowledged that the degree to which the overlying water (hypolimnion) and the surface (bioturbation zone) sediments can be kept oxygenated, thereby preventing mercury methylation, will need to be further evaluated during design.

Conclusions

To further examine the potential changes in fish concentrations after implementation of the selected remedy, an assessment of the potential concentrations of methylmercury in the media that the fish would be exposed to (water and food) after remediation was conducted during development of the Proposed Plan and ROD. The assessment indicated that exposure of fish to methylmercury in the water may be reduced by more than half (54 to 64 percent) following remediation. Exposure to methylmercury via the littoral (near shore) zone food chain may be reduced from less than 10 percent for SMU 5 to 86 percent for SMU 1. Exposure to methylmercury via the pelagic (deep water) zone food chain may be reduced by 26 to 96 percent. Thus, it is reasonable to expect to see significant, noticeable reductions in the mercury concentrations in the fish of Onondaga Lake (especially pelagic fish) following source control and lake remediation. If the selected remedy does not at least achieve the range of fish tissue PRGs specified in the ROD, the remedy will be reevaluated at a minimum as part of the five-year review under CERCLA, and could be addressed through a modification of the ROD.

It is possible that refinements of these estimates based on the length of exposure time and the relative importance of individual routes of exposure to various species of fish could be made with a more complex mechanistic model; however, it is unlikely that the final conclusion – that it is reasonable to expect to see a significant reduction in the concentrations of contaminants in fish as a result of the remediation within a relatively short period of time (i.e., less than 10 years after remediation) – would be changed. As additional data are acquired, NYSDEC will consider whether it is appropriate to develop or refine fate and transport models for the site. If such models are developed or refined, they will be used, as appropriate, to optimize the remedial design as implementation proceeds.

Technical Comment #17: The potential for resuspension of the ILWD to be a significant source of mercury (and other contaminants) to the lake has been established, but the magnitude has not. This would have required application of appropriate quantitative tools (models). The profundal sediments as a major source of mercury also lacks quantification.

Response to Technical Comment #17: As discussed in the RI report, an assessment of the potential for resuspension of the ILWD to act as a source of mercury to the lake was initiated by NYSDEC in the fall of 2001 with a sampling/monitoring program. This program confirmed an increase in total mercury concentrations in the water column above the ILWD during wind-induced resuspension, and the transport of those elevated concentrations farther out into the rest of the lake. This program also established a relationship between wind speed and direction and turbidity (a surrogate for resuspended waste/sediments).

This information was utilized in a simple model in which the water column above the ILWD was idealized as a completely mixed tank, and used the following site-specific information: the relationship between total suspended solids and turbidity, the relationship between wind speed and turbidity, the meteorological data for the years 2001 to 2003, and the relationship between wind speed and current speed. The RI report presented a range of potential total mercury loads from the ILWD during the stratified period (2,000 to 20,000 g). A refined estimate based on further analysis of the meteorological data suggested a load of 6,300 g of total mercury to the water column of the lake from resuspended ILWD sediments (Gbondo-Tugbawa et al., 2005), which agrees well with the mass balance developed in the RI report. (See also response to Technical Comment #14 and associated TC Table 3.) Certainly a more sophisticated hydrodynamic model would yield an estimate with less uncertainty, and the RI report was clear on the limitations of this estimate, but NYSDEC considered these estimates to be sufficient to identify the resuspension of the ILWD to be a source of total mercury on the same scale as all of the external loads to the lake.

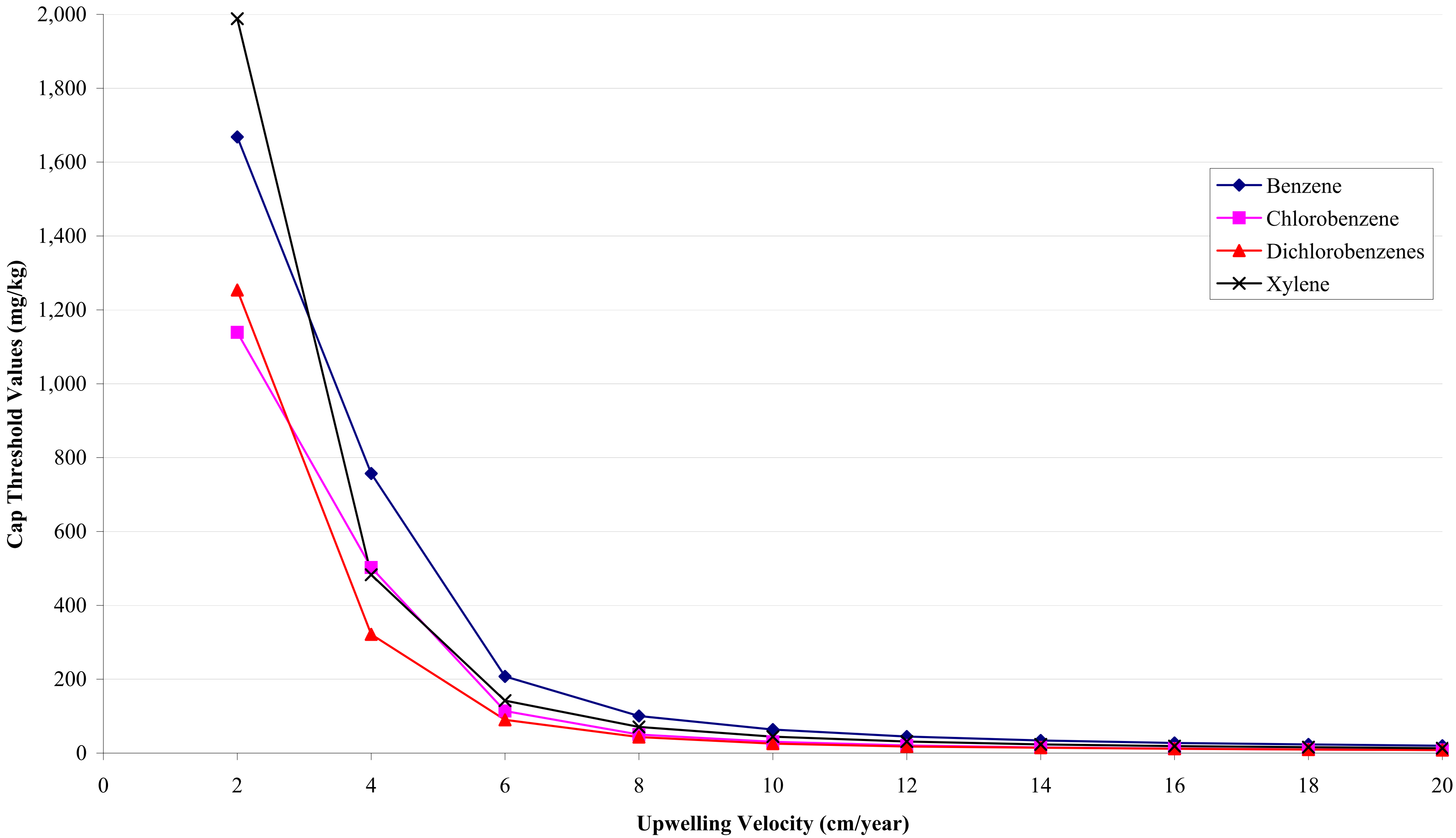
As discussed in the RI report, the sediment trap data clearly and consistently show an increase in particle-bound mercury across the hypolimnion, indicating a source below the thermocline. The RI report proposed that ebullition of methane gas likely acted as a mechanism for transferring total mercury associated with particles from the large mercury reservoir in the sediments across the sediment-water interface into the water column. Ebullition is often cited as a dominant transfer mechanism across the sediment-water interface, but it appears that only a few studies have actually documented this. Ohle (1958) and Matinvesi (1995) both qualitatively described the transport of sediments by the convection currents created by the rising methane bubbles, while Service Environmental & Engineering (2002) quantified the rate of particle transport. Martens and Klump (1980) and Martens et al. (1980) quantified the increase in diffusional transport caused by ebullition. As discussed in the RI report, the ebullition rate in Onondaga Lake (as estimated by Addess, 1990) is comparable (and is actually higher) than that cited in the St. Louis River by Service Environmental & Engineering. The RI report used the average particle transport rate from Service Environmental & Engineering (2002) and the average mercury concentration in the top 30 cm of the profundal sediments to estimate the mass of total mercury transported by this mechanism during the stratified period (880 g). Note that if the range of particle transport rates from Service Environmental & Engineering were used, the range of estimated transport rates from the profundal sediments to the water column in Onondaga Lake would be about 500 to 1,300 g of total mercury. These values, along with the increased diffusion, agree well with the mass balance presented in the RI report.

The current understanding of the magnitude of both of these sources of mercury, as well as all of the other sources and sinks of mercury to the lake, is sufficient for remedy selection. The magnitude of these sources and sinks may be confirmed, if warranted, as part of either the pre-design sampling or baseline monitoring programs. As additional data are acquired, NYSDEC will consider whether it is appropriate to develop or refine fate and transport models for the site. If such models are developed or refined, they will be used, as appropriate, to optimize the remedial design as implementation proceeds.

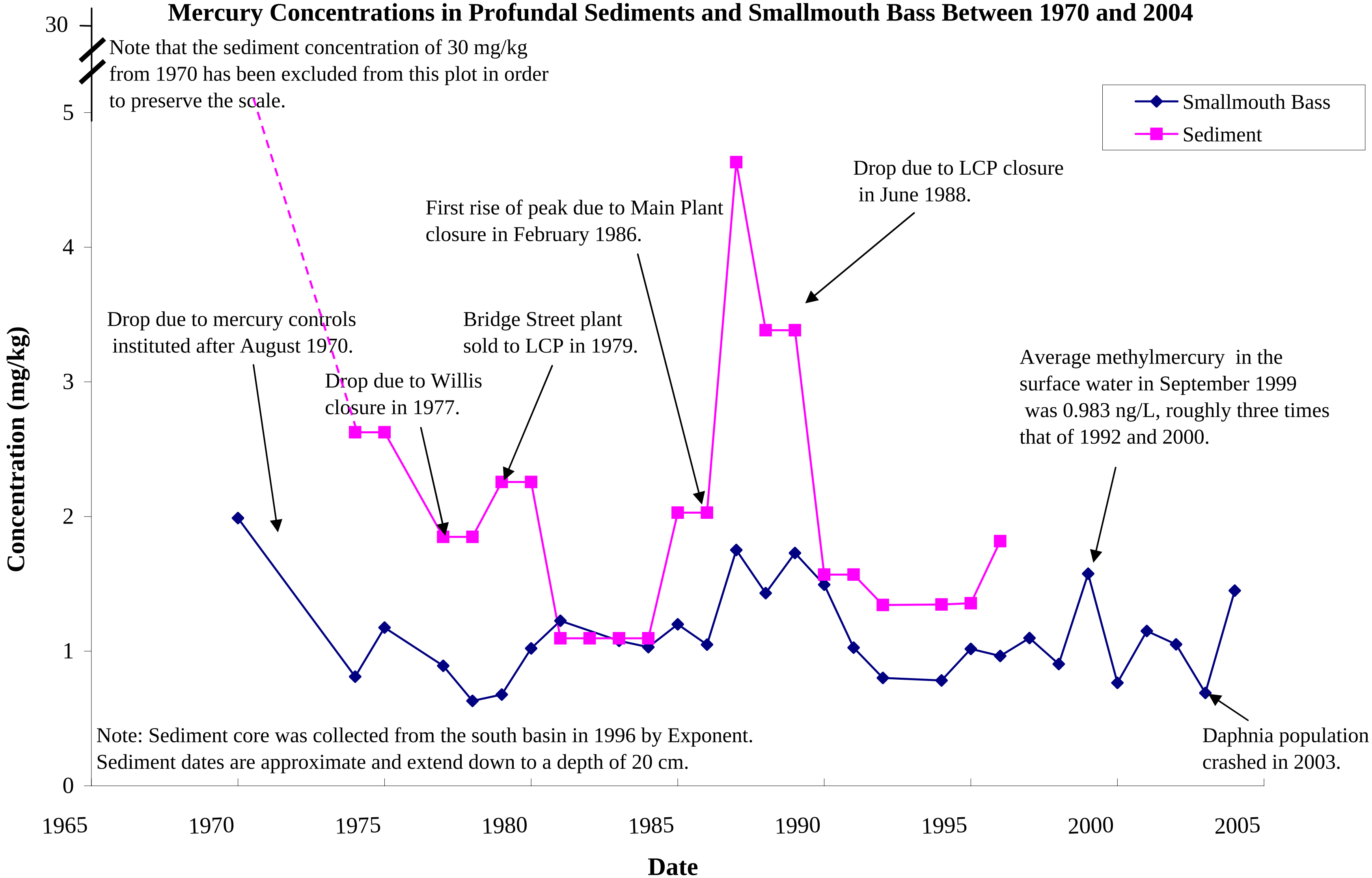
RESPONSIVENESS SUMMARY

FIGURES

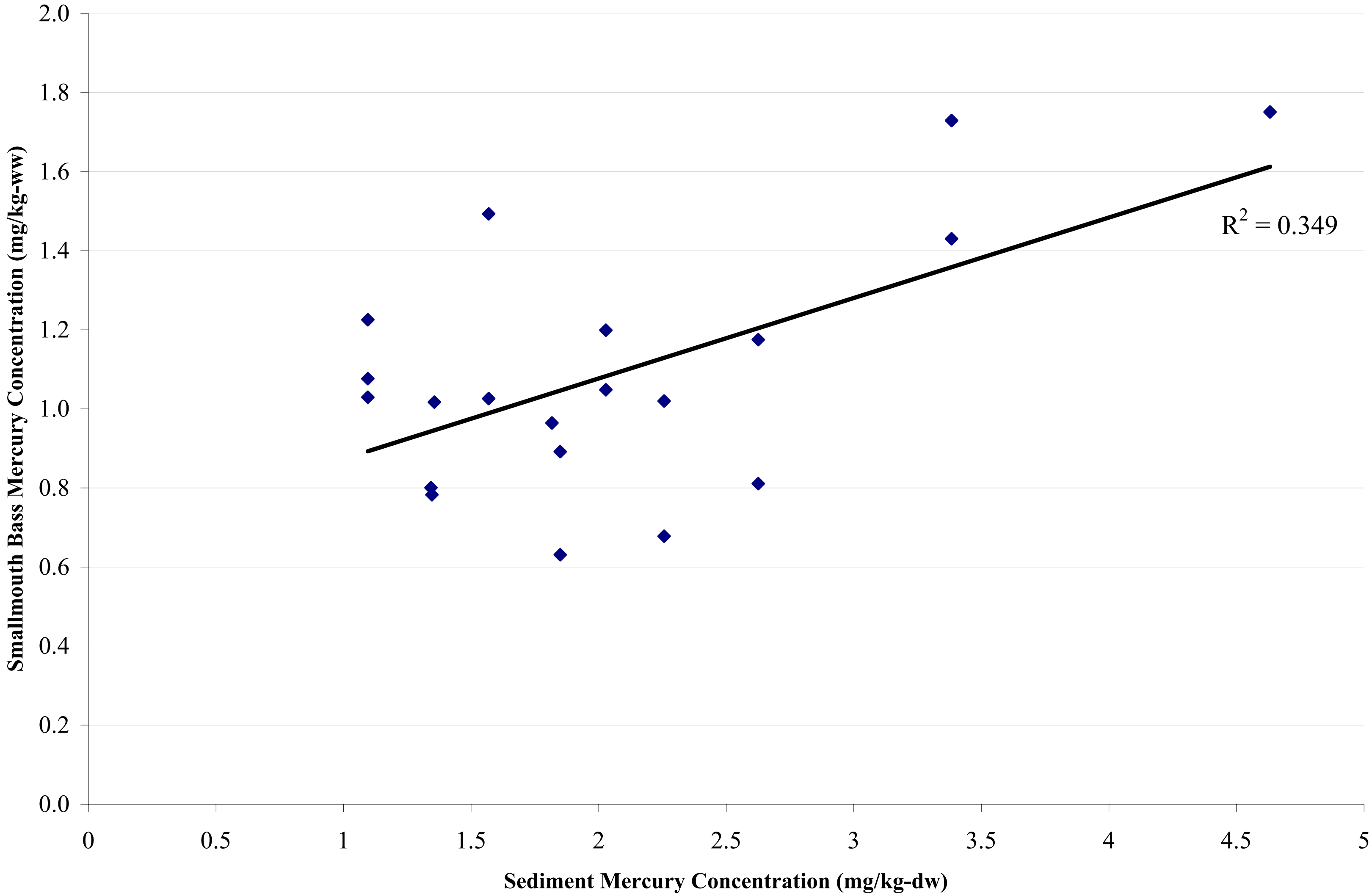
TC Figure 1
Sediment Cap Threshold Values vs. Upwelling Velocity for Benzene, Chlorobenzene, Dichlorobenzenes, and Xylene with a 2.5 Foot Isolation Layer



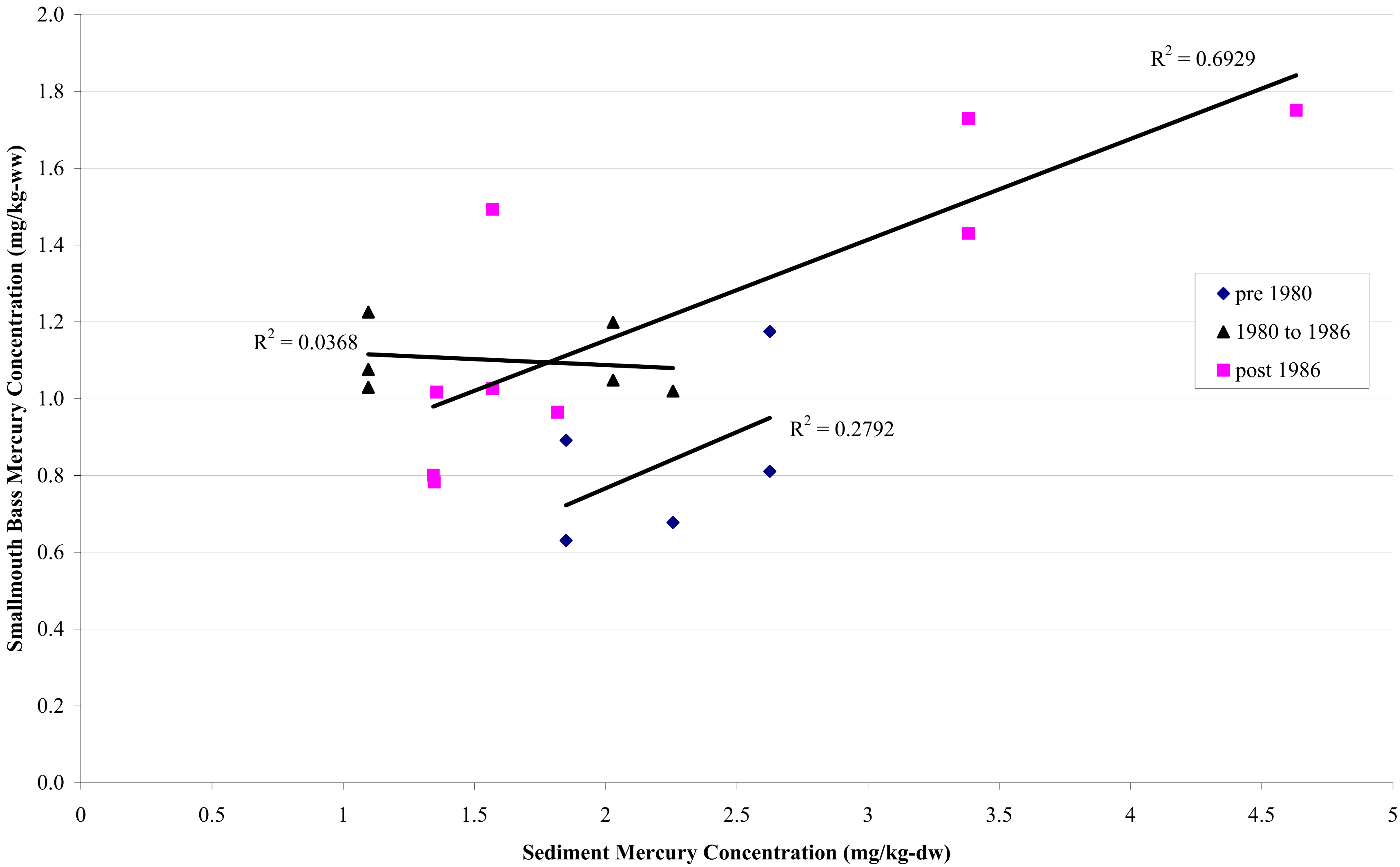
TC Figure 2
Mercury Concentrations in Profundal Sediments and Smallmouth Bass Between 1970 and 2004



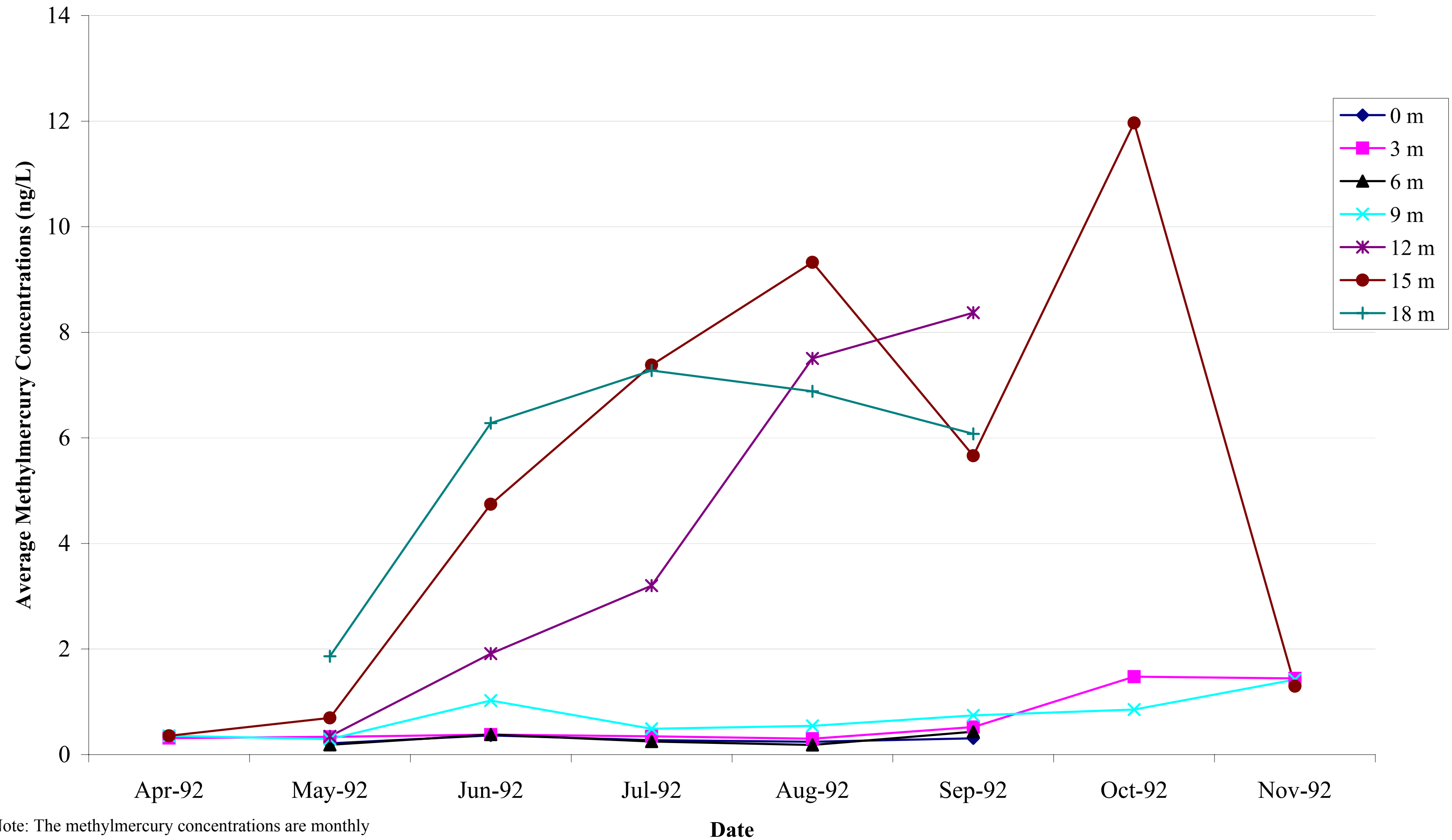
TC Figure 3
Mercury in Smallmouth Bass vs. Mercury in Sediment



TC Figure 4
Mercury in Smallmouth Bass vs. Mercury in Sediment by Era

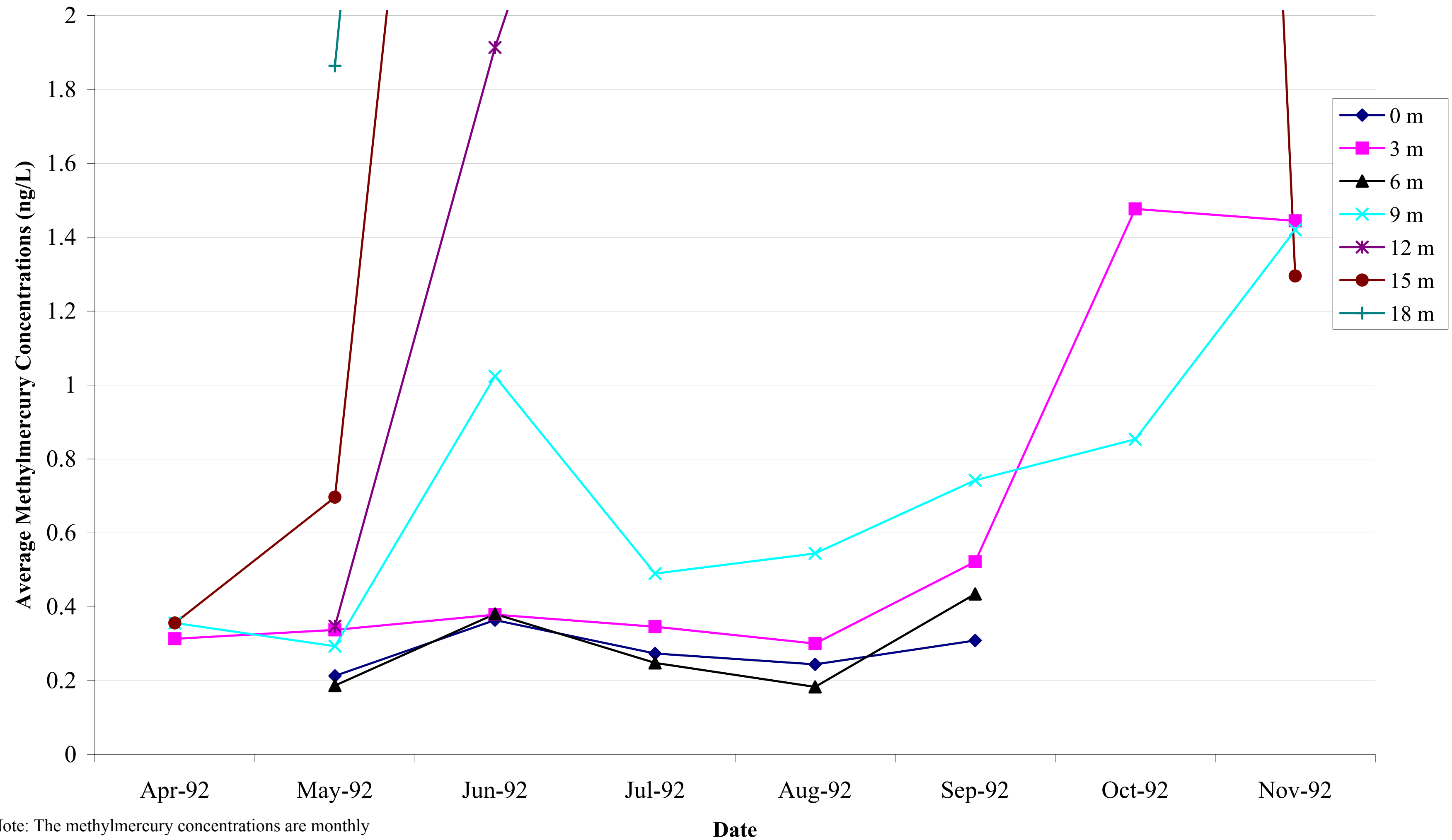


TC Figure 5
Temporal Trends of Methylmercury in Surface Water at Depths from 0 to 18 Meters



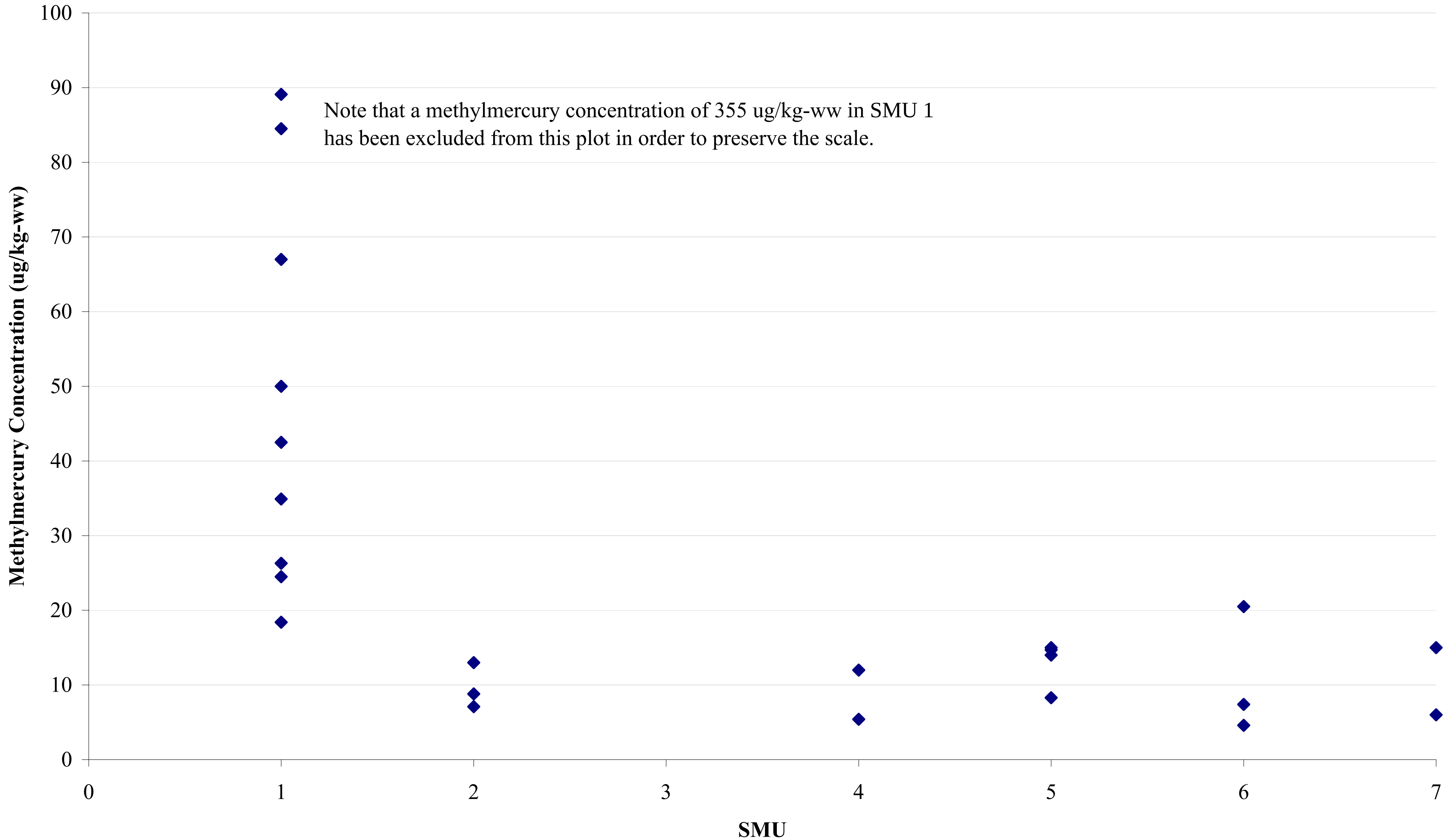
Note: The methylmercury concentrations are monthly averages from the north and south deep basin stations.

TC Figure 6
Temporal Trends of Methylmercury in Surface Water at Depths from 0 to 18 Meters Excluding the High Hypolimnion Values

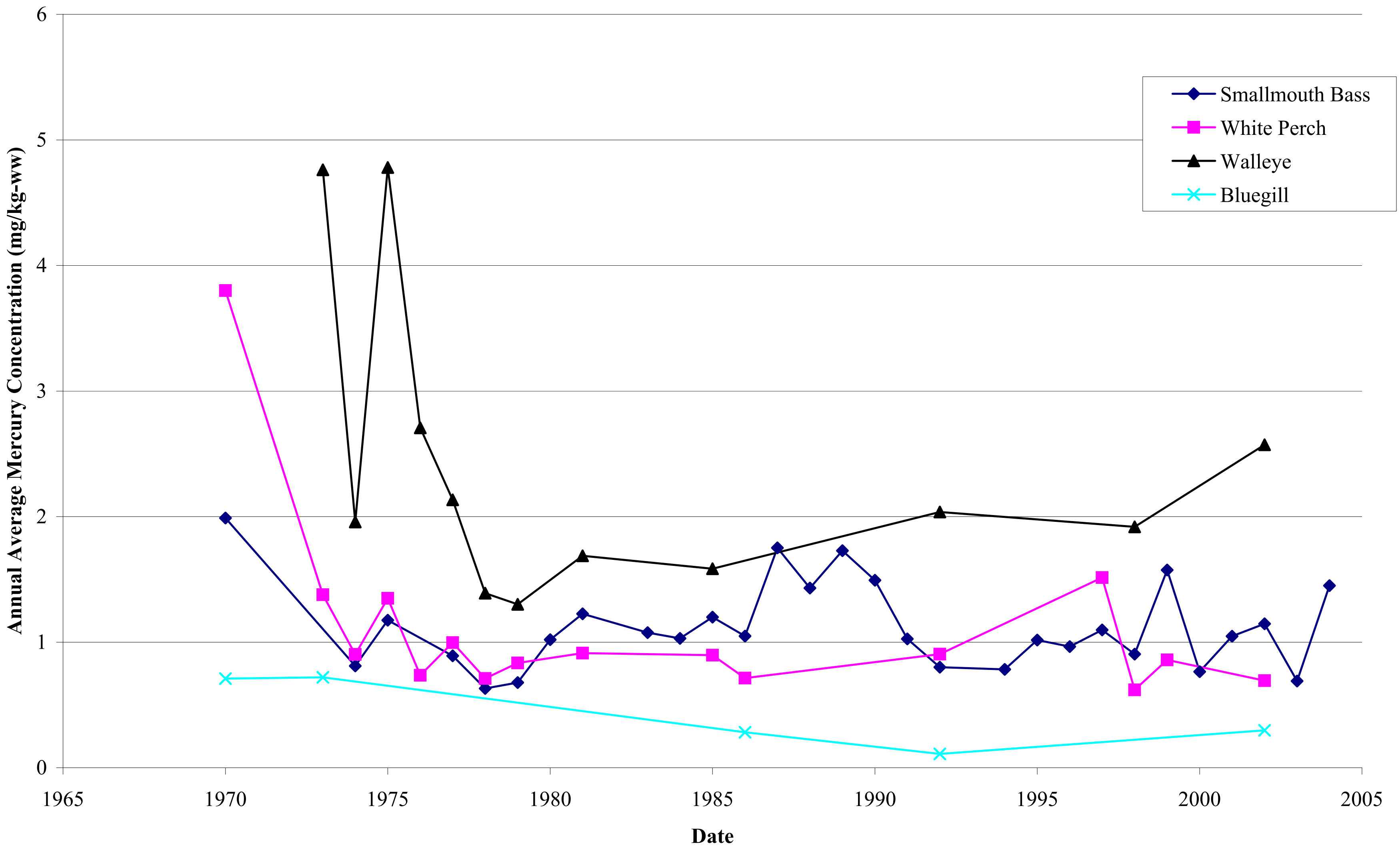


Note: The methylmercury concentrations are monthly averages from the north and south deep basin stations.

TC Figure 7
Methylmercury Concentrations in Chironomids from 1992 and 2000 in SMUs 1 through 7



TC Figure 8
Mercury Concentrations in Fish Fillets from 1970 to 2004



RESPONSIVENESS SUMMARY

TABLES

RS Table 1 – Onondaga Lake Responsiveness Summary
Comment Directory – Initial Comment Period through March 1, 2005

Letter Code	Last Name	First Name	Affiliation	Date Submitted	Form Submitted	Individual Comments
State						
S-1	Christensen	Joan K.	Member of Assembly, State Assembly of New York	2/17/05	Written	S-1.1
Onondaga Nation						
N-1	Heath, Esq.	Joseph J.	General Counsel for Onondaga Nation	2/8/05	Written	N-1.1 – N-1.7
Regional						
R-1	Coburn	David	Director, County of Onondaga, Executive Department, Office of the Environment	2/25/05	Written	R-1.1 – R-1.6
R-2	Rapp, Mrs.		Onondaga County Legislature	2/1/05	Written	R-2.1
R-3	Rivette	Barbara S.	Chair, Onondaga County Council on Environmental Health	2/23/05	Written	R-3.1 – R-3.8
Local						
L-1	Coogan	Mary Ann	Supervisor, Town of Camillus	2/9/05	Written	L-1.1 – L-1.12
L-2	Czaplicki	E. Robert	Supervisor, Town of Geddes	1/12/05	Written	L-2.1 – L-2.2
L-3	Warner	Deborah	Director of Government Affairs, Greater Syracuse Chamber of Commerce	1/12/05	Written	L-3.1 – L.3-5

RS Table 1 – Onondaga Lake Responsiveness Summary
Comment Directory – Initial Comment Period through March 1, 2005

Letter Code	Last Name	First Name	Affiliation	Date Submitted	Form Submitted	Individual Comments
Groups and Associations						
G-1	Breen	Ríobart É.	Executive Director, Anam Duan Franciscan Ecology Center	2/25/05	Written	G-1.1 – G-1.11
G-2	Burton	Cara	Director, Solvay Public Library	2/24/05	Written (letter to editor)	G-2.1
G-3	Daley	Douglas J. (and students)	Associate Professor, SUNY ESF	3/1/05	E-mail	G-3.1 – G-3.20
G-4	Effler, PhD and Driscoll, PhD	Steven W. and Charles T.	Director of Research, Upstate Freshwater Institute and University Professor of Environmental Systems Engineering, Syracuse University	3/1/05	Written	G-4.1 – G-4.22
G-5	Glance	Dereth	Program Coordinator, Citizens Campaign for the Environment	11/29/04	Written	G-5.1
G-6	Glance	Dereth	Program Coordinator, Citizens Campaign for the Environment	3/1/05	Written	G-6.1 – G-6.12
G-7	Loew	Martha Holly	Chair, Sierra Club, Iroquois Group	3/1/05	E-mail	G-7.1 – G-7.4
G-8	Long, MD	Robert E.	Onondaga Audubon Society, Inc.	2/16/05	Written	G-8.1
G-9	Murphy and Ringler	Cornelius and Neil H.	President and Chair, Faculty of Environmental & Forest Biology, SUNY ESF	2/25/05	Written	G-9.1 – G-9.3
G-10	Ringler	Neil H.	Distinguished Teaching Professor and Chair, Faculty of Environmental and Forest Biology, SUNY College of Environmental Science and Forestry	2/25/05	Written	G-10.1 – G-10.3
G-11	Sage	Samuel H.	President, Atlantic States Legal Foundation, Inc.	2/25/05	Written	G-11.1 – G-11.39

RS Table 1 – Onondaga Lake Responsiveness Summary
Comment Directory – Initial Comment Period through March 1, 2005

Letter Code	Last Name	First Name	Affiliation	Date Submitted	Form Submitted	Individual Comments
Honeywell						
H-1	Wickersham	David L.	Director, Remediation & Evaluation Services, Honeywell	2/28/05	Written	H-1.1 – H-1.16
Public Comments						
P-1	Bardeen	Joan E.		1/7/05	E-mail	P-1.1 – P-1.2
P-2	Bonner	David J.		1/7/05	E-mail	P-2.1
P-3	Bragman	Howard		1/12/05	Written (at Jan. meeting)	P-3.1 – P-3.2
P-4	Ciampi	Nancy		1/12/05	Written	P-4.1 – P.4-5
P-5	Comerford	Katherine J.		1/20/05	E-mail	P-5.1
P-6	Coughenour	Charles		12/15/04	E-mail	P-6.1 – P-6.3
P-7	Cram	Kenneth H.		2/19/05	Written	P-7.1
P-8	Cucci	JoAnn		1/12/05	Written (at Jan. meeting)	P-8.1
P-9	Eidt	Roger B.		1/9/05	Fax (to Steven Eidt @ DEC)	P-9.1 – P-9.2
P-10	Gibbs, Jr.	John S.		1/31/05	Written	P-10.1 – P-10.3
P-11	Haley	Kevin and Donna		2/23/05	E-mail	P-11.1 – P-11.4
P-12	Hanson	Bill	Manager, US Business Development, Great Lakes Dredge & Dock Company	11/30/04	E-mail	P-12.1
P-13	Johnson	Dallas		1/12/05	Written (at Jan. meeting)	P-13.1
P-14	Jones	Charles G.		2/12/05	E-mail	P-14.1 – P-14.2
P-15	Klink	P. Garry	Onondaga Yacht Club	1/12/05	Written (at Jan. meeting)	P-15.1 – P-15.3

RS Table 1 – Onondaga Lake Responsiveness Summary
Comment Directory – Initial Comment Period through March 1, 2005

Letter Code	Last Name	First Name	Affiliation	Date Submitted	Form Submitted	Individual Comments
P-16	Lange	J. Andrew		12/16/04	Written	P-16.1 – P-16.6
P-17	Lange	J. Andrew		1/12/05	Written	P-17.1 – P-17.6
P-18	Lathrop	Arnold W.		2/12/05	E-mail	P-18.1 – P-18.2
P-19	Law	Thomas E.		1/6/05	Written (at Jan. meeting)	P-19.1 – P-19.3
P-20	Lightcap	Richard J.		2/18/05	Written	P-20.1
P-21	Marquardt	Robert		1/8/05	Written	P-21.1 – P-21.3
P-22	Mazur	Allan		1/7/05	E-mail	P-22.1 – P-22.2
P-23	Mazur	Allan		2/22/05	E-mail	P-23.1
P-24	McGraw	Ashley (petition)	Ashley McGraw Architects PC	2/25/05	Fax	P-24.1
P-25	Monostory	Les		1/12/05	Written	P-25.1 – P-25.3
P-26	Motto	Barb		12/14/04	E-mail	P-26.1
P-27	Murphy	Michael		1/18/05	E-mail	P-27.1 – P-27.2
P-28	Murray	Susan and John		2/28/05	Written	P-28.1 – P-28.3
P-29	Myers	Temple W. and Mary A.		1/7/05	E-mail	P-29.1 – P-29.9
P-30	Nowak	Michael P.		2/22/05	Written	P-30.1
P-31	Orzell	Daniel L.		1/12/05	Written (at Jan. meeting)	P-31.1 – P-31.2
P-32	Poncha	Rusi		2/26/05	Written	P-32.1 – P-32.2
P-33	Procopio	Garrie		2/18/05	Written	P-33.1 – P-33.5
P-34	Procopio	Garrie		2/19/05	E-mail	P-34.1

RS Table 1 – Onondaga Lake Responsiveness Summary
Comment Directory – Initial Comment Period through March 1, 2005

Letter Code	Last Name	First Name	Affiliation	Date Submitted	Form Submitted	Individual Comments
P-35	Procopio	Garrie		2/19/05	E-mail	P-35.1
P-36	Rhoads	T.		1/12/05	Written (at Jan. meeting)	P-36.1 – P-36.5
P-37	Rhoads	T.		1/14/05	Written	P-37.1 – P-37.7
P-38	Russell	Sandra		2/18/05	Written	P-38.1
P-39	Ryder	Jesse		2/3/05	E-mail	P-39.1
P-40	Sanford	W. (petition)		2/23/05	Written	P-40.1
P-41	Schoenwald	Donald L.		2/22/05	Written	P-41.1
P-42	Spizuoco	Bill		3/4/05	E-mail	P-42.1
P-43	Tyler, PE	James H.		2/18/05	E-mail	P-43.1
P-44	Valenti, Jr.	Richard D.		12/8/04	E-mail	P-44.1
P-45	Webster	Deborah		3/1/05	E-mail	P-45.1 – P-45.2
P-46	Weller, PE	Dennis G.	President, Structural Associates, Inc.	2/4/05	Written	P-46.1
P-47	Woollis	Pam		2/16/05	Written (at 2/16 meeting)	P-47.1
Oral Comments (from transcript of 1/12 public meeting only)						
O-1	Pirro	Nick	Onondaga County Executive	1/12/05	Spoken	O-1.1 – O-1.8
O-2	Sweetland	Dale	Onondaga County Legislative Chairman	1/12/05	Spoken	O-2.1
O-3	Corbett	James	Onondaga County Legislator	1/12/05	Spoken	O-3.1 – O-3.2
O-4	Ward	Marlene	Mayor, Village of Liverpool	1/12/05	Spoken	O-4.1
O-5	Czaplicki	Bob	Supervisor, Town of Geddes	1/12/05	Spoken	O-5.1
O-6	Warner	Deborah	Greater Syracuse Chamber of Commerce	1/12/05	Spoken	O-6.1 – O-6.6
O-7	Sage	Sam	President, Atlantic States Legal Foundation	1/12/05	Spoken	O-7.1 – O-7.8

RS Table 1 – Onondaga Lake Responsiveness Summary
Comment Directory – Initial Comment Period through March 1, 2005

Letter Code	Last Name	First Name	Affiliation	Date Submitted	Form Submitted	Individual Comments
O-8	Holstein	Chuckie	FOCUS Greater Syracuse	1/12/05	Spoken	O-8.1 – O-8.9
O-9	Ohl	Clyde		1/12/05	Spoken	O-9.1 – O-9.3
O-10	Freedman	Jeffrey	Onondaga Yacht Club	1/12/05	Spoken	O-10.1 – O-10.6
O-11	Kochan	Nick	Village of Liverpool Planning Board Chairman	1/12/05	Spoken	O-11.1 – O-11.3
O-12	Chapman	David	Mountain Eagle Management	1/12/05	Spoken	O-12.1 – O-12.2
O-13	Bragman	Howard		1/12/05	Spoken	O-13.1 – O-13.2
O-14	Monostory	Les	President, Onondaga County Federation of Sportsmen's Clubs	1/12/05	Spoken	O-14.1 – O-14.2
O-15	Kaczmar, PhD	Swiatoslav		1/12/05	Spoken	O-15.1 – O-15.2
O-16	Fulmer	Sharon		1/12/05	Spoken	O-16.1 – O-16.2
O-17	Glance	Dereth	Central New York Program Coordinator, Citizens Campaign for the Environment	1/12/05	Spoken	O-17.1 – O-17.4
O-18	Hughes	Don	Technical Advisor to ASLF	1/12/05	Spoken	O-18.1 – O-18.5
O-19	Eckel	Sarah		1/12/05	Spoken	O-19.1
O-20	Effler	Steve	Director of Research, Upstate Freshwater Institute	1/12/05	Spoken	O-20.1 – O-20.4
O-21	Ciampi	Nancy		1/12/05	Spoken	O-21.1
O-22	Pedemonti	Peter		1/12/05	Spoken	O-22.1
O-23	Arnold	David		1/12/05	Spoken	O-23.1
O-24	Mossotti	Sherry		1/12/05	Spoken	O-24.1
O-25	Brown	Terry	Chairman/CEO, O'Brien & Gere	1/12/05	Spoken	O-25.1 – O-25.2

RS Table 1 – Onondaga Lake Responsiveness Summary
Comment Directory – Initial Comment Period through March 1, 2005

Letter Code	Last Name	First Name	Affiliation	Date Submitted	Form Submitted	Individual Comments
O-26	Monostory	Les	Co-chair, Fisheries Subcommittee of the Onondaga Lake Partnership; Vice-president of Central New York Chapter of the Izaak Walton League	1/12/05	Spoken	O-26.1 – O-26.3

RS Table 2 – Onondaga Lake Responsiveness Summary
Comment Directory – Second Comment Period

Letter Code	Last Name	First Name	Affiliation	Date Submitted	Form Submitted	Individual Comments
Honeywell						
H-2	Wickersham	David L.	Director, Remediation & Evaluation Services, Honeywell	4/29/05	Written	H-2.1 – H-2.5
H-3	Milch	Thomas H.	Arnold & Porter (legal counsel to Honeywell)	6/24/05	Written	H-3.1
Public Comments						
P-48	Anna-Fey	June		4/27/05	Written	P-48.1
P-49	Balboa	Alex		3/30/05	E-mail	P-49.1
P-50	Cappel	Sallie		3/12/05	E-mail	P-50.1
P-51	Cope Savage	Joan		4/29/05	E-mail	P-51.1
P-52	Hammond, MD	Susan P.		4/27/05	Written	P-52.1 – P-52.12
P-53	Lange	J. Andrew		4/2/05	Written	P-53.1 – P-53.7
P-54	Mager	Andy		4/29/05	E-mail	P-54.1
P-55	Markert	Alan		4/13/05	E-mail	P-55.1
P-56	Melvin	Alice C.		4/14/05	E-mail	P-56.1

TC Table 1. Onondaga Lake Sediment Effect Concentrations for Metals

	ER-L	TEL	ER-M	PEL	AET	PEC	ER-M and PEL Average
Metals (mg/kg)							
Antimony	3.10	4.00	3.10	4.30	NC	3.60	3.70
Arsenic	0.90	1.29	4.40	3.55	4.30	2.40	3.98
Cadmium	0.94	1.42	2.10	3.11	8.60	2.40	2.61
Chromium	17.6	29.3	47.9	67.3	195	50.3	57.6
Copper	12.3	19.1	40.7	48.3	83.7	32.9	44.5
Lead	9.68	13.3	56.9	57.6	116	34.5	57.3
Manganese	197	231	280	295	445	278	288
Mercury	0.51	0.99	2.80	2.84	13.0	2.20	2.82
Nickel	5.22	8.37	20.9	25.8	50.0	16.4	23.4
Selenium	0.42	0.40	0.60	0.68	0.94	0.58	0.64
Silver	0.82	0.90	1.20	1.42	2.70	1.28	1.31
Vanadium	2.70	3.40	6.00	8.30	12.2	5.60	7.15
Zinc	37.9	56.7	94.6	120	218	88.0	107

Notes:

- All concentrations are in dry weight.

AET - apparent effects threshold

ER-L - effects range-low

ER-M - effects range-median

NC - value was not calculated because of an insufficient number of detected observations or data points

PEC - probable effect concentration

PEL - probable effect level

TEL - threshold effect level

TC Table 2. Onondaga Lake Sediment Effect Concentrations for Organic Contaminants

	ER-L	TEL	ER-M	PEL	AET	PEC	ER-M and PEL Average
Organic Compounds							
BTEX Compounds (µg/kg)							
Benzene	27.3	42.4	42	299	5,300	150	171
Ethylbenzene	142	206	657	657	13.3	176	657
Toluene	13.1	15.9	27.5	50.3	443	41.8	38.9
Xylene isomers (total)	153	367	1,640	997	606	561	1,319
Chlorinated Benzenes (µg/kg)							
Chlorobenzene	64.4	48.3	580	799	10,000	428	690
Dichlorobenzene Sum	21.5	44.2	773	765	1,373	239	769
Trichlorobenzene sum	186	209	930	482	287	347	706
Hexachlorobenzene	7.16	8.9	28	23.6	28	16.4	25.8
Polychlorinated Biphenyls (µg/kg)							
Aroclor 1016	99.0	104	135	135	90	111	135
Aroclor 1248	82	98.7	300	307	470	204	304
Aroclor 1254	68.5	73.5	82.5	79.7	77	76.1	81.1
Aroclor 1260	80.0	115	240	221	240	164	231
Total PCBs	136	151	400	382	710	295	391
PAH Compounds (µg/kg)							
Naphthalene	340	471	1,400	1,380	2,100	917	1,390
Acenaphthene	469	478	1,200	1,030	1,700	861	1,115
Fluorene	55.2	66.9	305	327	3,500	264	316
Phenanthrene	92.2	135	480	491	16,000	543	486
Anthracene	33.0	49.6	210	249	4,400	207	230
Fluoranthene	140	483	1,400	2,482	26,000	1,436	1,941
Pyrene	114	238	650	795	NC	344	723
Benz[a]anthracene	60.7	118	415	451	NC	192	433
Chrysene	100	172	440	541	NC	253	491
Benzo[b]fluoranthene	63.1	80.9	240	253	1,100	908	247
Benzo[a]pyrene	62.8	98.2	210	355	NC	146	283
Indeno[1,2,3-cd]pyrene	58.8	102.0	370	503	NC	183	437
Dibenz[a,h]anthracene	49.4	67.7	180	218	730	157	199
Benzo[ghi]perylene	228	307	1,300	1,170	2,700	780	1,235
Acenaphthylene	507	673	1,850	1,970	3,000	1,301	1,910
Benzo[k]fluoranthene	63.1	80.9	240	253	1,100	203	247
Dibenzofuran	340	295	340	561	NC	372	451
Total PAHs	605	1,559	9,023	9,299	92,330	5,925	9,161
Other SVOCs (µg/kg)							
Phenol	45	45	45	45	45	45	45
Pesticides (µg/kg)							
DDT and Metabolites (Sum)	47	23.7	47	26.6	16.3	29.6	36.8
Chlordane isomers (Sum)	NC	5.1	NC	5.1	NC	5.1	5.1

Notes:

- All concentrations are in dry weight.

AET - apparent effects threshold

ER-L - effects range-low

ER-M - effects range-median

NC - value was not calculated because of an insufficient number of detected observations or data points

PEC - probable effect concentration

PEL - probable effect level

TEL - threshold effect level

RESPONSIVENESS SUMMARY

ATTACHMENT 1

National Remedy Review Board Recommendations
and
NYSDEC and EPA's Responses

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

February 18, 2005

MEMORANDUM

SUBJECT: National Remedy Review Board Recommendations for the Onondaga Lake Superfund Site

FROM: Jo Ann Griffith, Chair (//ss//)
National Remedy Review Board

TO: William J. McCabe, Acting Division Director
Emergency and Remedial Response Division

Purpose

The National Remedy Review Board (NRRB) has completed its review of the proposed cleanup action for the Onondaga Lake Superfund Site in Onondaga County, New York. This memorandum documents the NRRB's advisory recommendations.

Context for NRRB Review

The Administrator announced the NRRB as one of the October 1995 Superfund Administrative Reforms to help control response costs and promote consistent and cost-effective decisions. The NRRB furthers these goals by providing a cross-regional, management-level, "real time" review of high cost proposed response actions prior to their being issued for public comment. The board reviews all proposed cleanup actions that exceed its cost-based review criteria.

The NRRB evaluates the proposed actions for consistency with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and relevant Superfund policy and guidance. It focuses on the nature and complexity of the site; health and environmental risks; the range of alternatives that address site risks; the quality and reasonableness of the cost estimates for alternatives; regional, state/tribal, and other stakeholder opinions on the proposed actions, and any other relevant factors.

Generally, the NRRB makes advisory recommendations to the appropriate regional decision maker. The Region will then include these recommendations in the administrative record for the site, typically before it issues the proposed cleanup plan for public comment. While the Region is expected to give the Board's recommendations substantial weight, other important factors, such as subsequent public comment or technical analyses of response options, may influence the final regional decision. The Board expects the regional decision maker to respond in writing to its recommendations within a reasonable period of time, noting in particular how the recommendations influenced the proposed cleanup decision, including any effect on the estimated cost of the action. It is important to remember that the NRRB does not change the Agency's current delegations or alter in any way the public's role in site decisions.

Overview of the Proposed Action

The Onondaga Lake site, located in Onondaga County, New York, includes the Lake itself and all sources of contamination to the Lake, including potentially 10 to 20 subsites. Subsites are defined as any site that is situated on Onondaga Lake's shores or tributaries or in the proximity to the lake or tributaries that have contributed contamination to, or threatens to contribute contamination to, the Onondaga Lake system. One of these subsites is the Onondaga Lake Bottom, the subject of the presentation. The Onondaga Lake subsite consists of the 4.6-square mile Onondaga Lake.

The preferred remedy for the Lake Bottom subsite includes a combination of dredging, capping, aeration, and monitored natural recovery. The estimated present-worth cost of the preferred remedy is $451million. As a state-lead project, the New York State Department of Environmental Conservation assisted the Region in preparing the presentation package and made a presentation at the Board meeting. Three stakeholders have been identified: the Onondaga Nation, Honeywell International, a potentially responsible party, and Atlantic States Legal Foundation, Inc., the technical assistance grant recipient.

The Onondaga Nation presented written comments to the Board and made a presentation at the Board's meeting. The Onondaga Nation has a strong interest in the cleanup of Onondaga Lake, because it is located within its land claim area, and the Nation considers the lake and the land along its shoreline to be sacred. In its written comments and at the meeting, the Nation voiced its objection to any proposed remedy that would leave contaminants in Onondaga Lake.

Honeywell's written comments suggest that while it prefers its own remedy, it does not appear to substantively object to the State's preferred remedy described in the Proposed Plan. Atlantic States Legal Foundation, Inc. supports getting started on actions to clean up and rehabilitate the Onondaga Lake Bottom. It agrees that dredging and capping are necessary and suggests that design work leading to this work should commence as soon as practicable.

NRRB Advisory Recommendations

The NRRB reviewed the information package describing this proposal and discussed related issues with a number of representatives from the Region, State, and the Onondaga Nation (see the attached list) on February 8, 2005. Based on this review and discussion, the Board offers the following comments:

1. The Board recognizes that the State and Honeywell are operating pursuant to a consent decree based on state law. The Board believes, however, that it would be helpful for the State's decision document to refer to specific provisions of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), as well as relevant EPA guidance, to more clearly demonstrate how the Proposed Plan was prepared consistent with the same. The Board also recognizes that Honeywell's comments suggest that while it prefers its own remedy, it does not appear to substantively object to the State's preferred remedy described in the Proposed Plan.

2. The Board notes that the package presented to the Board did not quantify the human health and ecological risk reduction likely to be achieved for the various remedial alternatives. While remedy costs for various alternatives were presented, the benefits obtained by the different alternatives were not clearly described in the package presented to the Board. For example, it is unclear what additional benefits are afforded by dredging increasing volumes of sediment in Alternatives 2 through 5. The Board recommends that the decision document clarify how the preferred alternative best meets the remedial action objectives for the site.

3. The package presented to the Board and the Proposed Plan had limited discussion on the current and future uses of the lake. Further, the Onondaga Nation indicated during its presentation that people traditionally relied upon fish as an integral part of their diet and anecdotal information indicates that people may continue to consume fish from the lake in spite of the current fish consumption advisory. (The advisory recommends that no more than one meal per month be eaten and that walleye not be eaten at all. The advisory also recommends that infants, children under the age of 15 years, and women of childbearing age eat no fish from the lake.) The Board suggests that the decision document provide additional information regarding the current uses of the lake, to include any site-specific information related to fish consumption to better explain the importance of taking an action. In addition, this information could be used to improve, if necessary, the effectiveness of fish consumption advisories and other institutional controls.

4. EPA has established a set of sediment management principles regarding the cleanup of contaminated sediment sites (OSWER Directive 9285.6-08:*Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites,* February 12, 2002.) One of these principles discusses the need to coordinate with state and local governments and Tribes. At the meeting, the Onondaga Nation expressed concern related to the lack of coordination with it regarding the proposed remedy and the timing of the public comment period. The Board encourages an open dialogue among all parties. In addition, the

Board recommends that, if requested, the State consider extending the public comment period to allow time for additional dialogue with the Nation and other parties, including time for consideration of the Board's comments and the State's response to these comments.

5. The Board commends the State for utilizing a variety of measures of ecological risk (*e.g.*, effects range - low (ER-L), effects range - median (ER-M), etc.). However, the Board notes that EPA ecological risk assessment guidance (OSWER Directive 9285.7-25: *Process for Designing and Conducting Ecological Risk Assessments,* June1997) and EPA's draft sediment guidance (OSWER Directive 9355.0-85: *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites*, January 2005) recommend that a range of numerical remediation goals be developed and refined using the NCP remedy selection criteria to provide the basis for selecting final sediment cleanup levels. The Board encourages the State to explain further how the remediation goals developed for the site, either as currently expressed in the Proposed Plan or as they may be modified for the ROD, are appropriate and consistent with the NCP and EPA guidance.

6. The list of alternatives for consideration in the Proposed Plan includes limited variations of capping, dredging, and monitored natural recovery. It was not clear what basis was used to screen out alternatives that could isolate waste in place, such as the relocation of a barrier wall outside the boundary of the In-Lake Waste Deposit (ILWD). The Board recommends that the State explain in the Administrative Record why this alternative was screened out. In addition, only alternatives based on ER-Ls, or the mercury probable effects concentration (PEC) and a mean PEC Quotient (PECQ) of "1" were considered in the Proposed Plan. From the package presented to the Board, it was unclear why the State considered alternatives based on the mercury PEC and a mean PECQ of "2" to be unprotective. The Board recommends that the State either explain its decision more fully in the Administrative Record or expand the range of remediation goals which are evaluated for the site.

7. Under CERCLA 121(d)(2)(A), the Federal Ambient Water Quality Criteria would be a relevant and appropriate requirement. In January 2001, EPA released a methylmercury National Recommended Water Quality criterion for the protection of human health for the consumption of organisms. This criterion is 0.3 mg/kg as measured in fish tissue, based on a fish consumption rate of 0.0175 kg/day. The Board recommends that the State add this EPA value to its decision document as support for its fish tissue preliminary remediation goal (PRG) or describe why it would not be an applicable, or relevant and appropriate. Similarly, the decision document and Administrative Record should include evaluations of the requirements related to Clean Water Act Section 404(b)(1) and Section 10 of the Rivers and Harbors Appropriation Act of 1899.

8. The detailed cost estimates provided to the Board were essentially from Appendix F of the feasibility study (FS) reports. The Appendix included several assumptions which were used to base the alternative cost estimates. In these assumptions, it is stated that the

Sediment Consolidation Area (SCA) cap would include approximately 4.5 feet of soil material and a geosynthetic liner, etc. for a total thickness of nearly five feet. As this is thicker than is typically used at other sites, the Board recommends that the State consider whether the use of a thinner cap would meet site requirements and reduce costs. Additionally, page F 2-19 of the Appendix states that several oversight and management costs were used that are not consistent with EPA cost guidance. Most of these percentages are lower than EPA's guidance (*A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*, OSWER 9355.0-75, July 2000) and, therefore, may underestimate the estimated cost. The Board recommends that the Administrative Record include a more clear justification for these cost estimates.

9. The Board recommends that the State develop and implement a monitoring program for sediment, water, and biota as soon as practicable after remedial goals are finalized. The monitoring should be designed to serve as the baseline against which remedy performance can be measured. It also should include indicator parameters to provide near-term evidence that the system is responding to remedial activities as expected. For example, advective flux measured before and after installation of shoreline hydraulic controls will verify that the advection estimate used in cap design is correct. Additionally, the Board understands that a quantitative model for mercury cycles in the lake was not developed during the remedial investigation and feasibility study process, in part due to uncertainties associated with the predictive precision of such a model. As additional data are acquired through a monitoring program, it may be possible to develop or refine fate and transport models for the site to optimize the remedial design as implementation proceeds.

10. Page 40 of the package presented to the Board defines habitat optimization as having desired characteristics to meet a particular natural resource goal. However, during the presentation, the State clarified the definition and indicated that the habitat components of the remedies presented in Table 5.1, Lake-wide Alternatives, "reestablish" a viable habitat in areas that will be rededicated. The Board recommends that this be clarified in the Administrative Record and that the term "reestablish" be used.

11. OSWER Directive 9285.6-08:*Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites,* February 12, 2002, recommends that remedial action objectives (RAOs) and preliminary remediation goals (PRGs) be clearly tied to risk management goals. The Board recommends that the State revise or clarify the RAOs and PRGs in the decision document to more clearly communicate the objectives of the cleanup and how meeting the PRGs will help the cleanup attain the RAOs. In particular, the State should ensure that the goals are risk-based (see Principles 7 and 8) and that the cleanup levels are clearly tied to risk management goals (Principle 7). For example, the RAOs could discuss the level of risk reduction that will be accomplished by the cleanup or what risk will remain at the end of the cleanup (*i.e.*, residual risk). Another example of an RAO could be to what degree the fishing advisory is expected to be relaxed as a result of the cleanup. Once the RAOs are more clearly defined, the State should clearly show how the

PRGs will help attain the RAOs. The decision document should also discuss the uncertainties involved in deriving the PRGs and how they may relate to uncertainties in achieving the RAOs. For example, it appears that the bioaccumulation sediment quality value (BSQV) was derived using lake-wide average mercury concentrations in both fish and sediments. The Board is concerned that assuming a linear relationship between mercury in fish and mercury in sediment through a broad range of sediment concentrations may lead to underestimating the fish tissue levels of mercury at low sediment concentrations.

12. In the package presented to the Board, the total mercury loading from external sources to Onondaga Lake identified approximately one-third as coming from tributaries, the treated wastewater from the Metropolitan Syracuse Wastewater Treatment Facility, and groundwater. While several of these external sources have undergone interim response measures, other noteworthy external mercury sources to the lake are in the investigation phase. The Board is concerned with the timing of the lake-wide cleanup in relation to completion of all external source cleanups. This concern was also provided in written comments to the Board by the Onondaga Nation. Therefore, the Board recommends that the Administrative Record include a matrix showing the expected sequence of remedial actions at all external sources, in relation to the start of design and actual implementation of the lake-wide cleanup that is ultimately selected.

13. Looking at the data available to the Board regarding contaminant concentrations in the ILWD, it appears that most of the potential hotspot material would be removed as part of the two-meter dredging in Alternative 4. The Board recognizes the importance of additional data collection during remedial design and recommends use of these data in an adaptive management fashion to maximize remedy effectiveness and minimize cost. The Board recommends that the remedy as stated in the decision document include flexibility in dredge depth and cap thickness so that cap effectiveness and cost efficiencies can be attained following additional data collection. For example, additional evaluation of contaminant profiles in sediment and cap model results may elucidate whether flux of chlorobenzenes and other organics through the cap would or would not cause significant risk to benthos.

The NRRB appreciates the Region's efforts in working together with the stakeholders at this site. Once your response is final, then a copy of your response and the NRRB recommendations will be posted on the NRRB website.

Thank you for your support and the support of your managers and staff in preparing for this review. Please call me at (703) 603-8774 should you have any questions.

Attachment: List of Attendees at the NRRB Meeting, February 8, 2005.

cc: M. Cook (OSRTI)
E. Southerland (OSRTI)

S. Bromm (OSRE)
J. Woolford (FFRRO)
Rafael Gonzalez (OSRTI)
NRRB members

Attachment

National Remedy Review Board Meeting
February 8, 2005
Onondaga Lake Superfund Site

Name	Organization
Allen Burton	TAMS
Tim Larson	NYS/DEC
Helen Chernoff	TAMS
Bob Edwards	NYS/DEC
George Shanahan	EPA /Office of Region Counsel, Region 2
Carol Conyers	NYS/DEC Counsel
Janice Whitney	EPA/Indian Programs, Region 2
David Schevina	TAMS
Kelly Robinson	TAMS
Edward Modica	EPA/Superfund
John Szeligowski	TAMS
Joel Singerman	EPA/Superfund, Region 2
Tracy Smith	NYS/DEC
P. David Smith	NYS/DEC
Dale Desnoyers	NYS/DEC
Sal Ervolina	NYS/DEC
Michael L. Spera	TAMS
Leah Evison	EPA/OSRTI
Charles Openchowski	EPA/OSRTI
Amy Legare	EPA/OECA/OSRE
Stephen Ells	EPA/OSTRI
Ron Wilhelml	EPA/ORIA
Tom Short	EPA/Region 5
Michael Jasinksi	EPA/Region 1
Kathlean Salyer	EPA/Region 9
Timothy Mott	EPA/FFRRO
Judi Schwarz	EPA Region 10
Rich Norris	EPA/OSRTI
Marisa Guarinello	EPA/OSRTI
Craig Zeller	EPA/Region 4
Randy Sturgeon	EPA/Region 3
Carlos A. Sanchez	EPA/Region 6
Walter S. Graham	EPA/Region 3
John Frisco	EPA/Region 2
Andre Zownir	EPA/ERT
Emily Johnson	EPA/OSRTI

Attachment (cont.)

Name	Organization
Trish Erickson	EPA/ORD
Jerry Jones	EPA/ORD
Craig Smith	EPA/Region 7
Jo Ann Griffith	EPA/OSRTI
John Lapadula	EPA, Region 2
Michael Sivak	EPA, Region 2
Joe Heath	Counsel for the Onondaga Nation
Sid Hill	Onondaga Nation

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II

DATE: March 25, 2005

SUBJECT: National Remedy Review Board Recommendations for the Lake Bottom Sub-Site of the Onondaga Lake Superfund Site

FROM: William J. McCabe, Acting Director William McCabe
Emergency and Remedial Response Division
EPA - Region 2

TO: JoAnn Griffith, Chair
National Remedy Review Board

I am writing in response to your memorandum, dated February 18, 2005, providing the advisory recommendations of the National Remedy Review Board (NRRB) in connection with its review of the proposed remedial action for the Lake Bottom sub-site of the Onondaga Lake Superfund site. Please note that the New York State Department of Environmental Conservation (NYSDEC) was consulted in the preparation of this response.

Let me first express both the Region's and the State's appreciation to the Board for its expedited review of the proposed remedy for the Lake Bottom site. Our specific responses to the Board's advisory recommendations are provided below. For convenience purposes, each recommendation is presented in the order identified in your memorandum followed by our response.

Recommendation # 1: The Board recognizes that the State and Honeywell are operating pursuant to a consent decree based on state law. The Board believes, however, that it would be helpful for the State's decision document to refer to specific provisions of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), as well as relevant EPA guidance, to more clearly demonstrate how the Proposed Plan was prepared consistent with the same. The Board also recognizes that Honeywell's comments suggest that while it prefers its own remedy, it does not appear to substantively object to the State's preferred remedy described in the Proposed Plan.

Response # 1: The State and Honeywell's predecessor, Allied-Signal, Inc., entered into an interim Consent Decree (Index No. 89-CV-815) whereby Honeywell, in part, agreed to perform a remedial investigation and feasibility study (RI/FS) for the Lake Bottom sub-site (this Consent Decree was entered by the U.S. District Court for the Northern District of New York on March 16, 1992). Among the goals of the RI/FS were the investigation of the nature, extent and effect of the contaminants in the lake, and the evaluation of remedial alternatives. The contaminants that were investigated included hazardous substances, such as mercury, chlorinated benzenes, and PCBs. The RI/FS also investigated less hazardous stressors, such as calcium and chloride. The preferred remedy described in NYSDEC's Proposed Plan (as well as the other action alternatives) included habitat enhancement, an improvement of habitat conditions in areas where hazardous substances do not occur at levels that warrant remediation, but where habitat impairment due to stressors has been identified as a concern. The Record of Decision (ROD) will distinguish between "habitat re-establishment" (see Response #10, below), which is consistent with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 requirements, from "habitat enhancement," which is not. Any "habitat enhancement" actions performed at the site would be done so in conformance with the requirements of state law and not pursuant to the requirements of CERCLA.

The decision document will state that in selecting a remedy, NYSDEC considered the factors set out in CERCLA Section 121, 42 U.S.C. §9621, by conducting a detailed analysis of the viable remedial alternatives pursuant to the NCP, 40 CFR §300.430(e)(9), OSWER Directive 9355.3-01 (Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA: Interim Final, October 1988), and OSWER Directive 9200.1-23.P (A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents, July 1999). In addition, the decision document will state that community/public participation activities were conducted in accordance with CERCLA §117 and the NCP 40 CFR §300.430(f)(3).

Recommendation # 2: The Board notes that the package presented to the Board did not quantify the human health and ecological risk reduction likely to be achieved for the various remedial alternatives. While remedy costs for various alternatives were presented, the benefits obtained by the different alternatives were not clearly described in the package presented to the Board. For example, it is unclear what additional benefits are afforded by dredging increasing volumes of sediment in Alternatives 2 through 5. The Board recommends that the decision document clarify how the preferred alternative best meets the remedial action objectives for the site.

Response # 2: While the components of Alternatives 2 through 5 are identical in sediment management units (SMUs) 3, 4, 5, 6 and 8, they differ with respect to both the remediation of the In-Lake Waste Deposit (ILWD) in SMUs 1, 2 and 7, and the chlorobenzene non-aqueous phase liquids (NAPLs) present in SMU 2. The removal of portions of the ILWD prior to isolation capping has the potential to greatly reduce the mass of chemical parameters of interest (CPOIs) in SMU 1, and portions of SMUs 2 and 7, leaving behind significantly lower volumes and masses of wastes (and residual NAPLs) and significantly lower concentrations of many of the CPOIs beneath the cap. This will improve the effectiveness of the cap in isolating contaminants beneath the cap. The occurrence of "slumps" or slope failures within the ILWD, as was noted during side-scan sonar imaging of the lake bottom, as well as the generally soft nature of the wastes/sediments (resulting in very low shear strengths in certain areas) represent a significant engineering concern associated with capping in this area. Thus, dredging to improve slope stability of the ILWD and to improve overall geotechnical conditions for cap placement are also important considerations for SMU 1 and portions of SMUs 2 and 7.

In SMU 2, NAPLs have been observed in the sediments (up to a depth of 13 ft [4 m]) although the full extent is unknown. Based on the vertical extent of NAPLs in the NAPL recovery Interim Remedial Measure (IRM) area (which is immediately adjacent to Onondaga Lake), the possibility exists that the NAPLs in SMU 2 are as deep as 30 ft (9 m) below the top of the sediments. With regard to NAPLs in SMU 2, Alternatives 2 and 3 include partial NAPL removal (to a depth of 4 m), while Alternatives 4 and 5 include full NAPL removal (to a depth of 9 m) in SMU 2.

The State and the Region believe that the additional dredging afforded by Alternative 4 relative to Alternatives 2 and 3 is warranted because Alternative 4 involves more removal of contaminated sediments and NAPL, which corresponds to a greater degree of cap effectiveness, and long-term reliability and permanence of the overall remedy for the lake and a reduced possibility of remedy failure. CERCLA Section 121 paragraph (b)(1) states "the President shall, at a minimum, take into account:(F) the potential for future remedial action costs if the alternative remedial action in question were to fail." All of the alternatives which employ capping in a given area would be protective to the extent that the cap functions properly. If the cap fails via contaminant breakthrough and/or a catastrophic event (e.g., slope failure), it would need to be repaired and sediments contaminated by the release would need to be remediated (e.g., removed, capped in place). In the event of a failure, the impacts would be expected to be greatest under those alternatives that involve capping of the greatest mass/highest concentrations of contaminants. Accordingly, Alternative 4 provides more protection than Alternatives 2 and 3. It should also be noted that the ILWD is in an area of the lake that is likely to be subjected to high erosive forces from wave action, ice scour, anchor drag, etc., and much of the additional dredging would be in areas near creek mouths and along an exposed shoreline where flow from the creeks can be extreme in flood conditions, or where wave action can build up along this portion of the lake. In addition, some of the additional waste materials which would be removed from the lake under Alternative 4, but would remain under an isolation cap under Alternatives 2 and 3, have been characterized as principal threat wastes including large quantities of highly-contaminated waste material and NAPLs. The implementation of any of these alternatives would include the off-site treatment of all NAPLs that were segregated during the dredging/handling process. The treatment of NAPLs at an off-site facility is a critical component of the alternatives that meets EPA's treatment preference. The larger the volume of NAPLs that are removed from the lake and sent for off-site treatment, the more an alternative satisfies this preference for treatment. Thus, Alternative 4 would satisfy the NCP's preference for treatment of principal threat waste to a greater degree than would Alternatives 2 and 3. While Alternative 5 would remove more contaminated materials from the ILWD than Alternative 4, cap reliability would not increase commensurate with the increased $86 million in estimated present-worth cost over Alternative 4 since Alternative 5 would involve the capping of sediments with contaminant concentrations similar to those for Alternative 4. This will be discussed further in the Record of Decision.

The human health and ecological risk reductions associated with various remedial alternatives were presented in the FS report. Table I.26 (attached) shows the estimated residual surface-weighted average concentrations (SWACs) for mercury and polychlorinated biphenyls (PCBs) in sediment for the various remedial alternatives evaluated in the FS. Table I.28 (attached) shows the estimated percent reductions and the estimated residual tissue concentrations for prey fish and sport fish prior to and following remediation. Table I.28 shows that under the no-action alternative on both a littoral and lake-wide basis, the estimated concentrations of mercury and PCBs would exceed the upper end of the target tissue concentration range for sport fish, and that the estimated concentrations of mercury would exceed the upper end of the target concentration range for prey fish greater than 18 cm in length. Following implementation of Alternative 4 (see values under column F1 - H), the estimated concentrations of mercury and PCBs in fish would be at or below the upper end of the target tissue concentration range for all fish on both a littoral and lake-wide basis. While the residual risks for Alternatives 2 through 5 (which are equivalent to the residual risks presented in the tables for FS Alternatives F1 through H) are shown to be equal, it should be understood that Honeywell's analysis assumed that these alternatives would be equally successful in achieving RAO 2 (to eliminate or reduce releases of contaminants from the ILWD and other littoral areas around the lake). However, as is discussed above, the preferred alternative (Alternative 4) would employ more reliable capping in the ILWD and more removal of NAPL in SMU 2 and thus would be better able to meet the RAOs for the site than would Alternatives 2 and 3, and would be more cost-effective than Alternative 5.

Recommendation # 3: The package presented to the Board and the Proposed Plan had limited discussion on the current and future uses of the lake. Further, the Onondaga Nation indicated during its presentation that people traditionally relied upon fish as an integral part of their diet and anecdotal information indicates that people may continue to consume fish from the lake in spite of the current fish consumption advisory. (The advisory recommends that no more than one meal per month be eaten and that walleye not be eaten at all. The advisory also recommends that infants, children under the age of 15 years, and women of childbearing age eat no fish from the lake.) The Board suggests that the decision document provide additional information regarding the current uses of the lake, to include any site-specific information related to fish consumption to better explain the importance of taking an action. In addition, this information could be used to improve, if necessary, the effectiveness of fish consumption advisories and other institutional controls.

Response # 3: The discussion of current uses of the lake is limited due to the fact that the current usage pattern is constrained both by the advisories and the pollution of the lake. Therefore, the current usage does not reflect potential future uses of the lake in the absence of such constraints. Historically (up to the early 1900s), Onondaga Lake was a tourist destination and a prime fishing location. With the county park surrounding much of the northern part of the lake, there is a strong potential for increased future recreational uses once the pollution-related constraints are removed. Also, various community groups have indicated support for increased recreational use of Onondaga Lake. Currently, there is a canoe launch on lower Ninemile Creek near the lake and a marina and yacht club on the northern shore of the lake in Liverpool. Direct and indirect contact recreation is likely to increase substantially after the cleanup of the lake is completed.

While there is no site-specific information on fish consumption rates in Onondaga Lake or on the degree to which the fish consumption advisory is effective, the literature (Connelly et al., 1992 and New York State Department of Health [NYSDOH], 1999; as cited in *Human Health Risk Assessment [HHRA] for the Hudson River PCBs Site*, TAMS and Gradient, 2000) indicates that advisories are less than 100 percent effective, with a relatively wide range of data on awareness of the advisories (about 67 to 95 percent). In all surveys, a large percentage of individuals (32 to nearly 50 percent, based on Connelly et al., 1996 and Connelly et al., 1992, respectively; as cited in TAMS and Gradient, 2000) indicated that they would consume the fish they caught in the absence of advisories. The Onondaga Lake HHRA used EPA default values for fish consumption (25 grams per day for the reasonable maximum exposure [RME] scenario). In addition, the HHRA also qualitatively evaluated subsistence level fish consumption using an ingestion rate of 170 grams per day. Both ingestion rates assume that the NYSDOH fish consumption advisory is not in place or is not adhered to (see Section 4.3.1 of the Onondaga Lake HHRA).

Thus, based on the literature, which indicates that advisories are not completely effective, and anecdotal observations of people taking large numbers of fish home with them, it is likely that there are people who are consuming fish from Onondaga Lake in excess of NYSDOH's recommended amounts. Based on historical accounts and the potential for increased use, it is anticipated that consumption of fish will increase greatly if the contamination in the lake and fish is significantly reduced. Because of these considerations, one of the preliminary remediation goals (PRGs) contained in the FS and the Proposed Plan is to achieve concentrations of bioaccumulative contaminants in fish that are protective for the general population. As noted in the Proposed Plan, the human health methylmercury target PRG fish tissue concentrations (based on the Onondaga Lake HHRA) are 0.2 milligrams per kilogram (mg/kg) wet weight for the reasonable maximum exposure scenario and 0.6 mg/kg wet weight for the central tendency scenario. The 0.2 mg/kg wet weight target is roughly equal to the mean fish tissue background concentration of mercury in US lakes. The EPA methylmercury National Recommended Water Quality criterion for the protection of human health of 0.3 mg/kg in fish tissue, which falls between the two site-specific values (0.2 and 0.6 mg/kg), is also considered to be a human health fish tissue PRG.

It should be noted that the differences between the three fish tissue values referenced above are due to differences in the assumed fish consumption rates. The RME fish consumption rate of 25 grams per day used in the Onondaga Lake Bottom HHRA is higher than the consumption rate used in the Federal Ambient Water Quality criterion (17.5 grams per day), while the CT fish consumption rate of 8 grams per day used in the Onondaga Lake Bottom HHRA is lower than this value. The RME and CT fish consumption rates used in the Onondaga Lake HHRA were derived by EPA from the fish consumption rates identified in surveys of anglers from bodies of water similar to Onondaga Lake and are EPA's recommended default values for recreational freshwater anglers.

References for the Response to Recommendation #3:

TAMS Consultants, Inc. (TAMS)/EPA, 2000. Human Health Risk Assessment for the Hudson River PCBs Site. Prepared by TAMS and Gradient for EPA and US Army Corps of Engineers. TAMS Consultants, Inc., Bloomfield, New Jersey.

TAMS, 2002. Onondaga Lake Human Health Risk Assessment Report. Original document

prepared by Exponent, Bellevue, Washington, for Honeywell, East Syracuse, New York. Revision prepared by TAMS, New York, New York and YEC, Valley Cottage, New York, for New York State Department of Environmental Conservation, Albany, New York.

Recommendation # 4: EPA has established a set of sediment management principles regarding the cleanup of contaminated sediment sites (OSWER Directive 9285.6-08:*Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites,* February 12, 2002). One of these principles discusses the need to coordinate with state and local governments and Tribes. At the meeting, the Onondaga Nation expressed concern related to the lack of coordination with it regarding the proposed remedy and the timing of the public comment period. The Board encourages an open dialogue among all parties. In addition, the Board recommends that, if requested, the State consider extending the public comment period to allow time for additional dialogue with the Nation and other parties, including time for consideration of the Board's comments and the State's response to these comments.

Response # 4: The State has reviewed the Onondaga Nation's written comments which were submitted to the NRRB. They will be incorporated into the Administrative Record for the site and will be addressed in the Responsiveness Summary. Furthermore, with the belief that an open dialogue will best serve all interested parties, the State has worked diligently to consider the wide variety of comments received and has performed an extensive outreach program relative to the Proposed Plan. In this regard, the State initially provided for a three-month public comment period, which is three times that typically provided under either the State or federal Superfund program. Additionally, the State conducted three public availability sessions and two public meetings. The State also met with local stakeholders to discuss the Proposed Plan, including the Onondaga Nation (five meetings), Onondaga County Legislature's Environmental Committee, Onondaga County's Department of the Environment, Onondaga Lake Partnership (which consists of federal, state, local, public, and private interests that are involved in managing the environmental issues of Onondaga Lake and the Onondaga Lake watershed), Atlantic State's Legal Foundation (Technical Assistance Grant recipient), various local scientists associated with Upstate Freshwater Institute, professors from the State University of New York Syracuse College of Environmental Science and Forestry, and officials and residents of the Town of Camillus (the town in which a sediment consolidation area may be constructed). The State also met with environmental organizations, including the Sierra Club, Citizens Campaign for the Environment, and the Central New York Air and Waste Management Association.

The Onondaga Nation has requested an extension of time to submit comments on the proposed plan and to consult with EPA and the State concerning the proposed remedy. The request from the Nation was the only request that was received for an extension of time for submission of comments. The State has indicated that it will petition the Court for an extension of the Court-ordered schedule for a final decision on remedy selection. If approved by the Court, a new comment period will be opened for a period of 30 days from the date of publication of a newspaper notification that the Board's comments and these responses to the Board's comments by EPA Region 2 and the State are available in the administrative record repositories for review by the public. In addition, EPA Region 2 and the State have had four meetings with the Onondaga Nation since the Board meeting concerning the proposed plan and intend to continue discussions with the Nation throughout the remedy selection and implementation phases of the project.

Recommendation # 5: The Board commends the State for utilizing a variety of measures of ecological risk (*e.g.*, effects range - low (ER-L), effects range - median (ER-M), etc.). However, the Board notes that EPA ecological risk assessment guidance (OSWER Directive 9285.7-25: *Process for Designing and Conducting Ecological Risk Assessments,* June1997) and EPA's draft sediment guidance (OSWER Directive 9355.0-85: *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites*, January 2005) recommend that a range of numerical remediation goals be developed and refined using the NCP remedy selection criteria to provide the basis for selecting final sediment cleanup levels. The Board encourages the State to explain further how the remediation goals developed for the site, either as currently expressed in the Proposed Plan or as they may be modified for the ROD, are appropriate and consistent with the NCP and EPA guidance.

Response # 5: As discussed in the Proposed Plan, NYSDEC developed five site-specific sediment effects concentrations (SECs) (the ER-L, threshold effect level [TEL], ER-M, probable effect level [PEL], and apparent effect threshold [AET]) and a consensus-based probable effect concentration (PEC) to assist in evaluating sediment quality in Onondaga Lake. From a narrative standpoint, the various SECs present three different thresholds for predicting the presence of toxic effects. The ER-L and TEL represent concentrations below which toxic effects are predicted to rarely occur. The ER-M and PEL represent concentrations above which toxic effects are predicted to frequently (but not always) occur. The AET represents a threshold above which toxic effects are predicted to always occur. For mercury, the following SEC values were calculated: 0.51 mg/kg for the ER-L; 0.99 mg/kg for the TEL; 2.8 mg/kg for the ER-M; 2.84 mg/kg for the PEL; and 13 mg/kg for the AET. The PEC, which was determined by calculating the geometric mean of the five SECs, is a single value for each CPOI which represents a midrange of risk. For mercury, the PEC was calculated at 2.2 mg/kg. Three of the SECs were determined to be representative of the entire range of SECs to be used to evaluate areas and volumes of impacted sediment to be considered for remediation: the ER-L, PEC, and AET. These criteria, along with criteria based on the mean PEC quotient (PECQ) approach, were used in developing SMU-specific remedial alternatives. For many SMUs, the amount of remediation (e.g., area of capping) was the same since the entire area exceeded all of the SECs.

Five of the six action alternatives in the Proposed Plan (Alternatives 2 through 6) were developed based on exceedances of the mean PECQ of 1 or exceedances of the mercury PEC in order to ensure that potential risks posed to benthic invertebrates presented by mercury were also addressed. One alternative (Alternative 7) was based on exceedances of the individual ER-L values for the 23 CPOIs. While, as the Board recommended, additional remedial alternatives based on the mean PECQ of 1 and the mercury SECs could be included in the ROD, the State and the Region believe that these alternatives would either be similar to alternatives already included in the Proposed Plan or would not meet the threshold criterion of overall protectiveness of human health and the environment. Specifically, alternatives based on the mean PECQ of 1 and the mercury ER-L or mercury TEL would be similar to Alternative 7 in the Proposed Plan, since most of the lake exceeds these criteria for mercury. Alternatives based on the mean PECQ of 1 and the mercury ER-M or mercury PEL would be similar to Alternatives 2 through 6, which are based on exceedances of the mean PECQ of 1 and the mercury PEC, since the ER-M, PEL and PEC for mercury are within a very narrow range (2.2 to 2.84 mg/kg).

Alternatives based on the mean PECQ of 1 and the mercury AET, which is 13 mg/kg, or use of the individual AETs for the 23 CPOIs instead of the mean PECQ approach, were not included in the FS report or the Proposed Plan because remediation based on the AET was not considered to be protective of benthic macroinvertebrates (i.e., this represents a concentration at which adverse effects are always expected to occur), or wildlife and humans which consume fish from the lake (e.g., the AET for mercury is approximately 16 times greater than the bioaccumulation-based sediment quality value [BSQV] of 0.8 mg/kg). Since the mean PECQ integrates the toxic effects of multiple contaminants, this methodology provides a better representation of the risks posed by contamination in the lake than using multiple individual SECs.

Consequently, the State and the Region believe that the range of sediment cleanup levels and alternatives provided in the Proposed Plan is appropriate and consistent with the NCP and EPA's ecological risk assessment guidance (OSWER Directive 9285.7-25: *Process for Designing and Conducting Ecological Risk Assessments,* June 1997) and EPA's draft sediment guidance (OSWER Directive 9355.0-85: *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites*, January 2005).

Recommendation # 6: The list of alternatives for consideration in the Proposed Plan includes limited variations of capping, dredging, and monitored natural recovery. It was not clear what basis was used to screen out alternatives that could isolate waste in place, such as the relocation of a barrier wall outside the boundary of the ILWD. The Board recommends that the State explain in the Administrative Record why this alternative was screened out. In addition, only alternatives based on ER-Ls, or the mercury PEC and a mean PECQ of "1" were considered in the Proposed Plan. From the package presented to the Board, it was unclear why the State considered alternatives based on the mercury PEC and a mean PECQ of "2" to be unprotective. The Board recommends that the State either explain its decision more fully in the Administrative Record or expand the range of remediation goals which are evaluated for the site.

Response # 6: *Concerns Associated with the Construction of a Barrier Wall Around the ILWD*

The construction of a barrier wall around the ILWD followed by capping was not carried forward in the development of alternatives for the site because of regulatory issues regarding filling in a portion of Onondaga Lake and construction issues.

Regulatory Concerns Associated with the Construction of a Barrier Wall Around the ILWD

Any remedy incorporating dredging or placement of fill in protected streams or navigable waters in New York State must meet the substantive technical requirements of Environmental Conservation Law Article 15 Water Resources Title 5 Protection of Water. The applicable standards are found at 6 NYCRR Part 608.8 and require that the proposal: a) is reasonable and necessary; b) will not endanger the health, safety or welfare of the people of the State; and c) will not cause unreasonable, uncontrolled or unnecessary damage to the natural resources of the State. This applicable, or relevant and appropriate requirement (ARAR) protects the waters of the State from unreasonable or unnecessary impact from dredge and fill activities. A barrier wall would result in the loss of at least 84 acres of littoral habitat, impact navigational uses, and decrease the natural resource value of the lake. This damage would not be warranted as there are other options available (as were evaluated in the FS and the Proposed Plan) for remediating the ILWD portion of Onondaga Lake that would meet the requirements of 6 NYCRR Part 608 and not result in unreasonable and unnecessary damage.

Construction Concerns Associated with the Construction of a Barrier Wall Around the ILWD

The ILWD covers about 84 acres of the lake bottom with water depths ranging from under 1 foot to over 30 feet. The quantity of materials needed to fill this area to above flood level would likely be in excess of two million cubic yards. The in-lake barrier wall would be greater than several thousand feet in length and would need to be constructed in a manner where it would be strong enough that it could support the ILWD and the fill materials, and be able to withstand wind, wave and ice erosive forces. Accordingly, a cofferdam-type barrier wall might be required, which would involve the placement of a large quantity of additional materials. Therefore, it is likely that the construction of a barrier wall around the ILWD and the subsequent filling of this area would require the placement of a larger quantity of materials than the total quantity of capping materials that would be required by Alternative 4 for all of the SMUs combined.

Justification for Use of a Mean PEC Quotient of 1 in NYSDEC's Proposed Plan

One of the RAOs identified in the Onondaga Lake RI report is to eliminate or reduce existing and potential future adverse effects on fish and wildlife resources. To address this RAO, areas of sediment were selected for inclusion in the remedial alternatives based on various site-specific criteria as part of the Onondaga Lake FS.

The mean PECQ approach was proposed by Honeywell as one of the criteria to use for determining remedial areas. The mean PECQ is a single unitless index that has the potential to account for both the presence and concentrations of multiple contaminants in sediment samples. NYSDEC evaluated the mean PECQ approach to determine whether it could be applied to Onondaga Lake.

The relationship between the mean PECQ values and the toxicity data from 1992 was not particularly strong (see Slides 1 and 2, attached). This is due in part to the high degree of variability in the occurrence of toxicity in Onondaga Lake sediments, which may be related to the wide range of concentrations of the CPOIs in any given sediment sample. Such problems are inherent in any large scale sediment study, and are exacerbated in Onondaga Lake because of the extensive perturbation of the lake ecosystem that occurred over an extended period of time.

There were three main reasons for selecting the mean PECQ of 1 as the basis for remediating Onondaga Lake sediments:

- First, a mean PECQ value of 1 can be considered an "average" hazard quotient. The concept of the hazard quotient is based on the inference that if the concentration of a CPOI is less than or equal to its corresponding toxicity threshold (e.g., the PEC for that CPOI), then toxicity would not be anticipated to occur. The mean PECQ is the "average" hazard quotient for the number of CPOIs detected in the sediments. Discounting additive toxicity, a mean PECQ of 1 signifies that on average, none of the CPOIs are present in concentrations that exceed their corresponding PEC, and that acute toxicity is not likely to occur.

- Second, the mean PECQs were derived using only acute toxicity data for a single species[1] which is a relatively insensitive species. They do not take into account the potential for chronic toxicity impacts, or variations in sensitivity by other benthic species. Given the lack of chronic toxicity data, the selection of a remediation value higher than a mean PECQ of 1 cannot be justified.

- Third, a review of all of the sediment toxicity data collected in 1992 (see Slides 1 and 2) and 2000 (see Slides 3, 4 and 5, attached) shows that the areas of the lake that exceed the mean PECQ of 1 and a mercury PEC of 2.2 mg/kg generally coincide well with the areas of the lake where acute toxicity to the benthic macroinvertebrates was shown to occur.

For these reasons, the mean PECQ of 1 was used along with exceedances of the mercury PEC of 2.2 mg/kg in five of the seven alternatives in the Proposed Plan, including NYSDEC's preferred alternative.

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[1] Two species were used for toxicity testing done in 1992, *Chironomus tentans* and *Hyalella azteca*, using both mortality and growth as test effects. Since *C. tentans* mortality was the most sensitive effect, only those test results were used to derive mean PECQs. Forty-two day toxicity tests were conducted in 2000, also using *Chironomus tentans* and *Hyalella azteca*, but including the more sensitive endpoint of chironomid emergence. Too few studies, however, were conducted in 2000 to be integrated into (or otherwise used in) the derivation of mean PECQs. Those tests do add qualitative credibility to the usefulness of the mean PECQ of 1.

There was no apparent statistical basis for the use of a mean PECQ of 2 for defining areas for remediation. There was no clear inflection point at a mean PECQ of 2 and the use of the PECQ of 2 was not supported by the toxicity data. Alternatives based on the mean PECQ of 2 were included in Honeywell's FS but were not carried into the Proposed Plan since they were determined by NYSDEC not to be protective.

Relative Costs between Mean PECQ of 1 and 2

To assess the difference in cost that results from the use of a mean PECQ of 1 over the use of a mean PECQ of 2, lake-wide alternative (LWA) D2 (based on a mean PECQ of 2) was added to the FS (see Table 5.1 of the FS for details) at the request of NYSDEC to be identical to LWA F1 (based on a mean PECQ of 1). All components of these two alternatives are identical with the exception of the cleanup criterion. Thus, the difference between the cost for LWA F1 of $312 million and the cost for LWA D2 of $294 million represents an added cost of $18 million for using the more protective criterion.

This cost difference is based on the increase in areas that would be included for capping and removal in SMUs 5, 6 and 8. There would be an additional 24 acres of isolation capping and 16,000 cubic yards (cy) of removal in SMU 5, an additional 29 acres of isolation capping and 11,000 cy of removal in SMU 6, and an additional 134 acres of thin-layer capping in SMU 8 for a total increase of 187 acres of capping and 27,000 cy of removal using a mean PECQ of 1 instead of a mean PECQ of 2 (see Table 5.2 of the FS for details).

If Alternative 4 in NYSDEC's Proposed Plan were modified to be based on a mean PECQ of 2 instead of a mean PECQ of 1, the cost would be approximately $433 million ($451 million - $18 million). The added cost for using the more protective criterion is roughly 4 percent of the total estimated cost for the preferred alternative.

Summary

The mean PECQ of 1 was selected by NYSDEC as a basis for defining areas for remediation in the preferred remedy to account for uncertainties inherent in the toxicity data including statistical uncertainty, use of only acute toxicity data, and the use of a relatively insensitive species in the toxicity testing. The cost of using a mean PECQ of 1 over a mean PECQ of 2 increases the cost of the remedy by approximately $18 million.

***Recommendation # 7**:* Under CERCLA 121(d)(2)(A), the Federal Ambient Water Quality Criteria would be a relevant and appropriate requirement. In January 2001, EPA released a methylmercury National Recommended Water Quality criterion for the protection of human health for the consumption of organisms. This criterion is 0.3 mg/kg as measured in fish tissue, based on a fish consumption rate of 0.0175 kg/day. The Board recommends that the State add this EPA value to its decision document as support for its fish tissue preliminary remediation goal (PRG) or describe why it would not be an applicable, or relevant and appropriate requirement. Similarly, the decision document and Administrative Record should include evaluations of the requirements related to Clean Water Act Section 404(b)(1) and Section 10 of the Rivers and Harbors Appropriation Act of 1899.

Response # 7: As recommended by the Board, EPA's methylmercury National Recommended Water Quality criterion for the protection of human health for the consumption of organisms of 0.3 mg/kg in fish tissue will be added to support a site-specific methylmercury recommended fish tissue number or range in the ROD.

A discussion of the Clean Water Act Section 404(b)(1) and Section 10 of the Rivers and Harbors Appropriation Act of 1899 will be included in the ROD. Since a discussion of the substantive requirements of both the dredge and fill permit program under Section 404 and the Section 10 permit program are included in Appendix C of the FS report, the Region and the State believe that no further documentation need be placed in the Administrative Record.

The requirements of Clean Water Act Section 404(b)(1) are found at 40 CFR 230, Subparts C through H. A complete assessment of the Onondaga Lake Bottom remedial action in relation to the technical requirements of 40 CFR 230 (Subparts C through H) will be prepared during the project's design stage. At that time, detailed information will be available relevant to the type of dredging equipment that will be employed, the characteristics of capping materials, the method for placement of cap material, and other project elements.

The substantive requirements of Section 10 of the Rivers and Harbors Act will be addressed with U.S. Army Corps of Engineers during the project's design phase.

Recommendation # 8: The detailed cost estimates provided to the Board were essentially from Appendix F of the FS reports. The Appendix included several assumptions which were used to base the alternative cost estimates. In these assumptions, it is stated that the Sediment Consolidation Area (SCA) cap would include approximately 4.5 feet of soil material and a geosynthetic liner, etc. for a total thickness of nearly five feet. As this is thicker than is typically used at other sites, the Board recommends that the State consider whether the use of a thinner cap would meet site requirements and reduce costs. Additionally, page F 2-19 of the Appendix states that several oversight and management costs were used that are not consistent with EPA cost guidance. Most of these percentages are lower than EPA's guidance (*A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*, OSWER 9355.0-75, July 2000) and, therefore, may underestimate the estimated cost. The Board recommends that the Administrative Record include a more clear justification for these cost estimates.

Response # 8: The SCA cap conceptual design (e.g., 4.5 feet of soil material and a geosynthetic liner) was used to estimate costs of the various alternatives in the FS report. During the remedial design, the State will identify the specifics (e.g., types and thicknesses of cap components) necessary to ensure that the cap meets site requirements and is protective of public health and the environment. Based on cost data from the FS, a thinner cap (e.g., 3-ft thick) would likely reduce the overall cost by greater than $1 million (for materials), as well as savings in labor costs.

While the EPA cost guidance document was used in developing the majority of the costs for the FS, the percentages for professional/technical services (Project Management, Remedial Design, and Construction Management) were modified from the percentages stated in Exhibit 5-8 of the cost guidance, since it does not provide percentages for projects estimated to cost greater than $100 million. The guidance recognizes that as the total cost of the project increases, the percentage of the total project cost for engineering services decreases. This is why the percentage for professional/ technical services in the guidance decreases from 10 to 20 percent of capital costs for projects less than $100,000 to 5 to 6 percent for projects more than $10 million. The FS report followed this trend and used a lower percentage for professional/technical services for those alternatives estimated to cost more than $100 million. More specifically, a 2 to 4 percent value was employed in the FS report, depending on the total capital costs of the alternative being developed. The intent of employing these values was to avoid the potential overestimation of project costs.

An example of why this approach was used can be seen in reviewing the total costs for the SCA design in the different alternatives. While the basic design of the SCA would remain the same (and, therefore, the level of the engineering effort for the SCA design would not vary much between alternatives), the cost estimate for professional/technical services based on a constant percentage of total capital costs would increase dramatically due to the cost of the additional building materials (but not additional engineering services) needed to construct the larger SCAs.

Recommendation # 9: The Board recommends that the State develop and implement a monitoring program for sediment, water, and biota as soon as practicable after remedial goals are finalized. The monitoring should be designed to serve as the baseline against which remedy performance can be measured. It also should include indicator parameters to provide near-term evidence that the system is responding to remedial activities as expected. For example, advective flux measured before and after installation of shoreline hydraulic controls will verify that the advection estimate used in cap design is correct. Additionally, the Board understands that a quantitative model for mercury cycles in the lake was not developed during the RI/FS process, in part due to uncertainties associated with the predictive precision of such a model. As additional data are acquired through a monitoring program, it may be possible to develop or refine fate and transport models for the site to optimize the remedial design as implementation proceeds.

Response # 9: The development and implementation of a monitoring program for various site media (e.g., sediment, water, and biota) will begin as soon as practicable following the issuance of the ROD. The monitoring will be designed to serve as the baseline against which remedy performance can be measured. The development of the monitoring program will consider the possible inclusion of indicator parameters (e.g., advective flux) which could be employed to provide evidence that the system is responding to remedial activities as expected. As additional data are acquired, the State will consider whether it is appropriate to develop or refine fate and transport models for the site. If such models are developed or refined, they will be used, as appropriate, to optimize the remedial design as implementation proceeds.

Recommendation # 10: Page 40 of the package presented to the Board defines habitat optimization as having desired characteristics to meet a particular natural resource goal. However, during the presentation, the State clarified the definition and indicated that the habitat components of the remedies presented in Table 5.1, Lake-wide Alternatives, "reestablish" a viable habitat in areas that will be rededicated. The Board recommends that this be clarified in the Administrative Record and that the term "reestablish" be used.
Response # 10: The ROD will utilize the term "re-establish." The terms "habitat re-establishment" and "habitat optimization," which will be clarified in the Administrative Record, are explained below:

Habitat re-establishment is the restoration of habitats in areas where remediation substantially alters existing conditions. Re-establishment can be either restoring the same type of habitat that existed prior to remediation or establishing a different type of habitat that has been deemed appropriate for the ecological conditions of the area.

Habitat optimization is a type of habitat re-establishment, which is defined as re-establishing habitat with desired characteristics to meet a particular natural resource goal for a particular area of the lake in combination with designing the dredging/capping aspect of remediation.

The details of the re-establishment in the various areas of the lake will be developed during remedial design, based upon a comprehensive lake-wide habitat restoration plan.

Recommendation # 11: OSWER Directive 9285.6-08:*Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites,* February 12, 2002, recommends that remedial action objectives (RAOs) and preliminary remediation goals (PRGs) be clearly tied to risk management goals. The Board recommends that the State revise or clarify the RAOs and PRGs in the decision document to more clearly communicate the objectives of the cleanup and how meeting the PRGs will help the cleanup attain the RAOs. In particular, the State should ensure that the goals are risk-based (see Principles 7 and 8) and that the cleanup levels are clearly tied to risk management goals (Principle 7). For example, the RAOs could discuss the level of risk reduction that will be accomplished by the cleanup or what risk will remain at the end of the cleanup (*i.e.*, residual risk). Another example of an RAO could be to what degree the fishing advisory is expected to be relaxed as a result of the cleanup. Once the RAOs are more clearly defined, the State should clearly show how the PRGs will help attain the RAOs. The decision document should also discuss the uncertainties involved in deriving the PRGs and how they may relate to uncertainties in achieving the RAOs. For example, it appears that the bioaccumulation sediment quality value (BSQV) was derived using lake-wide average mercury concentrations in both fish and sediments. The Board is concerned that assuming a linear relationship between mercury in fish and mercury in sediment through a broad range of sediment concentrations may lead to underestimating the fish tissue levels of mercury at low sediment concentrations.

Response # 11: The ROD will provide further clarification as to how the PRGs are tied to risk management goals, communicate the objectives of the cleanup, and discuss how meeting the PRGs will help the cleanup attain the RAOs.

As part of the RI/FS process, the State and the Region worked with Honeywell to ensure that the cleanup levels were tied to risk management goals by developing risk-based sediment and fish tissue concentration target goals based on site-specific exposure assumptions.

However, the RAOs and PRGs must also consider the goal of remedial programs being implemented in New York State. Specifically, Part 375-1.10(b) states *"The goal of the program for a specific site is to restore that site to pre-disposal conditions, to the extent feasible and authorized by law. At a minimum, the remedy selected shall eliminate or mitigate all significant threats to the public health and to the environment presented by hazardous waste disposed at the site through the proper application of scientific and engineering principles."* While the PRGs for the site are clearly risk based, the development of the RAOs gave consideration to the restoration goal required by Part 375.
To clarify the intent and the connection to risk reduction inherent in the PRGs, a restatement of the objectives and goals is provided below.

The RAOs for Onondaga Lake were based on site-specific information including the nature and extent of the CPOIs, the transport and fate of mercury and other CPOIs, and the baseline human health and ecological risk assessments. The RAOs were developed in the RI as goals for controlling CPOIs within the lake and protecting human health and the environment. RAO 4 has been modified so as to be consistent with Recommendation #11 and will be included in the decision document as provided below.

The RAOs for Onondaga Lake are:

• RAO 1: To eliminate or reduce, to the extent practicable, methylation of mercury in the hypolimnion.

This will eliminate or reduce the largest source of methylmercury to biota (and humans) in the lake system, thereby reducing the risk due to bioaccumulation of methylmercury.

• RAO 2: To eliminate or reduce, to the extent practicable, releases of contaminants from the ILWD and other littoral areas around the lake.

These areas represent one of the largest sources of mercury and other contaminants to the lake system. Elimination of these releases and exposures will significantly reduce direct contact toxicity currently evident in the benthic community. In addition, the risks due to bioaccumulation caused by direct exposure in the water column and the sediments from bioaccumulative contaminants such as PCBs will be reduced as well as risks caused by mercury transported from these littoral areas to the hypolimnion where it is currently methylated.

• RAO 3: To eliminate or reduce, to the extent practicable, releases of mercury from profundal sediments.

These releases are a major source of total mercury into the anoxic hypolimnion where it is methylated and introduced into the food chain. Elimination of these releases will reduce risks due to bioaccumulation caused by methylation of the mercury released from these sediments into the hypolimnion.

• RAO 4: To be protective of fish and wildlife by eliminating or reducing to the extent practicable, existing and potential future adverse ecological effects on fish and wildlife resources and to be protective of human health by eliminating or reducing, to the extent practicable, potential risks to humans (*e.g.,* so that humans may consume fish in accordance with the State's general advisory for other bodies of water in New York State).

Inclusion of this RAO allows for the development and use of benthic toxicity-based cleanup levels and fish tissue-based cleanup levels, thus resulting in the reduction of risks to the ecosystem and to humans. Specifically, the goal of this RAO is to reduce risks so as to be protective of fish and wildlife which inhabit or depend on the lake, and the resources upon which they depend, and to reduce risks to human health (e.g., so that humans may consume fish in accordance with the State's general advisory for other bodies of water in New York State instead of the more restrictive advisory currently in effect for Onondaga Lake).

