Onondaga Lake Proposed Plan - Executive Summary
November 2004

Site Background

In 1994, Onondaga Lake and those upland areas which contribute or have contributed contamination to the lake system were added to the United State's Environmental Protection Agency's (USEPA) Superfund National Priorities List (NPL). Onondaga Lake is located adjacent to the city of Syracuse in Onondaga County, in central New York State (see the attached figure entitled "Location of Onondaga Lake NPL Subsites"). The area around Onondaga Lake is the most urbanized area in central New York.

Honeywell International Inc. (formerly AlliedSignal, Inc.), is conducting a Remedial Investigation and Feasibility Study (RI/FS) for Onondaga Lake. The RI/FS is being conducted under the direction of the State of New York pursuant to the terms of a Consent Decree entered into with the State of New York dated March 16, 1992, and associated stipulations (Consent Decree). Honeywell commenced the RI in 1992 and the RI was performed in accordance with USEPA guidance. The RI was completed in 2002 with the issuance of the RI report.

The purpose of the RI report was to present the results of the various studies that were conducted on Onondaga Lake, including field investigations to identify and determine the distribution of contaminants in lake water, sediment, soil, and biological tissue; and to evaluate human and ecological risk.

Remedial Investigation Activities

Field and laboratory investigations were conducted by Honeywell with NYSDEC oversight in 1992, 1993, 1994, 1995, 1999, and 2000. Additionally, NYSDEC conducted a supplemental lake water investigation in December 2001 and supplemental wetland sampling in May 2002. These investigations included the collection and chemical analysis of more than 6,000 samples from the following media:

- sediment, water (surface water, groundwater, and porewater), zooplankton, benthic macroinvertebrates, and fish from Onondaga Lake;
- sediment and water from tributary mouths;
- sediment from wetlands, and
- soil from a dredge spoils area located on the northwest shoreline of Onondaga Lake.

Findings of the Remedial Investigation

Key findings of the RI include the following:

- Mercury contamination is found throughout the lake, with the most elevated concentrations detected in sediments in the Ninemile Creek delta and in the sediments and wastes present in the southwestern portion of the lake.
- Much of the contamination in the southwest portion of the lake is present in an 84 acre area known as the In-Lake Waste Deposit (ILWD). The ILWD was formed primarily through the deposition of calcium carbonate and other wastes resulting from discharges from Honeywell's former operations. The volume of the ILWD is estimated to be in excess of 4,000,000 cubic yards.

- Other contaminants present within Onondaga Lake sediments include benzene, toluene, ethylbenzene, and xylenes (BTEX), chlorinated benzenes, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and polychlorinated dioxins and furans. These contaminants are primarily found in the southwestern portion of Onondaga Lake, including the ILWD. Elevated concentrations of some contaminants in certain locations in the southwestern portion of Onondaga Lake extend to a depth of at least 25 feet in lake sediments.

- Current and historic sources of contaminants to Onondaga Lake are evaluated in the RI. For example, ongoing transport of contaminants to the lake *via* groundwater has been documented for several contaminants, including 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). It is likely that the plumes of pure phase product which lie beneath some of these sites are a source of contaminants in groundwater, and may also be contributing product directly into the lake (see the attached figure entitled "Location of Onondaga Lake NPL Subsites").

- Onondaga Lake fish have elevated contaminant levels, and eating these fish would result in potential health risks greater than the values as presented in USEPA's National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

- Contamination in the lake presents risks to all trophic levels of the Onondaga Lake ecosystem.

The results of the RI were used during the Feasibility Study in the development and evaluation of possible remedial alternatives for Onondaga Lake.

Evaluation of Remedial Alternatives - The Feasibility Study

Honeywell submitted a draft Feasibility Study in May 2003, and revised versions of the Feasibility Study report in May 2004 and November 2004. The Feasibility Study identified and evaluated possible alternatives for cleaning up the hazardous waste contamination in the lake. Goals for the remedial program have been established through the remedy selection process stated in CERCLA and 6 NYCRR Part 375. The overall remedial goal is to meet all applicable or relevant and appropriate requirements (ARARs) and be protective of human health and the environment. At a minimum, the remedy selected should eliminate or mitigate all significant threats to the public health and to the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The goals selected for this site are:

- achieve applicable and appropriate sediment effect concentrations for chemical parameters of interest and the bioaccumulation-based sediment quality value for mercury, to the extent practicable, by reducing, containing, or controlling chemical parameters of interest in profundal and littoral sediments;

- achieve chemical parameters of interest concentrations, to the extent practicable, in fish tissue that are protective of humans and wildlife that consume fish; and

- achieve surface water quality standards, to the extent practicable, associated with chemical parameters of interest.

The Proposed Plan

Based upon the results of the RI/FS and the established remedy selection process, the NYSDEC is proposing a

suite of activities to address the contamination in Onondaga Lake.

The proposed cleanup is based upon a combination of alternatives evaluated in the Feasibility Study. The proposed remedy is protective of human health and the environment, removes source material from the environment, complies with ARARs to the extent practicable, is implementable, has good long and short term effectiveness, reduces the mobility of contaminants, and is cost effective.