• RAO 5: To achieve surface water quality standards, to the extent practicable, associated with CPOIs.

These standards are generally based on the protection of (reduction of risks to) human health and the environment. Achievement of these standards will reduce risks to levels considered acceptable as evidenced by the establishment of these standards.

In order to achieve the RAOs, PRGs were established to provide additional information/goals with which remedial alternatives could be developed and provide a basis for selecting an appropriate remedy. Onondaga Lake contains three primary media that have been impacted by CPOIs: sediments; biological tissue; and surface water. The following three PRGs have been developed, each addressing one of the affected media. PRG 2 has been revised from what was presented in the Proposed Plan in accordance with Response # 7.

• PRG 1: Achieve applicable and appropriate site-specific SECs for the CPOIs and the BSQV for mercury, to the extent practicable, by reducing, containing, or controlling CPOIs in profundal and littoral sediments.

As discussed in the NRRB Presentation Package and the Proposed Plan, use of the mean PECQ of 1 plus the mercury PEC will eliminate direct acute toxicity to the most directly exposed community in the lake (the benthos), and by so doing, will greatly reduce the chronic risks to the benthic community, as well as risks to organisms higher up the food chain. These criteria (the PECs for individual CPOIs which are used to calculate mean PECQ values) are based on the site-specific SECs that were calculated as part of the Onondaga Lake Baseline Ecological Risk Assessment. The use of the mercury BSQV of 0.8 mg/kg on an area-wide basis will further reduce levels of mercury in sediments, which is predicted to reduce the amount of mercury available for methylation and uptake into the food chain, thus reducing body burdens of mercury in fish.

• PRG 2: Achieve CPOI concentrations, to the extent practicable, in fish tissue that are protective of humans and wildlife that consume fish. This will include EPA's methylmercury National Recommended Water Quality criterion for the protection of human health for the consumption of organisms of 0.3 mg/kg in fish tissue.

Since a major source of risk to humans and upper-level predators is consumption of fish contaminated with mercury and other bioaccumulative CPOIs, concentrations of mercury in fish flesh that are protective based on the human health and ecological risk assessment models have been established. PRG 2 will be achieved by the reduction of total mercury in the lake system (thus reducing the availability of mercury for methylation) and by eliminating the conditions conducive for methylation by oxygenating the hypolimnion.

Concentrations of PCBs and polychlorinated dibenzo-*p*-dioxin/ polychlorinated dibenzofurans in fish tissue were also determined to be risk drivers for human health and wildlife. These contaminants are not as widespread in lake sediments as is mercury and are found primarily in a few specific areas of the lake (e.g., SMUs 1, 2, 6, and 7). The NYSDEC sediment screening criteria for protection of wildlife and humans from bioaccumulation were used as the comparison values for these two CPOIs. The areas where these CPOIs are elevated are generally co-located with areas that exceed the cleanup criteria of the mean PECQ of 1 plus the mercury PEC and would be addressed under the remedial alternatives evaluated in the Proposed Plan.

• PRG 3: Achieve surface water quality standards, to the extent practicable, associated with CPOIs.
These standards are generally based on the protection of (reduction of risks to) human health and the environment. Achievement of these standards, which are defined in the NRRB Presentation Package and Proposed Plan, will reduce risk to levels considered acceptable, as evidenced by the establishment of these standards.

The derivation of these goals and objectives and means to achieve them are further discussed below.
The preferred remedy (along with remediation of the upland subsites, including impacted tributaries) will address the RAOs and PRGs both directly and indirectly by reducing the external inputs to the lake, reducing and isolating the contaminant inventories in the lake, and by eliminating or reducing internal processes (e.g., methylation in the anoxic waters, resuspension of contaminated wastes/sediments) in the lake. While a mechanistic model does not exist to predict

the behavior of mercury and other CPOIs in the lake after remediation, the predicted reductions (on the order of 90 percent) in inputs and inventories are expected to reduce the exposures and uptake of contaminants in humans and wildlife. BSQVs have been developed for Onondaga Lake to provide a conservative total mercury concentration in sediments below which bioaccumulation is expected to be low enough to result in mercury concentrations in fish that are protective for human and wildlife consumption. These values are based on the average lakewide and littoral zone mercury sediment concentrations, since fish are mobile and may be exposed to various locations in the lake. A BSQV of 0.8 mg/kg mercury based on the most sensitive receptor, the river otter, was selected for use in the FS Report and Proposed Plan. This goal is considered protective of all human and ecological receptors modeled in the Onondaga Lake risk assessments. Following implementation of the preferred remedy, the average mercury concentration in the littoral zone, the primary foraging area for birds and mammals, is predicted to be 0.48 mg/kg, a reduction of 86 percent from the current average mercury concentration in the littoral zone (3.5 mg/kg).

The BSQV assumed a linear relationship between mercury in fish and total mercury in sediment through a broad range of sediment concentrations and oxygen conditions. This includes the anoxic conditions in the profundal zone which comprises two thirds of the lake sediment surface area. The uptake of mercury from the sediments is highly dependent on the amount of methylmercury in the surface sediment and porewater. While it is known that the proportion of methylmercury to total mercury in sediments is not constant, surface sediment data collected during the RI show that the ratios of methylmercury to total mercury in the littoral zone outside of SMU 1 are generally low (mean of 21 samples = 0.22 percent) and consistent (standard deviation of 0.15 percent, with a range of ratios from 0.04 to 0.6 percent), while ratios in SMU 1 are similar (mean of 22 samples = 0.20 percent) although somewhat more variable (standard deviation of 0.25 percent, with a range from 0.1 to 0.9 percent). The ratios in the profundal zone are higher (mean of 15 samples = 0.70 percent with a standard deviation of 0.3 percent and a range from 0.07 to 1.4 percent). In addition, the ratios of methylmercury to total mercury in the profundal zone are distinctly higher near the sediment-water interface than at depth while the ratios in the littoral zone are consistent vertically in the sediment. The profundal zone also has a higher concentration of methylmercury in the surface sediments than the littoral zone by a factor of 2 to 10, except for SMU 1 which has higher total mercury and methylmercury concentrations than most of the littoral zone.

Under NYSDEC's preferred remedy, all of SMU 1 will be remediated including removal of sediments to depths of 2 to 3 meters followed by placement of several feet of sand cap. Therefore, following remediation, SMU 1 is expected to have a low concentration of total mercury and a low ratio of methylmercury to total mercury, resulting in low concentrations of methylmercury at the surface. The rest of the littoral zone will be remediated to varying degrees, but since the ratio of methylmercury to total mercury is consistently low in these areas, the remediation based on total mercury concentrations is expected to address the methylmercury concentrations to a consistent degree as assumed by the linear relationship in the BSQV approach. The profundal zone will be addressed primarily by monitored natural recovery (MNR) and oxygenation of the hypolimnion. It is likely that the introduction of oxygen to the water column will directly affect the sediment-water interface, causing those sediments to become oxic, and producing a methylmercury to total mercury ratio similar to the current ratios in the littoral zone outside of SMU 1. Thus, any effect due to variable ratios will be eliminated following remediation, and the inclusion of data under current conditions from the profundal sediments in the development of the BSQVs provides a conservative factor when this is applied to littoral sediments overlain by oxygenated water. It is anticipated that a significant reduction of the current total mercury concentrations in the sediments and oxygenation of the hypolimnion will decrease the proportion of methylmercury to total mercury and the methylmercury concentrations in sediments. Removal and capping of sediments, the reduction of external inputs, and oxygenation will lead to significant reductions in total mercury and methylmercury in surface water. Consequently, the comment that fish tissue levels of mercury may be underestimated at low sediment concentrations because a linear relationship between mercury in fish and total mercury in sediment was used to develop the mercury BSQV is not anticipated to be of concern.

Recommendation # 12: In the package presented to the Board, the total mercury loading from external sources to Onondaga Lake identified approximately one-third as coming from tributaries, the treated wastewater from the Metropolitan Syracuse Wastewater Treatment Facility, and groundwater. While several of these external sources have undergone interim response measures, other noteworthy external mercury sources to the lake are in the investigation phase. The Board is concerned with the timing of the lake-wide cleanup in relation to completion of all external source cleanups. This concern was also provided in written comments to the Board by the Onondaga Nation. Therefore, the Board recommends that the Administrative Record include a matrix showing the expected sequence of remedial actions at all external sources, in relation to the start of design and actual implementation of the lake-wide cleanup that is ultimately selected.

Response # 12: As is indicated in the Proposed Plan, the remediation of the Onondaga Lake sub-site will need to be coordinated with upland remedial activities. The control of contamination migrating to the lake from the various upland sites (e.g., Willis Avenue, Semet Residue Ponds, Wastebed B/Harbor Brook, LCP/Bridge Street, and Geddes Brook/Ninemile Creek) is an integral part of the overall cleanup of Onondaga Lake. To prevent the recontamination of lake sediments, ongoing releases of contamination to a given portion of the lake will need to be eliminated prior to performing cleanup activities in that area of the lake. For example, the hydraulic control systems which will be installed/operated as part of the Wastebed B/Harbor Brook and Willis/Semet Barrier Interim Remedial Measures will address the ongoing releases of contaminants from these upland areas to SMUs 1 and 2, respectively. These systems will need to be constructed and operating prior to cleanup activities commencing in this part of the lake.

Furthermore, the effectiveness of the capping proposed for SMUs 1 and 2 would rely upon the proper functioning of the noted hydraulic control systems. Likewise, the effectiveness of capping in SMU 7 would be a function of the effectiveness of the hydraulic control system, which is proposed to be installed along the lakeshore as part of the remedy for this portion of the lake.

Therefore, the timing of remedial activities in Onondaga Lake will need to be coordinated with the remedial work which will be performed as part of the interim and final remedies at these upland areas. This will be reflected in a matrix showing the expected sequence of remedial actions at all external sources. The matrix will be included in the Administrative Record.

Recommendation # 13: Looking at the data available to the Board regarding contaminant concentrations in the ILWD, it appears that most of the potential hotspot material would be removed as part of the two-meter dredging in Alternative 4. The Board recognizes the importance of additional data collection during remedial design and recommends use of these data in an adaptive management fashion to maximize remedy effectiveness and minimize cost. The Board recommends that the remedy as stated in the decision document include flexibility in dredge depth and cap thickness so that cap effectiveness and cost efficiencies can be attained following additional data collection. For example, additional evaluation of contaminant profiles in sediment and cap model results may elucidate whether flux of chlorobenzenes and other organics through the cap would or would not cause significant risk to benthos.

Response # 13*:* The remedy that will be described in the ROD will include flexibility in dredge depth (with regard to "hot spot" threshold concentrations as they may be modified as a result of the additional cap modeling that will be performed during the remedial design) and cap thickness so that cap effectiveness and cost effectiveness can be attained.

TABLE I.26

PRE-REMEDIATION SWACs, ESTIMATED RESIDUAL SWACs, AND ESTIMATED PERCENT REDUCTION IN MERCURY AND PCB CONCENTRATIONS IN SEDIMENT BASED ON LAKE-WIDE REMEDIATION

	Remedial Alternatives / CPOI Concentration mg/kg Dry Weight)						
	A	B - D	D2	E	F1 - H	I	J
Lake-Wide Basis							
Mercury							
Pre-Remediation SWAC	2.91	2.91	2.91	2.91	2.91	2.91	2.91
Estimated Residual SWAC	2.91	1.00	0.97	0.97	0.96	0.92	0.34
Estimated Percent Reduction	0	65	67	67	67	68	88
Total PCBs							
Pre-Remediation SWAC	0.201	0.201	0.201	0.201	0.201	0.201	0.201
Estimated Residual SWAC	0.201	0.047	0.047	0.052	0.027	0.033	0.025
Estimated Percent Reduction	0	77	77	74	87	84	87
Littoral Basis							
Mercury							
Pre-Remediation SWAC	3.49	3.49	3.49	3.49	3.49	3.49	3.49
Estimated Residual SWAC	3.49	0.63	0.53	0.53	0.48	0.38	0.23
Estimated Percent Reduction	0	82	85	85	86	89	93
Total PCBs							
Pre-Remediation SWAC	0.367	0.367	0.367	0.367	0.367	0.367	0.367
Estimated Residual SWAC	0.367	0.047	0.047	0.052	0.027	0.033	0.025
Estimated Percent Reduction	0	87	87	86	93	91	93

Note:

Concentrations in capped areas following remediation are assumed to be equivalent to concentrations measured in Otisco Lake.

Residual concentrations of mercury in SMU 8 were estimated by the natural recovery model as described in the text. Residual concentrations of PCBs in SMU 8 were assumed to be equivalent to residual concentrations in the littoral zone.

TABLE I.28
CURRENT AND ESTIMATED MERCURY AND PCB CONCENTRATIONS IN FISH TISSUE FOLLOWING SEDIMENT REMEDIATION

		Remedial Alternatives / CPOI Concentration mg/kg Dry Weight)							Target Tissue Concentration Range
		A	B - D	D2	E	F1 - H	I	J	(mg/kg ww)
Lake-Wide Basis									
Mercury									
Estimated Percent Reduction		0	65	67	67	67	68	88	
Estimated Residual Concentration in Prey Fish (mg/kg ww)	<18 cm length	0.22	0.08	0.07	0.07	0.07	0.07	0.03	0.01 - 0.3
	>18 cm length	0.67	0.23	0.22	0.22	0.22	0.21	0.08	0.01 - 0.3
Estimated Residual Concentration in Sport Fish (mg/kg ww)		1.1	0.38	0.37	0.37	0.36	0.35	0.13	0.2 - 0.6
Total PCBs									
Estimated Percent Reduction		0	77	77	74	87	84	87	
Estimated Residual Concentration in Prey Fish (mg/kg ww)	<18 cm length	0.98	0.23	0.23	0.25	0.13	0.16	0.12	0.02 - 9.6
	>18 cm length	1.6	0.36	0.37	0.41	0.21	0.26	0.20	0.02 - 9.6
Estimated Residual Concentration in Sport Fish (mg/kg ww)		0.9	0.21	0.21	0.23	0.12	0.15	0.11	0.003 - 0.2
Littoral Basis									
Mercury									
Estimated Percent Reduction		0	82	85	85	86	89	93	
Estimated Residual Concentration in Prey Fish (mg/kg ww)	<18 cm length	0.22	0.04	0.03	0.03	0.03	0.02	0.01	0.01 - 0.3
	>18 cm length	0.67	0.12	0.10	0.10	0.09	0.07	0.04	0.01 - 0.3
Estimated Residual Concentration in Sport Fish (mg/kg ww)		1.1	0.20	0.17	0.17	0.15	0.12	0.07	0.2 - 0.6
Total PCBs									
Estimated Percent Reduction		0	87	87	86	93	91	93	
Estimated Residual Concentration in Prey Fish (mg/kg ww)	<18 cm length	0.98	0.12	0.13	0.14	0.07	0.09	0.07	0.02 - 9.6
	>18 cm length	1.6	0.20	0.20	0.22	0.12	0.14	0.11	0.02 - 9.6
Estimated Residual Concentration in Sport Fish (mg/kg ww)		0.9	0.11	0.12	0.13	0.07	0.08	0.06	0.003 - 0.2

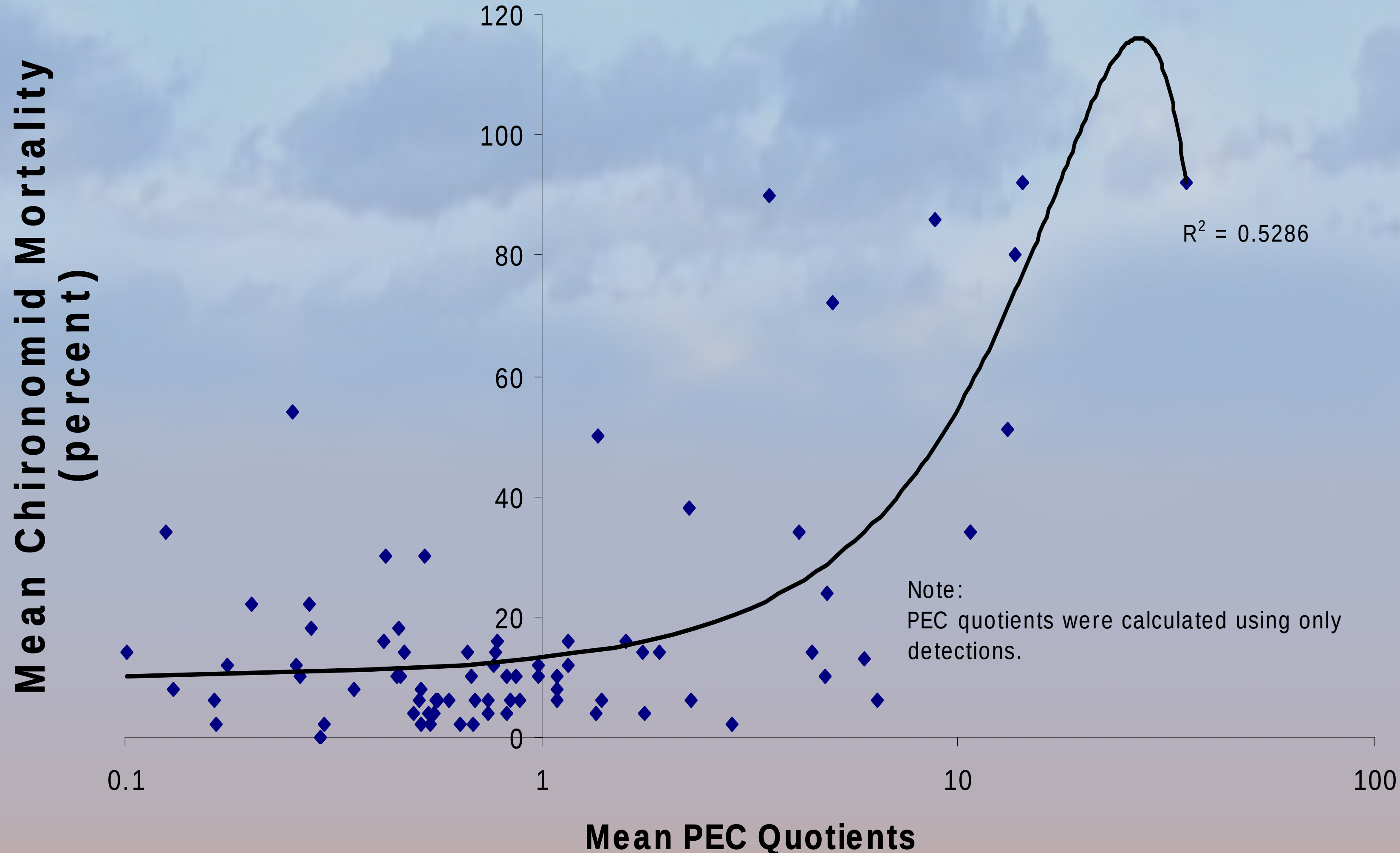
Notes:

Prey fish are consumed by wildlife and are evaluated on a whole body basis. Sport fish are consumed by humans and are evaluated on a fillet basis.

Current concentrations for prey fish (< 18 cm and > 18 cm in length) are mean concentrations from the BERA (TAMS, 2002a). Current concentrations for sport fish (i.e., fish of edible size) are 95 percent UCL on the mean concentrations from the HHRA (TAMS, 2002b).

Target tissue concentration ranges as determined in Appendix G, fish tissue goals

Chironomid Mortality vs. Mean PEC Quotients Using Revised 2 Grouping Method (1992)



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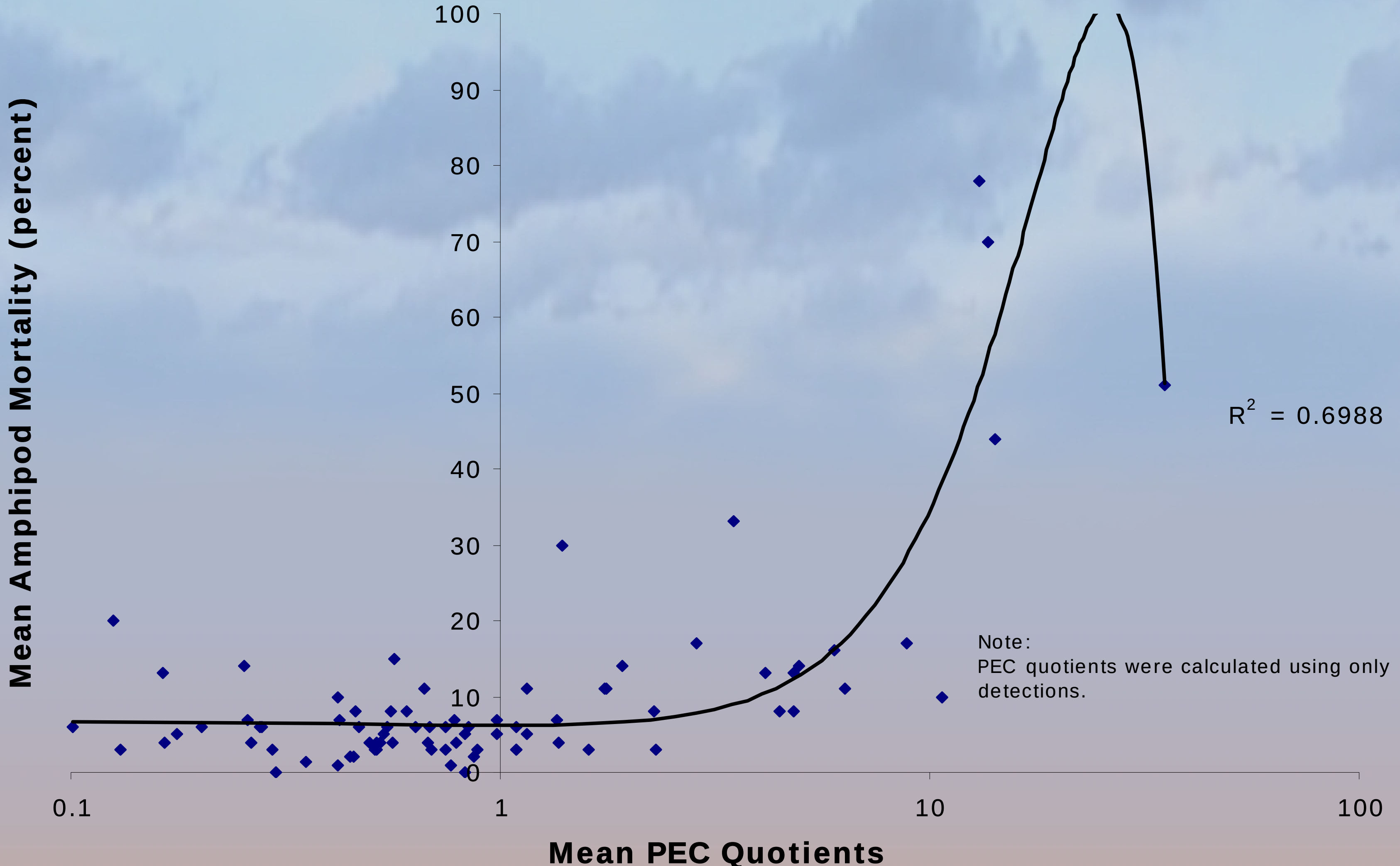
Amphipod Mortality vs. Mean PEC Quotients Using Revised 2 Grouping Method (1992)



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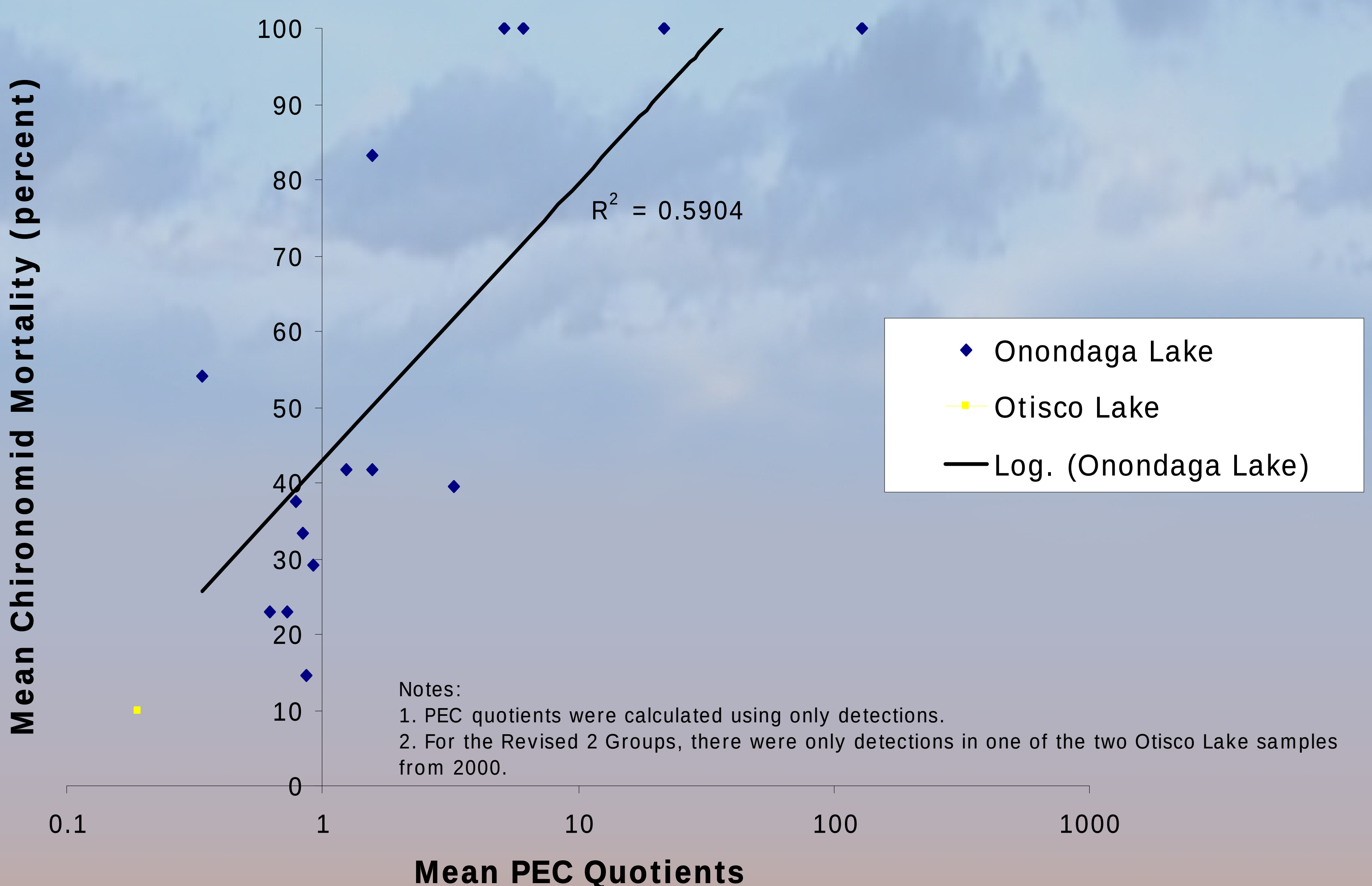
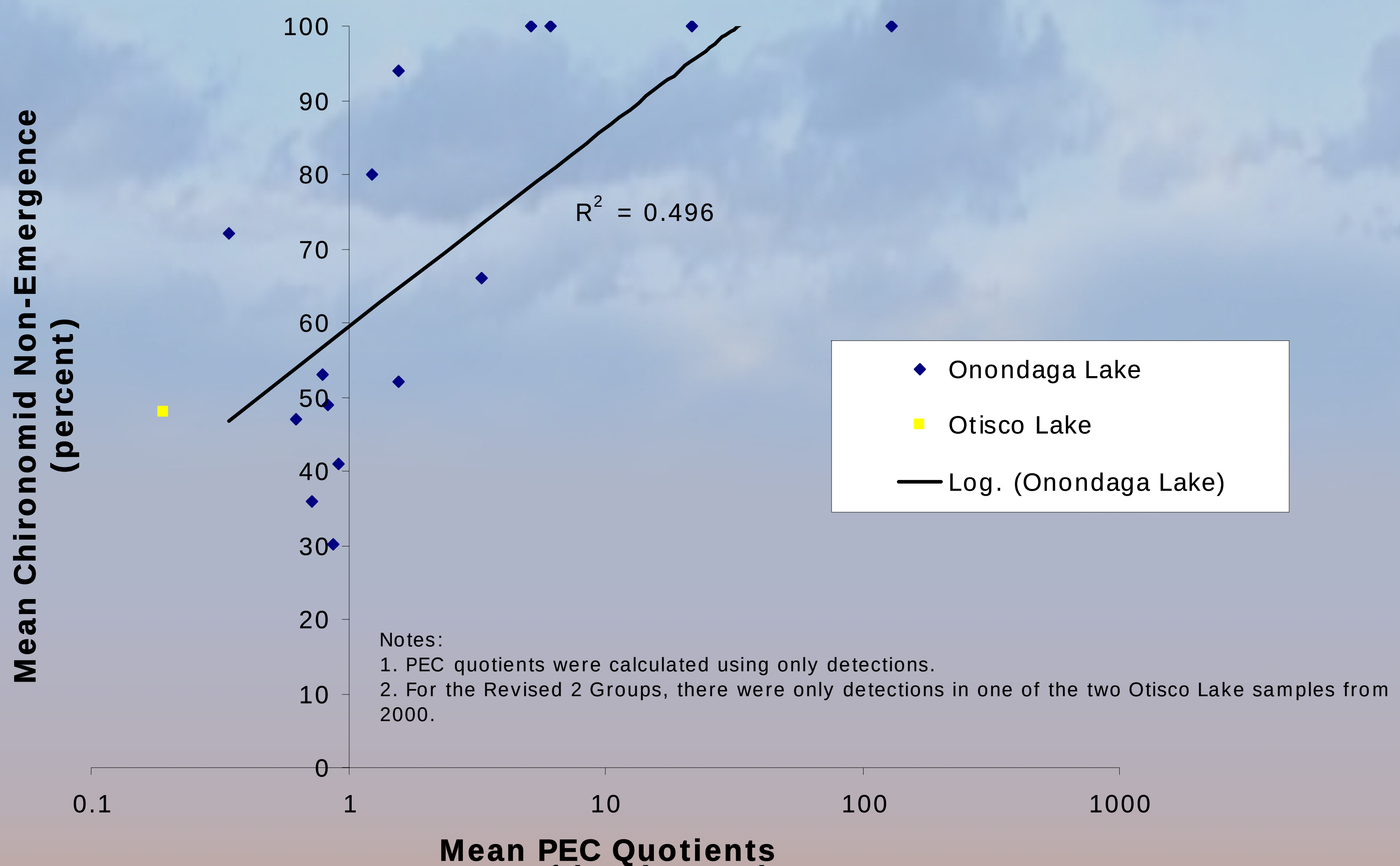
Chironomid Mortality vs. Mean PEC Quotients Using Revised 2 Grouping Method (2000)



Chironomid Non-Emergence vs. Mean PEC Quotients Using Revised 2 Grouping Method (2000)



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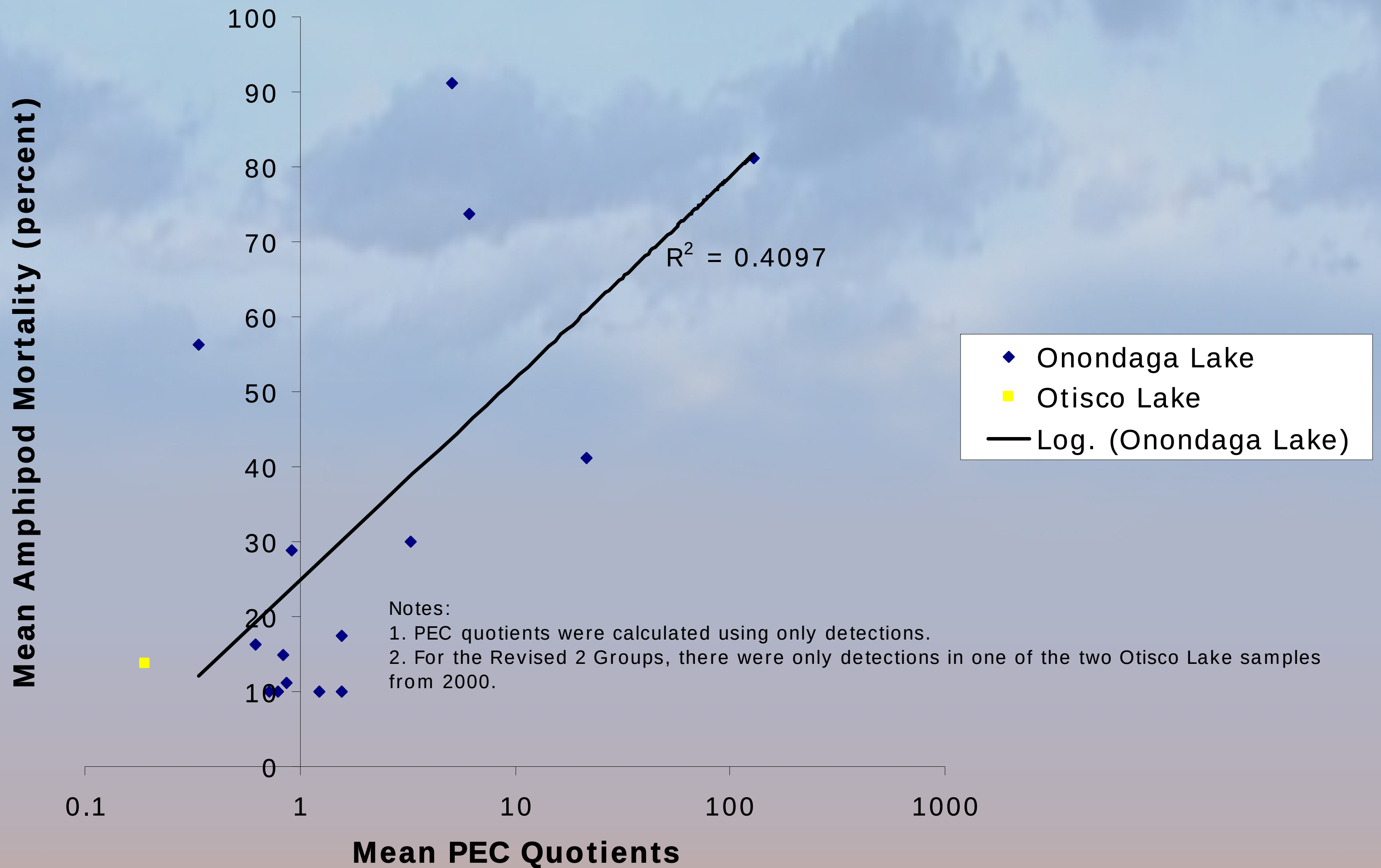
Amphipod Mortality vs. Mean PEC Quotients Using Revised 2 Grouping Method (2000)



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RESPONSIVENESS SUMMARY

ATTACHMENT 2

Comment and Response Index

Onondaga Lake Responsiveness Summary
Comment and Response Index

Name/Agency	Comment Code	Comment Summary	Response
State Government Comments			
Joan K. Christensen, Member of Assembly, State Assembly of New York	S-1.1	Commends NYSDEC for conducting the public meetings. Would like to receive any updated information on the project.	Comment noted.
Onondaga Nation Comments			
Joseph J. Heath, Esq., General Counsel for Onondaga Nation	N-1.1	In its February 8, 2005 comments to the EPA National Remedy Review Board (NRRB), the Onondaga Nation asserts that EPA and NYSDEC failed to "consult" with the Nation concerning the remediation of Onondaga Lake pursuant to the requirements of CERCLA § 126.	This comment asserts a claim that EPA and NYSDEC have violated the law. The Onondaga Nation has asserted this same claim in a Notice of Intent to Sue, dated January 6, 2005 ("Notice"). Because the Notice advises EPA and NYSDEC to expect litigation on this specific issue, the agencies will detail their compliance with the law concerning consultation during such litigation with the advice and representation of their respective counsel, should such litigation be commenced. We do note here briefly that EPA and NYSDEC have participated in a number of technical discussions concerning the Proposed Plan with the Onondaga Nation since November 2004 and that additional technical meetings are anticipated.

Name/Agency	Comment Code	Comment Summary	Response
J. Heath, Esq., cont.	N-1.2	The Onondaga Nation identifies its sacred, spiritual, historic, archeological and environmental interests in Onondaga Lake. The Nation is concerned that NYSDEC's preferred remedial alternative is inadequate and will result in permanent, long-term contamination and degradation of the lake due to continuing releases of mercury and other pollutants.	As part of the Superfund process, cultural resource assessments are performed for areas where it is believed that archeological resources may be present. A cultural resource assessment for the project are was produced in October 2004; this report noted the likelihood that the proposed project might encounter both recorded and unrecorded prehistoric and historic resources. Consequently, it is likely that once the area of remedial impact becomes established, additional cultural resource investigations will be required before the remedy is implemented. EPA and NYSDEC note these interests and value the views of the Onondaga Nation. See also response to Frequent Comment #6.
	N-1.3	Concerned that NYSDEC's preferred remedy does not adequately incorporate the proper and complete clean up of numerous upland toxic dump sites which continue to release pollutants into the lake.	See response to Frequent Comment #5.
	N-1.4	The Onondaga Nation asserts it is a trustee for natural resources under CERCLA.	EPA and NYSDEC note the concern, but acknowledge, generally, that EPA, the Department of the Interior, the National Oceanic and Atmospheric Administration, NYSDEC, and the Onondaga Nation are subject to the administrative procedures allowed under CERCLA for the designation of trustee(s) of natural resources concerning a Superfund site, and that such procedures operate as a separate process from the remedy selection process.

Name/Agency	Comment Code	Comment Summary	Response
J. Heath, Esq., cont.	N-1.5	The Onondaga Nation asserts that consultation with the Nation was required prior to NYSDEC's selection and announcement of a preferred remedy for Onondaga Lake.	See response to Comment N-1.1.
	N-1.6	The Onondaga Nation asserts it is entitled to have been afforded substantially the same treatment as a state under CERCLA and that EPA and NYSDEC have failed to consult with the Nation under CERCLA.	See response to Comment N-1.1.
	N-1.7	The Onondaga Nation asserts that EPA has violated various commitments, policies and its federal trust responsibilities.	See response to Comment N-1.1.
Regional Government Comments			
David Coburn, Director, County of Onondaga, Executive Department, Office of the Environment	R-1.1	Honeywell's November 29, 2004 feasibility study (FS) report is called a "draft final." Has the report been approved by NYSDEC? If not, how will the report be used by NYSDEC in the selection of a remedy for the site?	NYSDEC has approved the FS report in that it provided sufficient information (e.g., regarding the development and evaluation of remedial alternatives) to aid in NYSDEC's preparation of the Proposed Plan for the site and will be approved in that context. However, as the document contains statements that NYSDEC does not agree with, NYSDEC's approval does not constitute a full agreement with the contents of the FS report. NYSDEC's comment letters to Honeywell, which reflect NYSDEC and EPA's concerns raised during the development of te FS report.

Name/Agency	Comment Code	Comment Summary	Response
D. Coburn, cont.	R-1.2	Honeywell continues to refer to the concept of a defensible mercury model/mass balance concept in the FS. NYSDEC previously informed Honeywell that the model and associated mass balance were disapproved. Please clarify NYSDEC's position on this matter.	As noted, NYSDEC disapproved Honeywell's mercury mass balance, as it could not account for sources of approximately 75 percent of the total mercury flux through the lake. Subsequently, NYSDEC rewrote the Onondaga Lake RI report, and in it presented mass estimates for additional sources of mercury that Honeywell had not included. NYSDEC's RI report indicates that those sources are of the proper magnitude to close the mercury mass balance for the stratified period. While there are uncertainties in some of the mercury mass estimates, NYSDEC feels that the mercury mass balance for the stratified period is sufficient to identify the major sources and sinks of mercury and their relative importance and to support the selection of a remedy for the site.

Name/Agency	Comment Code	Comment Summary	Response
D. Coburn, cont.	R-1.3	It is unclear how the probable effect concentration quotient (PECQ) was used to determine the volume of material to be dredged from each sediment management unit (SMU). Clarify which factors and contaminants dictated the quantity of sediment to be dredged from each SMU and the basis for determining the sediment cap thickness.	For Alternatives 2 through 5, the mean PECQs (which were calculated for sediments within the 0 to 15 cm depth interval) and the mercury probable effect concentration (PEC), were used to determine the areal extent of remediation. The mean PECQs were not used to determine depths of dredging and therefore volumes of sediment removed for these alternatives. The factors determining the depth of removal depend on the SMUs and include targeted dredging in areas with high concentrations of chemical parameters of interest (CPOIs) and high groundwater upwelling velocities in order to increase isolation cap effectiveness as well as dredging to: • Ensure that placement of the isolation cap would result in no loss of lake surface area. • Optimize habitat and erosion protection. • Remove non-aqueous phase liquid (NAPL). • Remove materials in areas of hot spots and reduce concentrations prior to capping. For Alternative 6, which includes full removal to the cleanup criteria in SMUs 1 through 4 and 6 and 7, the depths and volumes of removal were based on exceedances of the mean PECQ of 1 or the mercury PEC using available data from all depths. Alternative 7 is similar to Alternative 6, except for the cleanup value used (effects range-low [ER-L] instead of mean PECQ and mercury PEC). Details of volume estimates are included in Appendix E of the FS report.

Name/Agency	Comment Code	Comment Summary	Response
D. Coburn, cont.	R-1.3, cont.		For Alternatives 2 through 5, the thicknesses of the isolation layer within the sediment caps for the littoral SMUs are based on the chemicals detected, the concentrations of these chemicals, and the upwelling velocities within each SMU. The cap model was run independently for SMUs 1, 2, 3, 4, 6, and 7 for some or all of the following parameters: mercury, BTEX, chlorobenzene, dichlorobenzenes, naphthalene, fluorene, phenanthrene, pyrene, benzo(a)pyrene, hexachlorobenzene, PCBs, and phenol. The model predicted concentrations in the bioturbation layer at steady state. Therefore, using the maximum concentrations detected in the sediment within each of these SMUs, the cap thickness in the model was increased until none of the modeled parameters exceeded their PECs (or sediment screening criteria for benzene, toluene, and phenol) at steady state. For example, chlorobenzene and dichlorobenzenes dictated the thickness of the isolation layer of the cap in SMU 1. Details of the isolation component requirements by SMU are included in Attachment G of Appendix H of the FS report. Refined cap modeling will be performed during the remedial design. The actual cap will include a safety buffer layer equal to 50 percent of the isolation layer, plus an additional layer will be placed to address possible mixing with underlying sediment and uneven application.

Name/Agency	Comment Code	Comment Summary	Response
D. Coburn, cont.	R-1.4	Oxygenation is experimental; its ecological and recreational use ramifications are not known; it is expensive; and it requires constant long-term operation and maintenance. Why is it included as part of the preferred remedy, rather than increasing the amount of thin-layer capping or isolation capping in the profundal zone. What supplemental remedies will be proposed if it is technically impracticable or does not work?	See response to Technical Comment #1.
	R-1.5	The focus on oxygenation wrongly implies that mercury is a problem in the lake because the lake is eutrophic, and undue emphasis is placed on the hypolimnion as the primary site of mercury methylation. In actuality, high mercury levels in fish are due to the industrial operations, past and present, that release mercury into the lake system, and there are other anoxic environments in the lake (e.g., littoral sediments, wetlands).	NYSDEC agrees that methylation can take place wherever conditions are conducive for sulfate-reducing bacteria to thrive. In addition to the water column, methylation can take place in the mercury-contaminated sediments in the lake, and porewater data from the RI and FS reports clearly illustrate this. However, one of NYSDEC's concerns is that the exposure to methylmercury in Onondaga Lake appears to be very closely tied to methylation that takes place in the hypolimnion. As presented in the RI report, in terms of contribution to the methylmercury mass balance for the water column, methylation in the hypolimnion is clearly the largest single source of methylmercury to the system. The fact that only very low concentrations of methylmercury (0.3 nanograms per liter [ng/L]) are seen throughout the water column when the lake is completely oxic prior to stratification strongly suggests that the sediments (either littoral or profundal) are not releasing significant amounts of methylmercury into the water column.

Name/Agency	Comment Code	Comment Summary	Response
D. Coburn, cont.	R-1.5, cont.		The water column is home to many types of biota and represents an important route of exposure. It is possible that certain organisms may also be exposed to methylmercury in other locations, such as the littoral zone and wetland sediments. However, the methylmercury concentrations in benthic macroinvertebrates were relatively low (10 to 20 µg/kg in chironomids) throughout the littoral zone, except for SMU 1 (based on 1992 data). Zooplankton in the epilimnion of SMU 8 contained 3 to 25 times as much methylmercury as the benthic macroinvertebrates. This suggests that there is relatively little methylmercury being created in the littoral sediments that is directly available to the food chain, while the methylmercury produced in the water column in the hypoliminion, which crosses the thermocline to the epilimnion, presents a much greater exposure. Thus, NYSDEC has proposed addressing this source of methylmercury in the hypolimnion using oxygenation, as well as addressing approximately 425 acres of littoral zone sediments through dredging and capping, and the profundal zone through monitored natural recovery and thin-layer capping.

Name/Agency	Comment Code	Comment Summary	Response
D. Coburn, cont.	R-1.6	All of the alternatives will likely alter the lake's bathymetry. The final remedy should consider creation of an updated bathymetric map of the lake.	An accurate and up-to-date bathymetry map of the current conditions will be developed during the remedial design for the areas requiring remediation. The bathymetry map will have to be updated after remediation in order to assess whether the remediation fulfilled the performance specifications of the design. Furthermore, the bathymetric surveys need to be updated on a regular basis as part of long-term monitoring in order to confirm that there has not been any failure or erosion of the cap and that the design thicknesses are being maintained.
Mrs. Rapp, Onondaga County Legislature	R-2.1	Issuance of Resolution No. 17, which memorializes NYSDEC's intent to issue a Record of Decision (ROD) and select an appropriate remedy by April 1, 2005 and provide implementation of that remedy as quickly as possible.	Comment noted. It should be noted that the court has granted an extension to the ROD signing date to July 1, 2005.
Barbara S. Rivette, Chair, Onondaga County Council on Environmental Health (CEH)	R-3.1	Commends all parties on reaching the current plans for remediation.	Comment noted.
	R-3.2	CEH is glad to see the prospect of action in the near future, rather than more studies. The four-to-seven-year time frame, or sooner, is appealing to people who have worked for a cleaner lake for over 25 years.	The NYSDEC will endeavor to expedite the remediation of Onondaga Lake. See also response to Frequent Comment #12.
	R-3.3	The plans should provide for monitoring and recognition of deficiencies, and allow for changes to be made accordingly.	Extensive monitoring will be conducted prior, during, and after remedial construction to assess the effectiveness and performance of all aspects of the remedy. If it is determined that the remedial objectives are not being met, appropriate steps will be taken to ensure the effective remediation of Onondaga Lake.

Name/Agency	Comment Code	Comment Summary	Response
B. Rivette, cont.	R-3.4	Dredging could have a serious adverse impact on the lake and its flow. While impacts may be short term, dredging is of serious concern to CEH.	See response to Frequent Comment #7.
	R-3.5	While disposal in Wastebed 13 will have immediate, if short-term, impacts, it is the logical destination for dredged material that is not severely hazardous. However, more thought needs to be given to the final configuration of the wastebed, and long-term monitoring of any disposal area should be required.	Long-term monitoring of the sediment consolidation area (SCA) is included in the selected remedy. The specifics of the monitoring, as well as the configuration of the SCA, will be developed during the remedial design. It should be noted that the location of the SCA has not been determined. See also response to Frequent Comment #9.
	R-3.6	Can capping replace some, or even most, of the proposed dredging?	See response to Comment R-1.3.
	R-3.7	There are community questions that still need to be addressed, such as "is this money being spent wisely or just to meet a standard?" "Will the standard change?" "What does the public see as an acceptable level of risk that would result by leaving some contamination in the lake?"	NYSDEC developed the selected remedy (including the cleanup criteria) so that it will be protective of human health and the environment, comply with laws and regulations, and will be cost effective. In regard to the public's view, public comments were solicited on the proposed remedy. The purpose of the Responsiveness Summary (RS) portion of the ROD is to provide responses to all questions and comments submitted to NYSDEC during the comment periods associated with the Proposed Plan and the Remedial Investigation/Feasibility Study reports.
	R-3.8	It is important that taxpayers realize that operation and maintenance (O&M) costs are an ongoing part of the proposal. A sequestered fund from Honeywell would be advisable. Local taxpayers need to be protected from any monetary liability.	See response to Frequent Comment #8.

Name/Agency	Comment Code	Comment Summary	Response
Local Government Comments			
Mary Ann Coogan, Supervisor, Town of Camillus	L-1.1	NYSDEC should revisit the entire issue of the SCA location. Consider in-water or lakeshore siting.	Construction of an SCA within Onondaga Lake would not comply with NYSDEC regulations. See also response to Frequent Comment #9.
	L-1.2	If Wastebed 13 is used, proactive odor prevention is needed. Suggests a demonstration-size SCA in the part of Wastebed 13 that is farthest from population centers. Use odor-control techniques at this demonstration SCA to determine their effectiveness. Also suggests that an agreed-upon protocol be in place prior to operation of the full-scale SCA in order to shut down operations in case of problems. Need mechanism in place to let SCA managers know as soon as there is an odor problem. Suggest an "Odor Panel" of homeowners.	The potential need for a demonstration-size SCA will be evaluated as part of the remedial design for the project. See also response to Frequent Comment #10. Odor prevention measures will be employed regardless of the SCA location. This will include the development of a plan which addresses the steps (e.g., use of odor control agents, modification of system operations, temporary shut down) needed to be employed if there are unacceptable odors.
	L-1.3	Noise modeling should be done, and mitigation planned for predicted noise impacts, particularly from pumping operations.	The need for noise modeling will be evaluated as part of the remedial design for the project. See also response to Frequent Comment #9.
	L-1.4	On-site construction activities could cause noise and traffic issues, which should be mitigated. Suggest using the stockpile of exempt construction and demolition (C&D) debris that is in Wastebed 15 for construction of SCA to cut down on transporting construction materials to site.	A detailed geotechnical analysis will be conducted on the wastebeds to determine their structural stability when project loads are imposed. Any upgrades to the embankments of the existing wastebeds to handle project loads will be accomplished using materials that possess specific geotechnical properties and that are placed and compacted in a manner prescribed by the project's engineering specifications. It is not likely that C&D debris material could meet the project's technical specifications for material quality, placement, or compaction. See also response to Frequent Comment #9.

Name/Agency	Comment Code	Comment Summary	Response
M.A. Coogan, cont.	L-1.5	Modeling a viewscape of the visual impacts of the SCA in Wastebed 13 should be a priority. Develop a screening plan. Planting vegetation should begin soon to shield the view of the SCA.	Attention will be paid to visual impacts during siting, design, and construction. This may lead to the installation of some form of screening or plantings, as suggested by the comment.
	L-1.6	Ability of Wastebed 13 to carry the load of the SCA should be evaluated now. If there are any doubts, the siting of the SCA should be reevaluated.	No final site (e.g., Wastebed 13) for the SCA has been identified. Before a final site is selected, candidate locations will undergo a geotechnical evaluation to determine, among other things, their load-carrying capacity. The final site selection will be made during the remedial design.
	L-1.7	NYSDEC should provide a “plain English” explanation as to why Honeywell’s proposal is not sufficiently protective. Explain whether the real world risk under Honeywell’s plan is unacceptable, and why. A speaker at the first public hearing said that NYSDEC’s risk assessment assumptions are conservative, thus overstating risks and making the FS report remedies even more conservative. Do not dredge more than is necessary because conservative assumptions are superimposed on earlier conservative assumptions.	See responses to Frequent Comments #1 and #11.
	L-1.8	If the SCA is sited in Camillus, suggests a citizen’s panel to be in an advisory role evaluating the final uses of the SCA.	See response to Frequent Comment #17.
	L-1.9	Expects and demands effective monitoring system for SCA during construction, operation, and post-closure. Gives details on what monitoring program should minimally include (e.g., groundwater/surface water quality monitoring).	See response to Frequent Comment #10.

Name/Agency	Comment Code	Comment Summary	Response
M.A. Coogan, cont.	L-1.10	Camillus wants to be part of review process for monitoring data and expects to be reimbursed for related expenses.	NYSDEC realizes that the specific design and monitoring of the SCA is of great interest to the local community. As part of the remedial design, NYSDEC will evaluate the appropriate location of the SCA and determine the specifics of the design and monitoring of the SCA. As part of this evaluation, NYSDEC will meet with the local community to discuss the evaluation process and the specifics of the design and monitoring of the SCA.
	L-1.11	New facilities must be secured against recreators and others. Open water or other hazards must be fenced.	The SCA will be designed and maintained in a manner that is protective of the surrounding community.
	L-1.12	Guarantee must be made, via some form of financial instrument, that long-term O&M costs will be covered. Need assurance that no cleanup-related costs will be passed along to the local/county government.	See response to Frequent Comment #8.
E. Robert Czaplicki, Supervisor, Town of Geddes	L-2.1	There has been enough study and delay; begin cleanup. NYSDEC says that once the plan is approved there will be an extensive design phase with more public meetings.	The design phase is a necessary component of the remedial action. See also responses to Frequent Comments #12 and #17.
	L-2.2	Post-cleanup, NYSDEC will require Honeywell to remain involved for at least 30 years to ensure cleanup effectiveness.	Long-term monitoring is crucial to ensuring the success, and continued efficacy, of the remedial action, as well as for protecting human health and the environment. See also response to Frequent Comment #8.
Deborah Warner, Director of Government Relations, Greater Syracuse Chamber of Commerce (GSCC)	L-3.1	GSCC supports the cleanup and is looking forward to the lake becoming a community asset. The faster the lake is cleaned up, the more development and spinoff jobs will occur. Other projects in and near the lake are moving forward.	Comment noted. See also response to Frequent Comment #12.

Name/Agency	Comment Code	Comment Summary	Response
D. Warner, cont.	L-3.2	Preserve development opportunities on reclaimed land. We do not want to lose or limit the economic potential of the land adjacent to the lake.	See response to Frequent Comment #18.
	L-3.3	The business community does not doubt the thoroughness or scientific acumen of NYSDEC and EPA. We trust that you have not overlooked any aspect of the RI/FS reports and we trust the monitoring programs that are part of the plan.	See response to Frequent Comment #12.
	L-3.4	Hopes that Honeywell agrees to the NYSDEC proposal.	See response to Frequent Comment #13.
	L-3.5	What assurances can taxpayers be given to ensure that if there is failure in the cap or engineered solution that they will not be responsible for the costs? If Honeywell as a company no longer exists, who will be responsible for costs?	See response to Frequent Comment #8.
Group and Association Comments			
Ríobart É. Breen, Executive Director, Anam Duan Franciscan Ecology Center	G-1.1	Very concerned about the health of the lake ecosystem and human health. Support all efforts to restore the full, natural functioning of the lake ecosystem.	Comment noted.
	G-1.2	Support measures that permanently restore lake's full, natural functions and services; do not support temporary actions that force the lake to depend on expensive, taxpayer-funded solutions in perpetuity.	See response to Frequent Comment #8.

Name/Agency	Comment Code	Comment Summary	Response
R. Breen, cont.	G-1.3	Remediation should restore the lake's self-sustaining ecosystems as much as possible. The proposed plan should be reviewed for such opportunities rather than "technology dependency." "Off-site" solutions just shift the problem to other communities and avoid responsibility. The proposed remedy should be revisited in terms of remedies that will not fully restore the ecosystem's health and should be revised to prevent problems for future generations.	See responses to Frequent Comments #8 and #14.
	G-1.4	The capping "solution" appears to allow mercury to leach into the lake and bioaccumulate into the food chain, thus relying on slow bioaccumulation to rid the lake system of mercury.	See response to Technical Comment #2.
	G-1.5	Concerned about effluent water from treated sediment and waste consolidation. Support treatment process that do not produce new/additional toxins.	The wastewater treatment systems that will be utilized will not create new toxins. The systems are all common technologies used to remove contaminants from effluent water. These include settling, precipitation/flocculation, air stripping and capture of volatile compounds, means for collecting any floating NAPLs, and carbon treatment.
	G-1.6	Concerned that goals will only "enhance" the lake as a community resource and only slightly "improve" aquatic habitat. Goals should include restoration of original functions of lake without permanent dependence on costly technology.	See response to Frequent Comment #14.
	G-1.7	Effort should be made to recruit and train community members for jobs related to restoration of the lake. Would like to see opportunities for volunteers to help with restoration.	See response to Frequent Comment #19.

Name/Agency	Comment Code	Comment Summary	Response
R. Breen, cont.	G-1.8	Support the initial assessment of effects of contamination on ecology; plan should have ongoing biological assessment and monitoring. Concerned about bioaccumulation, especially in vegetation and migrating birds. Use students or volunteers for monitoring.	See responses to Frequent Comments #4 and #19.
	G-1.9	Would like lake to return to being a cold-water fishery and support previously common fish.	See response to Frequent Comment #15.
	G-1.10	Would like an education and communication program to explain the restoration process and the effects of industrial waste. Include media campaign and opportunities for on-site public visits.	The NYSDEC will continue its outreach to the public as the remediation of Onondaga Lake continues, and will endeavor to provide innovative and effective ways of improving that outreach.
	G-1.11	Would like Honeywell to address how restoration and waste remediation has affected their operations, and what they are doing to prevent contamination at other sites. Other companies and communities could benefit from Honeywell's experience. There should be a "Never Again" memorial at the site explaining what happened and how it was restored.	Honeywell's interaction with the community, other than its role in assisting NYSDEC in the implementation of the community relations plan for the remediation of Onondaga Lake, is a matter within the corporation's discretion and not a matter for NYSDEC response. Therefore, NYSDEC cannot speak as to how Honeywell might address this matter.
Cara Burton, Director, Solvay Public Library	G-2.1	Library trustees are heartened to see that Honeywell is prepared to lead the lake cleanup effort. Library houses the files of Allied Chemical, and as keepers of part of the lake's history, trustees look forward to continuing to keep records of the story of the lake. Community will benefit environmentally, economically, and recreationally from restored lake.	Comment noted.

Name/Agency	Comment Code	Comment Summary	Response
Douglas J. Daley (and students Kyle Williams, Gwen Kernan, Jamie Pentland, Mike Crawford, Rob Conden, Lindsey Clark), Associate Professor, SUNY ESF	G-3.1	Delaying the start of remediation until all upland sources are removed or controlled is not necessary. Commencing dredging and capping actions in SMU 5 at the earliest possible time provides an early benefit.	See response to Frequent Comment #5.
	G-3.2	Oxygenation of the hypolimnion is a short-term interim measure, not a long-term solution. How does one ensure complete mixing of oxygenated waters?	Data collected from Onondaga Lake and examined in the RI report have shown that when the water column in Onondaga Lake is oxygenated, methylation of mercury is severely limited or completely eliminated. This technology is commonly used to improve oxygen resources in eutrophic lakes. Oxygenation is relatively inexpensive, compared to the remediation as a whole. The preliminary estimate of the cost for oxygenation for 30 years is $7 million out of the $451 million total of the selected remedy. For these reasons, it is reasonable to use this technology as a long-term solution. Ensuring complete mixing of oxygen in the hypolimnion is one of the major reasons for performing a pilot-scale study. There are two mechanisms that allow the movement of oxygen through the water column: diffusion and advection. The design of the system will have to include a distribution system such that these two mechanisms are sufficient to properly maintain oxic conditions throughout the hypolimnion. See also response to Technical Comment #1.
	G-3.3	In the event of an energy crisis, will the public be faced with the choice of paying operating costs versus shutting off the system? Will a trust fund be established to ensure that the O&M and replacement costs are covered in perpetuity?	See response to Frequent Comment #8.

Name/Agency	Comment Code	Comment Summary	Response
D. Daley et al., cont.	G-3.4	How much of the system design will address the lake's already high baseline oxygen demand?	The specifics of the design of the pilot system (e.g., amount of oxygen or air needed, most efficient delivery method) will be determined as part of the remedial design for the project.
	G-3.5	Why is capping necessary? There will be extensive habitat disruption during the dredging and cap placement. What mechanism will be used to restore the habitat at completion of construction? Why disturb the sediments at all, if the main purpose of the cap is to minimize erosion due to wave action, and oxygenation will address the methyl mercury formation in the littoral zone?	There are two major reasons for remediating the sediments in the littoral zone: • To eliminate direct exposure of biota (e.g., benthic invertebrates that are at the base of the food chain) to the contaminants in those sediments. This is the basis of the cleanup criteria used in the selected remedy. • To prevent releases of those contaminants into the water column where additional exposures can take place. In many of the areas where isolation capping will be employed, dredging will be necessary to ensure cap effectiveness by removing NAPLs and hot spots of contamination, to preserve the surface area of the lake, to preserve or improve littoral zone habitat, and/or to provide stability.

Name/Agency	Comment Code	Comment Summary	Response
D. Daley et al., cont.	G-3.5, cont.		Much of the current littoral zone is very poor habitat because of the toxicity caused by the contamination or because of the physical nature of the sediment/wastes which currently make up the bottom in those areas. The remediation of those sediments will remove poor habitat and replace it with appropriate habitat materials that are more conducive to colonization by plants, benthic organisms, and higher trophic-level animals. The benefits of the reduction in contamination and physical habitat improvements in the long term are considered to far outweigh the temporary habitat loss that will be experienced during remediation.
	G-3.6	After sediment removal, how will the clean sediment used for the cap be repopulated with benthic organisms?	Clean sediment placed in Onondaga Lake as the habitat layer above the isolation cap will be repopulated naturally by benthic organisms (larval and adult) from other parts of the lake and tributaries. There is generally a continuous stream of benthic organisms present in aquatic water bodies, so that the recovery of benthic invertebrates in a place of previous disturbance generally commences soon after the disturbance, if suitable habitat conditions exist.
	G-3.7	Once the lake is “clean” by the nitrification and phosphate removal processes at the Metro plant, will zebra mussels aid in breaking down remaining contaminants? Will they have any adverse effects on the lake, since they are likely to move in once it is cleaner?	There is no evidence that increases in zebra mussels (*Dreissena polymorpha*) in Onondaga Lake would assist in breaking down remaining contaminants. Zebra mussels require hard substrata for colonization, and therefore are unlikely to influence remediation efforts, which are focused on sediments in the lake.

Name/Agency	Comment Code	Comment Summary	Response
D. Daley et al., cont.	G-3.8	What evidence supports the design thickness of the isolation cap as being able to preclude contaminant migration? Methylation of mercury will still occur under the cap and can still be transported through the sand and gravel material of the cap and enter the water column.	See response to Technical Comment #2.
	G-3.9	What consideration has been given to the fact that ebullition will continue after remediation? This will disturb the cap and allow mercury to reach the water column.	Ebullition occurs in sediments that are very rich in organic material and are anoxic, where methanogenic bacteria can thrive and produce amounts of methane so large that methane concentrations exceed the solubility limit and forms bubbles large enough to force their way through the sediments into the water column. As discussed in the Onondaga Lake RI report, these conditions are primarily in profundal sediments in the deepest part of the lake. As presented by Upstate Freshwater Institute (UFI) at the Onondaga Lake Scientific Forum in 2004, the rate of ebullition from the sediment has dropped by a factor of about six since 1992, suggesting that this source of mercury to the water column has already dropped substantially. It is possible that some ebullition will continue after remediation. This will be further evaluated as part of the remedial design. In addition, modeling for the monitored natural recovery (MNR) assessment indicates that the mercury concentrations in the surface sediments (0 to 10 cm deep) of the profundal zone will decrease significantly in the future, further reducing the degree to which ebullition can act to transport mercury associated with particles into the water column.

Name/Agency	Comment Code	Comment Summary	Response
D. Daley et al., cont.	G-3.10	What are the management plans for the future use of the lake? Will the ultimate use affect the amount of sediment removed and the areas of removal?	The amount of sediment to be removed and the areas of remediation are based on exceedances of the cleanup criteria for protection of human health and the environment, as well as dredging that is needed to ensure cap effectiveness. Accordingly, future uses of the lake will not influence either the amount of sediment to be removed or the areas of removal. See also response to Frequent Comment #20.
	G-3.11	How exactly do silt curtains work? What is the smallest size particle that can pass through them?	Silt curtains are a form of turbidity barrier that can be employed to limit downstream migration of sediment that has been resuspended by either construction or dredging operations. Turbidity barriers fall into two general categories: structural and non-structural barriers. Non-structural barriers can also be grouped into two categories: silt curtains and silt screens. A silt curtain is an impervious, vertical barrier that is normally made of a flexible plastic or vinyl material. The silt curtain is suspended from a flotation material at the water surface and is weighted at the bottom so that it remains vertical. They typically come in 100-ft sections that are then connected to encircle the work zone. They work best in water conditions that have minimal current (e.g., lakes, bays, slow-moving rivers) so as to maintain a vertical position. The silt curtain's function is to create a quiescent environment that allows the suspended material to settle out of the water column and not migrate from the work zone.

Name/Agency	Comment Code	Comment Summary	Response
D. Daley et al., cont.	G-3.11, cont.		Silt screens are deployed in much the same way as silt curtains, but they allow the passage of water through openings in the screening fabric while capturing a fraction of the suspended load in the water column. Openings in silt screens are designated by US standard sieve sizes. Based on a survey of several manufacturers, the standard screens have sieve openings in the range of 60 to 100. These correspond to openings of approximately 0.25 to 0.15 mm. The quantity of sediment that will be disturbed by dredging operations has been estimated in the FS report. Much of the material suspended during dredging is expected to quickly settle to the lake bottom in the immediate work area within the area enclosed by the silt curtains. This material will then be either captured by following dredge passes or will be isolated when the final cap is installed.
	G-3.12	How were the SMUs divided up? Do ecological characteristics vary from SMU to SMU? In SMUs 3, 5, and 6, for example, there are littoral sections that do not require remediation. How were these areas determined, considering areas needing both dredging and isolation capping surround them? Will these areas be isolated during construction?	For the purpose of the FS report, Onondaga Lake was divided into eight SMUs based on water depth, sources of water entering the lake, physical and ecological characteristics, and chemical risk drivers. Appendix B of the FS report provides additional information on the characteristics of the SMUs. Areas that require remediation were based on the locations where the cleanup criteria (i.e., mean PECQ of 1 and mercury PEC) were exceeded. The areas where dredging and capping will occur will be isolated (using silt curtains and/or other controls) from cleaner areas where remediation is not planned.

Name/Agency	Comment Code	Comment Summary	Response
D. Daley et al., cont.	G-3.13	Where will the capping materials come from? Are there sufficient resources near the lake to carry out the remediation at a satisfactory cost? Will the materials have a significant impact on the water chemistry?	Quarries that are potential sources of cap materials exist near Onondaga Lake. Materials from these sources would have to be transported to the site and then either loaded onto barges via conveyors for offshore placement or pumped as a slurry from an onshore stockpile of sand to the capping areas. Actual sources of capping material will be evaluated and selected during the remedial design. The sand (silica) cap material is expected to have little direct impact on lake water chemistry, including alkalinity.
	G-3.14	Ongoing oxygenation is not a permanent solution because there are a number of currently unknown factors that could influence its long-term success.	The remedial design for Onondaga Lake will include an oxygenation pilot study (followed by full-scale implementation, if supported by the pilot study results) to address current unknowns associated with oxygenation. However, active hypolimnetic oxygenation is a widely used technology to maintain oxygen resources in eutrophic lakes and ponds. Many such programs have been active for years. For example, hypolimnetic oxygenation was begun at Lake Amisk (5 km^2, with 60 m maximum depth) in Alberta in 1988, and was begun at Irondequoit Bay (7 km^2, with 22 m maximum depth) in New York State in 1993. Both of these lakes (as well as others) have been studied extensively for various changes to their ecosystems. While there are specific components that will likely be unique to Onondaga Lake, the science of oxygenation is not new or experimental.

Name/Agency	Comment Code	Comment Summary	Response
D. Daley et al., cont.	G-3.15	In-the-dry sediment removal/dredging is more expensive, but potentially offers greatest benefit in the long term. This seems to be a better permanent solution than dealing with the uncertainty associated with oxygenation and isolation cap performance.	NYSDEC evaluated various remedial alternatives, including full sediment removal in several of the SMUs and selected an alternative that is protective of both public health and the environment. In-the-dry removal would not be feasible for all areas where dredging is warranted. However, during the remedial design, in-the-dry removal may be evaluated for some shallow areas of the lake.
	G-3.16	Preference should be given to solutions that are ecologically sustainable. High-energy processes (e.g., oxygenation) have proven to be infeasible at other sites.	Oxygenation is a relatively low cost, highly effective technology that has been used in many places throughout North America. While this technology will require active maintenance, oxygenation is a feasible technology. There does not appear to be any ecologically sustainable solutions for addressing the mercury methylation issue. See also response to Frequent Comment #14.
	G-3.17	Cap material placement is likely to cause displacement of underlying contaminated sediments through advection, even after dredging.	Although there are no standardized methods to predict the degree of contaminated sediment resuspension resulting from cap placement, field data provide some insights. EPA has conducted monitoring of capping-induced resuspension for projects at Eagle Harbor, WA and Boston Harbor, MA (Magar et al., 2002). Capping resuspension was low for both sites and decreased as capping operations continued.

Name/Agency	Comment Code	Comment Summary	Response
D. Daley et al., cont.	G-3.17, cont.		Similar results were also found for capping resuspension monitored for a large-scale pilot study at the Palos Verdes site near Los Angeles (Palermo et al., 2001; McDowell et al., 2001), where contaminant concentrations quickly returned to background levels. Extensive water quality monitoring of capping-induced resuspension conducted for the Soda Lake, WY project (ThermoRetec, 2001) detected no site-related petroleum hydrocarbons. Recent observations at the Anacostia River Cap Demonstration Project, MD, indicated no observable sediment resuspension due to cap placement with a clamshell operating within a silt curtain enclosure (Reible, 2004). Similar results are anticipated for cap placement in Onondaga Lake. Measures to reduce the potential for resuspension, volatilization, or other contaminant movement will include the proper selection of cap materials and placement equipment, and methods designed to spread the capping material over the site gradually, such as using multiple thin layers (lifts). For the Eagle Harbor project, cap material was hydraulically washed off a barge. A manifold arrangement for placement of cap material slurry was used at a capping project at Hamilton Harbor in Canada. At the Simpson Tacoma project in WA and at Soda Lake, a horizontal auger dredge was used to place cap material. These and other projects illustrate the range of possible approaches successfully used to place caps in a gradual manner so as to minimize potential for resuspension and displacement of contaminated sediments.

Name/Agency	Comment Code	Comment Summary	Response
D. Daley et al., cont.	G-3.18	The SCA should be confined to current or inactive waste management areas near the lake. Use of any other site is unacceptable.	See response to Frequent Comment #9.
	G-3.19	Would the export of sediment to Wastebed 13 change the regulatory status of the wastebeds to an RCRA-permitted facility?	An evaluation of SCA locations will be conducted as part of the remedial design. Any technical or regulatory issues associated with locating the SCA will be addressed during this evaluation.
	G-3.20	Using a cap comprised of sand and gravel merely limits the movement of contaminated sediment in the short term. Many things can contribute to cap failure, thereby exposing humans and wildlife to contaminated sediments.	The design of the sediment cap will include an armor layer designed to protect the isolation layer from erosional processes such as waves, ice scour, and propeller wash. Evaluations described in detail in Appendix H of the FS report determined suitable materials that are predicted to be effective at protecting the isolation layer against such erosional forces. Furthermore, the cap will also include a safety factor buffer layer equal to 50 percent of the modeled isolation layer. However, it is understood that extreme or unexpected events could result in cap failure; therefore, an estimate of the amount of cap repair needed has been included in the cost estimates (Appendix F of the FS report). Also included in the estimates for operation and maintenance are costs related to maintaining the sand, rock, and gravel that make up the cap.
Steven W. Effler, PhD, Director of Research, Upstate Freshwater Institute and Charles T. Driscoll, PhD, University Professor of Environmental Systems Engineering, Syracuse University	G-4.1	UFI would like to clearly indicate that we endorse the plan in general, although with the information provided we cannot endorse one alternative over another. Nevertheless, we strongly believe whatever remediation plan is selected should be implemented as soon as possible.	See response to Frequent Comment #12.

Name/Agency	Comment Code	Comment Summary	Response
S. Effler and C. Driscoll, cont.	G-4.2	For a variety of reasons, NYSDEC rejected the original mercury model developed by Honeywell for the RI/FS process. We strongly recommend the development of process-oriented contaminant mass balance models, supported by comprehensive monitoring of the site. Effective communication of progress, performance, findings, and model evaluations from this program would allow for the option of utilizing these tools to support potentially important management decisions, as well as providing ongoing critical insights for all stakeholders.	See response to Frequent Comment #16.
	G-4.3	The observation that the measured losses of mercury exceed the measured inputs of mercury by a large extent suggests that there is not an adequate understanding of the sources of mercury to the lake.	See response to Technical Comment #14.
	G-4.4	Although there has been a marked decrease in mercury loading to the lake since the early 1970s, there has been no corresponding change in fish mercury concentrations. One might speculate that total mercury loads to the lake do not regulate mercury levels in fish, but rather these levels are regulated by the very high rate of methylmercury production. It is not clear how the reduction in total mercury loads or control of methylation in the hypolimnion will address mercury concentrations in fish.	See response to Technical Comment #15.

Name/Agency	Comment Code	Comment Summary	Response
S. Effler and C. Driscoll, cont.	G-4.5	Without a basic understanding of mercury inputs and transformations, how can stakeholders be assured that the remediation program will be successful? The development of a well-tested and credible model that also addresses the fate and transport of selected components of the organic contaminants would go a long way in demonstrating this understanding and guiding the rehabilitation effort.	See responses to Frequent Comment #16 and Technical Comment #16.
	G-4.6	A monitoring program should be conducted by an independent, objective organization with experience in Onondaga Lake and the relevant contaminants. This group should publish the results of these measurements and routinely make this information available to all stakeholders. The program should be comprehensive and include measurements that will allow for complete interpretation of the response of contaminants to changes in inputs from rehabilitation and other drivers, should be initiated immediately, and should be fully integrated with a contaminant modeling effort.	The ROD is the means of documenting the selection of the remedy. The issues raised concerning the monitoring program will need to be addressed during the remedial design.
	G-4.7	An integrated program of monitoring and modeling needs to be implemented. The goals of such an initiative would be to develop a quantitative understanding of the behavior of Honeywell site contaminants in the lake in the form of scientifically credible mathematical models, to apply the models to forecast/predict the benefits of a clean up program, to apply the models to establish reasonable expectations from the cleanup effort, to establish the feasibility of reaching cleanup goals, and to evaluate the effects of other initiatives (i.e., METRO upgrades) and natural variability.	See responses to Frequent Comments #4 and #16.

Name/Agency	Comment Code	Comment Summary	Response
S. Effler and C. Driscoll, cont.	G-4.8	Lake rehabilitation should be tracked through a comprehensive and long-term monitoring program, and information should be made available to stakeholders and agencies in a timely manner.	See responses to Comment G-4.6 and Frequent Comment #4.
	G-4.9	A rigorous monitoring and modeling program for the lake would provide the tools and understanding that are needed in New York State to address the widespread problem of mercury contamination for other resources beyond Onondaga Lake.	Comment noted.
	G-4.10	The statement on page 9 of the Proposed Plan that the primary waste contaminant associated with soda ash and related material production at the site was Solvay waste is questionable, if not incorrect. Ionic wastes were arguably primary, and had major impacts on the lake and downstream waters. Residual ionic waste inputs continue to have important impacts.	The ROD states "Soda ash (sodium carbonate) and related products such as baking soda (sodium bicarbonate), sodium nitrite, sodium sesquicarbonate, ammonium bicarbonate, ammonium chloride, calcium chloride, and caustic soda (sodium hydroxide) were produced by a non-electrolytic cell process. The primary dissolved waste/contaminant associated with this process was ionic constituents (calcium, sodium, and chloride ions [Ca^{2+}, Na^{+}, and Cl^{-}, respectively]), and the primary solid component was Solvay waste, which is a white, chalky, calcite-rich material." The words "ionic waste constituents (Ca^{2+}, Na^{+}, and Cl^{-})" will be added to the top right box of the table entitled "Product Lines and Periods of Production at the Syracuse Works."
	G-4.11	Several factors contributing to the bi-directional flow regime at the lake's outlet are listed on page 15 of the Proposed Plan. However, the lake's elevated salinity, omitted from the listing, is also an important factor. A substantial portion of the elevated salinity is attributed to residual waste inputs from the site.	The words "elevated salinity" will be added to the text for the ROD.

Name/Agency	Comment Code	Comment Summary	Response
S. Effler and C. Driscoll, cont.	G-4.12	Hypolimnetic oxygen depletion is promoted by anthropogenic phosphorus loading. In the last paragraph on page 15 of the Proposed Plan, tributaries and Metro are listed as sources. While not an inaccurate statement, it is misleading as Metro represents 85% of the bioavailable phosphorus load. The 15% from the tributaries is only partly anthropogenic.	The ROD states "However, oxygen depletion in the hypolimnion of Onondaga Lake is exacerbated by loading of phosphorus to the lake from the Metro Plant discharge, and to a lesser degree from tributaries."
	G-4.13	On page 16 of the Proposed Plan, the single value of dissolved solids loading from Solvay Wastebeds 9-15 to Ninemile Creek is potentially misleading. For what year does this estimate apply? A progressive decreasing trend has been documented.	The ROD states "The Geddes Brook/Ninemile Creek RI report estimated that the daily total dissolved solids load from Solvay Wastebeds 9 through 15 to Ninemile Creek is on the order of 440 tons (400,000 kg) based on two base-flow sampling events in 1998." It is correct that this represents a reduced loading of dissolved solids since closure of the Honeywell operations in 1986.
	G-4.14	On page 21 of the Proposed Plan, the fifth item under the second bullet asserts that groundwater inputs are the most important loading pathway for several contaminants. Are any related loading estimates available?	The loading estimates for the various contaminants can be found in Chapter 6 of the RI report. It should be noted that the RI report text makes it clear that the various load estimates have differing degrees of uncertainty based on the type and number of data used to estimate the loading.
	G-4.15	The potential for resuspension of the in-lake waste deposit (ILWD) to be a significant source of mercury (and other contaminants) to the lake has been established, but the magnitude has not. This would have required application of appropriate quantitative tools (models). The profundal sediments as a major source of mercury also lacks quantification.	See response to Technical Comment #17.

Name/Agency	Comment Code	Comment Summary	Response
S. Effler and C. Driscoll, cont.	G-4.16	Several potential features of mercury cycling are presented on page 22 of the Proposed Plan but remain largely unquantified. One area of particular concern is the role of littoral sediments in supplying methyl mercury to the lake. If this is an important pathway, it would challenge the effectiveness of hypolimnetic oxygenation as a management approach.	An extensive sampling program will be performed during the remedial design. This will include sampling to assess the potential for littoral sediments to be sources of methylmercury to the lake. However, as discussed in responses to Comment R-1.5 and Technical Comment #16, the current information indicates that most of the littoral zone sediments provide a relatively small amount of the current exposures to methylmercury. In addition, approximately 425 acres of the littoral zone will be remediated by dredging and capping, resulting in significantly lower concentrations of mercury and methylmercury in these areas. Therefore, it is expected that the remedy will be effective in reducing exposures to methylmercury.
	G-4.17	Hypolimnetic accumulations are transported to overlying waters during the approach to fall turnover, not after turnover.	The ROD will indicate that the transport of methylmercury from the hypolimnion to the epilimnion takes place during the process of fall turnover.
	G-4.18	Regarding the first item under "Calcite Precipitation and Ionic Wastes" on page 23 of the Proposed Plan, there is no evidence that remediation of the Mud Boils has resulted in reduced in-lake sedimentation rates. Recently presented findings indicated no systematic reduction in solids loading from Onondaga Creek. Perhaps this reflects the large residual in-stream sediment deposits from earlier mud boil inputs.	While US Geological Survey publications (Kappel and McPherson, 1998) have indicated that the total suspended solids (TSS) load from the Tully Mudboil site has been reduced substantially, it is acknowledged that monitoring in lower Onondaga Creek has not shown this reduction to have translated to a reduced TSS load to the lake. The sentence in question will be changed to read "Current sedimentation rates are about half of the pre-1986 sedimentation rates."

Name/Agency	Comment Code	Comment Summary	Response
S. Effler and C. Driscoll, cont.	G-4.19	What is the precedence for the PECQ approach adopted, including its manner of determination? How many Superfund sites have adopted this approach? Is there any support for the approach in the peer-reviewed literature?	The mean PECQ approach was proposed by Honeywell as one of the criteria to use for determining remedial areas. The mean PECQ is a single unitless index that accounts for the presence, concentrations, and toxicity of multiple contaminants in sediment samples. NYSDEC evaluated the mean PECQ approach to determine whether it could be applied to Onondaga Lake. The focus of this evaluation was to determine whether the concept is valid as described in the literature, whether the site-specific data provided a basis for using the approach, and to determine a methodology based on the literature which provided the greatest predictive power of the mean PECQ methodology for Onondaga Lake. As discussed in detail in Appendix J of the FS report (Section J.3.3), the mean PECQ approach has been discussed extensively in the literature, with several variations on the concept having been proposed. The FS report lists a dozen sites where the approach has been used, and 13 agencies which have utilized it. The final form of the mean PECQ approach used in the FS report and the selected remedy was based on a final list of 23 contaminants, grouped into five chemical classes, using the consensus-based PECs developed by NYSDEC and TAMS (NYSDEC's contractor) and used in the Baseline Ecological Risk Assessment (BERA).

Name/Agency	Comment Code	Comment Summary	Response
S. Effler and C. Driscoll, cont.	G-4.19, cont.		The approach used at Onondaga Lake is consistent with the literature and precedents, but it is unique in several ways. The inclusion of chlorinated benzenes, ethylbenzene, and xylenes has not been proposed before since these highly volatile compounds are not typically associated with sediment contamination, but are found extensively in the ILWD. While the use of a geometrically averaged PEC to provide a consensus-based value is consistent with methodologies published in the literature (e.g., MacDonald et al., 2000; Ingersoll et al., 2000), the combination of the five particular sediment effect concentrations (SECs) used at Onondaga Lake is unique. Also, while the mean PECQ or similar approaches have been used at other Superfund sites as a tool to assess risk reduction, the Onondaga Lake remedial plan has gone further by using the mean PECQ, along with the mercury PEC, directly as cleanup values.
	G-4.20	What is NYSDEC's position with respect to having to base sediment clean-up initiatives on acute toxicity testing results rather than chronic toxicity testing observations?	See response to Technical Comment #7.
	G-4.21	Aeration will interact strongly with the effects of domestic waste inputs. Does NYSDEC agree that the interplay between manifestations of industrial and domestic waste discharges will need to be tracked carefully?	The interplay between manifestations of industrial and domestic wastes discharges in response to oxygenation needs to be closely monitored. Sampling for this purpose will be included in both the pre-design and the long-term monitoring programs.

Name/Agency	Comment Code	Comment Summary	Response
S. Effler and C. Driscoll, cont.	G-4.22	Despite the major reduction in deposition/sedimentation brought about by the reduction in Ca^{2+} loading associated with closure, most of the continuing sedimentation is arguably associated with residual effects of the industry. Specifically, external sediment loading is dominated by mud boil inputs and internal sediment production of calcium carbonate ($CaCO_3$) inputs.	The ROD indicates that although much of the profundal zone is being addressed by MNR (implying that the selected remedy will rely on ongoing processes to bury the contamination, as opposed to an active capping program), a large portion of the sediment entering the lake continues to originate from the Tully Valley, including the residual effects of solution mining, and does not represent a background TSS load that would be expected in a non-impacted lake.
Dereth Glance, Program Coordinator, Citizens Campaign for the Environment (CCE)	G-5.1	Requests that NYSDEC provide at least two additional public meetings during February; public involvement is critical and more meetings are needed.	In addition to the public availability sessions on January 6 and January 12, 2005 and the public meeting on January 12, 2005, NYSDEC provided an additional public availability session and public meeting on February 16, 2005. Following the review of the Proposed Plan by the National Remedy Review Board, and EPA's concurrence with the Proposed Plan, an additional public comment period was opened from April 1, 2005 to April 30, 2005. Further meetings will be held during the design phase.
Dereth Glance, Program Coordinator, Citizens Campaign for the Environment	G-6.1	CCE generally supports the dredging and isolation and thin-layer capping approach to remediation of the lake bottom.	Comment noted.
	G-6.2	CCE generally supports the selected remedy, with contingencies (presented in this index as Comments G-6.3 – G-6.11).	Comment noted.
	G-6.3	The remediation plan should be transparent, and citizen participation should occur throughout the entire process. NYSDEC should establish a Citizens Advisory Committee (CAC).	See response to Frequent Comment #17.

Name/Agency	Comment Code	Comment Summary	Response
D. Glance, cont.	G-6.4	Provide formal public participation opportunities on especially controversial components of the design phase. The ROD should guarantee the public that the SCA will be subject to a full Environmental Impact Statement, and once the design is complete for the SCA, an official comment period of at least 90 days should be provided to the public.	See response to Frequent Comment #17.
	G-6.5	The SPDES permit for the Metro discharge includes a proposed increase for the allowable discharge (loading) of mercury. This increase is in violation of the spirit and intent of the Proposed Plan. In addition, the monitoring of Metro's mercury discharges is insufficient.	The following discussion relates to the Metropolitan Syracuse Wastewater Treatment Plant ("Metro") and not to the Onondaga Lake remedial project. The NYSDEC Division of Water (DOW) agrees that the reduction in the discharge of mercury to Onondaga Lake from all sources is an important goal and essential to the long-term recovery of Onondaga Lake. The DOW is in the process of revising the mercury effluent limit (including frequency of monitoring) for the Metro discharge to Onondaga Lake. The existing permit Action Level of 0.53 lbs/day was reduced to an effluent limit of 0.196 lbs/day in the initial January 10, 2005 draft permit. The proposed 0.196 lbs/day effluent limit was based on the plant flow of 126.4 MGD. The DOW is in the process of revising its mercury guidance to require an effluent limit of 200 ng/L, using EPA Method 1631A to determine compliance. As this limit is concentration based, rather than mass based, it is inherently more conservative as less mercury will be permitted in the discharge at lower flow rates. These requirements have been included in the revised draft permit dated March 25, 2005.

Name/Agency	Comment Code	Comment Summary	Response
D. Glance, cont.	G-6.6	Supports ASLF's call for a detailed matrix that clearly defines all subsites of the lake site and provides schedules, remedies, etc., and also integrates all known or suspected sources of contaminants.	See response to Frequent Comment #5.
	G-6.7	The ROD should use a conservative assumption on the groundwater upwelling rate, as was presented in the Proposed Plan.	Comment noted. The ROD is consistent with the Proposed Plan in this regard.
	G-6.8	The ROD should provide for additional sediment removal if action levels for contaminants of concern are detected at greater depths, as was presented in the Proposed Plan.	Comment noted. Additional dredging (up to an additional meter in depth) will occur in hot spots at depths below the initial dredge cut of 6.6 ft (2 m). The ROD is consistent with the Proposed Plan in this regard.
	G-6.9	The ROD should support the goal of no loss of lake area or volume.	NYSDEC's remedy would not result in the loss of any lake surface area. There may be some areas of the lake where there will be minimal loss of volume following capping, and other areas where there may be a minimal gain in volume. However, it is expected that there will not be a significant (if any) net loss of volume of the lake as a whole.
	G-6.10	The ROD should propose use of hydraulic dredging, as mechanical (clamshell) dredging is environmentally insensitive.	Hydraulic dredging was selected as the representative process for detailed evaluation in the FS report and the ROD; however, the actual dredging method(s) would be determined during the design. Whatever dredging methods are used will be employed in an environmentally protective manner.
	G-6.11	Supports the remediation goals for sediment, biological tissue, and water. Strongly believes that NYSDEC should require public education and outreach efforts about the human health risk of fish consumption.	Comment noted. See also response to Frequent Comment #19.

Name/Agency	Comment Code	Comment Summary	Response
D. Glance, cont.	G-6.12	CCE looks forward to moving forward and ending the legacy of toxic industrial contamination in the lake.	Comment noted. See also response to Frequent Comment #12.
Martha Holly Loew, Chair, Sierra Club, Iroquois Group	G-7.1	Congratulates NYSDEC and Honeywell for holding outreach meetings, the most impressive effect of which is a public awareness of and hope for the future of the lake.	Comment noted. See also response to Frequent Comment #12.
	G-7.2	Request that NYSDEC and Honeywell web sites be augmented by weekly "State of the Lake" in local newspapers. This would include questions/answers, assure the public that concerns are addressed, and be a place to establish goals and endpoints with public participation. The proposed goals, such as edible fish tissue need to be put to the public for input.	See response to Comment G-1.10.
	G-7.3	Contaminated sediment dredging, storing, and transportation should involve input from health departments; constant monitoring; and communication with people in close proximity to the SCA.	Comment noted. See also response to Frequent Comment #17.
	G-7.4	Support the cleanup actions and long-term monitoring starting as soon as practical.	See response to Frequent Comment #12.
Robert E. Long, MD, Onondaga Audubon Society, Inc.	G-8.1	The southeast shoreline of Onondaga Lake should be restored as follows: • *Phragmites* should be removed to improve visibility, recreational activities, and birding. • Control dogs on the loose so that they do not disrupt shorebirds. • Build observation blinds in two locations. • Plant tree and shrub species that will attract songbirds.	The specific details associated with the remediation of the shoreline areas of Onondaga Lake will be determined as part of the remedial designs for the lake and the upland sites. Therefore, the proposed approach to improve the southeast shoreline of the lake will be evaluated as part of the remedial design.

Name/Agency	Comment Code	Comment Summary	Response
Cornelius Murphy, President, and Neil H. Ringler, Chair, Faculty of Environmental and Forest Biology, SUNY ESF	G-9.1	Propose bi-monthly meetings to coordinate participation in the cleanup plan.	See response to Frequent Comment #17.
	G-9.2	Propose seminars/courses that deal with some of the major issues and opportunities at the lake.	See response to Comment G-1.10.
	G-9.3	Propose comprehensive monitoring plan that blends the county plan with university monitoring.	See response to Frequent Comment #4.
Neil H. Ringler, Distinguished Teaching Professor and Chair, Faculty of Environmental and Forest Biology, SUNY College of Environmental Science and Forestry	G-10.1	Generally pleased with Proposed Plan. Technical pitfalls could emerge, such as if oxygenation cannot bring SMU 8 into compliance.	It is expected that oxygenation of SMU 8 will be successful. The ROD discusses the implementation of oxygenation pilot studies prior to full-scale implementation to assess the most effective method of maintaining sufficient oxygen to achieve the remedial goals, and also to assess the changes to the ecosystem. See also the response to Technical Comment #1.
	G-10.2	Glad to see ESF's work on littoral habitat considered during the RI report and that habitat is a major part of the plan. There has been headway made in assessment of a Permanent Habitat Module on the lake's northwestern shoreline. This work will need to be integrated into the overall plan.	Comment noted. See also response to Frequent Comment #4.
	G-10.3	The plan provides a great educational opportunity for ESF students, and the college is in a position to contribute to the project studies.	See responses to Frequent Comments #17 and #19.
Samuel H. Sage, President, Atlantic States Legal Foundation	G-11.1	A detailed matrix presenting the status and schedule for the Onondaga Lake subsites should be provided.	See response to Frequent Comment #5.

Name/Agency	Comment Code	Comment Summary	Response
S. Sage, cont.	G-11.2	Information on the contamination in the wetlands near the mouths of Ley Creek (Wetland SYW-12) and Harbor Brook (Wetland SYW-19) should be provided. These areas should be remediated and restored as valuable wetland habitat.	See response to Technical Comment #3.
	G-11.3	The effectiveness of the groundwater remediation along the lakeshore is critical to the success of the selected remedy. The Proposed Plan should have included a scenario for which the barrier walls are found to be ineffective.	See response to Technical Comment #4.
	G-11.4	The ROD should make it clear how the public will be informed of any changes in plans and how they can respond to any such changes.	NYSDEC will continue its public outreach throughout the design phase of the Onondaga Lake remediation such that the public is informed of ongoing remedial activities. In addition, NYSDEC will inform the public of any significant changes to the selected remedy.
	G-11.5	Alternative approaches to sampling and analysis of organic pollutants are available that greatly improve on detection limits. These techniques should be considered for determining the effectiveness of the remediation.	An effective monitoring program is necessary both to establish baseline conditions and to assess the effectiveness of the remedial program. The potential use of these alternative approaches will be considered during the remedial design.
	G-11.6	The Effects Range-Median (ER-M) or Probable Effect Level (PEL) values should be selected as reasonable indicators of acute toxicity rather than the PECs. Clarify if the SECs for the organic contaminants were normalized to organic carbon content. Also, the PECs do not include any margin of safety for chronic toxicity.	See response to Technical Comment #5.
	G-11.7	The Proposed Plan indicates that only 23 of the 46 CPOIs were used in the calculation of mean PECQs. It is unclear why some contaminants were retained and others were not. A more conservative approach based on all 46 CPOIs should be used.	See response to Technical Comment #6.

Name/Agency	Comment Code	Comment Summary	Response
S. Sage, cont.	G-11.8	The mean PECQ methodology does not explicitly address chronic toxicity and the mean PECQ threshold of 1 does not appear to be adequate for the protection of benthic organisms. A mean PECQ threshold of 0.3, which will result in additional areas requiring remediation, may be adequate.	See response to Technical Comment #7.
	G-11.9	There is a concern for worker exposure during dredging activities in areas containing high levels of VOCs and/or NAPLs. Consideration should be given to foams and protective gear for workers.	Since the potential to encounter pure-phase liquids such as NAPLs exists at the lake, air monitoring would be performed to protect workers at the site. Emissions of hazardous substances at the site may be controlled by reducing the rate of dredging operations, modifying the dredging equipment, or using an alternative dredge. If there are emission problems, upgrades could be made to the standard protective clothing and gear that workers wear if monitoring indicates that air concentrations are becoming elevated. Thus, workers could switch from conventional work clothing (Level D protection) to respirators, gloves, and fully protective external garments (Level C protection). Higher levels of worker protection are also possible (e.g., use of a self-contained breathing apparatus). The above would be detailed in the Health and Safety Plan that will be developed before construction commences.
	G-11.10	There will be a large spike in emission rates when pockets of highly contaminated sediments are dredged and pumped to the SCA. Soil washing and emission control systems should be used prior to discharging the dredged material to the SCA.	It is appropriate to assume that some fraction of the lake deposits being discharged to the SCA would carry organics that may volatilize. The pre-design sampling and analysis program, as well as available RI report data, would provide information on the potential level of organic emissions that can be expected at the SCA.

Name/Agency	Comment Code	Comment Summary	Response
S. Sage, cont.	G-11.10, cont.		Using this information, and an appropriate meteorological dispersion model, estimates would be made of the expected organic concentrations at the SCA boundary. Measures to control off-site emissions could then be incorporated in the project's design to limit emissions to levels that would not exceed public health thresholds established by NYSDEC and New York State Department of Health (NYSDOH). As further suggested by the comment, there are implementable control measures that can be employed at the SCA during disposal operations. It is not clear at this time that soil washing would be an effective strategy for the incoming sediment slurry. However, systems have been successfully employed directly at SCAs to capture volatilizing organics. In one such case, a floating cover was placed over the point of slurry discharge into an SCA and then the air space between the cover and the water surface was evacuated through a filtration system. Also, fine carbon material has been applied to an SCA surface to absorb organics prior to their release to the atmosphere. Finally, as mentioned in the comment, oil/water separation or oil absorption technology could be considered should a noticeable sheen occur on the SCA surface.

Name/Agency	Comment Code	Comment Summary	Response
S. Sage, cont.	G-11.11	The number of contaminants such as PCBs, metals other than mercury, and heavy polyaromatic hydrocarbons (PAHs) that are not unique to former Honeywell operations should be given greater scrutiny, including in the profundal zone (SMU 8). A successful remedial strategy must address all contaminants in the ecosystem.	While it is acknowledged that there are contaminants in Onondaga Lake which are not unique to the former Honeywell (Allied/Solvay Process) operations, the extent, distribution, and impact of these contaminants were assessed throughout the RI/FS report process. PCBs and PAHs are included in the mean PECQ; thus, they have been included in the selection of areas for remediation. The non-mercury metals, through extensive analysis, were not found to have an impact to acute toxicity at the concentrations detected within the bioturbation zone on a lakewide basis (see response to Technical Comment #6 for more detail). There was one discrete location (Station S327) where data suggested that very high levels of non-mercury metals may be contributing to acute toxicity. However, this location is already being addressed as it is in an area that was selected for remediation based on exceedances of the mean PECQ of 1 and the mercury PEC. Regarding the sediment within the profundal zone, as is illustrated in RI report Figures 6-32 through 6-35, data from high-resolution sediment cores collected in 1992 and 1988 indicate a significant decline in the concentration of metals over the last few decades within the deep basin area. Non-mercury metals appear to have had historical inputs similar to those of mercury, with peak concentrations detected at depths below 20 cm in the cores collected in 1992 (with the exception of zinc in Core S-51, which peaked at 12 to 15 cm).

Name/Agency	Comment Code	Comment Summary	Response
S. Sage, cont.	G-11.11, cont.		While it is not disputed that the peak levels of these metals are elevated above the NYSDEC screening standards, data indicate that these high concentrations have generally been buried below the bioturbation zone. It is expected that non-mercury metals will continue to be buried in the profundal zone through natural recovery, as will mercury. To ensure this is occurring, monitoring would include all contaminants that may be of concern in a particular area, as part of the Monitored Natural Recovery action proposed for the profundal sediments.
	G-11.12	How will companies or sites other than Honeywell that have contributed to contamination in the lake be brought into the lake remediation process?	There is a single ROD for the Onondaga Lake Bottom. This Onondaga Lake Bottom ROD addresses all hazardous substances at the Onondaga Lake Bottom subsite that require remediation under the state and federal Superfund laws. After the remedy is selected, NYSDEC will approach the responsible party to design and implement the remedy under a legal agreement. Lead responsible parties are free to pursue cost recovery negotiations with other contributors of hazardous substances to a site in order to apportion costs among all liable parties for a given site.
	G-11.13	ASLF supports getting started on actions to clean up/rehabilitate the Onondaga Lake Bottom site. ASLF agrees that dredging and capping are necessary, and that design work should commence as soon as practical. ASLF believes that organic contaminants should be completely removed. There should also be no loss of volume or lake surface area.	See responses to Frequent Comments #6 and #12.

Name/Agency	Comment Code	Comment Summary	Response
S. Sage, cont.	G-11.14	NYSDEC should develop a matrix of all actions required for the Onondaga Lake Superfund Site, including closure plans with Allied (Honeywell), state hazardous waste site remediation, voluntary clean-ups, and any other regulatory measures that influence contamination of Onondaga Lake. This should be made available to the public and form the basis for remediation schedules.	See response to Frequent Comment #5.
	G-11.15	The entire community should be involved in a debate leading towards a vision for Onondaga Lake and its basin. This vision must take into account scientific realities and is needed to develop endpoints in the cleanup of the lake bottom, all of the subsites, Metro, etc. The detailed remedial design must contain a habitat restoration plan.	With regard to goals, objectives, and vision for the lake, see responses to Frequent Comment #20 and to the NRRB's recommendation #11 (Attachment 1). A habitat restoration plan will be prepared during the remedial design phase.
	G-11.16	An extensive, long-term monitoring plan must be developed. This work should be done by an independent scientific team consisting of biostatisticians, chemists, environmental modelers, and others, and be coordinated with the extensive county monitoring plan. An endpoint needs to be established that would provide a means of determining success of the remediation. An outside group should critique and implement the plan.	See responses to Comment G-4.6 and Frequent Comment #4.
	G-11.17	Honeywell should pay up front for this work by creating a fund to be used solely for this purpose.	See response to Frequent Comment #8.
	G-11.18	The monitoring must begin immediately. Baseline data are needed to validate model predictions and to make sure there is a statistically significant database if a "build and measure" approach is used exclusively.	See response to Frequent Comment #4.

Name/Agency	Comment Code	Comment Summary	Response
S. Sage, cont.	G-11.19	Predictive, mathematical modeling should be done for the most important pollutants. A sampling protocol should be developed immediately and sampling for the models begun as soon as possible so that three years of baseline data can be collected before the actual dredging and capping begins. Ideally the work should be done by an outside consortium of scientists coming together for this purpose. Honeywell should create a fund to pay for this work. An outside peer review group should be convened at key stages of the work.	See responses to Frequent Comments #4 and #16.
	G-11.20	ASLF is the Technical Assistance Grant recipient for this project. However, our resources under this program are minimal. The January meeting on the Proposed Plan should be just the first in regular attempts to inform the public and to solicit their input on a complex program to alleviate a difficult problem. The public needs to be kept informed, asked for input, and kept part of the process. ASLF is willing to continue to be the lead outside agency in making sure the public understands what is happening.	Comment noted. See also response to Frequent Comment #17.
	G-11.21	ASLF is concerned that the human health risk assessment did not use the populations most at risk (i.e., people who disregard the fish advisory, immigrants, economically disadvantaged persons, the Onondaga Nation). The loss to the Onondaga Nation of the spiritual, cultural, and dietary resource of Onondaga Lake must be factored into the risk analysis.	The Onondaga Lake Human Health Risk Assessment (HHRA) used default values for fish consumption (e.g., 25 grams per day reasonable maximum exposure [RME]) assuming that the NYSDOH fish advisory is not in place or is not adhered to (see Section 4.3.1). The potential for the lake to serve as a subsistence source of food was also considered in the Uncertainty Section of the HHRA by utilizing EPA's default fish consumption rate for this subpopulation of 170 grams per day. Also, see the response to the NRRB's recommendation #3 (Attachment 1).

Name/Agency	Comment Code	Comment Summary	Response
S. Sage, cont.	G-11.22	Despite the great importance of SMU 8 as the source of the methylmercury that contaminates fish, there is almost no remedial action currently planned for the sediments in the profundal zone. According to our estimates, between 25 and 50 percent of the lake bottom (0 to 30 cm) is contaminated at levels above the PEL of 2.2 mg/kg, and this vast area of the lake will continue to be toxic to benthic organisms for a long time into the future.	See response to Technical Comment #10.
	G-11.23	There is considerable uncertainty in the STELLA® model's prediction of the rate of mercury reduction in surface sediments. There are insufficient data to support the model. The model validity was tested based on a single core collected in 1997.	Since the STELLA® model is one-dimensional, it is reasonable to calibrate the model to a single location as long as that point is representative of the system, as is the case with the high-resolution cores. Data from six high-resolution cores collected in 1988 (two cores), 1992 (two cores), 1996 (one core), and 1997 (one core) were available for use in the model development. These cores were from the profundal zone in the north and south deep-basin stations and from the saddle region. These locations provide a reasonable representation of the deep-basin area, which comprises a large percentage of the profundal zone, and mercury profiles in the cores are consistent with each other for the upper layers. Dating of five of these sediment cores (only one of the cores from 1988 was used) resulted in net sediment accumulation rates ranging from 0.45 to 0.63 cm/yr between 1986 (the year that Honeywell's manufacturing operations ceased) and the year of collection, suggesting that although data are limited, deposition rates are consistent between the north and south basins and the saddle region.

Name/Agency	Comment Code	Comment Summary	Response
S. Sage, cont.	G-11.23, cont.		These five cores were used because the slicing and chemical analysis procedures provided sufficiently fine chemical profiles for this model. The mercury concentrations in the model were based directly on the mercury data from the top 2 cm of the 1996 and 1997 high-resolution cores, which provided the most recent sediment concentrations available. Sediment densities and porosities were based on the 1997 core, since this was the only high-resolution core in which data were collected with which to derive values for density and porosity. The accuracy of the model was assessed by comparing the model output with the most recent high-resolution core available (see FS report Figure N.19) (i.e., the 1997 core from the saddle collected by Hairston et al., 1999), although all of the high-resolution cores exhibit similar profiles in the upper layers. This assessment suggested that the general trend of the model agreed well with the actual data, but that the model was conservative (overestimated concentrations) in terms of the final concentration.
	G-11.24	While mercury concentrations have decreased since 1970, the authors of Appendix N of the FS report admit that "there appears to be insufficient surface sediment data to make any conclusions regarding trends in surface sediment concentrations since 1987." The model provides almost no technically sound basis for predicting a time frame for "natural recovery." Any claims that MNR is expected to achieve target mercury concentrations within 10 years are without merit. MNR should be considered only as a potential remedial measure.	The basis for this statement in the FS report is that there has only been one widespread sediment sampling program across the profundal zone: the 1992 program. Thus, a direct geographic point-by-point comparison cannot be made for the entire profundal zone between two different points in time. However, the 1992 sampling program did demonstrate that the mercury concentrations in the surface sediments (0 to 2 cm) were uniform across the profundal zone (mean of 2.7 mg/kg, standard deviation of 0.81 mg/kg, and a range from 0.93 to 6.1 mg/kg, n = 45).

Name/Agency	Comment Code	Comment Summary	Response
S. Sage, cont.	G-11.24, cont.		It should be noted that two stations at the base of the ILWD exhibited mercury concentrations of 5 and 6.1 mg/kg, which exceeded the next closest sample concentration (3.6 mg/kg) by a large amount. This suggests that the three locations where high-resolution cores were collected are representative of a large portion of the profundal zone. The pre-design sampling will address this issue and will allow a complete assessment of the validity of the model and the prediction of MNR-related time frames for the profundal zone. See also response to Comment G-11.23.
	G-11.25	Attempts to quantify the movement of total and methylmercury have been unsuccessful, and there are varied estimates as to the quantity of methylmercury released from the profundal sediments. In addition, estimates of methylmercury production in the RI report differ from the model results provided in Appendix N of the FS report. There is a leap of faith that oxygenation can greatly reduce the downward flux of methylmercury to the sediments. There is no solid scientific basis for remediation of SMU 8. There is no predictive model to determine the effect of remedial actions on methylmercury levels in fish flesh. Other remedial technologies should be considered.	While it is clear that there are uncertainties in the exact quantification of the methylation process, the overall understanding is sufficient to address this issue in the selected remedy. The RI report and FS report examined methylmercury releases from the sediments in different ways. The RI report used a strict mass-balance approach for the stratified period. The releases from the profundal sediments were estimated using conservative calculations of the transfer of methylmercury due to diffusion to arrive at a value of 22 g of upward flux during the stratified period (0.067 kg/yr). However, the RI report did note that the effects of ebullition in the profundal zone likely caused a higher diffusion rate (at least a factor of 3) than was calculated. Furthermore, the RI report pointed out that the methylmercury gradient was not typical or well defined, again likely resulting in a low bias for the calculated diffusion rate.

Name/Agency	Comment Code	Comment Summary	Response
S. Sage, cont.	G-11.25, cont.		The modeling conducted in the FS report presented a higher diffusion rate (0.8 kg/yr), but based on the assumed low biases discussed in the RI report. This is not inconsistent with the RI report estimates. If a factor of 3 for both the ebullition effects and the gradient issues is assumed, a flux rate of 0.6 kg/yr is derived based on the RI report values. The estimates for the downward methylmercury flux are relatively similar (1.6 and 2.6 kg/yr). Both of these estimates are based on the same data. The difference is due to the statistical methods used to determine the flux. The RI report used a mean on a monthly basis, while the FS report used the overall mean to provide flux on a yearly basis. Thus, NYSDEC did not consider these estimates to be in conflict. Of greater importance is the fact that all estimates indicate that the sediments are a net sink for methylmercury, indicating that methylation in the water column is the major source of methylmercury to the lake. As discussed in the responses to Comment R-1.5 and Technical Comment #16, the implications of oxygenation can be discerned under current conditions in the spring turnover period when the entire water column is oxygenated. During this period the methylmercury concentrations in the water column are uniformly low (about 0.3 ng/L) and there is no indication of methylmercury releases from the sediments. Accordingly, oxygenation of the hypolimnion, as well as other remedial activities, is expected to reduce methylmercury levels in fish tissue.

Name/Agency	Comment Code	Comment Summary	Response
S. Sage, cont.	G-11.26	The mapping methodology employed by TAMS in the RI report has, in all likelihood, led to distortions in the predicted distribution of contaminants shown in the FS report. This has resulted in underestimates of mercury, chlorinated benzenes, BTEX, and possibly other contaminants in the profundal zone. SMU 1 should be expanded into the deeper waters of the lake so as to include this contamination. These highly contaminated sediments should be subject to the same dredging and capping remedial approach as the other sediments in the ILWD. SMU 7 and SMU 2 should be reexamined in this light.	See response to Technical Comment #12.
	G-11.27	ASLF agrees that a high priority should be placed on capturing and destroying DNAPL. The removal of DNAPLs via dredging in SMUs 1 and 2, and possibly 7, is necessary. This material must be handled carefully to minimize exposure to workers and residents.	Dredging to remove NAPL will target NAPL (including DNAPL) in sediments and waste, which constitute an ongoing source (and potential source) of contamination to other media in the lake. Implementation of the remedy will remove a large quantity of highly contaminated material (waste, NAPLs, sediment) from the ILWD, which will significantly reduce the concentrations of CPOIs that would remain under the isolation cap. This area of the lake contains the highest concentrations of the more mobile contaminants such as BTEX, chlorobenzene, and dichlorobenzenes.

Name/Agency	Comment Code	Comment Summary	Response
S. Sage, cont.	G-11.27, cont.		The remedy will also address the NAPLs (including DNAPLs) present in SMU 2 through removal to an estimated depth of 30 ft (9 m). This would include the removal of NAPL in the sediments, as well as the NAPLs that are believed to be present in the marl unit beneath the sediments. These materials will be handled carefully (in accordance with procedures to be developed during the remedial design) to minimize exposure to workers and residents.
	G-11.28	The Proposed Plan identifies NAPL found within the ILWD (SMU 1) as a Principal Threat Waste, and thus, removal of this material is a high priority. However, it is unclear whether the NAPL in SMUs 6 and 7 will be removed, and it is clear that the NAPL in SMU 8 will not be addressed at all. The plan should treat all NAPL as a high priority.	The remedy for SMU 1 will address the NAPLs that are present in the upper 3 m. The removal of the ILWD materials in SMUs 2 and 7 will be performed consistent with how these materials will be addressed in SMU 1. The NAPL in SMU 6 is consistent with compounds found in petroleum/fuel oil mixtures. These compounds tend to be less toxic and more susceptible to environmental degradation. As such, this area is being remediated using isolation capping with some dredging. If, based on pre-design data, it is determined that a cap may not be effective in areas containing NAPL in SMU 6, additional removal in this area prior to capping would be considered during the design.

Name/Agency	Comment Code	Comment Summary	Response
S. Sage, cont.	G-11.28, cont.		The NAPLs noted in the profundal sediments are buried quite deep (60 to 80 cm), below the expected bioturbation/habitat zone for a benthic community (top 10 to 15 cm; see response to Comment P-52.9) and well below the mercury peak concentrations. As discussed in response to Technical Comment #10, the fact that the profundal sediments are very stable in a highly depositional regime provides an opportunity to allow them to be naturally buried by cleaner sediments and thus further isolated from the environment.
	G-11.29	There are reports of a tarry waste in or near SMU 2 which have a different nature. These are more solid than liquid, and are likely to have originated from the Semet-Solvay process. In addition, what appear to be emulsified organic deposits have been documented in SMU 3 along the wastebeds. This material is likely to sequester organic contaminants such as BTEX, PAHs, chlorinated benzenes, and dioxins.	The area associated with Station S435, located along the shore of SMU 2 near Tributary 5A and reported to contain tarry wastes, was selected for remediation in the selected remedy. If additional tarry wastes are encountered in this area during pre-design sampling or during remedy implementation, NYSDEC will evaluate the potential need for their remediation. There are areas in SMU 3 along the shoreline of the wastebeds that will be remediated, including Station S48, which was selected for remediation based on its high benzene concentrations. NYSDEC is not aware of the emulsified organic deposits in SMU 3 that were noted in the comment and will discuss this with ASLF prior to commencing pre-design sampling. This issue will be further investigated and, if warranted, addressed as part of the remedial design.

Name/Agency	Comment Code	Comment Summary	Response
S. Sage, cont.	G-11.30	ASLF endorses all efforts to remove, to the greatest extent possible, all of these organic materials from Onondaga Lake. They are highly toxic, mobile, and unsuitable for capping. This material should be separated from the less-toxic silts, sands, and Solvay waste material which will make up the bulk of the dredged sediments.	Comment noted. See also response to Technical Comment #13.
	G-11.31	Sediments are to be hydraulically dredged and pumped to Wastebed 13. Why was this site, the most distant wastebed from the lake, selected?	The FS report assumed (for costing purposes) that the SCA would be constructed on Wastebed 13 based on its capacity, as well as other factors. However, during the remedial design, various locations for siting the SCA will be evaluated. This will include: Wastebeds 1 through 8, Wastebeds 9 through 11, as well as Wastebeds 12 through 15. The evaluation will consider various factors including potential impacts on the local community, geotechnical stability of the wastebeds, SCA construction requirements, wastebed size, the means for transporting dredged materials to the SCA, costs, etc.
	G-11.32	There are residential neighborhoods near Wastebed 13. ASLF expressed concern about releases and control of volatile contaminants. Residents and workers should not be exposed (via air emissions) to these hazardous substances.	As indicated in the response to Comment G-11.31, the actual location for the SCA will be determined during the remedial design. Please also see response to Frequent Comment #9. NYSDEC and NYSDOH will require the employment of engineering controls to minimize or eliminate odors and emissions. This may include sprayers or misters, foam over the surface water, and the addition of activated carbon. It will also include the use of full-time air monitoring stations at various locations surrounding the work areas in the lake and the SCA.

Name/Agency	Comment Code	Comment Summary	Response
S. Sage, cont.	G-11.32, cont.		The monitoring points will detect the presence of any chemical emissions from the dredge areas and the SCA. This is an added level of protection. Other SCA sites and dredging projects with similar contamination and a similar level of monitoring have shown few, if any, emissions. Workers involved in the remediation activities will be required to utilize personal protective equipment and monitoring devices for most construction and treatment activities during remedial design. A Health and Safety Plan (HASP) for these activities will be developed and implemented. See also response to Frequent Comment #10.
	G-11.33	Treatment of the sediments should be required to separate out highly contaminated material. Soil washing technologies, which have been demonstrated on sediments in other places, could be a very effective way to separate the calcareous Solvay waste from the NAPL. Another potential benefit of soil washing lies in its ability to separate sand from fine-grained silts and clays. In the case of Onondaga Lake, this technology could potentially be used to generate clean capping material, while reducing the amount of sediments being disposed of in the SCA.	See response to Technical Comment #13.
	G-11.34	In the RI report and FS report, the lake was divided into two zones: the profundal zone (>9 m deep) and the littoral zone (<9 m deep). This artificially imposed line of demarcation implies a sharp change in sediment concentrations visible in many of the maps (see RI report Figures 5-2 to 5-27).	The 9-m contour is not arbitrary. It is the typical depth of the thermocline in Onondaga Lake. The large physical, chemical, and biological differences between the epilimnion and the hypolimnion were the basis for selecting this contour to differentiate littoral from profundal sediments. See also response to Technical Comment #10.

Name/Agency	Comment Code	Comment Summary	Response
S. Sage, cont.	G-11.35	We have found that contamination characteristic of the ILWD (chlorinated benzenes, mercury, and BTEX) extend beyond the 9-m boundary used by TAMS in the RI report to separate the profundal and littoral zones. The Thiessen polygons used in the FS report result in an underprediction of the contamination in the profundal zone.	See response to Technical Comment #12.
	G-11.36	Kriging is generally accepted among spatial analysts as the optimal spatial predictor, but it is a complex and very time-consuming procedure. Figure 9 of RI report Appendix I was created by TAMS for mercury using kriging, but only with cores located in the profundal zone. This pre-determination of contaminant distribution is not an appropriate application of kriging and cannot possibly represent the true distribution of the lake bottom contaminants.	It was determined by NYSDEC that kriging each individual depth interval down to 8 m for every CPOI presented in the RI report was not warranted. In addition, the RI report maps do present a reasonable conceptualization of the contaminant distribution in the lake at all depth intervals for all CPOIs and were not intended to delineate remedial areas and volumes. In addition to a map (RI report Figure I-9) showing the results of kriging in the profundal zone, a map (RI report Figure I-13) showing the results of kriging in the littoral zone was also included in Appendix I of the RI report. These areas were mapped separately since the sampling intervals (in terms of depth into the sediments) for the 1992 and 2000 data were generally different, which would affect the integrity of the kriging process (see Section I.2.1 of the RI report). It should be noted that the profundal samples were collected almost exclusively in 1992 in 2 and 30 cm segments and that the majority of the littoral sediments were collected in 2000 in 15, 70, and 100 cm segments. See also response to Technical Comment #12.

Name/Agency	Comment Code	Comment Summary	Response
S. Sage, cont.	G-11.36, cont.		With the exception of the profundal area off of the ILWD, surface sediments in the top 2 cm in the profundal zone are generally less contaminated than surface sediments in the top 15 cm in the southern littoral zone. This is supported by the high-resolution cores collected from the profundal zone in the 1990s which show that the highest levels of mercury in the profundal sediments are more than 15 cm below the sediment-water interface. This observation is obscured if only the data from 0 to 30 cm or deeper are used in the data presentation for the profundal zone.
	G-11.37	The comment suggests that ASLF suspects that the demarcation used by TAMS in the RI report was employed with the intent of limiting the sediment removal areas. ASLF does not support the plan to remove sediment only in those areas falling within the 9-m depth contour.	As is stated in the response to Technical Comment #10, use of the 9-m contour was not arbitrary, since it was based on real physical, chemical, and limnological conditions. There was no intent by NYSDEC to limit the dredge area. See also response to Technical Comment #12.
	G-11.38	Another area of concern is that a uniform sediment organic carbon value of 5 percent was applied across the lake in the mapping. We have calculated, to the best degree possible, the variation in organic content across the lake explicitly in order to identify areas that represent unacceptable risks, and we found that roughly one-half of the lake sediment surface could be kriged for organic carbon. This approach should be applied to identify those areas that represent unacceptable risks. Based on this there are several areas of the profundal zone where levels exceed toxicity values. The profundal zone should not be ignored.	Unlike NYSDEC sediment screening standards for organic compounds, the Onondaga Lake site-specific SEC/PEC values and the resultant mean PECQ used in the FS report and the Proposed Plan were derived empirically from toxicity testing and are all on a dry-weight basis, not an organic-carbon basis (see also response to Technical Comment #5). Therefore, normalization to organic carbon was unnecessary for the data in the FS report. The selected remedy calls for phased thin-layer capping, oxygenation, and MNR to remediate the profundal zone and hypolimnion.

Name/Agency	Comment Code	Comment Summary	Response
S. Sage, cont.	G-11.38, cont.		As noted in response to Technical Comment #10, the plotting of data down to 30 cm into the profundal sediments includes highly contaminated sediments below a depth of 15 cm that will not be available to biota in the lake. This method exaggerates the risk caused by contaminants in surface sediments. The data from the 0 to 2 cm samples, along with the high-resolution cores, provide the best indication of the risks posed by the profundal sediments. The suitability of thin-layer capping at the base of the ILWD in SMU 8 will be reviewed during the remedial design based on extensive data to be collected as part of the pre-design program.
	G-11.39	The bins used in the mapping presented in the RI report underrepresent the toxicity levels found in the lake's sediments. TAMS selected their methodology based on "the typical log-normal nature of contaminant data" but no literature reference is given upon which to base this statement. Clearly they have not based it on the actual distribution of this data.	The comment implies that the size of the bins used to define the isoconcentration contours in the contaminant distribution maps (RI report Figures 5-1 to 5-27) distorted the interpretation of risk posed by those sediments. As noted in the RI report (page 5-9), because of the large range of values some consistent step had to be developed that would accommodate data which spanned five orders of magnitude, and was understandable to the reader. A log step (or half-log step) is reasonable to do this. In order to give some perspective to the concentrations, an effort was made to include NYSDEC risk-based sediment screening values as part of the binning process. However, it should be emphasized that the purpose of these maps was to allow for an understanding of contaminant distribution, both laterally and vertically, and was not to describe risk, which is done in the risk assessments.

Name/Agency	Comment Code	Comment Summary	Response
S. Sage, cont.	G-11.39, cont.		As stated in the RI (page 5-9), "the organic CPOI maps must be interpreted with caution from a risk-based perspective. Specifically, the organic carbon-based criteria shown on the maps represent a general guide to those areas exceeding NYSDEC screening criteria. However, these contours should not be considered exact for the purposes of identifying areas that present unacceptable risks." "NYSDEC sediment criteria have been used as a screening tool to identify areas affected by various contaminants. Site-specific risks are discussed at length in the BERA and HHRA (TAMS 2002a,b). While many of the NYSDEC screening criteria are not generally applied to sediments at depth, they are used here to assist in describing contaminant concentrations." It should also be noted that the contaminant distribution maps presented in Chapter 5 of the RI did not use the site-specific risk-based values (i.e., the SECs and PECs) that were generated as part of the BERA since these values were finalized after completion of these RI maps. Maps showing the locations of stations throughout the lake that exceed the various site-specific SEC/PEC values are presented in Appendix F of the BERA. A compilation of the exceedances of the site-specific PEC values was presented as Figure 8-2 of the RI based on the mapping presented in the BERA.

Name/Agency	Comment Code	Comment Summary	Response
Honeywell Comments			
David L. Wickersham, Director, Remediation & Evaluation Services, Honeywell	H-1.1	Honeywell summarizes some differences and similarities between its recommended alternative and NYSDEC's preferred remedy. Honeywell believes that its recommended alternative is as protective as the preferred remedy.	See responses to Frequent Comments #1 and #11.
	H-1.2	NYSDEC determined that the original mercury model developed by Honeywell could not be used as a predictive tool for selecting a remedial alternative. The mercury mass balance later developed by NYSDEC in the RI report, together with the data collected for the RI report and for upland site investigations, provides a substantial understanding of mercury fate and transport in the lake. Upland source controls, dredging and capping of sediments, and hypolimnetic aeration are expected to eliminate ongoing sources of mercury to the lake ecosystem, protect against mercury bioaccumulation, and result in decreased mercury concentrations in the food chain.	Comment noted. See also response to Frequent Comment #16.
	H-1.3	Honeywell believes that the use of a mean PECQ of either 1 (as used in NYSDEC's preferred remedy) or 2 (as used in Honeywell's recommended alternative) for defining areas for remediation is protective of benthic organisms. Both Honeywell's and NYSDEC's remedies address potential human health risks associated with consumption of contaminated fish and recreational contact with contaminated sediments.	Comments noted. See also responses to Frequent Comment #3 and Technical Comment #7.
	H-1.4a	Most of the sediment data in SMU 1 were collected within the top 2 m. The limited data at depths greater than 2 m cannot be considered representative of conditions over the 84-acre area of SMU 1.	See response to Technical Comment #8.

Name/Agency	Comment Code	Comment Summary	Response
D. Wickersham, cont.	H-1.4b	Honeywell believes that the depth of removal and associated cap design (thickness) in its recommended alternative is sufficiently protective since many conservative assumptions were used in its cap model. In addition, Honeywell believes that its recommended alternative for SMU 1, rather than the preferred remedy for SMU 1, is a more appropriate balance of the statutory and regulatory criteria governing remedy selection.	See response to Technical Comment #9.
	H-1.5	Honeywell and NYSDEC propose an on-site SCA; any changes to the remedy that result in substantial volumes of sediment being sent off-site for disposal may not be supported by an analysis of the requirements governing remedy selection.	The estimated volume of sediments/wastes that will be removed from the lake that is presented in the ROD is the same as the volume stated in the Proposed Plan. The majority of the dredged sediments will be disposed in an SCA constructed on one or more of the Solvay wastebeds. Only the most highly contaminated materials (e.g., pure phase chemicals segregated during the dredging/handling process) will be sent off-site for treatment and/or disposal. The means for identifying those materials which would be sent off-site will be determined during the remedial design.
	H-1.6	Although the cost estimates in the Proposed Plan assume advanced water treatment may need to be used, the plan recognizes that the specific treatment process used will be developed during the remedial design after additional sampling and treatability testing. Should there be changes to the preferred remedy set forth in the Proposed Plan that substantially increase the estimated cost of treatment (such as the generation of significantly increased volumes of sediment), NYSDEC's conclusion that the Proposed Plan is cost effective may no longer be appropriate.	Comment noted.

Name/Agency	Comment Code	Comment Summary	Response
D. Wickersham, cont.	H-1.7	Requests that Honeywell's additional memoranda (a list is provided as Exhibit A of Honeywell's comments) be made part of the Administrative Record.	See response to Comment H-3.1.
	H-1.8	Specific criteria should be developed during the remedial design for delineating areas and volumes of the SMU 1 ILWD to be removed, including specification of portions of SMUs 2 and 7 subject to potential dredging for NAPL.	Additional data collected as part of the design phase of the Onondaga Lake remediation will be evaluated such that actual removal areas and actual removal depths can be determined. Confirmatory sampling will also be a component of the remedial construction phase of the project to ensure that remedial construction objectives are met.
	H-1.9	Community participation should be ongoing.	NYSDEC concurs with the need for ongoing community participation. See response to Comment G-1.10.
	H-1.10	Targeted dredging should be allowed in lieu of a barrier wall along SMU 7, contingent upon the results of the design investigations.	If data collected as part of the design phase of the Onondaga Lake remediation indicate that targeted dredging in SMU 7 would be as effective as the hydraulic control system, NYSDEC may allow targeted dredging in place of a hydraulic control system for SMU 7.
	H-1.11	The methods for complying with the bioaccumulation-based sediment quality value (BSQV) of 0.8 mg/kg for mercury should be made clear in the ROD.	The manner in which the BSQV would be applied to the remediation of Onondaga Lake is discussed in the "Remedial Action Objectives" and "Description of Selected Remedy" sections of the ROD.
	H-1.12	Honeywell summarizes some differences and similarities between their recommended alternative and NYSDEC's preferred remedy. Honeywell believes that their recommended alternative is as protective as NYSDEC's preferred remedy.	See responses to Frequent Comments #1 and #11.

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Name/Agency	Comment Code	Comment Summary	Response
D. Wickersham, cont.	H-1.13	Believes the RI/FS report is adequate to allow the selection of an appropriately protective remedy at this time. Years of additional study would not benefit the community or the environment.	See response to Frequent Comment #12.
	H-1.14	With regard to dredging in the ILWD, the FS report modeling establishes that any dredging beyond that in the Proposed Plan would not be warranted. Also, any changes regarding the use of the SCA would have to be reevaluated in terms of overall cost effectiveness.	See responses to Comment H-1.5 and Technical Comments #8 and #9.
	H-1.15	NYSDEC determined that the original mercury model developed by Honeywell could not be used as a predictive tool for selecting a remedial alternative. The mercury mass balance later developed by NYSDEC in the RI, together with the data collected for the RI and for upland site investigations, provides a substantial understanding of mercury fate and transport in the lake. Upland source controls, dredging and capping of sediments, and hypolimnetic aeration are expected to eliminate ongoing sources of mercury to the lake ecosystem, protect against mercury bioaccumulation, and result in decreased mercury concentrations in the food chain.	See response to Comment H-1.2.
	H-1.16	Honeywell believes that the use of mean PECQs of either 1 (as used in NYSDEC's preferred remedy) or 2 (as used in Honeywell's recommended alternative) for defining areas for remediation is protective of benthic organisms. Both Honeywell's and NYSDEC's remedies address potential human health risks associated with consumption of contaminated fish and recreational contact with contaminated sediments.	See response to Comment H-1.3.

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Name/Agency	Comment Code	Comment Summary	Response
David L. Wickersham, Director, Remediation & Evaluation Services, Honeywell	H-2.1	Honeywell agrees with the NRRB that most hot spot material would likely be removed by dredging to a depth of 2 m. Honeywell believes that the cap would be effective without additional dredging beyond its recommended alternative. Honeywell concurs with the NRRB's recommendation that the ROD should include flexibility in dredge depth and cap thickness.	Determination of the amount of removal below a depth of 2 m will be made based on additional sediment data that will be collected during pre-design sampling. See also response to Technical Comment #8. The remedy described in the ROD includes flexibility in dredge depth (with regard to hot spot threshold concentrations, as they may be modified as a result of the additional cap modeling that will be performed during the remedial design) and cap thickness so that cap effectiveness and cost effectiveness can be attained.
	H-2.2	Honeywell recommends that the ROD contain sufficient flexibility concerning the location of the SCA to allow for an evaluation of other Solvay wastebeds as potential SCA locations.	The Proposed Plan and the ROD provide flexibility concerning the location of the SCA on the Honeywell wastebeds.
	H-2.3	The mean PECQ provides a rational and conservative means to identify sediments that pose risk to benthic macroinvertebrates. The selected remedy would result in a reduction of chronic toxicity in those areas of the lake where contaminated littoral sediments would be capped.	Comment noted. See also response to Frequent Comment #3.
	H-2.4	Honeywell appreciates the substantial opportunities NYSDEC has provided for public comment on the Proposed Plan.	Comment noted.
	H-2.5	Honeywell supports some of the comments offered by the public. In light of the stated willingness of NYSDEC and Honeywell to continue to engage the public during the remedial design, Honeywell respectively urges NYSDEC to move forward promptly with issuing the ROD.	Comments noted.

Name/Agency	Comment Code	Comment Summary	Response
Thomas H. Milch, Arnold & Porter (legal counsel to Honeywell)	H-3.1	Requests that documents identified in Comment H-1.7 be replaced with documents identified in this comment (H-3.1) and be made part of the Administrative Record.	As requested, these documents have been added to the Administrative Record.
Public (Individual) Comments			
Joan E. Bardeen	P-1.1	Who is paying the difference between Honeywell's $237 million proposal and NYSDEC's $449 million proposal?	After the remedy is selected, NYSDEC will approach the responsible party to design and implement the remedy under a legal agreement. For clarification, please note that the estimated cost of the selected remedy is $451 million.
	P-1.2	We will be in the courts for another 20 years over this.	Comment noted.
David J. Bonner	P-2.1	It will be good to see activities on the lake and development at a cleaned-up lake.	Comment noted. See also response to Frequent Comment #12.
Howard Bragman	P-3.1	We have been down this route before. If Allied were still here, we would not be here tonight.	Comment noted.
	P-3.2	Damming it is the one true way of getting to the bottom of things. Cap all waste in containers and leave it there.	Damming is not a viable remedial technology for Onondaga Lake. Capping involves putting a "cover" as an isolation layer over the waste, but not putting it in containers. Putting the waste in containers is not feasible for the lake site, given the large volume of contaminated sediments to be remediated. See also response to Frequent Comment #2.

Name/Agency	Comment Code	Comment Summary	Response
Nancy Ciampi	P-4.1	During the December 9, 2004 Town of Camillus meeting, I understood that only non-hazardous waste would be dumped into Wastebed 13. During the January 12, 2005 meeting, I understood that Honeywell has proposed Wastebed 13, but that NYSDEC has left it open to Wastebeds 9 – 15. How will it be determined which wastebed[s] will be used?	See response to Frequent Comment #9.
	P-4.2	How will the hazardous waste dredged from the lake be separated? If it is determined that low hazardous goes to the wastebed and high goes to the Niagara Falls area, how is it determined what is low/high? If this is still to be determined and to be defined during the design period, what factors will determine what is low/high?	As part of the design phase, specific criteria will be developed to determine what sediment/waste will be disposed of in the SCA and what material will be disposed of off-site. Factors that will be considered when determining what waste will be disposed of off-site include chemical concentrations, presence of NAPL, and the ability of the material to be contained within the SCA.
	P-4.3	If Wastebed 13 remains open during the four-year implementation period and is not capped until one to two years after the dredging is completed, what is keeping the material (some of which will probably be hazardous) from going airborne, and thus potentially affecting our health and property value? While there will be an air and odor monitoring system in effect, what are the parameters of the monitoring range? What steps will be taken if the range shows that levels are harmful? Will the public be informed of the readings on a regular basis, and have access to the readings on a daily basis, if requested?	See response to Frequent Comment #10.
	P-4.4	Will there be public meetings and sufficient notice of those meetings when the design phase begins and during its three-year period? The public should be kept informed as to ongoing actions and how their concerns are being addressed.	See response to Frequent Comment #17.

Name/Agency	Comment Code	Comment Summary	Response
N. Ciampi, cont.	P-4.5	What will happen if Honeywell does not agree with NYSDEC's decision for the selected remedy? It is my understanding that if Honeywell rejects the plan, the government will implement NYSDEC's remedy, with taxpayers paying for the project, and that the government will bill Honeywell upon completion. Does this mean the government will be reimbursed, but the taxpayers will not be?	See response to Frequent Comment #13.
Katherine J. Comerford	P-5.1	What precautions or remedial actions will take place to prevent contamination from flowing into Lake Ontario via the Oswego River?	See response to Frequent Comment #7.
Charles Coughenour	P-6.1	Capping a few major spots of pollution and dredging certain areas is not "treating" the problem. It is a band-aid solution that ignores the lake as a whole.	See responses to Comment P-16.5 and Frequent Comment #6.
	P-6.2	What are the "standards" that will be used to measure water quality and determine that the lake is clean and safe?	As discussed in the response to the NRRB's recommendation #11 (Attachment 1), the Proposed Plan includes several goals of the remedial program, including: 1) Address toxicity to the benthic community caused by contamination in the sediments. This is measured by the mean PECQ, PECs, and direct measurement of toxicity. 2) Address toxicity caused by bioaccumulation from the sediments to higher organisms such as fish and humans. This is measured by the BSQV.

Name/Agency	Comment Code	Comment Summary	Response
C. Coughenour, cont.	P-6.2, cont.		3) Reduce the concentration of contaminants in fish to risk-based concentrations. This is measured directly in fish and compared to criteria such as EPA's national recommended water quality methylmercury criterion for the protection of human health for the consumption of organisms of 0.3 mg/kg in fish tissue. This will be achieved by eliminating sources of mercury to the lake and by eliminating methylation of mercury in the hypolimnion by the addition of oxygen. 4) Reduce concentration of contaminants in the water column to protective levels. These concentrations in surface water can be compared to state and national standards. Concentrations of methylmercury in the water column will be reduced by controlling sources of total mercury and by oxygenation of the hypolimnion.
	P-6.3	To dump pollutants that could seep into the groundwater is not "treatment." It just moves the problem elsewhere.	The materials placed in the SCA will be completely isolated from the environment. This isolation will be achieved in part by use of an cap and an impermeable liner beneath the dredged materials to prevent seepage into the groundwater. The SCA will be designed to ensure that contaminants in the dredged material do not seep into groundwater.
Kenneth J. Cram	P-7.1	Strongly supports looping the lake. Hopes that the local government will take control of the entire lakeshore, develop it for recreational use only, and keep commercial developers away from the lake edge.	See response to Frequent Comment #18.
JoAnn Cucci	P-8.1	Let's get the job done. Just do it!	Comment noted.

Name/Agency	Comment Code	Comment Summary	Response
Roger B. Eidt	P-9.1	The [Syracuse] Post made reference to 165,000 lbs of mercury in the lake. Where did this number come from? Was a material balance made on the system? There are several areas where mercury was lost; it seems the largest quantity was lost to the ground, not the lake. They may have used the monthly mercury purchases that were made to maintain cell levels.	The widely cited mass of 165,000 lbs (75,000 kg) of mercury having been discharged to Onondaga Lake is based on analysis in EPA (1973). This mass was derived by applying the mercury discharges reported by Allied Chemical in 1970 (22 lbs/day) to the company's production history. 22 lbs/day was used for the period from 1953 to 1970, when both the Willis Avenue and Bridge Street chlor-alkali facilities were in operation, and 11 lbs/day was used for the period from 1946 to 1952, when only the Willis Avenue facility was in operation. The FS cites a mercury inventory of 536,000 lbs (243,000 kg) currently in the sediments using more recent sediment data from the RI. Estimates of the amount of mercury lost to the ground beneath and adjacent to the facilities were not developed for the Onondaga Lake RI/FS. In regard to mercury being "lost to the ground," data from the RIs for the Honeywell subsites indicate that a substantial quantity of mercury has been identified in the soils at the LCP Bridge Street and Willis Avenue sites.
	P-9.2	How much soil was removed when the peroxide process building was demolished? The "working" solution for the process contained several "nasty" materials.	The ROD for the LCP Bridge Street site called for the top 3 ft of soil at operable unit (OU) 2 (the area of the peroxide process building) to be excavated and placed at OU 1. Some soil from OU 2 was removed for proper off-site disposal due to PCB contamination, but this was a very small volume (less than 10 cy).

Name/Agency	Comment Code	Comment Summary	Response
R. Eidt, cont.	P-9.2, cont.		The excavation in the OU 2 area was stopped when soil contaminated with the working solution was encountered. At that point only about 1 ft (2,700 cy) of soil had been removed from OU 2 and placed in the cap/slurry wall system at OU 1. The remaining soil in the OU 2 area will be handled as part of the final remedy for OU 2 which has not yet been determined. NYSDEC anticipates that it will propose (to the public) a remedy for OU2 in 2006.
John S. Gibbs, Jr.	P-10.1	Any cleanup of the lake will improve its quality and the potential for aquatic activities, as well as the economic forecast for the community. While there are differences in Honeywell's and NYSDEC's plans, it is time to get the project underway.	See response to Frequent Comment #12.
	P-10.2	Those opposing the project would like a model to hypothesize the project's outcome; is this realistic? Such a process will delay the cleanup. Is not aware of any project similar to what is proposed for the lake and supposes that there is no reference data available.	See response to Frequent Comment #16.
	P-10.3	After 10 years of testing, and with a plan that seems feasible, the cleanup should begin. Encourages NYSDEC to approve the Honeywell plan, with the idea that it may need modification as cleanup progresses.	See response to Frequent Comment #11.

Name/Agency	Comment Code	Comment Summary	Response
Kevin and Donna Haley	P-11.1	Very concerned about plan to dump 2.65 million cubic yards of contaminated sediments in Camillus. Many children live and play close to the proposed site. Would be living around highly toxic chemicals, like mercury (which is hazardous to humans in even low levels) and PCBs (which cause cancer and many other health problems, and does not readily break down).	It is anticipated that the most highly contaminated materials (e.g., pure phase chemicals separated during the dredging/handling process) will be treated and/or disposed at an off-site permitted facility. The balance of the dredged materials will be disposed in the SCA. The SCA will be designed in accordance with state and federal requirements and will include a liner, leachate collection and treatment, and cap to ensure that the materials would be contained in a protective fashion precluding human exposure in surrounding neighborhoods. During construction and operation of the SCA, extensive and inclusive monitoring will be required and procedures put in place to protect the public from exposure. Post-construction long-term monitoring will be performed to ensure the effectiveness of the containment structures.

Name/Agency	Comment Code	Comment Summary	Response
K. and D. Haley, cont.	P-11.2	There are many things that could go wrong with the controls proposed for the SCA. Identifies several such problems, including possible failure of the piping.	See response to Technical Comment #11.
	P-11.3	Are there other possible dumping areas or methods? Can the money that would be spent to pipe the waste to Camillus be used to site the SCA in or around the lake?	See response to Frequent Comment #9.
	P-11.4	Will having a waste site nearby affect property values? We are proud of our neighborhood. This is an unnecessary risk.	See response to Frequent Comment #21.
Bill Hanson, Manager, US Business Development, Great Lakes Dredge & Dock Company	P-12.1	Will NYSDEC or Honeywell be completing the dredging work in the lake? Offers to provide comments, as dredging contractors, on potential methods.	After the remedy is selected, NYSDEC will approach the responsible party to design and implement the remedy under a legal agreement.
Dallas Johnson	P-13.1	No point in cleaning up the lake for development unless the development is a continuation of the park.	The lake is not being cleaned up for development but, rather, because it poses an ongoing risk to human health and the environment. Beyond that, however, a cleaned-up lake and lakeshore have significant potential for future use.

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Name/Agency	Comment Code	Comment Summary	Response
Charles G. Jones	P-14.1	Mother Nature is working. The mud boils were sealing the mercury in the bottom of the lake with a layer of clay. This solves the mercury contamination. The lake hasn't been this clean in years, when the zebra mussels came along and have been cleaning the lake at no cost.	See response to Comment P-16.5.
	P-14.2	It is sad that NYSDEC is allowing 20,000 gallons of industrial-strength chlorine to come into a residential neighborhood each month to a regional treatment facility (RTF).	This comment does not appear to be directly applicable to NYSDEC's Proposed Plan, which addresses the Superfund and hazardous waste disposal issues associated with Onondaga Lake. The comment is most appropriately addressed by NYSDEC's Division of Water staff, who can be reached at (315) 426-7400.
P. Garry Klink	P-15.1	The part of SMU 5 that is in front of the yacht club should be a weed-free zone.	NYSDEC will evaluate this request as part of the Onondaga Lake remedial design when actual areas of remedial work in SMU 5 will be determined.
	P-15.2	Can the liner in Wastebed 13 handle the extra material that will be dumped in it as a result of the dredging? Won't the dredged material push the wastebed's existing contents into the watershed and then the lake?	Before any of the wastebeds are used for disposal of dredged material, an extensive geotechnical engineering analysis will be conducted. The engineering analysis will be focused on responding to this issue; i.e., can a particular wastebed handle the weight of dredged material that would be placed on it? The analysis may show that a wastebed can handle the dredged material without modification or that it would be necessary to enhance the stability of the bed before using it as a disposal site. Furthermore, please note that none of the wastebeds have a liner. A liner would be installed as part of the construction of the SCA. See also response to Comment L-1.6.

Name/Agency	Comment Code	Comment Summary	Response
P.G. Klink, cont.	P-15.3	The underwater and under-silt obstructions (e.g., barges, piers) must be removed before dredging.	A study of any obstructions to dredging/capping and a plan for removing or otherwise managing such obstructions will be developed during the design phase.
J. Andrew Lange, PE	P-16.1	The proposed cleanup plan is extravagant and NYSDEC should start over.	Since the Onondaga Lake site is extremely complex, describing the site and the measures to address the contamination problem required a very detailed and complex discussion. The remedy described in the Proposed Plan resulted from over 10 years of studies of the contamination in Onondaga Lake, the risks posed by the contamination, and evaluation of various alternatives for remediating the lake. While the commentor believes that the proposed plan is “extravagant,” the selected remedy is based on the level of remediation necessary to be protective of public health and the environment.
	P-16.2	Dredging is suspect for effectively eliminating mercury. A Hudson River project has found only 50 percent contaminant removal and an anticipated cost overrun of $500 million.	The removal of PCBs from the Hudson River as called for in EPA’s February 2002 record of decision for the Hudson River PCBs site is still in the design phase. Since dredging has not yet begun on the Hudson River project, no contamination has been swept downstream as a result of remedial dredging, and thus no additional costs have been incurred.

Name/Agency	Comment Code	Comment Summary	Response
J.A. Lange, PE, cont.	P-16.3	Camillus residents are justifiably concerned about having the dredged material from the lake bottom in their township. Given the history of the Metro sewage plant, it is likely that a large portion of the lake bottom material is sewage solids. Sewage sludge should remain in the lake.	The selected remedy calls for the disposal of up to 2,650,000 cy of dredged materials in the existing Honeywell Solvay wastebeds. It is likely that a portion of this material contains solids derived from the sewage treatment plant discharge. It is assumed that the commentor is concerned about odors from this material. NYSDEC is aware that there are concerns about odors and air emissions from the SCA, and there will be plans to institute control measures. It should also be pointed out that any sewage solids from the time that Metro operated as a primary treatment facility have been exposed to the environment for decades. They have undergone additional oxidation and degradation, and will not resemble fresh sewage. Furthermore, the removal/capping of this rich organic material from the lake bottom will likely have a positive impact on the lake beyond that of the hazardous waste issues, since these sediments are likely a source of phosphorus to the lake.

Name/Agency	Comment Code	Comment Summary	Response
J.A. Lange, PE, cont.	P-16.4	There is little evidence of significant environmental impact by mercury in the lake at the present, except for fish contamination. There is no justification for NYSDEC's expenditure.	The remedy was selected following an extensive study of the lake's contamination and evaluation of alternatives for remediating the lake. Levels of mercury and other contaminants in sediments and fish pose risks to human health and ecological receptors (e.g., invertebrates, fish, birds, and mammals), based on the results of the human health and ecological risk assessments. These risk assessments show that the current contamination in Onondaga Lake has produced adverse ecological effects at all trophic levels examined and people consuming fish from the lake are at risk. The selected remedy was developed to address these risks to humans and ecological receptors. Data collected over the last 30 years indicate that there has been no significant reduction of mercury in fish tissue since the closure of manufacturing processes at the Honeywell facilities, due to ongoing releases from the littoral and profundal zones and upland sources (e.g., tributaries and groundwater). In addition, ionic waste in Onondaga Lake has adversely affected aquatic macrophytes, resulting in the loss of macrophyte habitat that formerly provided valuable feeding and nursery areas for aquatic invertebrates and vertebrates.

Name/Agency	Comment Code	Comment Summary	Response
J.A. Lange, PE, cont.	P-16.5	The mercury in the lake is currently sequestered (embedded) in the lake sediments. The remedy should allow this sequestration to continue, since dredging would only release mercury. The remedy could be enhanced by installing a permanent cap, which could be rapidly designed utilizing NYSDEC data that are already available. The cost would probably be negligible in contrast.	The FS report evaluated the natural processes in the lake as well as potential technologies that might be used in remedial actions. An important characteristic of the lake is the natural division of the sediments into the littoral and profundal zones. As defined in the RI report, the littoral zone sediments are in less than 30 ft (9 m) of water and are subject to wind-driven waves that resuspend the sediments. It was demonstrated in the RI report that the resuspension of these littoral zone sediments is a major source of mercury, and that the contamination in those sediments is not sequestered from the environment. Unlike the littoral zone sediments, the profundal sediments are protected by the overlying water from resuspension. The pattern of mercury contamination in the profundal sediments shows that the vast majority of the contamination is being buried and secluded from the environment.

Name/Agency	Comment Code	Comment Summary	Response
J.A. Lange, PE, cont.	P-16.5, cont.		Because of this major distinction between littoral zone and profundal sediments, NYSDEC selected different remedies for each zone. In the littoral zone, where burial of contaminated sediments is not occurring, the primary remedial action proposed is the placement of an engineered isolation cap. In order for the cap to be effective at isolating the sediments containing mercury and organic compounds, some dredging is needed prior to cap placement. The remediation includes targeted dredging in areas with high concentrations of contaminants and high groundwater upwelling velocities in order to increase the effectiveness of the isolation cap, dredging to ensure that the placement of the isolation cap would result in no loss of lake surface area, dredging to optimize habitat and erosion protection, dredging to remove NAPL, and dredging to remove hot spots and reduce concentrations prior to capping. In the profundal zone, the selected remedy calls for allowing the contamination to continue to be buried, with thin-layer capping in selected areas that have elevated concentrations of contaminants, and oxygenation of the hypolimnion to help control methylation of mercury. The cost of placing a thin-layer cap over the entire profundal zone would be greater than the cost for the selected remedy for SMU 8. With regard to impacts from dredging, see also response to Frequent Comment #7.

Name/Agency	Comment Code	Comment Summary	Response
J.A. Lange, PE, cont.	P-16.6	"Public review" of a huge set of documents is inadequate for public commentary on the NYSDEC plan. A better procedure is needed. An executive summary should be prepared, and a page or two would be released to the newspaper each week. The more significant commentaries would be printed the following week.	While the scope of the Onondaga Lake project is large, and there are many documents available for public review, NYSDEC would be remiss if it did not offer all reports, studies, evaluations, plans, etc. to the public. The Proposed Plan summarizes the many reports that went into its preparation, and is readily available to the public. A fact sheet and a five-page executive summary were released with the Proposed Plan in November 2004 and were made available on NYSDEC's web site (http://www.dec.state. ny.us/ website/der/projects/ ondlake/). Fact sheets and/or executive summaries will continue to be issued, as needed, during the next phases of the project. NYSDEC does not judge comments from the public as "more significant" or less so. All public comments are given equal weight and consideration.
J. Andrew Lange, PE	P-17.1	Scooping (dredging) solids from the lake bottom is inefficient. Spillage from the dredging would return a major proportion of each load back to the lake. Mercury contamination could then spread widely and reach the remainder of the lake and the Seneca River.	See response to Frequent Comment #7.
	P-17.2	The impact (of mercury contamination from dredging) would be beyond imagination, as contrasted with the only problem presently reported – minor fish contamination. It is unlikely that mercury found in fish could have come from the multiple layers deposited many years ago.	See responses to Comments P-16.4 and P-16.5.
	P-17.3	The lake bottom layers should remain entombed and not be disturbed.	See response to Comment P-16.5.

Name/Agency	Comment Code	Comment Summary	Response
J.A. Lange, PE, cont.	P-17.4	Dredging has proven to be a failure on the Hudson River (PCBs removal) project. According to an Albany Times Union article, half of the contaminant was swept downstream when the river bottom was disturbed. The additional work is anticipated to cost more than $500 million and take more than six years to complete.	See response to Comment P-16.2.
	P-17.5	In a 1/7/05 newspaper letter, Alan Gancy, former director of research for Solvay, stated that dredging is too risky, and proposed an alternative treatment system to eliminate mercury. This might also deal with the minor contamination of fish.	Treatment will not only be needed for mercury but also many organic contaminants such as BTEX, chlorinated benzenes, PAHs, and PCBs. Fish contamination poses unacceptable risks to human health and wildlife and is, therefore, not considered to be minor. See also responses to Comment P-21.2 and Frequent Comment #7.
	P-17.6	For those who have stated than an adequate model for cleanup is lacking, the Hudson River project provides such a model.	While the Hudson River PCBs remediation project is similar in scope and complexity to the Onondaga Lake project, the two systems (river and lake) are not equivalent in terms of modeling. See also response to Frequent Comment #16.
Arnold W. Lathrop	P-18.1	Dredging the lake sounds ridiculous. It would stir up and spread pollutants.	See response to Frequent Comment #7.
	P-18.2	Proposes that the lake be “sumped.” Using a barge with trash pumps, pump pollutants to wastebeds and into “V”-shaped settling ponds with valved drawoffs for removing most of the contaminants.	The suggestion on sumping the sediments of the lake is actually very similar to the hydraulic dredging and sediment consolidation that has been proposed by NYSDEC. Hydraulic dredging uses a suction to remove water and sediment from the lake bottom.
Thomas E. Law	P-19.1	Endow the lake with a “lake keeper” staff that has authority to test progress with respect to ownership responsibilities.	See response to Frequent Comment #19.

Name/Agency	Comment Code	Comment Summary	Response
T. Law, cont.	P-19.2	Model the lakeshore areas to define candidates for Class B+/A- waters, possibly involving bottom contouring to capture freshwater from tributaries, even possibly with criblike containment for flow throttling (such as levees).	There are various factors that impact the classification associated with a surface water body, and as the conditions in Onondaga Lake change the classification of Onondaga Lake surface water will be appropriately reevaluated.
	P-19.3	Do better georeferencing of all pertinent science and planned engineering for broken-down foci to shorten paper trail and learning curve for lakekeeper staff. Provides predicted numbers of employees and salaries for proposed staff.	See response to Frequent Comment #19.
Richard J. Lightcap	P-20.1	Supports the construction of a trail around the lake, as does much of the general public. Hopes this will be taken into consideration.	See response to Frequent Comment #18.
Robert Marquardt	P-21.1	Dredging could make things worse. Proposes that a 1 percent escape rate would occur during dredging and that this escaped mercury-contaminated sediment will spread over the entire lake.	It is expected that less than 1 percent of the material being dredged will enter the water column. This is because modern environmental dredges are relatively precise machines that can carefully remove targeted sediments without excessive disturbance of the lake bottom. Furthermore, some of the sediments that will be dredged are relatively coarse, sandy materials that will resettle in the immediate dredging vicinity. Therefore, as dredging work proceeds from one location to the next, the sediment that settles quickly could be collected during continuing dredging operations.

Name/Agency	Comment Code	Comment Summary	Response
R. Marquardt, cont.	P-21.1, cont.		It should also be noted that all dredged areas and some areas that are not to be dredged will be capped by covering any residual contamination with clean material. Within those areas, the cap will isolate any solids that migrate there during dredging operations. Thus, for a number of reasons, the problem of contamination escaping dredging operations is not expected to be as severe as suggested by the comment. It should also be remembered that the areas selected for dredging and capping are not currently isolated from the environment. The RI report indicated that resuspension of contaminated material in the littoral zone is currently one of the largest sources of contamination to the lake. See also response to Frequent Comment #7.
	P-21.2	Proposes the following cleanup plan: 1. Stop all continuing pollution. 2. Clean up the lakefront and make it fit for on-shore recreation. 3. Cover the lake contaminants in place. 4. Experiment with Mr. Gancy's inexpensive idea of "black box" filtering. 5. Let nature assist in cleanup and recovery. If it takes 20 or 50 years, that's okay with most Central New York residents.	Other than the water, or "black box," filtering process, the cleanup described by the commentor is similar to the selected remedy. The other subsites have been cleaned up, are undergoing cleanups, or will be cleaned up. Many of these sites are in the RI/FS process themselves. The implementation of those cleanups will stop the "continuing pollution" and will be coordinated with the implementation of the lake remediation.

Name/Agency	Comment Code	Comment Summary	Response
R. Marquardt, cont.	P-21.2, cont.		The selected remedy calls for cleaning up the "lakefront perimeter," with dredging and capping in the littoral zone in areas where sediments exceed the cleanup criteria. The littoral zone and parts of the profundal zone will be capped, with dredging done primarily to address physical and chemical aspects of the capping, including targeted dredging in areas with high CPOI concentrations and high groundwater upwelling velocities in order to increase the effectiveness of the isolation cap, dredging to ensure that the placement of the isolation cap would result in no loss of surface area, dredging to optimize habitat and erosion protection, dredging to remove NAPL, and dredging to remove materials in areas of hot spots and reduce concentrations prior to capping. The selected remedy includes monitored natural recovery in the profundal zone, with oxygenation to allow natural processes to aid in the recovery. It should be pointed out that Dr. Gancy did not claim to have a mechanism that could filter out mercury to concentrations of less than 1 ng/L and other contaminants to very low levels or not detected; rather, he proposed that one could be developed. It should also be pointed out that such a filtering mechanism would have to be large enough to filter all of the water in the lake on a continuing basis until such time that the sediments were no longer a source of contamination to the water column.

Name/Agency	Comment Code	Comment Summary	Response
R. Marquardt, cont.	P-21.3	NYSDEC's dredging plan is expensive and risky. If dredging backfires, the entire $449 million plan is a disaster. Uncorrectable pollution could be distributed across the lake bed. The payoff from dredging is not worth the cost and risk.	See response to Frequent Comment #7.
Allen Mazur	P-22.1	The $449 million is too much money to spend for the primary purpose of removing mercury from the lake bottom and fish. There are more important environmental needs for the lake and county.	NYSDEC is responsible for investigating and, as appropriate, remediating hazardous waste sites located throughout New York State. Onondaga Lake, although a hazardous waste site, is also a valuable natural resource that is and will continue to be utilized by the people of New York State. By remediating Onondaga Lake, NYSDEC will be improving this valuable resource. Please note that the remedy addresses a number of contaminants in addition to mercury.
	P-22.2	Proposes a compromise with Honeywell, where the company would accept a mercury cleanup costing around $250 million and provide another $150 million for non-mercury improvements. The first priority after mercury cleanup would be to completely encircle the lake with park and recreational trails, then develop Onondaga Creek Walk. Spend less on mercury and more on people's broader use and enjoyment of the lake.	See responses to Frequent Comments #11 and #18.
Allan Mazur	P-23.1	Would like some of the money intended for cleanup to be allocated for improving the shoreline (e.g., a path and parkland around the lake).	See response to Frequent Comment #18.
Ashley McGraw, Ashley McGraw Architects PC	P-24.1	Transmittal of a petition with 30 signatures in support of looping the lake.	See response to Frequent Comment #18.

Name/Agency	Comment Code	Comment Summary	Response
Les Monostory	P-25.1	Concerned over NYSDEC plan's extensive use of hydraulic dredging. Dredging is dirty and disruptive and tends to resuspend sediments, which will in turn be transported up the food chain to fish. Expect to see high levels of mercury in lake fish for the duration of the dredging project and for the life span of those fish.	See responses to Frequent Comment #7.
	P-25.2	Recommends capping contaminated sediments with layers of clean stone, gravel, and sand, in preference to dredging.	Much of the dredging that is included in the selected remedy is required, primarily, to ensure that the cap is effective in both the short- and long-term. See also response to Comment P-16.5.
	P-25.3	Hydraulic dredging of contaminated sediments should be limited to nearshore areas where slurry materials can be better contained. Minimize or eliminate dredging in deeper waters.	No dredging is planned for the deep waters in the profundal zone of the lake. See also responses to Comment P-16.5 and Frequent Comment #7.
Barb Motto	P-26.1	Happy to see the lake look cleaner than it has in years. Her brother, Dr. Michael Dahlberg, sent information on a process he patented that reverses the effects of acid rain. This system has worked in waterways in Pennsylvania that were polluted by coal. Provides further details on cleanup system.	This information on the cleanup system is appreciated. However, this system is, primarily, designed to treat surface water, and, thus, would not be effective in treating or removing the organic and inorganic contaminants from the sediments of Onondaga Lake.
Michael Murphy	P-27.1	Proposes putting rafts with 30 – 40 ft of old tires suspended into the water at random spots around the lake. The tires will provide zebra mussel habitat, filter the water, and provide cover and feeding grounds for fish. Once or twice a year pull [the tires] through a set of large rollers and let the shells coat the [lake] bottom. Wind-driven or solar-powered turbines would be on top of the rafts and drive a pump that would deliver aerated water to the lake. These ideas may be far-fetched but are cheap. You have engineers to solve the problems.	The commentor suggests two interesting approaches to address contamination in the water column: bioremediation using zebra mussels as a filtering medium and the addition of oxygen to the deep waters of the lake using wind or solar power. The addition of oxygen to the lower waters of the lake (hypolimnion) to reduce dissolved concentrations of mercury and eliminate methylation of mercury in the water column has been selected as part of the remedy.

Name/Agency	Comment Code	Comment Summary	Response
M. Murphy, cont.	P-27.1, cont.		The exact technology to be used will be determined in the design phase, and the possibility of using a renewable energy source can be considered. The other suggestion (which involves filtering of lake water), unfortunately does not address the major focus of the remediation process, which is to control the sources of mercury and other contaminants from the sediments to the lake and its biota. A large percentage of the lake sediment is actually toxic to the animals that live there, and these sediments act as a continuing source of contamination to the water column. The removal, capping, and natural burial of these sediments are needed regardless of other possible remedial activities and, along with the oxygenation of the hypolimnion, will result in the reduction in the concentrations of contaminants envisioned by the author.
	P-27.2	A creek flows out of Oneida Lake near the headwaters of Ley Creek. If the land between the two could be purchased or right-of-way secured, a channel could be cut between them. This would increase clean-water flow in both the lake and the creek and wouldn't cost much. These waters all used to be connected by wetlands. This may also help to heal the rift between the Onondaga and Oneida Indians.	The commentor suggests adding additional inflow of clean water from Oneida Lake to Onondaga Lake to dilute the concentrations in the water column. This suggested alternative will not address the contamination in the primary medium of concern (i.e., lake sediments), and its associated toxicity.
Susan and John Murray	P-28.1	Understand importance of cleanup, but are concerned about dredged sediment disposal area. Recently built a home in the area because of its clean, country-like feel. Concerned about effects (including odor) of having contaminated sediments near their home and children.	See responses to Frequent Comments #9 and #10.

Name/Agency	Comment Code	Comment Summary	Response
S. and J. Murray, cont.	P-28.2	Concerned about decreasing land values.	See response to Frequent Comment #21.
	P-28.3	Support the concept of cleaning the lake, but if a cleanup plan causes potential harm to people and the community, it is better to leave the pollution at the lake bottom. Asks NYSDEC to consider other options.	See response to Frequent Comment #9.
Temple W. and Mary A. Myers	P-29.1	Heartened to see substantial discussions and proposals taking place for improvement of the lake. Prefer the word "improvement" to "cleanup."	Comment noted.
	P-29.2	Clearly define the desired outcome and time frame. Be sure the goals and alternatives are clearly stated.	See response to Frequent Comment #20.
	P-29.3	If Honeywell walks away saying it has satisfied its part of the agreement, and yet the government and the community are dissatisfied with the so-called "cleanup," what is the next step? Who pays for the next stage? How long must we and our children's children wait?	See response to Frequent Comment #13.
	P-29.4	What are "acceptable levels of pollution" after the so-called "cleanup"?	The remedial action objectives (RAOs) and preliminary remediation goals (PRGs) specified in the ROD provide the goals of the remediation for various site media, including sediment, water, and fish. For additional information regarding these goals, please see the response to NRRB's recommendation #11, contained in Attachment 1 of this RS.

Name/Agency	Comment Code	Comment Summary	Response
T. and M. Myers, cont.	P-29.5	When the waters are finally "improved" enough to support the public fishing, eating fish, wading and swimming, how does the community ensure the waters and shorelines will remain forever accessible to the public? It would be a travesty to see billionaires and politicians promoting the construction of "huge waterfront destinations for the benefit of the community."	See response to Frequent Comment #18.
	P-29.6	Are the waters reasonably protected from future pollution? Is there a master plan to protect the lake and control future development of surrounding properties, shorelines, and drainage systems?	See response to Frequent Comment #20.
	P-29.7	Will my family be able to fish, eat the fish, wade and swim in Onondaga Lake at the end of the Honeywell so-called "cleanup"? If not, then we have wasted a lot of time and money.	It is expected that after the remediation of the lake and after the improvements at the Metro plant are complete, Onondaga Lake fish consumption advisories will be less restrictive and swimming will be more likely. See also response to Frequent Comment #20.
	P-29.8	There are a lot of unanswered questions. If I were an astronaut and this was the first moon shot, I'd be extremely upset.	The questions from the public have been answered in this RS. Any additional questions posed by the public will be addressed as they come up.
	P-29.9	Five generations of my family have lived and played on the shores of the lake; we'd like children and grandchildren to have the same opportunity. Thank you for bringing this most serious undertaking to the public forum; and thank you for listening to our concerns.	Comment noted.

Name/Agency	Comment Code	Comment Summary	Response
Michael P. Nowak	P-30.1	Has not seen any plans for remediation of Lakeview Point, which was a prime amusement area before Solvay Process began dumping soda ash at the site (encloses a picture of neglected Lakeview Point). Hopes that point is also considered for cleanup and development. If untreated, it may compromise lake cleanup plans.	Lakeview Point is part of the Wastebeds 1 to 8 site, which is currently being investigated. Plans for remediation of this site have not yet been developed.
Daniel L. Orzell	P-31.1	Onondaga Lake should never have been allowed to get in such a bad condition. I grew up on its shores and am sick over what has happened to it.	Comment noted.
	P-31.2	It should be restored to its original condition. No shortcuts.	See response to Frequent Comment #14.
Rusi Poncha	P-32.1	Dredging and burying the sediment in a wastebed will create more problems, in addition to the odor and the possibility of toxic matter leaching out.	See responses to Frequent Comments #7 and #10.
	P-32.2	A better method would be to immobilize the pollutants by mixing them with cement and disposing the cement blocks in a landfill or the ocean. Carefully consider all schemes before proceeding with cleanup.	The concept of blending contaminated dredged material with cement or cementitious additives has been considered at numerous contaminated sediment sites. In fact, this approach may be used to a limited degree as part of the Onondaga Lake remedial work. Some of the most highly contaminated material would be disposed of off-site. This more contaminated fraction would then either be dewatered or, alternatively, stabilized using cement additives and hauled off to treatment/disposal facilities outside the region. The major difference between the suggestion made in this comment and the approach that could be taken at the project site is that the material being disposed off-site would not be turned into "cement block" but rather would be "stabilized" with cement-like additives and then disposed of in a secure landfill.

Name/Agency	Comment Code	Comment Summary	Response
Garrie Procopio	P-33.1	Supports a cleanup of the lake but doubtful that it can be accomplished. Outraged that NYSDEC is considering disposing of the contaminated sediment in his back yard (i.e., in the Belle Isle Road Construction Landfill) (see P-34.1 in this comment index). Does not understand why NYSDEC's cleanup remedy repeats the mistake that contaminated the lake in the first place, by showing disregard for the way a contaminated environment affects the community. Suggests that NYSDEC visit the neighborhoods and businesses that have the landfill in their backyards to see where NYSDEC is proposing to bring contaminants. Wants NYSDEC to know that there are residences and schools in the area.	As indicated in a follow-up e-mail from the commentor, the FS report evaluated the potential disposal of dredged materials at Wastebed 13 and not the Belle Isle Road Construction Landfill. NYSDEC and EPA do not have any plans to evaluate this landfill as a potential site for the SCA. Furthermore, it is not known whether Wastebed 13 would be an appropriate location for constructing the SCA. The FS assumed (for costing purposes) that the SCA would be constructed on Wastebed 13 based on its capacity, as well as other factors. However, the actual Solvay wastebed location(s) on which the SCA(s) would be constructed would be determined during the remedial design based on various factors including geotechnical testing and screening that would be performed during the remedial design. Once a site is selected, the SCA will be designed in accordance with state and federal requirements and guidance, and would include, at a minimum, the installation of an impermeable liner, leachate collection and treatment, and a cap. The operation of the SCA would employ the appropriate controls to address concerns with odors, noise, etc. Thus, it is not anticipated that there would be any significant impacts to the environment or the local community as a result of the SCA. See also response to Frequent Comment #9.

Name/Agency	Comment Code	Comment Summary	Response
G. Procopio, cont.	P-33.2	What will NYSDEC do about issues such as health hazards to children from the SCA, decrease in home value, contamination to air and water, and odor problems?	The SCA will be designed in accordance with state and federal requirements and will include a liner, leachate collection and treatment, and cap to ensure that the materials would be contained in a protective fashion precluding human exposure in surrounding neighborhoods. During construction and operation of the SCA, extensive and inclusive monitoring will be required and procedures put in place to protect the public from exposure. Post-construction long-term monitoring will be performed to ensure the effectiveness of the containment structures.
	P-33.3	If the project cannot be stopped via community or legal action, I will be forced to move to protect my children. Will NYSDEC reimburse me for the loss in property value?	The ROD is the process for selecting a remedy under CERCLA. CERCLA is concerned exclusively with encouraging fast, efficient cleanup of hazardous substances. CERCLA does not provide any basis for claims for personal injuries or property damage. Therefore, there is no basis for a CERCLA claim for legal damages due to the diminished value of a home owner's property. Nonetheless, it should be noted that the ROD indicates that the SCA will be used only temporarily, during lake remediation, after which it would be closed. Closure of the SCA would include capping, seeding as a green area, and possible reuse, potentially for park or other recreational purposes. Upon closure of the SCA, and, more broadly, as other aspects of the lake remedy are completed, it is possible that property values in Camillus and other municipalities near Onondaga Lake may increase as a result of overall lake remediation. See also response to Frequent Comment #21.

Name/Agency	Comment Code	Comment Summary	Response
G. Procopio, cont.	P-33.4	Formally requests that more open forums be held before a decision is made.	See response to Frequent Comment #17.
	P-33.5	The community has not been given proper notice or enough time to oppose the proposal. Would like to be notified of a deadline for submitting a petition.	The comment periods were a total of four months in duration, which is considerably longer than the required 30-day period. In addition to two public meetings and three availability sessions, NYSDEC has met with citizens and officials of the Town of Camillus as well as several local organizations. There will be additional meetings during the design phase. During the remedial design, NYSDEC and EPA will evaluate various locations for siting the SCA. This will include wastebeds included in the following groups: Wastebeds 1 through 8, Wastebeds 9 through 11, as well as Wastebeds 12 through 15. The evaluation will consider various factors including potential impacts on the local community, geotechnical stability of the wastebeds, SCA construction requirements, wastebed size, the means for transporting dredged materials to the SCA, costs, etc. As part of an extensive public outreach program, local communities would be provided opportunities to have input on SCA-related issues both during the design/construction of the SCA, as well as during the operation of the SCA.
Garrie Procopio	P-34.1	Made an error in earlier comment (P-33.1 in this comment index) in referring to the SCA as being sited at the Belle Isle Road Construction Landfill, not at Wastebed 13.	Comment noted.
Garrie Procopio	P-35.1	Similar comment to that made in P-34.1. Notes that the remainder of his original comment (P-33 in this comment index) is unaffected by this error.	Comment noted.

Name/Agency	Comment Code	Comment Summary	Response
Tom Rhoads	P-36.1	It is excellent that a lake remediation plan is close to happening. I suggest a plan of action by April 1, 2005. Act now; no more studies.	See response to Frequent Comment #12.
	P-36.2	More information is needed on the movement and disposal of dredge spoils.	This topic will be addressed in the design phase.
	P-36.3	More information is needed on liners and the design of the upland dredge spoil disposal sites.	This topic will be addressed in the design phase.
	P-36.4	More information is needed on capping and closure of the upland disposal sites.	This topic will be addressed in the design phase for the lake, as well as when proposed remedies for the upland sites have been developed and made available for public review and comment.
	P-36.5	In the three-year design phase, do another public hearing on the transportation and upland disposal fill areas. Make these elements the best for our environment.	See response to Frequent Comment #17.
Tom Rhoads	P-37.1	Thank you for providing the public with the opportunity to participate in the plan. NYSDEC has done a very good job in discussing the Proposed Plan.	Comment noted.
	P-37.2	Present plan documents do not provide adequate detail for work related to: • Conveyance of dredged sediments • Design of SCAs • Treatment of leachate from SCAs • Closure and post-closure monitoring of SCAs • End use of the wastebeds and the SCA, including recommended recreational opportunities	The level of detail associated with the design for the items noted is typically not included in an FS report, the document upon which the Proposed Plan was primarily based. These aspects of the remedy will be evaluated in much greater detail during the design phase. Once available, the public will be provided with additional detail on these issues, as well as others associated with the design of the lake remedy.
	P-37.3	Would like the design of SCAs to be topic of public hearing. Points out potential flaws and engineering elements to be considered in landfill/system design.	See response to Frequent Comment #17.

Name/Agency	Comment Code	Comment Summary	Response
T. Rhoads, cont.	P-37.4	Concerned about conveyance of dredge spoils, specifically with respect to odor, fugitive emissions, and traffic. Trucking dredge spoils poses several potential hazards to the community. Conveyance plan should be developed and presented to the public at a hearing.	At this time, it is expected that significant quantities of dredged spoils would not be trucked to the wastebeds. It is likely that a large portion of the dredging will be hydraulic dredging, which conveys the dredged sediments in a slurry form that can be pumped a considerable distance. Thus, it is likely that the principal means of dredged material conveyance for this project will be pumping sediments into the SCA via pipelines. The more contaminated materials will be segregated from the bulk of the dredged material and hauled to an off-site disposal facility. In the case of these materials, it will likely not be necessary to first take them to the SCA; rather, they may be stabilized at the lakeshore and moved directly to the interstate system that runs adjacent to the lake. See also response to Frequent Comment #17.
	P-37.5	Concerned about leachate treatment considerations. Requests a public hearing (separate from that to announce final design). Eventual discharge from treatment facility will likely be to the lake's watershed.	Comment noted. Strict discharge limitations will be imposed on operations at the SCA. See also response to Frequent Comment #17.
	P-37.6	Improvement of habitat must be an integral part of the design for the closure of the SCA and wastebeds. Makes multiple suggestions for habitat types. Public recreation should also be part of design.	The details of the composition of the cover that will be used to close the SCA will be determined as part of the remedial design.
	P-37.7	Taxes lost to future generations by use of wastebeds to hold waste should require significant, ongoing investment in public uses to repay the community.	The SCA will be designed and constructed such that the area containing the SCA can be reused post-SCA closure.

Name/Agency	Comment Code	Comment Summary	Response
Sandra Russell	P-38.1	Supports creating a multi-purpose recreational trail around the lake. Would be glad to volunteer to help establish such a trial.	See response to Frequent Comment #18.
Jesse Ryder	P-39.1	Proposed plan is both a hard-won victory and a failure. The lake needs a final solution, and capping is unacceptable. If the lake is too polluted then let it go and focus on problems that can be fixed. No capping.	See response to Frequent Comment #6.
William Sanford	P-40.1	Transmittal of a petition with signatures of 12 Liverpool citizens asking NYSDEC and Honeywell to work together to find a solution/begin cleanup as soon as possible. The Honeywell plan is solid in design and has the potential to increase quality of life through economic development and recreational projects.	NYSDEC is working with Honeywell in a cooperative manner in order to further the cleanup of Onondaga Lake. However, NYSDEC determined that the Honeywell plan is not sufficiently protective of humans and the environment (see response to Frequent Comment #11) and the selected remedy will meet the goals as well as allow increased recreational uses of the lake and its vicinity relative to current conditions. See also response to Frequent Comment #12.
Donald L. Schoenwald	P-41.1	Submitted a copy of a letter to the editor [of the Syracuse Post-Standard?] from David C. Ashley of Syracuse that calls for looping the lake with a recreation trail. Letter provides analysis of remedial alternatives proposed and assessment of feasibility of constructing trail. Mr. Schoenwald finds the letter persuasive and hopes the suggestions will be included in the plan.	See response to Frequent Comment #18.

Name/Agency	Comment Code	Comment Summary	Response
Bill Spizuoco	P-42.1	Incorporate a permeable barrier material within the capping materials. This would allow for treatment of some chlorinated and petroleum compounds. Provides further details of such a barrier.	Reactive materials were evaluated in the FS report as one way to improve the overall performance of cap material. Unlike standard sand caps, reactive caps are often intended to have a finite design life. Depending on the quantity of chemical sources underlying the cap, as the reactive material is used up, cap material may need to be periodically removed and replaced with new reactive materials. Where fluxes of large quantities of chemicals are involved, this may add a considerable ongoing periodic maintenance cost to reactive caps. The performance and effectiveness of standard capping techniques were extensively analyzed in the FS report, and it was found that such techniques will be effective in all SMUs.
James H. Tyler, PE	P-43.1	Supports Honeywell's plan. Time to do the work and prove that all parties are serious about completing the task in a timely manner.	Honeywell's plan was determined by NYSDEC to not be sufficiently protective of human health and the environment. The selected remedy will be protective of public health and the environment, will meet the remedial goals, and will allow increased recreational uses of the lake and its vicinity. NYSDEC is dedicated to seeing that the lake is restored to become an important resource for the Syracuse area. See also response to Frequent Comment #11.
Richard D. Valenti, Jr.	P-44.1	Wonders why the proposal is not being offered as a PDF file on NYSDEC's web site, rather than forcing people to travel to sites where the volumes will likely not be available.	The Proposed Plan can be found (in PDF format) on NYSDEC's web site at www.dec.state. ny.us/website/der/projects/ondlake. The RI, risk assessments, and FS documents are available at six document repositories (including NYSDEC's Syracuse office) in the Syracuse area, as well as at NYSDEC headquarters in Albany.

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Comment and Response Index

Name/Agency	Comment Code	Comment Summary	Response
Deborah Webster	P-45.1	Would like Honeywell to ensure they will not further contaminate the lake by dredging, and that the current marine life will not be disturbed.	See response to Frequent Comment #7.
	P-45.2	Would like the entire lake to be cleaned up; later in time it will be even more expensive to do so.	See response to Frequent Comment #6.
Dennis G. Weller, PE	P-46.1	Time for NYSDEC and Honeywell to reach agreement and move ahead with cleanup. In addition to the other benefits of a clean lake, imagine the boost to the local economy.	Comment noted. See also response to Frequent Comment #12.
Pam Woollis	P-47.1	Has always been concerned about groundwater safety but testing is prohibitively expensive. Do you have a groundwater map of our area so we can determine if there is cause for concern?	According to groundwater maps in the Blasland & Bouck 1989 report "Hydrogeologic Assessment of the Allied Wastebeds in the Syracuse Area," the area of the address noted by the commentor lies in an upgradient position relative to the nearest wastebeds (Wastebeds 12 to 15, but primarily 15). Based on the available data, there should be no impact to groundwater from the wastebeds at this property. However, this interpretation is strictly for shallow groundwater, as there are no data in the report for deep groundwater in the vicinity of this property. It is anticipated that, during the design phase, monitoring wells will be installed at the perimeter of the SCA (regardless of which wastebed it is constructed on) and in off-site areas to evaluate groundwater movement. Furthermore, the design of the SCA will employ proper engineering controls (e.g., liner, leachate collection) to ensure that contaminants associated with the dredge spoils are contained at the site.
June Anna-Fey	P-48.1	The corporate polluters must be forced to do it properly or a bad example will be set for future cleanups.	Comment noted. NYSDEC and EPA have selected a remedy that will be protective. They will oversee the design and implementation of that remedy.

Name/Agency	Comment Code	Comment Summary	Response
Alex Balboa	P-49.1	Media reports continue to underscore the seemingly lack of progress in thoroughly cleaning up this valuable freshwater natural resource. Please coordinate, collaborate, and cooperate on federal, state, and local jurisdictional levels in addressing concerns potentially impacting adversely public health, lands, trust, confidence, and quality of life issues.	NYSDEC is working cooperatively with Honeywell in order to further the clean up of Onondaga Lake. NYSDEC is committed to remediating Onondaga Lake in an expeditious manner that is protective of both public health and the environment, such that this resource can be better utilized by the people of New York State. A lot of progress has been made over the past several years on Onondaga Lake as well as the various upland sites. See also response to Frequent Comment #5.
Sallie Cappel	P-50.1	Some professors, possibly at SUC Oswego, developed a process using microbes that actually digested pollution. Is this a valid solution for Onondaga Lake? It could be a cheaper and more sound way of doing things.	NYSDEC has reviewed the work conducted by the researchers mentioned in the comment. While work by the team at SUNY Oswego has produced techniques which can effectively destroy several of the organic compounds (such as PCBs and BTEX) found in Onondaga Lake, these methods would not remove all of the contaminants (e.g., mercury) from the sediments. Therefore, these methods would not be adequate as the primary remedial technology for the lake.
Joan Cope Savage	P-51.1	I have not detected a thoughtful evaluation of the innovative technologies that remove mercury from sediments or those technologies that dechlorinate hazardous synthetic chemicals. Provides references for some technologies.	NYSDEC has reviewed the information provided in the comment. Unfortunately, none of the technologies presented in the documents or web sites appear capable of treating the complex mixture of contaminants found in Onondaga Lake, especially those in sediments and wastes of the ILWD. See also response to Frequent Comment #14.

Name/Agency	Comment Code	Comment Summary	Response
Susan P. Hammond, MD	P-52.1	Honeywell activities over almost 100 years are the major reason Onondaga Lake is a Superfund site. Honeywell was/is responsible in large part for destroying a thriving economic and recreational asset of the community. There was also a considerable amount of time over which this damage was caused.	Comment noted.
	P-52.2	Mercury is not sequestered but continually resuspended. Thus, unless the sediments are physically removed (dredged) or effectively isolated from the water column, the mercury problem will never be eliminated.	See responses to Comment P-16.5 and Technical Comment #10.
	P-52.3	It appears that underwater isolation by capping, even were it to be "effective," is less satisfactory than dredging because only dredged sediments would be available for treatment.	The selected remedy was determined by NYSDEC and EPA to be consistent with the National Oil and Hazardous Substances Pollution Contingency Plan's (NCP's) preference for removal and treatment. As discussed in the description of the remedy, up to approximately 2.65 million cy of the most contaminated material in the lake will be removed by dredging. This removal includes NAPLs in SMU 2 that are considered to be principal threat wastes. This also includes approximately 1.5 million cy of wastes and contaminated sediments that will be removed from the ILWD, primarily to reduce the concentrations of the contaminants in order to ensure the effectiveness of the cap.

Name/Agency	Comment Code	Comment Summary	Response
S. Hammond, MD, cont.	P-52.3, cont.		The available data suggest that this would result in the removal of a significant portion of the contaminant mass present in the ILWD. The supernatant water resulting from the dredging will be treated. The remaining, less contaminated sediments will be capped and isolated from the environment. The isolation (in the littoral zone) and burial (in the profundal zone) of these contaminants effectively removes them from the Onondaga Lake ecosystem.
	P-52.4	The PEC for mercury (2.2 mg/kg) is rather close to the ER-M (2.8 mg/kg) which represents a level above which “toxic effects are likely to occur.” Where the proposal relies on capping to achieve a PEC, the cap wouldn’t have to be very “leaky” at all to produce levels equaling or exceeding the ER-M.	The thickness of the isolation layer in the cap for each SMU was chosen to ensure that there would be no predicted exceedances at steady state of the PECs for any of the CPOIs that have been shown to exhibit acute toxicity on a lakewide basis or NYSDEC sediment screening criteria for benzene, toluene, and phenol. The model predicts that it would take well over 1,000 years for mercury to migrate through the isolation layer of the cap in SMU 1 to reach a steady-state concentration which is predicted to be less than the PEC and ER-M for mercury. See response to Technical Comment #2 for information on isolation capping and the model used to evaluate cap effectiveness.
	P-52.5	Since use of ER-Ls is more likely to protect against chronic toxicity than the PECs, how can NYSDEC assume that capping, even if it works at keeping levels below the PECs, will have any significant effect in reducing chronic toxicity?	For discussion on the selection of the appropriate cleanup values for defining areas for remediation and the relationship to chronic effects, see response to Technical Comment #7.

Name/Agency	Comment Code	Comment Summary	Response
S. Hammond, MD, cont.	P-52.6	Alternatives 4 through 7 in the Proposed Plan call for full removal of NAPLs to a depth of 30 ft in SMU 2, which is considerably deeper than what is typically required for preventing loss of lake surface area or reduction of erosive forces needed for capping. Why trust the cap for contaminants other than NAPL? Why dredge NAPLs out and leave considerable amounts of other contaminants behind?	The effectiveness of an isolation cap for each of the littoral SMUs was assessed during the FS report using a computer model originally developed by EPA and United States Army Corps of Engineers (USACE) (see response to Technical Comment #2 and Appendix H of the FS report). This model incorporates contaminant transport via advection and diffusion, which both depend on partitioning of the contaminants between the solid phase (sediment) and the aqueous phase (porewater), as well as specific physicochemical properties of the modeled contaminants. The selected remedy calls for removal of NAPL deposits to a depth of 9 m below the sediment-water interface in SMU 2 and removal of highly contaminated sediments/waste to depths of 2 to 3 m in the ILWD, which is primarily in SMU 1. The dredging will be performed prior to capping in areas with high CPOI concentrations to improve cap effectiveness, and to remove materials in areas of hot spots and reduce concentrations prior to capping.

Name/Agency	Comment Code	Comment Summary	Response
S. Hammond, MD, cont.	P-52.6, cont.		These removals are consistent with EPA guidance on principal threat wastes, which are source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or that would present a significant risk to human health or the environment should exposure occur.
	P-52.7	The Proposed Plan indicates that slope stability is an important consideration for cap stability in the region of the ILWD. Since the lake bed sediments are soft and steep in other areas of the lake outside of the ILWD, slope stability should be a concern in other areas as well.	In general, dredging is expected to improve stability of the sediments in Onondaga Lake, since it provides an opportunity to remove loose or unstable material and to reduce the steepness of the slope. NYSDEC has expressed a concern about the stability of the slopes explicitly for the ILWD since there is evidence of previous slope failures in this area in the geophysical survey report (PTI, 1992). However, an assessment of geotechnical stability will be made in all areas slated for remediation during the design.
	P-52.8	For capping to be effective, groundwater flow patterns and velocities would have to remain within the limits of the capping models when all dredging and capping in the lake and remediation in the surrounding areas are completed. Can NYSDEC ensure this will be so?	The on-shore barrier wall and groundwater collection system will need to be constructed and operating prior to cleanup activities commencing in the southern portion of the lake. Furthermore, the effectiveness of the capping proposed for SMUs 1 and 2 would rely upon the proper functioning of these hydraulic control systems. Likewise, the effectiveness of capping in SMU 7 would rely upon the proper functioning of the hydraulic control system which is proposed to be installed along the lakeshore as part of the remedy for this portion of the lake.

Name/Agency	Comment Code	Comment Summary	Response
S. Hammond, MD, cont.	P-52.8, cont.		The use of sheet piling barrier walls and groundwater collection and treatment are proven technologies and it is expected that this system will perform as required for the success of the selected remedy. The monitoring program will likely include the measurements of indicator parameters (e.g., advective flux) which could be employed to provide evidence that the system is responding to remedial activities (including the on-shore barrier wall and collection system) as expected.
	P-52.9	The benthic community may thrive to the extent that bioturbation activities may exceed the cap model parameters, decreasing or even eliminating the effectiveness of the isolation layer.	The effects of bioturbation were considered in the sediment cap design in the FS report. During the preliminary design process, the required thickness for bioturbation protection was included in the total cap thickness in addition to the thickness required for chemical isolation. The thickness of the bioturbation layer in freshwater environments was estimated based on the literature, as the current benthic invertebrate community of Onondaga Lake is considered impaired. The majority of invertebrate life is found in the top 5 to 10 cm (2 to 4 in) of sediments, but bioturbation depth may be greater than 10 cm for larger (but fewer) bioturbators, with a pattern of decreasing activity and abundance with depth (Clarke et al., 2001; Cunningham et al., 1999). Based on a review of bioturbation depths, 15 cm (6 in) was used by Honeywell for the bioturbation design depth for the preliminary cap design. The clean habitat/bioturbation layer will generally be placed over an armor layer, which would serve as a barrier to deep bioturbation so that the isolation layer of the cap is not affected.

Name/Agency	Comment Code	Comment Summary	Response
S. Hammond, MD, cont.	P-52.10	NYSDEC's recommended alternative relies on dredging rather than capping in dealing with NAPLs, thus sending a clear signal that NYSDEC doesn't really consider capping to be "treatment." Alternative 7, which is based on the ER-Ls and includes full removal instead of isolation capping, is the best alternative of the seven proposed alternatives.	See responses to Frequent Comment #6 and Technical Comment #7.
	P-52.11	SCAs are more permanent and reliable for dealing with contaminated sediments than underwater capping of these same sediments. For Alternatives 6 and 7, Honeywell might have to secure additional areas for dredgings or cart them away.	Comment noted. Wastebeds 1 through 15 might not have sufficient capacity for the proper containment of all of the removal volumes (12 to 20 million cy) under Alternatives 6 and 7.
	P-52.12	Alternative 7 is clearly preferable to Alternative 4, yet the Proposed Plan declares that NYSDEC prefers Alternative 4. I strongly disapprove of any remedy that does not clean the gunk out of the lake, no matter what it costs.	See responses to Frequent Comment #6 and Technical Comment # 7.
J. Andrew Lange, PE	P-53.1	Attached a letter partially printed in the Syracuse Post-Standard which opposes hydraulic dredging to remove hazardous materials from the lake.	Comment noted. See also response to Frequent Comment #7.
	P-53.2	The sediment cap provided by nature has been effective since there is no evidence that the buried mercury has any deleterious effect upon the lake water. However, there is minor contamination of fish.	See responses to Comments P-16.4 and P-16.5.

Name/Agency	Comment Code	Comment Summary	Response
J.A. Lange, PE, cont.	P-53.3	Dredging would disturb the existing cap, resulting in a release of significant quantities of mercury now buried.	The contamination in the littoral zone sediments (including the ILWD, which contains some of the highest concentrations of contaminants in the lake) is not sequestered from the environment. As documented extensively in the RI report, these littoral areas act as continuing sources of contamination to the lake. These are the areas which are to be remediated by a combination of dredging and isolation capping. The sediment in the profundal zone, where burial is taking place in most areas, will not be dredged as part of the selected remedy. See also response to Technical Comment #10.
	P-53.4	According to an Albany Times Union article on the Hudson River dredging project, half of the contaminant sediment was swept downstream when the river bottom was disturbed. The additional work is anticipated to cost more than $500 million and take more than six years to complete.	The removal of PCBs from the Hudson River is still in the design phase. Since dredging has not begun on the Hudson River project, no contamination has been swept downstream as a result of remedial dredging, and thus no additional costs have been incurred.
	P-53.5	The NYSDEC's plan addresses poor clarity of lake water due to green algae particles. Algal growths are enhanced by the Metro plant discharge. Plant modifications were found to be too costly for action.	The selected remedy will address contamination by hazardous substances under CERCLA. The plan does not address the eutrophic condition (the excessive algae cited in the comment) of the lake. Eutrophication issues are being addressed under the programs administered by the NYSDEC Division of Water. These efforts include the major upgrades to the Metro plant, among others.
	P-53.6	Elimination of hydraulic dredging would substantially minimize the proposed cost and the cost reduction can be used to fund the Metro plant modifications.	The major remedial action for the littoral zone is capping of contaminated sediments and/or wastes. However, for the capping to be implemented and effective in the short and long term, the underlying material must be dredged to varying degrees. See also responses to Comment P-16.5 and Frequent Comments #1 and #7.

Name/Agency	Comment Code	Comment Summary	Response
J.A. Lange, PE, cont.	P-53.7	The team from the University of Maryland's Biological Laboratory, having experience with the Hudson River project, would be ideal to study this proposal prior to selection of the final plan.	The use of outside peer review of major studies and documents is an acknowledged practice in EPA's Superfund program. The Proposed Plan for Onondaga Lake underwent such a peer review in the form of the NRRB and EPA's Office of Superfund Remediation and Technology Innovation (OSRTI) Sediment Team. The NRRB is comprised of senior EPA managers or experts on remedy selection, cost effectiveness, and program implementation from both the EPA regions and EPA headquarters. Each region has one management-level representative on the NRRB. Headquarters representatives include national experts from the Federal Facilities Restoration and Reuse Office, the Technology Innovation Office, the Office of General Counsel, the Office of Research and Development's (ORD's) National Risk Management Research Laboratory, and the Office of Emergency and Remedial Response. The OSRTI Sediment Team offers consultation to assist site managers in making scientifically sound and nationally consistent risk management decisions at contaminated sediment sites. The OSRTI Sediment Team consists of national experts from OSRTI and ORD. Each region has one representative on the Sediment Team. The OSRTI Sediment Team made recommendations to the NRRB regarding the Onondaga Lake Proposed Plan.

Name/Agency	Comment Code	Comment Summary	Response
J.A. Lange, PE, cont.	P-53.7, cont.		The NRRB considered the nature of the site, the risks posed by the site, regional and State/Tribal opinions on proposed actions, the quality and reasonableness of the cost estimates, and any other relevant factors or program guidance in making "advisory recommendations" to the EPA Regional Administrator regarding the Proposed Plan. The overall goal of the reviews is to ensure sound decision making consistent with current law, regulations, and guidance. The NRRB's recommendations to EPA Region 2 and NYSDEC on the Proposed Plan and the responses to those recommendations from EPA Region 2 and NYSDEC are included in Attachment 1 of this RS.
Andy Mager	P-54.1	The plan for cleaning the bottom of the lake seems completely inefficient. Mercury will leach through the cap and will continue to contaminate the lake.	See responses to Frequent Comment #6 and Technical Comment #2.
Alan Markert	P-55.1	I fail to understand the justification for the costs involved in cleaning up the lake. The money should be spent on maintaining or improving other lakes and rivers in the Central NY area. Or better yet, focus on clean air initiatives that would help decrease the alarming mercury levels, particularly in the pristine Adirondacks.	Onondaga Lake was placed on the EPA National Priorities List (NPL) in December 1994. This NPL listing means that the lake 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. Based upon the results of the RI report and the human health and ecological risk assessments, NYSDEC and EPA have determined that active remediation of the lake is necessary to protect public health or welfare and the environment from actual and threatened releases of hazardous substances into the environment.

Name/Agency	Comment Code	Comment Summary	Response
Alice C. Melvin	P-56.1	Get on with the project as soon as possible. We do not want any more delays.	See response to Frequent Comment #12.
Oral Comments (NOTE: These oral comments were given at the January 12, 2005 public meeting. They have been summarized from the meeting's transcript, and are presented in the order they were received.)			
Nick Pirro, Onondaga County Executive	O-1.1	NYSDEC's plan has no schedule, and Honeywell's plan doesn't propose substantial work until 2011. This is too long to wait. An implementation schedule, with start and end dates, needs to be part of the plan and begin much sooner than 2011.	The remedial construction (dredging and capping) components of the selected remedy are estimated to take approximately four years. This does not include the time it would take to design the remedy, which would take approximately three years. The timing of remedial activities in Onondaga Lake would need to be coordinated with the remedial work which would be performed as part of the interim and final remedies at the upland sites. However, as stated in the comment, the specific start or completion dates are not being provided. Doing so would be extremely difficult at this time. For example, one of the steps in moving forward will be to negotiate an agreement with the responsible party for the design and construction of the remedy. Furthermore, NYSDEC and the responsible party will need to work together to finalize a schedule by identifying all of the tasks that need to be completed as part of the remedial design and remedial construction activities related to the lake remedy, as well as those upland activities which need to occur prior to working in a related area of the lake. This schedule would be developed as part of the remedial design and would be provided to the public once it is available.

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Name/Agency	Comment Code	Comment Summary	Response
N. Pirro, cont.	O-1.1, cont.		Please note that NYSDEC will endeavor to identify potential streamlining measures which could be used to accelerate the various remedial design and construction steps. Also see response to Frequent Comment #5.
	O-1.2	Need coordination with cleanup of upland sites, which must be addressed before lake remedy can take place. All of these sites should have been addressed collectively, as part of a single, comprehensive, lake cleanup plan, and not as independent hazardous waste sites. The County recommends that the upland sites be cleaned up as quickly as possible so that the lake bottom cleanup can begin.	See response to Frequent Comment #5.
	O-1.3	Long-term viability of engineered structures (e.g., groundwater cutoff walls; confinement caps; the SCA; oxygenation equipment) proposed in the plan will need permanent O&M. What assurance can NYSDEC and Honeywell provide to the community that it will not inherit the financial burden of these facilities? The final plan must address this concern, including formal legal protections and long-term financial assurances.	See response to Frequent Comment #8.
	O-1.4	Institutional controls typically impose limitations, and, therefore, could impact use of the lake as a recreational resource. Such controls should not be part of the remedy.	Currently there are no plans to impose institutional controls that would limit the future use of Onondaga Lake as a recreational resource to the community. Institutional controls will include the notification of appropriate government agencies with authority for permitting potential future activities which could impact the implementation and effectiveness of the remedy.

Name/Agency	Comment Code	Comment Summary	Response
N. Pirro, cont.	O-1.5	It appears that the SCA represents a sizable ongoing challenge and potential burden to this community due to issues such as the unexplained procedure to separate out hazardous materials; Wastebed 13's physical stability; potential for odor problems; management of the supernatant; long-term O&M; and loss of redevelopment potential for the site.	See response to Frequent Comment #17.
	O-1.6	It appears that the only option for handling the dredged spoils was the SCA; if no other alternatives were evaluated, the County questions the justification for constructing the SCA.	Other options for handling dredged materials were considered. The assessment of various management disposal options in the FS report included hydraulic dredging with disposal in an SCA and mechanical dredging with off-site disposal (at one or more permitted landfills outside of the Syracuse area). However, on-site consolidation of the sediment in an SCA was identified as the preferred sediment management option. On-site management in an SCA, designed, constructed, and monitored in accordance with federal and state guidance, is a proven and reliable technology for management of contaminated sediment that is protective of human health and the environment. Alternatives that include transporting dredged material to off-site permitted landfills were evaluated in Appendix K of the FS report. The analysis determined that hydraulic dredging with on-site consolidation in an SCA is more cost-effective than transporting and disposing of sediments off-site.

Name/Agency	Comment Code	Comment Summary	Response
N. Pirro, cont.	O-1.7	Monitoring is generally deferred to the design stage, which is not uncommon; however, for a site as complex as this lake, it could be difficult to accurately monitor change/improvements and determine whether they are due to the remedial measures. In order to assure the community that the remedial measures, once implemented, are working, monitoring should begin now to establish baseline conditions.	See responses to Comment G-4.6 and Frequent Comment #4.
	O-1.8	Understands that it is not easy to develop a plan for complex contaminated sites such as the lake, and the Proposed Plan is a laudable effort. The County's comments are intended as constructive input.	Comment noted.
Dale Sweetland, Onondaga County Legislative Chairman	O-2.1	We have a great opportunity here, and are closer than ever to coming to terms with the lake's pollution. Reserves criticism of the Proposed Plan from an engineering/scientific standpoint, but asks that NYSDEC and Honeywell continue their hard work, use logic and common sense, and make this cleanup happen, even if the plan is not perfect. It is very important to the community to have the lake come back to life and be an asset.	Comment noted. See also response to Frequent Comment #12.
James Corbett, Onondaga County Legislator	O-3.1	Constituents are concerned about pumping of sediments from the lake to the SCA at Wastebed 13, with regard to two aspects in particular: odor control and the length (4 miles) of the pipe carrying the dredged sediments.	It is anticipated that the piping would run along the lakeshore, adjacent to Wastebeds 1 through 8, and then up the shore of lower Ninemile Creek. This would have minimal impact on residential areas. See also responses to Frequent Comments #9 and #10.

Name/Agency	Comment Code	Comment Summary	Response
J. Corbett, cont.	O-3.2	Another option for dealing with the dredged sediments is putting them in Wastebeds 1 – 8, which would avoid many of the problems with Wastebed 13 (e.g., going through a residential area). The currently proposed trail and possibly other recreational uses could still be options for Wastebeds 1 – 8 in the long run. Asks NYSDEC/Honeywell to seriously consider this option.	See response to Frequent Comment #9.
Marlene Ward, Mayor of Liverpool	O-4.1	Cannot recall a time when the lake was not polluted, and has seen cleanup proposals come and go. Glad that we have apparently reached a point where some of the cleanup goals may be accomplished. Thanks those who have brought us to that point and asks, on behalf of the village of Liverpool, that plans for a clean lake continue to move forward.	Comment noted. See also response to Frequent Comment #12.
Bob Czaplicki, Supervisor, Town of Geddes	O-5.1	While no plan is perfect, the community is ready for us to stop talking and get moving. This can be an economically viable area.	Comment noted. See also response to Frequent Comment #12.
Deborah Warner, Greater Syracuse Chamber of Commerce	O-6.1	GSCC supports NYSDEC's plan and is delighted that a cleanup goal is finally in sight.	Comment noted. See also response to Frequent Comment #12.

Name/Agency	Comment Code	Comment Summary	Response
D. Warner, cont.	O-6.2	Anticipates tourism benefits and economic development impact as a result of the cleanup and being able to use the lake, and economic benefits of the over $400 million cost of the plan. Urges final approval and implementation as soon as possible. The faster the lake is cleaned up, the more development and jobs will occur in the community. Looks forward to Honeywell being a valued community member for a long time. Asks that development opportunities are preserved to the largest extent possible on the reclaimed land. Believes there will be strong interest and additional development adjacent to the lake and doesn't want to lose this economic potential.	Comment noted. See also response to Frequent Comment #18.
	O-6.3	GSCC members do not doubt the thoroughness of NYSDEC and EPA and trust the RI/FS report and the monitoring programs.	Comment noted. See also response to Frequent Comment #12.
	O-6.4	Asks that Honeywell consent and agree to move forward with the NYSDEC plan.	See response to Frequent Comment #13.
	O-6.5	If there is a cap or engineering solution failure, what assurances can taxpayers have that they will not be held responsible for the cost? If Honeywell no longer exists, who will be responsible for the costs in the end?	See response to Frequent Comment #8.
	O-6.6	We gained notoriety as the most polluted lake in the land. Now we can have a new reputation as an example of state-of-the-art remediation.	See response to Frequent Comment #12.
Samuel Sage, President, Atlantic States Legal Foundation	O-7.1	ASLF is glad to see that something is finally going to happen, and hope work can begin as soon as possible. Recognizes the need for dredging and capping.	Comment noted. See also the response to Frequent Comment #12.

Name/Agency	Comment Code	Comment Summary	Response
S. Sage, cont.	O-7.2	Concerned that there needs to be a consensus vision for the lake, as a matter of public policy. What does the community want? We recognize that there are scientific limitations in restoring the lake to what it once was.	See response to Frequent Comment #20.
	O-7.3	Need to start doing baseline monitoring now. Recommends outside input and peer review into developing the monitoring plan.	See response to Frequent Comment #4.
	O-7.4	Would like to see a fail-safe mechanism in place to ensure that the very high cost of the monitoring plan will be funded. One idea is to collect a sum of money up front and keep it in a monitoring-specific fund.	See response to Frequent Comment #8.
	O-7.5	There was a half-hearted attempt at developing a mercury model. Need to start monitoring efforts now in order to do modeling later, especially for mercury, although we should also be modeling for parameters other than mercury.	See responses to Frequent Comments #4 and #16.
	O-7.6	Urges a more comprehensive, continuing public participation effort be conducted along with the remediation.	See response to Frequent Comment #17.
	O-7.7	Has suggested to NYSDEC that a matrix be prepared for the public showing the relationship of the upland sites to the lake bottom and the dates and issues.	See response to Frequent Comment #5.

Name/Agency	Comment Code	Comment Summary	Response
S. Sage, cont.	O-7.8	The welfare of those who will actually be performing the cleanup work must be considered. Proper hazardous management training must be undertaken by these workers and all steps must be taken to ensure their health and safety.	To address personal health and safety issues, all personnel performing remedial work on the lake or at the SCA will be required to successfully complete a 40-hour health and safety training course and other relevant requirements of the Occupational Safety and Health Administration. Personnel will follow the site HASP developed in advance of the work start date. All personnel must read and sign the HASPs prior to performing work on site. Health and safety monitoring will be conducted during all field activities. The plans will specify monitoring procedures, action levels, and response procedures to prevent adverse impacts to the workers.
Chuckie Holstein, FOCUS [Forging Our Community's United Strength] Greater Syracuse	O-8.1	FOCUS conducted community surveys. Out of 87 goals, the number one goal was to build biking and hiking paths along waterways, and the third highest goal was to develop and clean Onondaga Lake.	See responses to Frequent Comments #18 and #20.
	O-8.2	There is good news that there is good fishing in the lake. The carp colony is wonderful and tourists are interested in fishing.	Comment noted.
	O-8.3	You can travel from the lake to the Mississippi River, and vice-versa, and that is a way of bringing tourism to the community.	Comment noted.
	O-8.4	FOCUS meetings showed that the foremost community issue is water quality. Continue the cleanup and have a long-range plan to keep the lake clean.	Comment noted.
	O-8.5	Community wants to be informed of current state and usability for recreation and fishing. They want to get on the lake, not just stand there looking at it.	Comment noted.

Name/Agency	Comment Code	Comment Summary	Response
C. Holstein, cont.	O-8.6	Create a positive publicity/media campaign about the lake.	Comment noted.
	O-8.7	People want public transportation and access to the lake.	Comment noted.
	O-8.8	FOCUS members want all land around the lake to remain in the public realm, with public ownership of the shoreline and a long-term plan to protect that.	Comment noted. See also response to Frequent Comment #18.
	O-8.9	It is good news that we are beginning this process. Start now – just do it.	Comment noted. See also response to Frequent Comment #12.
Clyde Ohl	O-9.1	There is a scientific way to resolve the lake issues, by having an independent scientist study the lake. The final solution would be based on a master plan. We do not have a master plan as yet. Because scientific study has been subverted by the political process we have the "build and measure" plan, such as was used by Onondaga County to deal with sewage discharge. Such a plan has no precise goals, no independent monitoring, and is more concerned with inching along. As part of "build and measure" polluters are not producing results based upon proper scientific models. While Honeywell is doing many things differently than other organizations, these practices still fly in the face of standard environmental cleanup.	See responses to Frequent Comments #16 and #20.
	O-9.2	The major shortcoming of the plan is the lack of modeling, especially to arrive at predetermined, measurable goals.	See response to Frequent Comment #16.

Name/Agency	Comment Code	Comment Summary	Response
C. Ohl, cont.	O-9.3	The wastebeds could be an opportunity for Camillus to bring the beds into some type of development profitable for the town. Camillus should be involved in the design process for wastebed development. Using the wastebeds only for dumping flies in the face of economic development. Years ago Allied developed a scheme for golf courses, parkland, etc. for this area, but nothing has happened. None of this mentions economic development. We do not want to lose another opportunity. It's not too early for Camillus to be involved with Honeywell and NYSDEC in the design for a better use of the wastebeds.	See response to Frequent Comment #9.
Jeffrey Freedman, Onondaga Yacht Club	O-10.1	Members of the Onondaga Yacht Club support the efforts of NYSDEC and Honeywell to clean up the lake.	Comment noted.
	O-10.2	Underwater obstructions to navigation, as indicated on National Oceanic and Atmospheric Administration charts, need to be removed.	A study of any obstructions to dredging/capping and a plan for removing or otherwise managing such obstructions will be developed during the design phase.
	O-10.3	Would like a plant-free zone in the marina harbor and the channel between the harbor and the lake in the deep end.	Comment noted. This suggestion will be considered during the development of the lakewide habitat restoration plan.
	O-10.4	Anchoring restrictions over capped areas could pose a danger to boaters.	The cap will be designed and installed to resist boat wakes and anchors, and no restrictions on those activities are expected. However, there may be anchoring restrictions in the immediate vicinity of the oxygenation equipment that would be installed beneath the lake surface.

Name/Agency	Comment Code	Comment Summary	Response
J. Freedman, cont.	O-10.5	Yacht club sees this as an opportunity (e.g., for day camps, community sailing programs, boating events, etc.) and is appreciative of NYSDEC's and Honeywell's efforts.	Comment noted.
	O-10.6	Understands there is a discrepancy between NYSDEC and Honeywell plans; do not get bogged down in court. Would like the cleanup effort to go as quickly as possible.	Comment noted. See also response to Frequent Comment #12.
Nick Kochan, Chairman, Village of Liverpool Planning Board	O-11.1	Liverpool's economy has changed, as industry has changed, over the years. It is encouraging to see the effort being put into this project.	Comment noted.
	O-11.2	Successful and diligent upland remediation should be one of the first priorities. Make sure that Honeywell stays involved in the long run to ensure maintenance of facilities.	The remediation of the upland sites is a high priority and is an integral part of the overall cleanup of Onondaga Lake. See also response to Frequent Comment #8.
	O-11.3	Encourages Honeywell and NYSDEC to find the best economic and scientific compromise for the project.	Comment noted.
David Chapman, Mountain Eagle Management	O-12.1	Making scientific statements on behalf of Dr. George Putnam (of the same firm). Also commends NYSDEC and Honeywell for moving towards action steps.	See response to Frequent Comment #12.

Name/Agency	Comment Code	Comment Summary	Response
D. Chapman, cont.	O-12.2	His company has a patent on a reverse of the Solvay process. This is an opportunity to try some new technologies. Would like this to be a forum where new/different technologies can really be considered and not just brushed aside.	The Solvay process used sodium chloride (NaCl) and carbon dioxide from limestone (primarily calcium carbonate, $CaCO_3$) to produce soda ash (Na_2CO_3) along with large quantities of wastes, both solid and dissolved. The solid Solvay waste is a white chalk-like material containing large amounts of calcite and salts. It is unlikely that the commentor's reversal method is applicable to the remedial program, since the reversal method is not expected to address all of the varied hazardous substances in the lake (e.g., mercury, chlorinated benzenes, BTEX, PCBs, and PAHs) and it would not address the RAOs of the RI/FS report.
Howard Bragman	O-13.1	We've been down this route before. Not long ago a SUNY ESF professor stated that it would take at least 50 years and we still wouldn't know where we were. Is it emollients, PCBs, mercury, whatever? Onondaga County does not collect taxes anymore. I used to hear rumors that Allied employees were rushed out the door if they thought about polluting the lake. If Allied were still here we would not be here tonight.	Comment noted.
	O-13.2	Proposes damming the lake. Put up big barriers and see what you have, then cap it so well that it will probably never leak again. And they could go back after two years, leaving a space every two or three years. They have barriers they put on highways to work on them; they can use the same type of technology on the lake.	See response to Frequent Comment #2.

Name/Agency	Comment Code	Comment Summary	Response
Les Monostory, President, Onondaga County Federation of Sportsmen's Clubs	O-14.1	Concerned about shoreline safety issues, in particular the "white cliffs" adjacent to the New York State Fairgrounds parking area. If you walk into the water in this area you could fall through a hardened calcitic sediment, and it could be dangerous to land a boat there. Wrote a letter to NYSDEC and Honeywell on November 26, 2004 about these safety issues. Honeywell responded and described proposed remedial measures specifically for the white cliffs area of SMUs 3 and 4, with the FS report recommending dredging of near-shore sediments and capping. In reviewing both the Honeywell and NYSDEC plans, it is clear that specific areas along the shoreline will be dredged and capped, thus removing calcitic sediments; however, the reports are unclear with regard to specific stabilization measures that will be used for shoreline sediments not targeted for dredging and capping in this area.	The remedy includes habitat enhancement along an estimated 1.5 miles of shoreline (SMU 3) and over approximately 23 acres (SMU 5) to stabilize calcite deposits and oncolites and promote submerged macrophyte growth. The details will be developed during the remedial design, based upon a comprehensive lakewide habitat restoration plan. Habitat enhancement would improve the SMU 3 littoral area by stabilizing the shoreline and restoring an appropriate habitat. The SMU 3 shoreline is unstable and has the potential to erode during wind/wave events. A range of habitat approaches can be considered for SMU 3. The steeper banks at the northernmost portion of SMU 3 are considered part of the Wastebeds 1 through 8 upland areas that are being addressed under a separate RI/FS. The stability and safety concerns regarding the upland portion of Wastebeds 1 through 8 will be evaluated during the RI/FS for that site.
	O-14.2	To address safety issues for anglers or boaters at the shoreline along the white cliffs, I am recommending that solidified calcitic sediments along the entire 2,500-m cliff shoreline be removed to a depth of 1 to 2 m and that the entire shoreline be stabilized with capping material to a minimum depth of 1.5 m.	NYSDEC will evaluate the commentor's concern. If remedial measures are needed in this area, it will be determined whether they should be performed as part of the lake remedy or as part of other activities (e.g., potential remedial work at Wastebeds 1 through 8, which is currently being investigated).

Name/Agency	Comment Code	Comment Summary	Response
Kaczmar Swiatoslav, Adjunct Professor, Syracuse University; Chief Scientist, O'Brien & Gere	O-15.1	Focused his review of the RI/FS report documents on the risk assessment, which used conservative or unrealistic assumptions for the purpose of being protective. Feels that the remedies proposed in the FS report adequately address those risks. As such, the remedy [proposed in the FS report] is an appropriate remedy.	The assumptions used in the HHRA and BERA were selected to be protective of human and ecological receptors potentially at risk from exposure to contaminants present in the lake. Each risk assessment evaluated two scenarios to assess realistic upper-bound and average exposure. The risk assessments identified and characterized the current and potential threats to human health and the environment from a hazardous substance release. For the HHRA, the RME and the central tendency scenarios were evaluated, while the BERA used a 95 percent upper confidence limit and a mean exposure scenario. Site-specific information was used when available, and when it was not, the closest regional or local data available were used as input. In addition, a range of toxicity (effects) concentrations were used for both risk assessments to evaluate average and upper-bound scenarios. The HHRA and BERA were conducted in accordance with the Onondaga Lake RI/FS Work Plan (PTI, 1991), the NCP, and other applicable guidance documents from EPA and NYSDEC. The HHRA only quantified excess (incremental) risk associated with the site. The methodology used for the HHRA followed standard guidance (including EPA, 1989, 1991a,b, 1998b). The BERA followed EPA (EPA, 1997, 1998a, 1999) and NYSDEC (NYSDEC, 1994) guidance.

Name/Agency	Comment Code	Comment Summary	Response
K. Swiatoslav, cont.	O-15.1, cont.		All assumptions used in both risk assessments were consistent with federal and state guidance. Based on the results of the HHRA and BERA, as well as evaluations of various lakewide remedial alternatives, the selected remedy is more protective of public health and the environment than Honeywell's recommended alternative.
	O-15.2	Encouraged to see the enhancements present, especially the ones that are not required but are going to make the community a better place.	Comment noted.
Sharon Fulmer	O-16.1	Hopes that Honeywell and NYSDEC can come to an agreement without a long, drawn-out process. Would like to see project go forth as quickly as possible.	See response to Frequent Comment #12.
	O-16.2	Asks for additional repositories of project material at the Liverpool, Solvay, and Camillus libraries.	In response to this and other requests, NYSDEC added three new repositories, in addition to the three existing repositories at NYSDEC's office in Syracuse, the Onondaga County Public Library in Syracuse, and the Atlantic States Legal Foundation in Syracuse. The new repositories are: • Liverpool Public Library, 310 Tulip St., Liverpool, NY, 13088. Hours are Mon. – Thurs. 9 – 9, Fri. 9 – 6, Sat. 10 – 5, and Sun. 12 – 5. Phone: (315) 457-0310. • Maxwell Memorial Library, 14 Genesee St., Camillus, NY, 13031. Hours are Mon. – Wed. 10 – 8, Thurs. – Fri. 10 – 5, and Sat. 10 – 3. Phone: (315) 672-3661. • Moon Library, SUNY ESF, 1 Forestry Drive, Syracuse, NY. Phone: (315) 470-6712.

Onondaga Lake Responsiveness Summary
Comment and Response Index

Name/Agency	Comment Code	Comment Summary	Response
Dereth Glance, Central New York Program Coordinator, Citizens Campaign for the Environment	O-17.1	Appreciates the efforts made by NYSDEC, Honeywell, and others to improve the lake.	Comment noted.
	O-17.2	CCE urges NYSDEC to have additional public hearings in a question-and-answer format.	An additional public availability session and public meeting on the RI/FS reports and Proposed Plan, with a question-and-answer session, were held on February 16, 2005. A public meeting (with a question-and-answer session) was also held on January 12, 2005. Furthermore, an additional public comment period was opened from April 1, 2005 to April 30, 2005 following the review of the Proposed Plan by the National Remedy Review Board and EPA's concurrence with the Proposed Plan.
	O-17.3	NYSDEC should provide ample opportunity for public involvement during the design phase. Recommends that a citizens' advisory committee be established, and provides details about how such a committee would operate.	See response to Frequent Comment #17.
	O-17.4	NYSDEC should require public education as part of the remediation efforts. The public should be informed about the safety of using the lake for common recreational activities. CCE is concerned about PRG 2 (biological tissue goal). The extensive mercury contamination in the lake warrants aggressive public education efforts concerning fish consumption.	An extensive public outreach program will be performed during the design and construction of the remedy. As part of the development of the program, NYSDEC will work with the NYSDOH and EPA to determine the level of education warranted to ensure that the public is adequately informed with regard to the commentor's concerns. See also response to Frequent Comment #19.

Name/Agency	Comment Code	Comment Summary	Response
Don Hughes, Technical Advisor, Atlantic States Legal Foundation	O-18.1	People should know that remediation heavily depends on the viability of the slurry wall. The wall has to work for the whole plan to work.	To prevent the recontamination of lake sediments, the on-shore barrier wall and groundwater collection systems will need to be constructed and operating prior to cleanup activities commencing in this part of the lake. Furthermore, the effectiveness of the capping proposed for SMUs 1 and 2 would rely upon the proper functioning of these hydraulic control systems. Likewise, the effectiveness of capping in SMU 7 would rely upon the proper functioning of the hydraulic control system which is proposed to be installed along the lakeshore as part of the remedy for this portion of the lake. The use of sheet piling barrier walls and groundwater collection and treatment are proven technologies and it is expected that these systems will perform as required for the success of the selected remedy.
	O-18.2	Why was Wastebed 13 chosen for the pumped sediments? It seems treatment has not been considered, except cursorily. You can use mining technology to separate the contaminated sediments in the tarry deposits from the Solvay waste. Separation technologies have been demonstrated for sediments in Saginaw Harbor.	The FS report assumed (for costing purposes) that the SCA would be constructed on Wastebed 13 based on its capacity, as well as other factors. However, during the remedial design, various locations for siting the SCA will be evaluated. This will include: Wastebeds 1 through 8, Wastebeds 9 through 11, as well as Wastebeds 12 through 15. The evaluation will consider various factors including potential impacts on the local community, geotechnical stability of the wastebeds, SCA construction requirements, wastebed size, the means for transporting dredged materials to the SCA, costs, etc.