The estimated present worth cost to implement the remedy is approximately $451,000,000. The cost to construct the remedy is estimated to be $414,000,000 and the estimated average annual operation and maintenance cost is $3,000,000.

Elements of the Proposed Remedy

The proposed remedy (referred to as Alternative 4 in the Proposed Plan) would remediate all areas of the lake where the surface sediments exceed the cleanup criteria. These cleanup criteria were developed to address acute risks in Onondaga Lake. As shown in the attached figure (entitled "Sediment Management Units"), during the FS, Onondaga Lake was separated into eight areas or sediment management units (SMUs) for ease of evaluating alternatives in different portions of the lake. As shown on the attached figure (entitled "Preferred Remedy"), the proposed remedy includes dredging prior to capping in SMUs 1 through 7 to a depth that prevents a loss of lake surface area (ensures that any cap is submerged), minimizes erosive forces on the cap, and optimizes habitat, as well as to ensure cap effectiveness, remove non-aqueous phase liquids (NAPLs), and reduce concentrations of chemical parameters of interest in select SMUs. In SMU 8, the preferred remedy calls for phased thin-layer capping, the performance of an oxygenation pilot study followed by full scale implementation (if supported by the pilot study), and monitored natural recovery.

The proposed remedy is estimated to include the dredging of up to an estimated 2,653,000 cubic yards of sediment from the littoral zone (the portion of the lake in which water depths range from 0 to 30 feet) with most of the dredging being performed in SMU-1 (the ILWD) and SMU-2. It would also include the use of isolation capping over an estimated 425 acres of the littoral zone (the portion of the lake in which water depths do not exceed 30 feet) (within SMUs 1 to 7). An estimated 154 acres of the profundal zone (the nonlittoral zone portion of the lake in which water depths exceed 30 feet) within SMU 8 would receive a thin layer cap. (Please see the attachment which provides additional information regarding the preferred remedy on a SMU-specific basis.)

Other highlights of the proposed remedy would include:

- Habitat optimization would be performed in areas where dredging/capping would occur.

- Habitat enhancement along an estimated 1.5 mi (2.5 km) of shoreline (SMU 3) and over approximately 23 acres (SMU 5) to stabilize calcite deposits and oncolites and promote submerged macrophyte growth would occur.

- It is anticipated that the most highly contaminated materials (e.g., pure phase chemicals segregated during the dredging/handling process) would be treated and/or disposed at an off-site permitted facility. The balance of the dredged sediment would be placed in a Sediment Consolidation Area which would be constructed on one of Honeywell's Solvay wastebeds which historically received process wastes from Honeywell's former operations. The remedial design of the containment area would be undertaken in accordance with State and Federal requirements and guidance. The containment area would 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 would occur.

- Continuation of existing institutional controls on fish consumption, as necessary, and implementation of other institutional controls (*e.g.*, prohibition of unauthorized dredging in capped areas) as needed to ensure long-term effectiveness of the remedy would occur.

- Implementation of a long term operation, maintenance, and monitoring program to monitor the effectiveness of the remedy, ensure that the remedy remains effective, and include any additional action that might be necessary to maintain remedy effectiveness (e.g., cap repair).

The design and construction of the remedy would need to meet the substantive requirements for permits associated with disturbance to state 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 would be developed during the remedial design, based upon a comprehensive lakewide habitat restoration plan.

The remediation of the Onondaga Lake subsite would 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 site, 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 would 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 Semet/Willis Barrier Interim Remedial Measures will address the ongoing releases of contaminants from these upland areas to SMU-1 and SMU-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 SMU-1 and SMU-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. Therefore, 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 these upland sites.

The remedial construction (dredging and capping) components of this preferred remedy are estimated to take approximately four years. This does not include the time it would take to design the remedy which would also take approximately three years. Design and construction activities at several of the upland areas would be ongoing while design of the lake remedy was underway.

Executive Summary Attachment

The Preferred Alternative (Alternative 4) consists of the following remedial activities on a SMU-specific basis:

- SMU 1 – Dredging to 2 m (on average) and Hot Spot Removal / Capping / Habitat Optimization
- SMU 2 – Dredging for NLSA, H&E , and NAPL Removal / Capping / Habitat Optimization
- SMU 3 – Habitat Enhancement / Dredging for NLSA and H&E and Targeted Dredging / Capping / Habitat Optimization
- SMU 4 – Dredging for NLSA and H&E / Capping / Habitat Optimization
- SMU 5 – Habitat Enhancement / Dredging for NLSA and H&E / Capping / Habitat Optimization
- SMU 6 – Dredging for NLSA and H&E and Targeted Dredging / Capping / Habitat Optimization
- SMU 7 – Dredging for NLSA and H&E / Capping / Habitat Optimization
- SMU 8 – Phased Thin-Layer Capping to Mean PECQ1, Hg PEC and BSQV / Aeration (Oxygenation) / MNR

NLSA - No loss of surface area of lake.
H&E - Dredging in order to be able to place a cap at a water depth that results in an acceptable habitat and is at a water depth that is protective with regard to erosional forces.