Name/Agency	Comment Code	Comment Summary	Response
D. Hughes, cont.	O-18.2, cont.		Numerous treatment alternatives were considered by Honeywell in the FS report. Separation processes (i.e., processes that separate contaminants from soils) were not given a high rating in the FS report due to the nature of the in-lake deposits. The bulk of the dredging will take place in areas that contain either primarily Solvay wastes (i.e., the ILWD) or fine-grained organic-rich sediments (e.g., SMUs 6 and 7) with very little coarse-grained material. Solvay wastes are themselves composed of relatively fine-grained materials and it is likely that the contaminants of concern, such as mercury, are adsorbed to the Solvay waste or other fine-grained materials. Thus, it is not expected that physical separation processes which rely on density or particle-size differences could be successfully applied to the contaminated lake sediments, since only a small reduction in the volume of contaminated material to be disposed of would be achieved. Based on NYSDEC's initial research, Saginaw Bay contaminants were PCBs and other industrial organics that were adsorbed, at least in part, to native sediments with a greater variety of grain sizes than are found in Onondaga Lake. See also response to Technical Comment #13.
	O-18.3	What about volatile emissions from the sediments on the wastebeds? The volatile chemicals smell bad and are toxic. We've got to have a good odor and emission control system to protect workers and residents.	See responses to Frequent Comments #9 and #10.

Name/Agency	Comment Code	Comment Summary	Response
D. Hughes, cont.	O-18.4	The plan focuses on the littoral (shallow) zone – a wait-and-see approach is taken for the profundal (deep water) zone. That's what monitored natural recovery is. Doesn't see how the program STELLA® is going to successfully model mercury concentrations in surface sediments over time. STELLA® is a generic program; we are lacking basic inputs; there are a lot of issues regarding sediment disturbance.	The profundal zone is a distinctly different environment than the littoral zone, including characteristics that made it a candidate for MNR (see response to Comment P-16.5). A model was developed in the FS report using STELLA® software to assess whether MNR is a feasible alternative for remediating contaminated profundal sediments in Onondaga Lake. The primary purpose of the MNR model is to understand how natural recovery might occur (or fail to occur) in the future based on what is known about the system. Another purpose of the model is to provide information on how sediment surfaces might react during and after remedial actions. Site-specific data were used to calibrate the model, which examined the diffusion, bioturbation, groundwater-mediated advection, settling, burial, and degradation mechanisms likely to be present at this site. By assessing these mechanisms over time, a prediction of chemical concentrations and fluxes in the future can be obtained. It is acknowledged that much of the data used in the model will need to be updated during the pre-design sampling to refine the model. However, the data that are currently in hand (see FS report Appendix N, Figures N.13 to N.15) clearly show that the sediments are undisturbed and the overwhelming majority of the mercury (and other metals, as shown in RI report Figures 6-32 and 6-33) is being buried by cleaner material. Based on this evidence, MNR is an appropriate remedial measure for the profundal zone. In those profundal areas where MNR is not sufficient, thin-layer capping is called for in the selected remedy.

Name/Agency	Comment Code	Comment Summary	Response
D. Hughes, cont.	O-18.5	Generic comment regarding the NYSDEC decision-making process and the standard language, used in the preliminary remediation goals and remedial action objectives, that states "to the extent practical." Who decides what is practical? Shouldn't goals and objectives be transparent, achievable, and measurable? Why not define what cleanup levels are technically practicable, given the very best model and cutting-edge remediation technologies, and make those the goals?	See response to Frequent Comment #20. See also the response to the NRRB's recommendation #11 in Attachment 1 of this RS.
Sara Eckel	O-19.1	Concerned that the plan does not involve a comprehensive cleanup of the wastebeds. The plan should not ignore future problems that could result from leaving these areas untreated. Also understands the importance of moving the plan forward.	NYSDEC's evaluation regarding the need for closure of Wastebeds 9 through 15 is underway. Furthermore, an RI/FS will be performed at Wastebeds 1 through 8 to determine the nature and extent of contamination and to evaluate potential remedial alternatives for the site.
Steve Effler, Director of Research, Upstate Freshwater Institute	O-20.1	UFI endorses proposed rehabilitation efforts for the site that include removal of toxic sediments, capping, and improvement of degraded habitat. Let's get on with it.	Comment noted. See also response to Frequent Comment #12.
	O-20.2	There is a continuing review process. If we find new sources of contaminant problems in the course of cleanup, those items would be addressed.	As the remediation process for Onondaga Lake continues, NYSDEC will review new information, as appropriate and applicable, to ensure that the remedial goals are met. If necessary, the remedial design for Onondaga Lake can be adjusted to address this new information.

Name/Agency	Comment Code	Comment Summary	Response
S. Effler, cont.	O-20.3	Has great concern with the lack of understanding of the behavior of contaminants from the Honeywell site within the lake itself. This lack is largely attributable to constraints within the Superfund process. It is a difficult arena in which to get some of the basic scientific information that we still need. Neither NYSDEC nor Honeywell can tell us how much better the lake will be after cleanup. They cannot quantitatively say, for example, how much lower fish mercury will be. The bottom line is that we are lacking a credible scientific model that can predict responses in the lake to these actions. We support moving ahead without a model, but we do need one in the future. We recommend that this model be developed and tested outside the Superfund process.	See responses to Frequent Comment #16 and Technical Comments #15 and #16.
	O-20.4	The monitoring program is very important, as we do not have adequate monitoring data to be able to assess how much better things will be following remediation. The monitoring program needs to be flexible to allow changes in response to observations, and must support the modeling program. The monitoring program should start ASAP.	See response to Frequent Comment #4.
Nancy Ciampi	O-21.1	The public meetings are important to the success of the plan, and the public needs to know that there will be well publicized, open, honest meetings going forward.	See response to Frequent Comment #17.
Peter Pedemonti	O-22.1	Would like to see the most thorough and complete cleanup of the lake, regardless of time or cost.	See response to Frequent Comment #6.

Name/Agency	Comment Code	Comment Summary	Response
David Arnold	O-23.1	Illegal acts are committed by some elected officials. How can the Onondaga Lake cleanup succeed? We need someone we can trust to appoint public committees to scrutinize all phases of these projects.	Comment noted. However, the issue raised is outside of the scope of a remedy selection document.
Sherry Mossotti, Executive Director, Leadership Greater Syracuse	O-24.1	Cleanup of the lake is an important topic in the community. We are glad to see Honeywell, NYSDEC, the County, and other parties working together, and implore you to continue doing so and move this project forward.	Comment noted. See also response to Frequent Comment #12.
Terry Brown, Chairman/CEO, O'Brien & Gere	O-25.1	Feels passionately about the lake and the community, and has some ideas about what the sites could be. We have made this too confusing for the public by talking about modeling, science, etc. We can go forward with the information we have.	Comment noted. See also response to Frequent Comment #12.
	O-25.2	Make the science simpler and do the modeling as we go along. We will learn more by doing and addressing the issues during remediation than through modeling. We need to move with urgency so we do not lose this opportunity.	Comment noted.
Les Monostory, Co-chair, Fisheries Subcommittee of the Onondaga Lake Partnership and Vice-president of the Izaak Walton League	O-26.1	Wants to address a fishery goal statement for the lake and tributaries. The Fisheries Subcommittee comments that: • We should improve the fisheries we already have. • The lake and its principal tributaries can be promoted as a combination cold/warm-water fishery. • A future goal should be for the lake to be clean enough to support both cold- and warm-water fish.	See response to Frequent Comment #15.

Name/Agency	Comment Code	Comment Summary	Response
L. Monostory, cont.	O-26.2	Dan Lemon of NYSDEC, also a member of Fisheries Subcommittee, states that NYSDEC Region 7 does not feel that reestablishing a self-sustaining population of trout and Atlantic salmon in the lake is realistic. A realistic objective is a combination of cool-water and warm-water fish.	See response to Frequent Comment #15.
	O-26.3	NYSDEC Region 7 fisheries has prepared a draft position statement for EPA that recommends adoption of a fishery goal statement for the lake. Presents a specific fishery goal statement for the lake that supports the achievement of a suitable year-round warm- and cold-water fishery. The Fisheries Subcommittee endorses this statement.	Comment noted. See also response to Frequent Comment #15.

RESPONSIVENESS SUMMARY

ATTACHMENT 3

Letters Submitted During the Public Comment Period

STATE COMMENTS

S-1

JOAN K. CHRISTENSEN
Assemblywoman 119TH District

THE ASSEMBLY
STATE OF NEW YORK
ALBANY

CHAIR
Legislative Commission on
Skills Development and
Career Education

COMMITTEES
Housing
Labor
Insurance
Small Business
Real Property Taxation

RECEIVED
FEB 22
REMEDIAL BUREAU B

February 17, 2005

Timothy J. Larson
Remedial Bureau B
NYS Dept. of Environmental Conservation
625 Broadway
Albany, NY 12233-7016

Dear Mr. Larson:

Thank you for the invitation to attend the Onondaga Lake Proposed Plan public meeting held on February 16, 2005 at the NYS Fairgrounds, Art and Home Center, Martha Eddy Room. Regrettably, I was unable to attend as I was traveling home from Albany and arrived too late to attend.

I commend you, Timothy and your co-workers at the NYS Department of Environmental Conservation for conducting this meeting and the January 2005 presentations to inform and educate the public about the proposed plan for cleaning Onondaga Lake. 1

Although I have been unable to attend your public meetings, please know that I would like to receive any updated information for my files.

Sincerely,

Joan

Joan K. Christensen
Member of Assembly

JKC/eb

Room 502, Legislative Office Building, Albany, New York 12248, (518) 455-5383, FAX (518) 455-5417
4317 E. Genesee Street, Room 103, Syracuse, New York 13214, (315) 449-9536, FAX (315) 449-0712

ONONDAGA NATION COMMENTS

N - 1

Comments of the Onondaga Nation Submitted to the EPA National Remedy Review Board Onondaga Lake Superfund Site

New York, New York
February 8, 2005

The Onondaga Nation ("Nation") submits these comments to the United States Environmental Protection Agency's National Remedy Review Board ("NRRB") concerning the proposed preferred remedial alternative for the Onondaga Lake Superfund Site, located in Onondaga County, New York.

The Nation objects to the procedures being followed by EPA and the New York State Department of Environmental Conservation ("DEC") concerning remediation of Onondaga Lake. As set forth in detail below, contrary to the clear requirement in section 126 of the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. § 9626, that Indian nations be consulted by EPA during the remedial selection process – and, in particular, prior to the selection of a preferred remedy – EPA and its surrogate, DEC, have failed to consult the Nation concerning the remediation of Onondaga Lake. In doing so, EPA and DEC have ignored the crucial spiritual and cultural significance that the Lake has for the Onondaga people, and have utterly failed to incorporate the environmental and health concerns of the Nation. The failure by EPA and DEC to consult not only violates CERCLA, but is also inconsistent with the commitments made by EPA in response to the report of the EPA Inspector General criticizing the agency's failure to adequately involve Indian nations in the Superfund process; violates EPA's Indian Policy; and violates the federal trust responsibility. 1

Despite numerous requests from the Nation for meetings and consultation over the past several years, on the Onondaga Lake Superfund Site and the various upland toxic sites, no consultation meetings occurred until November 22, 2004, which was merely days before the DEC announced this preferred plan. Additionally, when the Nation submitted written comments to the DEC on various upland toxic sites, such as the Salina dump and the Semet tar pits site, those letters were not responded to.

Since the November 22, 2004 meeting, the Nation has retained outside, special environmental counsel and a toxics expert, who have begun the process of reviewing the Remedial Investigation/Feasability Study, the Baseline Ecological Risk Assessment and the Human Health Risk Assessment. This expert review is not complete because of the limited time.

The Nation reserves its right to submit comments at a later date after it has had sufficient time to complete its technical and legal review of the documentation.

In the meantime, however, the Nation submits these comments to alert the NRRB to the failure by EPA and DEC to consult the Nation during the remedy selection process for Onondaga Lake, as required by CERCLA.

2 I. The Nation's Sacred, Spiritual, Historic, Archeological and Environmental Interests in Onondaga Lake

The Nation's interest in Onondaga Lake spans thousands of years. Onondaga Lake and the land along its shoreline are sacred to the Onondaga Nation and the other Nations of the Haudenosaunee Confederacy, which include the Mohawk, Oneida, Cayuga, Seneca and Tuscarora Nations. It was on the shores of the Lake that the Peacemaker formed the Confederacy, hundreds of years ago.

The Lake lies within the aboriginal territory of the Onondagas, and within its land claim territory. Before the intervention of European settlers in this area, the Onondaga had villages on the shores of the Lake. In the past, the Nation has relied heavily on the Lake and its tributaries for fishing, gathering of plants for medicinal and nutritional needs, and for recreation. The Nation has a fundamental cultural interest in the environmental restoration and integrity of the Lake and its shores.

After the arrival of European settlers, the Onondagas were forced to move their villages away from the Lake and the villages were then located progressively south, along Onondaga Creek. There are, therefore, many former Onondaga village sites along the Lake and the Creek. The Nation has an intense interest in maintaining the archeological integrity of these former village sites.

Please be hereby advised that, pursuant to 36 CFR § 800.3(f)(2), the Onondaga Nation, as the central fire for the Haudenosaunee Confederacy, attach sacred, historic, archeological and cultural significance to Onondaga Lake and its environs and to the historic sites and properties that may be disturbed and impacted by the remediation of Onondaga Lake and its upland areas. It is the Nation's position that these areas are eligible for listing on the National Historic Landmarks Registry, pursuant to 36 CFR 60.4 (a), (b), (c) and (d), in that this area, or district is:

(a) Associated with events of pre-colonial Onondaga history, which made significant contributions to the broad patterns of Onondaga and American history;

(b) Associated with the lives of pre-colonial Onondagas and Haudenosaunee, who are significant to the Onondaga and the American past;

(c) Contains archeological evidence of pre-colonial structures that embody the distinctive characteristics of that period; and

(d) Contains archeological evidence that has yielded, and is likely to yield, information important to prehistory and history.

Given these sacred, spiritual, historic, archeological, and treaty based interests, and its environmental interest in a complete clean up and restoration of Onondaga Lake, the Nation is deeply concerned that DEC's preferred remedial alternative is inadequate and will result in permanent, long-term contamination and degradation of the Lake due to continuing releases of mercury and other pollutants.

The Nation is further concerned that DEC's preferred remedy does not adequately incorporate the proper and complete clean up of numerous upland toxic dump sites which continue to release to pollutants into the Lake. Neither EPA nor DEC have consulted the Nation concerning these critical components of the Onondaga Lake cleanup. This additional lack of consultation further hinders the Nation's ability to evaluate the preferred remedy for the lake bottom. 3

II. The Nation is a Trustee for Natural Resources 4

The Onondaga Nation is a trustee for natural resources as defined by CERCLA and the EPA regulations. Onondaga Creek is one of the main tributaries to the Lake, and is a "supporting ecosystem" of the Lake. Onondaga Creek runs through the Onondaga Nation territory prior to discharging to Onondaga Lake, and is therefore a resource "belonging to, managed by, controlled by, or appertaining to" the Nation. See 40 CFR 300.610. Moreover, because Onondaga Lake and adjacent areas are within the treaty and land claim area of the Nation, the Lake and its environs "appertains" to the Nation within the meaning of CERCLA and the regulations, and the Nation is therefore a trustee for the Lake's natural resources. Id.

5 III. The Nation is Entitled To Be "Afforded Substantially the Same Treatment as a State" Under CERCLA

Section 126 of CERCLA provides that "[t]he governing body of an Indian tribe shall be afforded substantially the same treatment as a State with respect to the provisions of . . . section 9604 (c)(2) of this title (regarding consultation on remedial actions) . . . ." 42 U.S.C. § 9626(a). In this regard, the EPA regulations specify that "[b]oth EPA and the state shall be involved in preliminary discussions of the alternatives addressed in the FS prior to preparation of the proposed plan [setting forth the preferred remedy] and the ROD." 300.515(e)(1); (emphasis added). Thus, it is clear that the Nation was required to be consulted prior to DEC's selection and announcement of a preferred remedy for Onondaga Lake.

6 IV. EPA and DEC Have Failed to Consult the Nation as Required by CERCLA and EPA Policy, and in Violation of the Federal Trust Responsibility

A. The Contacts Between the Agencies and the Nation Have Not Constituted "Consultation"

CERCLA §§ 9604 (c)(2) and 9626(a) require that EPA "shall consult with the affected [Indian nation] before determining any appropriate remedial action to be taken . . . ." (Emphasis added). Consistent with its entitlement to "substantially the same treatment as a State" with respect to remedy selection, EPA's consultation with the Nation was required to be "meaningful and substantial." 40 CFR 300.500(a); (emphasis added). EPA regulations also specifically require consultation with natural resource trustees as part of the remedy selection process, by requiring that the "lead agency shall seek to coordinate necessary assessments, evaluations, investigations, and planning with . . . state and federal trustees [of natural resources]." 300.430(b)(7). Despite the fact that DEC has already announced its selection of a proposed remedy for Onondaga Lake, neither EPA nor DEC have consulted the Nation as required by CERCLA.

As lead agency for remedial action at Onondaga Lake pursuant to a CERCLA cooperative agreement, DEC is required to comply with CERCLA's Indian nation consultation requirement. DEC did not contact the Nation to discuss the selection of a preferred remedy for Onondaga Lake until November 16, 2004 – less than two weeks prior to the date already chosen by DEC to publicly announce its selection. A meeting among Nation representatives, DEC staff and staff from EPA was then held on November 22, 2004 – three working days prior to DEC's remedy selection announcement date. At that meeting, the Nation's representatives were provided with a copy of a twenty-page Power Point presentation. The Power Point presentation was the only documentation provided to the Nation by DEC or EPA concerning the selection of a preferred cleanup alternative for Onondaga Lake.

The foregoing does not constitute "consultation" with the Onondaga Nation, as required by CERCLA. The fact that DEC waited until the eleventh hour to contact the Nation, together with the patently inadequate documentation provided, rendered any meaningful response and input from the Nation impossible. Moreover, rather than consulting the Nation prior to selecting a remedy as required by CERCLA, the sole purpose of the November 22 meeting was to inform the Nation of the decision that had already been made by DEC and EPA concerning a preferred cleanup alternative.

On November 24, 2004, the Nation faxed a letter to Commissioner Crotty, copies of which were sent to EPA, notifying DEC that it was in violation of the Indian nation consultation requirements of CERCLA. The letter further stated:

> Because DEC has failed to timely provide the Nation with the information, reports and data necessary for the Nation to provide a meaningful assessment of the various proposed remedies, the Nation hereby requests that the Department provide all such documentation for its review. The Nation further requests that DEC delay any decision concerning a preferred alternative for Onondaga Lake until the Nation (i) has had a full and adequate opportunity to review the requested documentation, and (ii) has provided DEC with written comments setting forth the Nation's position with respect to remediation of Onondaga Lake.

Neither DEC nor EPA responded to the Nation's November 24, 2004 letter.

Moreover, in disregard of the Nation's letter and CERCLA's consultation requirement, DEC announced its selection of a preferred remedial action for Onondaga Lake on November 29, 2004. Consequently, by letter dated January 6, 2005, the Nation notified EPA and DEC pursuant to CERCLA § 310(e) that it intends to commence suit after 60 days concerning the agencies' failure to consult with the Nation as required. The 60 day notice period expires on March 14, 2005.

7 **B. <u>EPA's Failure to Consult Violates the Commitments Made in Response to the September 2004 Inspector General Report Concerning Indian Nation Involvement in Superfund Programs</u>**

EPA's failure to consult is particularly inexplicable in light of its recent public commitments to improve consultation with Indian nations on Superfund matters following the release of an Inspector General's report criticizing EPA's track record in this area. "Tribal Superfund Program Needs Clear Direction and Actions to Improve Effectiveness," Office of Inspector General, Rept. No. 2004-P-00035 (Sept. 30, 2004) ("OIG Report"). The OIG Report specifically noted that in response to a 1998 national Indian nation forum, EPA had identified various actions to enhance Indian nation participation in the Superfund program, including incorporating Indian nation cultural values into the Hazard Ranking System and risk assessment guidance. The Report found:

> The Agency's method for screening, assessing and prioritizing hazardous waste sites are based on risk principles that do not specifically account for tribal use of natural resources. Due to subsistence lifestyles that involve living close to the land, spiritual practices, and other cultural aspects, tribes have multiple exposures that, if not considered, are likely to result in insufficient protection of human health in Indian country. Further . . . government agencies' approach to risk assessment and management fall short of taking into account that affected groups consume and use fish, aquatic plants, and wildlife in different cultural, traditional, religious, historical, economic, and legal contexts than the "average" American. According to one tribal risk assessor, subsistence lifestyles alone may result in 10 to 100 times more exposure than suburban lifestyles.

OIG Report at 10.

Although, as a result of the Indian nation forum, EPA had agreed to incorporate Indian nation risks into its risk assessment process, the OIG Report EPA's efforts in this regard to be "incomplete and unsuccessful." OIG Report at 10. The Report concluded:

> [EPA] will not be able to fully consider the interests of tribes in identifying, prioritizing, and evaluating hazardous waste sites unless tribal cultural resource use is accounted for systematically. Further, if EPA does not take action to revise its risk tools, it could undermine its relationships with tribes and be at odds with its own Indian Policy, which calls for removing barriers to tribal participation in environmental programs. <u>According to its Federal trust responsibility, EPA must consider the interests of tribes in conducting its activities and ensure its actions protect tribal treaty rights</u>.

OIG Report at 12; (emphasis added).

The OIG Report also specifically recognized the crucial role that consultation plays with respect to fulfilling EPA's trust responsibility:

> <u>According to its trust responsibility, EPA must consult with and consider the interests of tribes in conducting its activities and ensure its actions protect tribal treaty rights</u> . . . The U.S. Supreme Court has noted that the Federal government, as trustee, is "charged with moral obligations of the highest responsibility and trust" . . . Because tribes are sovereign, EPA must honor a direct government-to-government relationship with tribes. <u>Consequently, no decisions about tribal lands, resources, and people should be made without consulting with the tribal government</u>.

OIG Report at 28; (emphasis added).

The Report identified four factors resulting in successful EPA-Indian nation relationships: (1) frequent, timely communication; (2) appropriate information sharing; (3) addressing issues raised by Indian nations; and (4) operating in a government-to-government relationship. Id. at 29. Unfortunately, all four factors are absent in EPA's handling of its trust responsibilities with regard to the Nation's interests in Onondaga Lake. This is despite the commitments made by EPA in response to the OIG Report. As part of the response EPA committed to "ensuring that tribal cultural life ways are appropriately factored into stage of the Superfund process," "issue guidance incorporating tribal cultural factors . . . into the HRS and Superfund risk assessment processes," and "involve tribes early in the Superfund process." OIG Report at 42. Again, none of these commitments have been met in the case of Onondaga Lake.

C. EPA's Failure to Consult the Nation Violates the Agency's Indian Policy

EPA's Indian Policy contains numerous commitments concerning the manner in which the Agency will deal with Indian nations in the context of the federal environmental laws the Agency administers and enforces. Unfortunately, these commitments have been ignored in the case of the Onondaga Lake remediation. Among the commitments set forth in the Indian Policy is the following:

> The Agency, in keeping with the federal trust responsibility, will assure that tribal concerns and interests are considered whenever EPA's actions and/or decisions may affect reservation environments. EPA recognizes that a trust responsibility derives from the historical relationship between the Federal Government and Indian Tribes as expressed in certain treaties and Federal Indian Law. <u>In keeping with that trust responsibility, the Agency will endeavor to protect the environmental interests of Indian Tribes when carrying out its responsibilities that may affect the reservations</u>.

EPA Policy for the Administration of Environmental Programs on Indian Reservations, dated November 8, 1984 ("EPA Policy"), § 5; (emphasis added).

The Policy further specifies:

> The Agency will encourage cooperation between tribal, state and local governments to resolve environmental problems of mutual concern. Sound environmental planning and management require the cooperation and mutual consideration of neighboring governments, whether those governments be neighboring States, Tribes, or local units of government. <u>Accordingly, EPA will encourage early communication and cooperation among Tribes, States and local Governments</u>.

EPA Policy § 6; (emphasis added).

Contrary to the commitments set forth in the EPA Policy, the Agency has made no effort to even consult the Nation, much less protect the environmental interests of the Onondaga people concerning Onondaga Lake. And, as set forth above, far from encouraging "early communication and cooperation" among EPA, DEC and the Nation, the Agency has been a silent partner in DEC's ongoing failure to consult or communicate with the Nation concerning selection of a remedy for Onondaga Lake.

V. Conclusion

The Onondaga Nation has longstanding sacred, spiritual, historic, archeological and environmental interests in Onondaga Lake. Because its reservation is located on and encompasses portions of Onondaga Creek, and because Onondaga Lake is included within the Nation's treaty and land claim area, the Nation is a trustee for natural resources. For these reasons, the Nation is entitled under CERCLA § 126 to substantially the same treatment as a state concerning, inter alia, consultation during the remedy selection process. However, EPA and DEC have failed to consult the Nation as required by CERCLA's express provisions, commitments made by EPA in response to the Inspector General's report on Indian nation participation in Superfund programs, EPA's Indian Policy and the federal trust responsibility.

Prior to DEC's announcement of a preferred remedy alternative, the Nation wrote to the Department noting that the Nation had not been consulted and requesting DEC to postpone announcement of the preferred remedy until such consultation had occurred. A copy of the letter was sent to EPA. The Nation received no response to its request from either DEC or EPA, and DEC announced the selection of the preferred remedy in derogation of CERCLA's consultation requirements. Consequently, the Nation served a CERCLA 60-day written notice on EPA and DEC advising them of its intention to bring suit concerning the agencies' failure to consult. To date, there has been no response from either agency to the notice letter.

In summary, the remedy selection process for Onondaga Lake has been characterized by utter disregard of the interests of the Onondaga Nation. Given the immense significance of Onondaga Lake to the Onondaga people, the Nation is committed to pursuing all available remedies to protect its interests in a full and complete remediation of the Lake.

Respectfully submitted,

Joseph J. Heath, Esq.
General Counsel for Onondaga Nation
716 East Washington Street
Suite 104
Syracuse, New York 13210
(315) 475-2559

REGIONAL COMMENTS

R-1

COUNTY OF ONONDAGA
EXECUTIVE DEPARTMENT
OFFICE OF THE ENVIRONMENT

NICHOLAS J. PIRRO
County Executive

JOHN H. MULROY CIVIC CENTER
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SYRACUSE, NEW YORK 13202
315 - 435-2647
FAX 315 - 435-8582

DAVID COBURN
Director

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FEB 28 20[illegible]
REMEDIAL BUREAU B

Via U.S. Mail and E-Mail

February 25, 2005

Timothy J. Larson, P.E.
New York State Department of
Environmental Conservation
Bureau of Remedial Action
625 Broadway, 12th Floor
Albany, NY 12233

Re: State's Proposed Plan for the Lake Bottom Subsite, November 2004

Dear Mr. Larson:

The County submits the following supplementary comments to the oral and written Comments submitted by Onondaga County Executive Nicholas J. Pirro at the Public Meeting held on January 12, 2005.

The November 2004 FS Report submitted by Honeywell was identified as a "Draft Final Feasibility Study." It is the County's understanding that the Report has not yet been approved by the State. Can the State clarify the final status of the November 29, 2004 FS and the weight, if any, it will be accorded in the remedy selection process? 1

Related to this question of the status of the FS, Honeywell's practice of continuing to reference the rejected concept of a defensible mercury model/mass balance concept in the FS, if allowed to continue into the remedy selection and design process, may bias the focus of pre- and post-remediation monitoring and analysis. The State previously informed Honeywell that their effort to construct a mass balance was seriously flawed and disapproved. Please clarify the State's position on this matter. 2

It is unclear to the County, from a review of the State's Proposed Plan for the Lake Bottom Subsite, how the PEC quotient was utilized in determining the volume of material to be dredged from each SMU. The State should clarify what factors and which contaminants dictated the quantity of sediment to be dredged from each SMU and the basis for determining the thickness of any sediment cap. 3

The proposed remedy for SMU-8 calls for relatively limited thin-layer sediment capping (*i.e.*, of 154 acres, or approximately 8% of the profundal area) with experimental oxygenation to 4 follow. While thin-layer sediment capping presumably will prevent mercury entrained in methane bubbles trapped in surficial sediments from releasing into the hypolimnion, aeration, in theory, will introduce oxygen directly into the hypolimnion and inhibit mercury methylation.

Aeration, or oxygenation, as a remedy intended to prevent the methylation of mercury appears never to have been used successfully for the collective purposes, on the scale, or for the length of time sought here. As described for this project, it is experimental. Its ecological and recreational use ramifications are not known; it is not inexpensive; and it requires constant, long-term operation and maintenance. Yet, the FS does not fully address other possible remedial alternatives for SMU-8, including more substantial thin-layer capping or isolation capping or what, if any, supplemental remedies will be required if oxygenation is technically impracticable or simply does not work. Given the objective of RAO 1 and the goal of PRG 1, why is oxygenation preferred to other potentially more successful as well as more permanent remedies?

5 Furthermore, the Proposed Plan seems to place undue emphasis on the anoxic hypolimnion as the primary site of mercury methylation in the Lake. In reality, mercury also methylates in other anoxic environments in the Lake *(e.g.*, littoral sediments; sediments in wetlands attached to the Lake; and in pelagic sediments, prior to and following stratification where the bottom waters are oxygenated) and even within the last two miles of Ninemile Creek. This focus on oxygenation in the Proposed Plan wrongly implies that mercury is a problem in Onondaga Lake because the Lake is eutrophic. In Onondaga Lake, methylmercury levels in fish are not elevated because the Lake is eutrophic; they are elevated as a result of industrial operations, past and present, which caused and continue to cause massive uncontrolled releases of mercury into the Lake and the Onondaga Lake System.

6 The preferred alternative (and the State's Proposed Plan) calls for capping and dredging of the Lake bottom, which almost certainly will alter the Lake's bathymetry. Other remedies discussed for the Lake bottom similarly would affect its bathymetry. It is in the public's interest to have an accurate bathymetric picture of the Lake bottom after it is remedied. For that reason, the final remedy should consider creation of an updated bathymetric map of the Lake.

Thank you for the opportunity to comment on the State's Proposed Plan. The County looks forward to further progress towards the implementation of Lake cleanup efforts.

Respectfully,

David Coburn
Director

cc: Kenneth Lynch, Regional Director
Mary Jane Peachey, Regional Engineer

R-2 18.

February 1, 2005

FEB -7 2005

Motion Made By Mrs. Rapp RESOLUTION NO. 17

MEMORIALIZING THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION TO SELECT A REMEDY BY APRIL 1, 2005 FOR THE REMEDIATION OF ONONDAGA LAKE SEDIMENTS

WHEREAS, the New York State Department of Environmental Conservation (NYSDEC) and 1
Honeywell International (Honeywell) both have issued Proposed Plans to address the cleanup of the Onondaga Lake Sediments (Onondaga Lake Superfund Site); and

WHEREAS, the NYSDEC is soliciting public comment on the State's Proposed Plan to ensure that the concerns of the community are considered in selecting an effective remedy for this site; and

WHEREAS, the State's Proposed Plan is the result of fifteen years of litigation (including a Consent Decree entered into in 1992) and numerous studies on remedial and restoration measures needed to address the impacts of past and ongoing releases of hazardous and other substances into Onondaga Lake; and

WHEREAS, it is important to this community for the NYSDEC to select an effective and appropriate remedy and to provide for the implementation of that remedy as quickly as possible; and

WHEREAS, it is the desire of this Onondaga County Legislature for the NYSDEC to select a remedy and issue a record of decision by April 1, 2005, which is the deadline imposed by the Consent Decree, and for the NYSDEC to provide for the expeditious implementation of such remedy; now, therefore be it

RESOLVED, that this Onondaga County Legislature hereby memorializes the NYSDEC to issue a record of decision and select an appropriate remedy for the cleanup of the Onondaga Lake Sediments by April 1, 2005 and to provide for the implementation of that remedy as quickly as possible; and, be it further

RESOLVED, that the Clerk of this Legislature is hereby directed to send a certified copy of this resolution to the NYSDEC to be included as part of the public comment on the State's Proposed Plan.

LAKE CLEANUP 01.19.05
Jlt
sle

ADOPTED
FEB -1 2005

I HEREBY CERTIFY THAT THE FOREGOING IS A TRUE AND EXACT COPY OF LEGISLATION DULY ADOPTED BY THE COUNTY LEGISLATURE OF ONONDAGA COUNTY ON THE 1st DAY OF February, 2005.

Debra L. Ficlera

CLERK, COUNTY LEGISLATURE
ONONDAGA COUNTY, NEW YORK

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ONONDAGA COUNTY
LEGISLATURE
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REMEDIAL BUREAU B

Onondaga County Health Department

R-3

Division of Environmental Health

Lloyd F. Novick, MD, MPH
Commissioner of Health

Gary R. Sauda, P.E.
Director of Environmental Health

421 Montgomery Street
Syracuse, New York 13202

Nicholas J. Pirro
County Executive

www.ongov.net

Council on Environmental Health
(315) 435-6600

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February 23,2205

Mr. Timothy Larson
Onondaga Lake Superfund Site
Public Comment, NYSDEC
625 Broadway
Albany, New York 12233

Dear Mr. Larson:

This is a moment of great hope for Onondaga Lake and people concerned with its welfare. We believe there has been considerable improvement in lake water quality over time and much more will appear after the operational changes made to the Onondaga County Metropolitan Sewage plant and its entire system become fully operational. 1

Now, all parties should be commended on reaching the current proposals for remediation by Honeywell Cooperation of the lake bed's industrial pollution.

These comments by the Onondaga County Council on Environmental Health (CEH) are based on what we, as an advisory group to county officials, believe is best for the future of the county and its citizens.

It is particularly heartening to CEH members to see the prospect of action in the near future to deal with the lake's industrial pollution instead of further studies and litigation. The four to seven year action time frame is very appealing to people who have been involved with various Onondaga Lake clean-up proposals for more than 25 years, although speeding up that time frame is even more appealing. 2

After reviewing remediation proposals by both Honeywell and the state Department of Environmental Conservation (DEC), the Council on Environmental Health has the following comments:

1) To wait for a "perfect plan" is impractical and unreasonable. However, any work plan that is approved should provide for monitoring and recognition of deficiencies. If deficiencies in the process are identified, the work plan should allow for changes to be made. 3

2) CEH members are very concerned and cautious about dredging on the lake bottom, although both the Honeywell and NYSDEC plans use that method as the focal point for remediation. New dredging techniques will lessen some of the impact as will treatment in the facility to be built on the lake shore. 4

However, we believe that dredging itself could have a serious adverse impact on the lake itself and its downstream flow. The more extensive the dredging, the greater the disturbance for an unknown period of time. Dredging has a relatively short-term impact when viewed over several decades, but it is still a concern to CEH members.

5 3) Disposal of lake bottom material on Wastebed 13 in Camillus will certainly have an immediate but relatively short-term adverse impact. However, Wastebed 13 is the logical destination for dredged material that is evaluated as not being severely hazardous. The pipeline disposal method will curtail some of the local impact, but not all.

More thought needs to be given to the final configuration of Wastebed 13. Long-term monitoring of any disposal area should be required. As deficiencies are identified by the monitoring, then changes in the work plan should be required.

6 4) Capping the lake bottom is suggested for various locations after dredging, which raises the question of why capping could not replace some or even most of the dredging in the remediation proposal. This would lessen many people's concern about the impact of dredging.

7 5) Both the DEC and Honeywell action plans raise questions from citizens that reflect their concerns. We need to find a way to respond to these issues-- "Is this money being wisely spent or just to meet a standard?" "Will the standard change?" "What does the public see as an acceptable level of risk that would result by leaving some contamination in the lake?"

8 6) Both remediation plans have long-term annual operating and maintenance costs in the millions of dollars that will only increase in the future. It is important that taxpayers understand this is an on-going part of the proposal for a cleaner Onondaga Lake.

A sequestered fund from Honeywell, set up in advance of the beginning project, would be advisable. Local taxpayers need to be protected from assuming any monetary liability if Honeywell or its successor does not meet the financial responsibilities of the clean-up action plan or the long-term monitoring.

CEH members recognize that the proposal under review needs further refinement. We look forward to seeing all parties move forward to real action.

Sincerely,

Barbara S. Rivette

Barbara S. Rivette, Chair
Onondaga County Council on Environmental Health

cc. Nicholas Pirro, Onondaga County Executive
Dale Sweetland, Onondaga County Legislature Chairman
Lloyd Novick, M.D., MPH, Onondaga County Health Commissioner

LOCAL COMMENTS

Office of the Supervisor
TOWN OF CAMILLUS
4600 WEST GENESEE STREET
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L-1

MARY ANN COOGAN
SUPERVISOR

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February 9, 2005

Mr. Timothy Larson
Onondaga Lake Superfund Site – Public Comment
New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233-7016

Re: Comments on Proposed Plan – Onondaga Lake Bottom Subsite of the Onondaga Lake Superfund Site

Dear Gentlemen:

As the proposed host community for the dredging from the Onondaga Lake cleanup, the Town of Camillus has some concerns which need to be addressed to insure that no negative impacts will occur to our community during the cleanup. Some of these issues relate to the details of the design and operation of the proposed SCA on SB 13, part of what is known as the Allied Waste Beds. We make these comments now because we are unsure of future opportunities to do so. Camillus requests a review and advisory role as the project goes forward.

Camillus believes that the Department should revisit the entire issue of the SCA location. From some of the supporting materials accompanying the FS, it is obvious that shoreline and in-the-water locations for SCAs have been successfully used for dredgings in the past. The selection process gave no opportunity to select an in-the-water SCA because of goals for no loss of lake surface or volume. An SCA location, or locations, near or in the lake would result in a relatively tiny loss of lake surface and volume and it would eliminate the costs and environmental concerns associated with the pipeline up Nine Mile Creek and the new SCA on SB 13. A new upscale subdivision, Golden Meadows, is being built a short distance from SB 13 to add to the large number of people already living in the area. Moving the SCA to a lakeshore or in the lake location should save money, decrease environmental risk to Town of Camillus residents, and provide a means to construct space for something useful to the general public such as a marina/boat launch or more fairgrounds parking. If time is an issue, the revisiting of the SCA location could be done as part of the design phase. 1

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2 A. If the SCA ultimately is located in SB 13, the primary issue is the proactive prevention of odors escaping to receptors in the community. The Honeywell FS and the DEC Proposed Plan acknowledge the potential for odor releases. The details of the odor mitigation plans are to be developed during design; some of the techniques are discussed. Our suggestions are as follows:

- Construct a "Demonstration Size" SCA in the part of SB 13 farthest from the population center in Amboy. The size should be large enough so that it could run long enough to thoroughly validate the process and make corrections if necessary, <u>at the greatest possible distance from people's homes</u>. We understand that the odors may differ depending on the source of the dredgings, and that below SCA surface discharge and a partial floating cover would be employed at a minimum. We also suggest that odor control technologies be demonstrated in the small SCA for the phase when the SCA is full and water is completely drawn off. That phase may have significant potential for odor release as the dredgings dewater, and preparations should be made in advance.

- An agreed-upon protocol should be in place prior to operations relative to shut-down while corrections are being made if problems occur. Camillus does not want to be in the position of having to prod DEC or Honeywell to react to problems. A mechanism needs to be created to get feedback from odor receptors to the project team at the earliest sign of problems. We suggest an "Odor Panel" of local homeowners who would monitor air quality in their neighborhoods.

3 B. The pumping operation to move the dredgings to SB 13 and out into the SCA has the potential to generate noise which will be heard in the adjoining neighborhoods. Noise modeling should be done to predict noise impacts and appropriate mitigation should be included in the project.

4 C. Construction activities on-site have the potential to create noise and traffic issues. These issues should be mitigated up front in so far as possible. One very significant mitigation technique would be to use exempt Construction and Demolition waste for pre-loading and constructing the SCA areas. There is a large stockpile of exempt C&D in the eastern portion of SB 15 and some in the western portion of SB 15. Utilizing these materials for construction cuts down on impacts associated with bringing construction materials to the site but also will reclaim space in SB 15 for disposal of non-exempt C&D.

D. Visual impacts of the proposed SCA in SB 13 should be an immediate priority. Viewscape modeling should be performed to develop a screening plan to shield the view of the SCA from nearby residents and the passerby. Screening techniques could include setting the SCA boundary inboard as far as possible from the current outer berms. Planting of vegetation would need to be initiated soon to be effective at the time of SCA operation. 5

E. The ability of the existing structure of SB 13 to carry the load for additional sediment, water and the weight of the SCA should be verified immediately. If the load carrying ability is at all suspect, after analysis, then a fresh look at where to put the SCA would be in order. 6

F. Our understanding at this writing is that there is no consensus between DEC and Honeywell on the quantity of dredgings to come to the SCA, with Honeywell's proposed quantity to be significantly less. From the Camillus prospective, less is better, because of reduced environmental risks. Could the Department please provide a "plain English" explanation why Honeywell's proposal is not sufficiently protective of the lake and its inhabitants? One of the speakers at the January 10 Public Hearing, made the point that the assumptions going into the Risk Assessment are very conservative, thus overstating the risks and making the remedies in the FS even more conservative. Let's not dredge more material than we need to simply because conservative assumptions are superimposed on other conservative assumptions. If the <u>real world</u> risk under Honeywell's proposal is unacceptable, please explain. Perhaps a compromise quantity of dredgings would be agreeable to all. 7

G. Camillus suggests a Citizen's Panel to play an advisory role in evaluating final uses of the completed SCA if it is within the Town. A wide variety of potential uses are possible and public input is vital to making appropriate choices. 8

H. Camillus expects and demands an effective monitoring system for any SCA built in Camillus, during construction, during operation, and post closure. This monitoring program should <u>at a minimum</u> include: 9

- The aforementioned "Odor Panel".
- Air quality sampling locations with sample testing and an agreed upon protocol for determining results of concern.
- Noise monitoring equipment to validate that activities do not violate the Camillus noise regulations.
- Groundwater and Surface Water quality monitoring.

10 Camillus wants to be part of the review process for the monitoring data, and to be reimbursed for our expenses in evaluating the monitoring data and responding to it.

11 I. Security of any new facilities to guard against accidents from snowmobilers, bikers, and others is a must. Any areas with open water or other hazards must be fenced.

12 J. The long term financial capabilities to continue post closure care and monitoring must be guaranteed by some form of financial instruments. We must be assured that there is no way that local or County government is saddled with any expenses resulting from the lake cleanup.

Depending on additional public comment, we may have additional comments prior to March 1. We thank you for the opportunity to bring these issues to your attention.

Very truly yours,

Mary Ann Coogan

Mary Ann Coogan
Camillus Supervisor

cc: Members of the Town Board
Mr. Donald Hesler- NYSDEC
Ken Lynch, Esq. - NYSDEC
John McAuliffe, P.E. - Honeywell
Al Labuz - Honeywell
Dirk Oudemool, Esq. – Town of Camillus
Paul Dudden, P.E. – Barton & Loguidice, P.C.

L-2

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SUPERVISOR

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FAX (315) 488-1544

January 12, 2005

Timothy Larson, P.E.
NYS DEC Project Manager, Onondaga Lake Bottom
625 Broadway
Albany, New York 12233-7016

Dear Mr. Larson,

As Geddes Town Supervisor the town that happens to have the greatest land area involved in the lake cleanup. Let me just say, "It's time to stop talking and start doing." 1

The people of Geddes are the most immediate neighbors of the lake. Most of the people I talk to just want the cleanup to get going. They think 12 years of study and the fact the EPA must ultimately approve the final plan are more than enough reassurance that it's based on solid science. According to the DEC, once the plan is approved there will be an extensive design phase that will involve more scientists and more public meetings.

It is also important to note that once the cleanup is done, the DEC will require Honeywell to remain involved for at least 30 years to make sure that the cleanup is working and is effective. 2

As Supervisor, I have been closely observing this plan from its inception, and will continue to do so to protect the interests of the people of Geddes. I believe my constituents want a revitalized lake and a redeveloped shoreline, not more unproductive debate and unnecessary delay. 1

Very truly yours,

Elliot Czaplicki

E. Robert Czaplicki, Supervisor
Town of Geddes

L-3

•Communication •Collaboration •Commerce

New York State
Department of Environmental Conservation

Proposed Clean up Plan for Onondaga Lake

January 12, 2005

Testimony of
Deborah Warner, Director of Government Affairs
Greater Syracuse Chamber of Commerce

Greater Syracuse Chamber of Commerce

572 S. Salina St., Syracuse, NY 13202-3320
Ph: 315-470-1800 Fax: 315-471-8545 www.SyracuseChamber.com E-mail: info@SyracuseChamber.com

1 Good evening Commissioner Crotty, Regional Director Lynch, Project Managers Donald Hesler and Timothy Larson, members of the DEC Commission, and distinguished guests.

My name is Deborah Warner and I am Director of Government Relations at the Greater Syracuse Chamber of Commerce. We are the largest business organization in Central New York with more than 2300 member firms employing more than 140,000 working men and women in our community.

On their behalf, I extend our thanks to you for this hearing and the years of dedicated work you have given to the goal of the cleanup of Onondaga Lake. We are delighted and encouraged that after more than a decade we are finally at the point where we are talking about a remedy to implement. The goal is finally in sight. You are all to be congratulated for working through this Herculean task.

I am here tonight to tell you that we support the restoration plan that you have put forth. We believe and trust that all the research and study has yielded a plan worthy of implementation. We agree with Congressman James Walsh when he said, "we have finally found a holistic and thorough approach to cleaning up this valuable community asset."

Our Chamber includes the Onondaga County Convention and Visitors Bureau. Although we already market the lake for a range of events, we are thrilled at the potential of visitors and events after the remediation is complete. Waterways are certainly a huge part of our tourism marketing efforts. Currently, to the naked eye, the activity along the shoreline of Onondaga Lake is a fabulous asset. But the question remains from our out of town visitors, why is there no activity on the water? Imagine the tourism benefits when we can successfully host major fishing and boating events. When DestiNY is built, the value of the lake to us in nearly inestimable.

We urge final approval and implementation of this program as soon as possible. Many projects in and near Onondaga Lake are moving forward, particularly the more than $200 million Inner Harbor project being done by the DestiNY team. The faster the lake is cleaned up the more development and spin off jobs will occur. Of course we can't ignore the economic impact of over $400 million over the next seven years in the local economy. We look forward to Honeywell being a valued member of the community for a long time.

I would also ask that in your remediation, you preserve development 2
opportunities on the land that is reclaimed. We believe there will be very strong interest in additional development adjacent to the lake and don't want to lose or limit this economic potential.

I know our members want me to give you a vote of confidence in your 3
work. The business community does not doubt the thoroughness or scientific acumen of the DEC and the EPA. We trust that you have not overlooked any aspect of the Remedial Investigation and Feasibility Study. And we trust in the monitoring programs that are part of the plan.

We also speak tonight to the Honeywell representatives to voice our wish 4
that they agree to the DEC proposal.

One last question we hope you will be able to respond to. The remediation 5
plan is designed to be a permanent solution and will probably need monitoring for generations. Going forward, what assurances can the taxpayers be given that if there's a failure in the cap or an engineered solution they will not be held responsible for such costs? What if Honeywell no longer exists or has merged with another company, who will be responsible for costs in that event?

Onondaga Lake is a jewel for this community and the City of Syracuse. 1
The lake is a resource that any city would envy. We gained a lot of notoriety as the most polluted lake in the land. Now we will have a new

reputation as an example of state of the art remediation of one of the largest Superfund sites in the nation.

We are looking forward to the earliest implementation of the DEC recommended $449 million plan.

Thank you again for the opportunity to comment.

GROUPS AND ASSOCIATIONS COMMENTS

Anam Duan
Franciscan Ecology Center 6-1
P.O. Box 11581 • Syracuse • New York 13218
(315) 559-7634 • fec@anamduan.org

February 25, 2005

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REMEDIAL BUREAU B

Donald Hesler
Onondaga Lake Superfund Site – Public Comment
New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233-7016

Dear Mr. Hesler:

Anam Duan's Franciscan Ecology Center would like to provide public comment concerning
the Proposed Plan for the Onondaga Lake cleanup. As a local nonprofit agency that engages
primarily youth and young adults in environmental education and ecological restoration in the
greater Syracuse area, we are very concerned about the health of the Onondaga Lake Ecosystem,
not only for this current generation, but also for future generations. We are also concerned not only
about the impacts on human heath, but also for the health of the entire lake ecosystem which has
been severely impacted by industrial and other wastes. As we all know, human health is intimately 1
linked our ecosystem health. We support all efforts to restore the full, natural functioning of the
Onondaga Lake ecosystem, including its biological diversity, its complex and interdependent
functions, its ecological services, and its ongoing resilience and capacity for self-regulation.

We support measures that permanently restore the Onondaga Lake ecosystem's full, natural
functions and services. We do not support the use of temporary actions that force the lake to 2
depend on expensive, tax payer-funded technological solutions in perpetuity. Before industrial
disturbance, the lake ecosystem used solar power, biological diversity, and complex, interdependent
processes—which were all free to taxpayers—to maintain its ecological functions, system integrity, 3
and resiliency. As much as possible, the restoration technologies used in the Plan should restore the
lake ecosystem's natural functions so that it may restore its own resiliency and health over time.
The current proposed plan should be reviewed for opportunities to restore permanent natural
functions rather than rely on "technology dependency." Examples of potential "technology

dependency" in the proposed plan include any new water or sediment treatment facility, any off-site permitted facility, and the hydraulic containment system.

We support measures that will allow us to solve this problem within this community and by this generation. We do not support the removal of our problems to "off-site" solutions that put our ecological responsibilities on another community or group of people. Because of the existence of systemic environmental injustice that currently exists in U.S. environmental policy and planning, it is unlikely that decisions to select a new "off-site" location for waste disposal will be made adequately with respect to environmental justice. We have a moral imperative to take responsibility as a community for our own past environmental actions and inactions. We also must not force future generations—citizens who will have had no voice in previous generations' environmental decisions that effect their lives in profound ways—to bear the economic costs and costs to human and ecological health from our inadequate choices. The next generation will not have benefited from the economic profit that resulted from the creation of these industrial wastes, and yet they may have to engage in costly mitigation to undo or redo our own proposed actions. Any decision we as a community make now that forces the next generation to bear these costs will be an injustice. The proposed plan needs to be reviewed in terms of remedial actions that will *not* fully restore the health of the lake ecosystem, and should be revised to prevent inevitable problems for future generations.

4 We are concerned that the proposed plan finds that mercury is present all along the lake bottom, but capping will only be for a portion of the lake. This will not solve the mercury problem. In essence, this proposed capping "solution" appears to also rely on the leaching or otherwise slow release of mercury into the lake biota over time, which will simply allow bioaccumulation in fish, wildlife, and humans of the food web, all of whom will absorb all the remaining uncapped mercury residue that will be released. The proposed plan's solution appears to be not just a "capping" strategy, but rather a "capping with slow-release bioaccumulation of mercury" strategy that relies on the process of bioaccumulation of mercury in the food chain as the de facto method for permanently ridding the system of mercury.

5 We are concerned about the effluent water resulting from sediment and waste consolidation that will be treated. We are supportive of treatment processes that do not produce additional toxins, and we oppose the creation of any additional new toxins.

6 We support the attempt to find a remedy that would "result in a long-term reduction in the toxicity, mobility, and volume of the key contaminants in Onondaga Lake, including mercury, benzene, toluene, ethylbenzene, and xylenes (BTEX), naphthalene, chlorinated benzenes, and

polychlorinated biphenyls (PCBs) and would enhance the lake as a valued community resource by improving aquatic habitat throughout the lake while achieving the desired objectives and goals." We are concerned that the goals will only "enhance" the lake as a community resource, and only slightly "improve" aquatic habitat. The goals should include the restoration of the original natural functions of the lake ecosystem without permanent dependence on costly technology.

We would like to see an effort to recruit and train local community members for jobs related 7
to ecological restoration of the lake ecosystem. This should include using youth and young adult conservation corps models, where unemployed youth and college students from the community work seasonally to provide labor for monitoring and remediation work, while also receiving environmental education, basic job skills, and advanced ecological restoration skills that are marketable.

We would like to see volunteer opportunities for community members to volunteer their time to provide labor to restore the lake ecosystem. Community nonprofit organizations can provide the management and logistics of recruiting, training and supervising volunteers, and funding for lake ecosystem restoration could include allocations to local nonprofit organizations to defray costs of volunteer management.

We support the initial assessment that has considered the effects of industrial waste and lake 8
contamination on vegetation and wildlife that are part of the natural lake ecosystem. Since mercury and other contaminants bioaccumulate in wildlife, but the level of bioaccumulation is unknown, we would like an ongoing biological assessment and monitoring component to be a formal part of the plan. We are especially concerned about the level of mercury in deer, waterfowl, and fish that will ultimately be consumed by humans who hunt and fish. We are also concerned about how mercury bioaccumulates in migrating birds and brings mercury to other geographical areas. This process also needs to be assessed and monitored. We are concerned that the recolonization by vegetation of the western and southern lakeshore covered by wastebeds is vegetation that is bioaccumulating toxins. The costs of monitoring and assessment can be reduced by making use of trained community volunteers, students from local colleges and universities, and youth and young adult conservation corps. These labor sources could also take part in habitat restoration and bioremediation along the lakeshore.

We would like to see the restoration of conditions of the lake ecosystem that would again 9
support a cold-water fishery and support previously common fish species including Atlantic salmon (*Salmo salar*), cisco (*Coregonus artedii*), American eel (*Anguilla rostrata*), and burbot (*Lota lota*).

10 We would like to see a major education and communication initiative that informs citizens and other community members of the ecosystem restoration process while it happens, so that the community will understand the effects of industrial wastes, and the processes and efforts involved in mitigating it. This should include a media campaign (website with pictures, videos, etc., newspaper coverage, TV and radio news coverage). It should also offer opportunities for onsite public visits, so that students and other members of the community can watch the ecosystem restoration process as it happens.

11 We would also like Honeywell to formerly address the community about how this process of ecological restoration and industrial waste remediation has impacted their manufacturing processes in the U.S. and abroad, and what new processes and procedures they are using to prevent this from happing in other communities and ecosystems. This is an incredible opportunity for adaptive management, and for developing new processes for sustainable development that do not impair human health and ecosystem health. Other communities and corporations could benefit from Honeywell's experience in this ecological restoration process. Honeywell should agree to publish a document or some other report that could be used elsewhere.

We would like to see a permanent "Never Again" ecological degradation and restoration memorial at the site that describes what happened in the ecologically degraded the area, and what was done to restore it. Honeywell and restoration partners would receive recognition for their efforts to make good on past environmental mistakes.

We thank you for this opportunity to comment of the Proposed Plan for the Onondaga Lake.

Sincerely,

Ríobárt É. Breen
Executive Director
fec@anamduan.org
(315) 559-7634

Cc: Timothy Larson

Solvay Public Library

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DIRECTOR

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1

LETTERS

Letters in Neighbors

The deadline to submit letters for next Thursday's West Neighbors is noon Friday. Letters must be signed originals and include an address and daytime telephone number. Neighbors reserves the right to edit letters and limit the number of letters submitted by a single author. Send letters to Robert Andrews, West Neighbors, The Post-Standard, 5320 W. Genesee St., Suite A, Camillus 13031. You also may fax them to 470-3187 or e-mail to westnews@syracuse.com

Library contributes to cleanup of lake

To the Editor:

Trustees of the Solvay Public Library are heartened to see that the Honeywell Corp., which merged with Allied-Signal/Allied Chemical a few years ago, has assumed responsibility for the cleanup of Onondaga Lake and is prepared to lead this effort under the supervision of the state DEC.

The lake project is important to the quality of life and economic growth in Solvay and Geddes.

We are proud of the fact that our library has been able to contribute to the research and progress made to date through the library's Solvay Process Room that houses the files of the Allied Chemical Co. Syracuse Works, first known as Solvay Process.

Donated to the library in 1987 when the Solvay plant closed, this archive has been searched by people for information about the plant itself, their relatives, or about the Hazard family home.

In the past two years, however, the collection has been of particular importance to those working on the Onondaga Lake management project.

Environmental engineers, attorneys and publicists have all made use of this collection for information about Onondaga Lake and the impact Solvay Process and its waste beds have had on it.

The trustees of the Solvay Public Library have been promoting its building as a community treasure during our Centennial Building Project to preserve and expand our Carnegie Library, erected in 1905.

It is fitting that our library, built with the assistance of the first president of Solvay Process, houses its files and now serves to assist Honeywell and others by supplying needed information.

As part of our expansion plan, it is our hope to include new space meant for archival storage and preservation for this special collection and for digitizing these materials.

As keepers of this part of the lake's history, we look forward to recording the next chapters of this story and Honeywell's leadership role.

Our community will reap the environmental, economic and recreational benefits of a restored Onondaga Lake.

Meanwhile, the public can access an overview of the Solvay Process collection at "http://www.clrc.org/solvay"

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Comments on the Onondaga Lake Bottom Subsite Proposed Plan

March 1, 2005

Submitted by: Douglas J. Daley, Associate Professor

On behalf of students of SUNY ESF in FEG 489 Engineering Planning and Design:
Kyle Williams
Gwen Kernan
Jamie Pentland
Mike Crawford
Rob Conden
Lindsey Clark

State University of New York College of Environmental Science and Forestry
Syracuse, NY

1. Timing: Delaying the start of remediation until all upland sources are removed or controlled is not necessary. There are admittedly portions of the lake that are directly impacted by continuing upland sources, and source control in these instances is essential before remediation commences. However, an area like SMU 5 is not impacted by the upland sources to the same extent. Commencing dredging and capping actions in this area at the earliest possible time provides an early benefit, and provide invaluable experience in rigorous application of construction methods, debris and sediment control, sediment removal and cap placement that could be later applied in the critically impacted areas (like SMU 4 and the ILWD). 1

2. Oxygenation: Oxygenation of the hypolimnion is proposed as the primary mechanism to mitigate methyl mercury generation. I have severe reservations about this technology as a long term solution. I see it as a short-term (10- to 15-year) interim measure. A permanent long-term solution could be developed in that interim. Technological and political issues abound: 2

3. How does one ensure complete mixing of oxygenated waters?

4. In the event of an energy crisis, will the public be faced with the choice of paying high or exorbitant operating costs versus shutting off the system and allowing mercury to enter the food chain again? 3

5. Will a trust fund be established to ensure that the operating, maintenance and replacement costs are covered in perpetuity?

4 6. Given the high oxygen demand that exists already from biological and anthropogenic sources, how much of the system design will address the baseline oxygen demand?

5 7. There still seems to be an inherent disconnect between the extensive capping in the littoral zone and the control of pollutants in the water column. The necessity for the cap escapes me. There will be extensive habitat disruption during the dredging and cap placement. What mechanism will be used to restore the habitat at completion of construction? Why disturb the sediments at all, if the main purpose of the cap is to minimize erosion due to wave action, and oxygenation will address the methyl mercury formation in the littoral zone?

6 8. After removing sediment (and benthic organisms) from the bottom of Onondaga Lake, how will you repopulate the clean sediment added in for the cap with benthic organisms?

7 9. Once the lake is "clean" by the nitrification and phosphate removal processes at the Metro plant, will the zebra mussels aid in breaking down remaining contaminants? Will they have any other adverse effects on the lake, since they are likely to move in once it is cleaner?

8 10. What evidence supports the design thickness of the isolation cap as being able to preclude migration of contaminants such as mercury and PAHs through diffusion, advection and dispersion?

11. The proposed materials (sand and gravel) will still allow contaminant migration via diffusion.

12. Methylation of mercury will still occur under the isolation cap in the anaerobic sediments. This can still be transported through the isolation cap, although the travel time will be longer, mercury will eventually enter the water column.

9 13. What consideration has been given to the fact that ebullition will continue after remediation? This will disturb the isolation cap, and create short circuiting that will allow mercury to be transported to the water column.

10 14. What are the management plans for the future of Onondaga Lake? (e.g. A hotel bordering the lake or a trail path. Do you hope to make the lake swimmable and fishable?) Will the ultimate use have an effect on amounts of sediment removed and the areas of removal?

11 15. How exactly do the silt curtains work? What is the smallest size particle that can pass through it? There will be a tremendous amount of sediment disturbed during dredging; this will be transported into other areas of the lake.

12 16. How were the SMUs divided up? Do the ecological characteristics vary from SMU to SMU? In SMUs 3, 5, and 6 for example, there are littoral sections that do not require remediation.

How were these areas determined, considering areas needing both dredging and isolation capping surround them? Will these areas be isolated during construction?

17. Where will the materials for the capping come from? Are there sufficient resources near the lake to carry out the remediation at a satisfactory cost? Will the materials have a significant impact on the water chemistry (e.g. alkalinity)? 13

18. Ongoing oxygenation is not a permanent solution because there are a number of factors that could influence its long-term success that are currently unknown. 14

19. In-the-dry sediment removal /dredging is more expensive, but potentially offers greatest benefit in the long term (e.g. 100 years). The cost and technical feasibility of removing the greatest amount of mercury contaminated sediment seems to be a better permanent solution than dealing with the uncertainty associated with oxygenation and isolation cap performance. 15

20. Preference should be given to solutions that are ecologically sustainable; extensive requirements for high energy input processes (e.g. oxygenation, dewatering, pumping) have proven to be infeasible for many conventional systems nationwide. 16

21. the method of cap material placement is likely to cause displacement of underlying contaminated sediments, even after dredging, through advection. 17

22. The SCA site location should be confined to current or inactive waste management areas near Onondaga Lake. Use of any other site is unacceptable. 18

23. Would the export of sediment from the lake to Wastebed 13 change the regulatory status of the wastebedsto a RCRA-permitted facility? 19

24. Using a cap comprised of sand and gravel merely limits the movement of contaminated sediment in the short-term. Long-term geomorphological changes, groundwater movement, and extreme weather events can all contribute to cap failure, thereby exposing humans and wildlife to contaminated sediments. 20

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(comment received via e-mail from djdaley@esf.edu on 3/1/05)

6-4

UPSTATE
FRESHWATER
INSTITUTE

March 1, 2005

Mr. Don Hesler and Timothy Larson
NYS DEC
625 Broadway
Albany, NY 12233

Dear Mr. Hesler and Mr. Larson,

We are writing to provide comments on the State's proposed plan to address the impacts of the Honeywell site on Onondaga Lake. First we would like to clearly indicate that we endorse the plan in general. Honeywell and its consultants and the State and its consultants have spent considerable time and effort attempting to understand sources of contamination to the lake, and 1
the fate and transformations of these contaminants. Also considerable care has been taken to develop preliminary plans for the remediation of the lake, including a large number of alternatives. With the information provided, we cannot endorse one alternative over another. Nevertheless, we strongly believe whatever remediation plan is selected should be implemented as soon as possible.

While we are pleased to see that the remedial investigation/feasibility study (RI/FS) process is 2
proceeding, we are disappointed that the State has decided to rely solely on a "build and measure" approach. We are aware that the original plans were to develop and use models as part of the RI/FS process and that for a variety or reasons the State rejected this approach. The reason given in the public comments for the failure of developing a model is that the system is "too complicated". We reject this thinking. Our perspective is that the elimination of modeling reflects a fundamental lack of understanding of the sources, transport, fate and transformations of the Honeywell contaminants.

We strongly recommend the development of process-oriented contaminant mass balance models, supported by comprehensive monitoring of the site. We envision that this would proceed in parallel with, but outside of, the SuperFund process. Effective communication of progress, performance, findings and model evaluations from this program would allow for the option of utilization of these tools to support potentially important management decisions, as well as providing ongoing critical insights for all stakeholders. Contaminant models should be an integral component of rehabilitation efforts for the lake.

We have a major concern that the many aspects of contaminant behavior in Onondaga 3
Lake are not understood. There are two observations, in particular, which call into question the basic understanding of contaminant behavior in the Lake and challenge the potential for

4 rehabilitation of the Lake. First, the measured losses of mercury exceed the measured inputs of mercury by a large extent. This observation suggests that there is not an adequate understanding of the sources of mercury to the Lake. Second, although there has been a marked decrease in the mercury loading to the lake since the early 1970s (as evidence of sediment mercury deposition), there has been no corresponding change in fish mercury concentrations. This observation suggests that previous large decreases in mercury loading have not changed the major exposure pathway of mercury to humans and wildlife. The logical explanation is that at this time fish mercury is not regulated by mercury loading to the lake. This observation is worrisome if controls on mercury inputs are expected to result in decreases in fish mercury concentrations. One might speculate that the very high rate of methyl mercury production regulates fish mercury concentrations. However to our knowledge this hypothesis has never been tested. Presumably the reason for inclusion of hypolimnetic oxygenation in the State's rehabilitation plan is to reduce the in-lake supply of methyl mercury and reduce fish mercury concentrations. Unfortunately, the RI/FS did not determine if the supply of methyl mercury to fish largely occurs in the hypolimnion, as opposed to littoral sediments. Moreover, to our knowledge there has
5 never been a study of mercury response to hypolimnetic oxygenation. Without this basic understanding of mercury inputs and transformations how can stakeholders be assured that a very expensive remediation program will be successful? How will it be possible for the State, as stewards of this resource, to communicate to stakeholders how the lake will respond to remediation activities? The development of a well-tested and credible model(s) would go a long way in demonstrating this understanding and guiding the rehabilitation effort.

Further, a modeling program should also address the fate and transport of selected components of the organic contaminants from the Honeywell site. These constituents clearly have their own set of impacts and their behavior diverges strongly from that of mercury.

6 A second concern that we have with State's plan is the lack of detail on the Lake monitoring program. Of course monitoring is a critical component of a "build and measure" program. In the public forums, the State clearly has indicated the need for a rigorous monitoring program, stating that this monitoring program would be developed in the design phase of the process. We have several concerns with a monitoring program:

- We believe that a monitoring program should be conducted by an independent, objective organization(s) with experience in Onondaga Lake and the relevant contaminants (e.g., mercury) that will rigorously publish the results of these measurements and routinely make this information available to all stakeholders;

- The monitoring program should be comprehensive and include measurements that will allow for complete interpretation of the response of contaminants to changes in inputs from rehabilitation and other drivers;

- Given the lack of comprehensive background data and time-series on mercury and other contaminants, a monitoring program should be initiated immediately even at the risk of being not fully integrated with the overall rehabilitation design program; and

- The monitoring should be fully integrated with a contaminant modeling effort.

In summary, an integrated program of monitoring and modeling needs to be implemented to understand and track the Honeywell site contaminants in Onondaga Lake. The goals of such an initiative would be to: 7

- Develop a quantitative understanding of the behavior of Honeywell site contaminants in the Lake in the form of scientifically credible mathematical models;

- Apply the models to forecast/predict the benefits of a clean-up program;

- Apply the models to: 1) establish reasonable expectations from the cleanup effort; 2) establish the feasibility of reaching cleanup goals; and 3) evaluate the effects of other initiatives (i.e., METRO upgrades) and natural variability;

- Track the Lake rehabilitation through a comprehensive and long-term monitoring program; and 8

- Make information available to stakeholders and agencies in a timely manner.

We also want to stress the critical opportunity that the Onondaga Lake rehabilitation effort provides. This is a great opportunity for the community of Central New York. But maybe more importantly this represents an important opportunity for New York State, and indeed the entire country. As you know there are more advisories for mercury on lakes in New York (and the entire country) than any other contaminant. We have limited knowledge of long-term patterns in lake mercury or how lake ecosystems respond to decreases in loading. A rigorous monitoring and modeling program for Onondaga Lake would provide the tools and understanding that are needed in New York State to address the widespread problem of mercury contamination for other resources beyond Onondaga Lake. 9

If you have any questions, please do not hesitate to contact us. Additionally, you will find selected specific comments on the State's "Proposed Plan" document attached.

Sincerely,

Steven W. Effler

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Charles Driscoll

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cc: Honorable J. Walsh

Selected Specific Comments: Onondaga Lake PP Comments

No.	Page	
1.	9	The statement that the primary waste contaminant associated with soda ash and related material production at the site was Solvay waste is questionable, if not incorrect. Ionic wastes (Ca^{2+}, Na^{+}, and Cl^{-}) were 10 arguably **primary**, and had major impacts on the lake and downstream waters. Residual ionic waste inputs continue to have important impacts (Effler and Matthews 2003).
2.	15	Several factors contributing to the bi-directional flow regime at the lake's outlet are listed (**P**2). However, the lake's elevated salinity, omitted from the listing, is also an important factor (Effler and 11 Matthews 2003). A substantial portion of the elevated salinity is attributed to residual waste inputs from the site.
3.	15	Hypolimnetic oxygen depletion is promoted by anthropogenic phosphorus loading. In the last paragraph tributaries and Metro are listed as sources. While not an inaccurate statement, it is misleading as 12 Metro represents 85% of the bioavailable phosphorus load. The 15% from the tributaries is only partly anthropogenic (Effler et al. 2002).
4.	16	The single value of dissolved solids loading from Solvay Wastebeds 9-15 (**P**1) to Ninemile is potentially misleading. For what year does this estimate apply? A progressive decreasing trend has been documented 13 (Matthews and Effler 2003).
5.	21	Why aren't load estimates presented for the various contaminants, according to the identified sources? The fifth item under the second bulletin asserts groundwater inputs as the most important loading 14 pathway for several contaminants. Are any related loading estimates available?
6.	21	Resuspension of the ILWD as a significant source of Hg (and other contaminants) to the lake, perhaps the largest internal input? The potential of this pathway has been established, but the magnitude has 15 not. This would have required application of appropriate quantitative tools (model(s)). The profundal sediments as a major source of Hg, also lacks quantification. These two (2) assertions (ILWD) and profound sediments) are repeated in several instances through the following portions of the report.
7.	22	Several potential features of Hg cycling are presented but remain

16

largely unquantified. Their relative importance can only reasonably be represented within credible models. One area of particular concern is the role of littoral sediments in supplying methyl mercury to the lake. If this is an important pathway, it would challenge the effectiveness of hypolimnetic oxygenation as a management approach.

Hypolimnetic accumulations are transported to overlying waters during 17
the approach to fall turnover, not after turnover (last bullet under mercury).

8. 23 First item under "Calcite Precipitation and Ionic Wastes". There is no 18
evidence that remediation of the Mud Boils has resulted in reduced in-lake sedimentation rates. Recently presented findings (6th Annual Onondaga Lake Research Forum; Prestigiacomo et al. 2005. Insights from the Robotic Water Quality Monitoring Network. III. Sediment Loading in Onondaga Creek) indicated no systematic reduction in solids loading from Onondaga Creek. Perhaps this reflects the large residual in-stream sediment deposits from earlier mud boil inputs.

9. 39 What is the precedence for the PECQ approach adopted, including its 19
manner of determination? How many SuperFund sites have adopted this approach? Is there any support for the approach in the peer-reviewed literature?

10. 42 What is the State's position with respect to having to base sediment 20
clean-up initiatives on acute toxicity testing results rather than chronic toxicity testing observations?

11. 53 Aeration will of course interact strongly with the effects of domestic 21
waste inputs. Does the state agree the interplay between manifestations of industrial and domestic waste discharges in response to this action will need to be tracked carefully?

12. 54 Monitored Natural Recovery. Despite the major reduction in 22
deposition/sedimentation brought about by the reduction in Ca^{2+} loading, associated with closure, most of the continuing sedimentation is arguably associated with residual effects of the industry. Specifically, external sediment loading is dominated by mud boil inputs (via Onondaga Creek), and internal sediment production of $CaCO_3$ inputs. This needs to be made clear to all stakeholders.

References

Effler, S.W. and D.A. Matthews. 2003. Impacts of a soda ash facility on Onondaga Lake and the Seneca River, NY. Lake and Reservoir Management **19**:285-306.

Effler, S.W., S.M. O'Donnell, D.A. Matthews, D.M. O'Donnell, M.T. Auer and E.M. Owens. 2002. Limnological and loading information and a phosphorus Total Maximum Daily Load (TMDL) analysis for Onondaga Lake. Lake and Reservoir Management **18**:87-108.

Matthews, D.A. and S.W. Effler. 2003. Decrease in pollutant loading from residual soda ash production waste. Water, Air and Soil Pollution **146**:55-73.

CITIZENS CAMPAIGN
FOR THE ENVIRONMENT

Protecting the environment and working for a healthy world.

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November 29, 2004

Commissioner Erin Crotty
New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12233

6-5

DEC - 2 2004

Dear Ms. Crotty,

RE: CCE Request for Additional Public Hearings for the Onondaga Lake Remediation Plan

Citizens Campaign for the Environment (CCE) is an 80,000 member, not-for-profit, non-partisan advocacy organization working to protect public health and the natural environment throughout New York State and Connecticut. CCE operates from five regional offices across New York State and interacts with New York and Connecticut residents to advance sound environmental policies throughout the year.

CCE congratulates the Department staff that worked so hard on preparing the proposed clean up plan for Onondaga Lake. We look forward to reviewing and offering input to this important document. 1
CCE commends the Department's decision to extend the public comment period to ninety days; however, we believe the single public meeting scheduled for January 12, 2005 is insufficient. **CCE is respectfully requesting that the Department add at least two additional public hearings scheduled during the month of February.**

It is our view that it is paramount to rigorously involve and engage the public during the public comment period. CCE believes the one public hearing shortchanges the public comment process, especially following the busy holiday season. Understanding that the proposed plan is more than 12 years in the making, CCE believes the public deserves at least ***three opportunities*** to attend a public hearing to voice their opinion and hear other opinions on the clean-up plan options. Additional public hearings will allow more citizens the opportunity to reflect and provide meaningful and substantive comments about the public's preferred clean up alternative.

Thank you for your thoughtful consideration of our request. I look forward to your response.

Sincerely,

Dereth Glance
Program Coordinator

RECEIVED
DEC 10 2004
REMEDIAL BUREAU B

CC: Kenneth Lynch, NYSDEC Region 7 Director
Adrienne Esposito, CCE Executive Director

DEC - 8 2004
$ 7406

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March 1, 2005

6-6

RECEIVED
MAR - 3 2005
REMEDIAL BUREAU B

Donald Hesler/Timothy Larson
Onondaga Lake Superfund Site—Public Comment
New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12233-7016

RE: Comments on the Onondaga Lake Bottom Subsite of the Onondaga Lake Superfund Site Proposed Plan

Comments by Citizens Campaign for the Environment

Citizens Campaign for the Environment (CCE) is an 80,000 member, not-for-profit, non-partisan advocacy organization working to protect public health and the natural environment throughout New York State and Connecticut. CCE operates from five regional offices across New York State and interacts with New York and Connecticut residents to advance sound environmental policies throughout the year.

CCE has participated in Superfund remediation efforts across the state including the Hudson River, Brookhaven National Laboratory, LiTungsten and others. CCE has been monitoring and participating in the Onondaga Lake remediation efforts since opening our Central New York/Finger Lakes Regional Office in 2002.

CCE supports remediation of the Onondaga Lake Bottom that is sufficiently protective of human health and the environment. CCE has been an active participant the comment period on the Onondaga Lake Bottom Subsite of the Onondaga Lake Superfund Site Proposed Plan, herein referred to as the Proposed Plan. CCE has worked to gain a thorough understanding of the Proposed Plan to raise founded concerns, offer meaningful solutions, and to educate the public about the Proposed Plan. CCE staff met directly with New York State Department of Environmental Conservation (Department) Region 7 staff, Honeywell International representatives, and independent scientists. CCE has interacted with Department Proposed Plan experts at multiple public availability sessions, offered testimony and comments at both public hearings, and participated in forums held by community organizations.

Onondaga Lake Background and Brief Discussion of Extent of Lake Bottom Pollution

Considered one of the most polluted lakes in the world, Onondaga Lake, located on the northwest side of Syracuse, NY, was once a celebrated resort area and continues to be considered sacred waters by the Onondaga Nation. A symbol of peace and democracy, Onondaga Lake hosted the historic gathering of Native American nations to plant the tree of peace—to symbolize the end of war, killing and violence and form the Confederacy or Haudenosaunee.

However, a century of abuse left a legacy of industrial chemical and municipal sewage contamination in Onondaga Lake. Inadequate sewage treatment led to a ban on swimming in 1940. Fishing was banned in 1970 because of industrial mercury contamination. The fishing ban prompted the New York State Attorney General to sue Allied Chemical Corp. (later known as AlliedSignal, which is present-day Honeywell) to stop mercury dumping, which was calculated to be 22 pounds of mercury per day. A total of 82 tons of mercury and other chemicals have been discharged into the lake over the last century. In 1995, Onondaga Lake was added to the Federal Superfund National Priority List.

The Proposed Plan is a result of years of remedial investigations and feasibility studies to understand the extent of pollution and present pollution remediation strategies. Onondaga Lake bottom sediments are contaminated with persistent industrial toxic waste discharges of volatile organic compounds (VOCs), oils and petroleum derivatives, polychlorinated biphenyls (PCBs), dioxins and furans, and mercury. Initial sampling have detected these contaminants as deep as 27 feet below the lake bottom in the most contaminated area of the lake, commonly referred as the In Lake Waste Deposit (ILWD) or Sediment Management Unit (SMU)1, 2, and 7.

Discussion of Alternatives

In the Proposed Plan, the Department proposed seven alternatives for Onondaga Lake Bottom remediation. The required "No Action Alternative" and six additional alternatives that all propose a combination of dredging contaminated lake bottom sediments and capping. The alternatives most significantly differ on the quantity of sediment removal through dredging. The Department recognizes that alternatives six and seven "would provide greater long term effectiveness than Alternative Four (the preferred Department alternative), but that the quantity of dredged material would "likely exceed capacity of a single [Sediment Containment Area] SCA."

CCE recognizes the technical limits to removing 100% of the contamination and understands the real physical constraints of depositing quantities of contaminated dredged
1 material that would exceed more than one SCA. In general, CCE supports the dredging and isolation and thin layer capping approach to remediate the Onondaga Lake bottom.

<u>Comments</u>

After careful review of the proposed plan, in general CCE supports the Department preferred alternative four, contingent upon acceptance of our following comments: 2

1. **Ensure lake bottom remediation plan transparency and citizen participation.** The Department's preferred alternative, like all other alternatives presented, is conceptual. Many of the key decisions, including the appropriate depths to dredge, thickness of isolation caps, construction design of a proposed hydraulic control system necessary to maintain cap effectiveness, aeration pilot study, and non-hazardous dredged material landfill or Sediment Contaminant Area (SCA) design and specific location, and scope of monitoring requirements---will be made during the Remedial Design Phase. The Remedial Design Phase is the time between the issuing of the final Record of Decision (ROD) and construction. Our current understanding is that the Design Phase will not be a public-participatory process. **CCE strongly believes that transparency and citizen participation throughout the entire process is necessary to gain community support, confidence, and acceptance.** 3

   <u>Recommendation #1</u> **CCE recommends that the Department establish a Citizens Advisory Committee (CAC).** CCE believes the CAC should advise, provide guidance, and support to Onondaga Lake remediation efforts. CAC members should meet on a regular, perhaps monthly basis, to review plan implementation, provide input on design phase decisions, and receive reports on Onondaga Lake remediation progress and challenges. **The CAC should consist of members representing the Onondaga Nation, scientists, environmentalists, local government officials, and concerned citizens.** Such CACs are well established throughout New York State and the nation and have been beneficial to government agencies, stakeholder organizations and the general public. A CAC would be an easily accessible stakeholder body to consult the public with any unforeseen scenarios, such as an ineffective ground water barrier. CAC members would gain a deeper technological understanding of the remediation effort and could assist in efforts to help inform the public. CCE respectfully requests consideration of membership on the CAC.

2. **Provide formal public participation opportunities on especially controversial components of the Remedial Design Phase.** The proposed plan calls for dredged contaminated sediments to be placed in the Sediment Containment Area (SCA) or if considered hazardous waste, the dredged material will be transported to an offsite permitted hazardous waste site. The SCA is proposed to be built upon one of the Solvey wastebeds, currently classified as category III hazardous waste site by New York State. The final SCA design will be determined by geotechnical testing and screening. Conceptually, the plan calls for the SCA to meet all federal and state requirements and will minimally have an impermeable liner installed, leachate collection and treatment, and an isolation cap. During our interaction with the community throughout the comment period, CCE heard, on a number of occasions, 4

significant community concerns about the SCA. **In general, CCE supports the conceptual design of the SCA, however CCE strongly believes direct public participation on this remediation component is appropriate, necessary, and imperative for community acceptance.** The public has a right to review the specifics of the actual SCA design, review alternative designs, and have the Department consider their comments.

<u>Recommendation #2</u> CCE believes the Record of Decision should guarantee the public that the SCA will be subject to a full Environmental Impact Statement (EIS). Once the engineering and design are complete for the SCA, CCE believes an official public comment period of at least ninety days should be required to provide the public ample opportunity to participate.

5 3. **Actively integrate upland remediation and continued reduction of contaminant loads to support the Onondaga Lake Bottom remediation project.** CCE supports the Department's proactive approach to coordinating the multiple remediation efforts to reduce pollutant loading to Onondaga Lake through Interim Remedial Measures (IRM) like the Willis/Semet Barrier. ***CCE believes this same level of coordination with ongoing remediation efforts should include Department permitted loadings to Onondaga Lake from the Metropolitan Syracuse Wastewater Treatment Plant (Metro) discharge.*** CCE is highly concerned with the Draft State Pollutant Discharge and Elimination System (SPDES) permit number NY-002708, which is currently open for public comment until March 28, 2005. CCE plans on submitting formal comments on the SPDES permit, but believes the following points relate directly to the efforts to remediate the Onondaga Lake bottom. In the draft permit, the Department finds it "reasonable" to increase the permitted amount of mercury discharged from Metro outfall 001 to be 0.52 lbs/day. The three-year daily maximum of mercury from Metro has been 0.196 lbs/day for total recoverable mercury. Additionally, the Department is proposing to require Metro to monitor mercury for only one year.

CCE believes that permitting over 180 lbs of mercury per year into a portion of Onondaga Lake that will be dredged to remove mercury contaminated sediments and subject to an isolation cap to protect human health and the environment from mercury violates the spirit and intent of the Proposed Plan. Furthermore, CCE finds the limited monitoring requirement of Metro mercury discharges to be completely insufficient. CCE will reiterate these comments in our formal comments on draft SPDES number NY-002708. Understanding that Onondaga lake continues to experience mercury loading from atmospheric deposition, CCE urges the Department to scrutinize and reduce all point sources of mercury so that the remediation efforts required by Federal and State law achieve the stated goal of the Onondaga Lake bottom remediation effort.

6 <u>Recommendation #3</u> CCE supports Atlantic States Legal Foundation's call for a "detailed matrix to be prepared that clearly defines all of the subsites for the Onondaga Lake Superfund Site with the schedules, remedies, technical contact

people, etc." which would also integrate all known or suspected sources of contaminants of concern or CPOI, including, but not limited to discharges from Metro, atmospheric deposition, non-point source pollution, and contaminated groundwater.

4. CCE specifically supports the adoption of the following in the Record of Decision.

   a. **Conservative assumption on the groundwater upwelling rate.** For use in developing the cap model, the Department has chosen a more conservative groundwater upwelling rate of 2.4 inches/year. This figure results in lowering hot spot concentrations that trigger additional contaminated sediment removal and is done so to help ensure isolation cap effectiveness. *CCE strongly supports the Departments erring on the side of caution when it comes to protecting human health and the environment.* 7

   b. **Additional sediment removal if the action levels for contaminants of concern are detected at greater depths.** CCE supports the Department requiring additional contaminated sediment to be removed if the contaminant concentrations exceed threshold values below 3.3 feet (1meter) dredge cut. 8

   c. **The goal of no loss of lake area or volume.** Onondaga Lake has a large watershed, provides an important role in the Lake Ontario basin, and to whatever extent possible, should not be filled in. 9

   d. **Hydraulic dredging technology.** CCE finds mechanical or clamshell dredging to be environmentally insensitive due to excessive sediment resuspension. CCE considers clamshell dredging be an antiquated and less effective toxic sediment remediation technology. 10

   e. **The remediation goals for sediment, biological tissue and surface water.** In particular, CCE understands that achieving pollutant fish tissue concentrations that are protective of humans and wildlife that consume fish is a long term goal and should be supplemented with public education and outreach efforts to protect human health in the near term. 11

   Recommendation #4 CCE strongly believes the Department should require public education and outreach efforts about the risk to human health from consuming Onondaga Lake fish as part of the remediation plan to protect human health.

Conclusion

Recognizing the court-defined time constraints surrounding the Proposed Plan, CCE
especially appreciates the Department's efforts to be available, flexible, and responsive to
citizen concerns, advice, and comments during this process. CCE supports the conceptual
12 Onondaga Lake Bottom remediation plan Alternative Four that addresses the above outlined
concerns and adopts the above recommendations. CCE looks forward to the Proposed Plan
moving forward and ending the legacy of toxic industrial contamination in Onondaga Lake.

We thank you in advance for careful consideration of our comments.

Sincerely,

Dereth Glance
Program Coordinator

cc:
Ms. Adrienne Esposito, CCE Executive Director
Ms. Denise Sheehan, NYSDEC Acting Commissioner
Ms Kathleen C. Callahan, EPA Region 2, Acting Regional Administrator
Honorable George Pataki, New York State Governor
Honorable Elliot Spitzer, New York State Attorney General
Honorable John DeFrancisco, New York State Senate
Honorable David Valesky, New York State Senate
Honorable Joan Christiansen, New York State Assembly
Honorable William Magnarelli, New York State Assembly
Honorable Jeff Brown, New York State Assembly
Honorable Nicholas Pirro, Onondaga County Executive
Honorable Matthew Driscoll, Mayor, City of Syracuse
Honorable James Walsh, United States House of Representatives
Honorable Sherwood Boehert, United States House of Representatives
Honorable Charles Schumer, United States Senate
Honorable Hillary Rodham Clinton, United States Senate

Sierra Club/Iroquois Group
PO Box 182
Jamesville, N.Y. 13078

Donald Hesler/Timothy Larson, Onondaga Lake Superfund Site-Public Comment
NYSDEC
625 Broadway
Albany, N Y, 12233

Gentlemen,

The Sierra Club, Iroquois Group (Central New York), Executive Committee appreciates the opportunity to comment on the Proposed Plan for Onondaga Lake Superfund Site.

We congratulate both DEC and Honeywell for the outreach to the community in the many meetings held throughout the county. 1

The most impressive effect of this outreach is that there is finally a public awareness and hope for the future of the lake. A public that has seemed for years to give up on the possibility of a rehabilitated lake. A public that preferred to "Loop the Lake" than even mention remediation. A public that accepted a toxic lake as inevitable, like lake effect snow.

Now that hundreds are aware and concerned, we request that the DEC and Honeywell informational web sites and newsletters be augmented by a weekly "State of the Lake" in the local Sunday paper-like the one that has promoted Destiny for years. This would include questions and answers. 2

This action would assure that the public concerns could be constantly addressed and the public drive to see this action through would be kept alive.

This same venue (newspaper) should also be a procedure for establishing goals, or end-points, for the cleanup action. A vision for the lake would have check points at which the goals would be reevaluated. These goals should be established with public participation and include all other sites, metro, etc.

One of the remedial goals in the PP is edible fish tissue, by humans and wildlife. Another is to achieve surface water standards. These goals need to be put to the public for input and/or revision. Goals that also may be affected by scientific realities.

Dredging, storage, and transportation of contaminated sediments should include input from the State and County Health Departments and constant monitoring and communication with the people in close proximity to the chosen Solvay Waste Bed. 3

We support the start of actions to clean up the lake as soon as practical and the long term monitoring programs, especially inspection and repairs for cap effectiveness. 4

Thank you for the opportunity to comment on this most important action.

Martha Holly Loew, Chair
Sierra Club, Iroquois Group.

(comment received via e-mail from mloew@twcny.rr.com on 3/1/05)

ONONDAGA AUDUBON SOCIETY, INC.
Box 620 Syracuse NY 132010620
February 16, 2005

Re: Comments regarding the proposal to restore Onondaga Lake by the NYS DEC -

The Onondaga Audubon Society was formed in 1950 and, as the Society grew in membership, field trips increased and new birding areas were discovered. One of these sites was the southeast shore of Onondaga Lake. The area from the mouth of Nine Mile Creek to the south east corner had hundreds of shorebirds stopping there in the early summer. These birds had already bred in the far north up to the arctic circle, and were on their way to winter in South America. Probing their bills into the sandy shore, they found plenty of tiny insects and many other sources of food. As the summer passed, new species would arrive as others left, much to the pleasure of the birders. The Shorebird migration ended in mid September.

As more birders came, more species were found, including some very rare shorebirds from the British Isles. During the 1960's, Onondaga Lake was one of the best place to see shorebirds in Upstate New York. By 1972, there were 31 different species of shorebirds.

Unfortunately, a new, very aggressive weed from Europe, Phragmites, began to occupy the areas around the south shore and seemed to get worse once RT. 690 was finished. Phragmites are now all along the interstate highways. They grow to six feet and have a wavy gray top. Birds and mammals leave these areas. By 1975, the Phragmites was so dense that the shoreline disappeared. Shorebirds had no place to land and passed by. Now, you have to go to Montezuma NWR to see shorebirds. Unfortunately, one needs a powerful telescope to see them. Shorebirds continue to fly over the Onondaga Lake in summer but they have no place to land.

The OAS Proposal to restore the south east shoreline of the Lake:

1. **Remove the Phragmites**. It can be done with special mitigation procedures. People will be a great deal happier if they can see the Lake and, with a re-constructed beach, the shorebirds will come. 1

2. **Control Dogs on the loose**. Dogs will disrupt shorebirds and chase them away. If dogs are loose on the pathway, the most effective method is fencing certain places along the shore to keep dogs out.

3. **Build observation blinds** in two locations, one to view the outlet of Nine Mile Creek and another further to the east to view the southeast corner of the Lake. These blinds could be connected with the fencing in each specific area.

4. **Plant trees and shrubs** on the hill behind the pathway using species that will attract song birds.

Robert E Long MD

Robert E. Long MD 989 James St. Apt 9H Syracuse, NY 13203 4750681

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State University of New York
COLLEGE OF ENVIRONMENTAL SCIENCE AND FORESTRY

MAR - 1 2005

February 25, 2005

Kenneth P. Lynch,
Regional Director
NYS DEC Region 7
615 Erie Blvd. West
Syracuse, NY 13204-2400

Dear Ken:

Thank you for your presentation to our ESF group on February 21. Attached is the letter that Neil Ringler sent to Tim Larson for the March 1st deadline. We hope that you will take a look at it, as it details some of the reasons for our excitement about working together as the Plan moves forward.

We would like to propose a structure for SUNY ESF to contribute to the design and monitoring of the activities outlined in the Plan. Representatives of several of our Faculties are highly motivated and prepared to participate in the plan, both during the design phase and in the various monitoring aspects. These Faculties (Departments) include Environmental and Forest Biology, Environmental Resources & Forest Engineering, Chemistry, and Landscape Architecture. A partial list of faculty ready to participate is attached.

We propose three elements at this stage:

1) A guided set of meetings at approximately bi-monthly intervals to coordinate the many complementary elements of ESF's participation in the Plan. Neil Ringler would take responsibility to coordinate these on behalf of ESF. These meetings would also include close colleagues at Upstate Freshwater Institute and Syracuse University who have shown interest and productivity in contributing to the scientific solutions of the lake and its watershed. The meetings would be coordinated with those of the Partnership and other interested parties. We would propose a formal role with the Partnership team if possible. Products of the meetings would include recommendations and steps for implementation of the aspects of the Plan that are particularly well understood by the academic community. 1

2 2) A set of seminar/courses beginning Fall 2006 that deal with some of the major issues and opportunities in the lake. These courses, initially at the graduate level, would include as participants/instructors the people actually taking responsibility for the plan, including NYSDEC regional biologists and engineers, Honeywell scientists/engineers, and in some cases subcontractors and ESF/SU scientists and engineers.

3 3) 3) A comprehensive monitoring plan that develops a practical approach to blending the existing County plan with university scientific monitoring

We look forward to further discussing this proposal, and would be pleased to meet anytime to work out details and develop a time table.

Sincerely,

Cornelius B. Murphy Jr.
Cornelius Murphy, President

Neil H. Ringler
Neil H. Ringler, Chair
Faculty of Environmental & Forest Biology

Cc. Lynette Stark

6-10

State University of New York
COLLEGE OF ENVIRONMENTAL SCIENCE AND FORESTRY

February 25, 2005

"Onondaga Lake PP Comments"

Donald Hesler/Timothy Larson
Onondaga Lake Superfund Site- Public Comment
NYS Dept. Environmental Conservation
625 Broadway
Albany, NY 12233-7016

Dear Sirs:

My letter is written from the perspective of Chair of the Faculty of Environmental and Forest Biology at SUNY ESF, a broad and capable group with interest and expertise in the Onondaga Lake system (faculty in several other ESF departments bring additional expertise and experience). I also write as a scientist engaged directly in ecological studies of the lake: my graduate students and I have worked on the littoral habitats and fisheries since 1986. I have taught many undergraduate students on the shores of the Lake, and I have lived in nearby Baldwinsville since 1975.

I am generally pleased with the proposed plan. Technical pitfalls such as the 1
problems that would emerge if oxygenation cannot bring SMU 8 into compliance will doubtless be addressed by many others during this comment period, and thereafter. It was encouraging to see our 1990's work on littoral habitat cited and considered during the remedial investigation. It was refreshing to learn that habitat (not solely waste
removal and risk reduction) was a central feature of the plan. I believe that the apparent 2
positive responses of such a broad sector of the scientific and neighborhood community were tied to the flexibility provided during the design phase.

In addition to the work carried out with EPA support during the 1990's, the Onondaga Lake Cleanup Corporation/Habitat Team has made substantial headway in assessment of a Permanent Habitat Module on the northwestern shoreline, near a recently connected wetland. These data appear to represent the only recent, detailed data that might be of particular application during the next three years of design. This work and the more extensive experimental base that preceded it will need to be integrated into the overall assessment plan.

As indicated at recent meetings (Air and Waste Management Association in 3
Syracuse; Honeywell technical personnel and later with Mr. Ken Lynch at ESF), the new plan provides a great educational opportunity for students of all levels at SUNY ESF. The proximity of the teaching learning enterprise to the Onondaga Lake system provides an enormous opportunity to fashion unique and timely responses and solutions to the problems that lie ahead. The College is also in a strong position to help to fashion an appropriate and lasting Vision (2020 or beyond); many of us have worked energetically under the earlier and more restricted Salmon 2000, which was a significant impetus for

many projects. Dozens of interactions over many years have shown that local community people look to the College for its expertise and commitment to restoration of lake habitats.

In addition to contributions to the design phase, the resources and facilities at ESF would be highly valuable in monitoring many aspects of the plan. Current funding to university personnel is highly restricted, as most monitoring has been subsumed by county programs. Although these programs are themselves monitored and have been evaluated by NYSDEC, there are many reasons to encourage a broader base of monitoring and particularly of assessment and analysis.

I look forward to the opportunity to work energetically to coordinate and focus our teaching/learning opportunities in our Environmental & Forest Biology Faculty and at ESF as the design phase of the work moves forward. On behalf of my students and colleagues, I thank NYS DEC for the extensive opportunities to learn about the Plan and to provide constructive input.

Neil H. Ringler

Neil H. Ringler
Distinguished Teaching Professor and Chair
Faculty of Environmental and Forest Biology
SUNY College of Environmental Science and Forestry
Syracuse, NY 13210 (315) 470-6770

ATLANTIC STATES
LEGAL FOUNDATION, INC.

25 February 2005

Donald Hesler/Timothy Larson
Onondaga Lake Superfund Site – Pubic Comment
New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233-7016

Re: Onondaga Lake PP Comments

Gentlemen:

The attached comments represent Atlantic States Legal Foundation's formal submittal to the hearing record for the PRAP for Onondaga Lake Bottom Subsite of the Onondaga Lake Suerfund Site (Lake Bottom). Our submittal consists of this letter followed by a copy of our submission of 27 January 2005 to the National Remedy Review Board of EPA and some additional materials submitted here for the first time. As you have previously received a copy of our previous submitted detailed report on the geo-spatial analysis of sediment contamination in Onondaga Lake, which was resubmitted to EPA as Appendix A of our comments, we are not attaching another copy with these comments. If you need another copy, we can submit one to you on CD.

The comments submitted have been prepared by Atlantic States Legal Foundation with the assistance of our technical consultants Hughes Consulting Services and Geographical Modeling Services. Financial support for employing these technical consultants is acknowledged from the EPA TAG program.

We appreciate the opportunity to discuss details of the PRAP with you and your consultants as well as with Honeywell and their consultants. These meetings greatly improved our understanding of the objectives and the substance of the complex PRAP document. We hope that our comments will be valuable to you as you prepare the final ROD for this subsite. Basically our comments analyze some of the scientific and technological basis for your proposal action alternative and encourage some alternative analysis and conclusions from your work. Further, we suggest other necessary work that must be done to maximize the public benefit from this large expenditure of funds and to further insure the integrity of the process. Some of this additional work needs to be incorporated as part of the ROD and other items are probably better handled as side agreements with Honeywell.

658 West Onondaga St. Syracuse, NY 13204-3711 (315) 475-1170 FAX (315) 475-6719 Atlantic.States@aslf.org

Our comments are meant to stand alone along side of the PRAP and the various technical submittals upon which it was based. Obviously, these are very lengthy and complex documents and our time and resources to analyze them was less than ideal amount. 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

Submission to New York State Dept. of Environmental Conservation
Comments on Onondaga Lake Bottom Superfund Sub-site
Atlantic States Legal Foundation, Inc.
28 February 2005

Upland Sites

Onondaga Lake is the receptacle and ultimate sink for all manner of contamination that originates anywhere within its basin. Clean up of the Lake Bottom can only logically take place after all other upland sites have been isolated so that no more contamination can enter the lake. The Onondaga Lake Superfund Site consists of many subsites. These subsites are all in various stages of remediation, but in only one case (Ley Creek Dredge Spoils) has remediation been completed. There have been completed RODs for several of them, IRMs are in process in various cases, but in other cases studies are in more initial stages. Subsites also continue to be added. 1

As part of the ROD for the Onondaga Lake Bottom, Atlantic States Legal Foundation requests that a detailed matrix be prepared that clearly defines all of the subsites for the Onondaga Lake Superfund Site along with the schedules, remedies, technical contact people, etc. This schedule should be incorporated by reference into the ROD for the Onondaga Lake Bottom Subsite. This analysis is necessary for both *technical* and *public policy* reasons. The technical reason is clear: to prevent any recontamination of the Onondaga Lake Bottom Subsite from any upland sites. The public policy issues relate to clarifying and protecting the public interest in the overall work of the Onondaga Lake Superfund Site. The overall clean-up effort is a mammoth and lengthy undertaking. Many different subsites are being studied and subsequently remediated, each at a pace of its own and under differing site managers. Contaminants and remedies are unique to each subsite. Keeping all of this clear is a hard task that would be made much easier with this matrix and related materials supplied by the department as part of the ROD.

Wetlands 2

We are concerned with two wetland areas that must be cleaned up as part of the overall remediation, but seem to be falling outside of the existing RI/FS process and so are not yet included in any proposed ROD. These two wetland areas are discussed briefly in terms of the Lake Bottom Subsite, but then moved off to another process. Note: we realize that there are additional wetlands that must be evaluated and investigated as part of the overall superfund site. Onondaga Lake has lost most of its important wetland areas and it is critical to the future of the lake ecosystem that what is remaining be restored as much as possible.

The sites that concern us here are Wetland SYW-12 at the mouth of Ley Creek and Wetland SYW-19 at the mouth of Harbor Brook. In the former case, this wetland was proposed as a wetland educational center and later determined to be too contaminated for any public access.

This area needs to be remediated and returned to use as important wetland habitat. The latter area is very critical habitat and needs to be restored. As recently as the 1970's, this area of the shoreline provided the most important Central New York resting area for migrating shorebirds on their way south from nesting areas in the Arctic. Although the mud flats have largely been overrun with invasive *Phragmites australis*, common reed, restoration of the area is feasible and desirable for the wildlife and as an asset to community residents who used to go and view the birds when they were visiting the area.

3 Contingencies

In a project of this size, it is almost a certainty that unforeseen circumstances will arise which will necessitate a change in plans. Bad weather, equipment breakdown, delays, etc. are all things that, for the most part, can be worked around. In contrast to these relatively minor difficulties, there are some aspects of the plan which play a pivotal role in the success of failure of the remedial design. Chief among these is the effectiveness of the groundwater barrier walls being constructed as part of separate IRMs. One of the main purposes of these walls is to reduce the rate of groundwater movement through the sediment from about 200 cm/year to less than 8 cm/year, a greater-than-25-fold reduction. The entire design of the dredging and capping scenario proposed by DEC is predicated on this reduction. If groundwater moves through the sediments at higher rates, then contaminants left behind after dredging will move up through the cap and re-contaminate the lake bottom.

At this time, we do not know whether the barrier walls, with associated groundwater pumping systems, will be able to accomplish this major reduction in groundwater flow. Success will depend, no doubt, on the ability of the engineers to establish a "tight fit" with the marl layer underlying Onondaga Lake. There may be significant construction issues as well, given the extremely soft nature of the waste material in Waste Bed B and Harbor Br. In any event, the ROD for the Lake Bottom must address the fact the barrier wall in still under design, and thus its effectiveness is as yet unknown. This would have major ramifications for the remediation of SMU-1 and SMU-7. We therefore request that the proposed plan include a scenario for which the barrier walls are found to be ineffective. In all likelihood, this would necessitate the removal
4 of significantly more waste and sediments from SMU-1 and SMU-7. The ROD should also make clear how the public will be informed of any changes in plans and how they can respond to any such changes.

5 Monitoring and modeling of organic pollutants

Organic pollutants are one of the key drivers for the remediation of sediments in Onondaga Lake. Much is known about the concentration of a wide range of contaminants in the sediments, including chlorinated benzenes, BTEX, light and heavy PAHs, and chlorinated dioxins/furans. However, almost nothing is known about the distribution of these compounds in the water column based on conventional sampling data collected during the remedial investigation. For the most part, analyses have yielded "non-detects." According to the FS (p. 1-30), di- and tri-chlorobenzenes were detected in only one of 98 lake water samples collected in 1992. Benzene and chlorobenzene were detected in two of 11 near shore samples collected and analyzed in

1999.

Alternative approaches to sampling and analysis are available which greatly improve upon detection limits. In particular, a sampling device developed by Dr. John Hassett at the College of Environmental Science and Forestry, called PISCES, is capable of detecting organic pollutants at low concentrations (< 1 μg/L) in water. PISCES was used by Hubbard (1996), working under the direction of Dr. Hassett, to monitor a wide variety of compounds in Onondaga Lake in 1993-94. Approximate concentrations[1] of *p*-dichlorobenzene are shown in Figure 1. As shown, there is a strong concentration gradient along the southwest shore of the lake, with the highest concentrations (~4.5 μg/L) along the "causeway" in SMU-2. Concentrations decrease to the east and north, which is expected given the prevailing counter-clockwise circulation pattern in the lake.

Additional monitoring of the lake was conducted in 2002? by Avallone, another of Dr. Hassett's students. While his research was focussed on gasoline contamination from motorboats, he found that dichlorobenzenes, xylenes, and naphthalenes were consistently present in the waters of the lake. His monitoring efforts were considerably more intensive than Hubbard's: 10-11 locations were sampled weekly over the period ___ to ____. Like Hubbard, he found that the highest concentrations of dichlorobenzenes were in the SMU-2 area.

Another sampling methodology employing filtration, followed by XAD resin, has been used to achieve very low detection limits for hydrophobic contaminants such as PCBs, chlorinated dioxins/furans, PAHs, and pesticides. Researchers working in the Great Lakes, Chesapeake Bay, New York Harbor, and elsewhere have employed this technology. [For example, Simon *et al.* (2003) investigated contamination in the aftermath of the World Trade Center disaster on Sept. 11, 2001 using XAD.]

There are two important conclusions to be drawn from the foregoing. First, techniques exist which can be used to measure the concentrations of organic pollutants at much lower concentrations than obtained using conventional EPA methods. Secondly, these techniques can provide invaluable data relative to: pollutant sources, movement of pollutants in the lake environment, and, most importantly, the effectiveness of remediation.

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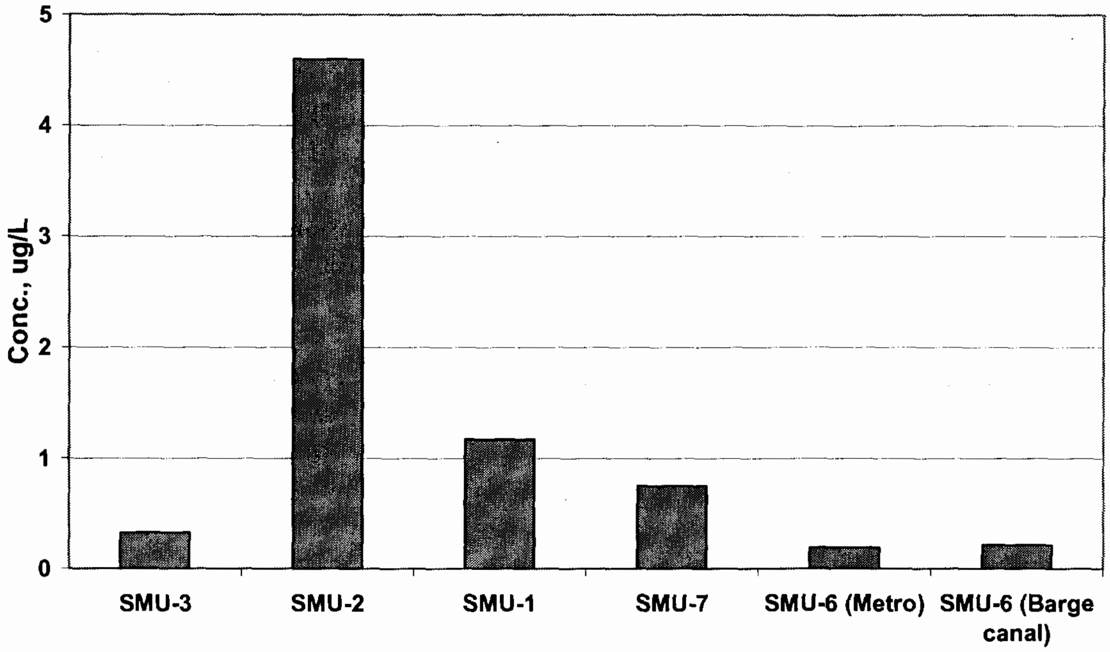
[1] Concentrations from PISCES are considered approximate because sampling rates are somewhat variable, depending on water velocity. In a lake environment, this variability is likely to be small.

Fig.1 Concentration of 1,4-dichlorobenzene in Onondaga Lake, Oct. 1993 - Sept. 1994. Based on mean PISCES data. (Hubbard, 1996)



6 Sediment Toxicity Criteria

<u>(a) Calculation of PEC</u>

The Proposed Plan for the Onondaga Lake Bottom provides an extensive description of toxicity criteria used to determine remedial areas and volumes (pp. 38-43). In short, two types of acute toxicity tests, a 10-day survival test using *Chironmis tentans* or *Hyallella azteca*, were used to derive five site-specific sediment effect concentrations. The five concentrations represent a smorgasbord of sediment toxicity criteria, stemming from various proponents: the ER-L/ER-M method developed by Long and Morgan (1991), the TEL/PEL method developed by MacDonald *et al.* (1994, 1996), and the AET method developed by Barrick *et al.* (1988) and subsequently adopted by the state of Washington.

The results of the toxicity tests, evaluated at 79 stations in Onondaga Lake and 5 in Otisco Lake (control site), were then geometrically averaged to develop a "Probable Effects Concentration" (PEC). While this approach has been advocated as "consensus-based" value, we do not necessarily concur. A more defensible approach, we feel, is to select either the ER-M or PEL values as reasonable indicators of acute toxicity.

Although it is not explicitly stated, we assume that the concentrations of all organic compounds were normalized to organic carbon content. This forms the basis for ER-L, ER-M, SEL and PEL for nearly every organic compound. Please verify that this was properly done.

A more fundamental problem with the PEC is that it **does not include any margin of safety for chronic toxicity.** The PECs are derived from mortality over a period of ten days. As noted in the FS (Appendix J, p. J.2-3), "the degree of response has also been shown to be greater in longer term, chronic, and/or sublethal tests." Unfortunately, chronic toxicity data are lacking for Onondaga Lake. It is our contention that the endpoint for sediment contamination should be below a level which causes significant acute or chronic toxicity to organisms which may inhabit the lake. The goal should be for a healthy ecosystem, not just a less-severely impacted one. Toward that end, we would recommend that a safety factor of 10 be applied to each site-specific PEC, or that the chronic toxicity screening level established by NYSDEC (1999) be applied, whichever is higher.

An alternative approach would be to recalculate the PECs *without the use of the Apparent Effects Threshold values*. Each AET identifies an endpoint where acute toxicity is always expected to occur. It therefore does not provide any margin of safety even from the point of view of acute toxicity, let alone chronic toxicity. It is worth noting that, in the discussion of site-specific sediment quality guidelines (Appendix J of Nov. 30, 2004 Feasibility Study), there are no references to the use of AET. All examples cited on pp. J.3-3 toJ.3-4 refer to ER-M and PEL values.

(B) Calculation of PEC Quotients 7

There are 43 contaminants of concerns, or CPOIs, considered in the RI/FS. Only 23 of these were used to calculate overall sediment toxicity as these "appeared to exhibit the strongest influence on observed acute toxicity on a lake wide basis." (Proposed Plan, p.41). We would support a more conservative approach, i.e. keep all CPOIs which may contribute toxicity. In examining the acute toxicity graphs in Appendix J, it is unclear why some contaminants were retained while others were rejected. For example, the correlation coefficient (r^2) for chironamid mortality and PECQ for toluene was 0.25, while the r^2 for monochlorobenzene was 0.22, essentially the same. But toluene was dropped from the list of CPOIs, while monochlorobenzene was retained. Why?

There is nothing gained by eliminating CPOIs from further consideration other than having to do fewer calculations. Since we live in age of computers and spreadsheet programs, this should not be a factor.

All of the remaining PECs were then amalgamated into a single factor: the PEC quotient (PECQ). The process for doing this seems to be extraordinarily convoluted. CPOIs were grouped into five categories:

- metals (mercury)
- aromatics (ethylbenzene and xylenes)
- chlorinated benzenes (mono-, di-, and tri-subsituted)
- PAHs (16 compounds)
- PCBs (total)

A mean PECQ was calculated for each chemical class, and then the five chemical classes were averaged. This approach inherently gives unequal weight to different compounds. Each PAH represents one of 16 compounds, so each PAH contributes 1/80 (1.25%) to the overall PECQ. Xylenes, assuming they are treated as a collective group, contribute 1/10 (10%) to the overall PECQ. Mercury individually contributes 20%. What justification can there be for this disparity?

We note that naphthalene, in particular, is a major contaminant in Onondaga Lake, and further that it does not necessarily correlate with other PAHs. The Wastebed B/ Harbor Brook sub-site is known to be heavily contaminated with naphthalene, for example. The distribution of light PAHs is markedly different from heavy PAHs, as illustrated in Figs. 1.21 and 1.22 of the FS.

There is no scientific justification for weighting the PECs unequally. Each contaminant should contribute to the total PECQ with equal weight. Admittedly, there are practical limitations to this due to the vagaries of analytical chemistry. PCBs are reported as "totals" or "Aroclors" and thus must be considered collectively. Similarly, it makes intuitive sense to group isomers such as the xylenes together. But, to the greatest extent possible, each contaminant should be added individually. This is consistent with "an implicit assumption that the contributions of each chemical to toxicity are additive." (FS, Appendix J, p. 3-6) This is unbiased and consistent with most toxicological observations.

In conclusion, we recommend that the framework for calculating the PECQs be revised as follows:

1. Include all 46 CPOIs.
2. Calculate a PECQ for each
3. Develop an overall mean PECQ

8 (C) Determination of an acceptable PECQ

Once an overall PECQ has been calculated, a threshold value must be established for specifying which sediments require remediation. The DEC has chosen an overall PECQ of 1.0, along with the separate PEC of 2.2 ppm for mercury. As noted in the Plan. "The mean PECQ of 1 was determined to be protective and selected as a remediation goal to address direct acute toxicity to benthic invertebrates." (p. 42) But, as further noted on p.42, "The mean PECQ methodology itself *does not* explicitly address chronic toxicity." (emphasis added)

The lack of protectiveness that setting the PECQ = 1 provides is illustrated graphically in Figures J.14 through J.18. Each of these graphs shows the relationship between chironomid or amphipod mortality and mean PEC quotient for varying exposure periods. We have selected PECQ = 1 as a point of comparing all four graphs. This is summarized below:

	Mortality		
Species	10-day	20-28 day	42-day
chironomid	13%	42%	No data shown
amphipod	7%	20%	24%

It is clear from the above that **a PECQ = 1 is not adequate to protect benthic organisms**: two out of every five chironomids is expected to die over a three-week period, and one out of every four amphipods is expected to die over a six-week period. Bear in mind that the background mortality rate at Otisco Lake was about 2 percent.

Once again, this points to the need for a much more conservative approach to setting an acceptable PECQ. Based on the limited data in Fig. J.17 (42-day amphipod mortality), we suggest that a PECQ of 0.3 might be adequate. While this may have little impact on remediation of those areas already selected for capping with clean sand, it can have a substantial impact on determining what additional areas might require dredging and/or capping.

Emissions of Hazardous Volatile Substances 9

There are numerous CPOIs which are highly volatile, and which are hazardous to human health. The sediments to be dredged from SMU-1 and SMU-2 contain substantial quantities of volatile organics. A list of the most important of these is given in Table 1 below. Average concentrations and quantities expected in the first pass of dredging at SMU-1 are listed as well.

Table 1. Average VOC concentrations and masses in SMU-1, first dredging pass (1.2 m). Total dredged volume = 318,000 cy. Potential emissions based on 100% volatile loss.

Compound	Avg. Conc., mg/kg	Mass, kg	Potential Emission rate, g/hr
Benzene	2.24	292	336
Xylene isomers	29	3,785	4,355
Toluene	4.2	548	631
Ethylbenzene	2.05	268	308
BTEX (total)		4,893	5,630
mono-CB	41.3	5,391	6,202
di-CB	49.4	6,448	7,418
tri-CB	5.9	770	886
total CBs		12,608	14,506
Naphthalene	42.2	5,508	6,337
TOTAL VOCs		23,010	26,473

We recognize that an analysis of potential emissions has been undertaken in Appendix L of the FS. We remain concerned about two issues:

a) Exposure of workers to NAPL at the dredging site.

We agree with the assessment that hydraulilc dredging is preferable to mechanical dredging since the potential for exposure to both workers and residents is much reduced. Nonetheless, as noted in Appendix L: "There is at least one area near the causeway in SMU-2 where pure-phase chlorobenzene liquids may exist." (p. L.4-5). It is later noted that "the only air quality issue associated with the point of dredge is the potential for the occurrence of NAPL containing VOCs in the dredge materials." (p.L.5-5) Modeling of air quality near the dredge operating in SMU-1 resulted in the following: "The maximum predicted air concentration of benzene at the point of dredging has the potential to exceed the OSHA PEL values...by a factor of 9." The text suggests the use of silt curtains baffles and booms to minimize exposure. This is a good start, but serious consideration must be given to foams and protective gear for workers as well.

10 b) Emission of contaminants from the Sediment Consolidation Area (SCA)

If the release of volatile organics is potentially an issue at the point of dredging, then surely it must be an even greater issue as the other end of the pipe. As noted above, NAPL which is currently bound in the pores of the sediments will be released when the material is disturbed by the dredgehead. Hopefully most NAPL will be sucked into the pipeline. This therefore will be an emission source at the SCA. Residences are located within one-half mile of Wastebed 13, the expected SCA site.

As shown in Table 1, there is thousands of kg of VOCs in these sediments. Concentrations vary greatly over space. Chorobenzene, for example occurs at a maximum concentration of 580 mg/kg in SMU-1 in the top 30 cm; dichlorobenzenes reach 393 mg/kg. When these pockets of highly contaminated sediments are encountered during dredging, there will be a large spike in emission rates at the SCA. It does not appear that this has been taken into account in the analysis presented in Appendix L.

We reiterate, then, that the SCA be preceded by a soil-washing/emission control system which would:

1) Capture emissions of volatile organics and NAPL. Floating NAPL can be intercepted using oil/water separator technology. Emissions could be destroyed through catalytic oxidation on-site, or condensed and sent off-site for disposal at a hazardous waste incinerator.
2) Greatly reduce organic contamination in the remaining sediments, thereby achieving a more permanent remedy under Superfund law.
3) Potentially recover substantial quantities of clean sand which could be utilized as cap material.

11 "Non-Honeywell" Pollutants

There are a number of contaminants in Onondaga Lake which are not unique to the Allied/Solvay Process operations on the western shore of the lake. These include:

PCBs
Heavy metals: arsenic, cadmium, chromium, copper, lead, nickel, and zinc
Other inorganics: aluminum, barium, cyanide, and selenium
Heavy PAHs and petroleum

With the exception of PCBs, which have been identified as bioaccumulative toxins, these substances have played a minor, if any, role in the remedial design.

There exists considerable evidence that these substances are having a detrimental impact on the lake environment. As noted in the FS, surface water criteria were exceeded for barium, copper, cyanide, lead, manganese, and zinc based on screening conducted for the BERA. In addition, heavy metal concentrations in deep-water sediments have been found to be well above the state-published "severe-effects" levels for metals in sediments, as shown in Table 2.

Table 2. Maximum concentrations in Sediment core S51, compared to New York State Severe Effects Levels (NYSDEC, 1999)

Element	Max. concentration (mg/kg)	SEL (mg/kg)	Exceedance Factor
cadmium	42	9	4.7
chromium	760	110	6.9
copper	375	110	3.4
lead	310	110	2.8
mercury	67	1.3	51.5
nickel	220	50	4.4
zinc	600	270	2.2

We submit that many of these substances should be given greater scrutiny. This is particularly true in assessing the success or failure of "monitored natural recovery" in SMU-8. This is not intended to detract from the importance of monitoring the 'Honeywell" contaminants—mercury, chlorobenzenes, and the like—but rather to emphasize the need to monitor these other contaminants as well. A successful remedial strategy must address all contaminants to the ecosystem.

To date, the entire investigation (RI), human and ecological risk assessments (HHRA, BERA) and Feasibility Study have been borne by Honeywell. We wonder about the involvement of other companies or institutions which have contributed contamination to the lake. At what point will GE and or Martin-Marietta Corp., a known contributor of cadmium to the lake, be brought into the process? Ley Creek has been a known source of PCBs and other compounds. Three Onondaga Lake sub-sites, General Motors Fisher Guide Plant; the creek dredgings, and the Town of Salina landfill, have all been sources to Ley Creek. How will these be addressed? 12

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Submission to EPA
National Remedy Review Board
Onondaga Lake Bottom Superfund Sub-site
27 January 2005
Atlantic States Legal Foundation, Inc.

We acknowledge and appreciate efforts by Honeywell and DEC to find a remedy for the contamination in Onondaga Lake and to include wide public involvement in these discussions. ASLF has benefited from extensive conversation with both Honeywell and DEC. At this point, ASLF is not prepared to take a position in favor of either the DEC or the Honeywell preferred alternatives. **We support getting started on actions to clean up and rehabilitate the Onondaga Lake Bottom. We agree that dredging and capping are necessary and design work leading to this work should commence as soon as practical.** At this point ASLF cannot comment on the extent of dredging and capping we feel is necessary. However, we do feel that organic contaminants, especially those that are liquid and volatile should be removed from under and within sediments in their entirety. Furthermore, we would insist that no loss of volume or surface area of the lake be allowed. 13

There is no sense in starting to remediate the Lake bottom if there are still pollutants entering the lake from upland sites. DEC should develop a matrix of all actions required from the Onondaga Lake Superfund Site, from closure plans with Allied (Honeywell), from state hazardous waste site remediation, from voluntary clean-ups, and any other regulatory measures that influence contamination of Onondaga Lake. This should be made available to the public and must form the basis for remediation schedules. 14

Vision: The entire community should be involved in a debate leading towards a vision for Onondaga Lake and its basin. This vision must take into account scientific realities, for example, the famous Onondaga Lake Whitefish was likely an endemic species which is now extinct. However, a vision is needed to develop end points in the clean up – not just the clean up of the Lake Bottom, but of all the sub-sites, Metro, habitat restoration, etc. The detailed remedial design must contain a habitat restoration plan. Developing the objectives of this plan involves public policy that can only profitably and democratically come from a thorough visioning exercise. Honeywell admitted to ASLF that they were uncomfortable having to make certain assumptions about habitat objectives absent any clear public policy determinations. This void in the entire lake clean up program should be filled as soon as possible. ASLF realizes that this might be beyond the purview of the Superfund program. However that doesn't mean it isn't necessary for a successful outcome of the Superfund clean-up program for the lake. 15

Monitoring: An extensive, long-term (at least 30 years, but really, indefinite) monitoring plan must be developed. This normally would be developed by Honeywell and the work would be largely done by them. DEC would have to approve the plan and would oversee its implementation. ASLF feels strongly that an independent scientific team must be assembled to develop this plan. The monitoring work would need to be 16 done very carefully with full involvement of biostatisticians, chemists, environmental modelers, and others. Monitoring must be coordinated with the extensive County monitoring plan. An end point needs to be established that would provide a means of determining success of the remediation. An end point is needed regardless of using a "build and measure" approach or using mathematical models for significant parameters. An outside peer review team should critique the plan before it is implemented. Ideally an outside, neutral group should be assembled to implement the plan as well.

17 The plan will be costly to implement. The estimate is $3,000,000 per year in today's dollars. ASLF believes that Honeywell should pay up front for this work by creating a fund just to be used for this purpose. There are too many cases of companies disappearing over a long period of time and thereby leaving the community in the lurch for this necessary work. Although it might be beyond the legal scope of Superfund to require this, Honeywell has indicated to ASLF that they might be willing to establish such a fund and so it must be seriously considered.

18 Finally and most critically, the monitoring must begin immediately. Baseline data is needed to validate model predictions (see below) and to make sure there is a statistically significant data base if a "build and measure" approach is used exclusively. How can we tell if the plan is working, if there isn't any baseline monitoring?

19 **Modeling:** In preparation of the FS and then in the PRAP, no predictive models for long-term trends in the major pollutants in the environment were employed. There was a nine-month effort to develop a mercury model, but that effort, deemed useless, was cancelled. Predictive, mathematical modeling should be done for the most important pollutant parameters. These include mercury, chlorinated benzenes, PCBs, and PAHs. A sampling protocol should be developed immediately and sampling for the models begun as soon as possible so that three years of baseline data can be collected before the actual dredging and capping begins. Ideally the work should be done by an outside consortium of scientists coming together for this purpose. Honeywell should create a fund to pay for this work. An outside peer review group should be convened at key stages of the work. Only with such a model will we be able to predict how much clean up is necessary to assure edible fish flesh for human and animal consumption. If this isn't considered a Superfund requirement, then negotiations outside of the Superfund program should take place leading towards an acceptable protocol for developing, testing, and using these models.

20 **Public Participation**: Dealing with the clean up and rehabilitation of Onondaga Lake is very complex presenting many scientific, engineering, economic, and public policy challenges. Help for the public in understanding all of this is minimal. ASLF is the TAG agency designated as such by EPA. However, our resources under this program are minimal. Otherwise our public agencies have provided little assistance other than the availability of documents either electronically or in depositories. The one public meeting on the PRAP represents the only formal public input to DEC. The process from now until final construction is completed —currently estimated as seven years—is a long and uncertain one. The public needs to be informed as to what is happened, to be solicited for

their input on various engineering alternatives, and to be kept part of the process. Unfortunately, with the other sites, proposed remedies and RODs were finalized and approved with little or no public discussion. Further work on these sites is generally being done without any further input from the public even if there are extensive changes in the ROD. In the case of the Lake Bottom Sub-site, the January meeting on the PRAP should be just the first in regular attempts to inform the public and to solicit their input on a complex program to alleviate a difficult problem. ASLF is ready and willing to continue to be the lead outside agency in making sure the public understands what is happening and is kept informed and is seeking additional resources to be able to carry out this important task.

Technical considerations:

21

1. **Baseline risk assessment**
   ASLF is concerned that the human health risk assessment that forms the basis for much of the subsequent work on the RI/.FS and PRAP did not use the populations most at risk. In our view, people who disregard fish advisories and subsist on fish caught in the lake should have been the basis for the analysis. Syracuse has a large population of immigrants and economically disadvantaged who routinely consume fish from Onondaga Lake. The other at-risk population is the Onondaga Nation, for whom the spiritual values of this water body and subsequent loss to their culture and changes in diet must be factored into the risk analysis.

2. **Profundal zone (SMU-8)** 22
   The profundal zone contains the vast majority of the 70+ tons of mercury which were discharged into Onondaga Lake. The mercury is spread throughout the lake, reaching maximum concentrations of 70 mg/kg in the top 50 cm. It is this mercury that is the main source of methylmercury which contaminates fish and poses a threat to fish-eating humans and to wildlife. Reducing this threat is a fundamental aim of the PRAP, as expressed in the following Remedial Action Objectives:
   (1) Eliminate or reduce,...methylation of mercury in the hypolimnion
   (3) Eliminate or reduce,...releases of mercury from the profundal sediments, and
   (4) Eliminate or reduce,...existing and potential future ecological risks on fish and wildlife resources, and potential risks to humans.

Despite the great importance of SMU-8, there is almost no remedial action currently planned for the sediments in the profundal zone.. Thin-layer capping would be applied over four small, disparate zones—one at "North Deep," two along the western shore, and one directly north of the In-lake Waste Deposit. These locations appear to be driven mainly by exceedance of the PECQ = 1 criterion. However, mercury occurs at concentrations above the PEL of 2.2 mg/kg throughout the profundal zone. According to our estimates, between 25 and 50% of the lake bottom (0-30 cm) is contaminated at levels above the PEL. Examination of Figure 1.10 in the FS shows an even higher fraction of the lake bottom (0-30 cm) having mercury concentrations in excess of 3.16 mg/kg. This corresponds to an area of about 600 hectares, or 1500 acres. This vast area of the lake will continue to be toxic to benthic organisms for a long time into the future.

23 A. Mercury reduction in the upper-most sediments

On p. 54 of the PRAP, it is stated that the STELLA model predicts that concentration of mercury in the surface sediments will decrease from 6.7 to 2.2 mg/kg over the period 1992- 2014 (22 years). Examination of the modeling of "monitored natural recovery" in Appendix N of the FS shows that there is considerable uncertainty in this estimate. This is largely because the basic data to support the model are lacking. Only five sediment cores with fine resolution (2-cm sections) have been collected, the most recent of these in 1997. In fact , the validity of the model was tested based on a *single* core collected in 1997. Parameters had to be manipulated to make the model fit even this single core.

24 While there is no disputing that Hg concentrations have decreased since 1970, the authors (Anchor Environmental, Inc. *et al.*) admit that "there appears to be insufficient surface sediment data to make any conclusions regarding trends in surface sediment concentrations since 1987." We agree with that statement, and further assert that the model, such as it is, provides almost no technically sound basis for predicting a time frame for "natural recovery." The variables are simply too great, and the basic data set is far too limited. Any claims made in the PRAP that MNR is expected to achieve target mercury concentrations within 10 years are without merit and should be eliminated. Instead, MNR should be considered only as a potential remedial measure. Selection of MNR at this point is entirely premature.

25 B. Methylation of mercury

One of the most important objectives for Onondaga Lake is to eliminate or at least greatly reduce the mercury contamination in fish flesh. RAOs 1, 3, and 4 are all needed components to achieve this goal. Conversion of mercury to methylmercury, or methylation, is mediated by sulfate-reducing bacteria in anoxic environments. Thus the profundal zone of Onondaga Lake is a perfect environment for these bacteria to produce methylmercury. However, there is considerable uncertainty as to where and how much methylmercury is produced. Both the profundal sediments and the deep waters of the lake appear to contribute substantial amounts (Sharpe, 2003; TAMS, 2002). Previous attempts to quantify the movement of both total mercury and methylmercury have not been successful.

Despite these difficulties, the authors of Appendix N in the FS go ahead with attempts to model the methylation of mercury and the effect of oxygenation thereon. The model predicts the release of 800-2000 grams methylmercury per year from the profundal sediments. This is much larger than TAMS's estimate of 67g, but comparable to Sharpe's estimate of 1900g. Next, these numbers are compared to downward fluxes as particles settle to the lake bottom. These are estimated to range from 1600 g/yr (TAMS, 2002) to 2600 g/yr (Anchor *et al.*). Thus, the conclusion to be drawn is that there is considerable internal cycling of methylmercury, with 1-2 kg moving upwards our of the profundal sediments, and about 2 kg being deposited back from the water column.

Further, the model is used to estimate the effects of aerating the hypolimnion. The authors state: "it is assumed that aeration (oxygenation) causes a 50 percent decrease in the methylmercury concentrations present in settling sediments." Why? Based on TAMS estimates of methylmercury production in the lake (230 g) and rates of methylmercury inputs via settling (557 g), there is a leap of faith that oxygenation can greatly reduce the downward flux of methylmercury to the sediments. (Note that the TAMS estimates differ greatly from the model results.) The authors conclude that "although there is great uncertainty with this assumption, [modeling results] show that reductions in methylmercury production in the hypolimnion could cause substantial decreases in the upward flux of methylmercury from the profundal sediments over time. Thus, under this scenario, MNR combined with aeration could substantially and positively alter the equilibrium of methylmercury fluxes that appear to currently exist..."

These words are hardly reassuring, and are a poor basis for selection, even if tentative, of a preferred remedy. Clearly there needs to be a much better understanding of mercury cycling within the lake before moving ahead with a remedial plan including oxygenation.

As the above analysis shows, there is no solid scientific basis for remediation of SMU-8. There is no predictive model for what effect any remedial action will have on methymercury levels in fish flesh (RAO-4). Therefore, the Administrative Record, and ultimately the Record of Decision should reflect that further analysis is needed to achieve specific goals for mercury in fish, i,e, so that fish is safe to consume by humans and wildlife. As a result, additional remedial technologies, such as lake-wide thin-layer capping, should not be excluded from consideration.

3. <u>**Expand boundaries of SMU-1 and adjacent SMUs**</u> 26

ASLF has previously undertaken a detailed geo-spatial analysis of sediment contamination in Onondaga Lake (see Appendix A). This is generally accepted among spatial analysts as the optimal spatial predictor. As explained in the attached Technical Memorandum prepared by Geographic Modeling Services, the methodology employed by TAMS has, in all likelihood, led to distortions in the predicted distribution of contaminants shown in the FS. This has resulted in **under-estimates of mercury, chlorinated benzenes, BTEX, and possibly other contaminants in the profundal zone.** Our sediment maps (see Figures 1-5 in Appendix B) show that these chemicals permeate sediments located beyond the rather artificial 9-meter boundary used to separate the profundal and littoral zones. In fact, many maps in the FS support this same conclusion:

mercury 0-30cm and deeper (Figs. 1.10).
BTEX , 30cm-1m (Figs. 1.14-1.16)
chlorobenzene, 30cm – 2m (Fig. 1.17)
dihlorobenzenes, 30cm – 2m (Fig. 1.18)
LPAH, 0-2m (Fig. 1.21)
HPAH, 0-2m (Fig. 1.22)
PCBs, 30cm – 2m (Fig. 1.23)

In our opinion, SMU-1 should be expanded into the deeper waters of the lake so as to include this contamination. These highly contaminated sediments should be subject to the same dredging and capping remedial approach as the other sediments in the ILWD. SMU-7 and SMU-2 should be reexamined in this light.

4. Removal and treatment of organic contaminants

One of the primary goals of the Proposed Remedy is to "eliminate or reduce,...releases of contaminants from ILWD and littoral areas around the lake." In addition to mercury, these contaminants include a long list of organic chemicals:

BTEX (benzene, toluene, ethylbenzene, xylenes)
PAHs
PCBs
chlorinated benzenes
polychlorinated dioxins and furans
pesticides

Many of these contaminants are concentrated in distinct organic phases. We understand that there are three distinct types of organic phases in Onondaga Lake. These are:

27 a) **DNAPL**. This is denser-than-water free-product consisting mainly of chlorinated benzenes. This has been identified as a Principal Threat Waste by NYSDEC,since it poses a significant risk to humans and the environment. We agree that a high priority should be placed on capturing and destroying these wastes. Construction of the slurry wall along the south-west shore of the lake should be effective in this regard. Also, the removal of DNAPLs via dredging in SMU-1 and SMU-2, and possibly SMU-7 is necessary. This material must be handled with the greatest of care to minimize exposure to both workers and residents.

28 b) **NAPL.** Visible oil and oil sheens have been observed in sediment cores collected in SMU-1, SMU-2, SMU-6, SMU-7, and SMU-8 (see attached Figure 1.26 from the FS). This NAPL is an oil phase less dense than water, and includes light petroleum hydrocarbons (e.g. benzene), dissolved PAHs, and a class of compounds known as diphenylethanes. This latter group includes substances unique to the production of organic hydrocarbon fractions by Allied Chemical (Hubbard, 1996).

The PRAP identifies NAPL found within the ILWD (SMU-1) as Principal Threat Waste (p.28). Disturbance of the sediments results in sheens on the lake surface, and therefore removal of this material from SMU-1 is a high priority. However, we must point out that these wastes are visibly present in the other locations noted above and shown on the map. Under the selected Alternative (4), NAPL in SMU-1 AND SMU-2 will be positively addressed. However, it is unclear whether NAPL in SMU-6 and SMU-7 will be removed. It is clear that the NAPL found in SMU-8 by Hubbard (1996) will not be addressed at all. The plan should treat all NAPL as a high priority.

c) **Organic deposits.** In addition, there are reports of a tarry waste in or near SMU-2 29
which have a different nature. These are more solid than liquid, and are likely to have originated from the Semet-Solvay process. In addition, what appears to be emulsified organic deposits have been documented along the Waste Beds in SMU-3. This material is likely to sequester organic contaminants such as BTEX, PAHs, chlorinated benzenes, and dioxins.

ASLF endorses all efforts to remove, to the greatest extent possible, all of these 30
organic materials from Onondaga Lake. They are highly toxic, mobile, and unsuitable for capping. Further, we believe that this material should be separated from the less-toxic, silts, sands, and Solvay Waste material which will make up the bulk of the dredged sediments. This is discussed further below.

5. **Disposal/treatment of dredged sediments**

Sediments are to be hydraulically dredged and pumped to Wastebed 13. Why was 31
this site, the most distant Wastebed from the lake, selected? There are residential neighborhoods nearby. What about release of volatile contaminants—how is this to 32
be controlled? The majority of the sediments to be dredged are from SMU-1, which contains high concentrations of volatile organics, such as benzene, toluene, chlorobenzene and the dichlorobenzenes. Residents and workers should not be exposed (via air emissions) to these hazardous substances.

We strongly urge that the ROD be written such that treatment of the sediments is 33
required to separate out this material. Soil washing technologies, which have been demonstrated on sediments in Saginaw Bay, among other places, could be a very effective way to separate the calcareous Solvay Waste from the NAPL which occurs in and near the In-lake Waste Deposit. Separated NAPL would then be sent to an off-site incinerator for final destruction. This would achieve permanent reduction of toxicity, which is, again, a basic requirement of CERCLA.

It should be noted that, by using a treatment technology such as soil washing, the amount of sediment requiring off-site disposal is kept to a minimum, or perhaps even reduced to zero. Only the concentrated organics need be sent off-site for ultimate disposal. This reduces costs, and reduces the chances of road accidents. It may be that, depending on the remedy chosen for the Semet Waste Beds, the separated tarry wastes could be co-disposed with the Semet wastes.

Another potential benefit of soil washing lies in its ability to separate sand from fine-grained silts and clays. This technique was used at Saginaw Bay to produce a relatively clean sand fraction that was suitable for capping or unconfined disposal. In the case of Onondaga Lake, this technology could potentially be used to generate clean capping material, while reducing the amount of sediments being disposed of in the SCA. In our examination of boring logs from the lake, we have noted that considerable sand deposits exist within the lake. (see Appendix C, boring logs for Stations S329-334)

These comments were prepared by Samuel H. Sage of Atlantic States Legal Foundation, with the assistance and input of our TAG consultants, Hughes Consulting Services and Geographic Modeling Services.

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Effler, S.W. *A Limnological and Engineering Analysis of a Polluted Urban Lake,* Springer-Verlag, Inc. New York (1996)

Hubbard, M.S. *Sources of Organic Contamination to Onondaga Lake*, Master's Thesis, State University of New York College of Environmental Science and Forestry, Syracuse, NY (1996)

Hughes, D.J., M.H. Hall, J.V. Mead, and P. Thompson. "A Geostatistical Analysis of Sediment Contamination in Onondaga Lake, N.Y.," prepared for Atlantic States Legal Foundation, Syracuse, N.Y. (2002)

APPENDIX A

APPENDIX B

TECHNICAL MEMORANDUM

To: Atlantic States Legal Foundation
Fr: Myrna H. Hall, Geographic Modeling Services
Re: Mapping of Contaminated Sediments in Onondaga Lake
Da: 26 January 2005

Prediction of contaminant concentrations

In the FS, the lake has been divided into two zones: the profundal zone (>9m deep) and the littoral zone (<9m deep). This division was used by TAMS, the consultant for New York State DEC, in the Remedial Investigation for the purpose of characterizing contaminant concentration distribution and toxicity throughout the Onondaga Lake sediments.

This artificially imposed line of demarcation implies a sharp change in sediment 34
concentrations visible in many of the output maps (Figs. 5-2 to 5-27 of the RI). Although 35
the general spatial patterns derived by TAMS for many contaminants are similar to those achieved through our efforts (see Hughes et al. 2002, Figs. 9, 12, 15, 18, 21-1, and 28), the methodologies are quite distinct and provide different results. This is particularly evident for areas of the profundal zone (SMU-8) that are close to the In-Lake Waste Deposit (ILWD). We have found that contamination characteristic of the ILWD (chlorinated benzenes, mercury, and BTEX) extend beyond the 9-meter boundary used by TAMS to separate the profundal and littoral zones.

The methodology employed by TAMS to map contaminants (page 5-7 of the RI) is called Inverse Distance Weighting (IDW). The RI Report explicitly states that the higher the exponent used, the less influence distant known values will have in generating a value for locations of unknown contamination concentration. A search window of 500 meters is used, but values outside the zone of interest are excluded. Thus, when evaluating cores inside the profundal zone, the data set employed by IDW does not truly represent a 500 m radius sample because data values located on the other side of the 9-meter line are ignored. For example, suppose a sediment core (call it "S1") is taken at 8.8 meters water depth at a location where the benthic surface is rapidly falling. The values assigned to unsampled cells that are perhaps only 3 meters away horizontally, but in 9.1 meters water depth, will be assigned a value based on a core located as far away as 500 meters because it is in the profundal zone. The result is that the high contaminant levels detected only a short distance from that location within the littoral zone (S1) are given no weight as they should be.

The RI Report (page 5-10) states (based on actual measured core values) "As shown in the cross sections, large volumes of mercury-contaminated sediments exist along the shoreline near Harbor Brook (Section A) and Ninemile Creek (Section D) to a distance over 500 m into the lake." Although the RI Report states that IDW was used to extrapolate data values to non-sampled sediment locations, the plots used in support of the proposed remediation, i.e. those that appear in the FS (e.g. Fig. N.1. showing surface sediment mercury concentrations) appear to have been created using Thiessen Polygons as the limiter for extrapolating data points. This method draws lines equidistant between sample points and applies concentration values to all areas inside the polygon defined by those lines. The 9-meter line always appears as one polygon delimiter. If this method was employed we again point to its artificiality and the probability that sediments in the profundal zone have much higher concentration values than depicted in Figure N.1 of the FS.

36 We employed the geostatistical procedure known as kriging to map contaminants in Onondaga Lake. This is generally accepted among spatial analysts as the optimal spatial predictor. It is admittedly a complex and very time-consuming procedure, which may explain its lack of use by TAMS. However, TAMS consultants state on page 5-8 "It is important to note that a geostatistical analysis (i.e., kriging) is required to accurately determine the volume of sediment to be remediated in the FS. This was demonstrated for mercury in Appendix I of this RI, in which areas with high probabilities of exceeding a site-specific probable effect concentration were delineated." So even the analysts, upon whose work the feasibility analysis is based, assert that kriging is necessary in order to accurately characterize the extent of contamination.

Figure 9 of Appendix I was created by TAMS using kriging, but only with cores located in the profundal zone. Again, this pre-determination of contaminant distribution is not an appropriate application of kriging, and cannot possibly represent the true distribution of the lake bottom contaminants. The map illustrates the probability that mercury concentrations in this zone exceed the PEC. Over much of the profundal sediment surface that probability is greater than 80%, yet Figure 5-2 of the RI leaves the impression that surface sediments in the profundal zone are considerably less
37 contaminated than those in the neighboring littoral zone. We have not spoken with TAMS consultants to determine why they employed this artificial line. One is led to suspect, however, that the demarcation was employed from the beginning with the intent of limiting the area from which sediments might have to be removed. We cannot, therefore, support the plan to remove sediment only in those areas falling within the 9 meter depth contour. Our kriging analysis and toxicity analysis give a more accurate delineation of the most impacted zones of the lake's surface sediments.[1] **The results of our analysis, with the 9-m contour, are shown in Figures 1 – 5, attached.**

Organic Carbon

38 Another area of concern is that a uniform sediment organic carbon value of 5% was applied across the lake. The RI Report states "However, these contours should not be considered exact for the purposes of identifying areas that present unacceptable risks." We have calculated, to the best degree possible, the variation in organic content across the lake explicitly in order to identify areas that represent unacceptable risks. In our report, we found that roughly one-half of the lake sediment surface could be kriged for organic carbon. The approach should be applied to identify those areas that represent unacceptable risks. Otherwise, why bother with a spatial characterization of the lake sediment contaminant concentrations? Again, upon examination of our surface sediment plots one sees that there are several areas of the profundal zone where contaminant levels reach 1 – 50 times the toxicity threshold or severe effects level (for Mercury). If our goal is a clean lake, the profundal zone cannot be ignored.

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[1] See Appendix A, Figure 5

6-11

Distribution of Data

Finally, the selection of the bins for representing contamination levels is described as follows: "Based on the large range of values and the typical log-normal nature of 39
contaminant data, contour intervals, or bins, were selected at either half-or one-log step. The number of bins for each map was limited to about eight, and in cases where more bins were required at the half-log step interval, a full log step interval was used instead. When applicable, the half-log or log step contour intervals were (LEL) and severe effect level (SEL) criteria for metal CPOIs (NYSDEC, 1999)." The bins under represent the toxicity levels found in the lake's sediments. TAMS selected their methodology based on "the typical log-normal nature of contaminant data" but no literature reference is given upon which to base this statement. Clearly they have not based it on the actual distribution of this data. We have analyzed the distribution of concentrations for each contaminant or contaminant class, and found that, in some cases, log transformation is appropriate, but in others (e.g. mercury, PAHs) a power-law transformation worked best.

Figure 1. Onondaga Lake predicted mercury contamination showing 9-meter contour.
(Severe effects level = 1.3 mg/kg.)

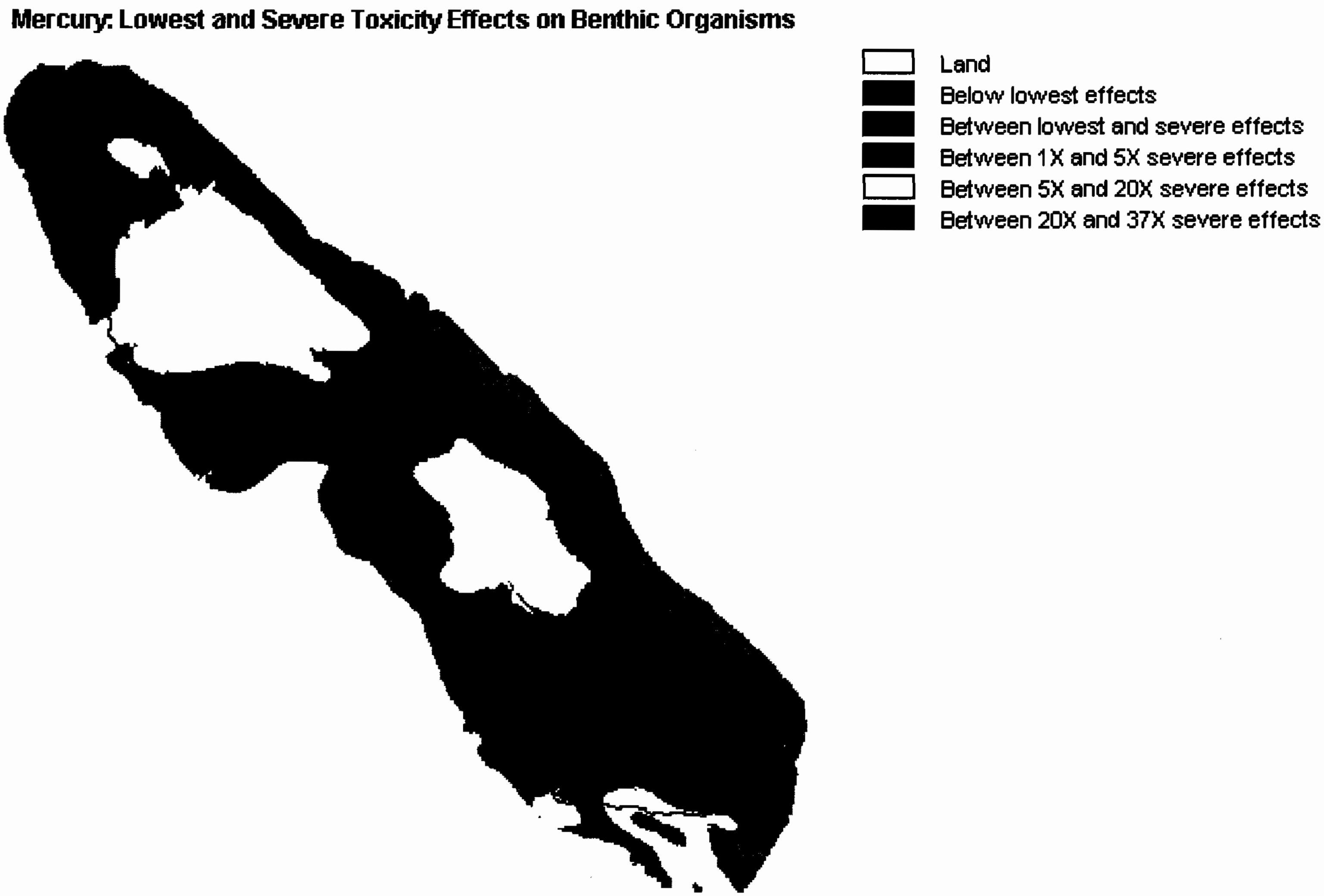


Figure 2. Onondaga Lake predicted dichlorobenzenes contamination showing 9-meter contour. Concentrations are given as factor of chronic screening level = 12 μg/g organic carbon.

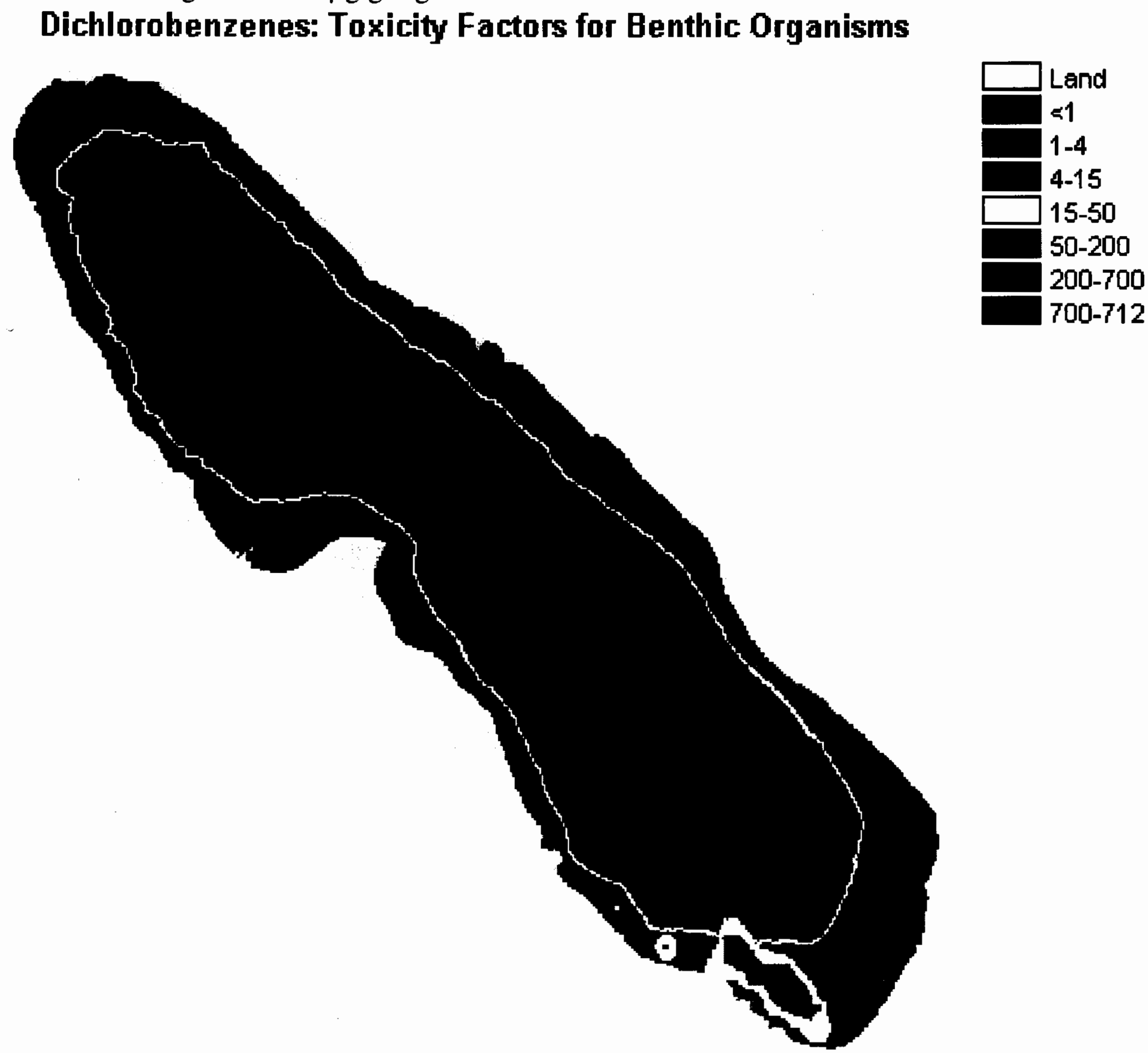


Figure 3. Onondaga Lake predicted chlorobenzene contamination showing 9-meter contour. . Concentrations are given as factor of chronic screening level = 3.5 μg/g organic carbon.

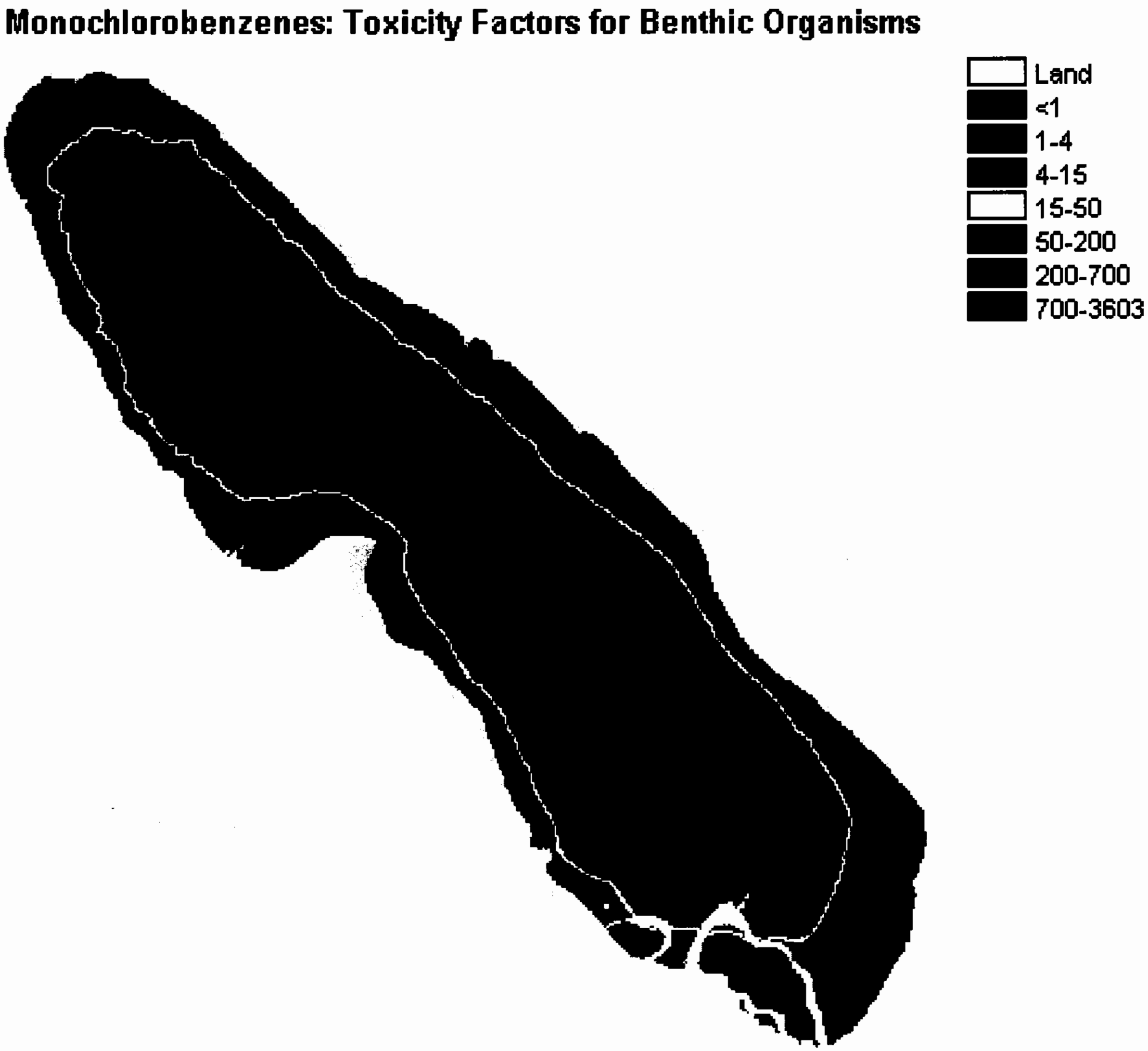


Figure 4. Onondaga Lake predicted PCB contamination showing 9-meter contour. Concentrations are given as factor of chronic screening level = 19.3 μg/g organic carbon.

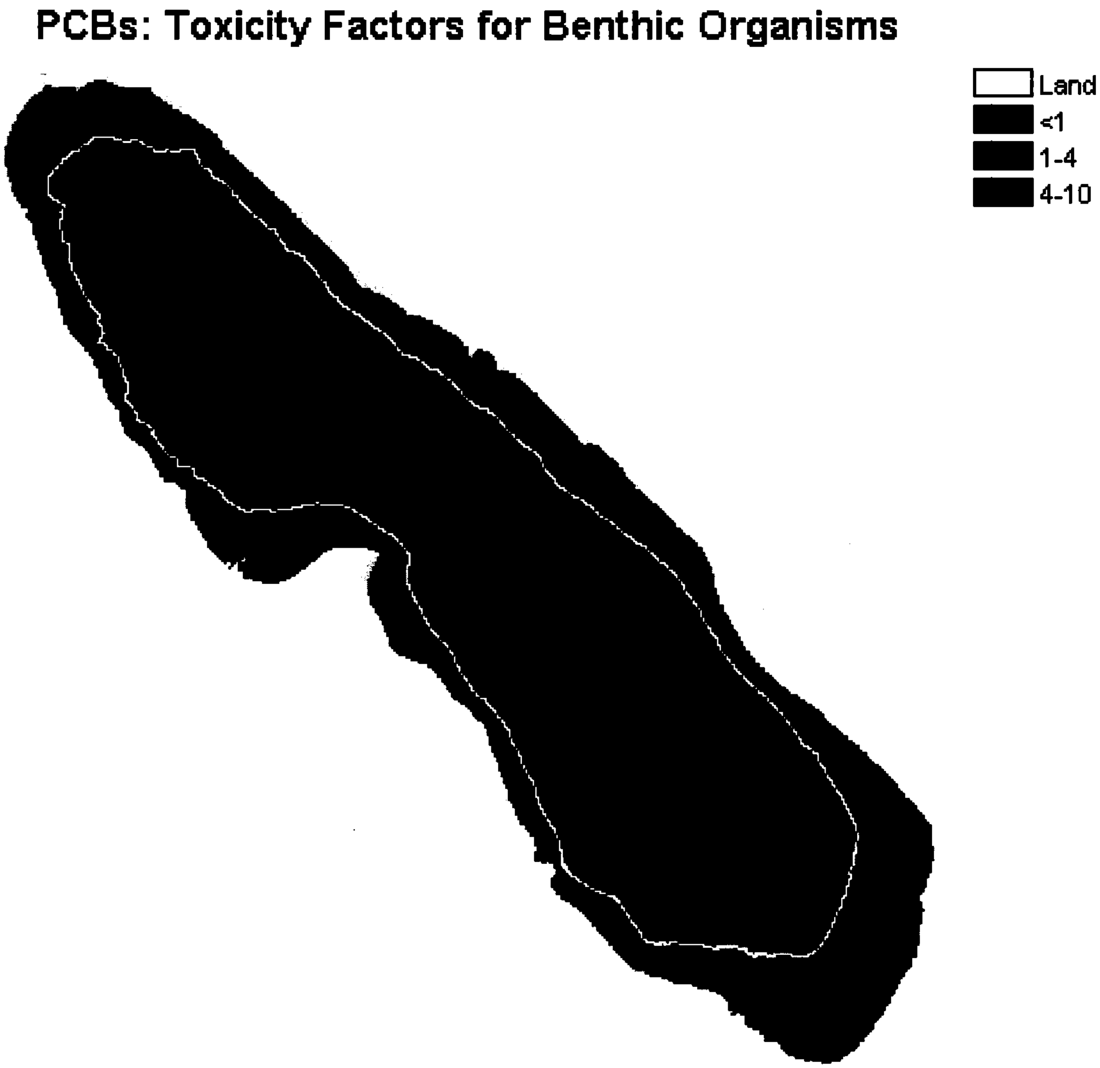
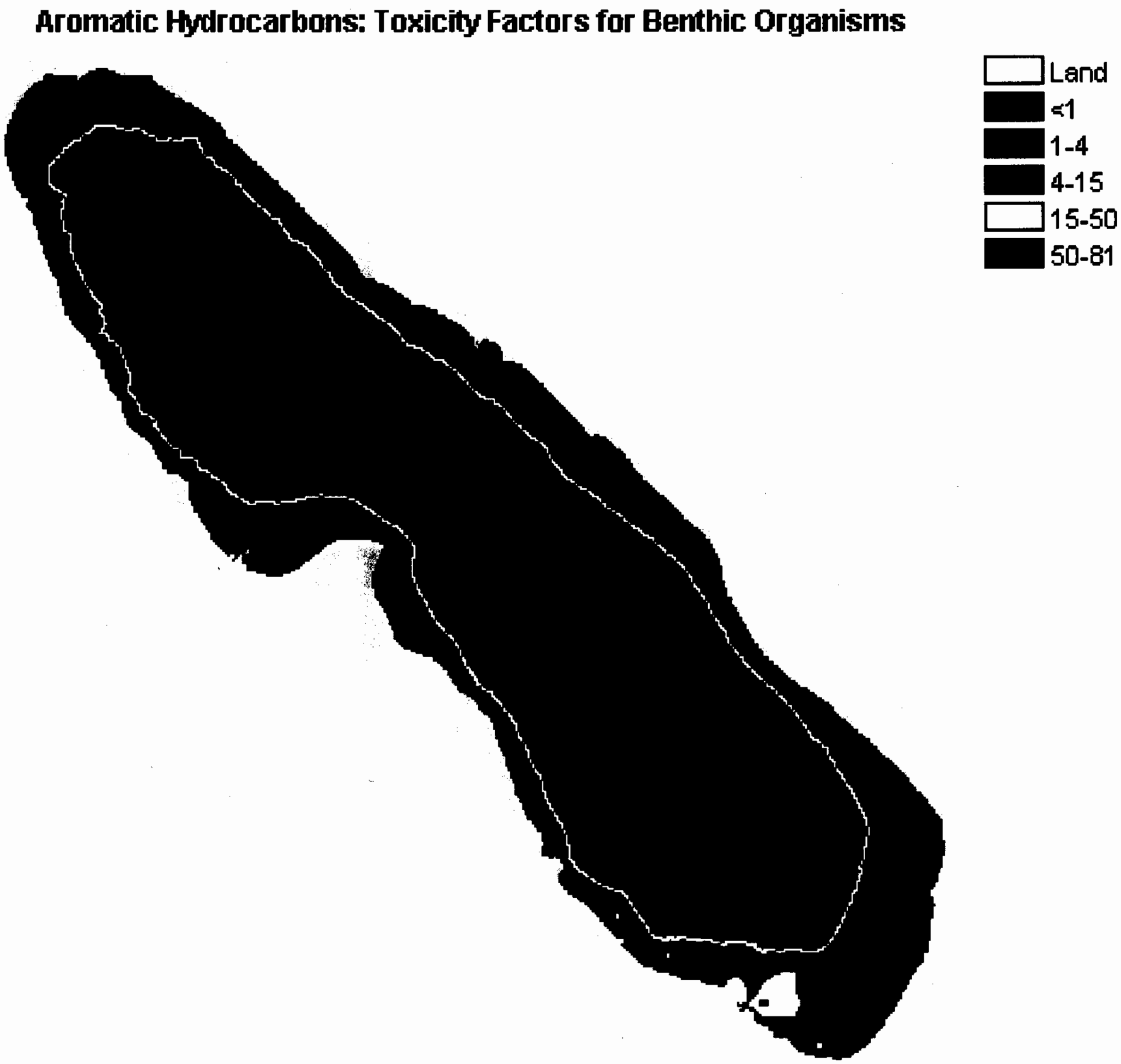


Figure 5. Onondaga Lake predicted BTEX contamination showing 9-meter contour. Concentrations are given as the sum of factors of chronic screening levels for benzene, toluene, xylenes, and ethylbenzene



HONEYWELL COMMENTS

Honeywell

Honeywell
P.O. Box 1139
Morristown, NJ 07962-1139

February 28, 2005

H-1

Mr. Donald Hesler
Mr. Timothy Larson
New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12233-7016

Re: ***Onondaga Lake Superfund Site – Onondaga Lake Bottom Proposed Plan- Public Comment***

Dear Mr. Hesler and Mr. Larson:

Honeywell International Inc. ("Honeywell") submits the following comments on the Proposed Plan for the Onondaga Lake Bottom Subsite of the Onondaga Lake Superfund Site.

As the Department knows, the Proposed Plan is the result of a substantial and lengthy remedial investigation and feasibility study ("RI/FS") effort undertaken by Honeywell and DEC pursuant to a Consent Decree overseen by the United States District Court for the Northern District of New York. As a result of the RI/FS process, Honeywell first submitted an FS in May 2003 and developed a revised FS in May 2004 which DEC determined to be substantially complete in July 2004. Between May 2004 and November 2004, Honeywell and DEC worked together to undertake additional analyses. A final FS was completed in November 2004.

Comment #1: FS Alternative C Compared to the Proposed Plan 1

The FS recommended implementation of Alternative C. The principal elements of FS Alternative C included: (a) Hydraulically dredging an estimated 543,000 cubic yards (cy) of sediments; (b) isolation capping of an estimated 336 acres within the littoral zone; (c) habitat optimization; (d) an aeration pilot project in the Lake's profundal zone; (e) use of an on-site former settling basin as a Sediment Consolidation Area ("SCA"); and (f) monitored natural recovery/thin-layer capping of profundal sediments.

The dredging of 543,000 cy of contaminated sediment in FS Alternative C would remove a substantial volume of contaminated sediment from the Lake, would provide an optimum depth for aquatic habitat, and would provide for the effectiveness of the capping components of the remedy. After dredging, an isolation cap would be placed to contain the maximum concentrations observed in the remaining underlying sediment. The isolation cap would be designed to include a 50 percent safety factor which would be added to the cap thickness as a further safety precaution. Groundwater upwelling and cap effectiveness modeling conducted as part of the FS demonstrated that an isolation cap could be designed to effectively contain the remaining COPC concentrations found in the sediment.

FS Alternative C meets the Remedial Action Objectives and Preliminary Remedial Goals established during the RI/FS process, including the criteria for mercury levels in fish, sediment and water established by DEC. Further, FS Alternative C is protective of human health and the environment, and consistent with USEPA's *Draft Contaminated Sediment Remediation Guidance for Hazardous Waste Sites*, including the eleven principles for managing contaminated sediment risk set forth in Appendix A to that document. Alternative C also minimizes short-term exposures and risks.

DEC's Proposed Plan contains remedial elements similar to those contained in FS Alternative C. Honeywell and DEC share the same goal of implementing a remedy that is protective of human health and the environment, restores and improves the Onondaga Lake habitat, and allows the Lake to return to being a valuable public recreational resource. The Proposed Plan, however, anticipates dredging a total of up to approximately 2.65 million cubic yards (cy) of contaminated sediment. Much of this dredged sediment (approximately 1.6 million cy) would be removed from an area known as the In-Lake Waste Deposit ("ILWD"), found in SMU 1. DEC's Proposed Plan also calls for additional dredging up to a sediment depth of about 9 meters in specific portions of SMU 2 to address the fact that NAPL was identified at depth immediately adjacent to the Lake. This additional dredging would remove an estimated 400,000 cy of sediment from SMU 2, including approximately 234,000 cy to address NAPL at depth.

DEC's Proposed Plan also calls for isolation capping of approximately 425 acres of the littoral zone sediments. The Proposed Plan would further require excavation of defined "hot spots" prior to cap application.

Thus, the primary differences between DEC's Proposed Plan and Honeywell's Alternative C relate to the extent of dredging and subsequent capping and include the size of the SCA necessary for remedy implementation; the volume of supernatant water required to be treated; the anticipated cost of the remedy; and other implementation considerations.

In light of the demonstrated effectiveness of the isolation cap as proposed in FS Alternative C, Honeywell believes Alternative C is as protective as DEC's Proposed Plan. Honeywell understands that the Department views the additional dredging in the Proposed Plan as a means to achieve enhanced cap reliability and stability by removing additional contaminated sediments. Honeywell does not agree with the Department's position and believes that the considerations outlined above and in the FS (including its appendices) demonstrate that FS Alternative C is as protective when all factors which must be balanced in the Part 375 and CERCLA remedy selection process are considered.

Comment # 2 Mercury Modeling 2

Honeywell understands that some members of the public have voiced concern over the perceived absence of quantitative, predictive models of mercury behavior in the Lake. DEC's RI (December 2002) included an extensive evaluation of the fate and transport of mercury in Onondaga Lake. The primary tool used in the RI was the development of a mass balance model. During the RI process, Honeywell attempted to develop a mechanistic mercury model based on what is still the state-of-the-art mercury model. However, the models' predictive ability was not sufficient to provide a basis for selecting a remedy and the model was not included in the final RI report. The precision of mercury models, in general, is limited by the natural variability of the many factors that contribute to mercury concentrations in fish, such as the rate of production of methyl mercury, the composition of the food web, rates of addition of mercury to the ecosystem from upland contamination, rates of mercury contribution from atmospheric deposition and from anthropogenic sources unrelated to the contamination, rates of sedimentation, and a variety of other factors. Nonetheless, the mercury mass balance model developed during the RI, together with the data collected for the RI and for upland site investigations, provides a substantial understanding of mercury fate and transport in Onondaga Lake.

Further, both FS Alternative C and the DEC Proposed Plan set forth several concrete remedial actions that are expected to eliminate ongoing sources of mercury to the Lake ecosystem, protect against mercury bioaccumulation and result in decreased mercury concentrations in the food chain. These actions include:

- **Upland Source Controls.** Upland source controls have been or will be put into place to address ongoing sources of mercury to the Lake. These upland source controls, including controls for Geddes Brook, Nine Mile Creek, the Semet and Willis Avenue IRM, Wastebed B/Harbor Brook IRM, and the LCP Bridge Street Site, are being handled through the Superfund process subject to Consent Orders between Honeywell and DEC. The timing of remedial activities in Onondaga Lake would need to be coordinated with the remedial work at these upland sites. We would, however, expect implementation of the IRM's identified above to expedite the schedule for Lake remediation.

- **Dredging/Capping.** Dredging will remove a portion of the mercury contamination in sediment. Capping will further isolate remaining mercury contamination and prevent it from reaching the food chain.

- **Hypolimnetic Aeration.** The aeration pilot project is expected to limit mercury methylation in the water column and thereby reduce methylmercury concentrations in water and subsequent bioaccumulation.

3 **Comment #3: PEC Quotients**

The DEC Proposed Plan uses a mean Probable Effects Concentration Quotient ("PECQ") of 1 to determine areas of the Lake in need of remediation. For any particular contaminant, the PEC represents the geometric mean of the ER-L, TEL, ER-M, PEL, and AET. A mean PECQ was used to take into account the presence and concentration of multiple chemicals in sediments.

To biologically calibrate the mean PECQs, during the FS process the quotients were compared with toxicity test results (i.e., percent mortality) obtained for the 10-day chironomid and amphipod sediment toxicity tests conducted at 79 stations in 1992. In general, neither the chironomid nor the amphipod test results demonstrated a noticeable increase in mortality until the mean PECQ exceeded approximately 1 to 2. Honeywell believes these data demonstrate that a mean PECQ of 1 to 2 adequately identifies the range at which Lake sediments might begin to demonstrate acute toxicity to benthic organisms. Honeywell believes the use of a mean PECQ of either 1 or 2 is protective of benthic organisms.

H-1

In addition, primary human cancer and non-cancer health hazards in Onondaga Lake are associated with ingestion of bioaccumulative chemicals in fish. The highest concentrations and greatest mass of these chemicals in sediment are in the same areas identified by the PECQ 1 or 2. Remediation of these areas as proposed in both FS Alternative C and the Proposed Plan, in concert with other proposed remedial activities (e.g., the aeration pilot study), is expected to result in decreased concentrations of bioaccumulative chemicals in fish tissue, to concentrations within the established target ranges. Because both remedies also propose extensive capping of littoral sediments (especially in the more contaminated southern portion of the Lake), both would also address potential risk related to the one other recreational exposure pathway identified in the human health risk assessment: wading in South Basin sediments.

Comment #4: Dredging in SMU 1 4A

Three significant contaminants in SMU 1 are chlorobenzene, dichlorobenzene, and mercury. Concentrations of all three contaminants appear to be substantially lower at depths greater than two meters than they are in the first two meters of sediment. Based on the existing data set, removal to two meters in SMU 1 would likely result in significant reductions in the average and maximum concentrations of chlorobenzene, dichlorobenzene and mercury.[1]

Moreover, it is worth noting that the distribution of data points in SMU 1 is relatively dense down through the first two meters of sediment. At depths below two meters, however, the data are significantly limited. The data at depths greater than two meters cannot be considered representative of conditions over the 84 acre area of SMU 1.

To evaluate the strength of the entire data set, we calculated confidence intervals on average concentrations for 17 different contaminants in SMU 1 *at each given depth interval*. The confidence intervals were calculated using standard t-statistic methods, thus assuming normality. Using these methods, calculated confidence intervals that span zero

[1] This analysis has focused on average and maximum concentrations of contaminants in sediments that would remain in SMU 1 after dredging because average and maximum concentrations are appropriate indicators of the condition of remaining sediment likely to come into contact with capping materials, and, therefore, appropriate parameters by which to judge whether dredging provides any improvement in capping effectiveness.

assuming normality. Using these methods, calculated confidence intervals that span zero indicate that the average concentration cannot be distinguished from zero at a significance level of 0.05, i.e. 95% confidence.[2] Whereas only three compounds for the zero to one meter interval have average concentrations indistinguishable from zero, the one to two meter interval has nine of the 17 compounds with confidence intervals that encompass zero, meaning that the average concentrations are statistically not significantly different from zero. For intervals deeper than two meters, no more than one compound has an average concentration distinguishable from zero at any given interval.

4B The FS demonstrates that an effective cap can be installed and maintained in SMU 1 after the dredging recommended in Alternative C. The SMU 1 cap, as proposed in FS Alternative C, takes into account erosive forces and groundwater upwelling. Groundwater modeling and cap effectiveness modeling in the FS both demonstrate that the cap would be effective without additional dredging beyond Alternative C. Indeed, in modeling cap effectiveness, Honeywell used a number of conservative assumptions or "protective measures," including using the worst case concentrations within each SMU, using literature pore water concentration values, and assuming a groundwater upwelling velocity greater than that generated by the groundwater model. Moreover, the Alternative C proposed cap thickness of four feet was predicated on the assumption that the cap would meet a factor of safety of 1.5 to ensure effectiveness.

Both DEC Guidance (TAGM 4030) and the National Contingency Plan require that the short-term risks associated with remedy implementation be considered when selecting a remedy. Here, the magnitude and/or duration of predicted short-term impacts increase relatively uniformly with the incremental volume being dredged from SMU 1.

In light of these considerations, as well as those set forth in Comments 1, 5, 6, and 9, Honeywell believes that the FS Alternative C remedy for SMU 1, rather than the Proposed Plan, is a more appropriate balance of the statutory and regulatory criteria governing remedy selection.

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[2] Indeed, a statistical comparison, using Dixon's extreme value test, of the data obtained from one data point, S312, compared to the data from surrounding data points further suggests that the results obtains from below two meters at S312 should be considered unreliable outlier data.

Both the FS Alternative C and the Proposed Plan propose that sediments dredged from the Lake will be managed in an on-site sediment consolidation area ("SCA") rather than staged for off-site disposal. (The Proposed Plan recognizes that limited volumes of highly contaminated sediment may have to be disposed of off-site).[3] Specifically, FS Alternative C and the Proposed Plan assume that such an SCA would be constructed on one of the Solvay wastebeds (e.g. Wastebed 13). 5

Honeywell believes that on-site consolidation of sediments in one of the Solvay wastebeds, such as Wastebed 13 is a necessary component of both FS Alternative C and the Proposed Plan. The use of an on-site SCA is an accepted and safe sediment management technology that can be effectively used at this Site. Monitoring, odor control, appropriate closure practices, noise control, and other issues will have to be detailed in the remedial design. For example, odor control techniques that must be evaluated include discharging the dredged slurry below a water blanket or a vapor control curtain as well as the use of activated carbon, odor suppressants and foams to control odors. These types of technologies have been used with success at other environmental dredging sites. We would expect the town of Camillus and the communities in the vicinity of the SCA to have input into these types of SCA operation and management issues, both during the design process and while the SCA is operating.

Any change in the Proposed Plan which results in substantial volumes of sediment being sent off-site for disposal rather than being managed in an SCA may not be supported by an analysis of the statutory and regulatory requirements governing remedy selection. In particular, off-site disposal of such significant volumes of sediment may result in substantial increases in implementation risks, greater community disruption as a result of transportation and loading or staging obligations, and increases in cost which may call into question the cost-effectiveness of the dredging set forth in the Proposed Plan. As a result, Honeywell believes that the Proposed Plan's reliance on an SCA for sediment management is supported by the CERCLA statutory and regulatory criteria governing remedy selection.

Comment # 6: Water Treatment 6

The Proposed Plan states that water entrained with dredged sediments would be transported to the SCA. Settlement of sediments will occur within the SCA and the excess

[3] Honeywell proposes to conduct sampling before dredging to identify and segregate those sediments or materials that may be sent off-site for disposal.

water will be decanted for treatment and subsequently discharged back to the Lake. The Plan recognizes that the specific treatment process used will be developed during the remedial design after additional sampling and treatability testing. Honeywell agrees with the position that the specific water treatment process used should be developed during the remedial design after additional sampling and treatability testing and, as set forth in the FS, Honeywell believes that none of the four analyzed treatment options (primary treatment, enhanced primary treatment, enhanced primary treatment with multimedia filtration, and advanced treatment) can be ruled out. Indeed, different treatment approaches may be acceptable at different points in the remediation, depending on which areas of the Lake are being dredged.

Honeywell further believes that the supernatant water is considered a dredged material under Section 404 of the Clean Water Act and, as such, Army Corps of Engineers Nationwide Permits 16 or 38 would be ARARs.

Nonetheless, for cost-estimating purposes, the Proposed Plan assumes that advanced water treatment (the most extensive treatment considered in the FS) may need to be used. Honeywell cautions that the Proposed Plan's assessment of the cost-effectiveness of dredging is predicated on assumptions related to the costs of advanced treatment. Any determination that the remedy set forth in the Proposed Plan must be changed in such a way as to substantially increase the estimated costs associated with water treatment may call into question DEC's conclusion that the Proposed Plan is cost-effective and may specifically call into question both the volume of sediments proposed to be dredged as well as the water treatment methodology proposed to be employed.

7 **Comment #7: Administrative Record**

At DEC's request, between May 2004 and November 2004, Honeywell submitted a number of additional memoranda to DEC regarding various issues in the May 2004 FS. As a result, Honeywell submitted a final, revised FS to the Department in November 2004. Because the Honeywell memoranda were part of the evidence submitted to the Agency during the course of the development of the FS, Honeywell respectfully requests that they be made part of the administrative record. A list of those memoranda is attached as Exhibit A.

Comment #8: Design Depths for Dredging

It is important that dredging be performed to depths and over areas that are defined in the design stage based on the preliminary design data, rather than on concentrations based on post-dredging confirmation sampling. Because dredged areas will be capped, any residual settling will be located under an effective isolation cap. If the Proposed Plan is implemented, specified criteria should be developed during remedial design for delineating areas and volumes of the SMU-1 ILWD to be removed, including specification of portions of SMUs 2 and 7 subject to potential dredging for NAPL. 8

Comment #9 Community Participation 9

Honeywell has worked diligently to encourage community participation in the remedy selection process. Over the course of the last year, Honeywell has discussed both the FS and the Proposed Plan with federal, state, county, and local elected and appointed leaders, local environmental groups and scientists, local business groups and business leaders, community organizations, and members of the public. The overwhelming response has been to urge Honeywell and DEC to reach agreement on a remedy and begin the Lake bottom cleanup as soon as possible. Honeywell plans to continue to seek community input as any remedy moves forward, including participation in developing a long-term vision for the Lake and the SCA. For example, Honeywell envisions an ongoing process of dialogue with community participants regarding the appropriate controls, processes, and procedures for minimizing issues related to the construction, operation, and closure of the SCA. Moreover, Honeywell has had discussions with a number of groups regarding key remedy implementation issues such as habitat planning, monitoring remedial progress, and the end use of the closed SCA.

Comment #10 SMU 7 Barrier Wall 10

Bullet 2 on Page 57 of the Proposed Plan and bullet 2 on Page 7 specify a groundwater barrier wall along SMU 7. The Plan should also allow for targeted dredging in lieu of installation of the barrier wall, depending on the results of the preliminary design investigation. Although current data suggest that the barrier wall may extend into SMU 7, the preliminary design data may indicate that targeted dredging in the southern half of the SMU might be a more effective and/or cost-effective measure to ensure cap effectiveness.

11 **Comment #11: BSQV Application**

With respect to SMU 8, the Proposed Plan and ROD should make clear that compliance with the mercury BSQV of 0.8 mg/kg following Phase I thin-layer capping, 10 years of monitored natural recovery, and Phase II capping, if required, would be based on consideration of the post-remediation surface area weighted average concentration ("SWAC") measured over subsets of the Lake that combine littoral and profundal areas and that such subsets are to be determined as part of the pre-design investigation and design process. Honeywell anticipates that the area of SMU 8 requiring thin-layer capping to achieve the BSQV-based goal would be determined as part of the pre-design investigation and design process, including revising modeling predictions for monitored natural recovery based on additional data to be collected during the pre-design investigation.

Sincerely,

David L. Wickersham

David L. Wickersham
Director, Remediation &
Evaluation Services

cc: Kate Adams
Evan Van Hook
Tom Milch
Michael Daneker
John McAuliffe
Victoria Streitfeld

EXHIBIT A

Onondaga Lake Feasibility Study
NYSDEC Supplemental Submittals
May - November 2004

Date	Author	Recipient	Submittal Summary
03-May-04	McAuliffe	Larson	Response to NYSDEC comments dated 11/28/03 on Draft OLFS
04-May-04	Johnson	Larson	Base map for groundwater model along with groundwater vistas with instructions
05-May-04	Johnson	Spera	OLFS cap model
05-May-04	Johnson	Larson	Electronic version of responses to NYSDEC comments on draft OLFS
07-May-04	Johnson	Spera	Polygon, shoreline and data point info for the OLFS
14-May-04	Hayes	Hesler	File showing mass loading rates for dredging (part of FS meeting)
18-May-04	Johnson	Spera	Response to Action Item #4: MNR model and Stella program to run the model
20-May-04	Johnson	Hesler	Action Item #28: Additional groundwater model files
24-May-04	Johnson	Hesler	Action Item #27: New tables for groundwater model
24-May-04	Johnson	Hesler	Memo and tables regarding the groundwater model
27-May-04	Nicotri	Larson	Response to Action Item #26: Duration of dredging season
27-May-04	Nicotri	Larson	Response to Action Item #11: PECQ2 data comparison
27-May-04	Nicotri	Larson	Response to Action Item #10: Boundaries for SMU 1 and 7
27-May-04	Nicotri	Larson	Response to Action Item #8: Cost estimate explanation
01-Jun-04	Nicotri	Larson	Response to Action Item #16: Thin layer capping
02-Jun-04	Nicotri	Larson	Response to Action Item #9: Cost estimate for water treatment
02-Jun-04	Nicotri	Larson	Response to Action Item #14: Trucking vs rail for offsite disposal
03-Jun-04	Nicotri	Larson	Response to Action Item #7: Breakpoint for various sediment removal volumes
07-Jun-04	Nicotri	Larson	Response to Action Item #2: Systems approach to dredging
07-Jun-04	Johnson	Spera	Revisions to groundwater model based on action items from 6/2 meeting
07-Jun-04	Nicotri	Larson	Response to Action Item #12: CPOI's for the OLFS
08-Jun-04	Nicotri	Larson	Response to Action Item #19: Ninemile Creek mouth erosion analysis
09-Jun-04	Nicotri	Larson	Response to Action Item #33 (i): CPOIs in 0-1 meter interval
09-Jun-04	Nicotri	Larson	Response to Action Item #23: NYCRR part 608 and potential loss of lake surface area
09-Jun-04	Nicotri	Larson	Response to Action Item #15: Mercury PEC on Table 4.5
16-Jun-04	Drachenberg	Larson	Response of Action Item #5: Mass of contaminants contained in LWAs
16-Jun-04	Johnson	Larson	Response to Action Item #33f: Part 1, Capping process utilized at Soda Lake site in Wyoming
17-Jun-04	Johnson	Spera	Memo regarding transport of cap material
17-Jun-04	Johnson	Larson	Response to Lake FS Action Item #37: Appendix L worksheets
21-Jun-04	Drachenberg	Larson	Response to action item #17 - Basis for dredge depth in Appendix L table
21-Jun-04	Drachenberg	Larson	Response to action item #36 - Basis for selection of data used to develop Figures E.34-E.73
21-Jun-04	Drachenberg	Larson	Response to Action Item #29: Remedial evaluation of wetlands
24-Jun-04	Johnson	Larson	Response to Action Item #32a: Table DB.1
25-Jun-04	Nicotri	Larson	Response to Action Item #39: Backup for NAPL presentation
25-Jun-04	Nicotri	Larson	Response to Action Item #31: Cost sensitivity of thin layer cap vs. isolation cap in 6-9 meter zone by SMU
25-Jun-04	Nicotri	Larson	Response to Action Item #33g: Explanation of calculation for area-weighted sediment concentrations
28-Jun-04	Johnson	Larson	Response to Action Item #33f: Info on capping at the Pine Street Canal site in VT
28-Jun-04	Nicotri	Larson	Response to Action Item #13: Selection of CPOIs included in Cap Model
28-Jun-04	Nicotri	Larson	Response to Action Item #24: Paper on BSAF approach
28-Jun-04	Nicotri	Larson	Response to Action Item #33f - Part 2 Info on Pine Street Canal Capping
28-Jun-04	Nicotri	Larson	Response to Action Item 32a and 32b: Groundwater model sensitivity to analysis and Tables DB. 1-6

Onondaga Lake Feasibility Study
NYSDEC Supplemental Submittals
May - November 2004

Date	Author	Recipient	Submittal Summary
30-Jun-04	Nicotri	Larson	Response to Action item #25: Back-up for cost estimates
30-Jun-04	Nicotri	Larson	Response to Action Item #24: Supplement to BSAF Memo on OLFS
30-Jun-04	Nicotri	Larson	Response to Action Item #25a: Supplement for water treatment system cost estimate
30-Jun-04	Nicotri	Larson	Response to Action Item 32e, f, g, h, I & j: Groundwater model revisions
30-Jun-04	Nicotri	Larson	Response to Action Item #33e: Cap criteria for 6 to 9 meter zone
30-Jun-04	Johnson	Larson	CD containing Action Items 32e - 32j: Groundwater model revisions
01-Jul-04	Nicotri	Larson	Response to Action Item #33 a, b, c, d, & h: Cap model revisions
02-Jul-04	Nicotri	Larson	Response to Action Item #34a, b, & c: Information related to cap settlement
06-Jul-04	Nicotri	Smith	Response to Action Item #33g: Explain calculation of area-weighted sediment concentrations
06-Jul-04	Gibbons	Edwards	Response to Action Item #25a: Backup for Water Treatment Cost Estimate
07-Jul-04	Nicotri	Larson	Response to Action Item #35: Details of cap at mouth of Ninemile Creek
08-Jul-04	Johnson	Scheuing	Clarification on NAPL calculations, supplement to Action Item #39
09-Jul-04	Nicotri	Larson	Attached revised memo for Action Item #35 Rev 1: Details of cap at mouth of Ninemile Creek
14-Jul-04	Steele	Larson	Response to Action Item 2: Supplemental information
14-Jul-04	Steele	Larson	Alternatives cost estimates table with additional line item at bottom showing cost of preloading included in each alternative
15-Jul-04	Drachenberg	Larson	Summary of alternatives costs with cost of SCA added as a line item and the sediment management option 5 cost summary with size of SCA added as a line item
20-Jul-04	Nicotri	Larson	Supplemental memo discussing the potential impact of double-counting side sloughing dredge volumes between SMUs for the PEC Alternatives
27-Jul-04	Johnson	Larson	Revised Tables 5.1 and 5.2 and revised list of additional documentation required for FS submittal schedule
28-Jul-04	Nicotri	Larson	Supplement to the response to Action Item #04: Supplemental MNR model runs
05-Aug-04	McAuliffe	Larson	Additional surface sediment sampling in SMU 5 letter work plan
06-Aug-04	Drachenberg	Larson	Draft final versions of Appendices E and F of the OLFS
25-Aug-04	Johnson	Larson	Draft narrative summaries for Sections 4 and 5, Appendix I, and abbreviated version of Appendix D
25-Aug-04	Johnson	Larson	Draft versions of full narrative summaries for Section 4, Section 5 and Appendix I, along with abbreviated narrative summary for Appendix D
26-Aug-04	Johnson	Larson	Draft versions of Tables 4.4A-G and 4.5
27-Aug-04	Johnson	Larson	Draft versions of narrative summaries for Appendices H, J, K & L and revised versions of Tables 5.1 - 5.3
31-Aug-04	Johnson	Larson	Draft version of the MNR narrative summary
01-Sep-04	Johnson	Larson	Responses to NYSDEC comments received in various emails from 7/23 - 8/20/04
01-Sep-04	Johnson	Larson	Narrative summary of changes to the May 2004 Feasibility Study
01-Sep-04	Johnson	Larson	Draft final versions of Appendices D, H, K, and N
01-Sep-04	Johnson	Larson	Response to NYSDEC comments on the May 2004 FS
10-Sep-04	Johnson	Larson	Results of the additional sediment sampling in SMU 5
17-Sep-04	Johnson	Larson	Response to DEC comments on narrative summaries received on 9/8/04

Onondaga Lake Feasibility Study
NYSDEC Supplemental Submittals
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Date	Author	Recipient	Submittal Summary
20-Sep-04	Nicotri	Larson	Revised response to NYSDEC comment J.1 in narrative summary submittal
20-Sep-04	Johnson	Larson	PCSTABL files from the slope stability analysis referenced in NYSDEC comment H.4
22-Sep-04	Johnson	Scheuing	Revised text for Appendix D to address SMU 7 barrier wall
30-Sep-04	Johnson	Larson	Draft final version of Appendix B - only files modified from 5/3/04 version
30-Sep-04	Johnson	Larson	Draft final version of Section 2 - only files modified from 5/3/04 version
01-Oct-04	Nicotri	Larson	Response to NYSDEC comments on narrative summaries for Section 5, Appendix K and Appendix L
01-Oct-04	Johnson	Larson	Revisions to Figures 2.1 and B.1: Remove SMU 9 from figures
05-Oct-04	Drachenberg	Hesler	9/1/04 version of Table 5.1, SMU 2 Figure
06-Oct-04	Johnson	Larson	Draft final version of Section 3, OLFS
06-Oct-04	Johnson	Larson	Draft final version of Appendix G, OLFS
06-Oct-04	Johnson	Larson	Draft final version of Appendix J, OLFS
06-Oct-04	Johnson	Larson	Draft final version of Section 1, OLFS
14-Oct-04	Johnson	Hesler	Revised text for Part A of Appendix D, OLFS
15-Oct-04	Johnson	Larson	Draft final version of Appendix L, OLFS
15-Oct-04	Johnson	Larson	Draft final version of Appendix I, OLFS
15-Oct-04	Drachenberg	Larson	Attached LWA Estimates spreadsheet which summarizes the mass of contaminants remediated by LWA
15-Oct-04	Johnson	Larson	Draft final version of Appendix M, OLFS
15-Oct-04	Johnson	Larson	Transmittal letter for Appendices I, L and M
15-Oct-04	Drachenberg	Larson	Updated version of Table 5.2
18-Oct-04	Johnson	Larson	Workbooks from Appendix L
21-Oct-04	McAuliffe	Larson	CD and hard copy of the draft final versions of the Section 4 figures for the OLFS
22-Oct-04	Johnson	Larson	FS text regarding the BSQV comparison
22-Oct-04	Johnson	Larson	Draft final version of Section 4, OLFS
25-Oct-04	Glaza	Hesler	Back-up info regarding SMU 1 hot spots table
01-Nov-04	Johnson	Larson	Draft final version of Section 5, OLFS
01-Nov-04	Johnson	Larson	Draft final version of Executive Summary, OLFS
07-Nov-04	Kiehl	Hesler	Additional cap model runs
09-Nov-04	Warren	Larson	Additional text for Section 5, OLFS
10-Nov-04	Johnson	Larson	File discussing use of the PECQ1 vs PECQ2 throughout the OLFS
11-Nov-04	Johnson	Larson	Updated FS costs, revised version of Table 5.5
11-Nov-04	Johnson	Larson	Figures for PRAP
12-Nov-04	Johnson	Larson	Revised PRAP Figures and new table with LWAs
12-Nov-04	Johnson	Larson	Revised versions of PRAP Figures
15-Nov-04	Johnson	Hesler	Attached 2 of the 5 revised figures for the PRAP
16-Nov-04	Johnson	Hesler	Revised versions of the remaining figures for the PRAP
18-Nov-04	Glaza	Hesler	Email noting that Section F.2.3.2 of the FS lists details on cap monitoring/maintenance estimates
22-Nov-04	Johnson	Larson	LWA cost summary: Outlines capital cost, average operation and maintenance cost, present value, and the cost for each alternative
24-Nov-04	McAuliffe	Larson	Draft Final FS for Onondaga Lake
30-Nov-04	McAuliffe	Larson	Draft Final FS for Onondaga Lake in PDF format. 20 copies to Tim Larson and 10 copies to Mary Jane Peachy

Honeywell

Honeywell
P.O. Box 1139
Morristown, NJ 07962-1139

H-1

January 31, 2005

Mr. Robert Nunes
Remedial Project Manager
Central New York Remediation Section
U.S. Environmental Protection Agency
290 Broadway, 20^{th} Floor
New York, NY 10007

Re: ***Proposed Plan for the Onondaga Lake Bottom Subsite, Onondaga Lake Superfund Site, Syracuse, New York***

Dear Mr. Nunes:

Honeywell International Inc. offers the following comments on the November 29, 2004 Proposed Plan ("Proposed Plan") issued by the New York State Department of Environmental Conservation ("DEC") for the Onondaga Lake Bottom Subsite, Onondaga Lake Superfund Site.

The Proposed Plan is the result of a substantial and lengthy remedial investigation and feasibility study effort undertaken by Honeywell and DEC pursuant to a Consent Decree overseen by the United States District Court for the Northern District of New York. To complete the Feasibility Study for the Site, Honeywell put together a team of nationally-recognized experts from over 30 different organizations and consisting of environmental engineers, civil engineers, geotechnical engineers, marine biologists, toxicologists, environmental scientists, habitat biologists, and geologists. The team includes Danny Reible of the University of Texas, Michael Palermo, retired from the Army Corps of Engineers, Ed Long, retired from NOAA, and Don Hayes of the University of Utah. The Remedial Investigation portion of the team invested 10 years of effort in data collection, modeling, and risk assessment activities. The Feasibility Study portion of the team spent another 2 years and approximately 90,000 hours in the effort to develop and analyze remedial alternatives.

For over one hundred years, Onondaga Lake suffered the accumulated effects of municipal and industrial pollution from many sources. Allied Chemical and AlliedSignal (now Honeywell) operated chemical production facilities collectively called the Syracuse Works on the southwest side of the Lake from 1884 to 1986. The original Solvay Process used the region's natural salt brines and limestone for the production of soda ash and associated products. The Syracuse Works eventually included the Main Plan, the Willis Avenue and Semet Plants, and the Bridge Street Plant.

12 **I. Honeywell's Recommended FS Alternative C**

As a result of the RI/FS process, Honeywell first submitted an FS in May 2003 and developed a revised FS in May 2004, which DEC determined to be substantially complete in July 2004. Between May 2004 and November 2004, Honeywell and DEC worked together to undertake additional analysis which was incorporated into the final November 2004 FS. That FS recommended implementation of Alternative C. Using regulatory cost estimating guidance, the FS estimated the costs of Alternative C to consist of $210 million in capital costs and $33 million in present value operating and maintenance costs. The principal remedial elements of Alternative C included:

Hydraulically dredging an estimated 543,000 cubic yards (cy) of sediments. FS Alternative C proposed dredging in Sediment Management Units ("SMUs") 1, 2, 3, and 6. Dredging in those SMUs was designed to enhance cap effectiveness and optimize aquatic habitat following capping of the dredged area. Dredging would accomplish two goals: (i) remove contaminated materials to an optimal habitat depth (meeting fish spawning requirements) and (ii) reduce erosive forces on the cap. Capped areas would be engineered for habitat optimization.

Isolation capping of an estimated 336 acres within the near-shore (littoral) zone. Alternative C's proposed isolation capping would be designed to eliminate the potential human health and ecological exposure pathways associated with impacted sediment. The cap would be designed with appropriate factors of safety to ensure long-term effectiveness, including the installation of groundwater interceptor walls and hydraulic containment systems in certain areas as part of upland site remediation.

Habitat Improvement. Alternative C proposed establishing surface characteristics of the cap that would improve aquatic habitat throughout the littoral areas of the Lake and enhance its recreational value. Although we would expect further public participation in resolving the design details of habitat improvement projects, generally the surface characteristics of the cap would be designed to enhance the growth of submerged aquatic plants, increase fish spawning, resist erosive forces, and maximize optimal habitat water depths. For example, Alternative C sets forth a number of habitat improvement measures for SMUs 1,2, 3, 6, and 7. In these SMUs, a 25 acre recreational/habitat buffer zone would be created by applying a thin sand layer over a rock layer in the cap, extending from the shoreline to the approximately 2 foot water depth. This zone would provide suitable substrate for benthic organisms and submerged macrophytes and protect the cap from erosive forces. Additional habitat for submerged macrophytes would be created over approximately 48 acres at water depths from 2 to 5 feet through the addition of a sand layer to the cap. Fish spawning habitat would be created over approximately 133 acres at water depths of 5 to 15 feet through the addition of a gravel layer to the cap. Finally, improved benthic habitat would be created over an additional 114 acres of water depths ranging from 15 to 30 feet by the use of a thin sand layer suitable for benthic organism colonization.

Aeration (oxygenation). Alternative C proposed an aeration pilot project in the Lake's deep (profundal) zone to reduce the conversion of mercury to methyl mercury. Aeration is expected to reduce mercury bioaccumulation in fish tissue.

Monitored Natural Recovery/thin-layer capping of profundal sediments. In FS Alternative C, Honeywell proposed a phased approach to monitored natural recovery ("MNR") and thin-layer capping of profundal sediments. Pre-design investigations and pilot testing would optimize implementation and ensure effectiveness of aeration, MNR, and phased thin-layer capping. Phase I would include installation of a full scale aeration system, as appropriate following pilot testing, initiation of natural recovery monitoring, and thin-layer capping in select areas that would otherwise be expected to exceed the mercury PEC or that, in combination with littoral sediments, would otherwise be expected to exceed the mercury bioaccumulation-based sediment quality value ("BSQV") on a surface area weighted concentration basis after an MNR period and in the presence of aeration. MNR would continue in Phase II as a means of assessing the effectiveness of the thin-layer capping, aeration, and natural recovery processes. Phase III would include additional thin-layer capping as a contingency, continuation of aeration if it has proven to be effective, and ongoing monitoring.

Consolidate sediments in an upland Sediment Consolidation Area ("SCA")/Treatment of SCA effluent. Under FS Alternative C, an SCA with an impermeable liner would be constructed on Wastebed 13. This former Solvay wastebed has the required capacity to accommodate the dredged sediments and will require only modest upgrades to the existing berms. Sediments would be conveyed through a double-lined pipeline, dewatered, and the resulting effluent would be treated before discharge back to the Lake.

FS Alternative C meets the Remedial Action Objectives and Preliminary Remedial Goals established during the RI/FS process, including the criteria for mercury levels in fish, sediment and water established by DEC. Further, FS Alternative C is protective of human health and the environment, and consistent with USEPA's *Draft Contaminated Sediment*

Remediation Guidance for Hazardous Waste Sites, including the eleven principles for managing contaminated sediment risk set forth in Appendix A to that document.

II. DEC's Proposed Plan

DEC's Proposed Plan contains the same essential remedial elements as FS Alternative C. Honeywell and DEC share the same goal of implementing a remedy that is protective of human health and the environment, restores and improves the Onondaga Lake habitat, and allows the Lake to return to being a valuable public recreational resource. Honeywell believes that both the FS Alternative C and the DEC Proposed Plan would fulfill these goals. A brief summary of the remedial elements of the Proposed Plan follows.

Hydraulic dredging of up to 2.65 million cubic yards of sediment. The Proposed Plan anticipates dredging a total of up to approximately 2.65 million cubic yards ("cy") of contaminated sediment. Much of this dredged sediment (approximately 1.6 million cy) would be removed from an area known as the In-Lake Waste Deposit ("ILWD"), found primarily in SMU 1. DEC's Proposed Plan also calls for additional dredging up to a sediment depth of about 9 meters in specific portions of SMU 2 to address the fact that NAPL was identified at depth immediately adjacent to the Lake. This additional dredging would remove an estimated 400,000 cy of sediment from SMU 2, including approximately 234,000 cy to address NAPL at depth. Under the Proposed Plan, most sediments would be placed in an upgraded SCA located on one of the on-site wastebeds. During remedial design as well as construction, it might be determined that a portion of the dredged materials would be treated and disposed of at an off-site facility. Final dredging volumes will be determined more accurately during the pre-design/design of the remedy.

Isolation capping of 425 acres of Lake bottom. In addition, the DEC Proposed Plan calls for isolation capping of approximately 425 acres of the littoral zone sediments. In both FS Alternative C and the Proposed Plan, the isolation cap would be designed to contain the maximum concentrations observed in the underlying sediment. In both remedies, a 50 percent safety factor would then be added to the cap thickness as a further safety precaution. Groundwater upwelling and cap effectiveness modeling conducted as part of the FS demonstrated that a cap could be designed to effectively contain the maximum concentrations found in the sediment. The Proposed Plan would further require excavation of defined "hot spots" prior to cap application.

Other Elements of the Proposed Plan. Finally, like Honeywell's FS Alternative C, the Proposed Plan calls for thin-layer capping of certain profundal sediments, an aeration pilot project, and monitored natural recovery. The significant differences between DEC's Proposed Plan and Honeywell's Alternative C include (a) the extent of dredging and subsequent capping; (b) the size of the SCA necessary for remedy implementation; (c) the degree of water treatment; and (d) the anticipated cost of the remedy.

III. Specific Comments on the Proposed Plan

Honeywell presents the following specific comments regarding the DEC Proposed Plan. [1]

A. Adequacy of the Data 13

The RI/FS process for Onondaga Lake has been extensive. Honeywell and its team of experts invested approximately 90,000 hours over the last two years to complete the FS process and DEC has also invested substantial effort. Together, approximately 6,000 samples of sediment, water, fish, and plants were collected and analyzed from hundreds of data points. Honeywell further developed sophisticated groundwater and cap effectiveness models and invested significant resources in tracking and understanding mercury sources and behavior in the Lake. Honeywell recognizes that remedial design will necessitate the collection of additional data. Indeed, the scope and magnitude of certain remedial actions, such as "hot spot" removal or other dredging in the ILWD, will likely be substantially defined by additional data collection during remedial design. Although the existing data would not be sufficient for certain remedial options, Honeywell believes that the RI/FS is adequate to allow for the selection of an appropriately protective remedy at this time. Years of additional study of the Lake would not benefit the community or the environment, and would only serve to prolong the implementation of the remedy and delay the return of the Lake to broader public use.

B. Dredging of the In Lake Waste Deposit 14

In developing the FS, Honeywell conducted extensive cap isolation modeling to ensure that the cap would be placed effectively. That modeling demonstrated that an isolation cap

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[1] These comments do not represent the entirety of Honeywell's comments on DEC's Proposed Plan. By submitting this letter to the Remedy Review Board, Honeywell does not waive its right to submit additional comments for consideration by DEC and for incorporation into the administrative record before the close of the DEC public comment period.

could be effectively placed over the ILWD, as well as other areas of the Lake.[2] Indeed, in modeling cap effectiveness, Honeywell used a number of conservative assumptions or "protective measures," including using the worst case concentrations within each SMU, using literature pore water concentration values, and assuming a groundwater upwelling velocity greater than that generated by the groundwater model. [3] The modeling demonstrated that a properly designed cap, together with the installation of a hydraulic containment system along portions of the shoreline as part of upland remedial measures, will effectively isolate existing contamination and prevent "contaminant breakthrough." As an additional measure, the Proposed Plan calls for a 50% increase in isolation layer thickness (similar to FS Alternative C) and dredging to an average depth of approximately 2 meters, with additional "hot spot" removal to a depth of up to 3 meters, depending on additional data. Doing so would remove additional mass of the ILWD from beneath the cap.

The FS cap effectiveness model and groundwater model both demonstrate that an effective isolation cap can be installed over the ILWD. Thus, Honeywell believes that FS Alternative C is fully supported by the data presented in the FS. DEC has proposed additional dredging because the Agency believes such dredging will achieve greater mass removal and increase geotechnical stability of the cap. The Agency Proposed Plan, however, does not raise any other concerns about the effectiveness of the isolation cap developed in the FS. In any event, the cap effectiveness demonstrated by the FS modeling establishes that any dredging beyond that set forth in the Proposed Plan would not be warranted, especially in light of the extraordinary costs, time delays, water quality issues, and community opposition raised by additional dredging.

Finally, the cost-effectiveness of the Proposed Plan regarding the use of the SCA is clearly demonstrated in the FS and any changes to this element of the final remedy would have to be re-evaluated in terms of overall cost-effectiveness.

15 **C. Mercury Modeling**

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[2] The model also demonstrated, for example, that a cap could be placed effectively over the contaminants present in the Lake, including detected NAPL, as demonstrated in FS Appendix H.

[3] In addition, DEC derived the threshold concentrations for hot spot delineation by employing an assumed groundwater upwelling velocity that was three times greater than the upwelling Honeywell used in the cap model.

H-1

Honeywell understands that some members of the public have voiced concern over the perceived absence of quantitative, predictive models of mercury cycles in the Lake. The RI included an extensive evaluation of the fate and transport of mercury in Onondaga Lake. The primary tool used in the RI was a development of a mass balance. During the RI process, Honeywell attempted to develop additional mercury cycle models but the models' predictive abilities did not have the capability to be sufficiently reliable tools upon which to base the FS or the Proposed Plan. In general, the precision of mercury models is limited by the natural variability of the many factors that contribute to mercury concentrations in fish, such as the rate of production of methyl mercury, the composition of the food web, rates of addition of mercury to the ecosystem from upland contamination, rates of mercury contribution from atmospheric deposition and from anthropogenic sources unrelated to the contamination, rates of sedimentation, and a variety of other factors. Nonetheless, the mercury mass balance developed during the RI, together with the data collected for the RI and for upland site investigations, provides a substantial understanding of mercury fate and transport in Onondaga Lake. A detailed summary of that understanding is set forth in Section 1.6 of the FS.

Both FS Alternative C and the DEC Proposed Plan set forth several concrete remedial actions that are expected to eliminate ongoing sources of mercury to the Lake ecosystem, protect against mercury bioaccumulation and result in decreased mercury concentrations in the food chain. These actions include:

- To prevent the recontamination of Lake sediments and to ensure cap effectiveness, active sources of contamination to a given portion of the Lake would need to be controlled before remedial activities begin in that area of the Lake. Upland source controls have been or will be put into place to address ongoing sources of mercury to the Lake. These upland source controls, including controls for Geddes Brook, Nine Mile Creek, the Semet and Willis Avenue Site, Wastebed B/Harbor Brook, and the LCP Bridge Street Site, are being handled through the Superfund process subject to Consent Orders between Honeywell and DEC. The timing of remedial activities in Onondaga Lake would need to be coordinated with the remedial work at these upland sites.

- Dredging will remove a portion of the mercury contamination. Capping will further isolate remaining mercury contamination and prevent it from reaching the food chain.

- The aeration pilot project is expected to interfere with methylation of mercury and thereby reduce its bioavailability.

The FS also developed a mercury BSQV of 0.8 mg/kg that has been used to ensure that the remedy sufficiently addresses mercury accumulation in the food chain. To derive this number, Honeywell first calculated a Biota Sediment Accumulation Factor ("BSAF") for mercury. The BSAF is the ratio of methyl mercury concentrations in fish tissue to total mercury concentrations in surface sediments. It is predicated on the overly conservative assumption that *all methyl mercury in fish originates from mercury in the surface sediments*.

To take account of the fact that different size fish have different mercury concentrations BSAFs were calculated for small fish and large fish using average mercury concentrations in both littoral sediments and in sediment Lake-wide. These BSAFs were then used to calculate sediment target concentrations or BSQVs for five different wildlife receptors based on reported Lowest Observable Adverse Effects Levels for each receptor. Honeywell chose the most protective of these BSQVs – the 0.8 mg/kg associated with protection of the river otter -- as the appropriate BSQV for the Lake. To ensure that the remedy adequately protects the food chain, the FS compared post-capping modeled surface area weighted concentrations of mercury in sediment to the mercury BSQV of 0.8 mg/kg. The results demonstrate that the littoral zone will meet this protective value after dredging and capping. On a Lake-wide basis, the results of the pre-design investigation, including updating the MNR model, will be used to determine the need for additional thin-layer capping in the profundal zone.

16 **D. PEC Quotients**

The DEC Proposed Plan uses a Probable Effects Concentration Quotient ("PECQ") of 1 to determine areas of the Lake in need of remediation. For any particular contaminant, the PEC represents the geometric mean of the ER-L, TEL, ER-M, PEL, and AET. A mean PECQ was used to take into account the presence and concentration of multiple chemicals in sediments.

The mean PECQ for sediment samples was calculated with a four-step process:

- CPOIs were divided into five groups based on chemical class;
- Each detected contaminant in a sediment sample was divided by its PEC to result in a chemical specific PECQ;
- For each chemical group, the resultant PECQs for a sediment sample were summed and that sum was divided by the total number of CPOIs in the group to produce a "group" mean PECQ.

- The mean PECQs for each chemical group were summed and the sum was divided by the total number of groups, giving a mean PECQ for the sediment sample.

To biologically calibrate the mean PECQs, during the FS process the quotients were compared with toxicity test results (i.e., percent mortality) obtained for the 10-day chironomid and amphipod sediment toxicity tests conducted at 79 stations in 1992. For a further discussion of this comparison, see FS Appendix J. In general, neither the chironomid nor the amphipod test results demonstrated a noticeable increase in mortality until the PECQ exceeded approximately 1 to 2. Honeywell believes these data demonstrate that a PECQ of 1 to 2 adequately identifies the range at which Lake sediments might begin to demonstrate acute toxicity to benthic organisms. To ensure an additional margin of safety in the remedy, therefore, DEC selected a PECQ of 1 in the Proposed Plan. Honeywell believes the use of a mean PECQ of 1 or 2 is protective of benthic organisms.

In addition, primary human cancer and non-cancer health hazards in Onondaga Lake are associated with ingestion of bioaccumulative chemicals in fish. The highest concentrations and greatest mass of these chemicals in sediment are in the same areas identified by the PECQ 1 or 2. Remediation of these areas as proposed in both FS Alternative C and the Proposed Plan, in concert with other proposed remedial activities (e.g., the aeration pilot study), is expected to result in decreased concentrations of bioaccumulative chemicals in fish tissue, to concentrations within the established target ranges. Because both remedies also propose extensive capping of littoral sediments (especially in the more contaminated southern portion of the Lake), both would also address potential risk related to the one other recreational exposure pathway identified in the human health risk assessment: wading in South Basin sediments.

* * *

Honeywell has worked diligently to encourage community participation in the remedy selection process. Over the course of the last year, Honeywell has discussed both the FS and the Proposed Plan with federal, state, county, and local elected and appointed leaders, local environmental groups and scientists, local business groups and business leaders, community organizations, and members of the public. The overwhelming response has been to urge Honeywell and DEC to reach agreement on a remedy and begin the Lake bottom cleanup as soon as possible. Honeywell plans to continue to seek community input as any remedy moves forward, including participation in developing a long-term vision for the Lake. For example, Honeywell has had discussions with a number of groups regarding key remedy implementation issues such as habitat planning and monitoring remedial progress.

Honeywell appreciates this opportunity to make this submission to the Remedy Review Board. Please do not hesitate to contact us if the Board has any additional questions or if the Board seeks additional information. Honeywell remains committed to working with DEC to implement a remedy for the Lake bottom that is protective of human health and the environment and that can be implemented in a responsible and reasonable timeframe.

Sincerely,

David L. Wickersham

David L. Wickersham
Director, Remediation &
Evaluation Services

April 29, 2005

Mr. Don Hesler
Mr. Timothy Larson
New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12233-7016

Re: Onondaga Lake Superfund Site – Onondaga Lake Bottom Proposed Plan – Public Comment

Dear Mr. Hesler and Mr. Larson:

Honeywell International, Inc. submits the following additional comments on the Proposed Plan for the Onondaga Lake Bottom Subsite of the Onondaga Lake Superfund Site in light of the National Remedy Review Board's ("NRRB") recommendations regarding the Proposed Plan.

First, Honeywell agrees with the NRRB that current data suggest that most of the potential hotspot material in the In Lake Waste Deposit ("ILWD") would likely be removed by dredging to depths of 2 meters. Based on existing data, Honeywell continues to believe that the FS demonstrates that an effective cap can be installed and maintained over the ILWD after the dredging recommended in FS Alternative C. That cap, as proposed in FS Alternative C, takes into account erosive forces and groundwater upwelling. Groundwater modeling and cap effectiveness modeling in the FS using site specific data demonstrate that the cap would be effective without additional dredging beyond Alternative C. 1

Honeywell also concurs with the NRRB's Recommendation # 13 regarding the collection of additional data in the ILWD during remedial design so that the data collected can be used in "an adaptive management fashion to maximize remedy effectiveness and minimize cost." Honeywell further concurs in the NRRB's recommendation that the remedy as stated in the Record of Decision ("ROD") include flexibility in dredge depth and cap thickness so that cap effectiveness and cost efficiencies can be attained following additional data collection.

Second, under the Proposed Plan, sediments dredged from the Lake will be managed in an on-site sediment consolidation area ("SCA") rather than staged for off-site disposal. The Proposed Plan recognizes that a portion of the dredged materials (e.g., 2

NAPLs) will be treated and/or disposed of off-site. As we have previously stated, on-site consolidation of sediments is a necessary component of any final remedy. The use of an on-site SCA is an accepted and safe management technology that can be effectively used at this Site. Monitoring, odor control, appropriate closure practices, noise control, and other issues will have to be detailed in the remedial design. Honeywell recommends that the ROD contain sufficient flexibility concerning the location of the SCA to allow for a evaluation of other Solvay wastebeds as potential SCA locations in order to identify the location that will most appropriately allow for management of the sediments without undue adverse community impacts. Honeywell continues to believe that any change in the Proposed Plan which results in substantial volumes of sediment being sent off-site for disposal rather than being managed in an SCA may not be supported by an analysis of the statutory and regulatory requirements governing remedy selection.

3 Third, the mean PECQ provides a rational and conservative means to identify sediments that pose risk to benthic macroinvertebrates. Appendix J of the FS sets forth the ample scientific precedent for use of the mean PECQ to evaluate sediment toxicity in Onondaga Lake. In addition, the sediment quality value quotient approach has been used at a number of locations in the U.S. for evaluating sediment toxicity in the presence of multiple co-located contaminants, as is the case for Onondaga Lake. However, some public commenters expressed concern that the mean PECQ does not address long-term or chronic sediment toxicity. In 2000, long term toxicity tests were conducted at 15 stations located in key parts of the Lake (i.e., the southern shoreline and the mouth of Ninemile Creek); these results are discussed in the Baseline Ecological Risk Assessment ("BERA"). As the BERA and FS Appendix J demonstrate, the Proposed Plan would result in a reduction of chronic toxicity to the benthic community in those areas of the Lake where existing contaminated littoral sediments would be capped.

4 Fourth, Honeywell appreciates the substantial opportunities DEC has provided for public comment on the Proposed Plan. The Proposed Plan was issued in November, 2004. Thereafter, DEC provided a 90-day public comment period. The public comment period was reopened on April 1, 2005 for an additional 30 days. Thus, by the close of this public comment period, the Proposed Plan will have been available to the public for five months and all interested parties will have had the opportunity to participate in two substantial public comment periods.

Mr. Donald Hesler
Mr. Timothy Larson
April 29, 2005
Page 3

In this regard, Honeywell has reviewed many of the written public comments filed with DEC in the first public comment period. Honeywell wishes to support some of the comments offered by members of the public. For example, 5

- Honeywell supports continued efforts to work with the public and impacted communities during the remedial design process.
- Honeywell conceptually believes that the Proposed Plan is consistent with efforts to improve access to and recreational enjoyment of the Lake. If Honeywell and DEC can agree on a final remedy, Honeywell will seek to coordinate its remedial efforts with the County's efforts to establish a "Loop the Lake" trail.
- Honeywell will consult with the community regarding habitat improvement and restoration projects that will be part of the remedial action.
- Honeywell understands the need for additional monitoring of Lake conditions during remedy design and implementation.

In light of the substantial opportunities for public comment that DEC has provided, and in light of the stated willingness of DEC and Honeywell to continue to engage the public during remedial design, Honeywell respectfully urges the Department to move forward promptly with issuing the ROD. Substantial delay in the issuance of DEC's Record of Decision will provide no additional benefit to the environment, the community, or Honeywell.

Sincerely,

David L. Wickersham
Director, Remediation & Evaluation Services

H-3

ARNOLD & PORTER LLP

Thomas H. Milch
Thomas_Milch@aporter.com

202.942.5030
202.942.5999 Fax

555 Twelfth Street, NW
Washington, DC 20004-1206

June 24, 2005

VIA TELECOPY AND FIRST CLASS MAIL

James H. Ferreira
Deputy Commissioner and General Counsel
New York State Department of Environmental Conservation
Office of General Counsel
625 Broadway
Albany, NY 12233-1500

Re: Onondaga Lake

Dear Jim:

Honeywell submitted comments on the Onondaga Lake PRAP which included an "Attachment A." Attachment A consisted of a list of items that Honeywell requested be placed into the administrative record. DEC has requested that Honeywell reconsider that request, based on the volume of material set forth in Attachment A and the redundancy of some of the material. After further review, Honeywell is willing to withdraw its request that the documents listed on Attachment A be placed in the administrative record, *except for the following documents, which it believes should be part of the record:* 1

Date	Author	Recipient	Submittal Title
May 2004	Honeywell	DEC	May 2004 Onondaga Lake Draft Feasibility Study (including Appendices)
May 3, 2004	McAuliffe	Larson	Response to NYSDEC comments dated 11/28/03 on Draft Lake Feasibility Study
May 27, 2004	Nicotri	Larson	Response to Action Item #10: Boundaries for SMU 1 and SMU 7

June 9, 2004	Nicotri	Larson	Response to Action Item #23: NYCRR Part 608 and potential loss of lake surface area
October 25, 2004	Glaza	Hesler	Back-up information regarding SMU 1 hot spots table.

Sincerely,

Tom Milch/kg

Thomas H. Milch

cc: Carol Conyers

PUBLIC COMMENTS

I would like to know who's paying the $212 million dollar difference between Honeywell's $237 million dollar proposal and the states $449 million dollar proposal? 1

Seems to me we will be in the courts for another 20 years over this. 2

Joan E. Bardeen
East Syracuse

Joan E. Bardeen
Syracuse University
Electronic Publishing Center
001 Sims Hall
Phone (315) 443 -4172
Fax (315) 443-5345

(Comment received via e-mail from jebardee@syr.edu on 1/7/05)

To Whom it May Concern,

Finally! Someone has finally come up with a plan to save what little is left of "good old" Onondaga Lake. Having grown-up in the city of Syracuse, and having also spent countless hours as a child playing on the sports diamonds along the lake, it would be nice to finally see actual boating and fishing going on. As opposed to just being able to watch the waves role bye.

With a clean-up that is timely and cost efficient, one can only marvel at the future development that can take place along the banks of a clear, clean lake-front. With the New York State Thruway running right over the inlet to the lake, can you image the people that would stop to partake in the area when they see the activity that has developed. I wish you well, and look forward to bringing my children to the shores of a once proud body of water.

Sincerely,

David J. Bonner

(Comment received via e-mail from DBonner@starpointcsd.org on 1/7/05)

1/13/05

P - 3

Form for Submitting Comments on the Onondaga Lake Proposed Plan

NYSDEC

Your input on the Proposed Plan for the Onondaga Lake subsite of the Onondaga Lake Superfund site is important to NYSDEC. Comments provided by the public are valuable in helping us select a final cleanup remedy for the site.

You may use the space below to write your comments. Use additional pages if needed. Fold the form along the dotted lines and tape (do not staple) the form closed. The return address is already printed on the reverse side. **Comments must be postmarked by March 1, 2005.** Those with electronic communications capabilities may submit their comments to NYSDEC via the Internet at the following e-mail address: DERweb@gw.dec.state.ny.us. Please note "Onondaga Lake Proposed Plan" in the subject box.

It seems that we've been this route before. Not so long ago 1
a professor emeritus from ESF stated it would take at least
½ a century and then we would not know where we were.
As it NH_4, NH_3, PCB's because Onondaga County does not
collect taxes anymore? Why am I not convinced! If
Allied were still here, we would not be here tonight)
I propose daming (damming?) it, because that 2
is the one true way of getting to the bottom
(of things). Next Ca Plast? Cap all waste it in
containers and leave there.

Your Name: Howard Bragman
Address: 2705 East Genesee Street
City: Syracuse
State: NY
Zip: 13224
Phone: 1522

1/12/05

Comments regarding the Onondaga Lake Clean-Up/Proposed Plan

1. During the 12/9 Town of Camillus meeting, I understood that only non-hazardous waste would be dumped into Wastebed 13. During the info meeting earlier today, I understood that Honeywell has proposed Wastebed 13 because of it size and capabilities, but the DEC has left it open to Wastebed 9-15, to be determined. How will it be determined which Wastebed(s) will be used? 1
2. I want to know when the project of dredging the lake begins, how will the hazardous and non-hazardous waste be separated? If the wording becomes low hazardous goes to the Wastebed and high hazardous goes to Niagara Falls area, once again, how is it determined what is low/high? If this is still to be determined and to be defined during the "3 year design period of time", what factors will determine what is low/high? 2
3. I saw one of the posters showing the Wastebed and how it would be prepared during the 1/12 information session. If the Wastebed remains open during the 4 year implementation period and is not capped until 1-2 years after the dredging is completed, what is keeping the (some of which probably will be hazardous) material from going airborne, potentially affecting our health and property values? I understand there will be an air and odor monitoring system in effect, but what are the parameters of the monitoring range, as well as what steps will be taken if the range is at a harmful level? Will the public be informed of the readings on a regular basis, and have access to that information on a daily basis if requested? 3
4. When the "design phase" of the project begins and during its anticipated 3-year period, will there be public meetings, with sufficient notice, to give the community a status update, and accept questions/comments from the community? I think it is very important to the success of this project that "the cards are on the table", that the public is kept informed in a way that it easy for the local citizens to understand what is happening, when it is happening, how it is being done, and their concerns are being addressed along the way. 4
5. I understand that on 4/1/05, the DEC will make a proposed plan decision. What happens if Honeywell does not agree with the plan? I am under the impression if Honeywell says no, the Fedl & State will proceed with the DEC proposed plan, which would mean the taxpayers would be paying for the project. When the project is completed, the Fedl/State/DEC would then give the bill to Honeywell and payment would be expected. So the Fedl, State, DEC are reimbursed, but the taxpayer is not???? 5

Nancy Ciampi
120 Scorpio Drive
Syracuse, NY 13209
315/468-2354

I was wondering what precautions or remedial action will take place to prevent contamination from flowing into Lake Ontario via the Oswego River. 1
Katie Comerford

(Comment received via e-mail from kjc05@health.state.ny.us on 1/20/05)

P-6

To cap a few major spots of pollution is not "treating" the problem, just temporarily covering it up. To dredge 1
certain areas and deposit the proble somewhere else is not "treating" the problem it is just moving the problem
somewhere else. It took 125 years to pollute the lake to the extent it is now. To throw a small band aide over
a few spots and ignore the rest of the lake as a whole is ridiculous. What are the "standards" by which the 2
water quality will be measured to achieve a ruling that the lake is clean and safe ? To dump pollutants that
could seep into the ground water is not "treatment" . It is just moving the problem elsewhere. This sounds like 3
"the solution to pollution is dilution" syndrome that led to the magnitude of the problem we have today. That
type of thinking is 1960's technology, solves little and only covers up the problem for future generations to have
to deal with eventually. Is this the best solution you could come up with over a 15 year period ?

Charles Coughenour
(Comment received via e-mail from clcou77@usadatanet.net on 12/15/04)

P - 7

112 Parsons Drive
Syracuse, N.Y. 13219
February 19, 2005

Donald Hesler/Timothy Larson
Onondaga Lake Superfund State-Public Comments
Department of Environmental Conservation
625 Broadway
Albany, N.Y. 12233

Gentlemen:

I am strongly in support of the recommendation by David C. Ashley in the Post-Standard this past week that "Looping Onondaga Lake with a usable recreation trail should be part of the current lake remediation options." 1

I would very much like to see a trail completed 100% of the way around the lake so that I could take my bicycle to a parking area somewhere around the lake, leave my car there, and circle the lake on my bicycle. This would be a significant enhancement to the Onondaga Lake park, which is pretty nice already.

I hope that the city and county, with whatever help they can get from the State and/or Federal governmenta, will take control of the entire shore of the lake, develop it in the future for recreational use only, and keep commercial developers back from the edge of the lake. Anyone who doubts the benefit to the public of this approach should spend some time in Ottawa, Canada, or in Washington, D.C. to appreciate how great an asset Onondaga Lake can be to the community. Ottawa has parks with picnic areas, sports fields, bicycle and hiking trails, formal walking paths, etc., stretching for tens of miles beside the Ottawa and Rideau rivers, the Rideau Canal and Dow's Lake. Washington's parks are beside or connected to the Potomac River. Both cities spent a lot of money to buy back the shorelines as they developed their parks; presumably Syracuse can still get such control for relatively little.

Respectfully,

Kenneth H. Cram

Kenneth H. Cram

RECEIVED
FEB 24
REMEDIAL BUREAU B

11205

Form for Submitting Comments on the Onondaga Lake Proposed Plan

P-8

NYSDEC

Your input on the Proposed Plan for the Onondaga Lake subsite of the Onondaga Lake Superfund site is important to NYSDEC. Comments provided by the public are valuable in helping us select a final cleanup remedy for the site.

You may use the space below to write your comments. Use additional pages if needed. Fold the form along the dotted lines and tape (do not staple) the form closed. The return address is already printed on the reverse side. **Comments must be postmarked by March 1, 2005.** Those with electronic communications capabilities may submit their comments to NYSDEC via the Internet at the following e-mail address: DERweb@gw.dec.state.ny.us. Please note "Onondaga Lake Proposed Plan" in the subject box.

Let's get the job Done. 1

Just Do it!

Your Name JoAnn Cucci
Address 201 E. Washington St
City Syracuse
State New York
Zip 13201
Phone 3' 448-8732

P - 9

R. B. Eidt
Phone 315.638.3271
Fax 315.638.3271

[redacted]

Fax

Roger

To:	Steven P. Eidt	**From:**	R. B. Eidt
Fax:	315.426.7459	**Date:**	January 9, 2005
Phone:	315.426.7506	**Pages:**	1 including cover
Re:	Source of Hg numbers	**CC:**	None

☐ **Urgent** X **For Review** ☐ **Please Comment** x **Please Reply**

---

1. **The Post made reference to the amount of mercury in the lake. They used a number of 165000 Pounds. Where did this number come from? Was a material balance made on the system? There are several areas where mercury was lost; I believe the largest quantity was lost to the ground, not to the lake. They may have used the monthly mercury purchases that were made to maintain cell levels.** 1

2. **How much soil was removed when the Peroxide process building was demolished? The " working " solution for the process contained several "nasty" materials.** 2

P-10

John S. Gibbs, Jr.
24 Chaucer Circle
Baldwinsville, New York 13027

January 31, 2005

RECEIVED
FEB - 4 2005
REMEDIAL BUREAU B

Mr. Timothy Larson, P.E.
Project Manager
New York State Department
Of Environmental Conservation
625 Broadway
Albany, New York 12233

Re: Onondaga Lake Clean Up – Syracuse, New York

Dear Mr. Larson,

It was with great interest that I continue to read and follow the lake clean up proposals for Onondaga Lake. Recently I have had the opportunity to review the project with some of the individuals at Honeywell who are directly involved with the project. While I am not an engineer by training, I am an avid outdoorsman and conservationist. I enjoy hunting, fishing and other outdoor recreational activities. I firmly believe that the restoration of Onondaga Lake to its natural state is admirable, but highly unlikely. I do, however, believe that any clean up of the lake will improve the quality of the lake, and the potential for additional boating, swimming, fishing and other aquatic activities. On an additional note, a clean lake would also benefit the economic forecast of the surrounding communities via the expansion of Destiny USA and the inner Harbor project. 1

My basic understanding of the project is that the floor of the lake or some portion thereof, is to be encapsulated in some method after a giant vacuuming has occurred. In addition, a filtration system is to be placed around the end of the lake in the Solvay area that should prevent storm/run off water from further contaminating the lake. I also know that some dredging will occur in areas where the contaminated silt/lake bottom is particularly deep. While the information that I have read indicates that the cost to do this will range from $250 million (Honeywell) to $437 million (DEC), I feel that it is time to get this project underway. To delay the project will only add additional costs and further hinder the usage of the lake for both recreational and economic development.

January 31, 2005
Mr. Timothy Larson, P.E., Project Manager
NYS Department of Environmental Conservation
Page Two.

2 While I understand that those opposing this project would like a model to be developed that might, with some certainty, hypothesize the outcome of the project – is this realistic? This process will most certainly delay the start of clean up, add additional costs and may not tell the scientists or engineers with any real accuracy that the clean up will work. I am not aware of any project similar to the one proposed for the clean up of Onondaga Lake; therefore, I suppose there is no reference data available.

3 However, it seems to me that after over ten years of testing, and a plan in hand that seems feasible, the clean up project should begin post haste. As with any plan, it may need modification and adjustments as it develops, but as such, I encourage you to approve the Honeywell plan for the Onondaga Lake remediation as it stands with the idea that it may need modification as the clean up progresses. In view of the fact that it is going to take over ten years for remediation of the lake to be complete – it is time to get this started.

Thank you most kindly for your attention to this letter. It would be my pleasure to discuss the Onondaga Lake clean up project with you further. Feel free to call my office, 315-484-2220, or my home at 315-638-7995, if you would like.

With best regards,

John S. Gibbs, Jr.

Copy: Richard Capozza, Esq. Hiscock & Barclay Law Firm
John McAuliffe, P.E., Project Director, Honeywell

MaryJane,

For the record, as I discussed with you yesterday via telephone, we have great concern about the potential plan to dump 2.65 million cubic yards of contaminated sediments, including mercury, PCB's and other toxic chemicals in our Camillus neighborhood. There are many reasons not to allow this magnitude of chemicals to be transported to our neighborhood. The most important reason is our children. We have two children, one is an 11 year old who is extremely sensitive to environmental odors, has numerous allegies, and a seemingly weakened immune system. We live less than 1/2 mile the landfill. There are many children who live in this residental area. We play in the nearby park on Belle Isle Road. We hike and bike all along Belle Isle Road, even closer to the proposed site. 1

We would be living around highly toxic chemicals, like mercury and PCB's. Mercury has low PEL of 0.01 mg/m3 TWA which means that even low levels are hazardous to us. Isn't it true that mercury, is a known to effect the central nervous system? That it is a kidney toxin, and effects the eyes and skin? Isn't it also true that PCB's irritate the eyes, nose and throat? Isn't is also true that PCB's are known to cause cancer and liver damage, as well as, chloracne? Isn't is true that PCB's may even effect the reproduction system? It is my understanding that PCB's are very resilient, and therefore doesn't break down easily?

Why would you take a chance that the controls you put in place would work everytime. There are many things that can go wrong. What contingency plans are in place? What happens if during the process of piping it back, the pipes crack or break leaking the toxins? Isn't it true is takes time to find a leak or break? How would this be handled to control the potential exposure to the environment? What if the safe levels are exceeded? How would those affected people be protected? How would you control the odors? Would you air monitor? If so, 24 hours a day, by whom, and what are the costs? In this area, we get impressive westerly winds - Do you realize that we are directly downwind of this area? 2

Are there other possible dumping areas or alternative methods? Is it possible to keep the waste closer to the lake? Aren't there costs to pipe it to Camillus. Can't those dollars, or Honeywell's monies be used to provide or prepare an area closer and more logical, like an area near, in or around the lake? 3

In our neighborhood alone, we have invested in our homes for almost 2 decades. Would this effect the value of our homes with decreased property values - a waste site so close? We take a great deal of pride in our Camillus neighborhood. We have a safe and healthly neighborhood. It's just too close to take this unnecessary risk to our lives, homes and sense of well-being. It just doesn't make sense. 4

Sincerely,

Kevin and Donna Haley
105 Hornady Drive
Syracuse, NY 13209
cell 382-0867 home 487-1266
haleyok@aol.com

(Comment received via e-mail on 2/23/05)

We are interested to learn of the significant dredging required in the cleanup of this lake. Can you advise as to if the State of NY or Honeywell will be completing this work when it eventually occurs? Do you have consultants working on this with you or would you be interested in our comments as dredging contractors on potential methods? 1

Bill Hanson
Manager, U.S. Business Development
Great Lakes Dredge & Dock Company
2122 York Road
Oak Brook, Il 60523
630 574 3000
630 574 3469 Direct
630 574 2419 Fax
www.gldd.com
whhanson@gldd.com

(Comment received via e-mail on 11/30/04)

1/12/05

P-13

NYSDEC

Form for Submitting Comments on the Onondaga Lake Proposed Plan

Your input on the Proposed Plan for the Onondaga Lake subsite of the Onondaga Lake Superfund site is important to NYSDEC. Comments provided by the public are valuable in helping us select a final cleanup remedy for the site.

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I dont see the point of cleaning up the lake for development unless the development is ~~not~~ a continuation of the Park! 1

Your Name Dallas Johnson
Address 6596 McDonald Rd
City Memphis
State NY
Zip 13112
Phone 689-7255

Attention Timothy J Larson: 1
Sorry we cannot attend,but would like to add My Two Cents...
Mother Nature was doing its Thing,The Mud Boils from the Otisco Valley while making Onondaga Creek muddy was sealing off the bottom of the lake with a layer of Clay and sealed in the Murcury from others Mistakes..Putting down a layer of clay over the murcury solves the Murcury contamination... Onondaga Lake hasn't been so clean in years until the Zebra Muscles came into the Lake..They are cleaning the lake at no cost to the Tax Payers ,and no Payoffs.
The sad part is DEC is allowing 20,000 gallons of Industrial Strength 2
Chlorine To come into a Residential Neighborhood each Month to a RTF ...I expect when sometyhing goes wrong They will say I'm Sorry..Well Sorrys Don't count...EnvironmentalJustice!
Comment Please......
! Sincerely Yours,
Charles G.Jones
EM- evejones@earthlink.net

(Comment received via e-mail on 2/12/05)

NYSDEC

Form for Submitting Comments on the Onondaga Lake Proposed Plan

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① IN SMU 5 the area in the HarBOR, IN Front of the cove the yacht club Should Be a weeD Free zone!! Small Boaters use it and it would Be great if it was a Sandy weeD free Bottom!! 1

② you are dumping the dredge material in one of the waste BEDS, can the LINER hold the extra material? won't it PUSH the contents already there into the watershed and then into the LAke? 2

③ you Must remove the underwater and under the silt obstructions (Barges, piers etc. Before you dredge 3

Your Name: P. GARRY KLINE
Address: PO BOX 538
City: JORDAN N.Y. 13080
State: N.Y.
Zip: 13080
Phone: 315-689 2031

Mr. J. Andrew Lange
1301 Nottingham Rd
Apt C112
Jamesville, NY 13078-8703

P-16

DEC 16 2004

The Reader's Page

REF: ONONDAGA LAKE – Bottom Deposits

A New York State Department of Conservation (DEC) Plan has been proposed for Lake Cleanup. It schedules completed public hearings by April 5, with construction soon thereafter. The estimated cost of the project is $449,000,000! 1

A recent Post-Standard opinion piece was entitled "More Time Please". In addition to time for review, it included a variety of questions relative to matters of concern. No answers can be given to these unknowns! More Time: No! Scrap this extravagant proposal and start over with a better plan.

Dredging is suspect for effectively eliminating Mercury. A Hudson River project has found only 50% contaminant removal with a cost overrun anticipated at $500,000,000 2

Concerns of Camillus Residents relative to proposed dumping of 2,650,000,000 Cubic Yards of Bottom Deposits within their township are valid. It is likely that a major proportion of this material is sewage solids. The Metropolitan Sewage Treatment Plant was operated for many years as a Primary plant with a huge impact on the Lake. Sewage sludge should remain in the Lake. 3

There is little evidence of significant Environmental Impact by Mercury in the Lake, except for fish contamination, at the present time. It would appear that there is no possible justification for this proposed DEC expenditure. 4

There is a somewhat questionable concern relative to the 82 Tons of Mercury, reputedly embedded within the Bottom Deposits. The worst of all scenarios would be Dredging. A substantial percentage of Mercury being liberated would migrate to areas not presently contaminated. 5

Embedment must continue to be practiced, but some enhancement could be considered to satisfy those extreme environmentalists who proposed the DEC Plan.

The installation of a permanent cap or flexible membrane could be installed over those Bottom Deposits known to contain Mercury. An Engineering Design could be rapidly developed, utilizing DEC Data already available. The cost would probably be negligible in contrast

6 "Public Review" of a huge set of documents, as those included for this DEC Plan, is inadequate for public commentary. Some better procedure is indicated. In this case, a cost of $20,000 per person, as stated recently by Congressman Walsh, deserves better respect.

An Executive Summary should be prepared for this project, not requiring more than a dozen or so pages. A page or two would be released to the newspaper each week. The more significant commentaries would be printed during the following week. More realistic "Public Review" would have been rendered, at conclusion of this procedure.

BY: J. Andrew Lange, Professional Engineer #27717 NYS

1/12/05

Mr. J. Andrew Lange
1301 Nottingham Rd. Apt. C112
Jamesville, NY 13078-8703

P - 17

DEC Cleanup Plan – Onondaga Lake
Public Meeting – 12JAN05

Introduction: By J. Andrew Lange, License No. 27717
Registered NYS Professional Engineer

Background: Over 40 Years of Experience
NYS Environmental Projects

Honor: Annual Award – 1994 Engineer of the Year
Central NY Chapter, NYSSPE

SUBJECT: ENVIRONMENTAL IMPACT
Proposed Onondaga Lake Cleanup Plan

This Plan proposes removal of solids – containing Mercury – from the Lake bottom, utilizing Dredging – a Scooping procedure.

Scooping solids from the Lake bottom is inefficient. Spillage would return a major proportion of each load back to the Lake. Mercury contamination could then spread widely. From a relatively small area now, Mercury would reach to the remainder of the Lake and the Seneca River. 1

The Environmental Impact would be beyond imagination, as contrasted with the only problem presently reported – minor fish contamination. It is unlikely that Mercury found in fish could have come from the multiple layers deposited many years ago. These layers [redacted] are also covered with silt deposits carried in by the streams that enter the Lake over many years. 2

The Lake bottom layers should remain entombed, and should never be disturbed. 3

DEC Cleanup Plan – Onondaga Lake

4 **Dredging has been proven to be a failure for a Hudson River Project. According to an Albany Times Union article, half of the contaminant was swept downstream, when the river bottom was disturbed. The additional work is expected to cost more than $500,000,000 and take longer than six years to complete.**

With knowledge of the above experience, there is no way that New York State DEC can justify Dredging for Onondaga Lake.

5 **Mr. Alan Brian Gancy, former Director of Research for Solvay, in a January 7 newspaper letter stated that in his opinion that Dredging is too risky. He also proposed an alternative treatment system to eliminate Mercury. It might well deal with the minor contamination of fish.**

6 **There are those who have criticized the lack of a scientific model to guide the cleanup.**

Experience at the Hudson River provides an adequate model.

Dredging is unacceptable for Onondaga Lake!

Dredging Ononadaga Lake sounds ridiculus. Dredging would only stir up the polutants and spread the polution. 1

I would suggest that the lake be "sumped". Using a barge with trash pumps, pump the polutants to the waste beds and into "V" shaped settling ponds that have valved draw offs for removing most of the contaniments. 2

Arnold W. Lathrop
211 Measowbrook Circle
Fulton, NY 13069-1068
Ph (315) 593-1164

(Comment received via e-mail from awlbji@dreamscape.com on 2/12/05)

APPENDIX C

NYSDEC

Form for Submitting Comments on the Onondaga Lake Proposed Plan

Your input on the Proposed Plan for the Onondaga Lake subsite of the Onondaga Lake Superfund site is important to NYSDEC. Comments provided by the public are valuable in helping us select a final cleanup remedy for the site.

You may use the space below to write your comments. Use additional pages if needed. Fold the form along the dotted lines and tape (do not staple) the form closed. The return address is already printed on the reverse side. **Comments must be postmarked by March 1, 2005.** Those with electronic communications capabilities may submit their comments to NYSDEC via the Internet at the following e-mail address: DERweb@gw.dec.state.ny.us. Please note "Onondaga Lake Proposed Plan" in the subject box.

1. ENDOW THE LAKE WITH A "LAKEKEEPER" STAFF ▲ 1
TO FOLLOW PROGRESS @ SITE, SOME WITH TECHNICAL PROFESSIONALISM & W/ A VOICE & SOME AUTHORITY TO TEST/LAB PROGRESS ≅> OWNERSHIP RESPONSIBILITIES @ HAND,

2. MODEL THE LAKE SHORES/AREAS TO DEFINE 2
CANDIDATES FOR CLASS B+, A⁻ WATERS POSSIBLY INVOLVING BOTTOM CONTOURING TO CAPTURE FRESHWATER TRIBUTARY WATERS EVEN POSSIBLY WITH CRIB LIKE CONTAINMENT FOR FLOW THROTTLING (~LEVEES).

3. DO BETTER AT GEOREFERENCE OF ALL (PERTINENT) SCIENCE (REF.) & 3
PLANNED ENGINEERING FOR BROKENDOWN FOCI TO SHORTEN BODY OF PAPERTRAIL & LEARNING CURVE FOR LAKE ~~KEEPERS~~ BOTTOM WORKERS 2006-2020.
NAME "ONONDAGA LAKE (~~REMEDIATION SCIENCE~~) CENTER" ~~SITE~~

▲ Suggest 5-7 staff including ~4 PERMANENT PART TIME = 2 F.T.
+ 3 " FULL TIME
COST @ $50,000 × 5 FULL TIME EQUIV. = $250 K/YR
+ EQPMNT + BOAT LEASE + BLDG = 100 K/YR
ALSO COULD BE ENDOWED & USE SUNY-ESF INTERNS ↓ $350 K/YR OR LESS

Your Name THOMAS E. LAW Signed by, Thomas E Law
Address 152 CHATHAM RD
City SYRACUSE
State NY DATE: THURSDAY
Zip 13203 JANUARY 6, 2005
Phone 315-478-3305

Dear Messrs. Hesler and Larson,

As long as I remember discussion about the 1
Onondaga Lake clean-up, I remember discussion about a trail around the lake. Why is this no longer a priority when the general public seems to be in so much favor of it? When you consider the cost of cleaning the lake, this project would require very few dollars, and it would add to the benefitt of cleansing the lake. During these times when people are more conscientious about their health, and the need to experience more physical activity (as opposed to television, spectator sports, computers, occupations that do not require manual labor, driving vehicles, etc.), why not add to the possibilities to bring people out-of-doors to hike, bike, etc? To link such a trail to the Creekwalk would open such possibilities to the locus of population in the City of Syracuse and more distant places.

I hope that your decisions in the future will look upon this goal favorably and so reflect the will of the people.

Sincerely,
Richard J. Lightcap

February 18, 2005

P-21

RECEIVED
JAN 13 2005
REMEDIAL BUREAU B

Robert Marquardt
1226 James Street
Syracuse, New York 13203

January 8, 2005

Donald Hesler/Tim Larson
Onondaga Lake Superfund Site
Public Comment
NYSDEC
625 Broadway
Albany, New York 12233

Re: Post Standard Editorial on 1/7/05 By Alan Ganey
Post Standard Staff Writer Article on 1/7/05 re clean-up plan

Dear Sirs:

My intuition and experience as an engineer tells me that Alan Gancy is correct in his negative assessment of the DEC clean-up plan.

1. You don't have to be a rocket scientist to imagine that dredging the lake contamination could make things worse. I think it is reasonable to assume that least 1% of the now concentrated contamination will escape into temporary suspension and thru currents and storms will escape into temporary suspension and be distributed over the entire lake bed and associated river systems. That is, instead of 2.65 million cubic yards of contamination in one concentrated area that can be covered and declared off limits, we will end up with a thin layer of 26.5 thousand cubic yards of contamination spread out over the lake bed that cannot ever be covered or eliminated. 1

No doubt, there are plans to prevent the escape of the contaminants, but the best plans of mice and men sometimes fall apart due to unforeseen difficulties and carelessness.

I believe a rational plan for clean-up would be as follows: 2

1. Stop all continuing pollution;
2. Clean-up the lake front perimeter and make it fit for on-shore recreational purposes.
3. Cover the lake contaminants in-place.
4. Experiment with Mr. Gancy's inexpensive idea of "black box" filtering.
5. Let mother nature assist in the clean-up and recovery process. If it takes 20 years or 50 years, that's okay with most CNY residents.

3 I believe this is a cheaper, safer and less risky plan than the dredging plan, which is a major expense and risk in the $449 million present DEC plan. Bear in mind, if the dredging idea back-fires, the entire $449 million dollar plan is a disaster. Furthermore, the lake could take on a distributed lake bed pollution that could never be corrected by any practical means.

In conclusion, I believe the pay-off from dredging is not worth the expense and technical risk.

Very truly yours,

Robert Marquardt

Robert Marquardt

$449 million seems to me too much money to spend for the primary purpose of removing mercury from the bottom of the lake, and hence from its fish. There are more important environmental needs for the lake, not to mention for Onondaga County as a whole. 1

I propose a compromise with Honeywell, accepting a mercury cleanup costing around $250 million, in exchange for Honeywell paying another $150 million for non-mercury improvements to the lake and its environs. My first priority, after the mercury, would be to completely encircle that lake with park and recreational trail, my second would be to develop Onondaga Creek walk, opening recreational space along that prominent waterway into the lake. 2

In sum, I'd spend less on mercury and more on people's broader use and enjoyment of the lake.

Allan Mazur
246 Scottholm Terrace
Syracuse, NY 13224

(Comment received via e-mail from amazur@maxwell.syr.edu on 1/7/05)

I wish some of the $450 million intended for mercury cleanup would be allocated to improving the shoreline of the lake, especially a path and parkland around the entire perimeter. 1

Allan Mazur
246 Scottholm Terrace
Syracuse, NY 13224

(Comment received via e-mail from amazur@maxwell.syr.edu on 2/22/05)

P-24

ASHLEY McGRAW ARCHITECTS, P.C.
Ashley McGraw Architects PC
500 S. Salina Street
Syracuse, N.Y. 13202
Phone (315) 425-1811
Fax (315) 425-0166

Fax

To: DONALD HESLER

Project: AMA Project #:

Fax: Date:

Re:

From: Page(s), including cover

☐ Urgent ☐ For Review ☐ Please Comment ☐ Please Reply ☐ Hard Copy to Follow

• Comments:

CC:

Petition to Loop Onondaga Lake as part of the DEC/Honeywell Remediation Plan

1 ***We the undersigned request that <u>looping Onondaga Lake</u> be include as one of the remediation measures that DEC should <u>require</u> to be achieved in the current options.*** We understand that this request may not be technically required by the pertinent regulations, but we also understand that public acceptance of the option selected is necessary. Five years ago, a wide ranging poll conducted by the local group F.O.C.U.S asked Onondaga County residents to list the measures they felt were the most important to achieve. Looping Onondaga Lake came out <u>as number one</u> on the list.

The current options under consideration do not appear to propose any above the water line corrections. These current options attempt to correct conditions for which there are technical remediation requirements, but the fact that the various pollutants and the huge waste bed destroyed the usefulness of the <u>above water recreation facilities</u> for large areas of the lake is apparently not addressed in the solution options. We respectfully request that it should have <u>a very high priority</u>, even if it requires acceptance of one of either Option 2, 3 or 4 instead of the $455,000,000 Option 5 now proposed. We understand that a trail may require some filling in of areas of the lake where there is insufficient available shoreline property.

We request that a park-like trail around the lake similar to the East side park trail with a paved trail(s) suitable for running, inline skating, biking, walking and trams complete with support facilities be constructed as soon as possible. The trail needs to have dedicated trail bridges across the entering streams and have suitable grades and width to allow running, inline skating and wheelchair marathons to take place and with a connection to the 16,000 car State Fair parking lot. (Send to: DEC, 615 Erie Blvd W, Syracuse, NY)

Name	Signature	Address
J. Gary Droege	Gary Droege	10 Parkington Cir East Syracuse
W. Howard Card	W. Howard Card	117 Saybrook Lane Syracuse N.Y. 13214
Peter Colman	Peter Colman	4921 Palmer Rd Manlius 13104
Joan Colman	Joan Colman	4921 Palmer Rd Manlius NY 13104
Diane Chappell	Diane Chappell	817 Sumner Ave, Syracuse, NY 13210
Judy G Brown	Judy Brown	104 Ostrom Ave #1 Syr NY 13210
Charles Wollowitz		107 Diana Ave. Syr. NY 13210
Jean Martin		4257 Cody Rd Cazenovia NY 13035
Linda P. Wollowitz		~~103~~ 107 Diana Ave Syracuse Ny 13210
Mike Dillon	[illegible]	310 Kensington Rd Sy NY 13210
Dale Sayman	Dale Sayman	3844 Pompey Ctr. Rd. Manlius NY 13104
Ellen Fuller	[illegible]	302 Broad St Syracuse NY 13210
Randy Case	R. Case	58 Ely Drive Fayetteville N.Y. 13066
Martin Rothenberg	M. Rothenberg	5211 Hook Cir F'ville NY 13078
Carroll Grant	[illegible]	58 Ely Dr Fayetteville 13066
Kenneth Neal	[illegible]	5810 Bradbrook Rd, E Syracuse 13057
Brenda Law	Brenda Law	933 Cumberland Ave. Syracuse NY 13210
Bruce Gilbert	Bruce Gilbert	129 S. Edwards Ave Syracuse NY 13206
Steve Schroeder	Steve Schroeder	6820 Kingsley Rd. Fayetteville NY 13066
Kevin Smith	Kevin Smith	178 Oakley Dr E Syracuse NY 13205
Peter Osborne	[illegible]	704 Fourth St. Liverpool, NY 13088
Sandell Sturdevant	Sandell Sturdevant	235 Goodrich Ave Syr., NY 13210

P-24

Petition to Loop Onondaga Lake as part of the DEC/Honeywell Remediation Plan

We the undersigned request that looping Onondaga Lake be include as one of the remediation 1
measures that DEC should require to be achieved in the current options. We understand that this request may not be technically required by the pertinent regulations, but we also understand that public acceptance of the option selected is necessary. Five years ago, a wide ranging poll conducted by the local civic action group F.O.C.U.S asked Onondaga County residents to list the measures they felt were the most important to achieve. Looping Onondaga Lake came out as number one on the list.

The current options under consideration do not appear to propose any above the water line corrections or improvements. These current options attempt to correct conditions for which there are technical remediation requirements, but the fact that the various pollutants and the huge waste beds destroyed the usefulness of the above water recreation facilities for large areas of the lake is apparently not addressed in the solution options. We respectfully request that it should have a very high priority, even if it requires acceptance of one of either Option 2 ($275,000,000), 3 or 4 instead of the $455,000,000 Option 5 now proposed. We understand that a trail may require some filling in of areas of the lake where there is insufficient available shoreline property where railroad or steep waste beds occur.

We request that a park-like trail around the lake similar to the existing East side park trail with a paved trail(s) suitable for running, inline skating, biking, walking and trams complete with support facilities be constructed as soon as possible. The trail needs to have dedicated trail bridges across the entering streams and have suitable grades and width to allow running, inline skating and wheelchair marathons to take place and with a connection to the 16,000 car State Fair parking lot. (Send to: Donald Hesler/Timothy Larson Onondaga Lake Superfund Site-Public Comments, DEC, 625 Broadway, Albany, NY, 12233, or Fax 518.402.9767

Name	Signature	Address
Jared Heath	Jared Heath	106 Melvin Ave Liverpool 13088
Jim Poseczniak	[illegible]	4421 Hoyt RD. SKANEATELES 13152
BILL SMITH	Bill Smith	437 S. MIDLER AVE 13206
Rebecca MacCall	R MacCall	115 Elm [illegible] Syr. NY 132[illegible]
Jennifer Dapson	Jennifer Dapson	116 Madison St. Oriskany Falls NY 13425
Dave Monaghan	Dave Monaghan	8023 Gallagher road Baldwinsville NY 130
Jun Shin	[illegible]	[illegible] E. [illegible] . SYRACUSE. NY 132[illegible]
CHULWON AHN	Chulwon Ahn	241 LAFAYETTE RD #32 SYRACUSE NY 13205

\|:2|05

P-25

COMMENTS ON DREDGING OF ONONDAGA LAKE BOTTOM SEDIMENTS

DEC PROPOSED PLAN
Public Hearing – January 12, 2005

Comments by Les Monostory, Environmental Planner (retired)
Address: 125 Euclid Drive, Fayetteville, NY 13066
E-mail: fishbugm5@twcny.rr.com

Comparison of Remedial Plans

The Honeywell Plan for remediation of Onondaga Lake bottom sediments essentially calls for removal of 500,000 cubic yards of contaminated sediments, and covering contaminated sediments with 355 acres of protective layer or "cap".
NYSDEC's preferred plan calls for removal of approximately 2.65 million cubic yards of contaminated sediments and covering approximately 579 acres of sediments with protective layer or "cap".

In essence, the DEC Plan calls for dredging and removal of approximately five (5) times the volume of contaminated bottom sediments compared to the Honeywell Plan, and capping of approximately 1.5 times the sediment acreage proposed to be capped by Honeywell.

The various dredging technologies are described on pages 48 and 49 of DEC's Proposed Plan dated November 29, 2004. Disposal of the dredged sediments is proposed to be accomplished by transfer of dredged materials to a sediment consolidation area (SCA), to be located at one of the Solvay wastebeds, such as Wastebed 13 in the Town of Camillus.

Hydraulic dredging will be used to collect a slurry of contaminated sediments containing about 10 percent solids, and the sediment slurry is proposed to be transported by pipeline to the sediment consolidation area. Upon delivery to the upland wastebed, the liquid slurry will then be consolidated and treated by filtration, air stripping, and activated carbon treatment in order to reduce contaminant concentrations. Silt barriers will be used in the open water work zones to contain resuspended sediments within each SMU dredging work zone.

Concerns over Dredging Operations

Results of contaminant testing by Honeywell and by DEC have shown that mercury and other industrial contaminants have been widely dispersed throughout the bottom sediments of Onondaga Lake.

Mercury discharges to the lake sediments have been greatly diminished over the past 30 years, and active chemical discharges to the lake have been nearly eliminated since closure of the Allied operations in 1986. For the past 20-30 years, Onondaga Lake's contaminated bottom sediments have been gradually covered with cleaner sediments contributed by inflows from the lake's major tributaries.

1 I am concerned over the DEC Plan's extensive use of hydraulic dredging, as dredging is a very dirty and disruptive practice that tends to disperse resuspended sediments throughout the water column. These resuspended sediments – containing mercury, PCB's and other chemical contaminats – will be absorbed by plankton and smaller organisms in the water column, and may be subsequently transported through the food chain to Onondaga Lake fish. We can expect to see elevated levels of mercury in Onondaga Lake fish for the duration of the dredging operations, plus the life span of those fish.

2 Recommendation for Sediment Treatment Priorities

My recommendation of priorities for the treatment of contaminated sediments in Onondaga Lake is that capping of those sediments with layers of clean stone, gravel and sand be the preferred alternative to dredging.

3 Hydraulic dredging of contaminated sediments should be limited to near-shore areas where slurry materials can be more effectively contained, and the use of dredging in deeper waters of Onondaga Lake should be minimized or eliminated altogether.

Hello,

I have watched onondaga lake clean up over the years.. Im happy to see the lakes water look clearer than it was back in the eighties.. I have a daughter who for a school project did a mini study on the lake on ways to assist in the cleanup efforts.. I helped her by paying for a water test of the lakes water from 3 places for compairasion.. The tests revelved it wasnt to high then in some chemicals but merc was high back then.. I then called my brother Dr.Micheal Dahlberg in Penn and spoke to him regarding my daughters project and told him of the tests results.. My brother works for the Federal Gov and has a pattend on reversing the effects of acid rain .. Mike had sent us liturature showing how hes cleaned up the waterways down in PA. Mike has used a manmade pond system using cornbobs to naturally clean the waters and its worked! Mike can send you for information you might want in regards to fixing the lake this way hes cleaned the waters from all the coal pollution that seeped in down there.. Mike said years ago he would gladly talk to anyone in regards to helping with input on the lake this is his hometown and he cares still.. Here is Mikes Address if you wish to speak to him 1

DR.Michael Dahlberg
165 Welsh Road
Washington PA 15301
Thanks For Caring About Our Waterways
Barb Motto

(Comment received via e-mail from barb13203@yahoo.com on 12/14/04)

To Whom it may concern,

How does this sound, put rafts with thirty or forty feet of suspended old tires hanging down into the water table at random spots around the lake. these will give the zebra mussels a place to florish, filter water and provide cover, shade and a place for fish to feed and school. Once or twice a year simply pull them thru a set of large rollers and let the shells help to coat the bottom. On top of these rafts could be wind driven or solar powered turbines hooked to a pump that would deliver aerated water to a lower depth than would normally be possible buy natural means. Granted these are far fetched ideas but reletively cheap when compared to the alterative. You guys have engineers who could solve the details. 1

Also near the head waters of Ley creek is a creek that flows directly out of Onieda Lake. If the land between the two could be purchased out of the clean up money or right of way secured, a small channel could be cut from one to the other, . because of the small change in elevation between the two lakes this shouldn't cause much of a problem. and would increase the flow of clean water in both the lake and creek, improving habitat in both for very little money or hassel. It shouldn't take a rocket scientist to figure out these waters were all connected by wetlands before we altered the natural flow of things. In a strange way it may help to heal the rift between the Onondaga & oneida indians since they have been isolated by the same things for about the same time. I hope that you read this and give it some serious thought, because what ever you do will go right buy my door. Thanks for your time. 2

Michael Murphy, Phoenix N.Y.

(Comment received via e-mail from Murfsurf69@aol.com on 1/18/05)

P-28

RECEIVED
FEB 28 20[illegible]
REMEDIAL BUREAU B

John and Susan Murray
115 Golden Meadows Way
Warners, New York 13164

Mr. Don Hesler and Mr. Timothy Larson
NYSDEC
625 Broadway
Albany, NY 12233

Dear Mr. Hesler and Mr. Larson,

We are writing to you in response to the recent town meeting in Camillus regarding the cleanup efforts of Onondaga Lake. We were unable to attend the meeting but feel strongly that our voice be heard. While we understand the importance of this effort, we have concerns over where the sediment being dredged up is to be disposed. We are one of a number of families who have recently built a new home in the Golden Meadows development off Airport Road. One of the many reasons we chose to build our house in the area was because of its clean, country-like appearance away from the hustle and bustle of many developments in the area. We now question whether this is to continue to be the case. 1

As parents of young children, we have concerns regarding the depositing of **any** type of contaminated sediments near our home. We question the residual effects there may be to having such material dumped near our home. Just as bad, how are residents of this community supposed to enjoy their yards if there is an odor from this sediment? What about land values? We paid a lot of money for a little "piece of heaven". Please don't destroy it for our children. Consider this picture: 2

It's a hot summer day and the kids are looking out the kitchen window at the pool and yard. Why are they not outside? Because of the odor coming from the old Allied Chemical landfill near Warners and Airport Road!!!

We beg you to do the right thing and consider other options that may be available to you. We do support the concept of cleaning up the lake. However, any plan that causes potential harm to people, of any community, is not worth it. If this is the case, you might as well just leave the pollution at the bottom of the lake and move on. 3

Please, reconsider the plan to dump waste sediments into the landfill near our, and our neighbors', homes. Thank you for your time and consideration of this matter.

Sincerely,

Susan Murray
John Murray

Susan and John Murray

P-29

January 7, 2005

TO: Donald Hesler/Timothy Larson
Onondaga Lake Superfund Site - Public Comment
NYSDEC
625 Broadway
Albany, NY 12233

FROM: Temple W. and Mary A. Myers
215 Pulaski St
Syracuse, NY 13204
[tmyers1@twcny.rr.com]

Subject: Onondaga Lake PP Comments

1. We are heartened to finally see substantial discussions and proposals taking place concerning the 1
environmental improvement of Onondaga Lake. We still prefer the word "improvement" to "cleanup".

2. The one thing the United States military always tries to obtain from our leaders before they respond to a 2
major crisis is: **<u>A Clear Set Of Goals</u>**. Clearly define the desired outcome. What is the time frame? This project deserves no less than a clear set of goals.

3. Does the desired outcome include the community's ability to fish, eat fish, wade, swim, etc. in and around the lake? What does the community want to see when this "cleanup" is done? What is the government's backup plan to attain the original Set of Goals in the event the so-called "cleanup" plan falls short of our goals? Does Honeywell endorse all of that? Does the public endorse all of that? **<u>Be sure the goals are clearly stated, and alternatives are also clearly stated.</u>**

4. If Honeywell walks away saying it has satisfied its part of the agreement, and yet the government and 3
the community are dissatisfied with the so-called "cleanup", what is the next step? Who pays for the next
stage? How long must we and our children's children wait? What are "acceptable levels of pollution" after 4
the so-called "cleanup"?

5. When the waters are finally "improved" enough to support the public fishing, eating fish, wading and 5
swimming, how does the community ensure the waters and shorelines will remain forever accessible to the public? It would be a travesty to see billionaires and politicians promoting the construction of "huge waterfront destinations for the benefit of the community". Horse feathers! Our community already smells those suspect and telltale odors at the Lakefront and Inner Harbor - as well as with the current investigation into the mishandling of the NY State Canal System.

6. Are the waters reasonably protected - per current technological standards - from future pollution? Is 6
there a Master Plan to protect the lake and control future development of surrounding properties, shorelines and drainage systems - things that could impact future water quality and free public access?

7. Will my family be able to fish, eat the fish, wade and swim in Onondaga Lake at the end of the 7
Honeywell so-called "cleanup"? If not, then we have wasted a lot of time and money.

8. I see a lot of questions that remain unanswered. If I were an astronaut and this were the first moon 8
shot, I'd be extremely upset right now.

9 9. Five generations of my family and extended family have lived and played on or near the shores of Onondaga Lake since the turn of the 20th century, so it holds a special meaning in our family history. We hiked, waded, swam and fished in those waters many, many years. We want to see children and grandchildren have that same opportunity once again.

Thank you for all the work you have accomplished, and for bringing this most serious undertaking to the public forum; and thank you for listening to our concerns.

Sincerely,
Temple W. and Mary A. Myers

(Comment received via e-mail from tmyers1@twcny.rr.com on 1/7/05)

P-30

RECEIVED
FEB 24 2005
REMEDIAL BUREAU B

407 Breakspear Road
Syracuse, New York 13219-2315

Mr. Timothy Larson
NYSDEC
625 Broadway
Albany, NY 12233

February 22, 2005

Dear Mr. Larson:

This letter is in response to public input into the DEC's plans for the cleanup of Onondaga Lake in Onondaga County, New York. I have been following summary preliminary plans as presented in our newspaper The Post Standard, and I have seen any plans for the remediation of Lakeview Point, a 500 plus acre parcel of land on the southwest shore of the lake, currently owned by Onondaga County and the State of New York. The parcel adjoins the New York State Fairgrounds, the main interchange for interstates 690 and 695, and otherwise is mostly vacant land with billboards, trailers, and temporary parking for the fairgrounds.

Before World War One, the site was a prime amusement area with beaches and an amusement park, but fell into disuse after 1920, when Solvay Process (now Honeywell International) began to dump some 230,000,000 tons of Soda-Ash until the plant process changed in 1948. The land remained dormant until the early 1990's as a fairgrounds sub-use area. The soda-ash still remains, and unless treated, modified or removed, it may compromise plans to clean the Onondaga Lake watershed and water quality. 1

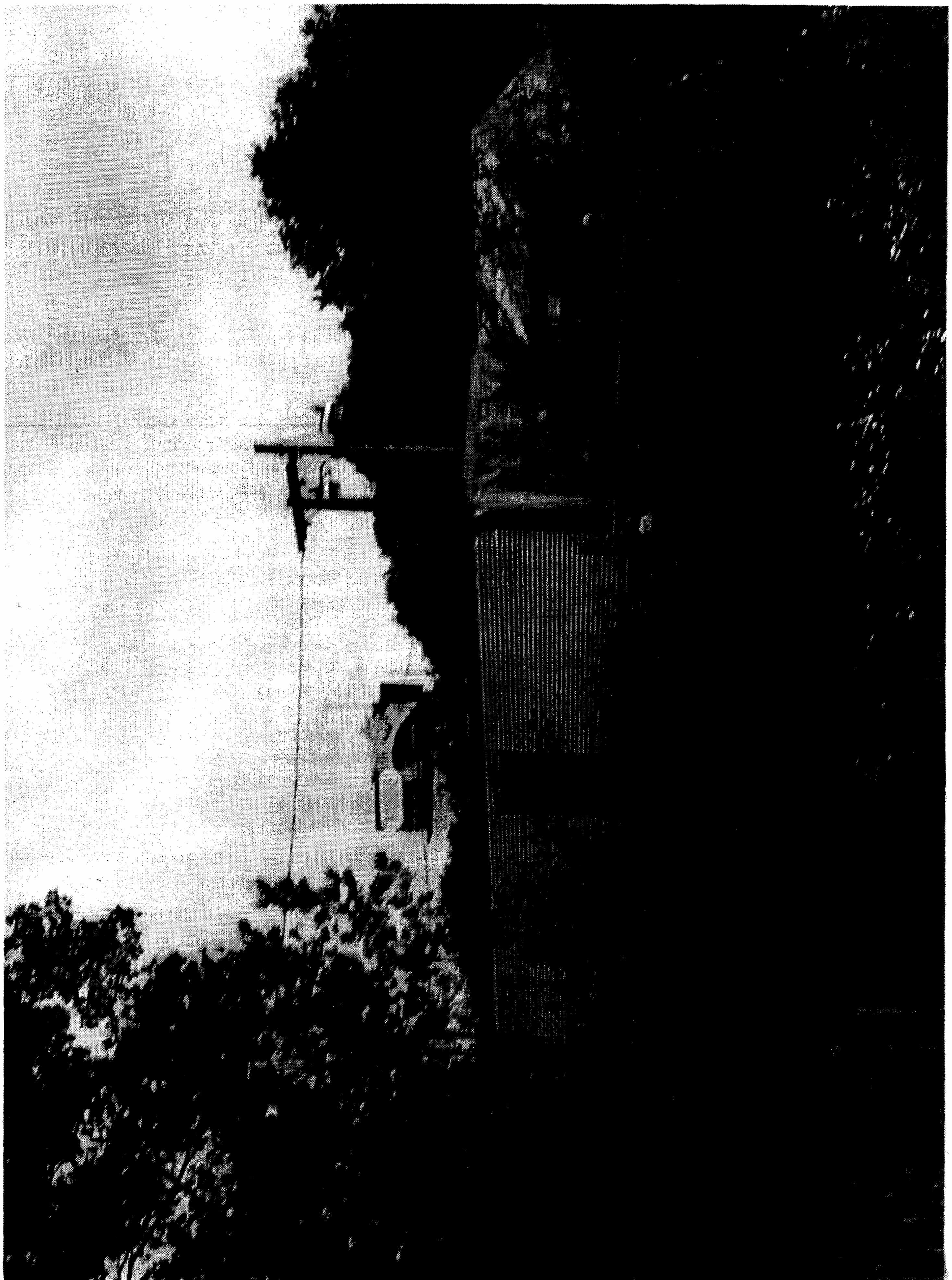
Enclosed is a recent photo of Lakeview Point at the eastern end of the site, taken in June, 2001, and it tells a story of some 80 years of neglect. We hope Lakeview Point is seriously considered for a clean up as well as the lake. With a clean lake, and a clean Lakeview Point site, it would give the Town of Geddes unlimited opportunities to re-develop the site, and pass on to future generations full use of the lake.

Sincerely,

Michael P. Nowak

Michael P. Nowak

Cc: Town of Geddes Supervisor
Mr. Robert Czaplicki
Geddes Town Hall
1000 Woods Road
Solvay, New York 13209



1/12/05

Form for Submitting Comments on the Onondaga Lake Proposed Plan

P-31

NYSDEC

Your input on the Proposed Plan for the Onondaga Lake subsite of the Onondaga Lake Superfund site is important to NYSDEC. Comments provided by the public are valuable in helping us select a final cleanup remedy for the site.

You may use the space below to write your comments. Use additional pages if needed. Fold the form along the dotted lines and tape (do not staple) the form closed. The return address is already printed on the reverse side. **Comments must be postmarked by March 1, 2005.** Those with electronic communications capabilities may submit their comments to NYSDEC via the Internet at the following e-mail address: DERweb@gw.dec.state.ny.us. Please note "Onondaga Lake Proposed Plan" in the subject box.

THIS LAKE SHOULD NEVER BEEN ALLOWED 1
TO GET IN SUCH A BAD CONDITION.
I GREW UP ON THE SHORES OF THIS LAKE AND
I'M SICK OF WHAT HAPPENED TO IT. IT
SHOULD BE RESTORED TO IT'S ORIGINAL 2
CONDITION, NO SHORTCUTS

Your Name: Daniel L. Orzell
Address: 303 Fern Rd
City: Syr
State: NY
Zip: 13219
Phone: 468-3774

58 Redoak Drive
Buffalo, NY 14227

February 26, 2005

Mr. Don Hesler
Mr. Timothy Larson
NYSDEC
625 Broadway
Albany, NY 12233

Dear Mr. Hesler and Mr. Larson,

I have been reading the various plans being considered for dredging the bottom 1
of Onondaga Lake and burying the contaminated sediment in a landfill waste bed or back in the lake along the shoreline. Besides the odor and the distinct possibility of the toxic matter being leached out, these schemes would create more problems.

A better way would be to immobilize the pollutants by mixing them with cement 2
and disposing the cement blocks in the landfill or dumping them in the ocean.

A very careful consideration should be given to all the suggested schemes before proceeding with the cleanup.

Sincerely,

Rusi Poncha

Rusi Poncha

RECEIVED
MAR - 2 2005
REMEDIAL BUREAU B

Garrie Procopio
108 Sizzano Trail
Syracuse, NY 13209
315.488.0481
gadues@earthlink.net

February 18, 2005

Attn: Timothy Larson, P.E., Project Manager

TO WHOM IT MAY CONCERN:

After recently discovering that the NYSDEC is actually considering a remedy for the clean up of Onondaga Lake by disposing of it's contaminated sediment in my very own back yard, I was understandably outraged!

Since my first day in Syracuse, New York, I have been saddened by the fact that 1
someone allowed such a beautiful lake to be slowly destroyed with the disposal of contaminated waste. I am in support of an attempt to rectify this tragic situation, although I have my doubts that such a clean up can be accomplished. However, this understanding of why an attempt would be made to clean up Onondaga Lake does not explain why, in the process of doing so, someone would make the exact same mistake that allowed this lake to be polluted in the first place. It occurs to me that a disregard for the way a contaminated environment effects it's community is exactly what caused this problem to begin with. It is my understanding that the NYSDEC, is proposing to repeat this historical error and disregard the effects of a contaminated environment on it's community when discussing the disposal of contaminated sediment at the Belle Isle Road Construction Landfill. If the DEC has not already done so, I suggest they visit the neighborhoods and businesses that have this same landfill in their backyards and see just where they are proposing to bring these contaminants. I would like to know how the DEC would feel if someone moved such sediment next door to where their children would grow up? Yes, there are many people, including young children, who live off Belle Isle Road in the Town of Camillus (location of the construction Landfill)! These same families did purchase a home near a construction landfill. However, they did not purchase a home near a contaminated sediment waste pile. I am also wondering if the DEC is aware of how close this Landfill is to Genesee Street and it's neighboring Schools?

If this proposal were approved, what is the DEC going to do about the health hazards to 2
our children, decrease in the value of our homes (which are currently selling at their highest in the 8 years that I have lived here), contamination to our air and water, and the odor which will result though out the town of Camillus (just to name a few concerns).

I am prepared to enlist my neighbors in a battle against this disposal site, taking legal 3
action if necessary. And, if I am unsuccessful in stopping this contamination of my neighborhood, then I would like to officially thank you (NYSDEC) for forcing me to move from my home, as I would no longer wish to raise my children in a potentially hazardous environment. If I am forced to do so, I would expect to sell my home for much less after the waste dumping occurs, as I would currently! However, I'm sure the DEC is prepared to reimburse me for the loss in property value?

4 I would appreciate an immediate response by the NYSDEC to this letter and formally request that there be more open forums to discuss this issue before any decisions on this matter are made. I would also like to be notified of a deadline for submitting a
5 petition regarding this matter. I do not feel the community i live in has been given proper notice or time in which to oppose this proposal.

Sincerely,

Garrie Procopio

(Comment received via e-mail from gadues@earthlink.net on 2/19/05)

Correction

RE: Onondaga Lake Cleanup Proposal

Dear Editor,

Regarding the letter just emailed minutes ago, I have mistakingly mentioned that the Onondaga Lake Cleanup would move sediment to the *Belle Isle Road Construction Landfill*. However, the proposed location is near Warners and Airport Roads in Camillus NY. According to your newspaper, the landfill is called *Waste Bed 13*. This location is approximately 1 mile from the one I had previously named **in error**. 1

Thank you,
Garrie Procopio

(Comment received via e-mail from gadues@earthlink.net on 2/19/05)

Correction

RE: Onondaga Lake Cleanup Proposal

Dear Editor,

Regarding the letter just emailed minutes ago, I have mistakingly mentioned that the Onondaga Lake Cleanup would move sediment to the Belle Isle Road Construction Landfill. However, the proposed location is near Warners and Airport Roads in Camillus NY (as you must know). According to Syracuse newspapers, the landfill is called *Waste Bed 13*. This location is approximately 1 mile from the one I had previously named in error. However, the remainder of my letter is uneffected by this error. 1

Thank you,
Garrie Procopio

(Comment received via e-mail from gadues@earthlink.net on 2/19/05)

1/12/05

Form for Submitting Comments on the Onondaga Lake Proposed Plan

P-36

NYSDEC

Your input on the Proposed Plan for the Onondaga Lake subsite of the Onondaga Lake Superfund site is important to NYSDEC. Comments provided by the public are valuable in helping us select a final cleanup remedy for the site.

You may use the space below to write your comments. Use additional pages if needed. Fold the form along the dotted lines and tape (do not staple) the form closed. The return address is already printed on the reverse side. **Comments must be postmarked by March 1, 2005.** Those with electronic communications capabilities may submit their comments to NYSDEC via the Internet at the following e-mail address: DERweb@gw.dec.state.ny.us. Please note "Onondaga Lake Proposed Plan" in the subject box.

It is excellent that a lake remediation plan is close to happening. I support a plan of action for the lake by April 1, 2005. Acting now is excellent. No more lake study - act please. 1

But you do need to do more in the next three years on the following elements: 2

- Movement and disposal of dredge spoils.
- liners and design of upland dredge spoil disposal sites 3
- capping and closure of the upland disposal sites 4
- In the three year design phase do another public hearing on the transportation and upland disposal fill areas. Make these elements the best for our environment. 5

Your Name: T. RHOADS
Address: 19 HANNUM ST
City: Skaneateles
State: NY
Zip: 13152
Phone: 685-2447

P-37

RECEIVED
JAN 19 2005
REMEDIAL BUREAU B

Comments - Onondaga Lake Proposed Plan

1. Thank you for providing the public with the opportunity to pa[illegible] the plan. The DEC has done a very good job in discussing the proposed plan for the lake cleanup. 1
2. The presently published plan documents are not developed in adequate detail for the work related to: 2
   - the conveyance of the dredged contaminated sediments,
   - the design of the sediment consolidation areas,
   - the treatment of leachate from the sediment consolidation areas,
   - the closure and post closure monitoring of the sediment consolidation areas,
   - And the final plan for the upland areas known as the Allied Waste Beds as well as the sediment consolidation areas so that these significant parcels of land can become wildlife habitat again and perhaps even be used for hunting, hiking, and other forms of outdoor recreation in the future.
3. The sediment consolidation areas are suggested to be design elements to come later in the process, but (perhaps) not subject to a separate public hearing process. Please submit the design of these landfills and systems to a future public hearing, not just a public meeting. These containments are not simple design elements – the waste bed underlying the containments will be a very difficult factor in design. There is serious potential for slope failure or liner failure in the sediment consolidation landfills due to the poor foundation materials. Liner tears could occur as the underlying waste beds consolidate under the load from the dredge spoils. The conventional perimeter berm for a typical landfill will likely not work in these same poor foundation conditions. Side slopes and slope failure will need to be carefully considered as the dredge spoils will be very wet and have low shear strengths. 3
4. The conveyance of the dredge spoils is no small environmental matter. The traffic impacts, fugitive emission impacts, and odor impacts from these sludges must be carefully managed to protect the environment and cause no undue harm to the local population. Trucking dredge spoils in the significant quantities proposed would be a very significant environmental impact/problem. Dredge materials must not be tracked out of the containment areas by the exiting truck traffic. Also, traffic problems would be enormous if the trucks used public roadways. Even the diesel emissions from the trucks themselves will be significant and the entire conveyance plan should be developed and presented to the public at a public hearing so that all these facets of the project can incorporate public comment. 4
5. Leachate treatment considerations, discharge standards, and design of the leachate treatment system to handle the complex mix of organic and 5

metallic contaminants will not be trivial. These elements are truly part of the design phase; however they are significant enough to merit public hearing (not just future public meetings to announce the final design). The eventual discharge from the treatment facility will likely be to the Onondaga Lake Watershed. As I am sure the DEC recognizes– it would be pointless to remove the sediments and pollution from the lake, only to allow the treated leachate to later reduce overall quality of the incoming tributaries to the lake.

6

6. Habitat for wildlife must be vastly improved as the sediment consolidation areas and waste beds are finally closed and capped. Design considerations need to incorporate deep soil cover layers over final impervious HDPE caps so that vegetation can restore the land and wildlife can return to the currently barren lands. Require the construction of the final contour of the site to include varying topography, pockets of trees and shrubs, and 'natural' wetland type pockets in the finished site plan. Require adequate closure and capping design so that these habitat elements can exist in the final land area – please don't create a 400 acre two-to-one sloped hump with marginal grasses, four feet of dirt allowing no trees or woody growth, and no wildlife habitat. Require the incorporation of public recreation uses and access. Require investment in habitat, nesting areas, wildlife forage and cover, access trails, parking at trailheads, and the ability for these areas to at least contribute to the

7

public enjoyment. The taxes lost to future generations by the use of these waste beds for the containment of the wastes on a multi-generational time scale should require significant initial and recurring investment in public uses to at least partial repay the community.

Thank you again for the opportunity to submit comments,

T. Rhoads
19 Hannum St.
Skaneateles, NY
13152

January 14, 2005

200 Stoneridge Drive
DeWitt, NY 13214
February 18, 2005

Mr. Donald Hesler/Mr. Timothy Larson
Onondaga Lake Superfund Site—Public Comments
Department of Envronmental Conservation
625 Broadway
Albany, NY 12233

Dear Mr. Hesler and Mr. Larson:

I am writing in support of creating a multi-purpose recreational trail around Onondaga Lake. A recent letter to the editor in the Syracuse Post-Standard newspaper indicated that the remediation options you are considering might not include all the improvements necessary to create such a recreational trail: 1

> Building a suitable recreational trail may require filling in areas where there is insufficient available shoreline property. The trail needs bridges across the streams entering the lake and suitable grades and width to allow running, inline skating and wheelchair marathons. (Post Standard letter to the editor, 2/18/05)

Much information is available on the importance of having usable green space in a community. I have walked sections of the trail that currently exists and have loved having the lake so close and the city seem so distant. As part of Syracuse's future, such a trail would continue to bring people together, provide a valuable recreational area, and show a planning vision that sometimes has been wanting here. In fact, I would be glad to volunteer in any capacity that you might need in order to establish this system.

Thank you for your consideration in this matter; I appreciate your time.

Sincerely,

Sandra Russell

(Mrs.) Sandra Russell
315-445-9408

As a life long resident of Central New York (33 years) I have waited my whole life to see Onondaga Lake fixed. The proposed clean-up while a hard won victory in some ways is a failure in others. Capping the lake is unacceptable. This is a real problem and needs a real and final solution. If the lake is too far gone than let it go and focus your energy on problems that can be fixed but don't throw away this opportunity to start fixing the lake the right way. NO CAPPING 1

Jesse Ryder
(Comment received via e-mail from jesseryder@hotmail.com on 2/3/05)

Please add these names to the comments on the Onon. Lake Project

February 23, 2005

P-40

As residents of the Liverpool community and neighbors of Onondaga Lake, we hold a unique perspective and stake in the Onondaga Lake cleanup project. Our homes, businesses and daily lives have been and will continue to be intertwined with the history and future potential of the lake. 1

After reviewing the Honeywell lake cleanup proposal, it is apparent this plan is solid in design and that this cleanup has the potential to increase our quality of life through economic development and recreational projects tied to Onondaga Lake. We understand that the New York State Department of Environmental Conservation (DEC) has released an alternate plan that is similar to the Honeywell approach.

That is why, we, the undersigned, encourage the DEC and Honeywell to come together and find an agreement that allows the cleanup to begin as soon as possible. Project completion is economically and recreationally advantageous to us all living and working on or near the lake.

Liverpool Citizens

Colleen Gunning 112 Green Cove Dr. Liverpool 13090

ALBERT J. ANTELMI - 125 WILMORE PL SYR NY 13208

DON COOK → 3963 Pawnee Dr. Liverpool, N.Y. 13090

Fannie M. Antelmi 125 Wilmore Pl. Syr. N.Y. 13208

6 Tigerwood Dr. Liverpool NY 13090

Robert H. Rowe 313 Pleasantview Dr. " " 13088

127 CIRCLE RD SYRACUSE NY 13212

225 Richfield Blvd Mattydale NY 13211

407 Brookfield Rd. Mattydale, N.Y. 13211

February 23, 2005

As residents of the Liverpool community and neighbors of Onondaga Lake, we hold a unique perspective and stake in the Onondaga Lake cleanup project. Our homes, businesses and daily lives have been and will continue to be intertwined with the history and future potential of the lake.

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That is why, we, the undersigned, encourage the DEC and Honeywell to come together and find an agreement that allows the cleanup to begin as soon as possible. Project completion is economically and recreationally advantageous to us all living and working on or near the lake.

Liverpool Citizens

Robert M Fry 206 [illegible] Road Liverpool N.Y.

Joseph M. Kelly 639 Old Liverpool Rd. Liv. NY 13090

Fred H Wyler 506 Third St Liverpool N.Y 13088 13088

MEMO FROM THE DESK OF

Donald L. Schoenwald

THIS LETTER IS VERY PERSUASIVE AND I HOPE THESE SUGGESTIONS WILL BE INCLUDED.

THANK YOU VERY MUCH

DON SCHOENWALD

Make loop trail part of lake remediation

To the Editor: 1

Looping Onondaga Lake with a usable recreation trail should be part of the current lake remediation options.

This may not be technically required; but public acceptance of the project is apparently needed. A few years ago, FOCUS asked county residents to list the measures they felt were most important. Looping Onondaga Lake was No. 1. I speak for these folks.

The four current remediation options do not appear to propose any above-the-waterline corrections or improvements. I request that such improvements should have a high priority.

From my review of the remediation option documents in the central library, the principal difference between Option 2 and Option 5 appears to be the amount of contaminated sludge pumped to the waste bed in Geddes, and that in Options 2, 3, 4 and 5, the whole lake bottom will be capped to contain or reduce further release of mercury and other contaminants.

Building a suitable recreation trail may require filling in areas where there is insufficient available shoreline property. The trai needs bridges across the streams entering the lake, and suitable grades and width to allow running, inline skating and wheelchair marathons.

The DEC needs to hear from us before March 1. Send your opinion to: Donald Hesler/Timothy Larson, Onondaga Lake Superfund Site-Public Comments, Department of Environmental Conservation, 625 Broadway, Albany, NY, 12233.

David C. Ashley
Syracuse

P-42

Why not require the incorporation of a permeable barrier material (i.e. zero valence iron) within the capping materials on the lake bottom. This would allow for treatment of chlorinated compounds and some petroleum compounds. As it is a cap, any precipitates formed would be inconsequential to the cap. 1

Regards,
Bill Spizuoco

(Comment received via e-mail from Scott A. Zollo, szollo@plumleyeng.com, on 3/4/05)

Gentlemen:

Almost 12 years have passed since the first water sample was taken from Onondaga Lake to initiate the AlliedSignal RIFS of the lake. 1

I write in support of the Honeywell plan to dredge 500,000 cubic yards of sludge and cap the exposed lake bottom. To do more may require additional sampling and studies, extend the design period and significantly lengthen the dredging and capping schedule.

It is time to move on with the work and demonstrate to the Syracuse community that all parties are serious about completing the task in a timely manner.

Sincerely yours,
James H. Tyler, PE, F.ASCE

(Comment received via e-mail from jhtyler@juno.com on 2/18/05)

P-44

Just wondering why the entire proposal is NOT being offered as a PDF file on your website? Instead of subjecting the people of the state of NY to travel to a site where the volumes will probably be in use or not available at the time of their visit. 1

Richard D. Valenti Jr.
CP Specialist #5321 (NACE)
5201 Dunhill Road
Fayetteville, NY 13066-9613
Fax: (315) 637-9532
Mobile: (315) 391-0801
email: RDValenti@aol.com

(Comment received via e-mail on 12/8/04)

My comments on the cleanup of Onondaga Lake would be that Honeywell would insure that they would not contaminate it any further with the removal of the material that will be dredged, and the current marine life would not be disturbed. 1 I also would hope that the entire lake would be cleaned up, not just to a certain portion because perhaps later in time, it will be more expensive. 2

Deborah Webster

(Comment received via e-mail from DWEBSTER@dot.state.ny.us on 3/1/05)

P-46

STRUCTURAL ASSOCIATES, INC.
General Contractors/Construction Managers

RECEIVED
FEB - 7
REMEDIAL BUREAU B

February 4, 2005

Mr. Donald Hesler
Onondaga Lake Superfund Site Public Comment
NYS Dept. of Environmental Conservation
625 Broadway
Albany, NY 12233

Dear Mr. Hesler:

I have read with great interest the steps being proposed by Honeywell Corp. and the New York Department of Environmental Conservation for the environmental remediation of industrial pollution in Onondaga Lake. It is in my estimation, time for all parties to reach an agreement and finally move ahead with the cleanup of this wonderful physical asset we have in our area. If we move forward now we may all be able to enjoy the benefits of a clean lake in our lifetime. 1

Along with the other great things being discussed within our community at this time, imagine the additional impact a clean Onondaga Lake could have on our local economy.

I urge the parties working on the final cleanup plan, to reach an agreement now, and move ahead with this project. We finally have the opportunity, after to long a wait, to restore Onondaga Lake to a point of pride in Central New York.

Sincerely,

Dennis G. Weller, PE
President

Principal Office
800 Starbuck Ave.
Watertown, NY 13601
PH: (315) 779-8878
FX: (315) 779-9588

Corporate Office
5903 Fisher Road
East Syracuse, NY 13057
PH: (315) 463-0001
FX: (315) 432-0795

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PO Box 43968
Baltimore, MD 21236
PH: (410) 931-0905
FX: (410) 931-0135

www.structuralassociates.com
info@structuralassociates.com

Form for Submitting Comments on the Onondaga Lake Proposed Plan

P-47

NYSDEC

Your input on the Proposed Plan for the Onondaga Lake subsite of the Onondaga Lake Superfund site is important to NYSDEC. Comments provided by the public are valuable in helping us select a final cleanup remedy for the site.

You may use the space below to write your comments. Use additional pages if needed. Fold the form along the dotted lines and tape (do not staple) the form closed. The return address is already printed on the reverse side. **Comments must be postmarked by March 1, 2005.** Those with electronic communications capabilities may submit their comments to NYSDEC via the Internet at the following e-mail address: DERweb@gw.dec.state.ny.us. Please note "Onondaga Lake Proposed Plan" in the subject box.

WE HAVE AN IRRAGATION WELL, A WILDLIFE + RECREATION POND 1
+ GROW VEGETABLES ON OUR PROPERTY.
HAVE ALWAYS HAD A CONCERN FOR THE SAFETY OF
THE GROUND WATER.
TESTING IS PROHIBITIVELY EXPENSIVE FOR US

DO YOU HAVE A GROUND WATER MAP OF OUR AREA
SO WE CAN DETERMINE IF WE HAVE CAUSE FOR CONCERN?

Your Name: PAM WOODCLIS
Address: 5990 BELLE ISLE Rd #7
City: SYRACUSE
State: NY
Zip: 13209
Phone: 315-468-3225

P-48

Ms. June Anna-Fey
8912 Boak Rd. E
Holland Patent, NY 13354

UTICA NY 133
PM
27 APR
2005

APR 28 2005

Onondaga County Regional
Office - DEC
615 Erie Blvd. W.
Syracuse NY 13204

1

April 27, 2005

To Whom It May Concern:

I'm writing regarding the proposed clean up of Onondaga Lake by the corporate polluters.

I feel their solution is definitely a no-win for everyone but them. Their way is never going to work. They must be forced to do it properly, or a bad example will be set for future clean ups.

Thank you.

June Anna-Fey

Dear Honorable Governor George E. Pataki,
I was reading the latest Albany Times Union article "Onondaga Lake cleanup faces delay EPA wants dredging in Syracuse postponed after tribe says leaders weren't given timely notice (Associated Press First publiched: Monday, March 28, 2005) with great interest when I came across the following sentences:

...The federal government said more time is needed to evaluate public concern over the state's plan to clean up the heavily polluted Onondaga Lake.
...The nation, which wants all polluted sediment removed, told the EPA its leaders were not consulted in a timely matter. Federal Superfund cleanup laws require input from the tribe, which considers the lake sacred.
...The state unveiled its plan in November, under which Honeywell international would pay for the cleanup of 165,000 pounds of mercury. The state blames the pollution on the Allied Chemical plant in Solvay that closed in 1986. Honeywell merged with Allied in 1999 and became responsible for pollution Allied dumped into the lake and along the shoreline.
...Allied made liquid chlorine and caustic soda at the plant for almost 100 years before selling the property to LCP Chemicals in 1979. The plant ceased operation in 1988 under pressure from the state after repeated chlorine leaks.
...Today, the lake is a toxic stew of mercury, ammonia, phosphorous, PCBs, benzene, cyanide and other pollutants. The lake bottom is a virtual junkyard of cars, barges, discarded tires and rims, and broken dishes.
...Under the state plan, Honeywell, which is based in Morris Township, N.J., would be required to dredge up to 2.65 million cubic yards of contaminated sediment from the lake and cap about 580 acres of lake bottom.

1 Please review and implement and action plan to thoroughly address this extremely troubling issue. Media reports continue to underscore the seemingly lack of progress in thoroughly cleaning up this valuable freshwater natural resource, despite the significant potential for adverse human health and environmental effects. This comes at a time of skyrocketing health care and environmental costs. Please contact the appropriate stakeholders/personnel to turnaround these growing issues and concerns. Please coordinate, collaborate and cooperate on Federal, State and/or local jurisdictional levels in

addressing these concerns potentially impacting adversely public health, lands, trust, confidence, environment and quality of life issues. Thank you for your time in this matter and hope to hear from you soon.

Sincerely,

Alex Balboa
26 Babcock Avenue
Ronkonkoma, NY 11779-6705

(Comment received via email from alexbalboa_us@yahoo.com on 3/30/05)

George,

This is supplemental to my recommendation about the Onondaga land claim/lake cleanup thread I sent.

I would like to have someone email me back about this next question I have— I have previously heard about some professors, I think they were at SUC Oswego, who had come up with a process using microbes that actually digested pollution. This seems to be to much more preferable that one that merely digs it up and transports it to another site, thus polluting a whole new site. 1

Is this microbe idea a valid solution? Is it out of favor for some unknown political reason in the scientific community? It seems to me that it would be much cheaper, and a more sound way of doing things if not.

Have someone let me know. I am very curious about this.
Thanks, Sallie

(Comment received via email from sage@sagaciousconsulting.org on 3/17/05)

In looking over the Honeywell proposal for Onondaga Lake sediment remediation, and the NYS DEC responses to the proposal, I have not detected a thoughtful evaluation of the innovative technologies that genuinely remove mercury from sediments or those technologies that dechlorinate hazardous synthetic chemicals. A thorough examination of those technologies and their potential usefulness for cleaning Onondaga Lake can contribute to a clearer understanding of how to achieve the best outcome for the lake, and for the community who live near it, including myself. We need not settle for plastic surgery when chemotherapy might provide a cure. 1

References to such technologies that have come to my attention, and are not necessarily a complete list, include the following:

A technology (Twidwell and Rockandel patents) to remove mercury from chlor-alkali waste without incineration is vended by Universal Dynamics (http://www.udl.com/systems/remerc_x.html) to chlorine manufacturers and is based on two patents.

1. M.A. Rockandel, L.G. Twidwell, "Hydrometallurgical Process for Treating Mercury Contaminated Muds", United States Patent 5,209,774, (1993), 8 p.

2. M.A. Rockandel, L.G. Twidwell, "Mercury Contaminated Mud Treatment", United States Patent 5,314,527, (1994), 18 p.

For other discussion on separation of organics from mercury waste, see the USEPA contract Document, "Analysis of Alternatives to Incineration for Mercury Wastes Containing Organics, " [EPA Contract No. 68-W4-0005, WA No. R11032 TechLaw Subcontract No. G-200-010 SAIC Project No. 06-6312-08-5226-002], viewable at www.epa.gov/epaoswer/hazwaste/ldr/mercury/incinalt.pdf
On-site dechlorination of NAPLs is discussed in this week's issue of Science News.

Alexandra Gobo, "Special Treatment" Science News, 167:266-268 April 25, 2005 reviews techniques to dechlorinate NAPLs (le.g. trichloroethane) by using nanoparticles, in situ and in soil.

The sciencenews.org website does not carry the article itself, but it does carry a link to the references used in the article, http://www.sciencenews.org/articles/20050423/bob10ref.asp

The US-EPA's NCER site carries an abstract about using iron nanoparticles to dechlorinate NAPLs.

http://es.epa.gov/ncer/publications/meetings/8-18-04/abstracts/lowry.html

During the public comment period, I have approached representatives from Honeywell, Atlantic States Legal Foundation and the Onondaga Nation, and urged them to look into the mercury extraction technologies.

At this time I have no personal financial interest in any of these remarkable techniques, nor have I seen their actual products.

The focus of my comment is the absolute need to leave no stone unturned in evaluation of all methods, and particularly these innovative remediation methods, in the selection of a genuine and effective lake clean up process, one that will take years into the future under the best of circumstances.

Respectfully submitted,
Joan E. Cope Savage
Joan Cope Savage
201 Houston Avenue
Syracuse NY 13224
(315) 472-5785

(Comment received via e-mail from jcopesa1@twcny.rr.com on 4/29/05)

P-52

Apr. 27, '05

Donald Hesler/Timothy Larson
Onondaga Lake Superfund Site - Public Comment
NYS Dept. of Environmental Conservation
625 Broadway
Albany, NY 12233-7016

Dear Sirs:

Having read the 81+ page document entitled "Onondaga Lake Bottom - Subsite of the Onondaga Lake Superfund Site - Syracuse, New York - Proposed Plan - November 29, 2004" that I obtained from the DEC website, I have the following comments to make.

With regard to background:

The DEC declares in this document that Honeywell operated manufacturing facilities in Solvay, NY for over 100 years which released, among other materials, mercury since at least the 1940's, and organic contaminants as early as 1918 (p9 & 12) and that current loads of contaminants to the lake are "primarily derived from Honeywell sites in the vicinity of the lake and along its perimeter" and further that it was Honeywell contributions that were the dominant sources of historical and current lake contamination (p13-14). In other words, Honeywell activities over almost 100 years are the major reason the Lake is a superfund site. This document also points out that the lake supported a thriving resort industry around the turn of the 20th century and even a commercial fishing industry in a "plentiful cold water fishery" until at least the late 1800's, around the time Honeywell began using it as a toxic dump, and even states that one of the impacts of the contamination is the "elimination of cold-water fishery" (p20). In other words, it would appear that Honeywell not only transformed a lake into a dump, but was/is responsible in large part for destroying a thriving economic and recreational asset of the community. This, by way of background for establishing not only the extensive amount of damage, but the considerable amount of time over which this damage was caused, i.e. this wasn't just a "mistake" caused by an "oops" - this was deliberate, planned dumping which no doubt saved Honeywell hundreds of millions, if not billions of dollars, over the 100 years of such activity. 1

The document claims that "the primary objectives ....are to remediate the sources of contamination within the ..Lake sediments such that any potential future health and environmental impacts are eliminated or reduced, to the extent practicable."(p24)

The document states that the lake sediments contain a huge reservoir of mercury, that internal (lake) sources of mercury probably contribute as much to the water mercury levels as external sources, that the mercury, although settling on the bottom, is not sequestered but continually resuspended (p22), producing the obvious conclusion that unless the sediments are either physically removed (dredged) or effectively isolated from the water column, the mercury problem will never be eliminated. It points out that the lake sediments are also huge reservoirs 2

3 or CPOIs, some of which, being found throughout lake bottom sediments, are resistant to biodegradation (p23), again indicating that they must either be dredged or effectively isolated in order to cease to be a problem. In view of the statements by the NYSDEC that active remediation is necessary (p39) and that the NCP expects that the remedy will employ treatment as a principal element (p19), it would appear that underwater isolation by capping, even were it to be "effective", is less satisfactory than dredging, because only dredged sediments would be available for treatment.

A couple of other points of interest, to which I will refer later, are the document's statements that the ultimate fate of most of the sediments is "burial" within the profundal sediments, although, as the document pointed out above, these are not really buried, and that the sources of contamination in the littoral (shoreline) zones of the lake are also sources of contamination to the profundal zone, as defined by the document (p32), and that the lake "is underlain by a thick layer of soft, unconsolidated sediments(p14) with a profundal nearshore shelf that is relatively steep(p32.)

With regard to methodology:

4 Four of the five RAOs, as outlined on p40, all speak of eliminating or reducing, "to the extent practicable" various chemicals or the hazardous effects of those chemicals.

Although it would seem to be rather apparent that the surest way to eliminate or even reduce the effects of the chemicals is to eliminate the chemicals, the document indicates the DEC decided not to aim for elimination but settle for reduction to "site specific risk based levels" (p39) and further that these levels were set by averaging 5 SECs, each of which was associated with a different level of risk for acute toxic effects to benthic organisms to arrive at a PEC, or PECQ. This approach is quite suspect from several points of view. To whit:

1) with respect to "averaging", it will be noted that the PEC for mercury, the example given on p39, is 2.2mg./kg. which is rather close to the ER-M (2.8mg/kg) above which level "toxic effects are likely to occur" and over 4 times higher than the ER-L (0.5mg/kg) below which toxic effects are rarely expected.

Where the proposal relies on capping to achieve a PEC, the cap wouldn't have to be very "leaky" at all to produce levels equalling or exceeding the ER-M.

5 2) "The ER-L is ..... more likely to protect the macroinvertebrate community from chronic effects."(p42)

3) with respect to acute vs toxic effects, the document points out that even though it is known that (p12) chronic exposure to at least some of the chemicals is known to produce significant toxicity, "insufficient data" were available to develop SECs for chronic toxicity. The document even admits that "the mean...methodology does not explicitly address chronic toxicity" but claims that, where contaminated littoral segments would be capped, "**assuming the cap is effective** in keeping levels below PECs" chronic toxicity would be reduced.

How can the Dept. assume that capping, even if it works to keep levels below PECs, will have any significant effect at all in reducing chronic toxicity when a) ER-Ls are more likely to protect against chronic toxicity, b) PECs are, by definition higher than ER-Ls, and perhaps, as in the case of mercury, considerably so, c) even if the cap works to keep levels below the PECs, the ER-Ls may be routinely exceeded, d) even if the ER-Ls, for acute toxicity are not exceeded, the Dept. cannot say anything at all about the worth of its chosen proposal with regard to chronic effects because it doesn't, apparently, have any idea what a PEC (even assuming PEC is a legitimate goal - see 1)) for chronic toxicity would be, let alone whether capping would work to achieve it.

With regard to mechanism:

As far as I am able to determine, Alternatives 2 through 5, involve remediating only those areas of the lake bed that exceed certain PEC or PECQ values. The rest of the lake bed will remain untouched even though it may have contaminant values which considerably exceed ER-Ls (see above). In addition, whatever dredging will be done will be done, not to achieve the PEC or PECQ levels but simply to debulk, to varying degrees, the contaminated areas, relying on caps instead to keep surface sediment levels at or below the PEC. And the extent of dredging seems to be determined not on the basis of what % of contaminants it would be a good idea to remove, but only to the extent necessary to either ensure no loss of lake surface area, reduce erosive forces on the cap, or "meet a particular natural resource goal" and "maintain littoral zone function"(p49). The exception to this appears to be with regard to NAPLs, wherein the alternative recommended (#4), as well as #5, 6, and 7, specifically seems to call for dredging to the depth (30 ft.) where NAPL s may possibly exist (p49) which is considerably deeper than what loss of lake surface area or reduction of erosive forces would require, as in alt. 2&3. This would seem to suggest that with regard to NAPLs, the Dept doesn't have much confidence that its capping mechanism would work to keep NAPL concentrations at "acceptable" levels, even with the "additional 50%" thickness "safety factor"(p52). Why trust the cap for other contaminants? Why dredge NAPLs out and leave considerable amounts of other contaminants behind? 6

The document also states that slope stability(p49), at least in the region of the ILWD, is an important consideration in determining the extent of dredging operations, in order to insure the stability of a cap. But, considering that, as noted above, lake bed sediments are soft and, at least in portions of nearshore slopes in several of the littoral SMUs as well as of the profundal SMU, slopes are relatively steep, is it not reasonable to assume that the effect of the dredging operations themselves might be to decrease the stability of these slopes, increasing the possibility of "slumping" or landslides in other areas of the lake, which, by the documents admission, threatens the integrity of any cap placed in unstable areas. Shouldn't slope stability be a concern in these areas as well, especially where, as in #4, the Dept. is relying on the cap to prevent contamination? Yet #4 discusses these "geotechnical concerns" only with respect to the ILWD. And, even here, as noted above, the Dept. apparently doesn't trust its own ability to adequately address these concerns with regard to its ability to adequately cap NAPLs - #4 proposes, basically, dredging to a depth where NAPLs might "possibly" exist. 7

One could have a similar discussion of the capping mechanism, where multiple

8 assumptions exist. The document points out that groundwater upwelling may prevent the cap from providing complete chemical isolation. It states that targeted dredging would be used in those areas where upwelling velocities are high(p48), but it also states that for capping to be effective, hydraulic control systems would need to be in place to minimize velocities. Obviously, for either mechanism to even theoretically work, groundwater flow patterns and velocities would have to remain within the limits of the capping models when all dredging, capping, etc. operations not only in the lake but in the surrounding remediation areas as well are completed. Can the Dept. ensure this will be so? And, should the patterns change, or the velocities increase, which, considering the extent and nature of the operations, is not out of the realm of possibility, the models, on which the entire operation is based, would be faulty, perhaps fatally so. Another
9 aspect of the cap design is the extent to which the "bioturbation" would affect the effectiveness of the cap. Ironically, to the extent that the initial cap succeeds in decreasing contamination, the benthic community may thrive to the extent that bioturbation activities may exceed the model parameters, decreasing or even eliminating the effectiveness of the isolation layer.

10 With respect to effectiveness of alternatives to meeting Objectives/Goals

A) Overall Protection of Human Health and the Environment

There is little more that needs to be said than what the document itself states (p644):

"Since Alternative 7 includes thin layer capping throughout all of SMU 8 as well as aeration, it would be the most effective alternative in achieving RAOs 1 and 3. In addition, Alternative 7 would meet BSQV for mercury on a lakewide basis and in SMU 8, and it would be the most effective at meeting RAOs 2, 4, and 5 and PRGs 1, 2, and 3 since it would address all areas meeting the ER-L."

"All of the alternatives which employ capping would be protective to the extent that the cap functions properly. ....In the event of a failure, the impacts would be expected to be greatest under those alternatives that involve capping of the greatest mass/highest concentrations of contaminants. ....Alternative 7 would be the most protective alternative because it would result in the further reduction of surface concentrations."

"...in regard to SMU-1, the level of protectiveness increases progressively from Alternative 2 through Alternative 7 (with the exception of Alternative 5...)."

"In regard to contaminant mass removal" (with regard to NAPL in SMU 2) "..Alternatives 6, and 7, which consist of full removal to the cleanup criteria for the littoral zone SMUs (...except.. SMU 5), an additional level of long-term protectiveness would be achieved through sediment removal instead of capping."

B) Compliance with ARARs

"Alternatives 6 and 7 might reduce water column concentrations" (of mercury) "to a greater degree than Alternatives 2, 3, 4, and 5."

C) Long-Term Effectiveness and Permanence

"Alternatives 6 and 7 provide the greatest long-term effectiveness and permanence by removal of all of the sediment that exceeds the cleanup criteria from SMUs 1 through 7 (...except... SMU

5). ...... Consolidation and disposal in an aboveground facility area (i.e. SCA) is more proven, easily maintained, and easily monitored compared to capping of wastes and contaminated sediments in an underwater environment. This makes it more reliable. For those sediments that are removed to a more secure location..., the remedial action is more permanent than capping within the lake. ......as the volume of material being removed and disposed of in the SCA increases, the permanence of the alternative increases."

D) Reduction of Residual Risk

"Alternative 7 would remediate all areas of the lake exceeding the ER-Ls and there fore would result in the lowest residual risk of acute and chronic toxicity."

E) Adequacy and Reliability of Controls

"Alternatives 6 and 7 provide the greatest long-term effectiveness of controls since these alternatives remove the the largest volumes of contaminated sediment and place them in a secure SCA. ....The greater the an ount of sediment that is removed, the more permanent and reliable is the alternative."

F) Reduction of Toxicity, Mobility, or Volume through Treatment

Considering that the Dept. recognizes the EPA's preference for treatment as a principal remedy, and, considering that, in recommending Alt. 4, which relies on dredging rather than capping in dealing with NAPLs, it is sending a clear signal that it doesn't really consider capping to be "treatment", so again, it points out that Alt.s 6 and 7 do not involve isolation capping, but instead would "remove all contaminated sediments down to their respective cleanup criteria in the littoral zone (except for areas in SMU 5). And, as between Alt. #6 and #7, recall that the "cleanup criteria" for #7 (to ER-Ls) is more stringent than for #6 (to PEC/PECQs), which is more likely to be protective against chronic toxicity. So, for other than aeration, the only sediments that would be available for "treatment" would be those removed (dredged) from the lake, bringing us back again to #7 as the best alt. of the 7 presented,

G) Implementability

Although the document states that with regard to construction of the SCA for Alt. 6 and 7 11
would be "challenging because of its size" and "might stretch the limits of the ability to design and contain the dredge spoils on **nearby Honeywell properties** (emphasis added), it also points out that "aquatic capping presents challenges not typically associated with capping of upland sites" and that "monitoring the conditions and effectiveness of an aquatic isolation cap is not routine relative to monitoring an upland containment cell such as an SCA." In other words, although, as stated above, SCAs are more permanent and reliable for dealing with sediments than underwater capping of these same sediments, Honeywell might have to secure additional areas for the dredgings or cart them away.

H) Cost

Alternative #4 - $451,000,000

Alternative #7 - $2,157,000,000

After spending a good deal of the document explaining the toxicity of the lake 12 contaminants, the need for remediation, the preference for treatment, which capping will not accomplish, the extent and duration of Honeywell's contribution to the contamination and why, for almost all the relevant criteria of environmental and human health criteria, reliability, permanence and effectiveness, Alt. #7 is clearly preferable to Alt. #4, the document then summarily declares that the Dept. prefers #4 and spends about 1 page explaining why. This explanation basically says that Alt. #4 is better or as good as Alt. 2, 3, 5, and 6 for various reasons. It never rescinds its previous conclusions regarding the superiority of #7 and only mentions #7 with regard to cost, and even then it says(p81) that "While Alternatives 6 and 7 would provide greater long term effectiveness than Alternative 4.....", that because the volumes of material removed might have to be moved offsite or require additional SCAs, the "incremental costs" incurred would "not be cost effective"!

After all these years and studies and loss of our lake, the DEC is now telling us that, even though it knows that the remedy it "prefers" is not as good or as permanent or as reliable or as effective as another remedy it knows about and has studied, it will nevertheless pick that lesser remedy because the much better one would cost the perpetrator of all this mess more money to clean up!

Gentlemen, you must be kidding!

In case the above statement is not strong enough, suffice it to say that I strongly disapprove of any remedy that does not clean the gunk out of the Lake! We can do better than #4. You know it and so does anybody who reads your document. We want our lake back and we want to make it clear that anybody who messes it up must clean it up, no matter what it costs him. If you stick with anything less than #7 (and perhaps even more is required), you will make it clear that the "E" in DEC has precious little to do with the Environment.

Yours truly,

Susan P. Hammond, MD
Susan P. Hammond MD
102 Elaine Ave.
N. Syracuse, NY 13212

Gentlemen - on re-reading this document, I realize that in addition to typos, the points I'd attempt to make are not as clear as I would like them to be - but I have run out of time - Given more time I am quite sure that my condemnation would be even more forceful! - SPH 4/27/05

P-53

Governor George E. Pataki
Executive Chamber
State Capital
Albany NY 12224

02APR05

RECEIVED
APR 13
REMEDIAL BUREAU B

APR - 6

REF: NYSDEC Plan
Onondaga Lake Project

Dear Governor Pataki,

The enclosed 24FEB05 Letter copy, partially printed in the Syracuse Post-Standard, opposes Hydraulic Dredging to remove hazardous materials located under small areas of the lake bottom. 1

Environmentalists express concern for, and demand removal of, a large quantity of Mercury - presently entombed - under deep layers of lake sediment under those small areas. That demand has been highly publicized! 2

Not publicized is how effective this sediment Cap has been – as provided by nature. There is no evidence that the buried Mercury has any deleterious effect upon the lake water.

What is highly publicized - minor contamination of fish. There are small amounts of Mercury over large areas of the lake bottom, available to contaminate fish. A good feature of the DEC Plan proposes covering those areas with a layer of sand. That would be, in effect, following nature's lead - as described above. Fish contamination would be terminated, thus eliminating the only major public interest in lake improvement.

Returning to Hydraulic Dredging: disturbing the existing Cap would be counterproductive, resulting in release of significant quantities of Mercury now buried – that would be widely distributed to lake waters. 3

This not just hyperbole. A recent Albany Times Union press release, included a study relative to dredging the Hudson River. It concluded that half of the sediment was swept downstream, when the river bottom was disturbed. Also stated: raising a possibility it will cost more than $500,000,000 and take six years longer. 4

The DEC Plan addresses poor clarity of lake water due to green algae particles. It is common knowledge that algal growths are enhanced by Syracuse Metropolitan Treatment Plant effluent. Studies have been made for plant modifications, but were found too costly for action. 5

Mr. J. Andrew Lange
Apt C112
1301 Nottingham Rd
Jamesville, NY 13078

6 Elimination of Hydraulic Dredging from this project would substantially minimize a proposed $449,00,000 cost. With a major cost reduction to Honeywell, Inc. certainly negotiation could be entertained for funding the above SMTP modifications, to the probable advantage of Honeywell. The public would appreciate a substantial improvement to lake attractiveness.

7 Former Governor Hugh Carey, after the Love Canal debacle, proposed the use of some less-politicized body be formed to assess risks. In this particular case, the team from the University of Maryland's Biological Laboratory - having experience with the Hudson River project, would be ideal to study these suggestions.

The 01APR05 Post Standard article – copy attached – indicates a delay in choosing a final plan until July 1.

In the belief that the simple logic of these facts is compelling: It is my request that your office require such a study prior to selection of a final Plan.

Respectfully submitted,

J. Andrew Lange

J. Andrew Lange,
NYSPE #27717

ENCL: 24FEB05 P-S
P-S Copies(2)

Copies: NYSDEC
Honeywell, Inc.
University of Maryland Biological Laboratory
P-S

THE P-S READERS PAGE 24FEB05

This is an UPDATE to previous letters, relative to the proposed NYSDEC Onondaga Lake Preferred Alternative 4.

It must be recognized that Onondaga Lake is a drainage lake, not another Finger Lake. This lake receives large quantities of silt, clay and Tully Valley mudboil sediments, annually. Over the years, the thickness of these layers has become substantial.

This is a very effective cap, preventing Mercury and organic chemicals from significant degrading of lake waters. For that reason, the only reported Environmental Impact, is minor contamination of fish.

Those layers should never be disturbed by hydraulic dredging as proposed by the DEC Plan. No justification for proceeding with Alternative 4 is possible.

It is reminiscent of the Love Canal incident in western New York State. According to a study completed in 2004, vast expenditures of money failed to find a single case of serious illness, in spite of false claims over many years.

Former Governor Hugh Carey, now 85 years of age, refers to this as "Political Pollution" as contrasted with "Environmental Pollution". He recommends formation of a disinterested party, such as Underwriters Laboratories, avoiding the self-serving practices by USEPA and NYSDEC.

"Political Pollution" has found central New York State.

By: J. Andrew Lange

'Political pollution' has touched Onondaga Lake

To the Editor:

Onondaga Lake is a drainage lake, not another Finger Lake. It receives large quantities of silt, clay and Tully Valley mud-boil sediments.

Over the years, these layers have become substantial. This is a very effective cap, preventing mercury and organic chemicals from significant degrading the lake waters. The only reported environmental impact is minor contamination of fish.

Those layers should never be disturbed by hydraulic dredging, as proposed by the state plan. It is reminiscent of the Love Canal incident in Western New York state. According to a study completed in 2004, vast spending failed to find a single case of serious illness, in spite of false claims over many years. Former Gov. Hugh Carey refers to this as "political pollution," in contrast to environmental pollution. He recommends the formation of a disinterested party to avoid the self-serving practices of federal and state government.

J. Andrew Lange
Jamesville

Tuesday, March 22, 2005 THE POST-STANDARD PAGE A-11

Friday, April 1, 2005 THE POST-STANDARD PAGE A-11

A reasonable delay for the lake plan

So many questions still swirl around New York's $451 million plan to clean up Onondaga Lake that it only makes sense to spend a little more time to address them.

After all, what's the rush? It took nearly 100 years to turn the lake into one of the most polluted bodies of water in North America. Taking a few more months to evaluate public concerns is hardly time wasted.

The state Department of Environmental Conservation was required by court order to select a final cleanup plan by today. But the U.S. Environmental Protection Agency, which has to sign off on the plan, suggests the state solicit public comments for another 30 days and delay choosing a final plan until July 1.

EPA officials say they particularly want to make sure the Onondaga Nation has a chance to properly analyze the state's plans to dredge or cap contaminated sediment on the lake floor. The Onondagas, who consider the lake sacred, want all contaminated sediment removed.

The Onondagas' opinions carry weight. As part of their land claim in Upstate New York, they insist that the lake and land surrounding it be restored to their original states. Federal Superfund cleanup laws also require government to seek their input — something Onondaga leaders say didn't occur until the last minute.

The federal judge overseeing the cleanup case should allow more time for public contribution. So far, the process has been far too exclusive.

Dear DEC folks:

I am a Syracuse resident who like my neighbors is concerned about Onondaga Lake and it's cleanup. 1

While I'm not a scientist, what I have read about the current plan for cleaning the bottom of the lake seems completely insufficient. There is little doubt that the mercury will leach through the cap, continuing the contamination of a lake which lies in the heart of our community and could again become a center for recreation and culture.

Please consider a more thoroughgoing cleanup effort of the lake bottom.

Thanks for your consideration,

Andy Mager
559 Buckingham Ave.
Syracuse, NY 13210

(Comment received via e-mail from andy@peacecouncil.net on 4/29/05)

Greetings,

As a resident of who has lived near Onondaga Lake for over 40 years, I fail to understand the justification for the costs involved in cleaning the Lake up. Knowing what I know of Onondaga Lake, I would never swim in the lake even if I was assured it was clean. Personally, I would much rather see the money going towards the Lake cleanup, spent on maintaining or improving the other lakes and rivers in the CNY area. Or better yet, focusing on clean air initiatives that would help decrease the alarming mercury levels, particularly in the pristine Adirondacks. 1

My 2 cents,
Alan Markert
amarkert@earthlink.net

(Comment received via e-mail on 4/13/05)

Dear Tim: Thanks for the Fact Sheep on the clean up of Onondaga Lake. This is a huge project and one that will take considerable time. We want you to get on with it as soon as possible. We live in Liverpool facing the lake and do not want any more delays. This is an idea that is worth developing. 1

Thanks
Alice Melvin
122 Hiawatha Trail
Liverpool.

(Comment received via e-mail from acmelvin@dreamscape.com on 4/14/05)

ORAL COMMENTS

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

\- -

In the Matter of

ONONDAGA LAKE PROPOSED REMEDIAL PLAN

\- -

PUBLIC MEETING in the above matter conducted at the New York State Fair Grounds, Art & Home Center Bldg. Martha Eddy Room, on **January 12, 2005 7:00-10:00 p.m.**

MODERATOR:

KEN LYNCH, Regional Director NYSDEC Syracuse

ALSO PRESENT:

DALE DESNOYERS	NYSDEC Albany
BOB EDWARDS	NYSDEC, Albany
DON HESLER	NYSDEC, Albany
TIM LARSON	NYSDEC, Albany
DAVID SMITH	NYSDEC, Albany
TRACY SMITH	NYSDEC, Albany
JIM BURKE	NYSDEC, Syracuse Reg Haz Waste Engr
MARY JANE PEACHEY	NYSDEC, Syracuse, Regional Engineer
HENRI HAMEL	NYS Department of Health
ALLEN BURTON	TAMS
HELEN CHERNOFF	TAMS
MARK MOESE	TAMS
BOB MONTIONE	TAMS
KELLY ROBINSON	TAMS
DAVE SCHEUING	TAMS
MICHAEL SPERA	TAMS
JOHN SZELIGOWSKI	TAMS

INDEX TO SPEAKERS

DIRECTOR LYNCH: Good afternoon everyone. Welcome to the Onondaga Lake Proposed Remedial Plan Meeting. It's certainly great to see such a strong turnout tonight in the interest that everyone has in Onondaga Lake. My name is Ken Lynch, I'm the regional director for Region 7 of the New York State Department of Environmental Conservation.

Tonight's meeting is basically going to be in three phases. We're going to start off with a brief presentation showing you what is in the Proposed Plan, real short, brief discussion about the elements of the plan itself.

Next we're going to go into a formal public comment time where people who want to make statements for the record can come up front and make your statements and we'll take those down.

After the public statements are completed we're going to go into a question and answer period. If anyone has specific questions regarding the plan we have a lot of technical staff and experts that worked on the lake here today to answer your questions.

So for those of you who know you want to speak right now we ask you to sign in in the back. Want to raise your hand Tracy. Tracy will give you a sign up card. I have some right now. As you sign up I'll take them and we'll call you in the order of signing up.

There may be many of you out there who have both a public statement to make and questions that you want answered. We ask that you make your statement at the appropriate time and then reserve your questions for the later time and we'll respond to those during the question and answer period.

We'll start with the presentation. As I stated, we're going to start with a brief overview and then go into the public comment and question period.

Cleaning up Onondaga Lake. What does that mean? I usually start my presentations on the clean up of Onondaga Lake, since it

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is such a complex matter and there is so many issues, with really defining the two major issues. The two major pollution issues impacting the lake are the wastewater treatment issues and the industrial pollution issues.

Many of you already know that the wastewater treatment issues are being handled by Onondaga County under an agreement signed with them back in 1998. And we're now proud to talk about the state of the art facility that we have on the lakeshore at the metro plant. We are not going to be addressing that problem tonight because we believe we're on track under the Amended Consent Judgment to address the wastewater treatment issues.

The focus of tonight's meeting is going to be on the industrial pollution. And specifically the Proposed Plan for cleaning up the lake bottom itself. There is industrial pollution impacting the lake from upland sites also. This plan does not address specifically cleaning up those upland sites. It is specifically geared toward cleaning up the lake bottom and the sediments and the impact that the contaminants have had on the lake bottom itself. As we'll discuss a little later there is a tie-in between upland sites and the lake bottom, but we'll discuss that briefly later on in this presentation.

This slide, which looks a little light but you might be able to see it. In your handouts, and I did not mention that we do have handouts on this presentation so you can follow along if you can't see the screen, bring the document home and look through it yourself on some of the details.

But basically this is a map of the lake itself. And in the middle of the lake we show the lake bottom. That's what we're going to be talking about tonight. Around this lake the several dots you see there are various sub-sites of the Onondaga Lake hazardous waste site. These are sites that have already been determined to have impacted the lake through discharges of industrial waste. Again, those sites aren't specifically addressed in the plan we're going to talk about tonight. We're talking about the lake bottom.

There is a process that both the state and the federal government follow in cleaning up industrial waste or hazardous waste pollution. It starts with the remedial investigation. Basically this is an assessment of the site, a lot of testing, a lot of monitoring to determine the extent of contamination, in this case in the lake bottom.

After you know what's there you go into the next step and that's the Feasibility Study. And basically what a Feasibility Study is is an assessment of all the alternatives or range of alternatives to clean up those contaminants.

The next step is the Proposed Plan. And that's what we're talking about tonight. After all the alternatives are laid out the state, as the lead agency in this case, assesses those alternatives, looks at

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various options and comes up with a proposed plan to present to the public.

Once that plan is proposed we step into our public comment period, in this case for Onondaga Lake. It started on November 29th and will run until March 1st.

Onondaga Lake is somewhat of a unique site in that it is both a state and federal Superfund site. Because it is also a federal Superfund site the Environmental Protection Agency is also reviewing the Proposed Plan, and they have a process for determining or reviewing the state's proposed final remedy.

Part of that process is an internal review process within the EPA called the National Remedy Review Board. And that evaluation will be taken -- undertaken by the EPA during the month of February.

Continuing on with the Superfund process, once we finish our public comment period and get all the comments on the Proposed Plan we issue what we call a Record Of Decision or the selected remedy, the final remedy, the remedy that the state believes should be implemented to clean up the lake. And in this case for Onondaga Lake by court order that remedy is due on April 1st of 2005.

Once the remedy is determined we anticipate that the design of this proposed clean up will take approximately three years. It's a complex extensive clean up project and there is a lot of planning and design to go into this Proposed Plan.

Once the project is designed we start the construction phase. And we're anticipating four years for the entire clean up activity to be undertaken.

Back to the first step. Just want to review a little bit what we found when we did the investigation of Onondaga Lake. There is an extensive investigation undertaken in various years, some by Honeywell, some by our Department, all with the oversight of our Department and the EPA. More than 6,000 samples were taken from the lake or around the lake. We did a human

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health risk assessment and ecological risk assessment as part of that investigation. And in real general terms what we found was that most of the contamination in Onondaga Lake is found in the southern portion or the portion located nearest to the southwest shore where most of the Allied or Honeywell activities took place, and much of other industrial activities took place.

There is mercury contamination throughout the lake. Again, most of that mercury contamination either being in the southwestern portion or at the mouth of Nine Mile Creek. We found other contaminants in the lake like benzenes, chlorinated benzenes and other contaminants. In some cases, in one area in particular, called the In-Lake Deposit Area, the deposits and contaminants reached levels up to 25 feet.

Once that investigation was completed Honeywell prepared a Feasibility Study with Department oversight. They evaluated some 14 alternatives to clean up the lake. They looked at alternatives ranging from doing nothing, to spending no dollars on the clean up of the lake, to doing an awful lot of sediment removal and capping to an extent of addressing 2,300 acres in the lake at an estimated cost of $2.1 billion.

As part of that Feasibility Study Honeywell identified their preferred remedy. And that is proposed dredging of half a million cubic yards and capping of 356 acres in the lake, at a cost of $243 million.

Once the alternatives were assessed the state began its process of reviewing those alternatives and determining what they felt was the best Proposed Plan for cleaning up the lake. And that's what we're presenting tonight.

One of the steps in coming up with this plan was to establish goals. And those goals are outlined here.

Number 1 is to achieve sediment concentrations that are protective of fish and wildlife.

Number 2 is to achieve concentrations in fish tissue that are protective of humans

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and wildlife that consume the fish.

And Number 3 is to achieve water quality standards.

Basically what we did in assessing the lake clean up, and it was also done by Honeywell in the Feasibility Study, was to break the lake into eight sections. And based on the contamination we knew of in those eight sections determine a remedial plan.

We determined that we would remediate all areas of the lake where the surface sediments exceeded our clean up levels.

That then resulted in an estimated proposed dredging of 2.7 million cubic yards and a capping of over 579 acres in the lake.

Where do those sediments go once we dredge them? The most highly contaminated sediments are proposed to be taken off-site to a permitted DEC or out of state facility. Other sediments that are less contaminated will go, are currently proposed to go to one of the Honeywell Solvay wastebeds.

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A unique aspect of this plan is Honeywell is proposing to perform a pilot study to oxygenate the deep areas of the lake. And in an attempt to prevent mercury methylation or the mercury seeping into the water column in the lake. That will be conducted and monitored by the department. If effective we will authorize a larger scale project.

The plan also includes habitat restoration or repairing the damage you cause when you dredge. And habitat enhancement, doing more than what exists there today, adding to the habitat in and around the lake.

It's important to note that the plan also includes a long term monitoring of the water quality, the capping of the lake, fish tissue and other things related to the clean up of the lake. So once the construction activity is done the responsible party doesn't walk away, they have a long term obligation to monitor the effectiveness of this plan. And the estimated present worth of our Proposed Plan is $450 million.

This slide, and I'm sorry you don't have it in color in your handouts but it's a pretty good overview of how the lake is divided into eight areas and what the Proposed Plan for those eight areas is. It shows the areas to be capped and dredged. And it shows you the different units that the lake is divided up to. There is also a chart over there depicts the same thing. And is there one in the plan itself? In the plan itself that is in line, that's one of our exhibits in there. It's a good reference to get a good oversight of what areas are going to be capped and dredged.

As I mentioned there is a long term monitoring plan that I think is very important to this plan. For those of you familiar with the Amended Consent Judgment, the county has established an extensive annual monitoring program to see how their proposed clean up, their addressing of the wastewater issues that's impacting water quality, and improving water quality.

We expect that the monitoring plan for

this clean up project will be very similar, very extensive, reviewed by our scientists and others. We're going to monitor the effectiveness of all the remedy components. We're going to sample tissue in fish invertebrate, we're going to sample the surface water, the sediments, we're going to make sure the cap is working, we're going to make sure any containment area that's proposed in the wastebeds or other places is effectively working. And we're going to continue on an annual basis to make sure that this plan is working.

At some point during that monitoring if we find there is a problem with a cap or problem with different areas in the lake we will advise the responsible party and they will be responsible to correct those problems

Time frame. One of the most common questions I get about this plan is how long will it take? When is the lake going to be clean? As I previously stated we anticipate, if all goes well, that the state will issue a Record On Decision or final remedy by April 1st.

Next is the anticipated design phase, which is estimated at this point for three years. Prior to starting construction of this remedial plan, prior to dredging, prior to cleaning up the lake bottom we have to be assured that the lake is no longer being impacted by upland sites. So that is one glitch in this schedule that we have to coordinate with the clean up of the lake bottom. Simply doesn't make sense to dredge the bottom of the lake where the lake is still being contaminated by upland sites.

So part of this proposal is to coordinate with the upland site cleanups so that those sites are no longer impacting the lake before you start dredging the material. And once the construction activity does start in the lake we anticipate a four year construction period.

And again, once the construction is done, the work is not done, there is an extensive monitoring program which will continue until we believe that the remedy has satisfactorily worked and there is no longer a need to monitor.

That's my presentation, I told you it would be short. We want to reserve most of this time to hear from you, both in public comment form and also in a question and answer form. But if you want to get more information about this plan, we've had two availability sessions, and we had a great turnout for both of those and we had a lot of great questions. But if you want more information you can go to our website that's listed there or you can come to these mentioned facilities and see the plan itself, the hard copy and go through it.

You can also comment on the Proposed Plan. You don't have to speak tonight to get your comments in. You can write in until March 1st and you can do that via the web or via mail.

We're now going to move into our public comment period to allow people who have comments for the record to come forward and state their comments. I do have a couple

LYNCH

ground rules so that we can make sure that we get to everybody that wants to speak and move this in an orderly manner. First and foremost when you come to the microphone, and Dawn is going to hold the microphone and come to you, if you can come out to the aisle Dawn will meet you in the aisle for you to make your statement. State your name and spell your name for the record. We have a stenographer (court reporter) here and I know he's a good speller but he can't get all the complicated names.

Keep your statements short and concise so we can get to everyone please. If the previous speaker or previous speakers have made a similar point you don't have to reiterate that. Oral comments tonight are given equal weight to written comments that you send in, so don't feel the absolute need that you have to make a statement tonight, if you would rather write that you can do that and it's given equal weight.

We will not be responding to the comments made initially during the comment period. We're going to reserve that again for the question and answer period. So if you want to make a statement and you also have questions, please reserve those questions to the later portion of the meeting.

I'm going to start with the public speakers and as we traditionally do with DEC public meetings we'll start with our public officials. And the first one up is County Executive Nick Pirro.

0-1 **COUNTY EXECUTIVE PIRRO:** Good evening Director Lynch, members of the DEC team, ladies and gentlemen. This will be concise, I'm not sure that short. The county understands all too well the difficult task it is to develop and obtain agreement on expensive solutions to large scale, complex problems such as the industrial contamination in Onondaga Lake. It is always easier to be critical of such plans than to produce them. The County is aware of the level of effort that has gone into the development of the state's Proposed Clean up

PIRRO

Plan and we applaud that effort.

The ongoing effort to reclaim Onondaga Lake is substantial and widespread. The Onondaga Lake Partnership is spending millions of federal and local dollars on projects ranging from non-point pollution to habitat improvement to trail development. By the time the County is done upgrading the municipal wastewater system that discharges to the lake, the County, with substantial help from our state and federal partners, will have invested well over $450 million on lake improvement projects. A good deal of that work is already completed. It is now time to aggressively move forward with remediation of the industrial side of the lake restoration equation. The plan proposed by the state is substantial and aggressive. It's not perfect. And there are certainly many questions that will have to be answered along the way. But it is time now to move forward without delay. The County is hopeful that the technical and public review and comment process that is now underway will allow this process to move in a positive and expeditious fashion.

That said, there are a number of critical issues that the County is hopeful can be addressed as the Proposed Plan becomes refined and finalized.

First, the schedule. As the County
1 understands it, the plan recommended by Honeywell in the most recent Feasibility Study would postpone implementation of the most substantial work in the lake until 2011. That is too long to wait. The state's Proposed Plan offers no start or completion dates. Based on what is written, work could begin as soon as next year or as late as 2011. As there is no schedule things could be delayed even beyond 2011. An implementation schedule, with start and end dates needs to be spelled out as part of the plan, and work needs to be begin sooner, much sooner than 2011.

2 Related to the schedule is the lack of progress and coordination to date in addressing the upland sites. I am referring

to sites like Willis Avenue, the Semet Tar Beds, Wastebed B and Harbor Brook, Wastebeds 1 through 8, and the Geddes Brook/Nine Mile Creek sites. It should be readily apparent to everyone that these sites, all of which are ongoing sources of contamination to the lake, have to be addressed before implementation of a remedy in the lake itself can take place.

The county has consistently pointed out that all these sites should have been addressed collectively as part of a single comprehensive lake clean up plan and not as independent hazardous waste sites.

From an ecological standpoint, all of these sites are linked to the lake. The approach of allowing the upland and lake remedial investigation to proceed on distinct legal and separate time frames has resulted in a significant impediment to proceeding immediately with the remediation of the lake itself. The County recommends that the process to clean up these upland sites proceed as quickly as possible, so

PIRRO

that the lake bottom clean up plan can begin, and can do so without having to rely solely on the installation of interim remedial measures at these upland sites.

3 A second issue of concern is the long-term viability and reliability of several of the measures that are proposed in the Plan. Many of the proposed measures involve containment rather than removal. All of these engineered structures will require ongoing inspection, operation and maintenance.

These include: 1) Groundwater cutoff walls coupled with pumping and treating contaminated groundwater intended to stop the migration of contamination into the lake.

2) Engineered confinement caps intended to encapsulate over 575 acres of contaminated lake bottom sediments.

3) Engineered confinement of the 2.6 million cubic yards of contaminated dredge spoils in the proposed Sediment Consolidation Area located on Wastebed 13.

PIRRO

4) Facilities to pump oxygen into the lower layers of the lake in an effort to inhibit the methylation of mercury released from lake bottom sediments.

These engineered, constructed facilities will have to work forever, and will require inspection, operation and maintenance forever. The need to monitor and maintain these sites will never go away. Can the state assure this community that Honeywell will be around forever to take care of these things? What assurance can the state and Honeywell provide to the local community that it will not inherit the financial burden of maintaining, repairing and replacing all of these facilities, 30, 40 or 50 years from now? How will the final plan address this concern? The final plan must include formal legal protections, long term financial assurances or other protections that address this concern.

4 Third, institutional controls. The goal of Onondaga Lake clean up efforts is to restore the lake for the use and enjoyment

of the community. Typically, institutional controls impose limitations on the use of the site or resource. Limitations on the future use of Onondaga Lake as a recreational resource to this community due to institutional controls should not be part of the remedy.

5 Fourth, there is very little information provided regarding the proposed Sediment Consolidation Area on Wastebed 13. It appears to the County, based on the limited information that has been provided, that the Sediment Consolidation Area represents a sizable ongoing challenge, and potential burden to this community in the future.

The potential issues include: 1) the unexplained procedure to identify and then separate hazardous materials in the lake bottom sediments from sediments that are simply contaminated during the dredging process.

2), the physical stability of the site.

3), the potential for odor problems.

4), management of the supernatant.

5), long term operation and maintenance. And by long term it appears that this containment facility will have to be maintained forever.

6) and it appears that any redevelopment potential for this site will be gone for generations.

6 It is not apparent that any other alternatives for handling the dredge spoil were given full consideration. The question the County has is whether the creation of the proposed Sediment Consolidation Area is justified given these uncertainties.

7 Finally, monitoring. The topic of monitoring, in both the Feasibility Study and the Proposed Plan, is largely deferred to the design stage. While this is not unusual or necessary inappropriate, it is too important an issue to ignore during the stage of the remedy selection process. Given the complexities of the Onondaga Lake system, and the ubiquitous extent of the contamination related to the industrial sources impacting the lake system, it could

be very difficult to accurately monitor change and improvements and ascribe them with confidence to the remedial measures in the Proposed Plan.

The community will want and deserves assurances that the remediation measures ultimately put in place are succeeding. Monitoring for this purpose should begin now, in order to assure the establishment of a reliable pre-construction or baseline data-base. Moreover, development of the post-construction monitoring program must involve the County and other appropriate stakeholders.

8 I wish to close by restating that it is not easy to develop and obtain agreement and expensive solutions to large scale, complex problems such as the industrial contamination in Onondaga Lake. The state's Proposed Clean Up Plan represents a substantial laudable effort. What we offer tonight should be viewed as constructive input to that plan.

DIRECTOR LYNCH: Thank you. Next

speaker is Dale Sweetland, Onondaga County Legislative Chairman.

O-2 **LEGISLATOR SWEETLAND:** Thank you. I'll be very brief, I am - since I left my office with the paper I had in my hand sitting on the desk. I am Dale Sweetland the chairman of the Onondaga County Legislature. And I'm here tonight not as an engineer, because I'm not, I'm not a scientist, I am a resident of Onondaga County. And I'm here to express to you the feelings of my constituents and my neighbors as I talked to them after this plan has unfolded and come about in the media.

Several years ago, this is my 12th year in the county legislature, I was in the legislature and chaired the drainage and sanitation committee when we signed the Amended Consent Judgment. And there is probably nothing that I am prouder of than the fact that the County is doing, with the help of the state and the federal government, doing an enormous amount of work to stop polluting Onondaga Lake.

SWEETLAND

Ever since I have been in high school or was in high school - sounded like I still am, didn't it? Ever since I was in high school I have heard about Onondaga Lake. We've all heard about Onondaga Lake. We now have a great opportunity. We are closer than we have ever been in this community to actually coming to terms with the pollution in Onondaga Lake.

I want to reiterate what the county executive said, and I applaud DEC and Honeywell for all the work they've done. It's taken an enormous amount of time and a lot of effort to get to this point. I would reserve any criticism of the Proposed Plan because again, I'll beg that I'm not an engineer and I'm not a scientist.

1 I would offer that people who I talked to are excited about an opportunity to see something positive happen with Onondaga Lake. It's necessary, not only for the city, the county and the Central New York region, but it's very important to have this lake come back to life and be a vital part

of this community. So I want to encourage Honeywell and DEC and everyone involved to continue their hard work and really make an agreement happen and have this work come to fruition.

The one thing that strikes me as that in every type of these situations, as the County Executive said, nothing is perfect in this world, nothing will ever be perfect. And all I ask is that all the parties be logical, use common sense, and be reasonable in all this process so that we can have some good things happen to Onondaga Lake and the city of Syracuse and Onondaga County. Thank you.

O-3 DIRECTOR LYNCH: Next speaker is James Corbett, Onondaga County Legislator.

LEGISLATOR CORBETT: Thanks, Ken. C-O-R-B-E-T-T. Welcome to my area. I represent this 8th District. And I'm here to comment on one aspect of the plan, having gone over it extensively. I want to preface it saying I'm speaking as the County Legislator for this district. I have also

CORBETT

lived for 20 years right down the road here. My house and my backyard overlook right over 690 at the lake. So for 20 years I looked right at this lake every day.

The aspect that I would like to talk about is the pumping of the sediments from the pump station proposed to be built at Onondaga Lake to the Sediment Containment Area constructed at Wastebed 13. This is after the dredged materials have been processed. I understand that there would be approximately 4 miles of pipe from the pump station to the proposed containment settling area 13.

What my concern is, I've received a number of calls from constituents in this area, and if you're familiar, anyone around here, with 13, which is over off of - between Armstrong and Warners Road, there is a lot of the residential area around there. There is always a wind up there; there is always a breeze.

1 And the calls that I have received are two-fold. One is concern about the odor

control, which has been brought up at the meeting in Camillus. And also the length of the piping to come from the proposed pump station to the Wastebed 13. It would be approximately 4 miles from what I understand, and one of the proposals is to follow Ninemile Creek.

2 I think there might be another option after looking at this. We've discussed, and it was up on the screen, you can see the finger right here going out into the lake, that's Wastebeds 1 through 8. Wastebeds 1 through 8 right now is part of, is Onondaga County land and it's also part of the parking.

What I have talked with some of my constituents about and I don't know if anyone from Honeywell or the DEC, what if we thought of putting that containment area right there? You have four miles less piping, you're not going through a residential area. You also have a lot less worry about odor control. You've got the lake on one side, you've got 690 down on the other side. Yes, it is now county property, and yes, we have a proposal for the trail around the lake there. But I would beg that this option maybe be looked at. And I would appreciate that if there is a scientific part of it, I just think that it's a real viable option. You're not going up Ninemile, you're not going through a residential area.

And I think in the long run it would prove to be, if it's done the way I've looked at everything, it could be turned right back into a recreational area. You could put that trail both up and down on it. And who knows, there might be a lot of uses for it down the road for maybe picnicking or a lot of other things. So I appreciate the opportunity to make this comment and I would hope you look at it. Thank you.

DIRECTOR LYNCH: Liverpool Mayor Marlene Ward.

0-4 **MAYOR WARD:** Thank you, Ken. Good evening. I appreciate the opportunity to be here this evening and to be able to comment and be part of this really important undertaking because it is an important issue for the village of Liverpool. As I said before I'm Marlene Ward, the mayor of the village. My husband and I are life-long relatives -- I'm sorry, residents, of the village of Liverpool. In fact my husband was born right on First Street in the village right there on the lake. And when we were coming over this evening he was talking about being a little boy and wading in the lake and being told, you can't wade in that water.

And as we all know, Liverpool is like a lot of other communities, it was founded on a beautiful body of water, which is Onondaga Lake. And history records over time that unfortunately it became polluted to the point that it has received national attention as one of the most polluted bodies of waters in the United States.

The pollution process began many years ago, and I know that I cannot and I doubt anyone here can really remember when the lake was not polluted. There is plenty of responsibility and blame to go around. The pollution was a combined result of everyone, from individuals to municipalities, to several businesses. Everyone either believed that it was not possible to pollute a body of water such as this, or else they did not care.

The foreign material that went into this lake on a yearly basis included millions of gallons of untreated human waste, various kinds of industrial waste, including some we did not realize was hazardous or dangerous until years later.

1 Many times throughout my lifetime there has been various attempts and proposals regarding lake cleanup. Always they seem to go nowhere. I came to believe we would never see a clean lake. Through the efforts of many dedicated people we have seemed to reach a point where we have a plan and a proposal that would at long last seem to accomplish some of these goals.

I would like to thank everyone who

brought us to this point and to say on behalf of the village of Liverpool, please continue to move forward with the goal of a clean Onondaga Lake, we certainly would appreciate it. Thank you.

0-5 DIRECTOR LYNCH: Are there any other elected officials who would like to speak?

SUPERVISOR CZAPLICKI: Hi, I'm Bob Czaplicki, supervisor of the Town of Geddes. I just want to say I've submitted some testimony for the record but I think it really is time that we move forward. I've lived in this community my entire life and know what the lake is about and I know what my constituents talk about. And they want us to stop talking and get moving.

1 So I know, as that the County Executive said, no plan is perfect, and we can work through this process and reasonable people can come up with reasonable explanations. But I think the time to get this lake cleaned up and to get this community moving, there is miles of shoreline that can be developed and it can be an economically

viable area. And I strongly urge that we get moving. Thank you very much.

0-6 DIRECTOR LYNCH: Any other elected officials? Okay the next speaker is Deborah Warner, Syracuse Chamber.

DEBORAH WARNER: Good evening Regional Director Lynch, thank you for holding this meeting. My name is Deborah Warner, I'm director of governmental affairs at the Greater Syracuse Chamber of Commerce. We're the largest business organization in Central New York with 2,300 organizations as members, employing over 140,000 people working in our community.

1 On their behalf I extend our thanks to you for this hearing and the years of dedicated work you have given to the goal of cleanup of Onondaga Lake. We're delighted and encouraged that after more than a decade we're finally at a point where we are finally talking about a remedy to implement. The goal is finally in sight. You are to be congratulated for working through this herculean task.

WARNER

I'm here tonight to tell you that we support the restoration plan you put forth. We believe and trust that all the research and study has yielded a plan worthy of implementation. We agree with Congressman James Walsh when he said, we have finally found a holistic and sterile approach to clean up this valuable community asset.

2 Our chambers includes the Onondaga County Convention and Visitors Bureau. Although we already market the lake for a range of events we're thrilled at the potential of visitors and events after the remediation is complete. Waterways are certainly a large part of our tourism marketing efforts. Currently to the naked eye the activity along the shoreline of Onondaga Lake is a fabulous asset.

But the question remains from our out of town visitors, why is there no activity on the water? Imagine the tourism benefits and economic development impact when we can successfully hold major fishing and boating events. When Destiny is built the value of the lake to us will be nearly inestimable. We urge final approval and implementation of this program as soon as possible. Many projects in and near Onondaga Lake are moving forward, particularly the more than $200 million inner harbor redevelopment project we should see this year begin.

And the faster the lake is cleaned up the more development and jobs will occur in our community. Of course we can't ignore the economic impacts of over $400 million of over 7 years in the local economy if the project moves forward. We look forward to Honeywell being a valued member of this community for a long time.

I would also ask that as you work through the remediation plan you preserve development opportunities to the largest extent possible on the land that is being reclaimed. We believe that there will be strong interest and additional development adjacent to the lake, and don't want to lose out or limit this economic potential.

3 I know our members want me to give you a

vote of confidence in your work. The business community does not doubt the thoroughness or scientific acumen of the DEC and the EPA. We trust that you have not overlooked any aspects in the Remedial Investigation and Feasibility Study. And we trust in the monitoring programs that are part of the plan.

4 So we also speak to Honeywell tonight asking them to consent and agree and move forward with the plan DEC has proposed.

One last question, we hope that you'll be able to respond to as you go forward, and it's similar to a concern that the County
5 Executive brought up. Going forward, what assurances can taxpayers in our community be given that if there is a failure in the cap or an engineering solution who's going to be held responsible for those costs? If Honeywell no longer exists, or has merged with another company who is going to be responsible for the costs in the end?

Onondaga Lake is a jewel for our community and the city of Syracuse. The lake is a resource that any city would envy. We gained a lot of notoriety as the most polluted lake in the land. Now we'll have a new reputation as an example of state-of-the-art remediation of one of the largest Superfund sites in the nation. So we look forward to the earliest implementation possible and support for the recommended plan the DEC has put forward. Thank you.

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O-7

DIRECTOR LYNCH: Sam Sage, Atlantic States Legal Foundation.

SAMUEL SAGE: Sam Sage, the president of the Atlantic States Legal Foundation. And I'm just going to make some preliminary remarks. Atlantic States will send in detailed comments to the EPA review panel and for the record here.

1

Before I say anything in detail we are happy to see that something is finally going to happen. We recognize the need for dredging and capping. And we hope that things can get started as soon as possible. I would just like to talk about three or four issues quickly.

SAGE

2 The first item is that we're concerned that there needs to be a vision for the lake, a consensus vision. This is a public policy issue: What do we in this community want the lake to be like fifty or even a hundred or more years from now? At this point there is a vision that the Onondaga Nation has presented, that this is their cultural heritage, this was their life source, and their fishery, and hunting grounds.

We need to see as a community what the end point of a rehabilitation of the lake should be. We have to recognize that there are scientific limitations in restoring the lake to what it once was but we really need to know what it is that the lake should become.

3 Part of that, to get there, the most important thing is a sensible and thorough monitoring plan for the lake. We need to start now doing baseline monitoring, so that by the time we have this plan implemented we know where we're going. This monitoring

plan is going to have to be very complex in its variation, it has to dovetail with the monitoring currently being done by Onondaga County. We would recommend that there be outside scientific input into developing the monitoring plan, and hopefully be outside peer review of the monitoring plan before it takes place.

4 Another concern about the monitoring plan is its cost. The monitoring plan is estimated to be something like $3 million a year for a minimum of 30 years, but probably more than that. That's a large sum of money. Corporations come and go, we really would like to see some fail-safe mechanism that the money will be available to do the monitoring properly. And one idea would be to collect a sum of money up front and keep it into a fund specifically for the purpose of the monitoring. The legal possibilities of doing that are the Superfund notwithstanding, I think that's something that should be investigated.

5 Part of the monitoring exercise is

SAGE

needed in order to do some modeling of the different parameters in the lake. There was a meager effort to do a mercury model. That was shown that it wasn't going to work. But that effort was pretty half-hearted at best. To do a mercury model properly is going to take a long period of time. We need to start now getting the monitoring data that will allow us to do that monitoring. Without some kind of modeling exercise we have no idea at what point we can expect to see improvements in biota, a lessening of methyl mercury in fish tissue and other things like that.

We also should be modeling for other parameters other than mercury. There are various organic compounds that should be modeled. And a thorough analysis should be made of what are the most reasonable parameters to that modeling exercise.

6 The next point that I think is needed to emphasize is public participation. It's very gratifying to see so many people coming to this meeting tonight. For all too many years when some of us have been dealing with Onondaga Lake issues we sort of talked to ourselves. However, the Superfund process is partly to blame. We at Atlantic States audit the TAG grant agency for the Environmental Protection Agency. But even so with all our efforts getting people interested in the esoteric of the Superfund process has been difficult.

Also unfortunately, this hearing is the only requirement under the Superfund process. And so we are urging that a more comprehensive continuing public participation effort go hand in hand with the remediation of the lake bottom site and with the other sites. I have suggested 7 separately to DEC that an overall matrix should be prepared for the public, showing the relationship of all the upland sites to the lake bottom sites on the dates and the conflicts and trying to hammer out, you know, what people can expect and what are the significant points at which some public comment would be desirable and necessary.

And I think there is some agreement to do something like that and I think that would go a long way in helping getting the public more involved.

8 Finally, the last point I would like to make is that in all the work to do the remediation we have to think of the workers who are going to be doing the work. And it's particularly important that proper hazardous management training be undertaken by all these workers and that all steps are taken to ensure their health and safety during the process. And thank you, we will submit written comments later.

0-8 DIRECTOR LYNCH: Thank you, Sam. Chuckie Holstein, FOCUS Greater Syracuse.

CHUCKIE HOLSTEIN: Good evening and thank you very much. I appreciate DEC being - giving us this opportunity. I'm with FOCUS Greater Syracuse. FOCUS stands for Forging Our Community's United Strength. And I'm speaking for the ordinary citizens who participated in our FOCUS visioning process in 1997 and 1998.

1 There are over 5,000 citizens who participated in this process to share with us their dreams and their visions for our community. That was eight years ago. And that visioning process developed 15,500 ideas. That's a lot of ideas. We distilled those into goals. We ended up with 87 goals. Those goals were voted on in a Vision Fair in 1998, and that's what I want to talk to you about.

As people voted on the goals they established the preferences for what they wanted to happen first in this community. The number one goal was to build bicycle paths and hiking trails, especially along the waterways in our community, ergo Onondaga Lake.

The third highest goal out of 87 goals was to develop and clean Onondaga Lake. I went into that great big fat notebook this afternoon to take a look at what some of the people were saying about Onondaga Lake. After I had counted 150 times just the three words, "clean Onondaga Lake," I stopped counting, because I think at every single one of the over 200 visioning sessions people did say they wanted Onondaga Lake restored so they could go swimming there and fishing and so on.

2 The citizens have waited a long time for the clean up of Onondaga Lake. The good news is that there is good fishing in the lake. We understand the carp colony is wonderful, and even those people from the United Kingdom would like to come here and fish for carp.

3 We also understand that you can travel from Onondaga Lake all the way to the Mississippi river, but they can also come here, and that's I think what Warren talked about in bringing tourism to this community.

Last year in 2004, we spent the entire year on the waterways and water in our community. We held two FOCUS meetings, an annual event and a workshop with experts. Some of you here in this room were part of that. We ended up with a report to the community. There were 10 strategies for

Onondaga Lake. I'm only going to read a few of them to you.

4 The first and foremost was to focus on water quality. And I think that's what the DEC, Honeywell and the other remediation projects are talking about.

They want to continue the clean up and have a long range plan to keep it clean. And that goes to what Sam Sage just talked about, the continuing monitoring.

5 They want the public to be informed of the current state and usability for recreation and fishing. In other words, they said, let's get people on the lake not just standing there and looking at the lake.

6 They want to create a positive publicity and media campaign about the lake. And I think we need to do that more and more. Of course they want the hiking trail and the bicycle path, the contiguous lake trail to be finished. And the edge lands be ready for development and public use.

7 The people talked about public accessibility and to provide transportation

to the lake. There is some people who don't have transportation and need public transportation to get to the lake.

8 And last but not least, they said all around the lake should remain in the public realm. There should be public ownership of the shoreline, and create a long term plan for the use.

9 I think the citizens of this community would find it very good news to hear that we're finally beginning the process. And we recommend that the process begin as soon as possible. We say start now, just do it. And I do have some documentation on the citizens goals and what they had to say and I will leave them with you. Thank you very much.

0-9 DIRECTOR LYNCH: Thank you. Next is Clyde Ohl.

CLYDE OHL: My short presentation here is entitled "Build and measure - but No Final Specific Master Plan." I have two areas of concern with proposals for Onondaga Lake.

OHL

1 First, as background, there is a scientific way to resolve the issues involving Onondaga Lake. The lake would be studied by an independent scientist, or independent scientists with proper peer review. The remedial issues would be defined, with extensive models constructed, based upon selected variables and a final solution based upon a clearly defined master plan. We don't have a master plan as yet.

Unfortunately, all too often clearly defined scientific study has been subverted to what I call is the political process.

The result has been what we call the Build and Measure Plan established by Onondaga County, without precise goals, to grapple with the sewage discharge into Onondaga Lake. Build and measure, often done without independent monitoring, I repeat, independent monitoring is a nice sounding term. However, it is not based on long-term goals but it's more concerned with inching along, sometimes delaying the project.

OHL

It comes as no surprise that Honeywell has followed or decided to follow what I call the Metro template, and wants the same arrangement. Fifteen years after the state filed the lawsuit and after collecting hundreds - or mounds of data and studies at a cost of several hundreds of millions of dollars, detailing the industrial pollution of the lake, we are again endorsing what I call this build and measure plan, and again without a clear predetermined goal.

To be succinct, under build and measure the polluters are being allowed to build what amounts to interim or test facilities, and merely measure their efficacy rather than require actual predetermined results based upon proper scientific models.

This flies in the face of what I call environmental cleanup practices everywhere in the country. I have been -- don't get me wrong now, I've been delighted that Honeywell has come along. They're doing things differently than other interested organizations. They're reaching out to the

OHL

public. They haven't announced the final plan. The final plan, as I understand, will be about three years from now. During the meantime they'll be doing a lot of work in preparing for this.

This type of initiative involving the public is long overdue on issues involving Onondaga Lake. And I do not want to delay major positive efforts with reference to the lake. However, I continue to remain concerned with the build and measure 2 approach proposed by Honeywell. The major shortcoming I again point to is a lack of modeling for the project, no models. We have to do what we do and then build and measure and so on. We spend hundreds of millions of dollars and we're throwing out a lot of that information we had before.

Using appropriate modeling to arrive at predetermined measurable goals is an overriding importance in this issue.

My second concern, by the way I mentioned two, rests with the Town of Camillus. And it goes like this. I'm not

speaking on behalf of Camillus officialdom, although as a former town supervisor in Camillus and a former county legislator I've been involved in the lake issues for many many years. I'm also chairman of what we call somewhat facetiously the Dead Lake Society. Dead Lake Society. The beds
3 actually represent a long lost opportunity, the present beds, represent this lost opportunity for long term economic development as well as recreational opportunities.

We just have the wastebeds in Camillus, several hundred acres. We now have the chance to regain the opportunity of bringing these areas back into some type of economic development profitable for the town.

I think it's important for Camillus to be involved in the design process for the development of the beds and the surrounding areas and not merely as a depository for the tailings from the dredging program.

The so-called Allied beds actually have potentiality easily ignored, often ignored

OHL

and not much appreciated for future development in Camillus. It seems to me using bed 13 and maybe even expanding it to bed 14 actually overrides or creates a major barrier to future development. Camillus has a finite area, and to see Allied beds continue only as a dumping site flies in the face of economic development.

I do remember a schematic developed about twelve years ago by Allied Chemical and they depicted future uses of this whole area. I was very much impressed. Golf courses, parkland, all kinds of things, even potential parking lots for the State Fair and also maybe a ramp, another exit ramp on Horan Road that would serve Camillus a little bit better. Well, time has passed by, twelve years later, and nothing much has happened as far as that part is concerned.

There is no mention in all of this, by the way, of economic benefit to the future. Unless we start now we may well end up with another lost opportunity. It's not too early for Camillus to be involved in conjunction with Honeywell and the DEC in any design processes. I want to see a better use of the wastebeds and surrounding areas than we are contemplating at the present time. Thank you.

0-10 DIRECTOR LYNCH: Jeffrey Freedman.

JEFFREY FREEDMAN: Thank you. I am Jeffrey Freedman, F-R-E-E-D-M-A-N. It's been my privilege and pleasure to have a sailboat and a motorboat on Onondaga Lake for the last six years. It's also been my pleasure to be a member of Onondaga Yacht Club. Onondaga Yacht Club has existed on the shore of Onondaga Lake since 1883, promoting recreational boating on Onondaga Lake and enhancing the recreational boating experience.

1 On behalf of the members of the Club, we number about 60 families who have about 50 boats that we use on the lake. We thoroughly support these efforts of the DEC and of Honeywell to clean up what we regard as our lake.

In the course of the clean up operations

FREEDMAN

2 we think it would be in the interest of public safety to remove all of the under-water obstructions to navigation. The Noah charts for Onondaga Lake list at least two sunken barges and numerous underwater pilings which remain from the amusement park on the western shore. These objects present a clear and present danger to public safety and also to the safety of the Honeywell workers who will be out on the lake in their boats. So we hope that in the course of the clean up efforts that these objects will be removed.

3 We hope that the clean up effort will, in the habitat enhancement part of the project, that we can have a plan free zone in the Marina Harbor, that will also support navigation, and the channel between the Marina Harbor and the lake in the deep end.

4 We are not anxious to see anchoring restrictions over the areas that are capped. An anchor is an item of safety equipment on a boat. We have seen sudden storms come across Onondaga Lake and we have measured

winds in excess of 80 miles an hour. So we need to deploy our anchors as a matter of boating safety, and we would not like to see any restrictions to anchoring in the cap areas.

5 Those things being said we look forward to working with the Honeywell staff as the clean up progresses. Our organization sees this as an opportunity to greatly expand recreational boating on Onondaga Lake. We have called for the creation of a day camp with sailing instruction and lake ecology instruction for children, possibly associated with our boating club. We would like to see community sailing programs for our senior citizens so that retired people could come and use boats, not necessarily have to own them themselves.

We would like to foster the relationships with our colleges and universities to bring back intercollegiate sailing on Onondaga Lake and scholastic sailing. And we also see our Club hosting Empire State Games sailing events and also national sailing regattas on Onondaga Lake for one design sailboats.

So we see a tremendous increase in sailing activity. We would like to also see a tremendous increase in fishing activity and rowing shells. So I think the vision that we have for Onondaga Lake from the standpoint of recreational boating is that the thousands of people who already enjoy Onondaga Lake Park would look out and see the lake literally covered and populated with sailboats, fishing boats and rowing shells on every nice day of the summer.

And once again, we are tremendously appreciative and express our deep gratitude to the staff of the DEC and to the Honeywell organization for their clean up activities.

6 Finally, we just hope that - we understand that there is presently a disparity between the scope of the operations that are being proposed by Honeywell and by the DEC. We would not like to see these - this disparity get bogged down in the judicial system under court -- in the courts, but we

KOCHAN

would like the clean up effort to go as expeditiously as possible so that we and the public can enjoy our lake. Thank you.

0-11 DIRECTOR LYNCH: Nick Kochan.

NICK KOCHAN: K-O-C-H-A-N. Good evening and I would like to - village of Liverpool Planning Board Chairman and twenty year resident of the village of Liverpool and a life-long resident of the Syracuse area.

1 In Liverpool which was incorporated in 1830 as one of the older communities in the area, probably had one of the first commercial enterprises on the lake with the collection of salt. And the focus of the lake has been an economic driver for everybody in this community for a long time.

And the twenty years since Allied has closed the community has taken a new focus and a new direction with respect to the lake. We have worked with the mall, we have the extraordinary growth of the use of the park, the Onondaga Lake Park, and also we have the improvements being done by the wastewater, in the wastewater facilities.

It's very encouraging to see the effort that's being put into this project and it's great to see this is getting closer to becoming a reality. I just have several quick comments to make because many of the points have been covered already.

2 Assuming that the upland remediation is successful and diligently protected, I would make that one of the first conditions in looking at this lake proposal. And we also have to make sure that Honeywell will still remain involved in the long-run to maintain those facilities. I would just like to
3 encourage Honeywell and the DEC to continue to work hard and find the best economic and scientific compromise possible for this project. Thank you.

0-12 DIRECTOR LYNCH: David Chapman.

DAVID CHAPMAN: How are you doing. I have some scientific statements I was going to make on behalf of Dr. George Putnam with our firm. My name is David Chapman, I'm with Mountain Eagle Management, we're a technology development firm.

CHAPMAN

1 I guess mainly I wanted to get across rather than, I can address this later for you and give this to you, but there is a lot going on in the community. First of all, I want to commend the DEC and Honeywell for moving towards action steps now as opposed to just a constant studying and remedial investigation going on seems like a lifetime.

2 Our firm has a patent on a reverse of the Solvay process, where they take carbon rock and turn it into natural chemicals. It's a patent, you take that natural chemicals and turn them back into carbon rock for sealing up buildings and soils.

We've run into a lot of, I don't know let's just say snags along the way in trying to get an idea of the chicken and egg theory a cross of whether it's been done before or how do we know it will work, and a lot of things like this. One of the things I see happening in this community right now is that we're really moving toward a community of technology development; what's going on down in Syracuse and various different operations that are happening around there and what Pataki recently proposed as far as new technology development in the Central New York area.

And I just want to say I think that with Onondaga Lake we have a great opportunity to really look at some of the other technologies, and I'm not just talking about ours, I have seen some other technologies that really hold some serious merit for the true clean up of the lake.

And all I want to say for the record is just that if we can just make sure that we have a forum where these technologies can truly be listened to by people like yourselves and other scientists and not just pushed aside where it's been done before. But really looked at for a way for some potential solutions.

Again, like I said, I want to commend the DEC and Honeywell and all the fine engineering firms who worked up to this point of bringing this to fruition with this diverse action, instead of just study.

That's pretty much it. As far as the technical, I'll leave this for you. Thank you very much.

0-13 THE COURT: Howard Bragman.

1 **HOWARD BRAGMAN:** I am H-O-W-A-R-D B-R-A-G-M-A-N. This will be like really short, just about a minute. It seems that we've been this route before. Not so long ago a professor emeritus from ESF stated it would take at least half a century and then we would not know where we were. Is it emollients, PCBs, mercury, whatever? Because Onondaga County does not collect taxes anymore. Because I used to hear rumors that people who worked for Allied if they suddenly think about polluting the lake, rushed into a room with an exit sign on it and they were out the door.

Why am I not convinced? If Allied were still here we would not be here tonight. I
2 propose damming it because that is the one true way of getting to the bottom of things. In other words, just put up big barriers and get in there and see what you have. And

then cap it so well that it probably will never leak again. And I think the technology that was here could be developed. If they can with that movie Titanic develop technology for the cameras that went down there, just for a movie, which means nothing, they can surely do this with Onondaga Lake if they really and truly want to.

And they could go back year after year, maybe the first two years after, then two years, leave a space, two years after, two years, three years. They have barriers that they put on highways when they want to work on them, they can use the same type of technology on the lake. I don't believe they can't. Thank you.

0-14 DIRECTOR LYNCH: Les Monostory.

LES MONOSTORY: I am Les Monostory, M-O-N-O-S-T-O-R-Y. I'm president of the Onondaga County Federation of Sportsmen's Clubs, and I represent about 30 clubs and several thousand members of sportsmen who are some of the primary users of the lake in terms of fishing, boating and we have a fair number of duck hunters that also use the lake for hunting purposes.

1 And my concern is about shoreline safety issues. Many of you may not be aware that along the shorelines where Allied had the wastebeds, which really covers basically from Nine Mile Creek all the way to past Onondaga Creek to Ley Creek. There was these wastebeds that leaked calcium sediments into the lake and particularly along the shoreline by the so called white cliffs, which is the area adjacent to the, well the New York State Fair parking areas.

There are areas along the base of those cliffs where if you walk into the water you may fall through a hardened calcitic sediment which has been deposited along those shores.

On November 26th I wrote a memorandum to Honeywell and DEC Region 7 about safety concerns related to Honeywell clean up of Onondaga Lake bottom sediments. I expressed concern over safety issues along the western shoreline related to potential hazards for fishermen or boaters who might try to either wade or land a boat along the Onondaga Lake shore.

Honeywell responded with a letter dated December 17th, in which they described proposed remedial measures specifically for the white cliffs section of Onondaga Lake, which comprise portions of SMU 3 and SMU 4.

With regards to the sediments beneath the white cliffs in SMU 3, Honeywell's letter indicates that the FS, I can't think right now, what does FS stand for? Feasibility Study recommended alternative includes dredging of near-shore sediments followed by capping along much of the shoreline.

Shoreline stabilization would be completed along the remainder of the shoreline in this area. And those areas targeted for dredging and capping, calcitic sediments would be removed. And those are these sort of glass type of sediments that I'm talking about. And the area covered with capping materials comprised of stone, cobble and sand. The thickness and size of these materials will be determined during the design phase.

They continue. "Various techniques would be used for shoreline stabilization, and may include vegetative plantings and brush mattresses. Along those portions of the shoreline that are either exposed to wave energy or more steeply sloped, stone may be placed at the bottom of the slope to stabilize the substrate and prevent erosion of the shoreline treatments. Honeywell believes these techniques will address the potential safety concerns you raised related to calcitic sediments along 2,500 meters of shoreline."

Again, this would be the area roughly from the 690 turn-off to State Fair Grounds to Ninemile Creek. That's approximately about 2,500 meters of distance.

Shoreline Safety Recommendations: In reviewing both the Honeywell and DEC plans for dredging and capping of the shoreline sediments in both SMU 3 and SMU 4, it is clear that specific areas along the shoreline will be dredged and capped from the lakeshore up to depths up to 9 meters. However, the reports are unclear regarding what specific stabilization measures will be completed along the shoreline sediments not specifically targeted for dredging and capping in this area.

2 In order to address the issue of physical safety concerns for anglers or boaters who may try to access the shoreline along the base of the white cliffs, I am recommending that solidified calcitic sediments along the entire 2,500 meters of shoreline at the base of the cliffs be removed to a water depth of one to two meters, and that the entire shoreline be stabilized with capping material composed of stone, cobble or sand to a minimum water depth of 1.5 meters.

The purpose of this additional shoreline stabilization is to provide safe recreational access for shoreline waders, anglers and boaters, who are currently at risk when they try to walk the lake shores at the base of the white cliffs there, due to existing layers of unstable calcium carbonate sediment.

I also have a separate statement which I may present later with regards to a fishery goal statement for Onondaga Lake and tributaries.

0-15 DIRECTOR LYNCH: Dr. Kaczmar.

DR. KACZMAR: S-W-I-A-T-O-S-L-A-V K-A-C-Z-M-A-R. I'm adjunct professor at Syracuse University and I'm chief scientist for O'Brien & Gere engineers. I'm here tonight speaking as an independent scientist. I had the good fortune of a public education. I have been performing risk assessment investigations such as this for over 20 years and teaching others to do the same.

1 I performed an independent review of the remedial investigation in the Feasibility Study for Onondaga Lake. Having reviewed that, I place particular focus on the risk

KACZMAR

assessment itself. Basically what a risk assessment is, it evaluates the chemicals in the system and it puts together a model of hypothetical exposures, and what's known about the toxic impact.

In reviewing this model the assumptions that were incorporated were very conservative, okay. Meaning that they had some very - assumptions that are unrealistic, but for the purposes of over-stating the risks. And the reason they're over-stated is for the purpose of protectiveness, not to try to put down, you know Honeywell caused the problem or whatever. But taking in the worst case, so that the uncertainties that might be inherit in the system, there are many, could be controlled.

Within that context there were some remedial actions taken to address those conservative risks. And it's my independent opinion that the remedies in the Feasibility Study adequately address those risks. And so I believe it's protective, and I believe it's for all practical purposes an appropriate remedy.

2 I'm particularly encouraged by the enhancements that are present. These are the kinds of things that are not required, okay, but really are going to make our community a better place, both on the ecological part in providing an integrated potential for development of the community. I'm very happy to see that and I'm happy to be here. Thank you.

0-16 DIRECTOR LYNCH: Sharon Fulmer.

SHARON FULMER: Thank you. I'm a resident of Liverpool and have been for more than three decades. My family was raised in Liverpool. I have served on two of the Onondaga Lake committees that existed back in the 19 - I don't know '80s and '90s. I see a few people here who were part of that group for the most part. We have all figured it was going to take a long time for something to happen.

1 And to that end I sincerely hope as others have said before me that Honeywell and the DEC can come to an agreement without

requiring long drawn out processes that can see this go forth as quickly as possible.

2 I'd also ask one thing. The last slide you showed today talked about how people can view information about what's been going on at the Syracuse library and DEC and one other place I can't remember what it is. I'd ask that you remember the people who are affected the most by this, those being the people who live in Liverpool, the village and outside the village. And those people who live on this side of the lake as well, and that you provide all those written materials for the Liverpool library, which is open seven days a week and open until 9 o'clock every day. And for the library in Solvay or Camillus, Solvay and Camillus, which probably have some more hours. Thank you.

0-17 THE COURT: Dereth Glance.

DERETH GLANCE: My name is Dereth Glance, I'm a Central New York Program Coordinator for Citizens Campaign for the Environment. CCE is a not-for-profit, non-partisan advocacy organization with over 80,000 members across the State of New York and in coastal Connecticut. We work for the protection of public health and natural environment.

1 CCE understands the challenges to remediate the Onondaga Lake bottom and of the toxic, persistent and bioaccumulative chemicals and metals discharged from industrial polluters are unparalleled. CCE appreciates the efforts of the New York State Department of Environmental Conservation - I'll call you the Department from now on - Honeywell International and the host of stakeholder groups dedicated to improving Onondaga Lake.

CCE plans to submit formal detailed comments for thoughtful review by the Department. Today, because of the time constraints I'll limit my comments to the following recommendations.

2 First, CCE urges the Department to hold additional public hearings in a question answer and format. We're very pleased to

GLANCE

hear about the question and answer that will follow this public comments process, I don't know the time that will be. And so from the turnout tonight it looks like we can really stand to have another public hearing in February. I understand there are several folks in the community that have been very involved in the process and were unable to make it today due to a variety of different conflicts.

Specifically we would like to have the additional public hearing to be held in the question and answer format so that we can inspire more and more questions from the community to thoroughly ask some good questions about the plan.

3 Secondly, we believe that CCE - we believe that the Department should provide ample opportunity for public involvement during the design phase. CCE understands that some of the most important decisions to be made regarding the Onondaga Lake bottom clean up are currently scheduled to occur during the design phase. These key

GLANCE

decisions currently include determining the appropriate Sediment Containment Area or the SCA, identifying the appropriate method of effluent treatment, in determining the long term monitoring requirements.

CCE believes these issues and others raised by this project will impact the local community and that the design phase needs to be transparent and accessible to the public. To this end, CCE recommends that the Department establish a Citizens Advisory Committee or CAC. The Citizens Advisory Committee should advise, provide guidance and support the Onondaga Lake remediation efforts.

CAC members would meet on a regular, perhaps monthly basis, to review plan implementation, provide input on design phase decisions, and receive reports on Onondaga Lake remediation progress and challenges. The CAC should consist of members representing the Onondaga Nation, scientists, environmentalists, local environmental officials and concerned citizens. Such CACs are well established throughout New York State and the nation and have been beneficial to government agencies, stakeholder organizations and the general public.

4 Finally, CCE believes that the Department should require public education as part of the Onondaga Lake bottom remediation efforts. CCE is concerned that the Proposed Plan, including the three preliminary remediation goals or the PRGs do not include a public education component to inform the public about the risks of our changing local waterbody.

CCE believes Onondaga Lake remediation discussions and actions need to be part of a coordinated public education effort that will inform individuals about the safety of using the lake for common recreational activities such as fishing, consuming fish, wading, swimming and boating.

Specifically, CCE is concerned about the PRG 2 or the Biological Tissue Goal, which is to achieve pollutant concentrations, to the extent practicable in fish tissue that are protective of humans and wildlife that consume fish.

The extensive mercury contamination in Onondaga Lake warrants aggressive public education efforts concerning fish consumption CCE understands that this is a long term goal, and that the public education and outreach efforts about the risks to human health from consuming Onondaga Lake fish needs to be a critical part of the remediation plan to protect public health. Thank you.

0-18 DIRECTOR LYNCH: Don Hughes.

DON HUGHES: Thank you, my name is Don Hughes, H-U-G-H-E-S. I've served as technical adviser to Atlantic States Legal Founda-Tion, and I'm a resident of the city of Syracuse since 1985, I believe. I'm going to talk, going to add to Sam Sage's comments earlier, but talk more about some of the technical issues concerning the remediation.

1 First of all, people should know that the remediation depends very heavily on the

HUGHES

viability of the slurry wall. This is an intermediate, interim remedial measure which is to be placed along the western shore in the corner of the lake, it's a mile and-a-half long. And it will hopefully cut off the movement of non-aqueous phase liquids from entering the lake. This has got to work for this whole plan to work. If it don't work we're going to be in trouble.

It has the cap, which is to be placed over the in-lake deposit is designed on a groundwater flow of 6 centimeters per year, the existing groundwater flow is about 200. So the slurry wall has got to reduce it, has got to cut off the groundwater, and you have to pump that groundwater into a treatment system. Okay, so that's a big concern.

2 Another concern I've got it has to do with what we're doing with the sediments. The sediments are going to be pumped up to the wastebeds, wastebed number 13 has been tentatively selected and I would ask why that one? It would seem that treatment has not really been considered to any extent

except to the most cursory level.

The contamination in the sediment is concentrated in these tarry deposits which are a non-aqueous phase. And these things are dispersed throughout a matrix of calcium based waste which is the Solvay waste, which is the white, the same stuff that's the white cliffs. And it's probably a fairly easy task to separate those two things. This is, you can use mining technology to separate things which have different sizes and different densities, and it's cheap.

It's been demonstrated on contaminated sediments in Saginaw Harbor, Saginaw Bay. And I was part of that investigation and it does work. And I think that the Department and Honeywell should look extensively into that, because that's a way to take the toxicity out of the sediments. And that is a primary goal of Superfund is to significantly and permanently reduce toxicity.

3 Another big issue is once you get the sediments onto the wastebeds what about volatile emissions? The sediments contain a

whole host of volatile chemicals, including benzene, toluene, chlorobenzene, dichlorobenzenes, xylenes and so forth. These things don't only smell bad, they are toxic. And we don't want to expose either residents or workers to this stuff. So we've got to have a good control system on odors, on emissions.

4 Another issue has to do with the deep waters of the lake. Now the plan really focuses on the littoral zone, the shallow waters of the lake, the profundal zone, which is the deep waters, is - well, it's kind of left in the lurch. It's - the plan really lacks a plan other than wait and see. That's what monitored natural recovery is.

The concentration of mercury will be monitored in surface sediments over time, over 10 years. And this is somehow going to be modeled using a program called STELA. STELA is a generic program for which any number of parameters and inputs can be specified. Right now we're kind of lacking basic inputs as to what's going to go into that.

And there is a lot of issues having to do with disturbance of the sediments and how the STELLA is going to successfully model the sediments. You've got groundwater moving upward into the sediments. There is a release of gas bubbles called ebullition, because there's been so much organic matter deposited in the bottom. And once the lake becomes more hospitable in the bottom waters, hopefully that's going to happen, now that Metro is being upgraded, we're going to see more fish and macro-invertebrates living in the bottom waters, which means more disturbance, more bioturbation of those sediments.

And based on the comments of Mr. Freedman we might see some boat anchors to worry about as well. So the profundal zone is a big big question mark. I would tend to characterize this whole remedial action as Part 1, the littoral zone. And Part 2 is the profundal zone, that will come later.

Finally I've got a generic comment

5 how the decision-making process goes. All three of the preliminary remediation goals and all five remedial action objectives are qualified by the phrase "to the extent practical." This type of language is typical in the Feasibility Study. But who decides what is practical and how will the public learn of and participate in these decisions?

How useful is the public -- how useful to the public is a goal that is achieved based on an undefined assessment of practicability? Is a qualified goal a real goal? Shouldn't goals and objectives be transparent, achievable and measurable?

Why not define what clean up levels are technically practicable given the very best model cutting edge remediation technologies fully justifying and documenting the determination to the public, and make those the achievable and measurable goals. Thanks.

0-19 DIRECTOR LYNCH: Sara Eckel. Sara Eckel here?

SARAH ECKEL: E-C-K-E-L, S-A-R-A-H. I

1 have seen the proposed plan to use existing wastebeds to contain the various sediment. And my concern evolves around the fact it will not include a comprehensive clean up of these existing wastebeds. While I understand the cost-effectiveness of the already contaminated areas I do not believe the plan should ignore the future problems that could result from leaving these areas untreated. I also understand the need to move this plan forward and I believe it should be done with future generations in mind.

0-20 DIRECTOR LYNCH: Steve Effler.

STEVE EFFLER: E-F-F-L-E-R. I am director of research of the Upstate Freshwater Institute, a not-for-profit research organization, and it's involved in the research study of a number of fresh water systems throughout New York State.

I've spent the larger part of my professional life studying Onondaga Lake. Some people do Lake Tahoe, some people do Lake Erie -- well someone had to do it I guess.

EFFLER

Anyway, the Institute over the last 20 some odd years has published more than 200 articles in the peer reviewed literature, and we're quite proud of the fact that one of those articles entitled The Impact of the Chlor-alkali Plan in Onondaga Lake and Adjoining Systems was actually the primary technical basis for the provisional lawsuit that has led to this cleanup.

As I said, we're involved in the research of a number of systems and have in the last decade led the development of water quality models for the New York City reservoir system.

Let's get down to where we stand based upon our review of much of the available documents with regards to cleanup of the Honeywell site. We enthusiastically endorse the proposed rehabilitation efforts for the site that include removal of toxic sediments, capping of sediments, and improvement of degraded habitat. We endorse proceeding without undue delay. Let's get on with it, we have all waited a long time. With the following caveats, of course.

2 There is a continuing review process. EPA will be involved in continuing technical review. There are portions of these documents that frankly fall outside of our expertise. And also we understand the way this process works, if indeed we find new sources of contaminant problems in the future during clean up those items would also be addressed.

3 All those nice things said, and by the way all the hard work that I know has gone into this, those efforts certainly should be applauded. All that said however, we have great concern with the lack of understanding of the behavior of contaminants from the Honeywell site within the lake itself. This is - we don't fault any of the agencies or organizations involved, to our way of thinking this is largely attributable to the constraints embedded in the Superfund process. It's simply a very difficult arena to get some of the basic scientific information that I think we still need.

EFFLER

Why should the community care about this esoteric stuff? Well, because neither Honeywell or the state can really tell us how much better the lake will be following execution of these rehabilitation programs. Meaning, they cannot answer the question quantitatively at least, how much lower will fish mercury concentrations be following these programs? Think about that. And that's not just mercury, the other contaminants also.

We have every reason to expect, as they have argued, things will be better. But at this point don't you think we ought to know how much better? And basically this comes down to the what's lacking is a credible scientific mathematical model that can predict responses in the lake to these and other management actions. There was originally a mathematical modeling element in the Superfund work, particularly related to mercury. But these efforts had to be dropped.

While we support moving ahead with clean up actions without a model - I'll say that again. We do support moving ahead with clean up actions without a model, this limitation should be eliminated in the future. We need those tools, we need that level of understanding. As Charlie Driscoll from Syracuse University was recently quoted, "If you understand the system you can model it."

So where we are is, while we expect things to get better and indeed so do I, I think we want to know it a little better than that.

Further, UFI recommends that this model be developed and tested outside of the Superfund process. Simply put, the process by the way it is set up it is simply not the arena to get this level of understanding. The kinds of questions or information such a tool gives is, it allows us to evaluate the feasibility of reaching various goals, certain levels of contamination in fish flesh, it will help us establish reasonable expectations for the lake in response to rehabilitation efforts. How much better will it get? And allow and support quantitative evaluation of management alternatives. And could contribute to future parts of a management program.

4 Lastly, we support the comments of a number of previous speakers with regards to the monitoring program. The monitoring program is extremely important, particularly for the adopted build and measure approach that relies primarily upon monitoring information before and after implementation.

This needs to start ASAP. We really don't have, from what's been done so far, adequate monitoring data to be able to assess how much better things are going to be following implementation. This needs to be designed and implemented so that it can also support the modeling program. It needs to be flexible to allow changes in response to observations, it needs to be flexible, right.

In other words when we see certain behavior we need to make changes. And that's very difficult within the Superfund process. And we believe that this data needs to be available to the public soon after collection as well as other experts. Thank you very much for your time.

0-21 DIRECTOR LYNCH: Nancy Ciampi.

NANCY CIAMPI: Thanks, Ken. Nancy C-I-A-M-P-I. I'm a town of Geddes resident. And I just want to say thank you, express my appreciation to the DEC, to Honeywell, Earth Tech, for the sessions that were held in the Town of Geddes December 9th, and the two sessions in January, as well as tonight. And hope that they continue.

1 My comment is that I feel these sessions are very important to the success of the plan and that the public needs to know that there will be well publicized open and honest public meetings to get frequent status updates and share their concern.

0-22 DIRECTOR LYNCH: Peter Pedemonti.

PETER PEDEMONTI: P-E-D-E-M-O-N-T-I. I

1 just like to say I would like to see the most thorough and complete clean up of the

lake regardless of time or cost. Just because when put into the context of our responsibility to future generations, the Onondaga Nation, wildlife and the lake itself, it means a little less. So thank you for the opportunity to comment.

0-23 DIRECTOR LYNCH: David Arnold.

DAVID ARNOLD: My name is Dave Arnold, A-R-N-O-L-D. I'm a life long resident of Onondaga County, Town of Clay. And I am a farmer. My farm is located on Route 57, just north of Moyers Corners almost to Three Rivers.

1 Two years ago on January 15th, 2003, I stood in front of you and spoke against issuing Evergreen Recycling a permit to operate in the Town of Clay. Along with 500 others we spoke our minds and collectively convinced you this was not a good idea, even though the Clay officials did. During this meeting I spoke about illegal acts committed by our elected officials. Since that time our representatives have rewarded those acts by issuing more than $2.5 million in grants

on projects involving a fraudulent contract at Three Rivers Point.

The Onondaga Lake Cleanup Project is much larger than the projects involved in Clay. The Clay Brownfield clean up project at Three Rivers could easily surpass $50 million if the land is cleaned up the way it should be.

If we can't even start a project in Clay without corruption and fraud at the $50 million level, how in the world can Onondaga Lake Cleanup Project succeed? A half a billion dollars in this town is a big chunk of change. We need someone at the county level that we can trust to take charge and appoint public committees of oversight that will independently scrutinize all phases of these projects. We must all take responsibility for neglecting Onondaga Lake and Three Rivers Point. Yes, the perpetrators will pay a large price, but we will pay an even higher one if we don't succeed.

On September 10, 2004, I contacted the Attorney General's office. It is my hope that Mr. Spitzer will investigate and prosecute all those involved in corruption and fraud in Onondaga County, so we can then proceed with confidence on these extremely important environmental projects.

We are fortunate in this country to be able to criticize those who represent us. What is unfortunate is when they refuse to listen. Thank you.

0-24 DIRECTOR LYNCH: Sherry Mossotti.

SHERRY MOSSOTTI: Thank you. Hello, Ken. Sherry M-O-S-S-O-T-T-I. I'm here to speak 1 as a citizen and a taxpayer of Onondaga County. I am a life long resident of this county. For over 23 years I have driven by Onondaga Lake and thought what a shame. I've traveled all over the world, and it doesn't take someone to travel to know the importance of a lake on a community. This is an opportunity, folks.

In my position as executive director of the Premier Community Leadership Program in this community that trains and educates our community's leaders which include 600 adults

MOSSOTTI

and 300 youth leaders, we have had the opportunity to hear about the history of the lake from a historian, what's in the lake from the scientists and biologists, the engineers, the methodologies for clean up, and also the economic potential of Onondaga Lake. Onondaga Lake clean up is a topic that continually comes up among our community leaders that we train every single year.

We have met with Honeywell, we have met with the DEC, and we have reviewed all of the proposed plans. I have discussed this with Ken Lynch, Neil Murphy, who is the head of SUNY ESF, numerous scientists, engineers and residents both adult and youth. And it was great to see some young people come up and speak this evening.

On behalf of Leadership Greater Syracuse we applaud Honeywell, the DEC, the county, the city, O'Brien and Gere, and all the interested parties for coming together to the table. And we ask you, no, we implore you, on behalf of our community, our wildlife, our children and our grandchildren, to continue to come together and work at the table and move this project forward to find a resolution that we can all be proud of for years to come for our children and our grandchildren. Thank you.

0-25 DIRECTOR LYNCH: Terry Brown.

TERRY BROWN: Thank you. I have to be honest I'm a little conflicted here this evening, didn't know whether I was going to say anything. But I'll get unconflicted at the end of my comments here. My name is Terry Brown, I'm am chairman/CEO of O'Brien & Gere, it's an engineering and construction firm headquartered in Syracuse, New York. And I have lived in Syracuse all my life. I raised my family, and I've been with O'Brien & Gere nearly 30 years.

I spent my first six years of my career with O'Brien & Gere making or building the third Metro wastewater treatment facility. It's now in its fourth construction. In 1974 that was supposed to clean up the lake, if people go back and look at the newspaper

BROWN

articles.

I really have a passion for the community, a passion for this lake. And I have really more so a passion of the opportunity we have as a community in front of us.

As an organization, O'Brien & Gere, we're in our 60th year. Our founder, Earl O'Brien, graduated from Solvay high school in 1913. So we have a presence in this community. We pride ourselves in offering cost effective environmental solutions for our clients and municipalities we serve. Solutions which on sites, environmentally impacted, they protect the environment for future generations. That's kind of the background.

1 As I started listening to some of this thing, I've attended these information hearings and I have spent a lot of time in the last, I spent 18 months looking at the sites and what they could be, trying to develop a vision with a couple of my colleagues on our own time. And the vision

BROWN

that we can create as community for the sites and the lake is just unbelievable.

We really are at a crossroads in this community as to what we can do. And the thing we talk about, and I'm an engineer, which is much different from a scientist, I'm a doer. And I was trained, some of my training was in military. The one thing I was trained to get was the information, as much as you can, in your gut, you know what's ahead and there is tough times ahead of you but you manage the situation and go.

And we can talk about modeling, and all this other thing that we've talked about but there is a point in time where we have to go. And I'm sorry, we have made this so confusing for the public, modeling and the science. This is not. And I beg forgiveness from some of my scientific colleagues, this is not rocket science. We don't need to make it difficult for this community to understand.

We have enough information and to go with the information we have, to have an

BROWN

effective clean up in this community and create a vision. But we have to have a sense of urgency. That's what I want to stress, this is not necessarily the DEC but the people that are commenting and running comments in the future.

We have, I have worked on sites for 25 years. We've had numerous corporations, we'll buy out a site, different philosophy, different management team come in. We have an organization willing to invest in this community now and take action. That could change tomorrow. We can't let this slip by us.

And when I say acting, take the information that we have, I could give you a resume of hundreds and thousands of environmental sites. And we just had some information, we knew what the science was, we didn't have all the answers but we went out there and cleaned it up. And to my knowledge O'Brien & Gere was never cited for any environmental citation, our reputation is flawless in the nation. We have worked with DEC and some of the gentlemen sitting here on numerous occasions. We didn't have a lot of information, but we had enough science, we knew what the conditions were and we managed it.

2 So my comment really to this group here is we have to have a sense of urgency. We have to make the science simpler. We can do the modeling as we go along. We'll learn more by doing and addressing the issues as we take on the environmental remediation than we will ever learn in the modeling process. And we'll have better models in the future. But we have to move on.

A very wise gentleman said to me this afternoon, who we all respect in this community, he said, we have an opportunity and we've got to make it right. But we also have to move and we have to move with urgency so we don't lose this opportunity. Thank you.

DIRECTOR LYNCH: Those are all the people that signed up to speak. Is there anyone else who wants to speak for the record other than a question and answer period? Les?

0-26 **LES MONOSTORY:** I'm speaking now on behalf, well as a co-chair of the Fisheries Subcommittee of the Onondaga Lake Partnership, also vice-president of the Central New York Chapter of the Izaak Walton League. And I'm going to talk about a fishery goal statement for Onondaga Lake and tributaries.

1 "It is difficult to evaluate the restoration plan for Onondaga Lake without first reaching a community consensus on the restoration goals and objectives for Onondaga Lake and it's major tributaries." This is a memo that I wrote to the Outreach Committee on October 27th, and also addressed to the committee chairman, who is Seth Ausubel with the US EPA.

"On November 10, the Fisheries Subcommittee meetings included a discussion on fisheries goals and objectives for Onondaga Lake. Comments include the following:

MONOSTORY

Participants at the first Onondaga Lake Fisheries Roundtable agreed that we want to improve what fisheries we already have.

Onondaga Lake and it's principal tributaries can be promoted as a combination cold-water and warm-water fishery.

The Fisheries Subcommittee members agreed that as a future fisheries goal, Onondaga Lake should be clean enough to support both warm-water and cold-water fish species, including trout and Atlantic salmon.

On November 17th I received an e-mail from Dave Lemon, an aquatic biologist with DEC in Cortland. Lemon is a member of the subcommittee but was not able to attend the November 10th meeting. He had the following comments:

Reading over the November 10 meeting minutes I just wanted to provide some comments regarding the desire for creating a cold-water fishery on Onondaga Lake." We're getting a little technical here but this is - Lemon makes some interesting points.

MONOSTORY

"We in the Region 7 Fisheries Office do not feel that reestablishing a self-sustaining population of trout and Atlantic salmon in Onondaga Lake is a realistic goal. I'm not sure if this is the objective of the group or not." Referring to our fisheries subcommittee.

2 "I've attached a draft position statement to EPA, which provides some facts on the life histories of the Cisco," the former white fish "and Atlantic salmon as well as current and expected conditions in the lake. Based on this we don't believe that self-sustaining salmonid population are a realistic objective in the foreseeable future.

As such we feel that the realistic objective for the lake's fish community is a combination of cool-water walleye, perch, pike, and warm-water bass, bluegill, etcetera, species. We certainly would be happy if lake conditions improve enough so that year-round habitat for trout survival exists, but for the foreseeable future that scenario is unlikely.

3 The Region 7 Fisheries Office has prepared a draft position statement to EPA entitled 'Coldwater Fisheries Rehabilitation and Management in the Onondaga Lake Watershed,' also known as the Fishery White Paper, which was prepared in July of last year. In addition to providing background information on lake water conditions and environmental requirements for various fish species, the White Paper recommends adoption of a fishery goal statement for Onondaga Lake."

A specific Goal Statement for the lake is presented as follows. "In the long term the Onondaga Lake Partnership supports the achievement of a suitable year-round habitat for a sustainable warm-water and cool-water fishery in the lake and conditions conducive for transient cold-water species in the lake and resident cold-water species in the lake tributaries."

As co-chairman of the Partnership's Outreach Committee's Fishery Subcommittee I endorse the fisheries goal statement contained in the DEC's Fishery White Paper and recommend adoption of this goal by the Onondaga Lake Partnership and its member agencies. This I think will help us at least in terms of what we would like to achieve as a fisheries goal and as a lifetime fisherman and, you know, as president of the Sportsmen's Federation I think - I happen to agree with the DEC's Fisheries goal for the lake.

0-27 DIRECTOR LYNCH: Anyone else like to speak? Bob?

BOB NUNES. My name is Bob Nunes, N-U-N-E-S, I'm the EPA project manager for the Onondaga Lake NPL site and I just wanted to briefly elaborate on what Ken said
1 briefly in the presentation about EPA's role and what process it's following now with regards to this Proposed Plan.

EPA's role for the Onondaga Lake Superfund site has been to act as a support agency to DEC. In this capacity EPA has provided approximately $18.7 million to the

State of New York under a cooperative agreement. And this funding has supported the performance of investigation activities, coordination and tracking of site-wide remediation activities, development of a comprehensive enforcement program, implementation of a site-wide citizen participation program, creation and maintenance of a site-wide database and project management activities.

EPA has also provided technical supports to DEC related to the investigation and clean up of the Onondaga Lake subsites. For the Onondaga Lake bottom subsite EPA provided technical support during the rewrite of the remedial investigation and review of the Feasibility Study report.

2 EPA will offer a position on the preferred remedy after the Proposed Plan and other project documents have been reviewed by EPA's National Remedy Review Board and EPA's Office of Superfund Remediation and Technology Innovation Sediments Team. (Microphone emitting noises) I thought it

NUNES

was the acronyms that were causing the problem.

The National Remedy Review Board is an EPA peer review group composed of technical and policy experts that review all proposed Superfund clean up decisions that meet certain cost-based or other review criteria to ensure that the proposed decisions are consistent with the Superfund law, regulations and guidance.

EPA Sediment Team offers consultation to assist risk managers in making scientifically sound and nationally consistent risk management decisions at contaminated sediment sites. The Board and Sediment Team will provide feedback to EPA Region 2 and a summary of the Review Boards and Sediment Teams comments and responses from the Region will be included in the responsiveness summary in the Record of Decision. Thank you.

DIRECTOR LYNCH: Anyone else? I want to thank everyone for some great comments. What we're going to do right now is take a very short five minute break, allow our stenographer (court reporter) to rest his hands and everyone to stretch a little bit. But we're going to try to start again real quickly with a question and answer period in about five minutes.

(Brief recess then Q&A period).

DIRECTOR LYNCH: Please don't be afraid to move up closer to us. Okay we're going to reconvene with the question and answer session. I apologize to all of you out there that have been sitting, dying to ask questions. As you can see we had a lot of people sign up for official public comments so we had to take those first. And hopefully we can answer all your questions tonight that you've been waiting to ask.

I will be attempting to answer some of those questions but not being an engineer or scientist myself I'm going to rely on my experts which are in the first two rows here. So please be patient with us so that we can identify the appropriate person amongst us to answer your particular question.

Q&A

I will ask a couple things. Try to ask only one or two questions at a time so I can get around the room and at least give everybody an opportunity to ask questions. We're going to try to go as long as possible. We'll also likely stick around to talk one-on-one with you if you want to ask your questions in that form.

We would also ask that if you have an especially technical question, and being a complex cleanup there are a lot of technical issues and questions, we will try to briefly respond to that. But we may ask that you stick around or talk to one of our experts outside on that particular interest so we don't consume everybody else's time and take up the opportunity for some other questions. So what I'm going to do is kind of open up to raise your hand and I'm going to ask Dawn, we'll start in the front and Dawn kind of work back with the microphone so she's not jumping all over the place.

Questions. You're going to have to start in the back Dawn. Also state your name for the record because this is also going to be recorded. This question and answer will be part of our response and summary as well as a response to all the comments that were made earlier .

BARRY RAICHLIN: Has there been any other searches all over the world with any other ways to do this than what we have, just plain on dredging like your swimming pool? Has there been any other things? With all the engineering we have in the world why haven't we looked into somewhere else that might have a better idea than we have? We're looking for Number 4, not Number 1. Get this done. Either you do it all, do it right or don't even bother because mother nature is doing a great job so far.

DIRECTOR LYNCH: The Feasibility Study that was an assessment of all the alternatives requires Honeywell to go and look at other technology out there other than just dredging. And although the Feasibility Study concentrates on dredging and capping alternatives Honeywell wasn't required to look at some other technical expertise around the country and around the world. And I'm not aware of any specific one that they looked at or one that they found would address a mercury and a sediments issue.

But they did look at, one of the things they looked at, as you said, leave it alone. They did look at the option of leaving it alone. And it was simply as a Department we didn't feel that that lake would heal itself in an acceptable time frame. It would leave open the environment, the fish, humans accessible to contaminants for a very long period of time before it was covered up.

BARRY RAICHLIN: Well, this is the fox in the hen house deal. As long as the little dinky fox is there we're going to have the same problem. I won't live long enough but the problem is going to be there unless we get everything out of there. We stop all the pollution and, you know, all the arteries going into the lake, it's never going to stop. This is just providing jobs for everybody, engineering, everything else. It's not the solution. You've got to cut the BS, you've got to get it all out of there or don't do anything.

You can damn it or whatever, you get right down to the bottom all the way around the lake, you won't have to worry about it anymore once you got them in jail, the crook, right? If you don't do that it's just going to keep going on and on.

I've been here 60 some years, if you don't straighten it out now it's never - if you don't do it completely it's never going to stop.

DIRECTOR LYNCH: We understand it's very important to address it now and we think we have a pretty good plan to do that.

BARRY RAICHLIN: Thank you very much.

DIRECTOR LYNCH: Thank you. In the back.

TOM RHOADS: My name is Tom Rhoads, R-H-O-A-D-S, and I was wondering about the sediment containment areas. I'm sorry I missed the first part but it seems like there is an awful lot of dredge spoils that are going to be moved in this project and I was wondering if there were going to be further public hearings or further discussion on the transport of those sediments, the dredge spoils and the containment system for the Sediment Containment Area and the capping enclosure of that so the sediments are not remobilized later on into the lake.

And I was wondering if there would be future public hearings on sort of that portion of the cleanup. This was primarily about the lake itself. Thank you.

DIRECTOR LYNCH: Excellent question. First the sediments have two options, two routes. They could go to a permitted facility or the less contaminated sediments right now are proposed to go somewhere on the wastebeds. That is a pretty general proposal in the plan. It is not defined and we admittedly will say that there is a lot of design work that needs to go into any sediment containment area on the wastebeds or anywhere else before it's built.

We do have the very basic requirements that a liner be placed for such a structure that thereby a leachate collection system and that leachate be treated. We will not permit or allow any sediment containment area unless we are convinced that it's stable and can adequately withhold the sediments that are put in that area.

We will be reviewing any proposals during the design phase. I will expect and I have had a meeting with the Town of Camillus, some of the residents that live near that area, that we will be coming back to the public to discuss any specific proposals that are made for disposal on those wastebeds. And that will likely also involve a public meeting for anyone interested in the specifics of that proposal.

Other questions?

JIM RHEA: Jim Rhea, R-H-E-A, life-long resident of Onondaga County. And I just have a clarifying question hopefully. In your presentation earlier you talked about the two different options, the one that

Honeywell had advanced and then the one that the state advanced in their plan. And there is a big difference there in terms of total volume that is going to be removed as well as total cost.

We heard some comments earlier about urgency and the need to work together and cooperatively. I wonder if you can comment, maybe clarify for everyone here what is the difference between those two in terms of actual volume and then maybe actual risk reduction. Because I assume that those differences need to be related to risk.

DIRECTOR LYNCH: You hit the major difference. Conceptually the two plans are very similar in that they both divide the lake into eight specific sections and develop a cap and dredge proposal for each of those sections.

The biggest difference in the - between the two plans is the amount to be dredged and the amount of capping that's placed. And the Department's position is, we took a very much more conservative view as the amount of material that needs to come out, the contaminated material that needs to come out, partially based on a risk assessment.

And also a little more conservative view of the depth of a cap that actually needs to be placed in the water to be protective. There are some other differences and these guys can probably add to that if you want to hear more about the differences between the two plans.

But the significant differences is the amount to be dredged. I think it was a half a million cubic yards in the Honeywell proposal and 2.7 for the DEC proposal.

DAVE ARNOLD: Dave Arnold, I spoke earlier. I guess what I'd like to do is just clarify, Mr. Lynch. In the beginning I said that I attended a hearing on Evergreen Recycling in the Town of Clay. And I would just like to I guess have some reassuring that you're not going to dump the bottom of Onondaga Lake on top of the Town of Clay on Woodward Industrial Park.

DIRECTOR LYNCH: There is no proposal to

do that, Mr. Arnold.

BARRY RAICHLIN: Why not?

DIRECTOR LYNCH: Any other questions?

RALPH MARTONE: I live over here in the city. I would like them to just expand on the toxic mercury methane and what is the possibility of, you know, health, once they start to dredge.

DIRECTOR LYNCH: During the dredging activities itself? You mean the extent to which mercury will be stirred up?

Q. (Martone) Right. I heard a new term to me, mercury methane?

A. (Lynch) Mercury methylation.

Q. Yes, what type of threat is that to the public health?

DIRECTOR LYNCH: I'm going to draw on one of my experts on this one to answer. Who can answer in very general terms. If we can explain mercury methylation and the potential impact from mercury during the dredging activities.

A. **(Bob Edwards)** I think I'm loud enough. I volunteered to answer your question. I work with the DEC and I've been involved in many or several anyway, dredging projects across the state. I was project manager of one big one up in Lake Champlain. And there are a number of controls, engineering controls that take place in the lake while we're dredging that would not expose any of the public to any mercury or any other contaminants that's in the soil or in the sediments.

Once that material is pumped up to the treatment system and the containment cell there will be controls up there to minimize odors, and there won't be any opportunity for this material to spill outside of the work zone. I mean that's one of the reasons these designs are so long is we have to cross every t and dot every i on the engineering aspects of it before we do start.

I know many people spoke to me today about how I remember they dredged down in Jamaica Bay or when they dredged the canal out and they just sprayed the stuff everywhere. That's a different type of dredging than environmental dredging. And actually the days of just spraying it up and the odors being uncontrolled are long gone. The public will not allow that to happen and we will not allow it to happen as DEC.

So I don't know if you were here for the availability section, but there is a lot of different things we can do to control odors and prevent releases of chemicals and exposures to the public and to workers.

One thing - at any of these jobs all workers are required to be trained in health and safety. There is many courses we have to take, there is many different protective clothing and respirators and stuff that we wear. So human safety, public safety, worker safety, those are paramount to any of these jobs. And all those controls and all those provisions are taken up in the design so that before any of this work starts we've addressed all these concerns.

Q. My question really is the hazard of mercury, this mercury evaporating, can that get into the atmosphere and surrounding areas or not? Is that possible or not?

A. Not during the dredging process because it will all be under water. It won't come up. How environmental dredging - or how hydraulic dredging works is a large amount of water is moved with the sediment. It's a giant pump on a boat, is essentially what it is.

Q. Slurry dredger?

A. It will slurry the material and pump it so there is no opportunity during the dredging process for that material to come to the surface, to the air. First time that material will be in the atmosphere would be at the treatment facility. And at that point there is other controls that can be taken to prevent exposure there.

RALPH MARTONE: Thank you.

HENRI HAMEL: I can probably be loud enough too. My name is Henri Hamel, I work for the State Health Department in Syracuse, and fairly familiar with the Onondaga Lake problems because I was a SUNY ESF student a long long time ago. I don't want to say how long.

Under current conditions the only risk or the primary risk that we've seen from the lake would be to people who are consuming fish. And as far as mercury getting into the atmosphere from the lake, that's not quite the way it works here. The mercury that we're worried about is mostly tied up in the sediments in the bottom of the lake where it was deposited. So you're not taking any hazards or any exposure from mercury just under the current conditions by living near the lake or walking around the perimeter or anything like that.

Now when we do start dredging, as Bob said, the dredging operation is under water, so we're not expecting that we're going to have any mercury exposure coming up. The sediments will be transported by pipe to the containment facility, and at that point we'll be trying to design systems then that will prevent anyone from being exposed to any volatilization of mercury or any of the other chemicals that we're going to be removing.

Now part of our operations at the lake front and also at the containment facility will be some health and safety monitoring for the workers. But we also mandate, the State Health Department requires that these projects have community monitoring programs. And we have instruments that can detect volatile organic chemicals, we also have instruments that can detect mercury.

So there will be monitoring to prevent any exposure to the public. And provisions that -- of what we would call action levels. And if we detect something with our instruments that is approaching a level that, it's a conservative level that means that somebody is going to be exposed then we have contingencies to shut down the project, do something differently, design a different system.

So we are very concerned about exposures to the public. We want to do this project to minimize that. And that's part of the design too. And we will be back talking about the design.

JEFFREY FREEDMAN: I just wonder if the folks from Honeywell would care to comment on their basis for believing that their Proposed Plan would bring the Onondaga Lake into compliance with the Clean Water Act. We've heard from the DEC and I think the public would like to hear from Honeywell if they would care to comment as well.

DIRECTOR LYNCH: This is a DEC meeting and I don't want to turn it into a Honeywell/DEC debate. I know the Honeywell people very well and if they're willing to speak they can or if they're willing to talk to you later, which I'm sure they would, outside to talk about this.

I know Honeywell has obligations and requirements under the Superfund process so I respect their position. If they want to maybe talk outside with you to explain the difference and their thoughts on their plan. And I see them shaking their head out there. So I think they would like to meet you after the meeting and talk to you.

BARRY RAICHLIN: You know, I was wondering she says they're going to develop means to process the waste. What do you mean they're going to develop it? Don't they know how to do it yet? Does all that water that's going to be pumped over there - what are they going to do with that, is that going to go back into Onondaga Lake like Skaneateles Lake water? Is it going to be sitting there and have to dry out for ten or fifteen years like the rest of that mess over there had to do? Why aren't we taking it to Wyoming or Buffalo or some other place. Why do we have to put it in our own back yard? That doesn't make any sense. Are there any other alternatives like railroads that we still have? You know, why can't we do that, why do we have to put it in our own back yard? Come on.

DIRECTOR LYNCH: Again, part of the Feasibility Study looked at those, specifically railroad, truck, transportation to facilities not only in New York State but out of state. This is one, another thing that they looked at was the feasibility of putting it nearby on the wastebeds where deposits have been placed before.

BARRY RAICHLIN: And it stunk.

DIRECTOR LYNCH: And the Department has agreed to assess that proposal. And if they can specifically design it, we know that they can dredge and place it in an area and contain the water and treat the water before it is discharged back to the lake.

They can dredge an environmentally safe manner and control the dredge spoils. It's been done before. We're very familiar with the basics of that operation. However, this is specific to Onondaga Lake. We have more contaminants, we have a lot of different contaminants, we have a unique area in the wastebeds.

So that's why we have to look at the details that Henri talked about and design something that will be safe to the environment. And if they can demonstrate that it will be safe to the environment it's something that we will consider in this area.

Q. (Raichlin) How do they take the water out of all those sediments and not ruin the whole area? She said they have to design something. Don't they know how to do it yet? That's scary.

A. (Lynch) I think they know how to dewater sediments. But specifically up on the wastebeds for this amount of sediment and the type of water that you're going to be taking out of those sediments you have to design specific parameters to demonstrate that it will be an effective ratio.

Q. So you're going to put it on top of the pads we already have there?

A. The wastebeds you're saying?

Q. Right.

A. That is one of the proposals. And one of the most likely or the wastebed that they're looking at first is Wastebed 13. And part of that reason is because that's one that was not entirely filled up. And there is some area that needs to be filled.

But again, there is a lot of detail to

be worked out regarding stability, controlling the water and the runoff, treating the water and containing the sediments. And --

Q. Why couldn't you go over across on the Thruway across from the service area over there. There is a big area over there that they're trying to ruin right now.

A. There is a lot of different areas you can look at but there is ownership issues, there is accessibility issues and there is a whole host of other things. But they did look at a wide range of disposal of sediments from the dredging activities and this is the one that we're going to focus on first in the Proposed Plan.

Q. They ought to have more public input than they have had so far. Make a lot more people have input.

A. As that plan is developed we will.

DORIE KRAEBEL: My name is Dorie Kraebel. K-R-A-E-B-E-L. I was just wondering, I was looking at the charts earlier and it looked like you were doing the option four or around there. And I was wondering how you decided to stop there. I was looking at the other charts, it seemed maybe that wasn't quite deep enough or far enough into the lake to get everything. So I mean I was wondering if it was like financial or just physically unable to do it or what the reason was for stopping there?

DIRECTOR LYNCH: The short answer is that the number one factor that we considered in any of the remedies is that it has to be protective of human health and the environment. And there are a number of remedies that had the potential of being protective of human health and the environment. But as you went up to different levels you would see that others are much more protective and less risky.

We basically did a risk assessment and determination that our proposed remedy, which is kind of a mix of the 14 outlined in the Feasibility Study. But our proposed remedy was the adequate remedy for both a feasibility standpoint, whether it actually can and will be implemented and most importantly from an environmentally sound standpoint.

DORIE KRAEBEL: Thank you.

DAVE CHAPMAN: I was just curious in the design phase if there is going to be any room for pilot projects to look at proprietary technology that could assist. One of our lab tests showed that we were able to stop wastebed B permeability by 99.88 percent within 600 hours. And as he mentioned binding it up or making sure it doesn't release back into the environment, that they'll be looking at technologies or be a forum for discussing and looking at it and still at the same time still protecting proprietary technology and so forth.

DIRECTOR LYNCH: There is always a potential to pilot projects as part of one of the remedial projects. As a matter of fact one of the pilots in this project is the oxygenation. I would suggest that since it is likely that Honeywell will be the responsible party implementing this plan that's where you could take your interest.

And that is the potential of the state or federal government doing other work but the way we address is usually through existing state contracts as far as who we hire to do the work. But I think you really should talk to Honeywell about the potential of looking at your pilot study or technology. And certainly if it was proposed to us we do take a look at it and see if it was appropriate.

Other questions? Dave way in the back. Could you just go over to the microphone so everybody can hear your question.

DAVE ARNOLD: There is a similar project that's happening, I don't know if it's completed yet or not down in Albany that G.E. or you're probably familiar with it, could you go over some of the problems that they ran into that might be similar to the ones that we're going to run into and you know, kind of give us an idea what we're looking forward to here.

DIRECTOR LYNCH: Yep, you're probably

referring to the Hudson River dredging project for the PCBs from the G.E. facility. And they've run into many questions much like we're hearing tonight. But they are not much further along than we are in this process. They have selected a remedial design but they haven't started. They probably started specific design but they haven't started any actual dredging work at this point.

So if you're asking what problems they ran into during the dredging that hasn't been done yet so I really can't answer those. But I would suggest if you have specific questions about the G.E. project, I think we have a number of people that have been involved or very familiar with that project and you can talk off line with them after the meeting. Anymore questions? One more.

RALPH MARTONE: I'd just like to know the resources that are available to this project. Is it just the one company that's Honeywell. Are they the only resource in this to draw on basically? Just one corporation's problem? Or is it -- how does the Superfund and the resources of the US government play into, you know, the clean up?

DIRECTOR LYNCH: Any environmental clean up for hazardous waste pollution, whether at the state level or federal level is first approached by attempting to have the responsible parties, those who cause the problem clean up the problem to avoid using public monies to do so.

And in this case we have one responsible party in Honeywell who contributed to the majority of the contamination in the lake. Not all of it. We do know that there are other companies and other operations that have impacted the lake. But the Superfund does hold Honeywell responsible for addressing the entire clean up although they have certain remedies against other responsible parties.

So from a state perspective we can take the primary responsible party like Honeywell and have them do the clean up. They can then seek contribution from other responsible parties to pay their collective share towards that clean up. There are state and federal resources involved, reviewing the project and oversight of the project which is also very important.

There is also the cases where you don't have a responsible party stepping forward and doing the work that it can be done with federal or state funds. But the first resort is the responsible parties, then we go from there.

Q. (Martone) Just to extend that same point I heard two billion dollars for the wish list on this project. What about that? What type of clean up would that involve? And I don't know if Honeywell has got two billion but if we needed to go that far would that be possible if that was necessary?

A. (Lynch) I think my presentation gave the real basics and I don't remember off the top of my head but it was the $2.1 billion proposal was the most expensive alternative looked at in the Feasibility Study. And help me quick with the numbers, dredging - there you go, dredging over 2,300 acres of the land, 20 million cubic yards, which is almost seven times, probably six times what we're doing now.

Q. Wouldn't we like that?

A. It's a seventeen year process. Would involve much disruption to the lake in the area, much more challenging. The dredging plan proposed now is very challenging but this would be very challenging. And you have the practicality of that amount of money. Whether in fact you could get Honeywell or a combination of responsible parties to actually implement that plan. So it certainly was considered as part of the feasibility plan but we determined that our plan would be more suitable, practical and still be protective of the environment.

BY BARRY RAICHLIN:

Q. 240 million is a hell of a discrepancy between that and 2.1 billion. What's wrong with that picture?

A. It's six times.

Q. I think they're a little short?

A. They may be. That is not necessarily taking every piece of contaminant out of the bottom of the lake.

Q. Here's a government saying this is what we need. They're saying, okay we'll take this. We have 40 degrees, a new coach, why can't we have this too?

A. I wish it was as simple as getting a new coach.

JO ELLEN RAICHLIN: Trying to get money out of them.

DIRECTOR LYNCH: Any other questions? We will have people sticking around for a few moments if you want to come up one-on-one, we have a lot of charts that we have from our previous availability session.

I want to thank everyone for your great comments, great questions and your input on the Onondaga Lake cleanup. Have a good night.

* * * *

LYNCH

CERTIFICATE

This is to certify that I am a Certified Shorthand Reporter and Notary Public in and for the State of New York, that I attended and reported the above entitled proceedings, that I have compared the foregoing with my original minutes taken therein and that it is a true and correct transcript thereof and all of the proceedings had therein.

John F. Drury

John F. Drury, CSR, RPR

Dated: January 18, 2005

APPENDIX VII

TRANSCRIPTS FOR JANUARY 12, 2005 AND FEBRUARY 16, 2005 PUBLIC MEETINGS

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

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In the Matter of

ONONDAGA LAKE PROPOSED REMEDIAL PLAN

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PUBLIC MEETING in the above matter conducted at the New York State Fair Grounds, Art & Home Center Bldg. Martha Eddy Room, on **January 12, 2005 7:00-10:00 p.m.**

MODERATOR:

KEN LYNCH, Regional Director NYSDEC Syracuse

ALSO PRESENT:

DALE DESNOYERS	NYSDEC Albany
BOB EDWARDS	NYSDEC, Albany
DON HESLER	NYSDEC, Albany
TIM LARSON	NYSDEC, Albany
DAVID SMITH	NYSDEC, Albany
TRACY SMITH	NYSDEC, Albany
JIM BURKE	NYSDEC, Syracuse Reg Haz Waste Engr
MARY JANE PEACHEY	NYSDEC, Syracuse, Regional Engineer
HENRI HAMEL	NYS Department of Health
ALLEN BURTON	TAMS
HELEN CHERNOFF	TAMS
MARK MOESE	TAMS
BOB MONTIONE	TAMS
KELLY ROBINSON	TAMS
DAVE SCHEUING	TAMS
MICHAEL SPERA	TAMS
JOHN SZELIGOWSKI	TAMS

INDEX TO SPEAKERS

DIRECTOR LYNCH: Good afternoon everyone. Welcome to the Onondaga Lake Proposed Remedial Plan Meeting. It's certainly great to see such a strong turnout tonight in the interest that everyone has in Onondaga Lake. My name is Ken Lynch, I'm the regional director for Region 7 of the New York State Department of Environmental Conservation.

Tonight's meeting is basically going to be in three phases. We're going to start off with a brief presentation showing you what is in the Proposed Plan, real short, brief discussion about the elements of the plan itself.

Next we're going to go into a formal public comment time where people who want to make statements for the record can come up front and make your statements and we'll take those down.

After the public statements are completed we're going to go into a question and answer period. If anyone has specific questions regarding the plan we have a lot of technical staff and experts that worked

LYNCH

on the lake here today to answer your questions.

So for those of you who know you want to speak right now we ask you to sign in in the back. Want to raise your hand Tracy. Tracy will give you a sign up card. I have some right now. As you sign up I'll take them and we'll call you in the order of signing up.

There may be many of you out there who have both a public statement to make and questions that you want answered. We ask that you make your statement at the appropriate time and then reserve your questions for the later time and we'll respond to those during the question and answer period.

We'll start with the presentation. As I stated, we're going to start with a brief overview and then go into the public comment and question period.

Cleaning up Onondaga Lake. What does that mean? I usually start my presentations on the clean up of Onondaga Lake, since it is such a complex matter and there is so many issues, with really defining the two major issues. The two major pollution issues impacting the lake are the wastewater treatment issues and the industrial pollution issues.

Many of you already know that the wastewater treatment issues are being handled by Onondaga County under an agreement signed with them back in 1998. And we're now proud to talk about the state of the art facility that we have on the lakeshore at the metro plant. We are not going to be addressing that problem tonight because we believe we're on track under the Amended Consent Judgment to address the wastewater treatment issues.

The focus of tonight's meeting is going to be on the industrial pollution. And specifically the Proposed Plan for cleaning up the lake bottom itself. There is industrial pollution impacting the lake from upland sites also. This plan does not address specifically cleaning up those upland sites. It is specifically geared toward cleaning up the lake bottom and the sediments and the impact that the contaminants have had on the lake bottom itself. As we'll discuss a little later there is a tie-in between upland sites and the lake bottom, but we'll discuss that briefly later on in this presentation.

This slide, which looks a little light but you might be able to see it. In your handouts, and I did not mention that we do have handouts on this presentation so you can follow along if you can't see the screen, bring the document home and look through it yourself on some of the details.

But basically this is a map of the lake itself. And in the middle of the lake we show the lake bottom. That's what we're going to be talking about tonight. Around this lake the several dots you see there are various sub-sites of the Onondaga Lake hazardous waste site. These are sites that have already been determined to have impacted the lake through discharges of

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industrial waste. Again, those sites aren't specifically addressed in the plan we're going to talk about tonight. We're talking about the lake bottom.

There is a process that both the state and the federal government follow in cleaning up industrial waste or hazardous waste pollution. It starts with the remedial investigation. Basically this is an assessment of the site, a lot of testing, a lot of monitoring to determine the extent of contamination, in this case in the lake bottom.

After you know what's there you go into the next step and that's the Feasibility Study. And basically what a Feasibility Study is is an assessment of all the alternatives or range of alternatives to clean up those contaminants.

The next step is the Proposed Plan. And that's what we're talking about tonight. After all the alternatives are laid out the state, as the lead agency in this case, assesses those alternatives, looks at

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various options and comes up with a proposed plan to present to the public.

Once that plan is proposed we step into our public comment period, in this case for Onondaga Lake. It started on November 29th and will run until March 1st.

Onondaga Lake is somewhat of a unique site in that it is both a state and federal Superfund site. Because it is also a federal Superfund site the Environmental Protection Agency is also reviewing the Proposed Plan, and they have a process for determining or reviewing the state's proposed final remedy.

Part of that process is an internal review process within the EPA called the National Remedy Review Board. And that evaluation will be taken -- undertaken by the EPA during the month of February.

Continuing on with the Superfund process, once we finish our public comment period and get all the comments on the Proposed Plan we issue what we call a Record Of Decision or the selected remedy, the final remedy, the remedy that the state believes should be implemented to clean up the lake. And in this case for Onondaga Lake by court order that remedy is due on April 1st of 2005.

Once the remedy is determined we anticipate that the design of this proposed clean up will take approximately three years. It's a complex extensive clean up project and there is a lot of planning and design to go into this Proposed Plan.

Once the project is designed we start the construction phase. And we're anticipating four years for the entire clean up activity to be undertaken.

Back to the first step. Just want to review a little bit what we found when we did the investigation of Onondaga Lake. There is an extensive investigation undertaken in various years, some by Honeywell, some by our Department, all with the oversight of our Department and the EPA. More than 6,000 samples were taken from the lake or around the lake. We did a human

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health risk assessment and ecological risk assessment as part of that investigation. And in real general terms what we found was that most of the contamination in Onondaga Lake is found in the southern portion or the portion located nearest to the southwest shore where most of the Allied or Honeywell activities took place, and much of other industrial activities took place.

There is mercury contamination throughout the lake. Again, most of that mercury contamination either being in the southwestern portion or at the mouth of Nine Mile Creek. We found other contaminants in the lake like benzenes, chlorinated benzenes and other contaminants. In some cases, in one area in particular, called the In-Lake Deposit Area, the deposits and contaminants reached levels up to 25 feet.

Once that investigation was completed Honeywell prepared a Feasibility Study with Department oversight. They evaluated some 14 alternatives to clean up the lake. They looked at alternatives ranging from doing

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nothing, to spending no dollars on the clean up of the lake, to doing an awful lot of sediment removal and capping to an extent of addressing 2,300 acres in the lake at an estimated cost of $2.1 billion.

As part of that Feasibility Study Honeywell identified their preferred remedy. And that is proposed dredging of half a million cubic yards and capping of 356 acres in the lake, at a cost of $243 million.

Once the alternatives were assessed the state began its process of reviewing those alternatives and determining what they felt was the best Proposed Plan for cleaning up the lake. And that's what we're presenting tonight.

One of the steps in coming up with this plan was to establish goals. And those goals are outlined here.

Number 1 is to achieve sediment concentrations that are protective of fish and wildlife.

Number 2 is to achieve concentrations in fish tissue that are protective of humans and wildlife that consume the fish.

And Number 3 is to achieve water quality standards.

Basically what we did in assessing the lake clean up, and it was also done by Honeywell in the Feasibility Study, was to break the lake into eight sections. And based on the contamination we knew of in those eight sections determine a remedial plan.

We determined that we would remediate all areas of the lake where the surface sediments exceeded our clean up levels.

That then resulted in an estimated proposed dredging of 2.7 million cubic yards and a capping of over 579 acres in the lake.

Where do those sediments go once we dredge them? The most highly contaminated sediments are proposed to be taken off-site to a permitted DEC or out of state facility. Other sediments that are less contaminated will go, are currently proposed to go to one of the Honeywell Solvay wastebeds.

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A unique aspect of this plan is Honeywell is proposing to perform a pilot study to oxygenate the deep areas of the lake. And in an attempt to prevent mercury methylation or the mercury seeping into the water column in the lake. That will be conducted and monitored by the department. If effective we will authorize a larger scale project.

The plan also includes habitat restoration or repairing the damage you cause when you dredge. And habitat enhancement, doing more than what exists there today, adding to the habitat in and around the lake.

It's important to note that the plan also includes a long term monitoring of the water quality, the capping of the lake, fish tissue and other things related to the clean up of the lake. So once the construction activity is done the responsible party doesn't walk away, they have a long term obligation to monitor the effectiveness of this plan. And the estimated present worth of our Proposed Plan is $450 million.

LYNCH

This slide, and I'm sorry you don't have it in color in your handouts but it's a pretty good overview of how the lake is divided into eight areas and what the Proposed Plan for those eight areas is. It shows the areas to be capped and dredged. And it shows you the different units that the lake is divided up to. There is also a chart over there depicts the same thing. And is there one in the plan itself? In the plan itself that is in line, that's one of our exhibits in there. It's a good reference to get a good oversight of what areas are going to be capped and dredged.

As I mentioned there is a long term monitoring plan that I think is very important to this plan. For those of you familiar with the Amended Consent Judgment, the county has established an extensive annual monitoring program to see how their proposed clean up, their addressing of the wastewater issues that's impacting water quality, and improving water quality.

We expect that the monitoring plan for

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this clean up project will be very similar, very extensive, reviewed by our scientists and others. We're going to monitor the effectiveness of all the remedy components. We're going to sample tissue in fish invertebrate, we're going to sample the surface water, the sediments, we're going to make sure the cap is working, we're going to make sure any containment area that's proposed in the wastebeds or other places is effectively working. And we're going to continue on an annual basis to make sure that this plan is working.

At some point during that monitoring if we find there is a problem with a cap or problem with different areas in the lake we will advise the responsible party and they will be responsible to correct those problems

Time frame. One of the most common questions I get about this plan is how long will it take? When is the lake going to be clean? As I previously stated we anticipate, if all goes well, that the state will issue a Record On Decision or final remedy by April 1st.

Next is the anticipated design phase, which is estimated at this point for three years. Prior to starting construction of this remedial plan, prior to dredging, prior to cleaning up the lake bottom we have to be assured that the lake is no longer being impacted by upland sites. So that is one glitch in this schedule that we have to coordinate with the clean up of the lake bottom. Simply doesn't make sense to dredge the bottom of the lake where the lake is still being contaminated by upland sites.

So part of this proposal is to coordinate with the upland site cleanups so that those sites are no longer impacting the lake before you start dredging the material. And once the construction activity does start in the lake we anticipate a four year construction period.

And again, once the construction is done, the work is not done, there is an extensive monitoring program which will continue until we believe that the remedy

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has satisfactorily worked and there is no longer a need to monitor.

That's my presentation, I told you it would be short. We want to reserve most of this time to hear from you, both in public comment form and also in a question and answer form. But if you want to get more information about this plan, we've had two availability sessions, and we had a great turnout for both of those and we had a lot of great questions. But if you want more information you can go to our website that's listed there or you can come to these mentioned facilities and see the plan itself, the hard copy and go through it.

You can also comment on the Proposed Plan. You don't have to speak tonight to get your comments in. You can write in until March 1st and you can do that via the web or via mail.

We're now going to move into our public comment period to allow people who have comments for the record to come forward and state their comments. I do have a couple ground rules so that we can make sure that we get to everybody that wants to speak and move this in an orderly manner. First and foremost when you come to the microphone, and Dawn is going to hold the microphone and come to you, if you can come out to the aisle Dawn will meet you in the aisle for you to make your statement. State your name and spell your name for the record. We have a stenographer (court reporter) here and I know he's a good speller but he can't get all the complicated names.

Keep your statements short and concise so we can get to everyone please. If the previous speaker or previous speakers have made a similar point you don't have to reiterate that. Oral comments tonight are given equal weight to written comments that you send in, so don't feel the absolute need that you have to make a statement tonight, if you would rather write that you can do that and it's given equal weight.

We will not be responding to the comments made initially during the comment period. We're going to reserve that again for the question and answer period. So if you want to make a statement and you also have questions, please reserve those questions to the later portion of the meeting.

I'm going to start with the public speakers and as we traditionally do with DEC public meetings we'll start with our public officials. And the first one up is County Executive Nick Pirro.

COUNTY EXECUTIVE PIRRO: Good evening Director Lynch, members of the DEC team, ladies and gentlemen. This will be concise, I'm not sure that short. The county understands all too well the difficult task it is to develop and obtain agreement on expensive solutions to large scale, complex problems such as the industrial contamination in Onondaga Lake. It is always easier to be critical of such plans than to produce them. The County is aware of the level of effort that has gone into the development of the state's Proposed Clean up

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Plan and we applaud that effort.

The ongoing effort to reclaim Onondaga Lake is substantial and widespread. The Onondaga Lake Partnership is spending millions of federal and local dollars on projects ranging from non-point pollution to habitat improvement to trail development. By the time the County is done upgrading the municipal wastewater system that discharges to the lake, the County, with substantial help from our state and federal partners, will have invested well over $450 million on lake improvement projects. A good deal of that work is already completed. It is now time to aggressively move forward with remediation of the industrial side of the lake restoration equation. The plan proposed by the state is substantial and aggressive. It's not perfect. And there are certainly many questions that will have to be answered along the way. But it is time now to move forward without delay. The County is hopeful that the technical and public review and comment process that is

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now underway will allow this process to move in a positive and expeditious fashion.

That said, there are a number of critical issues that the County is hopeful can be addressed as the Proposed Plan becomes refined and finalized.

First, the schedule. As the County understands it, the plan recommended by Honeywell in the most recent Feasibility Study would postpone implementation of the most substantial work in the lake until 2011. That is too long to wait. The state's Proposed Plan offers no start or completion dates. Based on what is written, work could begin as soon as next year or as late as 2011. As there is no schedule things could be delayed even beyond 2011. An implementation schedule, with start and end dates needs to be spelled out as part of the plan, and work needs to be begin sooner, much sooner than 2011.

Related to the schedule is the lack of progress and coordination to date in addressing the upland sites. I am referring to sites like Willis Avenue, the Semet Tar Beds, Wastebed B and Harbor Brook, Wastebeds 1 through 8, and the Geddes Brook/Nine Mile Creek sites. It should be readily apparent to everyone that these sites, all of which are ongoing sources of contamination to the lake, have to be addressed before implementation of a remedy in the lake itself can take place.

The county has consistently pointed out that all these sites should have been addressed collectively as part of a single comprehensive lake clean up plan and not as independent hazardous waste sites.

From an ecological standpoint, all of these sites are linked to the lake. The approach of allowing the upland and lake remedial investigation to proceed on distinct legal and separate time frames has resulted in a significant impediment to proceeding immediately with the remediation of the lake itself. The County recommends that the process to clean up these upland sites proceed as quickly as possible, so that the lake bottom clean up plan can begin, and can do so without having to rely solely on the installation of interim remedial measures at these upland sites.

A second issue of concern is the long-term viability and reliability of several of the measures that are proposed in the Plan. Many of the proposed measures involve containment rather than removal. All of these engineered structures will require ongoing inspection, operation and maintenance.

These include: 1) Groundwater cutoff walls coupled with pumping and treating contaminated groundwater intended to stop the migration of contamination into the lake.

2) Engineered confinement caps intended to encapsulate over 575 acres of contaminated lake bottom sediments.

3) Engineered confinement of the 2.6 million cubic yards of contaminated dredge spoils in the proposed Sediment Consolidation Area located on Wastebed 13.

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4) Facilities to pump oxygen into the lower layers of the lake in an effort to inhibit the methylation of mercury released from lake bottom sediments.

These engineered, constructed facilities will have to work forever, and will require inspection, operation and maintenance forever. The need to monitor and maintain these sites will never go away. Can the state assure this community that Honeywell will be around forever to take care of these things? What assurance can the state and Honeywell provide to the local community that it will not inherit the financial burden of maintaining, repairing and replacing all of these facilities, 30, 40 or 50 years from now? How will the final plan address this concern? The final plan must include formal legal protections, long term financial assurances or other protections that address this concern.

Third, institutional controls. The goal of Onondaga Lake clean up efforts is to restore the lake for the use and enjoyment

PIRRO

of the community. Typically, institutional controls impose limitations on the use of the site or resource. Limitations on the future use of Onondaga Lake as a recreational resource to this community due to institutional controls should not be part of the remedy.

Fourth, there is very little information provided regarding the proposed Sediment Consolidation Area on Wastebed 13. It appears to the County, based on the limited information that has been provided, that the Sediment Consolidation Area represents a sizable ongoing challenge, and potential burden to this community in the future.

The potential issues include: 1) the unexplained procedure to identify and then separate hazardous materials in the lake bottom sediments from sediments that are simply contaminated during the dredging process.

2), the physical stability of the site.

3), the potential for odor problems.

4), management of the supernatant.

5), long term operation and maintenance. And by long term it appears that this containment facility will have to be maintained forever.

6) and it appears that any redevelopment potential for this site will be gone for generations.

It is not apparent that any other alternatives for handling the dredge spoil were given full consideration. The question the County has is whether the creation of the proposed Sediment Consolidation Area is justified given these uncertainties.

Finally, monitoring. The topic of monitoring, in both the Feasibility Study and the Proposed Plan, is largely deferred to the design stage. While this is not unusual or necessary inappropriate, it is too important an issue to ignore during the stage of the remedy selection process. Given the complexities of the Onondaga Lake system, and the ubiquitous extent of the contamination related to the industrial sources impacting the lake system, it could

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be very difficult to accurately monitor change and improvements and ascribe them with confidence to the remedial measures in the Proposed Plan.

The community will want and deserves assurances that the remediation measures ultimately put in place are succeeding. Monitoring for this purpose should begin now, in order to assure the establishment of a reliable pre-construction or baseline data-base. Moreover, development of the post-construction monitoring program must involve the County and other appropriate stakeholders.

I wish to close by restating that it is not easy to develop and obtain agreement and expensive solutions to large scale, complex problems such as the industrial contamination in Onondaga Lake. The state's Proposed Clean Up Plan represents a substantial laudable effort. What we offer tonight should be viewed as constructive input to that plan.

DIRECTOR LYNCH: Thank you. Next

speaker is Dale Sweetland, Onondaga County Legislative Chairman.

LEGISLATOR SWEETLAND: Thank you. I'll be very brief, I am - since I left my office with the paper I had in my hand sitting on the desk. I am Dale Sweetland the chairman of the Onondaga County Legislature. And I'm here tonight not as an engineer, because I'm not, I'm not a scientist, I am a resident of Onondaga County. And I'm here to express to you the feelings of my constituents and my neighbors as I talked to them after this plan has unfolded and come about in the media.

Several years ago, this is my 12th year in the county legislature, I was in the legislature and chaired the drainage and sanitation committee when we signed the Amended Consent Judgment. And there is probably nothing that I am prouder of than the fact that the County is doing, with the help of the state and the federal government, doing an enormous amount of work to stop polluting Onondaga Lake.

SWEETLAND

Ever since I have been in high school or was in high school - sounded like I still am, didn't it? Ever since I was in high school I have heard about Onondaga Lake. We've all heard about Onondaga Lake. We now have a great opportunity. We are closer than we have ever been in this community to actually coming to terms with the pollution in Onondaga Lake.

I want to reiterate what the county executive said, and I applaud DEC and Honeywell for all the work they've done. It's taken an enormous amount of time and a lot of effort to get to this point. I would reserve any criticism of the Proposed Plan because again, I'll beg that I'm not an engineer and I'm not a scientist.

I would offer that people who I talked to are excited about an opportunity to see something positive happen with Onondaga Lake. It's necessary, not only for the city, the county and the Central New York region, but it's very important to have this lake come back to life and be a vital part of this community. So I want to encourage Honeywell and DEC and everyone involved to continue their hard work and really make an agreement happen and have this work come to fruition.

The one thing that strikes me as that in every type of these situations, as the County Executive said, nothing is perfect in this world, nothing will ever be perfect. And all I ask is that all the parties be logical, use common sense, and be reasonable in all this process so that we can have some good things happen to Onondaga Lake and the city of Syracuse and Onondaga County. Thank you.

DIRECTOR LYNCH: Next speaker is James Corbett, Onondaga County Legislator.

LEGISLATOR CORBETT: Thanks, Ken. C-O-R-B-E-T-T. Welcome to my area. I represent this 8th District. And I'm here to comment on one aspect of the plan, having gone over it extensively. I want to preface it saying I'm speaking as the County Legislator for this district. I have also lived for 20 years right down the road here. My house and my backyard overlook right over 690 at the lake. So for 20 years I looked right at this lake every day.

The aspect that I would like to talk about is the pumping of the sediments from the pump station proposed to be built at Onondaga Lake to the Sediment Containment Area constructed at Wastebed 13. This is after the dredged materials have been processed. I understand that there would be approximately 4 miles of pipe from the pump station to the proposed containment settling area 13.

What my concern is, I've received a number of calls from constituents in this area, and if you're familiar, anyone around here, with 13, which is over off of - between Armstrong and Warners Road, there is a lot of the residential area around there. There is always a wind up there; there is always a breeze.

And the calls that I have received are two-fold. One is concern about the odor control, which has been brought up at the meeting in Camillus. And also the length of the piping to come from the proposed pump station to the Wastebed 13. It would be approximately 4 miles from what I understand, and one of the proposals is to follow Ninemile Creek.

I think there might be another option after looking at this. We've discussed, and it was up on the screen, you can see the finger right here going out into the lake, that's Wastebeds 1 through 8. Wastebeds 1 through 8 right now is part of, is Onondaga County land and it's also part of the parking.

What I have talked with some of my constituents about and I don't know if anyone from Honeywell or the DEC, what if we thought of putting that containment area right there? You have four miles less piping, you're not going through a residential area. You also have a lot less worry about odor control. You've got the lake on one side, you've got 690 down on the other side. Yes, it is now county property, and yes, we have a proposal for the trail around the lake there. But I would beg that this option maybe be looked at. And I would appreciate that if there is a scientific part of it, I just think that it's a real viable option. You're not going up Ninemile, you're not going through a residential area.

And I think in the long run it would prove to be, if it's done the way I've looked at everything, it could be turned right back into a recreational area. You could put that trail both up and down on it. And who knows, there might be a lot of uses for it down the road for maybe picnicking or a lot of other things. So I appreciate the opportunity to make this comment and I would hope you look at it. Thank you.

DIRECTOR LYNCH: Liverpool Mayor Marlene Ward.

MAYOR WARD: Thank you, Ken. Good evening. I appreciate the opportunity to be here this evening and to be able to comment and be part of this really important undertaking because it is an important issue for the village of Liverpool. As I said before I'm Marlene Ward, the mayor of the village. My husband and I are life-long relatives -- I'm sorry, residents, of the village of Liverpool. In fact my husband was born right on First Street in the village right there on the lake. And when we were coming over this evening he was talking about being a little boy and wading in the lake and being told, you can't wade in that water.

And as we all know, Liverpool is like a lot of other communities, it was founded on a beautiful body of water, which is Onondaga Lake. And history records over time that unfortunately it became polluted to the point that it has received national attention as one of the most polluted bodies of waters in the United States.

The pollution process began many years ago, and I know that I cannot and I doubt anyone here can really remember when the lake was not polluted. There is plenty of responsibility and blame to go around. The pollution was a combined result of everyone, from individuals to municipalities, to several businesses. Everyone either believed that it was not possible to pollute a body of water such as this, or else they did not care.

The foreign material that went into this lake on a yearly basis included millions of gallons of untreated human waste, various kinds of industrial waste, including some we did not realize was hazardous or dangerous until years later.

Many times throughout my lifetime there has been various attempts and proposals regarding lake cleanup. Always they seem to go nowhere. I came to believe we would never see a clean lake. Through the efforts of many dedicated people we have seemed to reach a point where we have a plan and a proposal that would at long last seem to accomplish some of these goals.

I would like to thank everyone who

brought us to this point and to say on behalf of the village of Liverpool, please continue to move forward with the goal of a clean Onondaga Lake, we certainly would appreciate it. Thank you.

DIRECTOR LYNCH: Are there any other elected officials who would like to speak?

SUPERVISOR CZAPLICKI: Hi, I'm Bob Czaplicki, supervisor of the Town of Geddes. I just want to say I've submitted some testimony for the record but I think it really is time that we move forward. I've lived in this community my entire life and know what the lake is about and I know what my constituents talk about. And they want us to stop talking and get moving.

So I know, as that the County Executive said, no plan is perfect, and we can work through this process and reasonable people can come up with reasonable explanations. But I think the time to get this lake cleaned up and to get this community moving, there is miles of shoreline that can be developed and it can be an economically viable area. And I strongly urge that we get moving. Thank you very much.

DIRECTOR LYNCH: Any other elected officials? Okay the next speaker is Deborah Warner, Syracuse Chamber.

DEBORAH WARNER: Good evening Regional Director Lynch, thank you for holding this meeting. My name is Deborah Warner, I'm director of governmental affairs at the Greater Syracuse Chamber of Commerce. We're the largest business organization in Central New York with 2,300 organizations as members, employing over 140,000 people working in our community.

On their behalf I extend our thanks to you for this hearing and the years of dedicated work you have given to the goal of cleanup of Onondaga Lake. We're delighted and encouraged that after more than a decade we're finally at a point where we are finally talking about a remedy to implement. The goal is finally in sight. You are to be congratulated for working through this herculean task.

WARNER

I'm here tonight to tell you that we support the restoration plan you put forth. We believe and trust that all the research and study has yielded a plan worthy of implementation. We agree with Congressman James Walsh when he said, we have finally found a holistic and sterile approach to clean up this valuable community asset.

Our chambers includes the Onondaga County Convention and Visitors Bureau. Although we already market the lake for a range of events we're thrilled at the potential of visitors and events after the remediation is complete. Waterways are certainly a large part of our tourism marketing efforts. Currently to the naked eye the activity along the shoreline of Onondaga Lake is a fabulous asset.

But the question remains from our out of town visitors, why is there no activity on the water? Imagine the tourism benefits and economic development impact when we can successfully hold major fishing and boating events. When Destiny is built the value of

WARNER

the lake to us will be nearly inestimable. We urge final approval and implementation of this program as soon as possible. Many projects in and near Onondaga Lake are moving forward, particularly the more than $200 million inner harbor redevelopment project we should see this year begin.

And the faster the lake is cleaned up the more development and jobs will occur in our community. Of course we can't ignore the economic impacts of over $400 million of over 7 years in the local economy if the project moves forward. We look forward to Honeywell being a valued member of this community for a long time.

I would also ask that as you work through the remediation plan you preserve development opportunities to the largest extent possible on the land that is being reclaimed. We believe that there will be strong interest and additional development adjacent to the lake, and don't want to lose out or limit this economic potential.

I know our members want me to give you a vote of confidence in your work. The business community does not doubt the thoroughness or scientific acumen of the DEC and the EPA. We trust that you have not overlooked any aspects in the Remedial Investigation and Feasibility Study. And we trust in the monitoring programs that are part of the plan.

So we also speak to Honeywell tonight asking them to consent and agree and move forward with the plan DEC has proposed.

One last question, we hope that you'll be able to respond to as you go forward, and it's similar to a concern that the County Executive brought up. Going forward, what assurances can taxpayers in our community be given that if there is a failure in the cap or an engineering solution who's going to be held responsible for those costs? If Honeywell no longer exists, or has merged with another company who is going to be responsible for the costs in the end?

Onondaga Lake is a jewel for our community and the city of Syracuse. The lake is a resource that any city would envy. We gained a lot of notoriety as the most polluted lake in the land. Now we'll have a new reputation as an example of state-of-the-art remediation of one of the largest Superfund sites in the nation. So we look forward to the earliest implementation possible and support for the recommended plan the DEC has put forward. Thank you.

DIRECTOR LYNCH: Sam Sage, Atlantic States Legal Foundation.

SAMUEL SAGE: Sam Sage, the president of the Atlantic States Legal Foundation. And I'm just going to make some preliminary remarks. Atlantic States will send in detailed comments to the EPA review panel and for the record here.

Before I say anything in detail we are happy to see that something is finally going to happen. We recognize the need for dredging and capping. And we hope that things can get started as soon as possible. I would just like to talk about three or four issues quickly.

SAGE

The first item is that we're concerned that there needs to be a vision for the lake, a consensus vision. This is a public policy issue: What do we in this community want the lake to be like fifty or even a hundred or more years from now? At this point there is a vision that the Onondaga Nation has presented, that this is their cultural heritage, this was their life source, and their fishery, and hunting grounds.

We need to see as a community what the end point of a rehabilitation of the lake should be. We have to recognize that there are scientific limitations in restoring the lake to what it once was but we really need to know what it is that the lake should become.

Part of that, to get there, the most important thing is a sensible and thorough monitoring plan for the lake. We need to start now doing baseline monitoring, so that by the time we have this plan implemented we know where we're going. This monitoring

SAGE

plan is going to have to be very complex in its variation, it has to dovetail with the monitoring currently being done by Onondaga County. We would recommend that there be outside scientific input into developing the monitoring plan, and hopefully be outside peer review of the monitoring plan before it takes place.

Another concern about the monitoring plan is its cost. The monitoring plan is estimated to be something like $3 million a year for a minimum of 30 years, but probably more than that. That's a large sum of money. Corporations come and go, we really would like to see some fail-safe mechanism that the money will be available to do the monitoring properly. And one idea would be to collect a sum of money up front and keep it into a fund specifically for the purpose of the monitoring. The legal possibilities of doing that are the Superfund notwithstanding, I think that's something that should be investigated.

Part of the monitoring exercise is

SAGE

needed in order to do some modeling of the different parameters in the lake. There was a meager effort to do a mercury model. That was shown that it wasn't going to work. But that effort was pretty half-hearted at best. To do a mercury model properly is going to take a long period of time. We need to start now getting the monitoring data that will allow us to do that monitoring. Without some kind of modeling exercise we have no idea at what point we can expect to see improvements in biota, a lessening of methyl mercury in fish tissue and other things like that.

We also should be modeling for other parameters other than mercury. There are various organic compounds that should be modeled. And a thorough analysis should be made of what are the most reasonable parameters to that modeling exercise.

The next point that I think is needed to emphasize is public participation. It's very gratifying to see so many people coming to this meeting tonight. For all too many

SAGE

years when some of us have been dealing with Onondaga Lake issues we sort of talked to ourselves. However, the Superfund process is partly to blame. We at Atlantic States audit the TAG grant agency for the Environmental Protection Agency. But even so with all our efforts getting people interested in the esoteric of the Superfund process has been difficult.

Also unfortunately, this hearing is the only requirement under the Superfund process. And so we are urging that a more comprehensive continuing public participation effort go hand in hand with the remediation of the lake bottom site and with the other sites. I have suggested separately to DEC that an overall matrix should be prepared for the public, showing the relationship of all the upland sites to the lake bottom sites on the dates and the conflicts and trying to hammer out, you know, what people can expect and what are the significant points at which some public comment would be desirable and necessary.

And I think there is some agreement to do something like that and I think that would go a long way in helping getting the public more involved.

Finally, the last point I would like to make is that in all the work to do the remediation we have to think of the workers who are going to be doing the work. And it's particularly important that proper hazardous management training be undertaken by all these workers and that all steps are taken to ensure their health and safety during the process. And thank you, we will submit written comments later.

DIRECTOR LYNCH: Thank you, Sam. Chuckie Holstein, FOCUS Greater Syracuse.

CHUCKIE HOLSTEIN: Good evening and thank you very much. I appreciate DEC being - giving us this opportunity. I'm with FOCUS Greater Syracuse. FOCUS stands for Forging Our Community's United Strength. And I'm speaking for the ordinary citizens who participated in our FOCUS visioning process in 1997 and 1998.

HOLSTEIN

There are over 5,000 citizens who participated in this process to share with us their dreams and their visions for our community. That was eight years ago. And that visioning process developed 15,500 ideas. That's a lot of ideas. We distilled those into goals. We ended up with 87 goals. Those goals were voted on in a Vision Fair in 1998, and that's what I want to talk to you about.

As people voted on the goals they established the preferences for what they wanted to happen first in this community. The number one goal was to build bicycle paths and hiking trails, especially along the waterways in our community, ergo Onondaga Lake.

The third highest goal out of 87 goals was to develop and clean Onondaga Lake. I went into that great big fat notebook this afternoon to take a look at what some of the people were saying about Onondaga Lake. After I had counted 150 times just the three words, "clean Onondaga Lake," I stopped

HOLSTEIN

counting, because I think at every single one of the over 200 visioning sessions people did say they wanted Onondaga Lake restored so they could go swimming there and fishing and so on.

The citizens have waited a long time for the clean up of Onondaga Lake. The good news is that there is good fishing in the lake. We understand the carp colony is wonderful, and even those people from the United Kingdom would like to come here and fish for carp.

We also understand that you can travel from Onondaga Lake all the way to the Mississippi river, but they can also come here, and that's I think what Warren talked about in bringing tourism to this community.

Last year in 2004, we spent the entire year on the waterways and water in our community. We held two FOCUS meetings, an annual event and a workshop with experts. Some of you here in this room were part of that. We ended up with a report to the community. There were 10 strategies for

Onondaga Lake. I'm only going to read a few of them to you.

The first and foremost was to focus on water quality. And I think that's what the DEC, Honeywell and the other remediation projects are talking about.

They want to continue the clean up and have a long range plan to keep it clean. And that goes to what Sam Sage just talked about, the continuing monitoring.

They want the public to be informed of the current state and usability for recreation and fishing. In other words, they said, let's get people on the lake not just standing there and looking at the lake.

They want to create a positive publicity and media campaign about the lake. And I think we need to do that more and more. Of course they want the hiking trail and the bicycle path, the contiguous lake trail to be finished. And the edge lands be ready for development and public use.

The people talked about public accessibility and to provide transportation to the lake. There is some people who don't have transportation and need public transportation to get to the lake.

And last but not least, they said all around the lake should remain in the public realm. There should be public ownership of the shoreline, and create a long term plan for the use.

I think the citizens of this community would find it very good news to hear that we're finally beginning the process. And we recommend that the process begin as soon as possible. We say start now, just do it. And I do have some documentation on the citizens goals and what they had to say and I will leave them with you. Thank you very much.

DIRECTOR LYNCH: Thank you. Next is Clyde Ohl.

CLYDE OHL: My short presentation here is entitled "Build and measure - but No Final Specific Master Plan." I have two areas of concern with proposals for Onondaga Lake.

OHL

First, as background, there is a scientific way to resolve the issues involving Onondaga Lake. The lake would be studied by an independent scientist, or independent scientists with proper peer review. The remedial issues would be defined, with extensive models constructed, based upon selected variables and a final solution based upon a clearly defined master plan. We don't have a master plan as yet.

Unfortunately, all too often clearly defined scientific study has been subverted to what I call is the political process.

The result has been what we call the Build and Measure Plan established by Onondaga County, without precise goals, to grapple with the sewage discharge into Onondaga Lake. Build and measure, often done without independent monitoring, I repeat, independent monitoring is a nice sounding term. However, it is not based on long-term goals but it's more concerned with inching along, sometimes delaying the project.

OHL

It comes as no surprise that Honeywell has followed or decided to follow what I call the Metro template, and wants the same arrangement. Fifteen years after the state filed the lawsuit and after collecting hundreds - or mounds of data and studies at a cost of several hundreds of millions of dollars, detailing the industrial pollution of the lake, we are again endorsing what I call this build and measure plan, and again without a clear predetermined goal.

To be succinct, under build and measure the polluters are being allowed to build what amounts to interim or test facilities, and merely measure their efficacy rather than require actual predetermined results based upon proper scientific models.

This flies in the face of what I call environmental cleanup practices everywhere in the country. I have been -- don't get me wrong now, I've been delighted that Honeywell has come along. They're doing things differently than other interested organizations. They're reaching out to the

OHL

public. They haven't announced the final plan. The final plan, as I understand, will be about three years from now. During the meantime they'll be doing a lot of work in preparing for this.

This type of initiative involving the public is long overdue on issues involving Onondaga Lake. And I do not want to delay major positive efforts with reference to the lake. However, I continue to remain concerned with the build and measure approach proposed by Honeywell. The major shortcoming I again point to is a lack of modeling for the project, no models. We have to do what we do and then build and measure and so on. We spend hundreds of millions of dollars and we're throwing out a lot of that information we had before.

Using appropriate modeling to arrive at predetermined measurable goals is an overriding importance in this issue.

My second concern, by the way I mentioned two, rests with the Town of Camillus. And it goes like this. I'm not speaking on behalf of Camillus officialdom, although as a former town supervisor in Camillus and a former county legislator I've been involved in the lake issues for many many years. I'm also chairman of what we call somewhat facetiously the Dead Lake Society. Dead Lake Society. The beds actually represent a long lost opportunity, the present beds, represent this lost opportunity for long term economic development as well as recreational opportunities.

We just have the wastebeds in Camillus, several hundred acres. We now have the chance to regain the opportunity of bringing these areas back into some type of economic development profitable for the town.

I think it's important for Camillus to be involved in the design process for the development of the beds and the surrounding areas and not merely as a depository for the tailings from the dredging program.

The so-called Allied beds actually have potentiality easily ignored, often ignored

OHL

and not much appreciated for future development in Camillus. It seems to me using bed 13 and maybe even expanding it to bed 14 actually overrides or creates a major barrier to future development. Camillus has a finite area, and to see Allied beds continue only as a dumping site flies in the face of economic development.

I do remember a schematic developed about twelve years ago by Allied Chemical and they depicted future uses of this whole area. I was very much impressed. Golf courses, parkland, all kinds of things, even potential parking lots for the State Fair and also maybe a ramp, another exit ramp on Horan Road that would serve Camillus a little bit better. Well, time has passed by, twelve years later, and nothing much has happened as far as that part is concerned.

There is no mention in all of this, by the way, of economic benefit to the future. Unless we start now we may well end up with another lost opportunity. It's not too early for Camillus to be involved in conjunction with Honeywell and the DEC in any design processes. I want to see a better use of the wastebeds and surrounding areas than we are contemplating at the present time. Thank you.

DIRECTOR LYNCH: Jeffrey Freedman.

JEFFREY FREEDMAN: Thank you. I am Jeffrey Freedman, F-R-E-E-D-M-A-N. It's been my privilege and pleasure to have a sailboat and a motorboat on Onondaga Lake for the last six years. It's also been my pleasure to be a member of Onondaga Yacht Club. Onondaga Yacht Club has existed on the shore of Onondaga Lake since 1883, promoting recreational boating on Onondaga Lake and enhancing the recreational boating experience.

On behalf of the members of the Club, we number about 60 families who have about 50 boats that we use on the lake. We thoroughly support these efforts of the DEC and of Honeywell to clean up what we regard as our lake.

In the course of the clean up operations we think it would be in the interest of public safety to remove all of the under-water obstructions to navigation. The Noah charts for Onondaga Lake list at least two sunken barges and numerous underwater pilings which remain from the amusement park on the western shore. These objects present a clear and present danger to public safety and also to the safety of the Honeywell workers who will be out on the lake in their boats. So we hope that in the course of the clean up efforts that these objects will be removed.

We hope that the clean up effort will, in the habitat enhancement part of the project, that we can have a plan free zone in the Marina Harbor, that will also support navigation, and the channel between the Marina Harbor and the lake in the deep end.

We are not anxious to see anchoring restrictions over the areas that are capped. An anchor is an item of safety equipment on a boat. We have seen sudden storms come across Onondaga Lake and we have measured winds in excess of 80 miles an hour. So we need to deploy our anchors as a matter of boating safety, and we would not like to see any restrictions to anchoring in the cap areas.

Those things being said we look forward to working with the Honeywell staff as the clean up progresses. Our organization sees this as an opportunity to greatly expand recreational boating on Onondaga Lake. We have called for the creation of a day camp with sailing instruction and lake ecology instruction for children, possibly associated with our boating club. We would like to see community sailing programs for our senior citizens so that retired people could come and use boats, not necessarily have to own them themselves.

We would like to foster the relation-ships with our colleges and universities to bring back intercollegiate sailing on Onondaga Lake and scholastic sailing. And we also see our Club hosting Empire State Games sailing events and also national sailing regattas on Onondaga Lake for one design sailboats.

So we see a tremendous increase in sailing activity. We would like to also see a tremendous increase in fishing activity and rowing shells. So I think the vision that we have for Onondaga Lake from the standpoint of recreational boating is that the thousands of people who already enjoy Onondaga Lake Park would look out and see the lake literally covered and populated with sailboats, fishing boats and rowing shells on every nice day of the summer.

And once again, we are tremendously appreciative and express our deep gratitude to the staff of the DEC and to the Honeywell organization for their clean up activities.

Finally, we just hope that - we understand that there is presently a disparity between the scope of the operations that are being proposed by Honeywell and by the DEC. We would not like to see these - this disparity get bogged down in the judicial system under court -- in the courts, but we would like the clean up effort to go as expeditiously as possible so that we and the public can enjoy our lake. Thank you.

DIRECTOR LYNCH: Nick Kochan.

NICK KOCHAN: K-O-C-H-A-N. Good evening and I would like to - village of Liverpool Planning Board Chairman and twenty year resident of the village of Liverpool and a life-long resident of the Syracuse area.

In Liverpool which was incorporated in 1830 as one of the older communities in the area, probably had one of the first commercial enterprises on the lake with the collection of salt. And the focus of the lake has been an economic driver for everybody in this community for a long time.

And the twenty years since Allied has closed the community has taken a new focus and a new direction with respect to the lake. We have worked with the mall, we have the extraordinary growth of the use of the park, the Onondaga Lake Park, and also we have the improvements being done by the wastewater, in the wastewater facilities.

It's very encouraging to see the effort that's being put into this project and it's great to see this is getting closer to becoming a reality. I just have several quick comments to make because many of the points have been covered already.

Assuming that the upland remediation is successful and diligently protected, I would make that one of the first conditions in looking at this lake proposal. And we also have to make sure that Honeywell will still remain involved in the long-run to maintain those facilities. I would just like to encourage Honeywell and the DEC to continue to work hard and find the best economic and scientific compromise possible for this project. Thank you.

DIRECTOR LYNCH: David Chapman.

DAVID CHAPMAN: How are you doing. I have some scientific statements I was going to make on behalf of Dr. George Putnam with our firm. My name is David Chapman, I'm with Mountain Eagle Management, we're a technology development firm.

CHAPMAN

I guess mainly I wanted to get across rather than, I can address this later for you and give this to you, but there is a lot going on in the community. First of all, I want to commend the DEC and Honeywell for moving towards action steps now as opposed to just a constant studying and remedial investigation going on seems like a lifetime.

Our firm has a patent on a reverse of the Solvay process, where they take carbon rock and turn it into natural chemicals. It's a patent, you take that natural chemicals and turn them back into carbon rock for sealing up buildings and soils.

We've run into a lot of, I don't know let's just say snags along the way in trying to get an idea of the chicken and egg theory a cross of whether it's been done before or how do we know it will work, and a lot of things like this. One of the things I see happening in this community right now is that we're really moving toward a community of technology development; what's going on down in Syracuse and various different operations that are happening around there and what Pataki recently proposed as far as new technology development in the Central New York area.

And I just want to say I think that with Onondaga Lake we have a great opportunity to really look at some of the other technologies, and I'm not just talking about ours, I have seen some other technologies that really hold some serious merit for the true clean up of the lake.

And all I want to say for the record is just that if we can just make sure that we have a forum where these technologies can truly be listened to by people like yourselves and other scientists and not just pushed aside where it's been done before. But really looked at for a way for some potential solutions.

Again, like I said, I want to commend the DEC and Honeywell and all the fine engineering firms who worked up to this point of bringing this to fruition with this diverse action, instead of just study.

That's pretty much it. As far as the technical, I'll leave this for you. Thank you very much.

THE COURT: Howard Bragman.

HOWARD BRAGMAN: I am H-O-W-A-R-D B-R-A-G-M-A-N. This will be like really short, just about a minute. It seems that we've been this route before. Not so long ago a professor emeritus from ESF stated it would take at least half a century and then we would not know where we were. Is it emollients, PCBs, mercury, whatever? Because Onondaga County does not collect taxes anymore. Because I used to hear rumors that people who worked for Allied if they suddenly think about polluting the lake, rushed into a room with an exit sign on it and they were out the door.

Why am I not convinced? If Allied were still here we would not be here tonight. I propose damming it because that is the one true way of getting to the bottom of things. In other words, just put up big barriers and get in there and see what you have. And then cap it so well that it probably will never leak again. And I think the technology that was here could be developed. If they can with that movie Titanic develop technology for the cameras that went down there, just for a movie, which means nothing, they can surely do this with Onondaga Lake if they really and truly want to.

And they could go back year after year, maybe the first two years after, then two years, leave a space, two years after, two years, three years. They have barriers that they put on highways when they want to work on them, they can use the same type of technology on the lake. I don't believe they can't. Thank you.

DIRECTOR LYNCH: Les Monostory.

LES MONOSTORY: I am Les Monostory, M-O-N-O-S-T-O-R-Y. I'm president of the Onondaga County Federation of Sportsmen's Clubs, and I represent about 30 clubs and several thousand members of sportsmen who are some of the primary users of the lake in terms of fishing, boating and we have a fair number of duck hunters that also use the lake for hunting purposes.

And my concern is about shoreline safety issues. Many of you may not be aware that along the shorelines where Allied had the wastebeds, which really covers basically from Nine Mile Creek all the way to past Onondaga Creek to Ley Creek. There was these wastebeds that leaked calcium sediments into the lake and particularly along the shoreline by the so called white cliffs, which is the area adjacent to the, well the New York State Fair parking areas.

There are areas along the base of those cliffs where if you walk into the water you may fall through a hardened calcitic sediment which has been deposited along those shores.

On November 26th I wrote a memorandum to Honeywell and DEC Region 7 about safety concerns related to Honeywell clean up of Onondaga Lake bottom sediments. I expressed concern over safety issues along the western shoreline related to potential hazards for fishermen or boaters who might try to either wade or land a boat along the Onondaga Lake shore.

Honeywell responded with a letter dated December 17th, in which they described proposed remedial measures specifically for the white cliffs section of Onondaga Lake, which comprise portions of SMU 3 and SMU 4.

With regards to the sediments beneath the white cliffs in SMU 3, Honeywell's letter indicates that the FS, I can't think right now, what does FS stand for? Feasibility Study recommended alternative includes dredging of near-shore sediments followed by capping along much of the shoreline.

Shoreline stabilization would be completed along the remainder of the shoreline in this area. And those areas targeted for dredging and capping, calcitic sediments would be removed. And those are these sort of glass type of sediments that I'm talking about. And the area covered with capping materials comprised of stone, cobble and sand. The thickness and size of these materials will be determined during the design phase.

They continue. "Various techniques would be used for shoreline stabilization, and may include vegetative plantings and brush mattresses. Along those portions of the shoreline that are either exposed to wave energy or more steeply sloped, stone may be placed at the bottom of the slope to stabilize the substrate and prevent erosion of the shoreline treatments. Honeywell believes these techniques will address the potential safety concerns you raised related to calcitic sediments along 2,500 meters of shoreline."

Again, this would be the area roughly from the 690 turn-off to State Fair Grounds to Ninemile Creek. That's approximately about 2,500 meters of distance.

Shoreline Safety Recommendations: In reviewing both the Honeywell and DEC plans for dredging and capping of the shoreline sediments in both SMU 3 and SMU 4, it is clear that specific areas along the shore-line will be dredged and capped from the lakeshore up to depths up to 9 meters. However, the reports are unclear regarding what specific stabilization measures will be completed along the shoreline sediments not specifically targeted for dredging and capping in this area.

In order to address the issue of physical safety concerns for anglers or boaters who may try to access the shoreline along the base of the white cliffs, I am recommending that solidified calcitic sediments along the entire 2,500 meters of shoreline at the base of the cliffs be removed to a water depth of one to two meters, and that the entire shoreline be stabilized with capping material composed of stone, cobble or sand to a minimum water depth of 1.5 meters.

The purpose of this additional shoreline stabilization is to provide safe recreational access for shoreline waders, anglers and boaters, who are currently at risk when they try to walk the lake shores at the base of the white cliffs there, due to existing layers of unstable calcium carbonate sediment.

I also have a separate statement which I may present later with regards to a fishery goal statement for Onondaga Lake and tributaries.

DIRECTOR LYNCH: Dr. Kaczmar.

DR. KACZMAR: S-W-I-A-T-O-S-L-A-V K-A-C-Z-M-A-R. I'm adjunct professor at Syracuse University and I'm chief scientist for O'Brien & Gere engineers. I'm here tonight speaking as an independent scientist. I had the good fortune of a public education. I have been performing risk assessment investigations such as this for over 20 years and teaching others to do the same.

I performed an independent review of the remedial investigation in the Feasibility Study for Onondaga Lake. Having reviewed that, I place particular focus on the risk assessment itself. Basically what a risk assessment is, it evaluates the chemicals in the system and it puts together a model of hypothetical exposures, and what's known about the toxic impact.

In reviewing this model the assumptions that were incorporated were very conservative, okay. Meaning that they had some very - assumptions that are unrealistic, but for the purposes of over-stating the risks. And the reason they're over-stated is for the purpose of protectiveness, not to try to put down, you know Honeywell caused the problem or whatever. But taking in the worst case, so that the uncertainties that might be inherit in the system, there are many, could be controlled.

Within that context there were some remedial actions taken to address those conservative risks. And it's my independent opinion that the remedies in the Feasibility Study adequately address those risks. And so I believe it's protective, and I believe it's for all practical purposes an appropriate remedy.

I'm particularly encouraged by the enhancements that are present. These are the kinds of things that are not required, okay, but really are going to make our community a better place, both on the ecological part in providing an integrated potential for development of the community. I'm very happy to see that and I'm happy to be here. Thank you.

DIRECTOR LYNCH: Sharon Fulmer.

SHARON FULMER: Thank you. I'm a resident of Liverpool and have been for more than three decades. My family was raised in Liverpool. I have served on two of the Onondaga Lake committees that existed back in the 19 - I don't know '80s and '90s. I see a few people here who were part of that group for the most part. We have all figured it was going to take a long time for something to happen.

And to that end I sincerely hope as others have said before me that Honeywell and the DEC can come to an agreement without requiring long drawn out processes that can see this go forth as quickly as possible.

I'd also ask one thing. The last slide you showed today talked about how people can view information about what's been going on at the Syracuse library and DEC and one other place I can't remember what it is. I'd ask that you remember the people who are affected the most by this, those being the people who live in Liverpool, the village and outside the village. And those people who live on this side of the lake as well, and that you provide all those written materials for the Liverpool library, which is open seven days a week and open until 9 o'clock every day. And for the library in Solvay or Camillus, Solvay and Camillus, which probably have some more hours. Thank you.

THE COURT: Dereth Glance.

DERETH GLANCE: My name is Dereth Glance, I'm a Central New York Program Coordinator for Citizens Campaign for the Environment. CCE is a not-for-profit, non-partisan advocacy organization with over 80,000 members across the State of New York and in coastal Connecticut. We work for the protection of public health and natural environment.

CCE understands the challenges to remediate the Onondaga Lake bottom and of the toxic, persistent and bioaccumulative chemicals and metals discharged from industrial polluters are unparalleled. CCE appreciates the efforts of the New York State Department of Environmental Conservation - I'll call you the Department from now on - Honeywell International and the host of stakeholder groups dedicated to improving Onondaga Lake.

CCE plans to submit formal detailed comments for thoughtful review by the Department. Today, because of the time constraints I'll limit my comments to the following recommendations.

First, CCE urges the Department to hold additional public hearings in a question answer and format. We're very pleased to

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hear about the question and answer that will follow this public comments process, I don't know the time that will be. And so from the turnout tonight it looks like we can really stand to have another public hearing in February. I understand there are several folks in the community that have been very involved in the process and were unable to make it today due to a variety of different conflicts.

Specifically we would like to have the additional public hearing to be held in the question and answer format so that we can inspire more and more questions from the community to thoroughly ask some good questions about the plan.

Secondly, we believe that CCE - we believe that the Department should provide ample opportunity for public involvement during the design phase. CCE understands that some of the most important decisions to be made regarding the Onondaga Lake bottom clean up are currently scheduled to occur during the design phase. These key

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decisions currently include determining the appropriate Sediment Containment Area or the SCA, identifying the appropriate method of effluent treatment, in determining the long term monitoring requirements.

CCE believes these issues and others raised by this project will impact the local community and that the design phase needs to be transparent and accessible to the public. To this end, CCE recommends that the Department establish a Citizens Advisory Committee or CAC. The Citizens Advisory Committee should advise, provide guidance and support the Onondaga Lake remediation efforts.

CAC members would meet on a regular, perhaps monthly basis, to review plan implementation, provide input on design phase decisions, and receive reports on Onondaga Lake remediation progress and challenges. The CAC should consist of members representing the Onondaga Nation, scientists, environmentalists, local environmental officials and concerned

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citizens. Such CACs are well established throughout New York State and the nation and have been beneficial to government agencies, stakeholder organizations and the general public.

Finally, CCE believes that the Department should require public education as part of the Onondaga Lake bottom remediation efforts. CCE is concerned that the Proposed Plan, including the three preliminary remediation goals or the PRGs do not include a public education component to inform the public about the risks of our changing local waterbody.

CCE believes Onondaga Lake remediation discussions and actions need to be part of a coordinated public education effort that will inform individuals about the safety of using the lake for common recreational activities such as fishing, consuming fish, wading, swimming and boating.

Specifically, CCE is concerned about the PRG 2 or the Biological Tissue Goal, which is to achieve pollutant concentrations, to the extent practicable in fish tissue that are protective of humans and wildlife that consume fish.

The extensive mercury contamination in Onondaga Lake warrants aggressive public education efforts concerning fish consumption CCE understands that this is a long term goal, and that the public education and outreach efforts about the risks to human health from consuming Onondaga Lake fish needs to be a critical part of the remediation plan to protect public health. Thank you.

DIRECTOR LYNCH: Don Hughes.

DON HUGHES: Thank you, my name is Don Hughes, H-U-G-H-E-S. I've served as techni-cal adviser to Atlantic States Legal Founda-Tion, and I'm a resident of the city of Syracuse since 1985, I believe. I'm going to talk, going to add to Sam Sage's comments earlier, but talk more about some of the technical issues concerning the remediation.

First of all, people should know that the remediation depends very heavily on the viability of the slurry wall. This is an intermediate, interim remedial measure which is to be placed along the western shore in the corner of the lake, it's a mile and-a-half long. And it will hopefully cut off the movement of non-aqueous phase liquids from entering the lake. This has got to work for this whole plan to work. If it don't work we're going to be in trouble.

It has the cap, which is to be placed over the in-lake deposit is designed on a groundwater flow of 6 centimeters per year, the existing groundwater flow is about 200. So the slurry wall has got to reduce it, has got to cut off the groundwater, and you have to pump that groundwater into a treatment system. Okay, so that's a big concern.

Another concern I've got it has to do with what we're doing with the sediments. The sediments are going to be pumped up to the wastebeds, wastebed number 13 has been tentatively selected and I would ask why that one? It would seem that treatment has not really been considered to any extent except to the most cursory level.

The contamination in the sediment is concentrated in these tarry deposits which are a non-aqueous phase. And these things are dispersed throughout a matrix of calcium based waste which is the Solvay waste, which is the white, the same stuff that's the white cliffs. And it's probably a fairly easy task to separate those two things. This is, you can use mining technology to separate things which have different sizes and different densities, and it's cheap.

It's been demonstrated on contaminated sediments in Saginaw Harbor, Saginaw Bay. And I was part of that investigation and it does work. And I think that the Department and Honeywell should look extensively into that, because that's a way to take the toxicity out of the sediments. And that is a primary goal of Superfund is to significantly and permanently reduce toxicity.

Another big issue is once you get the sediments onto the wastebeds what about volatile emissions? The sediments contain a whole host of volatile chemicals, including benzene, toluene, chlorobenzene, dichlorobenzenes, xylenes and so forth. These things don't only smell bad, they are toxic. And we don't want to expose either residents or workers to this stuff. So we've got to have a good control system on odors, on emissions.

Another issue has to do with the deep waters of the lake. Now the plan really focuses on the littoral zone, the shallow waters of the lake, the profundal zone, which is the deep waters, is - well, it's kind of left in the lurch. It's - the plan really lacks a plan other than wait and see. That's what monitored natural recovery is.

The concentration of mercury will be monitored in surface sediments over time, over 10 years. And this is somehow going to be modeled using a program called STELA. STELA is a generic program for which any number of parameters and inputs can be specified. Right now we're kind of lacking basic inputs as to what's going to go into that.

And there is a lot of issues having to do with disturbance of the sediments and how the STELLA is going to successfully model the sediments. You've got groundwater moving upward into the sediments. There is a release of gas bubbles called ebullition, because there's been so much organic matter deposited in the bottom. And once the lake becomes more hospitable in the bottom waters, hopefully that's going to happen, now that Metro is being upgraded, we're going to see more fish and macro-invertebrates living in the bottom waters, which means more disturbance, more bioturbation of those sediments.

And based on the comments of Mr. Freedman we might see some boat anchors to worry about as well. So the profundal zone is a big big question mark. I would tend to characterize this whole remedial action as Part 1, the littoral zone. And Part 2 is the profundal zone, that will come later.

Finally I've got a generic comment

how the decision-making process goes. All three of the preliminary remediation goals and all five remedial action objectives are qualified by the phrase "to the extent practical." This type of language is typical in the Feasibility Study. But who decides what is practical and how will the public learn of and participate in these decisions?

How useful is the public -- how useful to the public is a goal that is achieved based on an undefined assessment of practicability? Is a qualified goal a real goal? Shouldn't goals and objectives be transparent, achievable and measurable?

Why not define what clean up levels are technically practicable given the very best model cutting edge remediation technologies fully justifying and documenting the determination to the public, and make those the achievable and measurable goals. Thanks.

DIRECTOR LYNCH: Sara Eckel. Sara Eckel here?

SARAH ECKEL: E-C-K-E-L, S-A-R-A-H. I have seen the proposed plan to use existing wastebeds to contain the various sediment. And my concern evolves around the fact it will not include a comprehensive clean up of these existing wastebeds. While I understand the cost-effectiveness of the already contaminated areas I do not believe the plan should ignore the future problems that could result from leaving these areas untreated. I also understand the need to move this plan forward and I believe it should be done with future generations in mind.

DIRECTOR LYNCH: Steve Effler.

STEVE EFFLER: E-F-F-L-E-R. I am director of research of the Upstate Freshwater Institute, a not-for-profit research organization, and it's involved in the research study of a number of fresh water systems throughout New York State.

I've spent the larger part of my professional life studying Onondaga Lake. Some people do Lake Tahoe, some people do Lake Erie -- well someone had to do it I guess.

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Anyway, the Institute over the last 20 some odd years has published more than 200 articles in the peer reviewed literature, and we're quite proud of the fact that one of those articles entitled The Impact of the Chlor-alkali Plan in Onondaga Lake and Adjoining Systems was actually the primary technical basis for the provisional lawsuit that has led to this cleanup.

As I said, we're involved in the research of a number of systems and have in the last decade led the development of water quality models for the New York City reservoir system.

Let's get down to where we stand based upon our review of much of the available documents with regards to cleanup of the Honeywell site. We enthusiastically endorse the proposed rehabilitation efforts for the site that include removal of toxic sediments, capping of sediments, and improvement of degraded habitat. We endorse proceeding without undue delay. Let's get on with it, we have all waited a long time. With the

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following caveats, of course.

There is a continuing review process. EPA will be involved in continuing technical review. There are portions of these documents that frankly fall outside of our expertise. And also we understand the way this process works, if indeed we find new sources of contaminant problems in the future during clean up those items would also be addressed.

All those nice things said, and by the way all the hard work that I know has gone into this, those efforts certainly should be applauded. All that said however, we have great concern with the lack of understanding of the behavior of contaminants from the Honeywell site within the lake itself. This is - we don't fault any of the agencies or organizations involved, to our way of thinking this is largely attributable to the constraints embedded in the Superfund process. It's simply a very difficult arena to get some of the basic scientific information that I think we still need.

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Why should the community care about this esoteric stuff? Well, because neither Honeywell or the state can really tell us how much better the lake will be following execution of these rehabilitation programs. Meaning, they cannot answer the question quantitatively at least, how much lower will fish mercury concentrations be following these programs? Think about that. And that's not just mercury, the other contaminants also.

We have every reason to expect, as they have argued, things will be better. But at this point don't you think we ought to know how much better? And basically this comes down to the what's lacking is a credible scientific mathematical model that can predict responses in the lake to these and other management actions. There was originally a mathematical modeling element in the Superfund work, particularly related to mercury. But these efforts had to be dropped.

While we support moving ahead with clean up actions without a model - I'll say that again. We do support moving ahead with clean up actions without a model, this limitation should be eliminated in the future. We need those tools, we need that level of understanding. As Charlie Driscoll from Syracuse University was recently quoted, "If you understand the system you can model it."

So where we are is, while we expect things to get better and indeed so do I, I think we want to know it a little better than that.

Further, UFI recommends that this model be developed and tested outside of the Superfund process. Simply put, the process by the way it is set up it is simply not the arena to get this level of understanding. The kinds of questions or information such a tool gives is, it allows us to evaluate the feasibility of reaching various goals, certain levels of contamination in fish flesh, it will help us establish reasonable expectations for the lake in response to rehabilitation efforts. How much better will it get? And allow and support quantitative evaluation of management alternatives. And could contribute to future parts of a management program.

Lastly, we support the comments of a number of previous speakers with regards to the monitoring program. The monitoring program is extremely important, particularly for the adopted build and measure approach that relies primarily upon monitoring information before and after implementation.

This needs to start ASAP. We really don't have, from what's been done so far, adequate monitoring data to be able to assess how much better things are going to be following implementation. This needs to be designed and implemented so that it can also support the modeling program. It needs to be flexible to allow changes in response to observations, it needs to be flexible, right.

In other words when we see certain behavior we need to make changes. And that's very difficult within the Superfund process. And we believe that this data needs to be available to the public soon after collection as well as other experts. Thank you very much for your time.

DIRECTOR LYNCH: Nancy Ciampi.

NANCY CIAMPI: Thanks, Ken. Nancy C-I-A-M-P-I. I'm a town of Geddes resident. And I just want to say thank you, express my appreciation to the DEC, to Honeywell, Earth Tech, for the sessions that were held in the Town of Geddes December 9th, and the two sessions in January, as well as tonight. And hope that they continue.

My comment is that I feel these sessions are very important to the success of the plan and that the public needs to know that there will be well publicized open and honest public meetings to get frequent status updates and share their concern.

DIRECTOR LYNCH: Peter Pedemonti.

PETER PEDEMONTI: P-E-D-E-M-O-N-T-I. I just like to say I would like to see the most thorough and complete clean up of the lake regardless of time or cost. Just because when put into the context of our responsibility to future generations, the Onondaga Nation, wildlife and the lake itself, it means a little less. So thank you for the opportunity to comment.

DIRECTOR LYNCH: David Arnold.

DAVID ARNOLD: My name is Dave Arnold, A-R-N-O-L-D. I'm a life long resident of Onondaga County, Town of Clay. And I am a farmer. My farm is located on Route 57, just north of Moyers Corners almost to Three Rivers.

Two years ago on January 15th, 2003, I stood in front of you and spoke against issuing Evergreen Recycling a permit to operate in the Town of Clay. Along with 500 others we spoke our minds and collectively convinced you this was not a good idea, even though the Clay officials did. During this meeting I spoke about illegal acts committed by our elected officials. Since that time our representatives have rewarded those acts by issuing more than $2.5 million in grants on projects involving a fraudulent contract at Three Rivers Point.

The Onondaga Lake Cleanup Project is much larger than the projects involved in Clay. The Clay Brownfield clean up project at Three Rivers could easily surpass $50 million if the land is cleaned up the way it should be.

If we can't even start a project in Clay without corruption and fraud at the $50 million level, how in the world can Onondaga Lake Cleanup Project succeed? A half a billion dollars in this town is a big chunk of change. We need someone at the county level that we can trust to take charge and appoint public committees of oversight that will independently scrutinize all phases of these projects. We must all take responsibility for neglecting Onondaga Lake and Three Rivers Point. Yes, the perpetrators will pay a large price, but we will pay an even higher one if we don't succeed.

On September 10, 2004, I contacted the Attorney General's office. It is my hope that Mr. Spitzer will investigate and prosecute all those involved in corruption and fraud in Onondaga County, so we can then proceed with confidence on these extremely important environmental projects.

We are fortunate in this country to be able to criticize those who represent us. What is unfortunate is when they refuse to listen. Thank you.

DIRECTOR LYNCH: Sherry Mossotti.

SHERRY MOSSOTTI: Thank you. Hello, Ken. Sherry M-O-S-S-O-T-T-I. I'm here to speak as a citizen and a taxpayer of Onondaga County. I am a life long resident of this county. For over 23 years I have driven by Onondaga Lake and thought what a shame. I've traveled all over the world, and it doesn't take someone to travel to know the importance of a lake on a community. This is an opportunity, folks.

In my position as executive director of the Premier Community Leadership Program in this community that trains and educates our community's leaders which include 600 adults and 300 youth leaders, we have had the opportunity to hear about the history of the lake from a historian, what's in the lake from the scientists and biologists, the engineers, the methodologies for clean up, and also the economic potential of Onondaga Lake. Onondaga Lake clean up is a topic that continually comes up among our community leaders that we train every single year.

We have met with Honeywell, we have met with the DEC, and we have reviewed all of the proposed plans. I have discussed this with Ken Lynch, Neil Murphy, who is the head of SUNY ESF, numerous scientists, engineers and residents both adult and youth. And it was great to see some young people come up and speak this evening.

On behalf of Leadership Greater Syracuse we applaud Honeywell, the DEC, the county, the city, O'Brien and Gere, and all the interested parties for coming together to the table. And we ask you, no, we implore you, on behalf of our community, our

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wildlife, our children and our grandchildren, to continue to come together and work at the table and move this project forward to find a resolution that we can all be proud of for years to come for our children and our grandchildren. Thank you.

DIRECTOR LYNCH: Terry Brown.

TERRY BROWN: Thank you. I have to be honest I'm a little conflicted here this evening, didn't know whether I was going to say anything. But I'll get unconflicted at the end of my comments here. My name is Terry Brown, I'm am chairman/CEO of O'Brien & Gere, it's an engineering and construction firm headquartered in Syracuse, New York. And I have lived in Syracuse all my life. I raised my family, and I've been with O'Brien & Gere nearly 30 years.

I spent my first six years of my career with O'Brien & Gere making or building the third Metro wastewater treatment facility. It's now in its fourth construction. In 1974 that was supposed to clean up the lake, if people go back and look at the newspaper

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articles.

I really have a passion for the community, a passion for this lake. And I have really more so a passion of the opportunity we have as a community in front of us.

As an organization, O'Brien & Gere, we're in our 60th year. Our founder, Earl O'Brien, graduated from Solvay high school in 1913. So we have a presence in this community. We pride ourselves in offering cost effective environmental solutions for our clients and municipalities we serve. Solutions which on sites, environmentally impacted, they protect the environment for future generations. That's kind of the background.

As I started listening to some of this thing, I've attended these information hearings and I have spent a lot of time in the last, I spent 18 months looking at the sites and what they could be, trying to develop a vision with a couple of my colleagues on our own time. And the vision

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that we can create as community for the sites and the lake is just unbelievable.

We really are at a crossroads in this community as to what we can do. And the thing we talk about, and I'm an engineer, which is much different from a scientist, I'm a doer. And I was trained, some of my training was in military. The one thing I was trained to get was the information, as much as you can, in your gut, you know what's ahead and there is tough times ahead of you but you manage the situation and go.

And we can talk about modeling, and all this other thing that we've talked about but there is a point in time where we have to go. And I'm sorry, we have made this so confusing for the public, modeling and the science. This is not. And I beg forgiveness from some of my scientific colleagues, this is not rocket science. We don't need to make it difficult for this community to understand.

We have enough information and to go with the information we have, to have an effective clean up in this community and create a vision. But we have to have a sense of urgency. That's what I want to stress, this is not necessarily the DEC but the people that are commenting and running comments in the future.

We have, I have worked on sites for 25 years. We've had numerous corporations, we'll buy out a site, different philosophy, different management team come in. We have an organization willing to invest in this community now and take action. That could change tomorrow. We can't let this slip by us.

And when I say acting, take the information that we have, I could give you a resume of hundreds and thousands of environmental sites. And we just had some information, we knew what the science was, we didn't have all the answers but we went out there and cleaned it up. And to my knowledge O'Brien & Gere was never cited for any environmental citation, our reputation is flawless in the nation. We have worked

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with DEC and some of the gentlemen sitting here on numerous occasions. We didn't have a lot of information, but we had enough science, we knew what the conditions were and we managed it.

So my comment really to this group here is we have to have a sense of urgency. We have to make the science simpler. We can do the modeling as we go along. We'll learn more by doing and addressing the issues as we take on the environmental remediation than we will ever learn in the modeling process. And we'll have better models in the future. But we have to move on.

A very wise gentleman said to me this afternoon, who we all respect in this community, he said, we have an opportunity and we've got to make it right. But we also have to move and we have to move with urgency so we don't lose this opportunity. Thank you.

DIRECTOR LYNCH: Those are all the people that signed up to speak. Is there anyone else who wants to speak for the record other than a question and answer period? Les?

LES MONOSTORY: I'm speaking now on behalf, well as a co-chair of the Fisheries Subcommittee of the Onondaga Lake Partnership, also vice-president of the Central New York Chapter of the Izaak Walton League. And I'm going to talk about a fishery goal statement for Onondaga Lake and tributaries.

"It is difficult to evaluate the restoration plan for Onondaga Lake without first reaching a community consensus on the restoration goals and objectives for Onondaga Lake and it's major tributaries." This is a memo that I wrote to the Outreach Committee on October 27th, and also addressed to the committee chairman, who is Seth Ausubel with the US EPA.

"On November 10, the Fisheries Subcommittee meetings included a discussion on fisheries goals and objectives for Onondaga Lake. Comments include the following:

MONOSTORY

Participants at the first Onondaga Lake Fisheries Roundtable agreed that we want to improve what fisheries we already have.

Onondaga Lake and it's principal tributaries can be promoted as a combination cold-water and warm-water fishery.

The Fisheries Subcommittee members agreed that as a future fisheries goal, Onondaga Lake should be clean enough to support both warm-water and cold-water fish species, including trout and Atlantic salmon.

On November 17th I received an e-mail from Dave Lemon, an aquatic biologist with DEC in Cortland. Lemon is a member of the subcommittee but was not able to attend the November 10th meeting. He had the following comments:

Reading over the November 10 meeting minutes I just wanted to provide some comments regarding the desire for creating a cold-water fishery on Onondaga Lake." We're getting a little technical here but this is - Lemon makes some interesting points.

MONOSTORY

"We in the Region 7 Fisheries Office do not feel that reestablishing a self-sustaining population of trout and Atlantic salmon in Onondaga Lake is a realistic goal. I'm not sure if this is the objective of the group or not." Referring to our fisheries subcommittee.

"I've attached a draft position statement to EPA, which provides some facts on the life histories of the Cisco," the former white fish "and Atlantic salmon as well as current and expected conditions in the lake. Based on this we don't believe that self-sustaining salmonid population are a realistic objective in the foreseeable future.

As such we feel that the realistic objective for the lake's fish community is a combination of cool-water walleye, perch, pike, and warm-water bass, bluegill, etcetera, species. We certainly would be happy if lake conditions improve enough so that year-round habitat for trout survival exists, but for the foreseeable future that scenario is unlikely.

The Region 7 Fisheries Office has prepared a draft position statement to EPA entitled 'Coldwater Fisheries Rehabilitation and Management in the Onondaga Lake Watershed,' also known as the Fishery White Paper, which was prepared in July of last year. In addition to providing background information on lake water conditions and environmental requirements for various fish species, the White Paper recommends adoption of a fishery goal statement for Onondaga Lake."

A specific Goal Statement for the lake is presented as follows. "In the long term the Onondaga Lake Partnership supports the achievement of a suitable year-round habitat for a sustainable warm-water and cool-water fishery in the lake and conditions conducive for transient cold-water species in the lake and resident cold-water species in the lake tributaries."

As co-chairman of the Partnership's Outreach Committee's Fishery Subcommittee I endorse the fisheries goal statement contained in the DEC's Fishery White Paper and recommend adoption of this goal by the Onondaga Lake Partnership and its member agencies. This I think will help us at least in terms of what we would like to achieve as a fisheries goal and as a lifetime fisherman and, you know, as president of the Sportsmen's Federation I think - I happen to agree with the DEC's Fisheries goal for the lake.

DIRECTOR LYNCH: Anyone else like to speak? Bob?

BOB NUNES. My name is Bob Nunes, N-U-N-E-S, I'm the EPA project manager for the Onondaga Lake NPL site and I just wanted to briefly elaborate on what Ken said briefly in the presentation about EPA's role and what process it's following now with regards to this Proposed Plan.

EPA's role for the Onondaga Lake Superfund site has been to act as a support agency to DEC. In this capacity EPA has provided approximately $18.7 million to the

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State of New York under a cooperative agreement. And this funding has supported the performance of investigation activities, coordination and tracking of site-wide remediation activities, development of a comprehensive enforcement program, implementation of a site-wide citizen participation program, creation and maintenance of a site-wide database and project management activities.

EPA has also provided technical supports to DEC related to the investigation and clean up of the Onondaga Lake subsites. For the Onondaga Lake bottom subsite EPA provided technical support during the rewrite of the remedial investigation and review of the Feasibility Study report.

EPA will offer a position on the preferred remedy after the Proposed Plan and other project documents have been reviewed by EPA's National Remedy Review Board and EPA's Office of Superfund Remediation and Technology Innovation Sediments Team. (Microphone emitting noises) I thought it

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was the acronyms that were causing the problem.

The National Remedy Review Board is an EPA peer review group composed of technical and policy experts that review all proposed Superfund clean up decisions that meet certain cost-based or other review criteria to ensure that the proposed decisions are consistent with the Superfund law, regulations and guidance.

EPA Sediment Team offers consultation to assist risk managers in making scientifically sound and nationally consistent risk management decisions at contaminated sediment sites. The Board and Sediment Team will provide feedback to EPA Region 2 and a summary of the Review Boards and Sediment Teams comments and responses from the Region will be included in the responsiveness summary in the Record of Decision. Thank you.

DIRECTOR LYNCH: Anyone else? I want to thank everyone for some great comments. What we're going to do right now is take a very short five minute break, allow our stenographer (court reporter) to rest his hands and everyone to stretch a little bit. But we're going to try to start again real quickly with a question and answer period in about five minutes.

(Brief recess then Q&A period).

DIRECTOR LYNCH: Please don't be afraid to move up closer to us. Okay we're going to reconvene with the question and answer session. I apologize to all of you out there that have been sitting, dying to ask questions. As you can see we had a lot of people sign up for official public comments so we had to take those first. And hopefully we can answer all your questions tonight that you've been waiting to ask.

I will be attempting to answer some of those questions but not being an engineer or scientist myself I'm going to rely on my experts which are in the first two rows here. So please be patient with us so that we can identify the appropriate person amongst us to answer your particular question.

Q&A

I will ask a couple things. Try to ask only one or two questions at a time so I can get around the room and at least give everybody an opportunity to ask questions. We're going to try to go as long as possible. We'll also likely stick around to talk one-on-one with you if you want to ask your questions in that form.

We would also ask that if you have an especially technical question, and being a complex cleanup there are a lot of technical issues and questions, we will try to briefly respond to that. But we may ask that you stick around or talk to one of our experts outside on that particular interest so we don't consume everybody else's time and take up the opportunity for some other questions. So what I'm going to do is kind of open up to raise your hand and I'm going to ask Dawn, we'll start in the front and Dawn kind of work back with the microphone so she's not jumping all over the place.

Questions. You're going to have to start in the back Dawn. Also state your name for the record because this is also going to be recorded. This question and answer will be part of our response and summary as well as a response to all the comments that were made earlier .

BARRY RAICHLIN: Has there been any other searches all over the world with any other ways to do this than what we have, just plain on dredging like your swimming pool? Has there been any other things? With all the engineering we have in the world why haven't we looked into somewhere else that might have a better idea than we have? We're looking for Number 4, not Number 1. Get this done. Either you do it all, do it right or don't even bother because mother nature is doing a great job so far.

DIRECTOR LYNCH: The Feasibility Study that was an assessment of all the alternatives requires Honeywell to go and look at other technology out there other than just dredging. And although the Feasibility Study concentrates on dredging and capping alternatives Honeywell wasn't required to look at some other technical expertise around the country and around the world. And I'm not aware of any specific one that they looked at or one that they found would address a mercury and a sediments issue.

But they did look at, one of the things they looked at, as you said, leave it alone. They did look at the option of leaving it alone. And it was simply as a Department we didn't feel that that lake would heal itself in an acceptable time frame. It would leave open the environment, the fish, humans accessible to contaminants for a very long period of time before it was covered up.

BARRY RAICHLIN: Well, this is the fox in the hen house deal. As long as the little dinky fox is there we're going to have the same problem. I won't live long enough but the problem is going to be there unless we get everything out of there. We stop all the pollution and, you know, all the arteries going into the lake, it's never going to stop. This is just providing jobs for everybody, engineering, everything else. It's not the solution. You've got to cut the BS, you've got to get it all out of there or don't do anything.

You can damn it or whatever, you get right down to the bottom all the way around the lake, you won't have to worry about it anymore once you got them in jail, the crook, right? If you don't do that it's just going to keep going on and on.

I've been here 60 some years, if you don't straighten it out now it's never - if you don't do it completely it's never going to stop.

DIRECTOR LYNCH: We understand it's very important to address it now and we think we have a pretty good plan to do that.

BARRY RAICHLIN: Thank you very much.

DIRECTOR LYNCH: Thank you. In the back.

TOM RHOADS: My name is Tom Rhoads, R-H-O-A-D-S, and I was wondering about the sediment containment areas. I'm sorry I missed the first part but it seems like there is an awful lot of dredge spoils that are going to be moved in this project and I was wondering if there were going to be further public hearings or further discussion on the transport of those sediments, the dredge spoils and the containment system for the Sediment Containment Area and the capping enclosure of that so the sediments are not remobilized later on into the lake.

And I was wondering if there would be future public hearings on sort of that portion of the cleanup. This was primarily about the lake itself. Thank you.

DIRECTOR LYNCH: Excellent question. First the sediments have two options, two routes. They could go to a permitted facility or the less contaminated sediments right now are proposed to go somewhere on the wastebeds. That is a pretty general proposal in the plan. It is not defined and we admittedly will say that there is a lot of design work that needs to go into any sediment containment area on the wastebeds or anywhere else before it's built.

We do have the very basic requirements that a liner be placed for such a structure that thereby a leachate collection system and that leachate be treated. We will not permit or allow any sediment containment area unless we are convinced that it's stable and can adequately withhold the sediments that are put in that area.

We will be reviewing any proposals during the design phase. I will expect and I have had a meeting with the Town of Camillus, some of the residents that live near that area, that we will be coming back to the public to discuss any specific proposals that are made for disposal on those wastebeds. And that will likely also involve a public meeting for anyone interested in the specifics of that proposal.

Other questions?

JIM RHEA: Jim Rhea, R-H-E-A, life-long resident of Onondaga County. And I just have a clarifying question hopefully. In your presentation earlier you talked about the two different options, the one that

Honeywell had advanced and then the one that the state advanced in their plan. And there is a big difference there in terms of total volume that is going to be removed as well as total cost.

We heard some comments earlier about urgency and the need to work together and cooperatively. I wonder if you can comment, maybe clarify for everyone here what is the difference between those two in terms of actual volume and then maybe actual risk reduction. Because I assume that those differences need to be related to risk.

DIRECTOR LYNCH: You hit the major difference. Conceptually the two plans are very similar in that they both divide the lake into eight specific sections and develop a cap and dredge proposal for each of those sections.

The biggest difference in the - between the two plans is the amount to be dredged and the amount of capping that's placed. And the Department's position is, we took a very much more conservative view as the amount of material that needs to come out, the contaminated material that needs to come out, partially based on a risk assessment.

And also a little more conservative view of the depth of a cap that actually needs to be placed in the water to be protective. There are some other differences and these guys can probably add to that if you want to hear more about the differences between the two plans.

But the significant differences is the amount to be dredged. I think it was a half a million cubic yards in the Honeywell proposal and 2.7 for the DEC proposal.

DAVE ARNOLD: Dave Arnold, I spoke earlier. I guess what I'd like to do is just clarify, Mr. Lynch. In the beginning I said that I attended a hearing on Evergreen Recycling in the Town of Clay. And I would just like to I guess have some reassuring that you're not going to dump the bottom of Onondaga Lake on top of the Town of Clay on Woodward Industrial Park.

DIRECTOR LYNCH: There is no proposal to

do that, Mr. Arnold.

BARRY RAICHLIN: Why not?

DIRECTOR LYNCH: Any other questions?

RALPH MARTONE: I live over here in the city. I would like them to just expand on the toxic mercury methane and what is the possibility of, you know, health, once they start to dredge.

DIRECTOR LYNCH: During the dredging activities itself? You mean the extent to which mercury will be stirred up?

Q. (Martone) Right. I heard a new term to me, mercury methane?

A. (Lynch) Mercury methylation.

Q. Yes, what type of threat is that to the public health?

DIRECTOR LYNCH: I'm going to draw on one of my experts on this one to answer. Who can answer in very general terms. If we can explain mercury methylation and the potential impact from mercury during the dredging activities.

A. **(Bob Edwards)** I think I'm loud enough. I volunteered to answer your question. I

Q&A Martone - Edwards

work with the DEC and I've been involved in many or several anyway, dredging projects across the state. I was project manager of one big one up in Lake Champlain. And there are a number of controls, engineering controls that take place in the lake while we're dredging that would not expose any of the public to any mercury or any other contaminants that's in the soil or in the sediments.

Once that material is pumped up to the treatment system and the containment cell there will be controls up there to minimize odors, and there won't be any opportunity for this material to spill outside of the work zone. I mean that's one of the reasons these designs are so long is we have to cross every t and dot every i on the engineering aspects of it before we do start.

I know many people spoke to me today about how I remember they dredged down in Jamaica Bay or when they dredged the canal out and they just sprayed the stuff everywhere. That's a different type of dredging than environmental dredging. And actually the days of just spraying it up and the odors being uncontrolled are long gone. The public will not allow that to happen and we will not allow it to happen as DEC.

So I don't know if you were here for the availability section, but there is a lot of different things we can do to control odors and prevent releases of chemicals and exposures to the public and to workers.

One thing - at any of these jobs all workers are required to be trained in health and safety. There is many courses we have to take, there is many different protective clothing and respirators and stuff that we wear. So human safety, public safety, worker safety, those are paramount to any of these jobs. And all those controls and all those provisions are taken up in the design so that before any of this work starts we've addressed all these concerns.

Q. My question really is the hazard of mercury, this mercury evaporating, can that get into the atmosphere and surrounding areas or not? Is that possible or not?

A. Not during the dredging process because it will all be under water. It won't come up. How environmental dredging - or how hydraulic dredging works is a large amount of water is moved with the sediment. It's a giant pump on a boat, is essentially what it is.

Q. Slurry dredger?

A. It will slurry the material and pump it so there is no opportunity during the dredging process for that material to come to the surface, to the air. First time that material will be in the atmosphere would be at the treatment facility. And at that point there is other controls that can be taken to prevent exposure there.

RALPH MARTONE: Thank you.

HENRI HAMEL: I can probably be loud enough too. My name is Henri Hamel, I work for the State Health Department in Syracuse, and fairly familiar with the Onondaga Lake problems because I was a SUNY ESF student a long long time ago. I don't want to say how long.

Under current conditions the only risk or the primary risk that we've seen from the lake would be to people who are consuming fish. And as far as mercury getting into the atmosphere from the lake, that's not quite the way it works here. The mercury that we're worried about is mostly tied up in the sediments in the bottom of the lake where it was deposited. So you're not taking any hazards or any exposure from mercury just under the current conditions by living near the lake or walking around the perimeter or anything like that.

Now when we do start dredging, as Bob said, the dredging operation is under water, so we're not expecting that we're going to have any mercury exposure coming up. The sediments will be transported by pipe to the containment facility, and at that point we'll be trying to design systems then that will prevent anyone from being exposed to any volatilization of mercury or any of the other chemicals that we're going to be removing.

Now part of our operations at the lake front and also at the containment facility will be some health and safety monitoring for the workers. But we also mandate, the State Health Department requires that these projects have community monitoring programs. And we have instruments that can detect volatile organic chemicals, we also have instruments that can detect mercury.

So there will be monitoring to prevent any exposure to the public. And provisions that -- of what we would call action levels. And if we detect something with our instruments that is approaching a level that, it's a conservative level that means that somebody is going to be exposed then we have contingencies to shut down the project, do something differently, design a different system.

So we are very concerned about exposures to the public. We want to do this project to minimize that. And that's part of the design too. And we will be back talking about the design.

JEFFREY FREEDMAN: I just wonder if the folks from Honeywell would care to comment on their basis for believing that their Proposed Plan would bring the Onondaga Lake into compliance with the Clean Water Act. We've heard from the DEC and I think the public would like to hear from Honeywell if they would care to comment as well.

DIRECTOR LYNCH: This is a DEC meeting and I don't want to turn it into a Honeywell/DEC debate. I know the Honeywell people very well and if they're willing to speak they can or if they're willing to talk to you later, which I'm sure they would, outside to talk about this.

I know Honeywell has obligations and requirements under the Superfund process so I respect their position. If they want to maybe talk outside with you to explain the difference and their thoughts on their plan. And I see them shaking their head out there. So I think they would like to meet you after the meeting and talk to you.

BARRY RAICHLIN: You know, I was wondering she says they're going to develop means to process the waste. What do you mean they're going to develop it? Don't they know how to do it yet? Does all that water that's going to be pumped over there - what are they going to do with that, is that going to go back into Onondaga Lake like Skaneateles Lake water? Is it going to be sitting there and have to dry out for ten or fifteen years like the rest of that mess over there had to do? Why aren't we taking it to Wyoming or Buffalo or some other place. Why do we have to put it in our own back yard? That doesn't make any sense. Are there any other alternatives like railroads that we still have? You know, why can't we do that, why do we have to put it in our own back yard? Come on.

DIRECTOR LYNCH: Again, part of the Feasibility Study looked at those, specifically railroad, truck, transportation to facilities not only in New York State but out of state. This is one, another thing that they looked at was the feasibility of putting it nearby on the wastebeds where deposits have been placed before.

BARRY RAICHLIN: And it stunk.

DIRECTOR LYNCH: And the Department has agreed to assess that proposal. And if they can specifically design it, we know that they can dredge and place it in an area and contain the water and treat the water before it is discharged back to the lake.

They can dredge an environmentally safe manner and control the dredge spoils. It's been done before. We're very familiar with the basics of that operation. However, this is specific to Onondaga Lake. We have more contaminants, we have a lot of different contaminants, we have a unique area in the wastebeds.

So that's why we have to look at the details that Henri talked about and design something that will be safe to the environment. And if they can demonstrate that it will be safe to the environment it's

something that we will consider in this area.
Q. (Raichlin) How do they take the water out of all those sediments and not ruin the whole area? She said they have to design something. Don't they know how to do it yet? That's scary.
A. (Lynch) I think they know how to dewater sediments. But specifically up on the wastebeds for this amount of sediment and the type of water that you're going to be taking out of those sediments you have to design specific parameters to demonstrate that it will be an effective ratio.
Q. So you're going to put it on top of the pads we already have there?
A. The wastebeds you're saying?
Q. Right.
A. That is one of the proposals. And one of the most likely or the wastebed that they're looking at first is Wastebed 13. And part of that reason is because that's one that was not entirely filled up. And there is some area that needs to be filled.
But again, there is a lot of detail to

be worked out regarding stability, controlling the water and the runoff, treating the water and containing the sediments. And --

Q. Why couldn't you go over across on the Thruway across from the service area over there. There is a big area over there that they're trying to ruin right now.

A. There is a lot of different areas you can look at but there is ownership issues, there is accessibility issues and there is a whole host of other things. But they did look at a wide range of disposal of sediments from the dredging activities and this is the one that we're going to focus on first in the Proposed Plan.

Q. They ought to have more public input than they have had so far. Make a lot more people have input.

A. As that plan is developed we will.

DORIE KRAEBEL: My name is Dorie Kraebel. K-R-A-E-B-E-L. I was just wondering, I was looking at the charts earlier and it looked like you were doing the option four or around there. And I was wondering how you decided to stop there. I was looking at the other charts, it seemed maybe that wasn't quite deep enough or far enough into the lake to get everything. So I mean I was wondering if it was like financial or just physically unable to do it or what the reason was for stopping there?

DIRECTOR LYNCH: The short answer is that the number one factor that we considered in any of the remedies is that it has to be protective of human health and the environment. And there are a number of remedies that had the potential of being protective of human health and the environment. But as you went up to different levels you would see that others are much more protective and less risky.

We basically did a risk assessment and determination that our proposed remedy, which is kind of a mix of the 14 outlined in the Feasibility Study. But our proposed remedy was the adequate remedy for both a feasibility standpoint, whether it actually can and will be implemented and most importantly from an environmentally sound standpoint.

DORIE KRAEBEL: Thank you.

DAVE CHAPMAN: I was just curious in the design phase if there is going to be any room for pilot projects to look at proprietary technology that could assist. One of our lab tests showed that we were able to stop wastebed B permeability by 99.88 percent within 600 hours. And as he mentioned binding it up or making sure it doesn't release back into the environment, that they'll be looking at technologies or be a forum for discussing and looking at it and still at the same time still protecting proprietary technology and so forth.

DIRECTOR LYNCH: There is always a potential to pilot projects as part of one of the remedial projects. As a matter of fact one of the pilots in this project is the oxygenation. I would suggest that since it is likely that Honeywell will be the responsible party implementing this plan that's where you could take your interest.

And that is the potential of the state or federal government doing other work but the way we address is usually through existing state contracts as far as who we hire to do the work. But I think you really should talk to Honeywell about the potential of looking at your pilot study or technology. And certainly if it was proposed to us we do take a look at it and see if it was appropriate.

Other questions? Dave way in the back. Could you just go over to the microphone so everybody can hear your question.

DAVE ARNOLD: There is a similar project that's happening, I don't know if it's completed yet or not down in Albany that G.E. or you're probably familiar with it, could you go over some of the problems that they ran into that might be similar to the ones that we're going to run into and you know, kind of give us an idea what we're looking forward to here.

DIRECTOR LYNCH: Yep, you're probably

referring to the Hudson River dredging project for the PCBs from the G.E. facility. And they've run into many questions much like we're hearing tonight. But they are not much further along than we are in this process. They have selected a remedial design but they haven't started. They probably started specific design but they haven't started any actual dredging work at this point.

So if you're asking what problems they ran into during the dredging that hasn't been done yet so I really can't answer those. But I would suggest if you have specific questions about the G.E. project, I think we have a number of people that have been involved or very familiar with that project and you can talk off line with them after the meeting. Anymore questions? One more.

RALPH MARTONE: I'd just like to know the resources that are available to this project. Is it just the one company that's Honeywell. Are they the only resource in

Q&A Martone - Lynch

this to draw on basically? Just one corporation's problem? Or is it -- how does the Superfund and the resources of the US government play into, you know, the clean up?

DIRECTOR LYNCH: Any environmental clean up for hazardous waste pollution, whether at the state level or federal level is first approached by attempting to have the responsible parties, those who cause the problem clean up the problem to avoid using public monies to do so.

And in this case we have one responsible party in Honeywell who contributed to the majority of the contamination in the lake. Not all of it. We do know that there are other companies and other operations that have impacted the lake. But the Superfund does hold Honeywell responsible for addressing the entire clean up although they have certain remedies against other responsible parties.

So from a state perspective we can take the primary responsible party like Honeywell and have them do the clean up. They can then seek contribution from other responsible parties to pay their collective share towards that clean up. There are state and federal resources involved, reviewing the project and oversight of the project which is also very important.

There is also the cases where you don't have a responsible party stepping forward and doing the work that it can be done with federal or state funds. But the first resort is the responsible parties, then we go from there.

Q. (Martone) Just to extend that same point I heard two billion dollars for the wish list on this project. What about that? What type of clean up would that involve? And I don't know if Honeywell has got two billion but if we needed to go that far would that be possible if that was necessary?

A. (Lynch) I think my presentation gave the real basics and I don't remember off the top of my head but it was the $2.1 billion proposal was the most expensive alternative looked at in the Feasibility Study. And help me quick with the numbers, dredging - there you go, dredging over 2,300 acres of the land, 20 million cubic yards, which is almost seven times, probably six times what we're doing now.

Q. Wouldn't we like that?

A. It's a seventeen year process. Would involve much disruption to the lake in the area, much more challenging. The dredging plan proposed now is very challenging but this would be very challenging. And you have the practicality of that amount of money. Whether in fact you could get Honeywell or a combination of responsible parties to actually implement that plan. So it certainly was considered as part of the feasibility plan but we determined that our plan would be more suitable, practical and still be protective of the environment.

BY BARRY RAICHLIN:

Q. 240 million is a hell of a discrepancy between that and 2.1 billion. What's wrong with that picture?

A. It's six times.

Q. I think they're a little short?

A. They may be. That is not necessarily taking every piece of contaminant out of the bottom of the lake.

Q. Here's a government saying this is what we need. They're saying, okay we'll take this. We have 40 degrees, a new coach, why can't we have this too?

A. I wish it was as simple as getting a new coach.

JO ELLEN RAICHLIN: Trying to get money out of them.

DIRECTOR LYNCH: Any other questions? We will have people sticking around for a few moments if you want to come up one-on-one, we have a lot of charts that we have from our previous availability session.

I want to thank everyone for your great comments, great questions and your input on the Onondaga Lake cleanup. Have a good night.

* * * *

LYNCH

C E R T I F I C A T E

This is to certify that I am a Certified Shorthand Reporter and Notary Public in and for the State of New York, that I attended and reported the above entitled proceedings, that I have compared the foregoing with my original minutes taken therein and that it is a true and correct transcript thereof and all of the proceedings had therein.

John F. Drury

John F. Drury, CSR, RPR

Dated: January 18, 2005

NEW YORK STATE DEPARTMENT

OF ENVIRONMENTAL CONSERVATION

- -

In the Matter of

ONONDAGA LAKE PROPOSED REMEDIAL PLAN

- -

Second PUBLIC HEARING (by this reporter) in the above matter conducted at the New York State Fair Grounds, Art & Home Center Building, Martha Eddy Room on **February 16, 2004,** 7:00-8:10 p.m.

MODERATOR:

KEN LYNCH, Regional Director NYSDEC, Region 7

ALSO PRESENT:

BOB EDWARDS	NYSDEC, Albany
DON HESLER	NYSDEC, Albany
TIM LARSON	NYSDEC, Albany
TRACY SMITH	NYSDEC, Albany
JIM BURKE	NYSDEC Syr Reg Haz Waste Engr
MARY JANE PEACHEY	NYSDEC, Syracuse Regional Engr
HENRI HAMEL	NYS Dept of Health
ALLEN BURTON	TAMS
HELEN CHERNOFF	TAMS
MARK MOESE	TAMS
BOB MONTIONE	TAMS
KELLY ROBINSON	TAMS
DAVE SCHEUING	TAMS
MICHAEL SPERA	TAMS
JOHN SZELIGOWSKI	TAMS

DIRECTOR LYNCH: Good evening everyone, welcome to our meeting on the proposed Onondaga Lake Cleanup Plan. My name is Ken Lynch, I'm the Regional Director for Region 7 of the New York State DEC. And I want to welcome everyone here tonight and thanks for coming.

Tonight's public meeting is going to have basically two parts. First of all, I'm going to provide a very general overview of the proposed Cleanup Plan, just go through a presentation, explaining real basic terms what's in the Plan and what it's all about.

After I'm completed with that presentation I'm going to open up the meeting to you for two purposes. Number 1 is to have you ask any questions of me and our DEC staff here tonight about the Plan. After making the presentation if you have any questions about details in the Plan we'll be willing to answer those questions.

We're also going to allow people to make formal public comments for the record. You do have the option of writing in your

Director

comments up until March 1st. But if instead you would like to make a formal public comment tonight here at the meeting we will be taking, we have a stenographer **(court reporter)** here tonight and we'll be taking your comments also.

With that said we'll get right into the presentation. Whenever we talk about cleaning up Onondaga Lake we're talking about a big challenge and a big project. And basically in real simple terms I describe the two biggest problems with Onondaga Lake is, Number 1 being the wastewater problems associated with the Onondaga County sewer treatment system and the combined sewer overflows, and the industrial waste problem, the hazardous waste that has entered the lake through many years of discharges at various industrial sites.

Most of you probably know that the domestic wastewater issues are currently being addressed via an agreement with Onondaga County which requires the county to implement several projects to address the wastewater issues. I'm proud to report that the county has just completed two very significant upgrades to their Metro plant, addressing most if not all of the issues related to ammonia and phosphorus being discharged from that plant.

But this meeting tonight is not to talk about the progress being made on the wastewater side, the focus of tonight's meeting is on the industrial waste problems that have impacted the lake.

The Proposed Plan that we're presenting tonight specifically addresses the lake bottom itself. The wastes that have been deposited into the lake and are currently impacting the lake in the sediments of the lake.

There are also many other wastewater or sorry, industrial contamination issues associated with upland sites. And the graph you see here and also is in your package demonstrates some of the upland sites that have impacted the lake. Although they are all tied into the impact to the lake the Plan itself actually addresses the lake bottom.

Onondaga Lake and some of its surrounding areas, both the state Superfund site and the federal Superfund site, And both the state and federal government have in place processes for reviewing and completing cleanups of these Superfund sites. And there is several steps in that cleanup process.

The first step is the remedial investigation or looking at the problem, investigating the problem, determining what are the contaminants in the lake and what has impacted the Lake. And we completed that very intense study in December of 2002.

The next step in the process is what we call the Feasibility Study. What that really is, is an assessment of a number of different alternatives to clean up the Lake. Once you lay out all the alternatives for cleaning up the Lake the state DEC is required to select a proposed remedy. And

Director

that's what we're talking about tonight.

We presented this Proposed Plan initially on November 29, 2004, and have opened it up to an extended public comment period until March 1st of 2005.

The public comment period includes meetings such as this one tonight. We held two previous meetings here in this room. We have also had several individual meetings with interest groups associated with the Lake, some of the municipalities around the Lake, a number of people who have expressed a desire to learn about this Plan and have more insight on the Plan. That's our state process for opening up the public comment.

There is also a pretty extensive process federal process led by the EPA. And one of the steps in that process is that the EPA has what they call the National Remedy Review Board. It's an independent board within their agency that looks at our Proposed Plan and assesses it. And we met with them last week and we soon will be receiving comments from that Review Board on our Proposed Plan.

Once the public comment period ends we assemble all the public comments, written and oral, and assess whether or not we need to adjust or amend the Proposed Plan. We're currently scheduled to come up with a final plan on April 1st of this year. And that April 1st date is set by an existing consent decree with the federal court.

Once we have a final decision or a final plan we begin an extended process of actually doing the clean up work. And we are anticipating for this Proposed Plan that the process will start with an extensive design period, a three year period to design the actual activity that will be undertaken to do the clean up. One of the reasons for such an extended period of time is this is not a simple clean up. There is a lot of work to be done. There is a lot of detail in our Proposed Plan, but there is also a lot of detail and engineering that needs to be worked out as we develop the construction process.

Director

Once the entire project is designed we will commence actual construction, dredging activities and other activities associated with the Lake clean up. And we're expecting that that construction activity will last for approximately four years.

As I mentioned, the first step in all this process was our Remedial Investigation. I just want to give you an example of some of the things we did in the first step of the process in looking at the Lake and assessing what has impacted the Lake.

The investigation was undertaken initially by Honeywell Corporation for an extended period of time from 1992 to the year 2000. At that point we felt that additional data was necessary, and the DEC undertook the completion of that investigation in 2001. And as I previously stated the entire investigation report was completed in 2002.

We took over 6,000 samples in and around the Lake. We did a human health risk assessment and a baseline ecological risk assessment as part of that investigation.

Real basically stated, the investigation results, we found that they're - for the most significant areas of contamination in the southern portion of the Lake; mercury contamination was found throughout the Lake, but most notably in that southern portion and also at the outlet or Nine Mile Creek Delta. We found other contaminants in the Lake like benzene, chlorinated benzenes, PCBs and others. In some areas, specifically again in that southern portion of the Lake, the contaminants were as deep as 25 feet into the sediments.

After collecting all that data we took the next step, and that's assessing a number of different alternatives. And Honeywell performed an assessment of 14 different alternatives, ranging from taking No Action or spending no dollars on the cleanup, to an extensive cleanup of removing over 20 million cubic yards of sediment and doing capping of over 23 acres of the Lake to an estimated cost of $2.1 billion.

Director

During that process where Honeywell proposed these 14 different alternatives they recommended a preferred alternative of dredging .5 million cubic yards and capping 356 acres in the Lake at a cost of $243 million.

Once we had the range of alternatives in front of us we assessed those alternatives and came up with the DEC's preferred alternative which we're talking about tonight.

The first step in that process was to establish remedial goals. What do we really want to accomplish when we do this clean up? Those goals basically stated, were to achieve sediment concentrations that are protective of fish and wildlife; to achieve concentrations in fish tissue that are protective of humans and wildlife that consume the fish; and last, to achieve water quality standards in the Lake itself.

We looked at remediation of all areas in the Lake where surface sediments exceeded our established clean up levels. What that

Director

means is after we did that assessment we are predicting that the clean up will entail dredging of an estimated 2.7 million cubic yards of sediment. It also includes capping an estimated 579 acres in the Lake.

During the dredging process as we take material out of the Lake we have to take it someplace. And we are proposing that the most highly contaminant sediments will be taken off-site to a permitted facility either within New York State or somewhere outside the state. Currently it's proposed that the remaining sediments, the less contaminated sediments that will be dredged will be taken up to the wastebed sites in the Town of Camillus.

And we will be reviewing Honeywell's proposal to construct what we call a sediment containment area up on the waste-beds where these sediments will be contained, isolated and protected from entering back into the environment. We will require at a minimum a liner in that system, a leachate collection system and a protective cap to prevent erosion from and leachate into the containment cells.

Also part of the Plan in the deep areas of the Lake is what we call Oxygenation Pilot Study. It's basically infusion of oxygen in the lower reaches of the Lake to see if that will have any impact on limiting what we call the methylation of mercury into the Lake from the sediments, eliminating the release of mercury into the water column.

Also included in the plan is habitat restoration. What we dig out we're going to replace. Also includes some habitat enhancement. We're not just going to replace in kind what was taken out but we're going to do significant improvement to the habitat in and around the Lake.

Very important to this Plan is the long term monitoring of the Plan itself. To be assured that the Plan is effective and protective of human health and the environment we will establish a very comprehensive monitoring plan of the clean up project.

Director

That includes monitoring the water column, monitoring the cap to make sure its working, if there is a sediment containment area on the wastebeds or somewhere else, monitoring that area to make sure that's protected and there is no leakage. Monitoring the fish, to see the improvements they will be making through the clean up efforts. An extensive look at how effective the remedy is and an extensive look to make sure that things like protective caps are staying protective. The estimated present worth of the DEC's Proposed Plan is $451 million.

This overview that's in your handout, I apologize it's in black-and-white in your handout but it really gives an overall example of what is proposed for each area of the Lake. Basically we split the Lake into eight different sections. And based on the quantity and quality of contamination in those sections determined a specific remedy for each of those eight sections. In many areas that includes dredging, dredging at

Director

different levels depending on the extent of contamination. And a lot of those areas include capping.

If you want to come up later there is a bigger depiction of this map over there on the poster board, and also if anyone has the Proposed Plan itself, it can also be obtained on our website. That is part of the Proposed Plan where you can view that section of the Lake and what the proposal is for each particular area.

Just a little more about the long term monitoring plan because this is very important to the project. We're going to monitor, like I said, the effectiveness of the various remedy components. Is it working? Is it cleaning up the Lake? We're going to monitor in a very comprehensive manner. Much of the detail will be worked out during that three year design period that I talked about.

But it most likely will include sampling of fish tissue, toxicity testing, sampling of surface water and sediments, sampling of

Director

the cap to make sure it's working, to make sure it's stable; and monitoring the sediments in the Sediment Containment Area in the wastebed or wherever else it goes.

There is a long term what we call O & M or Operation and Maintenance Plan included in any cleanup project. That assures that if fixes need to be made, if there are problems found with the proposed clean up the responsible party will correct those.

Lastly, just a little summary of the whole time frame. As I stated, once we complete this public review process we're required to come up with a final plan by April 1st, 2005. Once that Plan is completed we expect a three year design period. And after that a four year construction period.

Important to note that the actual work to be done in the Lake cannot be done until we first cut off the upland sites. This map here depicts a number of the upland sites that have impacted the Lake. Some of them still impacting the Lake today. Certainly

Director

doesn't make sense to dredge the bottom of the Lake, take out the contaminant sediments if you still have areas upland impacting the Lake.

So prior to actual dredging activity in the Lake we will make sure that the upland sites are no longer impacting the Lake itself. And there is a separate process already underway for many of those upland sites. Some of which are in the clean up phase at this point. Others are design and clean up proposals similar to what we're doing for the Lake bottom itself. But again before we actually start clean up activity in the Lake we will cut off the sources upland from the Lake.

And once again, once the clean up is done and during the clean up there is going to be an extensive long term monitoring program to make sure that everything we've done will be effective, and if not effective we can make the appropriate fixes to the clean up plan.

More information. Many of you probably

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already know that you can go to our website and view the Plan itself. I think we brought some copies of the Plan with us tonight. We have staff available tonight either during the question and answer period or afterwards to talk to you about the Proposed Plan. You can send in your comments via our website. You can write in your comments to those addresses listed. You can also view the Plan itself at several depositories like the local libraries. We have also extended the places where we have the Plan available. Do we have all those listed Mary Jane?

MARY JANE PEACHY: Yes.

DIRECTOR LYNCH: Last time I think we only had it a couple places and based on the recommendation at the last meeting we have extended the area where you can view the Plan if you can't get it on the website itself.

Again, public comments will be accepted until March 1st of this year. That concludes my presentation. And we'll move

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right into a question and answer comment period. Before we do that I just want to outline some ground rules.

First anyone wishing to speak should first state your name, spell your name because we have a stenographer **(court reporter)** here, and state who you represent and where you're from. We'd ask that everyone limit their questions at least initially to two questions so we make sure everybody gets an opportunity to ask questions.

If you're making a public comment for the record please state that. We won't be responding officially to public comments made tonight. What we do is part of our public comment period. When that's complete, when we put together the final plan we do what we call a formal responsiveness summary, which will summarize all the comments we received and reply to all the issues brought up during the public comment period.

This is a very technical plan. There is

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a lot of detail. There may be some very technical questions that we may have to defer to a later point after the meeting. I want to make sure everyone gets an opportunity to ask questions. We can get into some detail and spend an awful lot of time talking about technical issues.

So if we feel that we prefer to go off line and talk to you individually one on one with our experts we'll recommend that. It's not intended to be a debate whether certain aspects of this plan are good or bad. You certainly can make those comments as official public comments. But we don't plan to engage in a debate over alternatives or other parts of the plan whether they work or not. We will explain why we think they're effective and why we selected what we did. But as far as debating alternatives we will respond to anybody's opinion or position regarding those in the formal public responsiveness summary in the final plan.

That being said we're ready to move into public comment. I'll just ask that someone raise their hand, I'll call on you. If I call on you please step up to the mike and state your name and proceed with your question or comments. Mary Ann is first.

SUPERVISOR MARY ANN COOGAN: Jim, come on up with me. I'm Mary Ann Coogan, Supervisor for the Town of Camillus. I also have with me Jim Salanger, he's one of the council people on the board at the Town of Camillus. We have a letter we are going to share reading, it's a little lengthy, so if you will indulge us, appreciate that. This will go to the DEC, Mr. Donald Hesler. "Dear Gentlemen: As the proposed host community for the dredging from the Onondaga Lake cleanup, the Town of Camillus has some concerns which need to be addressed to insure that no negative impacts will occur to our community during this cleanup.

Some of these issues relate to the details of the design and operation of the proposed SCA, on SB 13, part of what is known as the Allied Wastebeds. We make these comments now because we are unsure of

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future opportunities to do so. Camillus requests a review and advisory role as the project goes forward.

Camillus believes that the Department should revisit the entire issue of the SCA location. From some of the supporting materials accompanying the FS, it is obvious that shoreline and in-the-water locations for the SCAs have been successfully used for dredging in the past. The selection process gave no opportunity to select an in-the-water SCA because of the goals for no loss of Lake surface or volume.

An SCA location or locations, near or in the Lake would result in a relatively tiny loss of Lake surface and volume and it would eliminate the costs and environmental concerns associated with the pipeline of Nine Mile Creek and the new SCA on SB 13.

A new upscale subdivision, Golden Meadows, is being built a short distance from SB 13 to add to the large number of people already living in the area. Moving the SCA to a lakeshore or in the lake location should save money, decrease environmental risk to Town of Camillus residents, and provide a means to construct space for something useful to the general public, such as the marina/boat launch or more fairgrounds parking. If time is an issue the revisiting of the SCA location could be done as part of the design phase."

COUNCILOR SALANGER: "A. If the SCA ultimately is located in SB 13, the primary issue is the proactive prevention of odors escaping to receptors in the community. The Honeywell FS and the DEC Proposed Plan acknowledge the potential for odor releases. The details of the odor mitigation plans are to be developed during design; some of the techniques are discussed. Our suggestions are as follows:

Construct a 'Demonstration Size' SCA in the part of SB 13 farthest from the population center in Amboy. The size should be large enough so that it could run long enough to thoroughly validate the process and make corrections if necessary, at the greatest possible distance from people's homes. We understand that the odors may differ depending on the source of the dredgings, and that below SCA surface discharge and a partial floating cover would be employed at a minimum. We also suggest that odor control technologies be demonstrated in the small SCA for phase when the SCA is full and water is completely drawn off. That phase may have significant potential for odor release as the dredgings dewater, and preparations should be made in advance.

An agreed-upon protocol should be in place prior to operations relative to shut-down while corrections are being made if problems occur. Camillus does not want to be in the position of having to prod DEC or Honeywell to react to problems. A mechanism needs to be created to get feedback from odor receptors to the project team at the earliest sign of problems. We suggest an 'Odor Panel' be created of local homeowners who would monitor air quality in their

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neighborhoods.

B. The pumping operation to move the dredging to SB 13 and out into the SCA has a potential to generate noise which will be heard in the adjoining neighborhoods. Noise modeling should be done to predict noise impacts and appropriate mitigation should be included in the project.

C. Construction activities on-site have the potential to create noise and traffic issues. These issues should be mitigated up front in so far as possible. One very significant mitigation technique would be to use exempt construction and demolition waste for pre-loading and constructing the SCA areas. There is a large stockpile of exempt C&D in the eastern portion of the SB 15 and some in the western portion of SB 15. Utilizing these materials for construction cuts -- for construction, cuts down on impacts associated with bringing construction materials to the site but also will reclaim space in SB 15 for disposal of non-exempt C&D."

SUPERVISOR COOGAN: "D. Visual impacts of the proposed SCA in SB 13 should be an immediate priority. Viewscape modeling should be performed to develop a screening plan to shield the view of the SCA from nearby residents and passerbys. Screening techniques could include setting the SCA boundary inboard as far as possible from the current outer berms. Planting of vegetation would need to be initiated soon to be effective at the time of SCA operation.

E. The ability of the existing structure of SB 13 to carry the load for additional sediment, water and the weight of the SCA should be verified immediately. If the load carrying ability is at all suspect, after analysis, then a fresh look at where to put the SCA would be in order.

F. Our understanding at this writing is that there is no consensus between the DEC and Honeywell on the quantity of dredgings to come to the SCA, with Honeywell's proposed quantity to be significantly less. From the Camillus perspective, less is better, because of reduced environmental risks. Could the Department please provide a 'plain English' explanation why Honeywell's proposal is not sufficiently protective of the Lake and its inhabitants?

One of the speakers at the January 10th public hearing made the point that the assumptions going into the Risk Assessment are very conservative, thus overstating the risks and making the remedies in the FS even more conservative. Let's not dredge more material than we need to simply because conservative assumptions are superimposed on other conservative assumptions. If the real world risk under Honeywell's proposal is unacceptable, please explain. Perhaps a compromise quantity of dredgings would be agreeable to all.

G. Camillus suggests the Citizen's Panel to play an advisory role in evaluating final uses of the completed SCA if it is within the Town. A wide variety of potential uses are possible and public input is vital to making appropriate choices.

H. Camillus expects and demands an effective monitoring system for any SCA built in Camillus, during construction, during operation, and post-closure. This monitoring program should, at a minimum, include:

The aforementioned 'Odor Panel.'

Air quality sampling locations with sample testing and agreed upon protocol for determining results of concern.

Noise monitoring equipment to validate that activities do not violate the Camillus noise regulations.

Groundwater and surface water quality monitoring."

COUNCILOR SALANGER: "Camillus wants to be part of the review process for monitoring data, and to be reimbursed for our expenses in evaluating the monitoring of data and responding to it.

I. Security of any new facilities to guard against accidents from snowmobilers, bikers, and others is a must. Any areas with open water or other hazards must be fenced.

J. The long term financial capabilities to continue post-closure care, and monitoring must be guaranteed by some form of financial instruments. We must be assured that there is no way that local or county government is saddled with any expenses resulting from the Lake cleanup.

Depending on additional public comment, we may have additional comments prior to March 1st. We thank you for the opportunity to bring these issues to your attention. Very truly yours, Mary Ann Coogan, Camillus Supervisor, and the Camillus Town Board." Thank you.

DIRECTOR LYNCH: Next? Questions, comments? There has got to be someone out there. Yes, sir?

QUESTIONS BY BARRY RAICHLIN:

Q. Still haven't - Barry Raichlin, Syracuse, I used to live in Camillus. There is still a discrepancy of $2.1 billion and $250 million. What's up?

(ALL ANSWERS BY DIRECTOR KEN LYNCH)

A. Well, the $2.1 billion proposal was the maximum alternative that was explored. That's not being examined at this point. The difference is the state's plan which we presented tonight of 451 million versus Honeywell's Proposed Plan of 240 million.

In real simple terms the big difference between those two plans are the extent of contamination that we take out of the Lake. The state feels we need to take more of the contamination that was originally proposed from Honeywell out of the Lake to have a protective remedy. That also includes additional capping in those contaminated areas and other areas that you may not dredge.

So the big cost difference is the difference in material that you take out and the amount of capping that you perform in the Lake.

Q. So who decides after all this goes down, who decides, one person?

A. No, believe me there have been a number of people that worked on this project, from

Honeywell's assessment of all the alternatives, from the DEC's review of the project. And that doesn't only include our regional people here in DEC, we have a large staff in Albany reviewing this proposal.

We also engage the state Department of Health, they have been very heavily involved in this project. The state attorney's general office involved from a legal perspective and technical perspective. And we also have as a federal Superfund site EPA and all their experts, the Region II office, Superfund people working on this project assessing it. And as I mentioned, they have a review board internally from all their EPA regions that have looked at this proposal.

So it's a number of people that examined not only all the alternatives but the specific proposal that the state of New York is making today.

Q. Who are the people that said it would be 2.2 billion, who are they? They don't exist?
A. No, Honeywell looked at --
Q. Like having the fox in the hen house

with Honeywell?

A. They looked at the alternatives and lined them out for us to look at. We looked at the details of them, decided whether the cost estimates made sense. And more importantly selected the portions of those alternatives that made sense to implement as part of this Proposed Plan.

Q. Yeah, but all they care about is Honeywell, they don't care about us.

A. Well, the state DEC cares about the environment and the people around the environment. And that's the bottom line that we - what we assessed in coming up with all the aspects of this Proposed Plan.

Q. I would bet everyone in Syracuse thinks you're going to dredge the whole Lake.

A. We're not, that's not the proposal.

Q. Exactly.

A. That's the purpose of this meeting and a number of other outreach efforts that we have made since this Proposed Plan has been out there.

QUESTIONS BY FRED WENTHEN (Fayetteville):

Q. My question is what criteria you use to decide dredging versus capping. I mean if you cap something, isn't it as effective as dredging but you don't run the risk of having to dispose of all this material, and boil off all of the water in the process of dredging. What is the advantage of dredging over capping?

A. The number one advantage of dredging is you can get out the most significant contamination in the Lake. And regardless of how effective a cap may be under water there are a number of variables that you have to consider when you leave that material behind.

And we have through our very extensive review process determined a certain level of material that we want out of that Lake regardless of whether you cap or not. It just makes sound environmental protection and human health protection sense to take out the most highly contaminated sediments.

Realizing that it would be very difficult to take all of that contamination out, part of the plan also includes capping. And you know there was a lot of examination of alternatives that assessed the different risks associated with leaving different material behind. And that assessment ultimately resulted in our proposal to cap, to dredge 2.7 million cubic yards and cap those areas and other areas in the Lake.

We have a number of people here that worked extensively on that assessment and reviewed the alternatives. I'm sure they'll be willing to talk to you later about some of the analysis that they did to determine at what levels do we take the material out and what levels do we leave it there and cap it?

QUESTIONS BY JOE FRAGNITO:

Q. I'm just representing myself. With regards to the sediments on top of the waste-beds, after everything is complete, what is the final outcome of the wastebeds there? Are you going to do any topping of the sediments, put any gravel, or what's the final aspect of the sediments that will be left there?

A. Basically the sediments will be capped with a layer of soil material to protect those sediments from leachate coming from any rainwater in the Lake. It will be graded so that the runoff will, clean runoff will go off and not into the area; much like a landfill area.

But we have more opportunity in the wastebeds because of the large area to grade that sediment containment area in the way that the area can be reused. And that's some of the discussions that Honeywell has had and offered potential reuse for those wastebeds. Because they are basically long used waste areas used way before environmental regulations were in place and were not capped to today's standards.

Any sediment that goes up to those wastebeds will be capped to state-of-the-art today's standards. And the alternative of reuse of those wastebeds will be looked at as part of Honeywell's plan in conversations with the Town of Camillus or others.

Q. Has Honeywell published these reuse possibilities? I mean is there any idea of what you're talking about? What kind of reuse can you use that if you ever got up there for some reason?

A. They have talked generally to certain groups in the public about general uses there. I don't think they have identified one specific use. But some examples that have mentioned recreational uses such as trails, snowmobile trails, they have talked about possibly recreation fields like football fields, lacrosse fields. They have talked about, you know, wilderness area. There are quite a bit of trees already growing on the wastebeds right now and there is a lot of wildlife up there. They have even talked about the potential of economic development in some areas on the wastebeds.

Q. Well, along that line is there any possibility of building on top of that?

A. I think there is. That certainly would need extensive assessment. That's not part of the actual Lake cleanup plan.

Q. I understand that, but what's the final outcome?

A. That could be a final outcome. It could be something that could be assessed.

Q. Someone has to consider how they leave this so that someone in the future many many years from now that there may be some possibility of doing something up there. What restrictions, you know, will be available and what possible uses could be there. But something that could be able to construct something would be nice even though I won't be around to see it, but.

A. And that's something that can be considered during the design phase. A lot of the detail regarding the sediment containment area on the wastebeds will not only talk about what the actual containment will be, how do you keep things in place and protect the environment, but also what the end use may be.

And we have already met a couple of times out in the Town of Camillus to talk to town representatives and some of the residents out there. And we expect if that proposal moves forward that we will continue a dialogue with the town and its residents. And part of that dialogue will include a discussion of potential end uses on the wastebeds.

MR. FRAGNITO: Sounds good. Thank you.

DIRECTOR LYNCH: Way in the back. Sir?

QUESTIONS BY JOE McCARTHY:

Q. Joe McCarthy, Syracuse, I'm speaking for myself. My question has to do with the upland remedial activities. Basically what does that mean? And is that at that point where, you know, Onondaga County will be addressing, you know, the pollution that they personally put into the Lake?

A. Okay, a couple aspects. The Onondaga County concerns are related to the waste-water treatment issues. And at the beginning of my presentation I mentioned briefly that there is an existing agreement in place that requires the county not only to upgrade its treatment, Metro treatment plant but also to address all the CSOs, combined sewer overflows that are impacting the Lake. That is done under a separate agreement, not part of this Cleanup Plan. But very important to the cleanup of the Lake. And that work is ongoing and continuing. And as I mentioned, many of the significant improvements at the Metro plant have been completed.

The upland sites that are referred to in my presentation are industrial waste sites; sites that have discharged hazardous waste into the environment, in many case along the west shore here to the Lake. A lot of those are old Allied sites, now owned by Honeywell. And each of those sites are in various stages of the cleanup process. Some of them we're still doing investigation at, others we're actually doing cleanup work at those sites.

Q. Clarification for myself. Is that by the fair grounds then?

A. Yes, most of those sites are. But I will note that there are other upland sites that have impacted the Lake that are not Allied or Honeywell sites on the western shore. For example, General Motors up on Ley Creek. They have had historical discharges of PCBs. And GM is addressing cleanup of their site in the impact of Ley Creek.

DIRECTOR LYNCH: Mr. Pickard.

QUESTIONS BY LEGISLATOR PICKARD:

Q. Good evening, Terry Pickard, I'm with the Onondaga County Legislature. I actually have a couple of legal questions and I wondered if you might be ability to respond to them.

And the first of which is I assume that after this process is over and you hear the public comment and you sit down and talk with Honeywell that there will be some kind of settlement reached between the DEC and Honeywell, if that's possible. I mean we're urging you to do that, to move this process along as quickly as possible. I know the legislature has spoken on this same issue of trying to get, reach a consensus in the community to get this process reached and moving as quickly as possible.

But what is the legal mechanism, what happens if an agreement is not reached and the DEC moves forward with the remedy that you promulgated or whatever you do with it. How actually does that work and who would come up with the funding and then ultimately how would you collect the monies to do that?

A. Okay, as you stated, the preferred method is that once a final plan is adopted we would agree with Honeywell for the implementation and we would enter into a legal document, require them to perform that remedy.

If there isn't an agreement, a couple of things could happen. We could proceed in court to attempt to force Honeywell or other responsible parties to undertake the cleanup.

The other option and the quicker option would be for the state and/or federal government to use state Superfund or federal Superfund dollars to actually do the cleanup ourselves, hire our own contractors to do

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the cleanup work.

And if that happens we are required by law then to seek cost recovery, any monies we spend we can pursue responsible parties like Honeywell and other parties that have caused damage to the Lake to recoup our costs that we spent to clean up - to undertake that remedy.

Q. Thank you, can I have one more question?

A. Go ahead.

Q. The other question deals with compensation to the community. By virtue of the fact that the contamination of the Lake, the community has lost the use of this valuable resource for many years. And I understand under the Superfund legislation that there are provisions which allow for the recovery for the loss of that use through natural resource recovery damages. And that the monies that are recovered for that loss can then be used to build enhancement or improvements around the Lake.

When does that enter into the discussions and who does that and who enforces it for the community at large here?

A. That's another responsibility of the state of New York and our department. This proposed cleanup plan addresses actually cleaning up the site, getting rid of the contamination, protecting the environment.

The lawsuit that we brought to force this cleanup plan to proceed also included a claim by the state of New York for natural resource damages. The loss of the use of the Lake caused by this contamination.

We are currently undergoing an assessment of what the extent of those damages are. And once we have that assessment completed we will move further in court to collect the extent of those damages.

Now, through that whole process there is always the opportunity to negotiate with Honeywell the extent of what those damages are and how they will correct or pay the community that's been impacted. And if those discussions happen, and I'm hopeful that they will, we will include the local municipality including Onondaga County and the towns around the Lake.

LEGISLATOR PICKARD: Thank you very much.

QUESTIONS BY BARRY RAICHLIN Again:

Q. Does that also include General Motors?

A. Yes, the claim for natural resources damages could also be extended to other responsible parties.

STATEMENT BY ROBERT LONG:

My name is Robert Long, L-O-N-G, and I'm representing the Onondaga Audubon Society. Because we have some ideas about reclamation that would bring back some of the very interesting shorebirds that used to occupy the - well, the southwestern shore of the Lake beginning at the Nine Mile Creek and going all the way down to the - really the southwest corner.

Shorebirds in the 1960s, these are shorebirds that are coming back from Canada, the Arctic Circle. And they show up in early July and hang around until September. Fascinating little birds, shorebirds. If people don't know what a shorebird is, think of a killdeer, these are little birds after you've been to the ocean you see them running along the shores. And over those years, Onondaga Lake really had the reputation in the '60s and '70s of having the best fall shorebird migration variety, even better than Montezuma.

Montezuma now is the only place where you'll see them. What ruined it was the phragmites. Because once the phragmites took hold and just covered the whole area down there the birds had no place. They have to have the sand, and they're sticking their little bills in the sand and picking up small insects and things like that to build up their resources, because some of these birds fly all the way to South America.

They would come back, because they are seen periodically flying over the Lake. And mitigation there would have to be phragmites removal, it's the worst weed. Does every-body know what phragmites is? It's a huge weed with a big tuft on it. If you drive down any Interstate you can see this stuff growing. Nothing will, no birds will nest in there, no animals can get through it, it gets so thick. That's why actually we lost the birds, we couldn't even get to them too. Mitigation of that.

And the other thing, I don't know whether they allow dogs on the trail. There is going to be a trail around the Lake eventually. There would have to be control of dogs, loose dogs can be, they don't match up well with shorebirds. And many areas of Long Island now are off limits to dogs, while they're trying to save several of the species, they're nesting there actually in the summer.

It does cost much because the phragmites are not easy to get rid of. I don't know if you ever try to cut one down, but believe me it's like cutting a tree down, they grow out quickly. But there are ways to mitigate and Honeywell in their proposal has suggested mitigation. So I - just to put a pitch in for Honeywell.

It could be arranged so we can build one of these little hides or you know, little structure that you can sit in and watch the birds, because they get very flustered when they see humans. Right along the trail hopefully that will come there and perhaps fence off from each little hide, maybe two of them, one near the outlet of the Nine Mile Creek and another one farther down south there.

That would bring a lot of birders in there, and it would be something that people, if they walk along the little walkways would have something to do. Because we could provide people to be there and explain what they're looking at in the summertime. Just some thoughts. Thank you.

DIRECTOR LYNCH: Thanks for your comments. Any other questions or comments? Yes, ma'am?

QUESTIONS BY DERETH GLANCE:

Q. Dereth Glance, Citizens Campaign for the Environment. I want to thank you, Director Lynch, and everyone else, for holding a subsequent public hearing in a question and answer format; also been responsive to the initial public concerns and questions so far.

I have a couple of questions, I'll stick with my two to begin with. But first of all, when will the public know when the Lake cleanup is done?

A. Well, as I mentioned the Proposed Plan and the Final Plan is going to include an extensive monitoring program and our goals set in the Plan itself.

We will be reporting to the public the progress of the monitoring program and the results of that program, and when we are meeting the goals that we have established in the Plan itself. There will be an ongoing process of monitoring not only this cleanup but there is an existing ongoing process to monitor the county's efforts on the wastewater treatment side.

And we'll be reporting out on a regular basis, in fact the law requires for the hazardous waste site a three year assessment of the Plan to make sure it's working and to see if it is complete. I expect it will be a very extended period of time for the Lake to fully recover. But I also expect that the monitoring program in place and the assessment of that monitoring program will allow us to have established when the Lake has met the goals of our Cleanup Plan.

I can't give you a specific answer today but I'm hopeful that we're going to be able to report as the cleanup progresses the progress of the cleanup and how effective it's going to be. And again, adjustments to the Plan can be made if we're finding that certain things aren't being effective.

Q. And the second question I have is, now from my read of the plan, you know, most of the decisions are going to be made during the design phase. And so I'm just wondering if that's - what kind of an opportunity the public is going to have during the design phase and if the DEC will create a specific citizen advisory committee or citizen advisory group to advise Honeywell and the DEC on these specific matters as well as helping improve the transparency of the process?

A. No specific determinations have been made. There are no specific requirements in the law for us to go back during the design phase. I can tell you though that we will.

We have already, as I mentioned had a couple meetings in the Town of Camillus and understandably very important to the Town of Camillus is any proposed design of the sediment containment area.

We will be back in the Town of Camillus talking about that proposal if it comes to fruition. We also will be out to the public in general, whether it be with fact sheets, information on our website or additional public comment periods or establishing citizen participation groups to discuss the proposed plan.

We're fortunate in regards to Onondaga Lake to also have the Onondaga Lake Partnership whose -- one of its primary purposes is to outreach the public to inform them about the overall cleanup efforts; not just the hazardous waste, not just the county's efforts on the wastewater treatments side. But there is an ongoing effort from that group also to keep the public informed.

We have annual meetings of the progress of the Lake cleanup and the development of design plans for specific areas like the dredging of the Lake.

DERETH GLANCE: Thank you.

DIRECTOR LYNCH: Any other questions or comments? We do have a number of people available and we're willing to stick around to answer any specific one-on-one questions you may have. I'll give you one last chance for a public statement or comment.

Again, you can write in to our office up until March 1st. Those public comments will all be reviewed, given equal weight to the oral comments that were made tonight and in other public sessions. And we will prepare a Comprehensive Responsiveness Summary as part of our Final Plan.

I want to thank you all for attending

and especially thank you for your interest in cleaning up Onondaga Lake. Thanks.

(Concluded at 8:05 p.m.)

* * * *

CERTIFICATE

This is to certify that I am a Certified Shorthand Reporter and Notary Public in and for the State of New York, that I attended and reported the above entitled proceedings, that I have compared the foregoing with my original minutes taken therein and that it is a true and correct transcript thereof and all of the proceedings had therein.

John F. Drury, CSR, RPR

Dated: February 22, 2005